
**Report on Preliminary Site Investigation
(Contamination)**

**Gosford Waterfront Revitalisation
Masterplan**

**Gosford Waterfront, Central Coast
Highway, Gosford NSW**

Prepared for Central Coast Council

Project 225005.00

18 March 2024

Document History

Details

Project No.	225005.00
Document Title	Report on Preliminary Site Investigation (Contamination)
Site Address	Gosford Waterfront, Central Coast Highway, Gosford NSW
Report Prepared For	Central Coast Council
Filename	225005.00.R.002.Rev1

Status and Review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Chamali Nagodavithane	Brent Kerry	21 December 2023
Revision 1	Chamali Nagodavithane	Brent Kerry	18 March 2024

Distribution of Copies

Status	Issued to
Revision 0	Deb Streit, Central Coast Council
Revision 1	Deb Streit, Central Coast Council

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

Signature

Date

Author		18 March 2024
Reviewer		18 March 2024

Executive Summary

Douglas Partners Pty Ltd (Douglas) was engaged by Central Coast Council (Council) to complete this preliminary site investigation (contamination) (PSI) for the proposed Gosford Waterfront Revitalisation Masterplan (GWRM) at Gosford Waterfront located along Central Coast Highway, Gosford.

This PSI includes a review of site history information, a site walkover, preliminary intrusive investigations and laboratory analysis. The current intrusive investigation was limited to Precincts 1, 3 and 4 and comprised the drilling of 14 boreholes, installation of three groundwater monitoring wells and collection of seventeen surface sediment samples, with the aim to inform the contamination conceptual site model for the site.

The site history review and walkover identified potential contaminating land uses / activities including land reclamation, demolition of structures, commercial business (e.g. swimming pool complex and sailing club) and boating related activities. In summary, the following potential sources of contamination were identified at the site: (S1) fill, (S2) existing marina and associated maintenance activities, (S3) hazardous building materials in existing structures and application of chemicals/pesticides within the crawl space (e.g. spraying for termites), (S4) bowling greens / sporting field (Precinct 2), (S5) existing swimming pool complex and (S6) surrounding land uses (e.g. railway line and commercial / industrial land uses).

Fill was encountered in all boreholes to depths of up to 2.8 m. The laboratory results reported exceedances of the adopted site assessment criteria in select soil, groundwater and sediment samples as summarised in Table 8, including a fragment of fibrous material which was confirmed to contain asbestos.

Although the sampling plan adopted for the PSI is considered to be adequate to meet the project objectives, some data gaps were identified, which should be addressed in future investigations. Based on the site history review, field and laboratory results, it is considered that the site can be made suitable for the proposed development, subject to the completion of a detailed site investigation (DSI) which should include the following:

- Further soil investigations to assess the possible extent and implications of contamination including:
 - o Further characterisation including lateral and vertical delineation of the B(a)P TEQ impacts in Precinct 1;
 - o Detailed asbestos investigation, including collection of bulk (10L) soil samples for sieving and determination of asbestos containing material (ACM) concentrations within Precinct 1;
 - o Further investigation in Precincts 2, 3 and 4, to address the existing data gaps.
- Further sediment investigation, including sampling at depth, to further characterise and delineate the identified sediment impacts. This would include sediment sampling from other areas along Brisbane Water, within the site boundary that are proposed to be redeveloped/disturbed; and

- Undertake an additional round of groundwater sampling to confirm the concentrations of metals in Well MW3. It is considered surface water sampling may also be warranted.

It is recommended that a sampling analysis and quality plan (SAQP) is prepared for individual precincts or development areas. Furthermore, it is considered that proposed development plans should be reviewed, to identify areas of building footprints and open-space recreational areas, that would inform the assessment, management and/or remediation options that may be required.

Table of Contents

	Page No
1. Introduction	1
2. Proposed Development.....	1
3. Scope of Work	5
4. Site Information.....	6
5. Environmental Setting	9
6. Review of Previous Reports	11
6.1 UoS (2007) – Heavy metal distribution and sediment quality	11
6.2 Douglas (2019) – PSI for Gosford Leagues Club Field.....	12
6.3 SESL (2019) – DSI for Gosford Leagues Club Field	13
7. Site History Review	13
7.1 Historical Aerial Photographs	13
7.2 Historical Photographs and Subdivision Plans.....	20
7.3 Public Registers and Planning Records.....	25
7.4 Site History Integrity Assessment	26
7.5 Summary of Site History	27
8. Site Walkover	27
9. Preliminary Conceptual Site Model.....	29
10. Sampling and Analysis Quality Plan	32
10.1 Data Quality Objectives	32
10.2 Soil Sampling Rationale	32
10.3 Sediment Sampling Rationale	32
10.4 Groundwater Sampling Rationale	32
10.5 Analytical Rationale	33
11. Site Assessment Criteria	34
12. Results	34
12.1 Field Work Results.....	34
12.2 Laboratory Analytical Results.....	37
12.3 Data Quality Assurance and Quality Control	39
13. Discussion	39
14. Conclusions and Recommendations.....	41

15.	References	42
16.	Limitations	42

Appendix A	About this Report
	Drawings 1 to 5
Appendix B	Historical Aerial Photographs
	EPA Site Searches and Council Records (Rev0 dated December 2023)
Appendix C	Site Photographs
Appendix D	Table D1: Summary of Laboratory Results (Soil)
	Table D2: Summary of Laboratory Results (Groundwater)
	Table D3: Summary of Laboratory Results (Sediment)
	(Rev0 dated December 2023)
Appendix E	Borehole Logs
	Sediment Sample Descriptions (Rev0 dated December 2023)
	Terminology, Symbols and Abbreviations
	Soil Descriptions
	Rock Descriptions
	Sampling, Testing and Excavation Methodology
Appendix F	Site Assessment Criteria (Rev0 dated December 2023)
Appendix G	Field Work Methodology (Rev0 dated December 2023)
Appendix H	Data Quality Objectives (Rev0 dated December 2023)
Appendix I	Quality Assurance / Quality Control (Rev0 dated December 2023)
Appendix J	Laboratory Certificates of Analysis and Chain-of-Custody Documentation

Report on Preliminary Site Investigation (Contamination) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford NSW

1. Introduction

Douglas Partners Pty Ltd (Douglas) was engaged by Central Coast Council (Council) to complete this preliminary site investigation (contamination) (PSI) for the proposed Gosford Waterfront Revitalisation Masterplan (GWRM) at Gosford Waterfront located along Central Coast Highway, Gosford (the site as shown on Drawing 1, Appendix A). The investigation was undertaken with reference to Douglas' proposal 225005.00.P.001.Rev0 dated September 2023.

The objective of the PSI was to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to the proposed development. The report has been prepared in connection with Gateway 1, a planning approval milestone of the GWRM.

This report must be read in conjunction with all appendices including the notes provided in Appendix A. The following key guidelines were consulted in the preparation of this report:

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

It should be noted that intrusive investigation and associated contamination sampling was limited to Precincts 1, 3 and 4 (see Section 2 below). A geotechnical investigation and an acid sulfate soil assessment (ASSA) was undertaken concurrently with the PSI and has been reported separately.

2. Proposed Development

It is understood that the Gosford Waterfront is intended to be revitalised (redeveloped) in stages over approximately 20 years, and comprises four precincts as outlined below (see also Drawing 1, Appendix A):

- Precinct 1 – Foreshore Precinct;
- Precinct 2 – Stadium Precinct;
- Precinct 3 – Esplanade Precinct; and
- Precinct 4 – Marine Recreation Precinct.

It should be noted that the initial concept plans provided to Douglas were revised following completion of Douglas' intrusive investigation. Screenshots of the latest concept plans are shown in Figures 1 to 3 below.



Figure 1: Concept masterplan – 0 to 5 years (SJB, 2024).



Figure 2: Concept masterplan – 5 to 10 years (JBS, 2024).



Figure 3: Concept masterplan – 11 to 20 years (JBS, 2024).

3. Scope of Work

Douglas carried out the following scope of works:

- Review of published topographic, soil, geological, hydrogeological and acid sulfate soil (ASS) maps;
- Review of key site history information including:
 - o Historical aerial photographs;
 - o Recent aerial imagery obtained through MetroMap;
 - o Historical photographs and subdivision plans;
 - o NSW EPA public registers for notices and licences issued under the Contaminated Land Management Act 1997 (CLM Act) and the Protection of the Environment Operations Act 1997 (POEO Act); and
 - o Relevant Council records.
- Review of previous contamination reports relevant to the site, provided by Council;
- A site walkover to observe the current land uses and assess the potential for contaminating activities;
- Drilling of boreholes across Precincts 1, 3 and 4, terminating in natural soils, or prior refusal;
- Collection of soil samples from regular depth intervals based on field observation;
- Installation of three groundwater monitoring wells (Wells MW1 to MW3), followed by well development and groundwater sampling;
- Collection of surface sediment samples from Precincts 1, 3 and 4;
- Field testing of soil samples with a photo-ionisation detector (PID) to assess the likely presence of volatile organic compounds;
- Laboratory analysis of selected soil, groundwater and sediment samples for a range of commonly encountered contaminants as identified in the conceptual site model (CSM - refer to Section 9);
- Field sampling and laboratory analysis according to standard environmental protocols, including a Quality Assurance / Quality Control (QA/QC) plan, appropriate Chain of Custody procedures and in-house laboratory QA/QC testing; and
- Preparation of this report detailing the findings of the investigations, commenting on the contamination status of the site and providing recommendations for further investigation or remediation (if required).

4. Site Information

Site Address	Gosford Waterfront, Central Coast Highway, Gosford (see also below)
Legal Description	Precinct 1 (Parts of Central Coast Highway, Foreshore Areas and Brisbane Water) - Lot 12, Deposited Plan (D.P) 868080 – Part of Central Coast Highway - Part of Lot 1, D.P 997118 – Part of Central Coast Highway - Lot 21, D.P 1040230 – 14A Dane Drive - Lot 22, D.P 1040230 – 14B Dane Drive Precinct 2 (Parts of Central Coast Highway, Industree Group Stadium and Gosford City Bowling Club) - Lot A, D.P 321237 – 20 – 22 Dane Drive - Lot 1, D.P 1011876 – 14 Dane Drive - Lot 2, D.P 1011876 – 18 Dane Drive Precinct 3 (Parts of Foreshore Areas and Brisbane Water) - Lot 7018, D.P 1116947 – Part of 8 Masons Parade / 6 Dane Drive - Lot 314, D.P 755227 – Masons Parade / Part of 6 Dane Drive - Lot 7017, D.P 1116968 – Part of 6 Dane Drive - Lot 7045, D.P 1081900 – Part of 6 Dane Drive - Lot 470, D.P 48569 – 12 Dane Drive - Lot 471, D.P 48569 – 12A Dane Drive Precinct 4 (Parts of Foreshore Areas and Brisbane Water) - Lot 7018, D.P 1116947 – Part of 8 Masons Parade / 6 Dane Drive - Lots 1 and 2, D.P 1081952 – Part of 28 Masons Parade - Lots 383 and 417, D.P 755227 – Part of 28 Masons Parade
Approximate Area	- Precinct 1 – 12.5 ha - Precinct 2 – 4.8 ha - Precinct 3 – 4.7 ha - Precinct 4 – 2.6 ha - Total site area – 25 ha

Zoning	Precinct 1 W2 – Recreational Waterways SP2 – Infrastructure (Road) Precinct 2 RE1 – Public Recreation SP2 – Infrastructure (Road) Precinct 3 W2 – Recreational Waterways RE1 – Public Recreation SP2 – Infrastructure (Road) Precinct 4 W2 – Recreational Waterways RE1 – Public Recreation
Local Council Area	Central Coast Council
Current Use	Mixed recreational and commercial land uses including: • Sports stadium (Industree Group Stadium); • Park land (e.g Graham Park, Lion’s Park and public open space); • Drifters Wharf (restaurant); • Eat Street Gosford (café); • Gosford Olympic Swimming Pool; • Gosford Sailing Club; and • Gosford Scout Hall.
Surrounding Uses	• North – Commercial land use, Donnison Street and rail line; • East – Central Coast Highway, and mix of commercial / industrial, recreational (e.g. Gosford Waterfront Park, Gosford Rotary Park) and residential land use; • South – Gosford foreshore (Brisbane Water and residential land use); • West – Rail line and / or Brisbane Water.

The site boundary is shown on Figure 4.



Figure 4: Site boundary (red dotted line) and Precincts 1 to 4. Aerial image sourced from MetroMap (12 September 2022).

5. Environmental Setting

Regional Topography	Landward areas varying from: - Level plain to hummocky terrain, with local relief and slopes highly variable; and - Undulation to rolling rises and low hills, with local relief < 60 m and slopes < 25%, rounded narrow crests with moderately inclined slopes.
Site Topography and Bathymetry	Reference to 2 m elevation contours obtained through published topographic maps indicates the following: - Precinct 1 has an elevation ranging from approximately 1 m Australian height datum (AHD) to 3 m AHD; - Precinct 2 has an elevation ranging from approximately 2 m AHD to 5 m AHD (north western corner); - Precinct 3 has an elevation ranging from approximately 1 m AHD to 3 m AHD; and - Precinct 4 has an elevation ranging from approximately 1 m AHD to 10 m AHD (south eastern corner). In the overwater areas, the depth to sediment ranged from relatively shallow depths adjacent the shoreline, up to approximately 3 m in the areas of the investigation.
Soil Landscape	Reference to the <i>Gosford-Lake Macquarie 1:100 000 Soil Landscapes Sheet</i> indicates the land-based portions of the site are underlain by the following: - Most of the site is underlain by “disturbed terrain”, extensively disturbed by human activity, including complete disturbance, removal or burial of soil; and - Minor parts of the site are underlain by the Erina (erosional) soil landscape characterised by the Terrigal Formation. These soils typically include yellow podzolic soils and yellow earths, and typically have high soil erosion hazard, localised foundation hazard, seasonal waterlogging of footslopes and are strongly acid soils of low fertility. No information was provided for the overwater areas.
Geology	Reference to the <i>NSW Seamless Geology Sheet</i> indicates the following: - Most of the site is underlain by Anthropocene deposits varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-size to clay matrix; - A minor part of the site (southern portion of Precinct 4) is underlain by the Buralow Formation characterised by fine-grained, micaceous, quartz-to quartz-lithic sandstone; interbedded with siltstone, grey shale and red-brown claystone; and

Geology (continued)	The overwater areas of the site are underlain by clastic sediment characterised by clay, silt, shell, very fine- to fine-grained lithic-quartz sand (fluvially and / or marine-deposited).
Acid Sulfate Soils	Reference to published ASS risk maps indicates the following: - Most of the site is mapped as having a high probability of occurrence within bottom sediments, or within 1 m of the ground surface with a severe environmental risk if bottom sediments or ASS materials are disturbed; - Parts of the site are mapped as “disturbed terrain”, where soils investigations are required to assess the area for ASS; and - Minor parts of the site within Precincts 3 and 4 are mapped as having no known occurrence of ASS material. An ASS assessment was undertaken concurrently with this PSI and has been reported separately.
Surface Water	The site is located along Brisbane Water (tidal marine environment), which is the main surface water discharge point.
Groundwater	The site is located along Brisbane Water, which is the main groundwater discharge point. A search of the publicly available registered groundwater bore database on 13 October 2023 indicated that there were two registered groundwater bores within approximately 500 m of the site which are summarised in Table 1 below.

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

Bore ID	Authorised Purpose	Completion Year	Status	Approximate Location Relative to Site	Final Depth (m)	Standing Water Level (m bgl)
GW201679	Irrigation, Recreation	2004	Current	On site (Precinct 2)	102	Unknown
GW201893	Recreation (groundwater)	2004	Current	60 m east of Precinct 2	78	Unknown

6. Review of Previous Reports

6.1 UoS (2007) – Heavy metal distribution and sediment quality

An ecosystem health assessment of Brisbane Waters was undertaken by the Environmental Geology Group from the University of Sydney, which included the collection of estuarine, fluvial and core sediment samples. The sampling location plan, extracted from UoS (2007) is presented in Figure 5 below.

The key objectives of the investigation were to determine the source and dispersion of heavy metals in sediments of the estuary, to estimate the magnitude of anthropogenic change that had taken place in the waterway and catchment, and to assess the quality of sediments in the estuary.

Samples collected included 40 estuarine samples from Brisbane Water, 30 fluvial samples from rivers discharging to the waterway, and 3 estuarine cores taken throughout the study area (see Figure 5 below). Total sediment was analysed for cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), manganese (Mn), nickel (Ni), lead (Pb) and zinc (Zn).

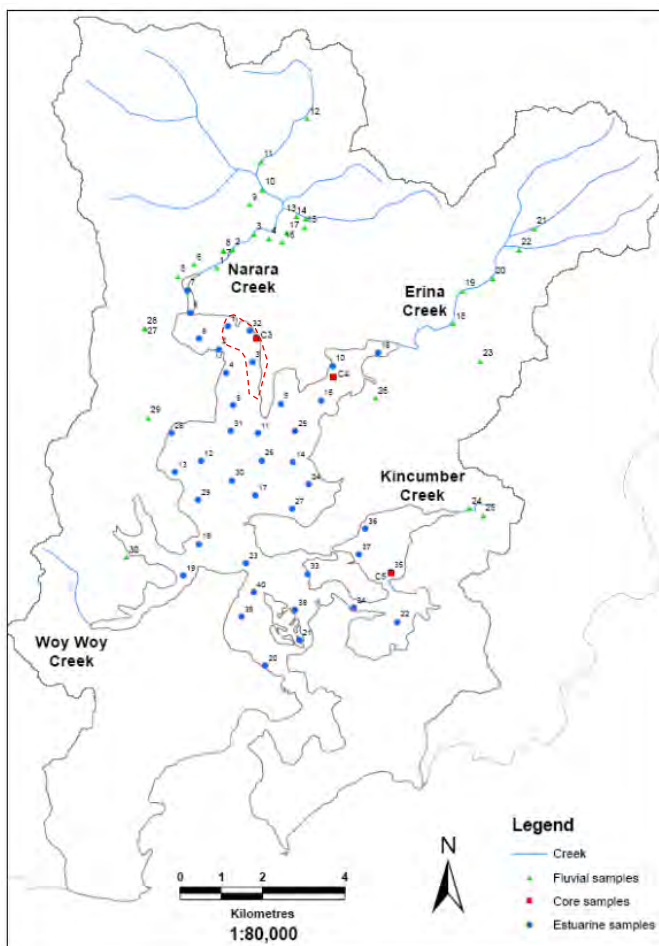


Figure 5: Sample locations extracted from Figure 2, Uos (2007). Sampling locations within the current site have been outlined in a red dotted line.

The main findings of the study were as follows:

- A strong contaminant gradient was evident in sediments of Brisbane Water with high metal concentrations of Cu, Pb and Zn in the north of the waterway decreasing rapidly southwards;
- High concentrations of metals in sediment immediately adjacent to the mouth of Narara Creek; high concentrations of Cu, Pb and Zn in fluvial samples taken from the Narara Creek catchment, and high modelled metal loadings, suggested that the Narara Creek and catchment played an important role in contamination of the northern part of Brisbane Water estuary;
- Metal concentrations were elevated above pre-anthropogenic levels over the entire estuary. Maximum enrichment of Cu, Pb and Zn was 4-5 times background in the north and 2 times in the south and eastern parts of the waterway;
- Six estuarine sediment samples exceeded the interim sediment quality guidelines low (ISQG L) values for Cu, Pb and Zn and no fluvial or estuarine samples exceeded interim sediment quality guidelines high (ISQG H). The risk to benthic fauna due to metallic contamination was therefore considered to be “probably low”; and
- Although almost 50% of Cu, Pb and Zn were available to sediment-dwelling animals, overall concentrations of these metals were low and thus the total metals that were bioavailable was considered to probably be minor.

The following recommendations were made:

- Identification of the primary sources of contamination, especially in the Narara Creek Catchment;
- An audit of industries in the Narara Creek catchment for possible contaminant discharges, and monitoring for compliance of high priority industries;
- Selected sampling and analyses should be undertaken on sediment in the northern portion of the estuary for organochlorine compounds, polycyclic aromatic hydrocarbons and polychlorinated biphenyls (given that organic contaminants frequently co-occur with heavy metals, especially in stormwater-dominated systems); and
- Undertaking a detailed study of sediment in the most contaminated, northern portion of Brisbane Water to fully evaluate toxicity, including bioavailability, speciation and partitioning studies.

6.2 Douglas (2019) – PSI for Gosford Leagues Club Field

Douglas prepared a PSI for Gosford Leagues Club Field, located east of the current site (i.e. east of Precincts 1 and 2). The PSI comprised a review of site history information, a walkover, preliminary intrusive investigation including drilling of six boreholes, collection of soil samples, subsurface gas monitoring, and laboratory analysis of selected samples.

Douglas identified the following potential contamination sources at the property: S1 – mixed historic development activities; and S2 – contaminated filling (land reclamation). The laboratory results of the soil samples were assessed against a generic recreational land use criteria.

A summary of the Douglas (2019) findings is provided below:

- Some near surface filling and natural soils were impacted by zinc and PAH as a result of possible historic activities at the site;
- A fragment of asbestos containing material (ACM), confirmed by laboratory analysis, was identified at the ground surface; and
- An elevated potential for the presence of hazardous ground gases (i.e. methane or carbon dioxide) was identified.

Douglas (2019) concluded that the property required further investigation to assess the need for remediation / management as part of the redevelopment process. Further investigation and potentially management of sub-surface soil gases was recommended.

6.3 SESL (2019) – DSI for Gosford Leagues Club Field

SESL was engaged to conduct a detailed site investigation (DSI) for Gosford Leagues Club Field, located east of the current site (i.e. east of Precincts 1 and 2). The scope of works comprised a review of Douglas (2019), a site inspection, installation of four groundwater monitoring wells, drilling of 18 boreholes, associated soil sampling (including ASS assessment) and laboratory analysis of selected samples. Sampling was undertaken in February and April 2019. It is noted that no groundwater samples were collected as part of the DSI.

Fill was observed across the “*whole of the investigation area*”, to a maximum depth of 1.7 m. The laboratory results indicated that all contaminant concentrations were below the adopted site assessment criteria (SAC). Based on the findings of the investigation, SESL concluded that the Gosford Leagues Club Field was suitable for the proposed development and land use, subject to the implementation of an acid sulfate soil management plan and an unexpected finds protocol.

7. Site History Review

7.1 Historical Aerial Photographs

Historical aerial photographs from 1954 to 2022 obtained from public databases and MetroMap were reviewed to identify possible former land uses and hence the potential for contaminating activities to have impacted the site. The aerial photographs and an approximate site boundary are presented in Appendix B. It is noted that data obtained from aerial photos was limited due to the relatively small scale and poor resolutions. A summary of the aerial photograph review is given in Tables 2 and 3 below.

It should be noted that due to an error with the NSW Spatial Services web service, some of the aerials in Appendix B (i.e. Precincts 1 and 2 – 1965 to 1984) have no data showing at the selected zoom level.

Table 2 – Summary of Historical Aerial Photographs (Precincts 1 and 2)

Year	Site	Surrounding Land Use
1954	Precinct 1 Most of the precinct comprises Brisbane Water. The existing wharf can be seen in the south eastern portion of the precinct. The northern portion of the precinct comprises land (i.e. apparent open space / recreational land use). Three small structures can be seen (possibly park benches / shelters). Precinct 2 One of the existing bowling greens can be seen along the northern portion of the precinct, and there appears to be structures to the east and west of the greens. South of the western-most structure, there appears to be a rectangular field. The remainder of the precinct appears to comprise open space recreational land use. A possible sports court can be seen in the south western portion, immediately north of the tree line, and three structures (possible amenities or sheds) can be seen along the western portion of the precinct.	The existing rail line has been constructed, adjacent and west of the precincts, and the land uses further west appears to comprise mainly residential (west of Precinct 2) and Brisbane Water (west of Precinct 1). The land use to the north appears to comprise commercial land use, and Donnison Street and the rail line can be seen further north. The land to the east appears to comprise a mix of commercial/industrial, residential and recreational land uses. It appears that some areas immediately east of the site have been subject to earthworks / possible land reclamation activities / filling (associated with construction of the Central Coast Highway / Dane Drive and surrounding park land). Brisbane Water extends further south of Precinct 1.
1965	Precinct 1 It appears that some land may have been reclaimed along the northern portion of the precinct compared to 1954. A possible wharf has been constructed along the eastern precinct boundary (approximately west of Vaughan Avenue). Precinct 2 Some of the structures observed in 1954 (northern portion) have been demolished, and another bowling green has been constructed in this area. A car parking area has been constructed south of the bowling greens. The remainder of the precinct appears much the same as in 1954.	The surrounding land use to the north and south appears much the same as in 1954. A structure has been constructed within the rail corridor, west of the rail line (approximately west of the boundary of Precincts 1 and 2), and there has been an increase in development on the land west of the rail line (i.e. west of Precinct 2). East of the site, construction of the Central Coast Highway (or Dane Drive) appears to be complete. An increase in commercial / industrial land use is evident compared to 1954.

Year	Site	Surrounding Land Use
1976	Precinct 1 The precinct appears much the same as in 1965. It is noted a boat ramp has been constructed off the existing wharf, and the wharf observed in 1965 (approximately west of Vaughan Avenue) has been demolished. Precinct 2 The structure west of the bowling greens has been demolished, and the rectangular field has expanded into a third bowling green. A structure (possible club house) has been constructed in the car parking area. The sports court observed in 1954 (south western portion of the precinct) appears to be demolished, and the area appears to be used for car parking. The three structures also appear to be demolished. A new structure has been constructed north of the car parking area.	The surrounding land use to the north, east, south and west appears much the same as in 1965. It is noted that the residential houses noted since 1954 (east of Precinct 2) appear to be demolished and the land comprises commercial use (i.e. Central Coast Leagues Club).
1984	Precinct 1 The precinct appears much the same as in 1976. Precinct 2 Most of the precinct appears much the same as in 1976. It appears that a possible structure has been constructed in the south eastern corner (north of the tree line).	The surrounding land use appears much the same as in 1976.
1994	Precinct 1 Land has been reclaimed along the northern portion of the precinct and it appears that this area has been subject to earthworks activity. <i>Continued below.</i>	The land use to the north, east and south appears much the same as in 1984. <i>Continued below.</i>

Year	Site	Surrounding Land Use
1994	Precinct 2 The southern portion of the precinct (i.e. south of the tree line) has been subject to significant change, with earthworks activity underway. The remainder of the precinct appears much the same as in 1984.	West of Precincts 1 and 2 (west of the rail line), the foreshore has been subject to earthworks activity. The remaining land use to the west appears much the same as in 1984.
2010	Precinct 1 The earthworks activity within the northern portion of the precinct appears to be complete and the area is generally consistent with the current layout (i.e. the existing road / Brian McGowan Bridge, roundabout, car park and Graham Park area has been constructed). It appears that some additional dredging has been completed in the north eastern corner of Brisbane Water (within Precinct 1). Precinct 2 The precinct has undergone significant change compared to 1994. Notably, the existing Central Coast Highway / Brian McGowan Bridge, and Industree Group Stadium has been constructed. The northern portion of the stadium is noted to extend into part of the bowling greens / leagues club (the former leagues club was possibly demolished as part of the stadium construction).	The land use to the north, east and south appears much the same as in 1994. The earthworks activity west of Precincts 1 and 2 appears to be complete, and Central Coast Highway and Pacific Highway has been constructed.
2015	Precincts 1 and 2 The precincts appear much the same as in 2010.	The surrounding land use appears much the same as in 2010. It is noted that further east of the precincts (i.e. former Gosford Public School – adjacent and east of the open space area), the buildings present since 1954 have been demolished, and the area appears to be subject to earthworks activity.
2022	Precinct 1 Most of the precinct appears the same as in 2015. The north western portion of the precinct has been subject to earthworks activity / a stockpile can be seen.	The land use to the north, south and west appears much the same as in 2015.

Year	Site	Surrounding Land Use
2022	Precinct 2 The precinct appears much the same as in 2015. It is noted an additional structure has been constructed in the smaller field, west of the main stadium (possibly a temporary tent structure).	The land use to the east has undergone significant change. The existing Leagues Club Park and Gosford Waterfront Park has been constructed, and further east the area that was subject to earthwork activity now comprises commercial / industrial land use.

Table 3 – Summary of Historical Aerial Photographs (Precincts 3 and 4)

Year	Site	Surrounding Land Use
1954	Precinct 3 It appears that the precinct has been subject to earthworks activity / filling (land reclamation activities). No structures are observed. Precinct 4 A structure can be seen within the northern portion of the precinct (locality of the existing Gosford Sailing Club), and there is a boat ramp to the west of the structure.	Brisbane Water can be seen west of the precincts. The land use to the east comprises a mixture of residential, recreational and some commercial land use. Masons Parade can be seen east of Precinct 4 / the southern portion of Precinct 3. The land use to the south comprises the foreshore area (Brisbane Water and residential land use).
1965	Precinct 3 It appears that most of the earthworks activity within the northern half of the precinct has been completed, and the existing open space recreational area can be seen. Within the southern half, the existing swimming pool complex appears to be under construction, and Lion's Park can be seen further south. Precinct 4 It appears the precinct has been subject to earthworks activity (land reclamation activities) and the structure noted in 1954 appears to have been demolished. Three small structures can be seen within the southern half of the precinct.	The surrounding land use to the south and west appears much the same as in 1954. East of the site, construction of the Central Coast Highway / Dane Drive appears to be complete. An increase in commercial and residential land use is evident compared to 1954.

Year	Site	Surrounding Land Use
1976	Precinct 3 Land has been reclaimed within the northern-most portion of the precinct and a structure (currently Drifters Wharf) has been constructed in this area, projecting out into Brisbane Water. Within the southern half of the precinct, it appears that earthworks and construction activity has progressed. The area of the existing car park has been stripped of vegetation, and in the swimming complex, a second swimming pool has been constructed. Precinct 4 The existing car park and driveway has been constructed. A building has been constructed in the northern portion of the precinct (likely the existing Gosford Sailing Club).	The surrounding land use appears much the same as in 1965. It is noted that additional buildings have been constructed to the east.
1984	Precinct 3 The northern half of the precinct appears much the same as in 1976. It is noted that a cycleway / footpath has been constructed along the eastern portion. Southern half: The existing car park has been constructed, and the swimming complex has been subject to further development. Precinct 4 The precinct appears much the same as in 1976. It appears that the existing Scout Hall has been constructed in the southern portion of the precinct.	The surrounding land use appears much the same as in 1976.

Year	Site	Surrounding Land Use
1994	Precinct 3 Most of the precinct appears much the same as in 1984, except for the swimming complex. A car parking area and additional structures have been constructed in the complex. Precinct 4 The Gosford Sailing Club appears to have expanded and the boat ramp has been extended.	The surrounding land use appears much the same as in 1984.
2010	Precinct 3 Within the northern most portion of the precinct, the building and surrounding area appears to have been refurbished (i.e. new paved areas and external building modifications - existing Drifters Wharf). The existing footpath along the western side of the precinct has been constructed, and the eastern portion of the open space recreational area (i.e. north of the car park) appears to be landscaped. The swimming complex has been subject to further development. Precinct 4 The precinct layout appears consistent with the current layout. The existing private marina can be seen west of the sailing club building.	The surrounding land use appears much the same as in 1994. It is noted that the intersection at Mann Street and Dane Drive has been upgraded, and there has been a general increase in residential apartment blocks to the east.
2015	Precinct 3 The precinct appears much the same as in 2010. It is noted that the existing Eat Street Café has been constructed, north of the car park. Precinct 4 The precinct appears much the same as in 2010.	The surrounding land use appears much the same as in 2010.

Year	Site	Surrounding Land Use
2022	Precinct 3 The precinct appears much the same as in 2015. Precinct 4 Most of the precinct appears much the same as in 2015. It appears that an extension has been added to Gosford Sailing Club.	The surrounding land use appears much the same as in 2015. It is noted that there has been an increase in residential apartment blocks.

7.2 Historical Photographs and Subdivision Plans

Historical photographs and subdivision plans were obtained online from the Central Coast Council Library Service, Flickr and NSW Land Registry Services, which are included in Figures 6 to 12 below.

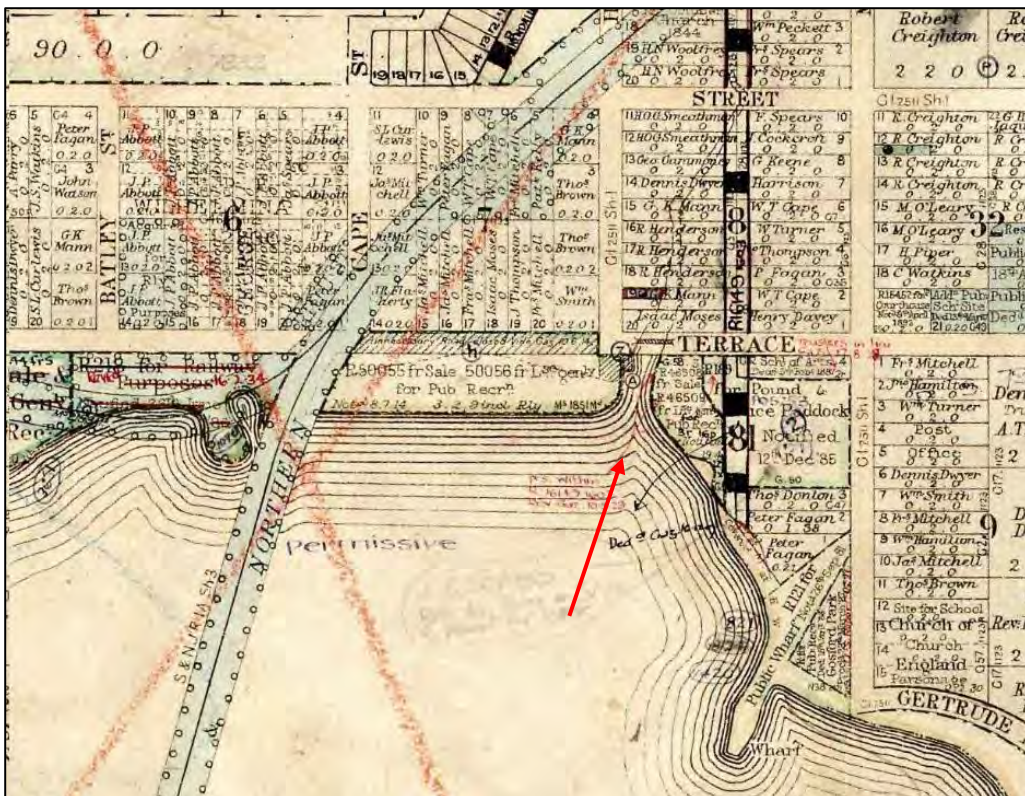


Figure 6: Map of the town of Gosford, 1922, identifying former creek line (arrow). Image sourced from <https://hlrv.nswlrs.com.au/>, Historical Parish Maps.

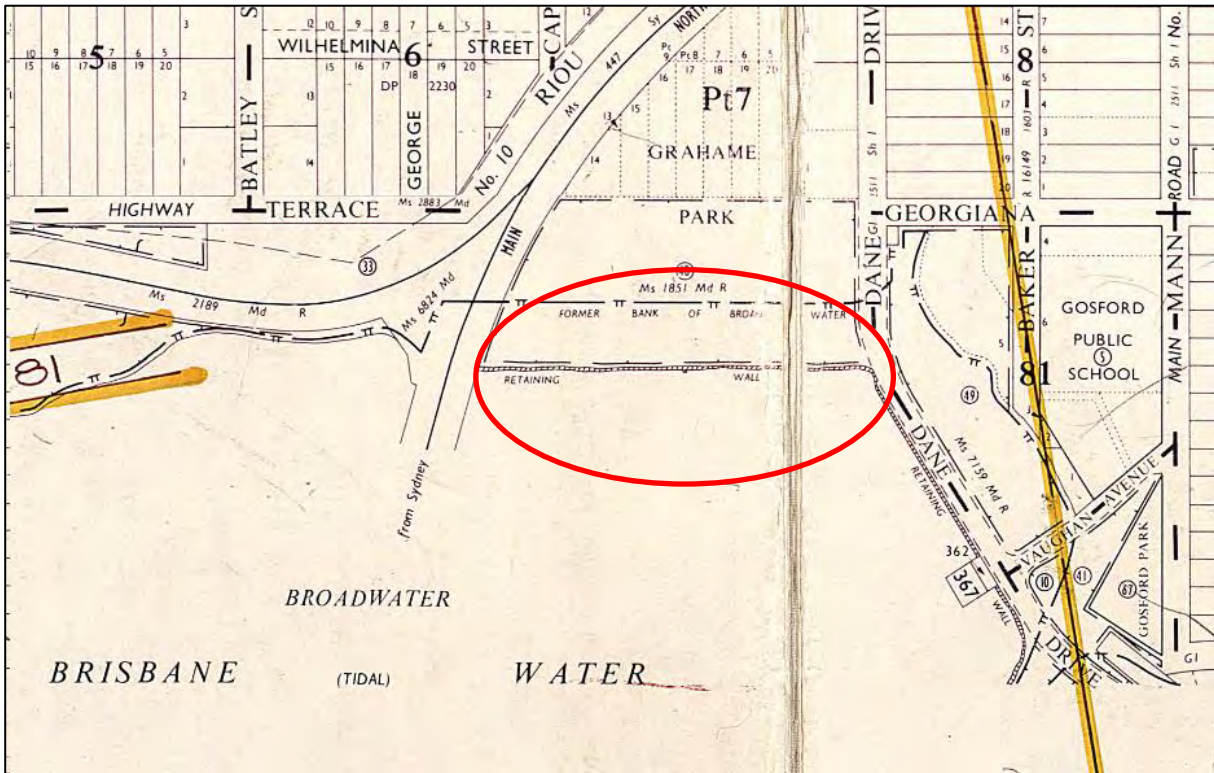


Figure 7: Map of the town of Gosford identifying the former bank of Broadwater / Brisbane Water and the existing retaining wall (circled). Date of Map 10 October 1978. Image sourced from <https://hlrv.nswlrs.com.au/>, LTO Charting Maps.



Figure 8: Map of the town of Gosford identifying the former bank and area proposed to be reclaimed (identified as 36 on map). Date of Map 14 June 1934. Image sourced from <https://hlrv.nswlrs.com.au/>, Historical Parish Maps.

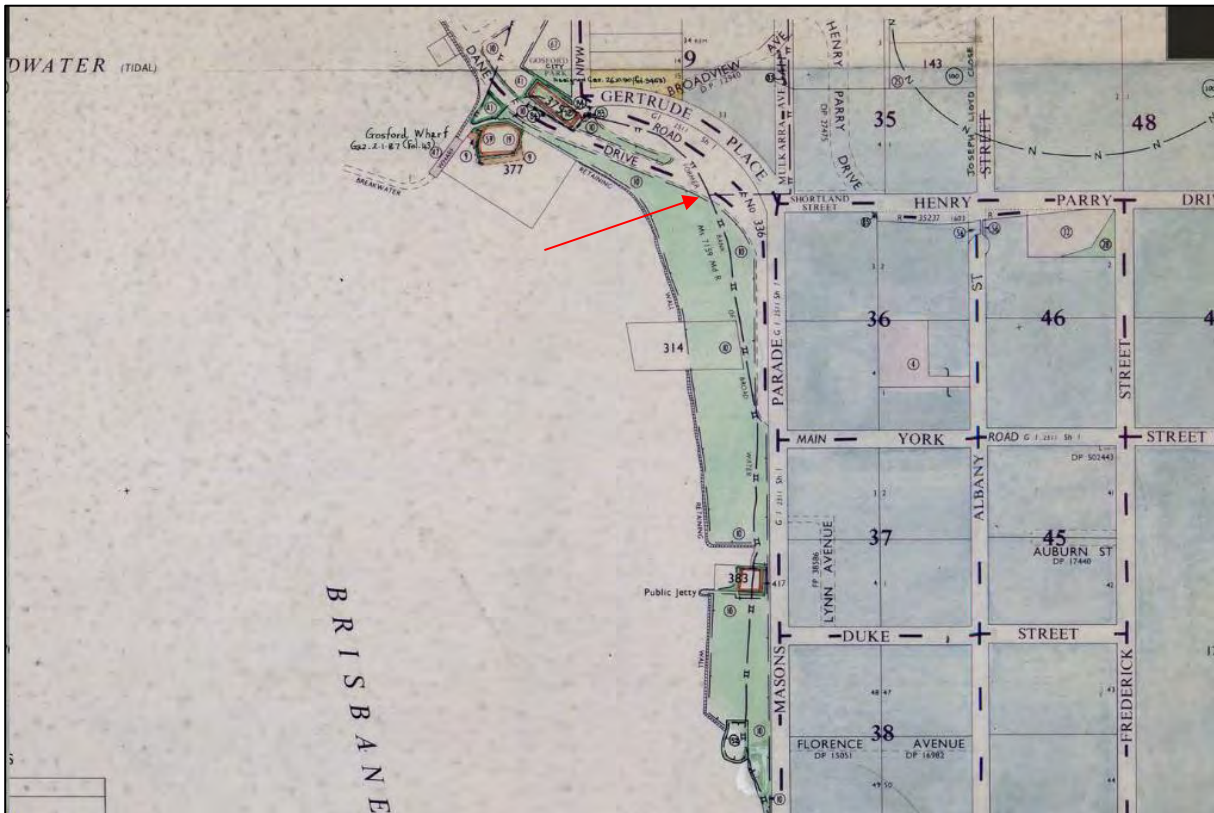


Figure 9: Plan of the town of Gosford identifying former bank of Broad Water / Brisbane Water (arrow). Image sourced from <https://hlrv.nswlrs.com.au/>, Status Branch Charting Maps. Date of map unknown, circa 1980s.



Figure 10: Photograph of Brisbane Water and Gosford circa 1887, showing former creek line (arrow) and former Gosford Wharf (circled). Image sourced from Flickr (<https://www.flickr.com/photos/gostalgaia/>).

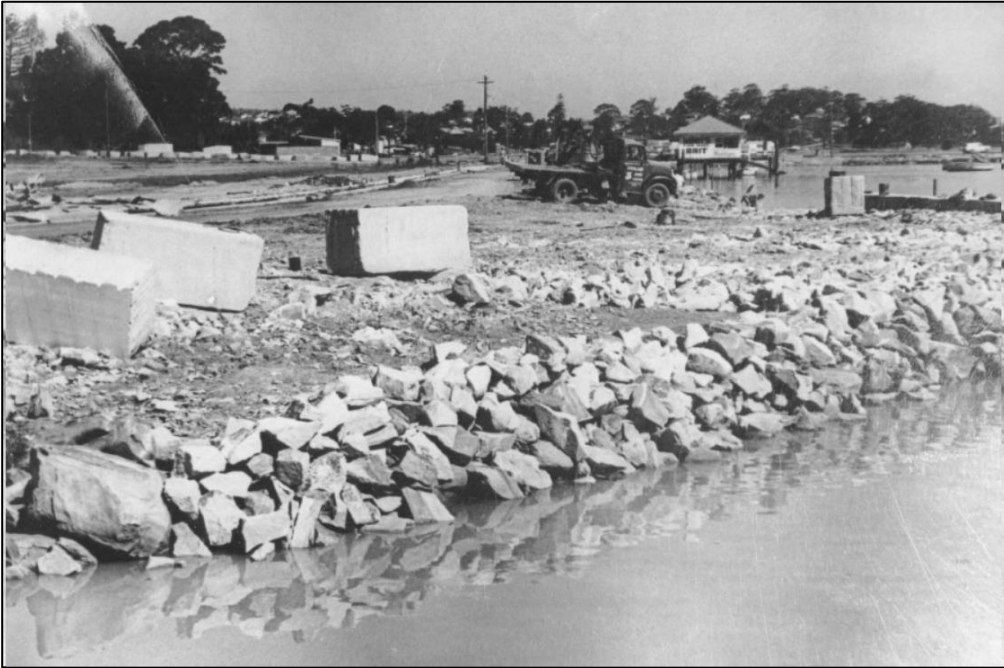


Figure 11: Waterfront reclamation works, Dane Drive, Gosford, circa 1950s – 60s. Image sourced from Central Coast Council (Library Service, Central Coast Memories).



Figure 12: Gosford swimming pool development, circa 1950s. Image sourced from Central Coast Council (Library Service, Central Coast Memories).

7.3 Public Registers and Planning Records

EPA Notices available under Section 58 of the Contaminated Land Management Act (CLM Act)	There were no records of notices for the site or adjacent sites.
Database searched 10 October 2023	
Sites notified to EPA under Section 60 of the CLM Act	The site and adjacent sites were not listed as a notified contaminated site.
Database searched 10 October 2023	
Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act)	The following licences were found pertaining to the site: - Masons Parade, Gosford (Gosford Olympic Pool) – Licence No. 1400 – Miscellaneous licensed discharge to waters (at any time) – surrendered - s58 Licence Variation issued 24 August 2001 and - s80 Surrender of a licence issued 2 Jan 2004
Database searched 30 October 2023	
PFAS Investigation Sites listed on the EPA website	The site was not listed or adjacent to a site listed under the NSW Government PFAS Investigation Program.

Council Records

Information emailed
by Council on
19 October 2023

Precinct 1

- Part of Central Coast Highway (Lot 1, D.P 997118) – Potential for contamination based on fill / reclamation activities for railway line;
- Part of Central Coast Highway (Lot 12, D.P 868080) - No known contamination or potential for contamination based on land use.
- 14A Dane Drive (Lot 21) and 14B Dane Drive (Lot 22) - No known contamination or potential for contamination based on land use.

Precinct 2

- 20-22 Dane Drive (Lot A) - No known contamination or potential for contamination based on land use;
- 14 Dane Drive (Lot 1) - Potential for contamination based on land use (sports field);
- 18 Dane Drive (Lot 2) - Potential for contamination based on land use (bowling green).

Precincts 3 and 4

- No known contamination or potential for contamination based on land use.

It is noted that Lot 1, D.P 872939 (located west of Precincts 1 and 2) is identified as having a potential for contamination based on land use (Railway Depot).

7.4 Site History Integrity Assessment

The information used to establish the history of the site was obtained from reputable and reliable sources including the EPA and government / local government websites. It should be noted that the aerial photographs are only available for certain years / intervals, therefore some data gaps exist in the information from this source. Furthermore, the observed site features are open to different interpretations and can be affected by the time of day and/or year at which they were taken, as well as specific events, such as flooding. Care has been taken to consider different possible interpretations of aerial photographs and to consider them in conjunction with other lines of evidence.

7.5 Summary of Site History

The review of the site history information suggests that the Gosford Waterfront has changed significantly since the late 1800s / early 1900s. Notably, there was previously a creek line that intersected the north eastern portion of Precinct 2, and most of the site has been subject to land reclamation works. The former bank of Brisbane Water is identified on Figures 7 and 9. Based on available information, the land reclamation works commenced circa 1950s (or possibly as early as the 1930s – see Figure 8), and likely continued till circa 1990s, associated with construction of Central Coast Highway / Brian McGowan Bridge and the existing Graham Park (i.e. Precincts 1 and 2).

Over time, various construction (including alterations and modifications) and demolition activities have taken place at the site. It is noted that structures were observed in some of the precincts since the 1950s. The existing railway line, west of Precincts 1 and 2 was likely constructed during or prior to 1922, and the surrounding land has included a mix of residential, recreational and commercial / industrial uses.

The EPA site searches did not identify any significant findings relating to contamination at the site or adjacent lands. However, the Council searches identified the potential for contamination based on land use in the following areas of the site:

- Precinct 1 (Lot 1, D.P 997118) – fill / reclamation activities for railway line; and
- Precinct 2 – sports field and bowling greens

The review of previous investigations at the site / surrounding area has identified impacts of heavy metal on sediments in Brisbane Water.

8. Site Walkover

A site walkover was undertaken by an environmental scientist from Douglas on 2 November 2023. Site photographs are presented in Appendix C, and the approximate location and direction of the photographs are shown on Drawings 2 and 3, Appendix A.

Overall, no staining or anthropogenic inclusions (unless stated in the below sections) were observed on the ground surface in areas where the ground surface was visible, and no odours were noted during the site inspection. The key observations in each of the precincts are provided below.

Precinct 1

Precinct 1 comprised predominantly an over-water area, part of Brisbane Water (Photos P1-1 to P1-4), and also minor land-based areas. Graham Park extended across the northern portion of the precinct, which was generally grass covered with some areas of exposed ground adjacent the seawall (Photos P1- 5 to P1-8). There was a car park adjacent and north of the park (Photo P1-9), extending under Brian McGowan Bridge, and part of Central Coast Highway within the north eastern portion of the precinct (Photo P1-10). A filled mound with trace concrete inclusions was observed in the north western portion of the precinct, adjacent the rail corridor (Photo P1-11 and P1-12). At the time of the walkover, there was no evidence of the earthworks activity / stockpile in the north western portion of the site which was observed in the 2022 aerial (see Table 2 above).

The south eastern portion of the precinct comprised a breakwall / Gosford Public Wharf (Photos P1-1, P1-2 and P1-13), and an associated boat ramp (Photo P1-14).

Precinct 2

The southern end of Precinct 2 comprised Brian McGowan Bridge (Photos P2-1 and P2-2) and a car park under the bridge (Photo P1-9). Industree Group Stadium (Photos P2-3 to P2-5) and associated grounds / car parking (Photo P2-6) were located north of the bridge.

The northern portion of the precinct comprised bowling greens, a clubhouse and associated structures, part of Gosford City Bowling Club (Photos P2-7 and P2-8). There was a car park adjacent north of the bowling greens (P2-9).

Precinct 3

The southern end of the precinct included Lion's Park (Photos P3-1 to P3-3), Gosford Olympic Swimming Pool and associated car parking and grounds (Photos P3-4 to P3-8). There was a footpath / cycleway along the foreshore, extending from Lion's Park to Precinct 1. At the time of the walkover, part of the footpath (west of the swimming pool) had been closed due to construction activities (Photo P3-9).

North of the swimming pool complex, there was a car park, and a boat ramp (Photos P3-10 and P3-11). Eat Street Café (Photo P3-12) was located in the northern portion of the car park. The area north of the car park comprised grassed public open space, with some landscaping (Photos P3-13 to P3-17) and a section of footpath on the eastern side, extending from the car park to the pedestrian crossing along Central Coast Highway.

The northern end of the precinct comprised Drifters Wharf restaurant and a car parking area (P3-18 and P3-19). General rubbish was observed near the seawall, adjacent the restaurant (P3-20).

Precinct 4

Gosford Scout Hall (Photos P4-1 and P4-2), an amenities block (Photo P4-3) and a boat ramp (P4-4) were located within the southern portion of the precinct, and Gosford Sailing Club (Photos P4-5 to P4-7), the associated boat ramp and private marina (Photo P4-8) were located within the northern portion of the precinct. The remainder of the precinct generally comprised grassed public open space area, including a car park (Photos P4-9 to P4-14).

9. Preliminary Conceptual Site Model

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

Potential Sources

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

- S1: Fill: Associated with levelling, land reclamation / dredging activities and demolition of former buildings on the site;
 - o COPC include metals, TRH, BTEX, PAH, PCB, OCP and asbestos.
- S2: Existing marina and associated maintenance activities;
 - o COPC include metals, TRH, BTEX, PAH, PCB and organotin (TBT).
- S3: Hazardous building materials in existing structures and application of chemicals/pesticides within the crawl space (e.g. spraying for termites);
 - o COPC include asbestos, synthetic mineral fibres (SMF), PCB, OCP and metals.
- S4: Bowling greens / sporting field (Precinct 2);
 - o COPC include OCP, OPP and metals.
- S5: Existing swimming pool complex
 - o COPC include metals, TRH, BTEX, PAH, acids, alkali and chlorine
- S6: Surrounding land uses including the railway line (relevant to Precincts 1 and 2) and current and/or previous commercial/industrial land use;
 - o COPC include primarily metals, TRH, BTEX, PAH, phenolics, OCP, volatile halogenated compounds (VHC) and per- and polyfluorinated substances (PFAS).

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [commercial and recreational land use];
- R2: Construction and maintenance workers;
- R3: End users [residential, commercial and recreational land use]; and
- R4: Adjacent site users [residential, commercial and recreational land use].

The following potential environmental receptors have been identified:

- R5: Surface water [Brisbane Water - marine] and sediment;
- R6: Groundwater; and
- R7: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

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

Summary of Potentially Complete Exposure Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S6) and receptors (R1 to R7) are provided in below Table 4.

Table 4: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill - metals, TRH, BTEX, PAH, PCB, OCP and asbestos S2: Existing marina and associated maintenance activities – metals, TRH, BTEX, PAH, PCB, TBT S4: Bowling greens / sporting field - OCP, OPP and metals S5: Existing swimming pool complex – metals, TRH, BTEX, PAH, acids, alkali and chlorine	P1 – Ingestion and dermal contact P2 – Inhalation of fibres/ dust and/or vapours	R1 – Current users R2 – Construction and maintenance workers R3 – End users	An intrusive investigation is recommended to assess possible contamination issues including testing of soils, sediment and groundwater. Surface water testing may be recommended based on the groundwater results.
	P2 – Inhalation of fibres/ dust and/or vapours	R4 – Adjacent site users	
	P3 – Surface water run-off P5 – Lateral migration of groundwater	R5 – Surface water and sediments	
	P4 – Leaching of contaminants and vertical migration into groundwater	R6 – Groundwater	
	P6 – Inhalation, ingestion and absorption	R7 – Terrestrial ecology	
S3: Hazardous building materials in existing structures and application of chemicals/pesticides within the crawl space (e.g. spraying for termites) - asbestos, SMF, PCB, OCP and metals.	P1 – Ingestion and dermal contact P2 – Inhalation of fibres/ dust and/or vapours	R1 – Current Users R2 – Construction and maintenance workers R3 – End Users	A hazardous materials survey should be conducted prior to demolition. Areas beneath the buildings should be assessed post-demolition.
	P2 – Inhalation of fibres/ dust and/or vapours	R4 – Adjacent site users	
S6: Surrounding land uses including the railway line (relevant to Precincts 1 and 2) and current and/or previous commercial/industrial land use – metals, TRH, BTEX, PAH, phenolics, OCP, VHC and PFAS.	P3 – Surface water run-off P5 – Lateral migration of groundwater onto site	R1 – Current Users R2 – Construction and maintenance workers R3 – End Users R5– Surface water and sediments R6 – Groundwater R7 – Terrestrial ecology	An intrusive investigation is recommended to assess possible contamination issues including testing of sediment and groundwater. Surface water testing may be recommended based on the groundwater results.

10. Sampling and Analysis Quality Plan

10.1 Data Quality Objectives

The PSI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The data quality objective process is outlined in Appendix H.

10.2 Soil Sampling Rationale

The soil sampling rationale was based on the CSM and data quality objectives (DQO). Given the preliminary nature of this investigation, an opportunistic sampling strategy was adopted. The sampling locations were selected in consultation with the client and were generally limited to areas of proposed development (i.e., based on proposed development plans provided to Douglas prior to the commencement of intrusive investigations. It is noted that the plans have since been revised). The borehole locations were completed in conjunction with the geotechnical investigation. The borehole locations are shown on Drawing 4, Appendix A.

Soil samples were collected from each borehole at regular depths, from the near surface and changes in lithology or signs of contamination. The general sampling methods are described in the field work methodology, included in Appendix G.

It should be noted that Bore P1-4 was drilled as a replacement to Bore P1-3, which could not be progressed to the required depth. However, Bore P1-4 also encountered refusal prior to reaching the target depth. Given that the subsurface profile of Bore P1-3 and P1-4 was similar, only samples collected from Bore P1-3 were submitted to the laboratory for analysis.

10.3 Sediment Sampling Rationale

Sediment samples were generally collected in transects as shown in Drawing 5, Appendix A. The CSIRO (2016) handbook states that for the assessment of sediment quality, determining contaminant concentrations in the top 10 cm depth should provide sufficient information to assess major contaminant exposure pathways for most organisms. It is noted that deeper sediments may need to be collected should activities such as dredging be proposed, or to assess historical contamination (CSIRO, 2016), however, for this preliminary investigation, sediment collection was limited to surface (0-0.1 m) samples.

10.4 Groundwater Sampling Rationale

In order to provide a preliminary assessment of the current groundwater contamination status at the site and evaluate whether historical / current / off site land uses have impacted on groundwater, sampling from three monitoring wells (MW1 to MW3) was undertaken.

A summary of the well locations and rationale is provided in Table 5.

Table 5: Summary of Groundwater Well Location and Rationale

Well ID	Location of Monitoring Well	Rationale
MW1 (Bore P1-1)	Precinct 1	To provide preliminary data on the concentration of contaminants in groundwater at the subject site.
MW2 (Bore P3-6)	Precinct 3	
MW3 (Bore P4-4)	Precinct 4	

The general sampling methods are described in the field work methodology, included in Appendix G.

10.5 Analytical Rationale

Soil

- All surface samples were analysed for a contaminant suite comprising metals, TRH, BTEX, PAH, OPC, PCB and asbestos (500 ml);
- Select fill samples collected at depths of up to 2.0 m were analysed for a suite comprising metals, TRH, BTEX, PAH, OCP and PCB;
- Two natural samples from Precincts 3 and 4 were analysed for a reduced contaminant suite comprising metals, TRH, BTEX and PAH;
- The fragment of fibrous material (suspected to contain asbestos – see Section 12.1) collected from Bore P1-1 at depths of 0.5 m was submitted to the laboratory for confirmatory purposes. A 500 ml soil sample was also collected from this fill layer and tested for asbestos; and
- Two samples were analysed for pH and CEC for derivation of the ecological investigation levels.

Sediment

- All surface sediment samples were analysed for a contaminant suite comprising metals, TRH, BTEX, PAH, OCP, PCB, phenols and TBT; and
- Select samples from each precinct (covering each distinct sediment matrix) were analysed for total organic carbon (%) for normalisation purposes.

Groundwater

- All groundwater samples were analysed for a contaminant suite comprising metals, TRH, BTEX, PAH, phenols and PFAS.

11. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation are informed by the CSM (Section 9) which identified human and environmental receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

Given that at the time of preparing the PSI, the layout of proposed buildings and areas of open space within each precinct had not been confirmed, a conservative SAC was adopted as summarised below:

- Precinct 1 - Residential (Land Use Category B for application of the health screening levels (HSL) for vapour intrusion);
- Precincts 3 and 4 – Commercial (Land Use Category D for application of the HSL for vapour intrusion); and
- Precincts 1, 3 and 4 – Recreational (Land Use Category C for application of other SAC).

The derivation of the SAC is included in Appendix F and the adopted SAC are listed on the summary analytical results tables in Appendix D.

12. Results

12.1 Field Work Results

12.1.1 Soil and Sediment

Details of the subsurface conditions encountered are given in the borehole logs and sediment sample descriptions in Appendix E, together with notes defining classification methods and descriptive terms. A summary of the ground profile observed (soil bores) is given below. Reference should also be made to Sections 12.1.2 below.

- SPRAY SEAL: Encountered in Bores P3-5, P3-6 and P4-2 to depths of up to 0.06 m;
- FILL: Typically brown, grey, orange brown, and grey brown mix of sand, silt, clay and / or gravel was encountered in all bores to depths of up to 2.8 m. Ballast was encountered in Bore P1-3 from depths of 1.2 m to 2.2 m. Bores P1-4 refused in fill at depths of 1 m.
- SAND / SILT / CLAY (Estuarine) – Typically grey or grey brown silty sand or sandy silt (but also sand, clayey sand, and clayey sandy silt / silty clay) was encountered in all boreholes (except Bore P1-4), underlying fill.
- CLAY / SAND (Alluvial) – Typically grey or grey mottled orange brown sandy clay or clay (but also clayey sand, and clayey silty sand) was encountered in Bores P1-1, P1-2, P3-1, P3-6 and P4-1;
- CLAY (Residual / Extremely Weathered Rock) – Encountered in Bores P4-1 and P4-2 as outlined below:
 - o Orange-brown mottled grey clay was encountered in Bore P4-1 from depths of 7.3 m to 13.10 m, underlain by pale grey mottled red brown clay; and
 - o Pale grey mottled red brown sandy clay was encountered in Bore P4-2 from depths of 1.6 m to 2.7 m.

- ROCK: Encountered in Bores P1-1, P1-2, P4-1 and P4-2 as outlined below:
 - o Pale grey or pale grey mottled red brown sandstone was encountered in Bores P1-1 at depths below 5.10 m and P1-2 at depths below 26.7 m;
 - o Pale grey mottled red brown sandstone, brown orange sandstone and dark grey siltstone was encountered in Bore P4 – 1 at depths below 14 m; and
 - o Pale grey mottled red brown claystone and orange brown sandstone was encountered in P4- 2 at depths below 2.7 m.

Free groundwater was encountered in all bores (excluding Bore P1-4 which refused in fill) at depths ranging from 0.4 m to 2.7 m. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and possibly tidal conditions, and will therefore vary with time. Reference should be made to Section 12.1.3 for water observations during groundwater sampling.

The sediment samples typically comprised dark grey or brown sand, sandy silt, silty sand or silt (alluvial).

12.1.2 Potential Contamination Observations

The following potential contamination observations were observed:

- A single fragment of fibrous material (suspected asbestos containing material) in Bore P1-1 at depths of 0.4 – 0.5 m; and
- Fragments of concrete in P4-3 from the surface to depths of up to 0.6 m.

With the exception of the above observations, there was no visual or olfactory evidence (e.g. staining, odours, free phase product) to suggest the presence of contamination within the soils or groundwater at the site. It is noted that there was a hydrogen sulfide odour in Bore P1-2.

The PID screening indicated the general absence of significant VOC impact in the sub surface soils, with all recorded values of less than 1 ppm.

12.1.3 Groundwater Levels and Parameters

The groundwater wells were developed on 30 October 2023 and sampled on 7 November 2023. Groundwater levels were gauged using an electronic oil/water interface meter prior to sampling. The measured water levels prior to sampling are shown in Table 6.

No phase-separated hydrocarbons (PSH) were observed during sampling.

Table 6: Summary of Groundwater Level Measurements on 7 November 2023

Well ID	Location of Monitoring Well	Ground Level * m (AHD)	SWL m (bgl)	SWL m (AHD)
MW1 (Bore P1-1)	Precinct 1	1.4	0.95	0.45
MW2 (Bore P3-6)	Precinct 3	1.5	1.28	0.22
MW3 (Bore P4-4)	Precinct 4	1.3	1.22	0.08

Notes:

*Surveyed by dGPS

AHD – Australian Height Datum

SWL – standing water level

bgl – below ground level

Based on the site layout (i.e. adjacent Brisbane Water), it is anticipated that groundwater would flow towards and discharge into Brisbane Water.

The stabilised groundwater field parameters recorded prior to sampling are summarised below in Table 7.

Table 7: Summary of Groundwater Field Parameters

Well and Bore ID	Temp. (°C)	DO (ppm)	EC (µS/cm)	pH	Redox (mV)	Observations
MW1 (Bore P1-1)	21.6	0.46	824	6.1	-32	Clear, no sheen or odour
MW2 (Bore P3-6)	26.5	0.17	3,980	7.2	-165	
MW3 (Bore P4-4)	19.9	0.1	634	6.2	-103	No sheen, strong odour (hydrogen sulfide), pale brown/orange in colour

The pH was slightly acidic / neutral and the dissolved oxygen (DO) and redox potential (Eh) results indicates anoxic and reducing conditions.

12.2 Laboratory Analytical Results

The laboratory results are summarised in Tables D1 to D3, Appendix D, together with the adopted SAC. Laboratory certificates of analysis together with the chain of custody documentation are provided in Appendix J. It should be noted that in Laboratory Report 337031, the sample reference differs slightly from the reference provided on the COC (i.e. sample depth missing). The correct sample reference has been provided in Table D1.

A summary of the results is provided below:

Soil

- Concentrations of BTEX, OCP and PCB were below the practical quantitation limit (PQL) and SAC in all samples;
- Concentrations of metals were below the SAC in all samples;
- Concentrations of TRH and PAH were below the SAC in all samples, with the exception of the following:
 - o Concentrations of B(a)P in four samples exceeded the ecological SAC of 0.7 mg/kg, with concentrations ranging from 0.98 mg/kg to 3.3 mg/kg. It is noted that the B(a)P ecological SAC is a low reliability value. Higher reliability screening levels have been published in CRC CARE Risk-based Management and Remediation Guidance for Benzo(a)pyrene (CRC CARE, 2017). The high reliability value of 33 mg/kg (or ranging from 21 mg/kg to 135 mg/kg) for fresh B(a)P suggests that the concentrations of B(a)P detected at the site are unlikely to pose an unacceptable risk to terrestrial ecosystems;
 - o Concentrations of B(a)P TEQ exceeded the human health criteria of 3 mg/kg in two samples (P1-1/0.1 (4.4 mg/kg) and P1-3/1.0 (4.3 mg/kg));
 - o Concentrations of TRH F3 fraction exceeded the ecological SAC (300 mg/kg) in sample P1- 3/1.0 (540 mg/kg). Further silica-gel cleanup analysis was undertaken on this sample (refer to Appendix J, Laboratory Report 336823-A, page 2), however the concentration of TRH F3 was 400 mg/kg, and still above the SAC;
- Based on the initial laboratory results, further toxicity characteristic leachate procedure (TCLP) and Australian Standard Leachate Procedure (ASLP) was undertaken to assess the leachability of PAH through the sub-surface, and leachability under typical site conditions, respectively. The TCLP and ASLP results (refer to Appendix J, Laboratory Report 336823-A, pages 3 and 4) indicated soil samples impacted by relatively high PAH concentrations typically have a low leaching potential (i.e. the PAH appear to be bound to the soil matrix and are therefore unlikely to leach PAH impacts into the underlying soils and/or migrate away from the source areas via groundwater seepage movement);
- The fragment of fibrous material found in Bore P1-1 at depths of 0.4 m - 0.5 m was confirmed to contain asbestos; and
- No asbestos was detected in soil samples at the reporting limit of 0.1g/kg and concentrations of fibrous asbestos (FA) / asbestos fines (AF) were <0.001 % w/w.

Sediment

- Concentrations of BTEX, TBT, PCB and phenols were below the PQL and / or SAC in all samples;
- Concentrations of PAH were below the SAC in all samples;
- Concentrations of metals were below the SAC (default guideline value (DGV) in all samples with the exception of the following:
 - Concentrations of lead in Samples P1-SS6, P1-SS8, P1-SS9 and P1-SS11, with concentrations ranging from 52 mg/kg to 66 mg/kg, which exceeded the DGV of 50 mg/kg; and
 - Concentrations of mercury in Sample P1-SS6 (0.2 mg/kg) which exceeded the DGV of 0.15 mg/kg.
- Concentrations of TRH in sample P1-SS5 (490 mg/kg) exceeded the SAC of 280 mg/kg. Further silica gel clean-up (SGC) was undertaken on this sample (refer to Appendix J, Laboratory Report 336824-B, Pg 2). The resultant concentration was below the SAC. Based on the SGC result, the elevated concentration of TRH is considered to be due to an organic source and is not considered to be an exceedance of the SAC; and
- Concentrations of OCP were below the DGV in all samples with the exception of the following:
 - Concentrations of DDD (0.006 mg/kg), chlordane (0.037 mg/kg) and dieldrin (0.0315 mg/kg) in Sample P1-SS5 which exceeded the corresponding DGV criteria. It is noted that chlordane and dieldrin also exceeded the GV-high criteria; and
 - Concentrations of DDT (0.00265 mg/kg) in Sample P1 – SS10 which exceeded the DGV criteria of 0.0012 mg/kg.

Douglas notes that elevated concentrations of lead have previously been reported in Brisbane Water (see Section 6.1).

Groundwater

- Concentrations of chromium, mercury, TRH, BTEX, PAH and phenols in all samples were either at or below the PQL, and below the SAC;
- Concentrations of PFHxS + PFOS and PFOA were below the SAC;
- Concentrations of PFOS exceeded the aquatic ecosystem SAC (0.00023 µg/L - 99% level of protection (LOP)) in the following samples:
 - Well MW2 (0.0021 µg/L); and
 - Well MW3 (0.0086 µg/L).

It is noted that concentrations of PFOS in the above samples are below the 95 % LOP guideline values;

- Concentrations of certain metals exceeded the aquatic ecosystem SAC (cadmium (0.7 µg/L), copper (1.3 µg/L), lead (4.4 µg/L), nickel (7 µg/L) and zinc (8 µg/L)) as outlined below:
 - Well MW1 – zinc (26 µg/L);
 - Well MW2 – copper (2 µg/L), nickel (9 µg/L) and zinc (corresponding QA sample - 12 µg/L)
 - Well MW3 – cadmium (1.3 µg/L), copper (3 µg/L), lead (5 µg/L), nickel (17 µg/L) and zinc (670 µg/L)

Based on Douglas' experience in the area, the concentrations of copper, zinc and / or nickel in groundwater in Wells MW1 and MW2 are considered likely to be attributed to the background concentrations that would be associated with the mineralogy of the clay, fractured rock and local urban runoff.

Douglas notes that the concentration of zinc in Well MW3 was significantly higher than the SAC and appears to be an outlier. Douglas also considers that this exceedance could be associated with minor breakthrough of particulates during the filtering process. Nevertheless, given that concentration of cadmium (which is rarely detected in groundwater at concentrations above the laboratory reporting limit), copper, lead and nickel also exceeded the SAC at this location, it is considered another round of groundwater sampling should be undertaken to confirm the results.

With regards to the PFOS exceedances, Douglas notes that a source of PFAS at the site has not been identified and detectable concentrations are commonly found in urban environments. Therefore, the PFAS concentrations in groundwater are likely to be representative of background conditions in the urban city environment.

12.3 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA/QC) results are included in Appendix I. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

13. Discussion

The current PSI comprised a review of site history information, a walkover, preliminary intrusive investigations comprising soil, sediment and groundwater sampling, and associated laboratory testing.

The site history review and walkover identified potential contaminating land uses / activities including land reclamation, demolition of structures, commercial business (e.g. swimming pool complex and sailing club) and boating related activities. In summary, the following potential sources of contamination were identified at the site: (S1) fill, (S2) existing marina and associated maintenance activities, (S3) hazardous building materials in existing structures and application of chemicals/pesticides within the crawl space (e.g. spraying for termites), (S4) bowling greens / sporting field (Precinct 2), (S5) existing swimming pool complex and (S6) surrounding land uses (e.g railway line and commercial / industrial land uses).

The current intrusive investigation was limited to Precincts 1, 3 and 4 and comprised the drilling of 14 boreholes, installation of three groundwater monitoring wells and collection of seventeen surface sediment samples, with the aim to inform the contamination conceptual site model for the site. Fill was encountered in all boreholes to depths of up to 2.8 m.

A summary of the key laboratory results is presented in Table 8 below.

Table 8: Summary of Results that Exceeded the Site Assessment Criteria

Sampling Location	Precinct	Contaminant Exceedance	SAC exceeded	Comments
Soil				
Bore P1-1/0.1	Precinct 1	B(a)P TEQ	Human Health	N/A
Bore P1-1/0.5	Precinct 1	Asbestos (fragment)	N/A	
Bore P1-3/1.0	Precinct 1	B(a)P TEQ	Human Health	
		TRH F3	Ecological	
Groundwater				
MW1	Precinct 1	Zinc	Aquatic ecosystems	Likely attributed to background concentrations / conditions
MW2	Precinct 3	Copper, nickel, zinc, PFOS (99% LOP)	Aquatic ecosystems	
MW3	Precinct 4	Cadmium, copper, lead, nickel, zinc, PFOS (99% LOP)	Aquatic ecosystems	N/A
Sediment				
P1-SS8 P1-SS9 P1-SS11	Precinct 1	Lead	Sediment quality (DGV)	N/A
P1-SS6	Precinct 1	Lead and mercury	Sediment quality (DGV)	
P1-SS5	Precinct 1	DDD	Sediment quality (DGV)	
		Chlordane, dieldrin	Sediment quality (DGV) and GV-high	
P1-SS10	Precinct 1	DDT	Sediment quality (DGV)	

Although the sampling plan adopted for the PSI is considered to be adequate to meet the project objectives, the following data gaps have been identified, which should be addressed:

- The current investigation included limited asbestos testing from boreholes and did not include the collection / sieving of bulk 10 L samples to assess ACM concentrations. The extent of asbestos impacts has therefore not been accurately delineated;

- Given the preliminary nature of the investigation, only limited sampling was undertaken across the site. Douglas notes that of the four boreholes drilled in Precinct 1 (noting that samples from Bore P1-4 were not submitted for laboratory analysis – see Section 10.2), SAC exceedances were reported in two of the boreholes. Furthermore, based on the extensive land reclamation activities that have taken place, there remains a potential for contamination between sampling points, in Precincts 3 and 4; and
- The sediment investigation was limited to the collection of surface samples to provide a preliminary indication of sediment quality. The contaminant concentration in sediments at depth is currently not known (e.g if dredging is proposed as part of the redevelopment works).

14. Conclusions and Recommendations

Based on the site history review, field and laboratory results, it is considered that the site can be made suitable for the proposed development, subject to the completion of a detailed site investigation (DSI) which should include the following:

- Further soil investigations to assess the possible extent and implications of contamination including:
 - o Further characterisation including lateral and vertical delineation of the B(a)P TEQ impacts in Precinct 1;
 - o Detailed asbestos investigation, including collection of bulk (10L) soil samples for sieving and determination of ACM concentrations within Precinct 1;
 - o Further investigation in Precincts 2, 3 and 4, to address the existing data gaps.
- Further sediment investigation, including sampling at depth, to further characterise and delineate the identified sediment impacts. This would include sediment sampling from other areas along Brisbane Water, within the site boundary that are proposed to be redeveloped/disturbed; and
- Undertake an additional round of groundwater sampling to confirm the concentrations of metals in Well MW3. It is considered surface water sampling may also be warranted.

It is recommended that a sampling analysis and quality plan (SAQP) is prepared for individual precincts or development areas. Furthermore, it is considered that proposed development plans should be reviewed, to identify areas of building footprints and open-space recreational areas, that would inform the assessment, management and/or remediation options that may be required.

15. References

- CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene*. Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.
- CSIRO. (2016). *Sediment Quality Assessment, A Practical Guide, Second Edition*. CSIRO Publishing.
- Douglas. (2019). *Report on Preliminary Site Investigation for Contamination, Proposed Regional Playground and Public Open Space, Leagues Club Field, Gosford*. Douglas Partners Pty Ltd: Ref: 83503.01.R.001.Rev0 dated 4 February 2019.
- NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.
- NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.
- NSW EPA. (2022). *Contaminated Sites, Sampling Design Guidelines*. NSW Environment Protection Authority.
- SESL. (2018). *Detailed Site Investigation - Gosford Leagues Club Field*. SESL Australia : Ref: J001634 dated May 2019.
- SJB. (2024). *Gosford Waterfront Revitalisation Masterplan, Urban Design Report*. March 2024.
- UoS. (2007). *Heavy metal distribution and sediment quality in the Brisbane Water Estuary, NSW*. The Environmental Geology Group, University Of Sydney: June 2007.

16. Limitations

Douglas Partners (Douglas) has prepared this report for this project at Gosford Waterfront, Central Coast Highway, Gosford in accordance with Douglas' proposal 225005.00.P.001.Rev0 dated 4 September 2023 and acceptance received from Central Coast Council dated 26 September 2023.

The work was carried out under Central Coast Council's Standard Conditions of Contract for Professional Service v2.11 with agreed amendments, as detailed in the letter of acceptance. This report is provided for the exclusive use of Central Coast Council for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results 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 Douglas' field testing has been completed.

Asbestos was detected in a fragment of fibrous material at one borehole location, as documented in this report. 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 (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, 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.

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

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

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

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

Appendix A

About this Report

Drawings 1 to 5

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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at

the time of construction as are indicated in the report; and

- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

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

Reports

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

continued next page

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.

intentionally blank

intentionally blank



Legend

- Approximate Site Boundary
- Approximate Precinct 1 Boundary
- Approximate Precinct 2 Boundary
- Approximate Precinct 3 Boundary
- Approximate Precinct 4 Boundary

100 0 100 200 300 400 m Drawing adapted from Metromap Image, dated 12 September 2022

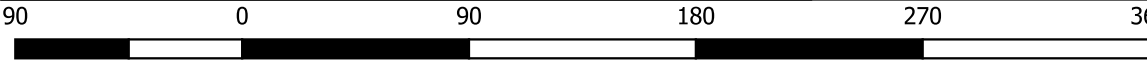
CLIENT: Central Coast Council	OFFICE: Central Coast	DRAWN BY: CLN	SCALE: 1:4,000 @ A3	PROJECT No: 225005.00
	TITLE: Site and Precinct Boundaries			DATE: 3.11.23
	Gosford Waterfront Revitalisation Masterplan			DRAWING No: 1
	Gosford Waterfront, Central Coast Highway, Gosford			REVISION: 0







- Legend**
- Approximate Site Boundary
 - Approximate Precinct Boundary
 - Approximate Borehole Location
 - Approximate Borehole / Groundwater Monitoring Well Location



Drawing adapted from Metromap Image, dated 12 September 2022

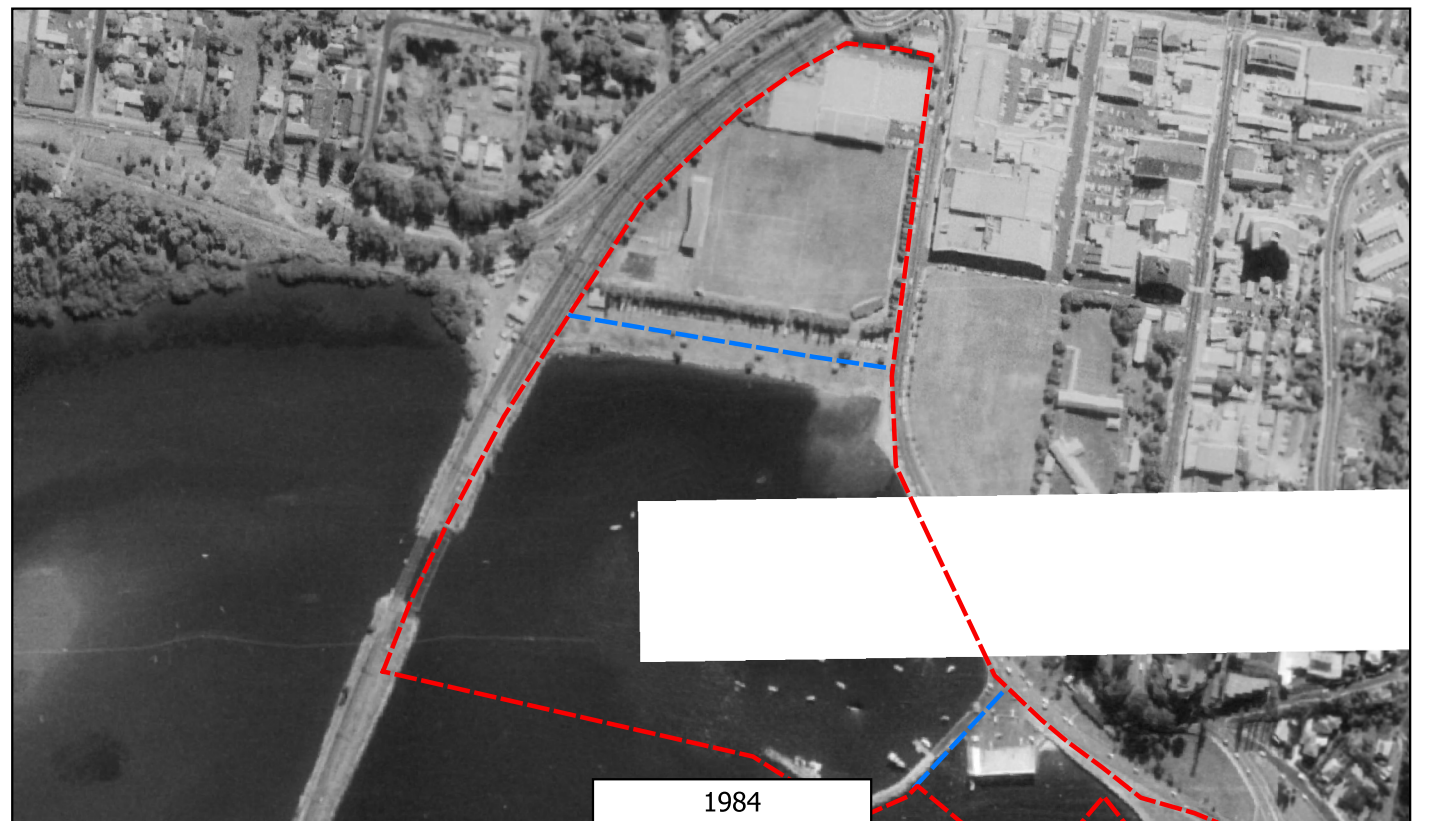
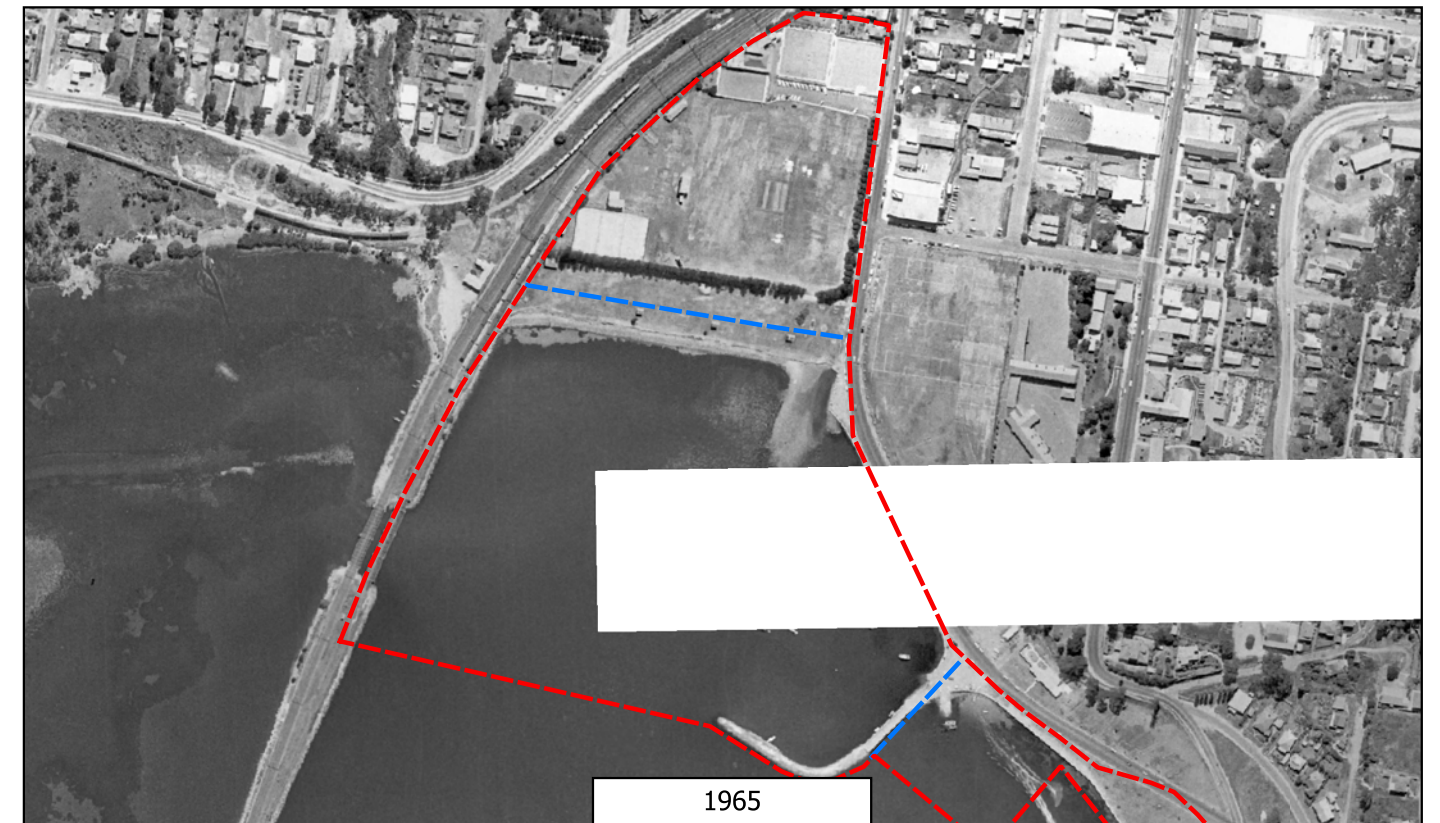
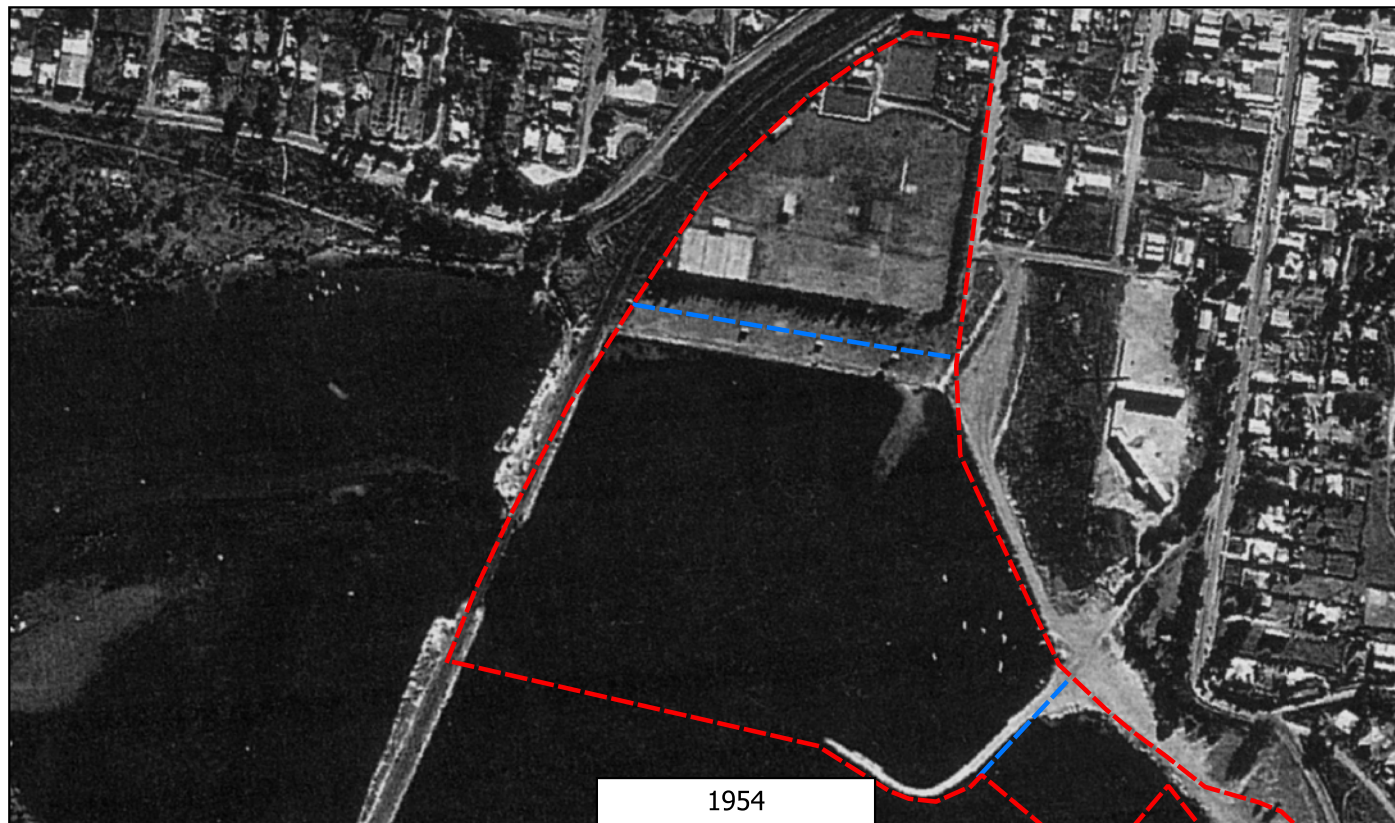
CLIENT: Central Coast Council	OFFICE: Central Coast	DRAWN BY: CLN	SCALE: 1:3,000 @ A3		PROJECT No: 225005.00
 Douglas Partners <i>Geotechnics Environment Groundwater</i>	TITLE: Borehole Location Plan Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford				DATE: 3.11.23
					DRAWING No: 4
					REVISION: 0



Appendix B

Historical Aerial Photographs

EPA Site Searches and Council Records



100 0 100 200 300 400 m

Legend

- Approximate Site Boundary
- Approximate Precinct Boundary



1994



2010



2015



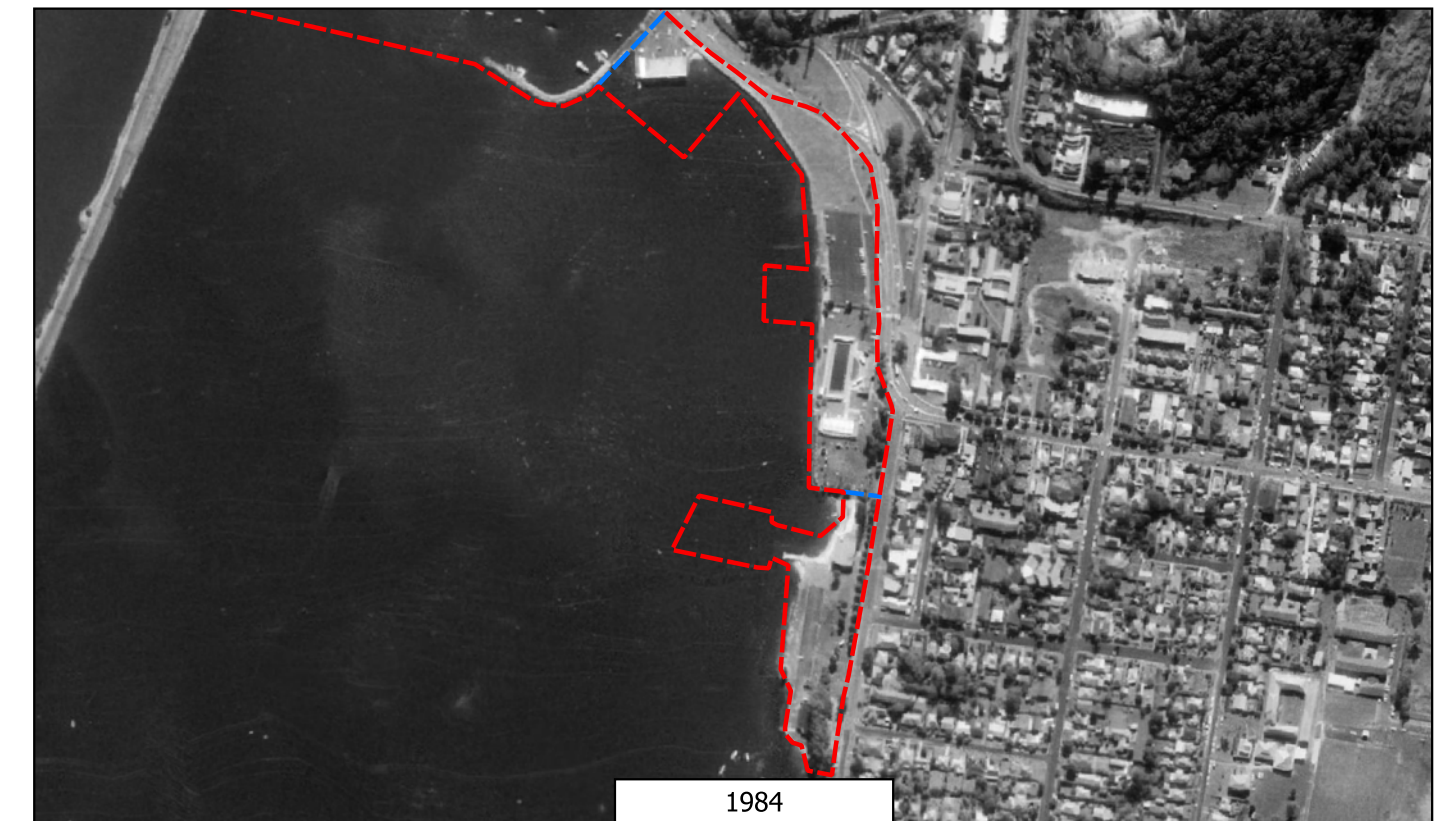
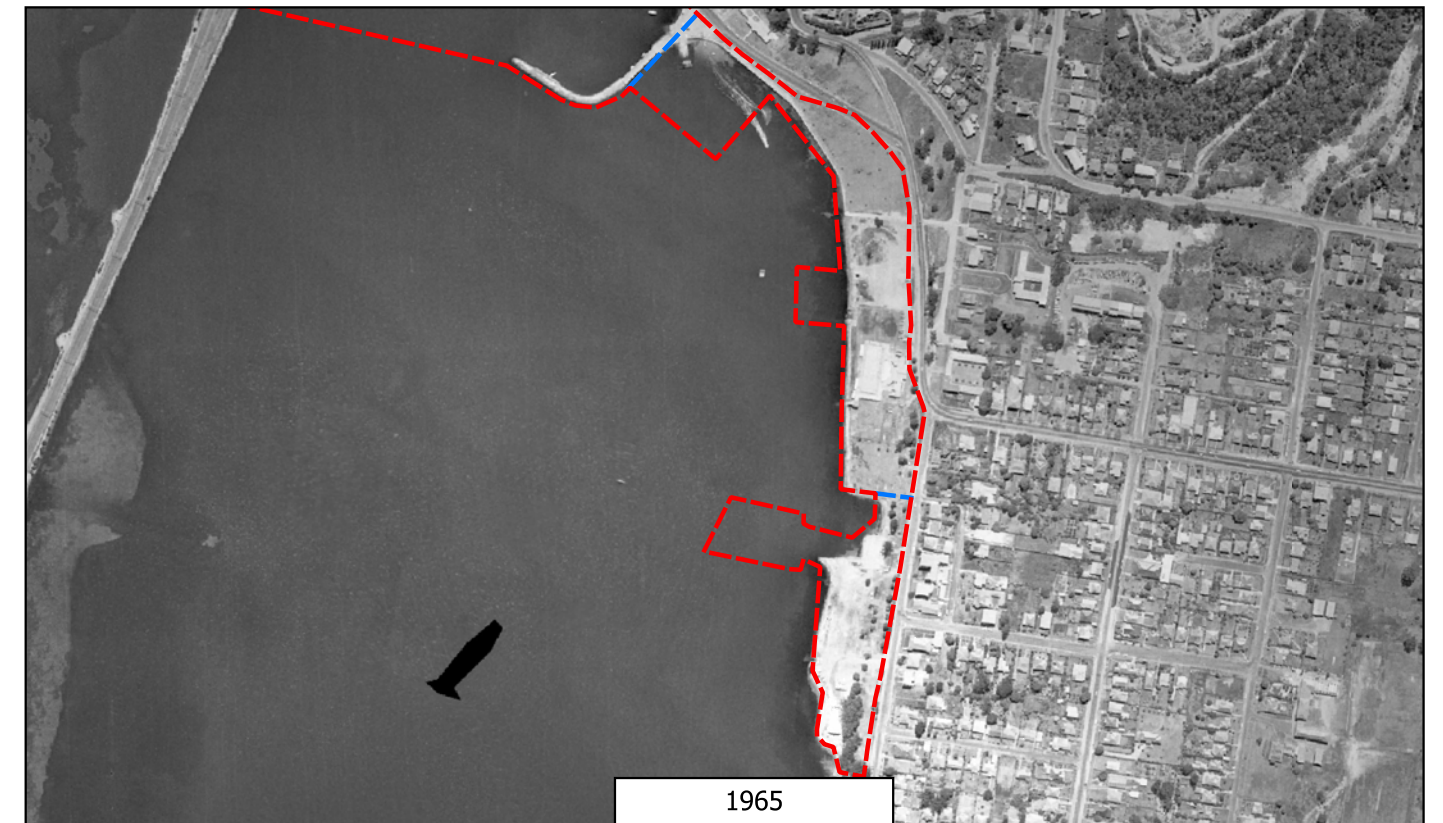
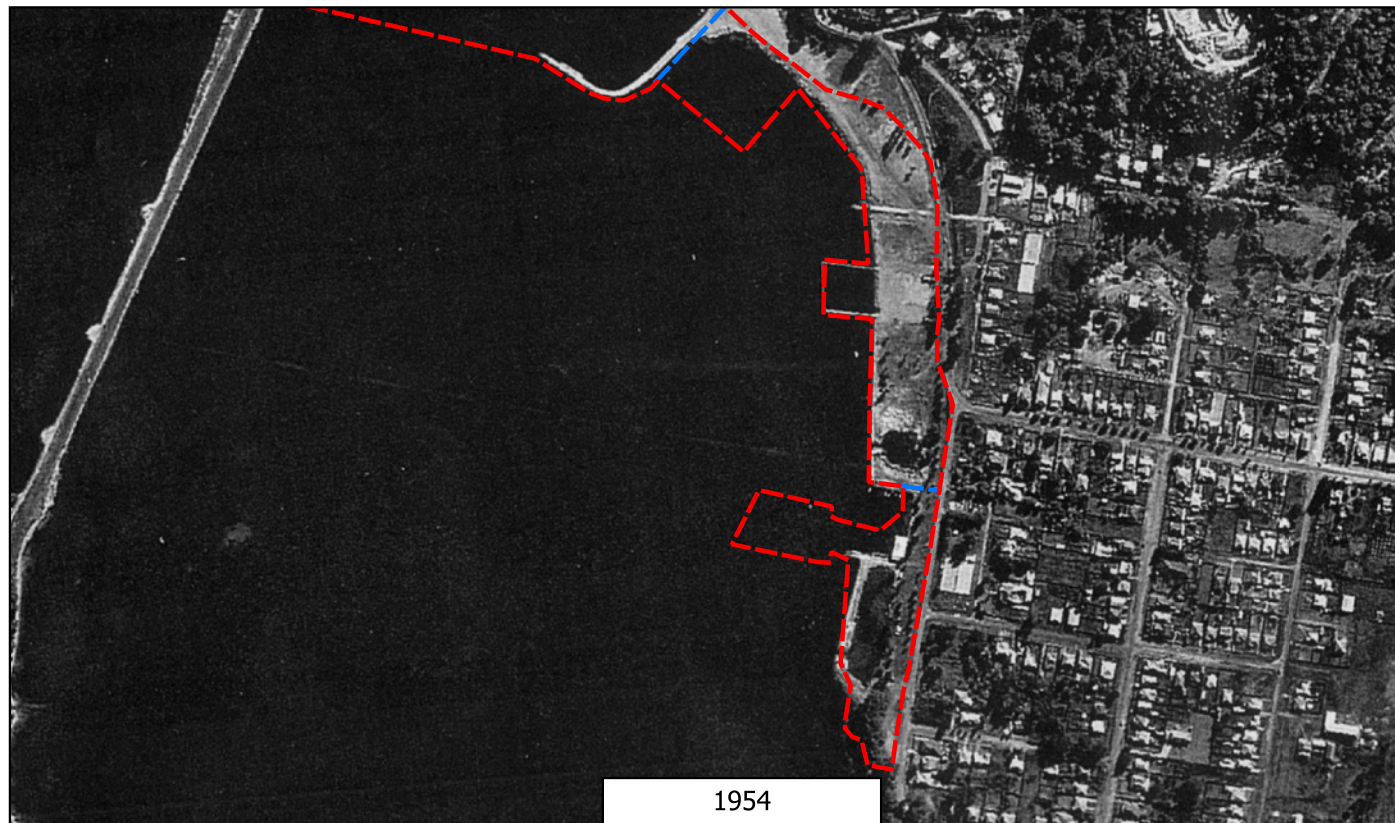
2022

100 0 100 200 300 400 m

Legend

- Approximate Site Boundary
- Approximate Precinct Boundary





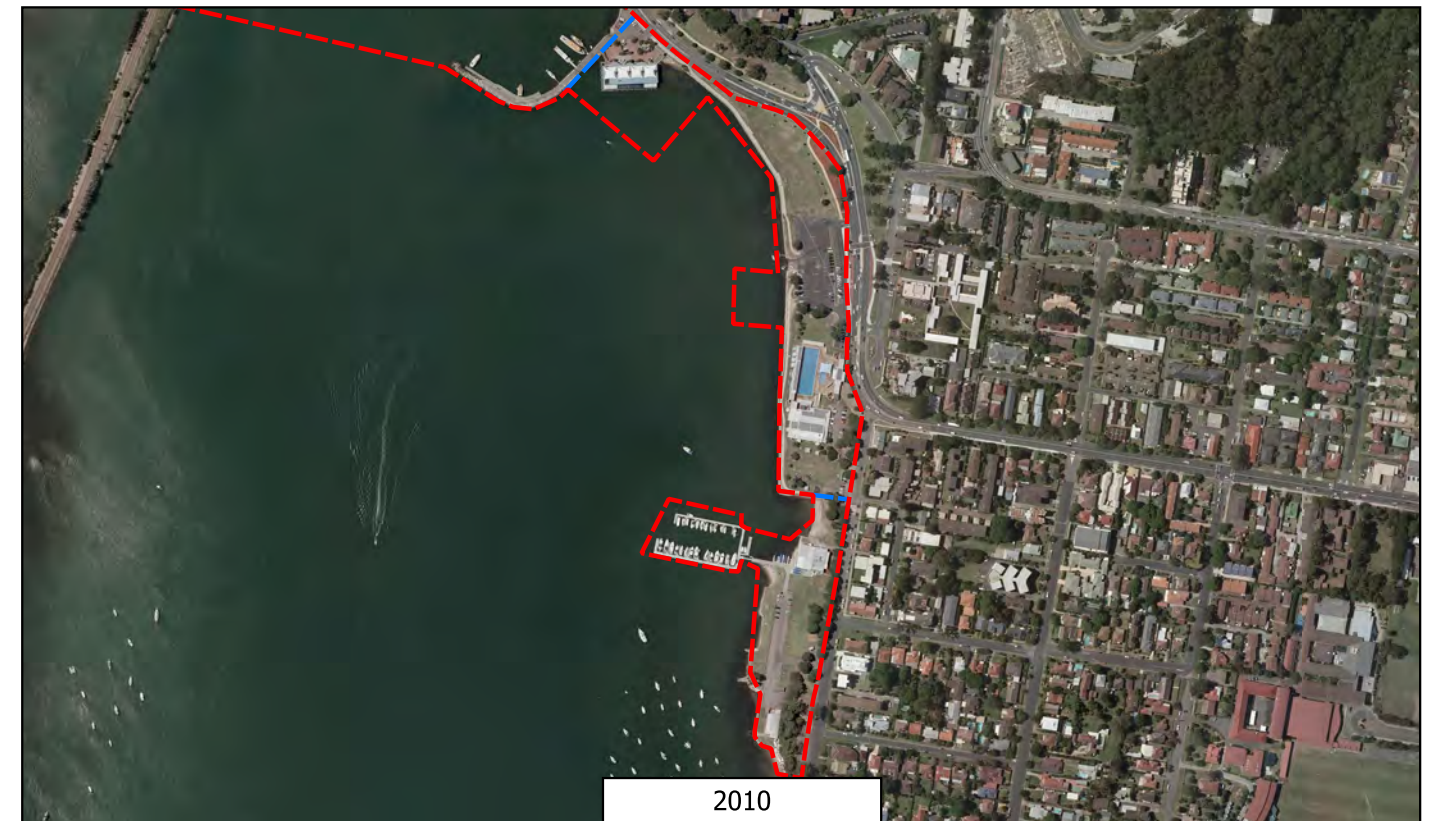
200 0 200 400 600 800 m

Legend

- Approximate Site Boundary
- Approximate Precinct Boundary



1994



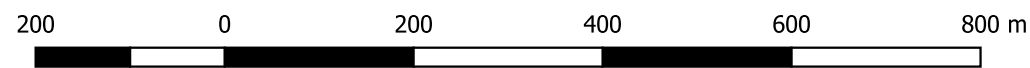
2010



2015



2022



Legend

- Approximate Site Boundary
- Approximate Precinct Boundary



Appendix B

EPA Site Searches and Council Records

NSW **epa** Your environment Reporting, incidents and recovery programs Licensing and Regulation Working together About us

Public registers

- POEO Public Register
- Contaminated land record of notices
 - About the record of notices
 - List of notified sites
 - Tips for searching
 - Disclaimer
- Dangerous goods licences
- Pesticide licences
- Radiation licences

Home Public registers Contaminated land record of notices

Search results

Your search for: Suburb: GOSFORD

did not find any records in our database

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the [planning process](#).

More information about particular sites may be available from:

- The [POEO public register](#).
- The appropriate planning authority, for example, on a planning certificate issued by the local council under [section 149 of the Environmental Planning and Assessment Act](#).

See [What's in the record](#) and [What's not in the record](#).

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed. This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register [POEO public register](#).

10 October 2023

Search results

Your search for: LGA: CENTRAL COAST COUNCIL

Matched 64 notices relating to 16 sites.

Suburb	Address	Site Name	Notices related to this site
BATEAU BAY	The Entrance ROAD	Former landfill	1 current
CALGA	101 Peats Ridge ROAD	Former service station	2 former
EAST GOSFORD	Althrop STREET	Hylton Moore Park	3 current and 2 former
EAST GOSFORD	44 Victoria STREET	Mobil Service Station	7 former
EMPIRE BAY	16B Sorrento ROAD	Empire Bay Marina	2 current
ERINA	1 Aston ROAD	Jaycar Electronics Store	1 current and 2 former
KANWAL	68 and part of 70 Craigie AVENUE	Kanwal General Store and Fuel Supplies and Adjacent Land	5 current and 4 former
KINCUMBER	Avoca DRIVE	Frost Reserve	3 current and 2 former
LONG JETTY	290-294 The Entrance ROAD	Westside Petroleum Service Station	2 current
WARNERVALE	Aldenhams and Railway ROADS	Former Timber Treatment Plant	3 former
WEST GOSFORD	Central Coast HIGHWAY	Adcock Memorial Park	3 current and 2 former
WEST GOSFORD	356 Manns ROAD	Metro Meat	2 former
WOY WOY	66 Memorial AVENUE	Bogas Service Station	4 current and 5 former
WOY WOY	177-181 Blackwall ROAD	Mobil Former Woy Woy Service Station and adjacent land	4 former
WYONG	Lot 4 Warner AVENUE	Drum Dump - Wyong	2 former
WYONG	16 Lucca ROAD	Wyong Bayer/Kemcon	3 former

	A	B	C	D	E	F	G	H
	Suburb	SiteName	Address	ContaminationActivityType	ManagementClass	Latitude	Longitude	
32	GOONELLABAH	Road Cattle Dip	161 Invercauld ROAD	Cattle Dip	under the CLM Act	-28.83098216	153.3097337	
33	GOSFORD	United (former Mobil) Depot	Corner Merinee Road and Bowen CRESCENT	Other Petroleum	Regulation under CLM Act not required	-33.41523225	151.3257069	
34	GOULBURN	Former Goulburn Gasworks	1 Blackshaw ROAD	Gasworks	Ongoing maintenance required to manage residual contamination	-34.75313166	149.725032	
35	GOULBURN	Goulburn Tannery	13 Gibson STREET	Other Industry	Regulation under CLM Act not required	-34.73756525	149.72059	
36	GOULBURN	Caltex Depot	13 Sloane STREET	Other Petroleum	Regulation under CLM Act not required	-34.77423152	149.7088626	
37	GOULBURN	Metro Goulburn Depot	23 Braidwood ROAD	Other Petroleum	Regulation under CLM Act not required	-34.76217302	149.7170897	
38	GOULBURN	Caltex Service Station	72-74 Clinton STREET	Service Station	Regulation under CLM Act not required	-34.75728157	149.7135824	
39	GOULBURN	Caltex Service Station	68 Goldsmith STREET	Service Station	Regulation under CLM Act not required	-34.75054432	149.7192098	
70	GOULBURN	Former Shell Autoport Service Station	Corner Bruce Street and Lagoon STREET	Service Station	Regulation under CLM Act not required	-34.74807885	149.7266246	
71	GOULBURN	Coles Express Service Station	90 Cowper (Corner Clinton Street) STREET	Service Station	Regulation under CLM Act not required	-34.75566648	149.7107831	
72	GOULBURN	Mobil Service Station	129 Lagoon STREET	Service Station	formerly regulated under the CLM Act	-34.74618793	149.7330484	
73	GOULBURN	Caltex Service Station	315 Auburn, corner Bradley STREET	Service Station	Regulation under CLM Act not required	-34.74942293	149.7232692	
74	GOULBURN	Former Mobil Service Station Goulburn	422-426 Auburn STREET	Service Station	Regulation under CLM Act not required	-34.74869879	149.7229392	
75	GOULBURN	Goulburn Roundhouse	12 Braidwood ROAD	Other Industry	currently regulated under CLM Act	-34.77409903	149.7106462	

Public registers

– POEO Public Register

Licences, applications and notices search

Penalty notices search

Enforceable undertakings search

Enforceable undertakings media releases

Exemptions and approvals search

Prosecutions or civil proceedings search

Terms of use: POEO public register

Licensing FAQs

List of licences

Unlicensed premises regulated by the EPA

+ Contaminated land record of notices

Dangerous goods licences

Pesticide licences

Radiation licences

[Home](#) [Public registers](#) [POEO Public Register](#) [Licences applications and notices search](#)

Search results

Your search for: **General Search** with the following criteria

Suburb - Gosford
returned 32 results

[Export to excel](#)

1 of 2 Pages

[Search Again](#)

Number	Name	Location	Type	Status	Issued date
11982	AUSGRID	Cnr Faunce Street & Racecourse Road, GOSFORD, NSW 2250	POEO licence	Surrendered	18 Aug 2004
1096145	AUSGRID	Cnr Faunce Street & Racecourse Road, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	20 Mar 2009
1518677	AUSGRID	Cnr Faunce Street & Racecourse Road, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	12 Mar 2015
1531494	AUSGRID	Cnr Faunce Street & Racecourse Road, GOSFORD, NSW 2250	s.80 Surrender of a Licence	Issued	22 Jun 2015
952	BITUPAVE LTD	LOT 1 COMSERV CLOSE, GOSFORD, NSW 2250	POEO licence	No longer in force	10 Mar 2000
1018071	BITUPAVE LTD	LOT 1 COMSERV CLOSE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	04 Mar 2003
12170	CENTRAL COAST COUNCIL	-, GOSFORD, NSW 2250	POEO licence	Issued	16 May 2005
1627407	CENTRAL COAST COUNCIL	-, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	10 May 2023
20269	DOWNER EDI WORKS PTY LTD	Main North Line Corridor - 2km section between Gosford and Narara Stations, GOSFORD, NSW 2250	POEO licence	Surrendered	14 May 2013
1519858	DOWNER EDI WORKS PTY LTD	Main North Line Corridor - 2km section between Gosford and Narara Stations, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	14 Feb 2014
1520252	DOWNER EDI WORKS PTY LTD	Main North Line Corridor - 2km section between Gosford and Narara Stations, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	14 Mar 2014
1530755	DOWNER EDI WORKS PTY LTD	Main North Line Corridor - 2km section between Gosford and Narara Stations, GOSFORD, NSW 2250	s.80 Surrender of a Licence	Issued	19 May 2015
1400	GOSFORD CITY COUNCIL	MASONS PARADE, GOSFORD, NSW 2250	POEO licence	Surrendered	24 Jul 2000
1005850	GOSFORD CITY COUNCIL	MASONS PARADE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	24 Aug 2001
1033576	GOSFORD CITY COUNCIL	MASONS PARADE, GOSFORD, NSW 2250	s.80 Surrender of a Licence	Issued	02 Jan 2004
1063899	GOSFORD CITY COUNCIL	-, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	16 Aug 2006
1082123	GOSFORD CITY COUNCIL	-, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	03 Apr 2008
1521868	GOSFORD CITY COUNCIL	-, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	03 Jun 2014
1528925	GOSFORD CITY COUNCIL	-, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	06 Oct 2015
1037723	HCOA OPERATIONS (AUSTRALIA) PTY LIMITED	9 BURRABILL AVENUE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	06 Jul 2004

12

30 October 2023

Public registers

POEO Public Register

Licences, applications and notices search

Penalty notices search

Enforceable undertakings search

Enforceable undertakings media releases

Exemptions and approvals search

Prosecutions or civil proceedings search

Terms of use: POEO public register

Licensing FAQs

List of licences

Unlicensed premises regulated by the EPA

+ Contaminated land record of notices

Dangerous goods licences

Pesticide licences

Radiation licences

[Home](#) [Public registers](#) [POEO Public Register](#) [Licences, applications and notices search](#)

Search results

Your search for: **General Search** with the following criteria

Suburb - Gosford

returned 32 results

[Export to excel](#)

2 of 2 Pages

[Search Again](#)

Number	Name	Location	Type	Status	Issued date
10404	HEALTH CARE NORTH GOSFORD PTY LTD	9 BURRABILL AVENUE, GOSFORD, NSW 2250	POEO licence	No longer in force	03 May 2000
10338	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	HOLDEN STREET, GOSFORD, NSW 2250	POEO licence	No longer in force	16 May 2000
1006833	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	HOLDEN STREET, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	30 Jun 2001
1019136	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	HOLDEN STREET, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	17 Jul 2002
1037415	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	HOLDEN STREET, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	11 Jun 2004
1039714	NORTHERN SYDNEY AND CENTRAL COAST AREA HEALTH SERVICE	HOLDEN STREET, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	09 Sep 2004
11647	ROADS & TRAFFIC AUTHORITY OF NEW SOUTH WALES	F3 SYDNEY TO NEWCASTLE FREEWAY, JOLLS BRIDGE TO MOUNT WHITE, GOSFORD, NSW 2250	POEO licence	Surrendered	10 Jul 2002
1022835	ROADS & TRAFFIC AUTHORITY OF NEW SOUTH WALES	F3 SYDNEY TO NEWCASTLE FREEWAY, JOLLS BRIDGE TO MOUNT WHITE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	26 Feb 2003
1025703	ROADS & TRAFFIC AUTHORITY OF NEW SOUTH WALES	F3 SYDNEY TO NEWCASTLE FREEWAY, JOLLS BRIDGE TO MOUNT WHITE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	23 Jun 2003
1030951	ROADS & TRAFFIC AUTHORITY OF NEW SOUTH WALES	F3 SYDNEY TO NEWCASTLE FREEWAY, JOLLS BRIDGE TO MOUNT WHITE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	19 Sep 2003
1039750	ROADS & TRAFFIC AUTHORITY OF NEW SOUTH WALES	F3 SYDNEY TO NEWCASTLE FREEWAY, JOLLS BRIDGE TO MOUNT WHITE, GOSFORD, NSW 2250	s.58 Licence Variation	Issued	09 Sep 2004
1043395	ROADS & TRAFFIC AUTHORITY OF NEW SOUTH WALES	F3 SYDNEY TO NEWCASTLE FREEWAY, JOLLS BRIDGE TO MOUNT WHITE, GOSFORD, NSW 2250	s.80 Surrender of a Licence	Issued	03 Jun 2005

12

30 October 2023

Public registers

- POEO Public Register
 - Licences, applications and notices search
 - Penalty notices search
 - Enforceable undertakings search
 - Enforceable undertakings media releases
 - Exemptions and approvals search
 - Prosecutions or civil proceedings search
 - Terms of use: POEO public register
 - Licensing FAQs
 - List of licences
 - Unlicensed premises regulated by the EPA
- Contaminated land record of notices
- Dangerous goods licences
- Pesticide licences
- Radiation licences

[Home](#)
[Public registers](#)
[POEO Public Register](#)
[Licences, applications and notices search](#)

Licence summary

[Search Again](#)
[Return to Previous Page](#)

Summary Licence No: 1400

[View this licence](#) (PDF document 105 kb)

Licence holder:	GOSFORD CITY COUNCIL
Premises:	GOSFORD OLYMPIC POOL MASONS PARADE, GOSFORD, NSW, 2250 LGA: CENTRAL COAST Catchment: Hawkesbury
Administrative fee:	\$585.00
Licence status:	Surrendered
Activity type:	Miscellaneous licensed discharge to waters (at any time)
Licence review:	Complete date 24 Sep 2001 Due date 24 Sep 2004
Pollution incident management plan:	No

Applications

Number	Application type	Current status	Date received
1033576	s.80 Surrender of a Licence	Issued	11 Dec 2003

Notices

Number	Issue date	Notice type
1005850	24 Aug 2001	s.58 Licence Variation
1033576	02 Jan 2004	s.80 Surrender of a Licence

Annual Returns

Start date	End date	Date received	Non-compliance	LBL data
01-Dec-2003	02-Jan-2004	01-Jun-2004	No	Not available
01-Dec-2002	30-Nov-2003	24-Dec-2003	No	Not available
01-Dec-2001	30-Nov-2002	09-Jan-2003	No	Not available
01-Dec-2000	30-Nov-2001	31-Jan-2002	No	Not available
01-Dec-1999	30-Nov-2000	01-Feb-2001	No	Not available

Public registers

- POEO Public Register
 - Licences, applications and notices search
 - Penalty notices search
 - Enforceable undertakings search
 - Enforceable undertakings media releases
 - Exemptions and approvals search
 - Prosecutions or civil proceedings search
 - Terms of use: POEO public register
 - Licensing FAQs
 - List of licences
 - Unlicensed premises regulated by the EPA
- Contaminated land record of notices
- Dangerous goods licences
- Pesticide licences
- Radiation licences

[Home](#)
[Public registers](#)
[POEO Public Register](#)
[Licences, applications and notices search](#)

Notice summary

[Search Again](#)
[Return to Previous Page](#)

Summary of Notice No: 1005850

[View report](#) (PDF document 157 kb)

Organisation:	GOSFORD CITY COUNCIL
Location:	GOSFORD OLYMPIC POOL MASONS PARADE, GOSFORD, NSW, 2250 LGA: CENTRAL COAST
Catchment:	Hawkesbury
Issue date:	24 Aug 2001
Notice status:	Issued
Complied with date:	
Notice type:	s.58 Licence Variation

Licence

Number	Name	Licence status
1400	GOSFORD CITY COUNCIL	Surrendered

Public registers

POEO Public Register

Licences, applications and notices search

Penalty notices search

Enforceable undertakings search

Enforceable undertakings media releases

Exemptions and approvals search

Prosecutions or civil proceedings search

Terms of use: POEO public register

Licensing FAQs

List of licences

Unlicensed premises regulated by the EPA

Contaminated land record of notices

Dangerous goods licences

Pesticide licences

Radiation licences

Home

Public registers

POEO Public Register

Licences, applications and notices search

Notice summary

Search Again

Return to Previous Page

Summary of Notice No: 1033576

View report (PDF document 73 kb)

Organisation: GOSFORD CITY COUNCIL

Location: GOSFORD OLYMPIC POOL
MASONS PARADE, GOSFORD, NSW, 2260

LGA: CENTRAL COAST

Catchment: Hawkesbury

Issue date: 02 Jan 2004

Notice status: Issued

Complied with date:

Notice type: s.80 Surrender of a Licence

Licence

Number	Name	Licence status
1400	GOSFORD CITY COUNCIL	Surrendered

Home > Your environment > Contaminated land > PFAS investigation program

Contaminated land

Managing contaminated land

Notified and regulated contaminated land

NSW site auditor scheme

Statutory guidelines

Non-statutory guidance documents

Underground petroleum storage systems

PFAS investigation program

NSW PFAS Expert Panel

PFAS investigation process

PFAS investigation program FAQs

Regulation of PFAS firefighting foams

Other contamination issues

Stay up to date

The NSW Government PFAS Investigation Program

View a map of the sites in NSW that may be contaminated with PFAS, learn how to reduce your exposure to these dangerous chemicals, and read about our investigation of the issue.

The EPA is leading an investigation program to assess the legacy of PFAS use across NSW. With the assistance of the NSW PFAS Technical Advisory Group, which includes NSW Health, Department of Primary Industries and the Office of Environment and Heritage, we provide impacted residents with tailored, precautionary dietary advice to help them reduce any exposure to PFAS.

Current investigations are focused on sites where it is likely that large quantities of PFAS have been used. The EPA is currently investigating PFAS at these sites:

Map view

List view

No filter set

Showing 7 of 50 sites

Reset map

Map

Satellite

PFAS investigation site

Multiple sites

Douglas Partners Pty Ltd

Appendix B, EPA Site Searches and Council Records
Gosford Waterfront, Central Coast Highway, Gosford

225005.00.R.002.Rev0
December 2023

Appendix C

Site Photographs



Photo P1-1: View from Gosford Public Wharf. Train line in the distance (arrow).

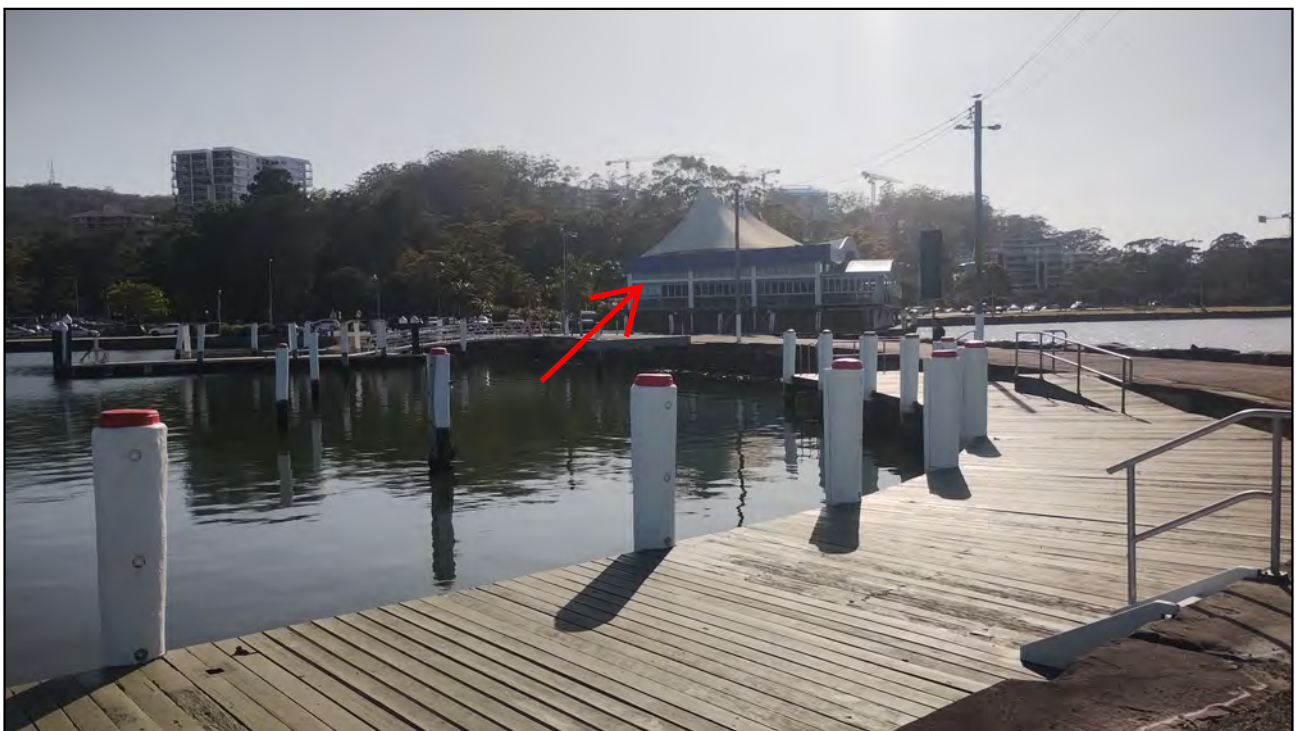


Photo P1-2: View from Gosford Public Wharf. Drifters Wharf in the distance (arrow).

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 1
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P1-3: View from Gosford Public Wharf, facing north.



Photo P1-4: View from Graham Park, facing south east.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 2
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P1-5: Graham Park.



Photo P1-6: Graham Park. Brian McGowan Bridge in the distance.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 3
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P1-7: Graham Park and Brian McGowan Bridge (left).



Photo P1-8: Exposed ground surface adjacent the seawall along Graham Park.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 4
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P1-9: Car park, and Brian McGowan Bridge overhead.



Photo P1-10: North-eastern portion of Precinct 1. Stadium in the distance (arrow).

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 5
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P1-11: North-western portion of Precinct 1. Filled mound in the distance (arrow).



Photo P1-12: Close-up of filled mound along rail corridor.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 6
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P1-13: Breakwall / Gosford Public Wharf.



Photo P1-14: Boat ramp.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 1) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 7
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P2-1: Brian McGowan Bridge in the distance.

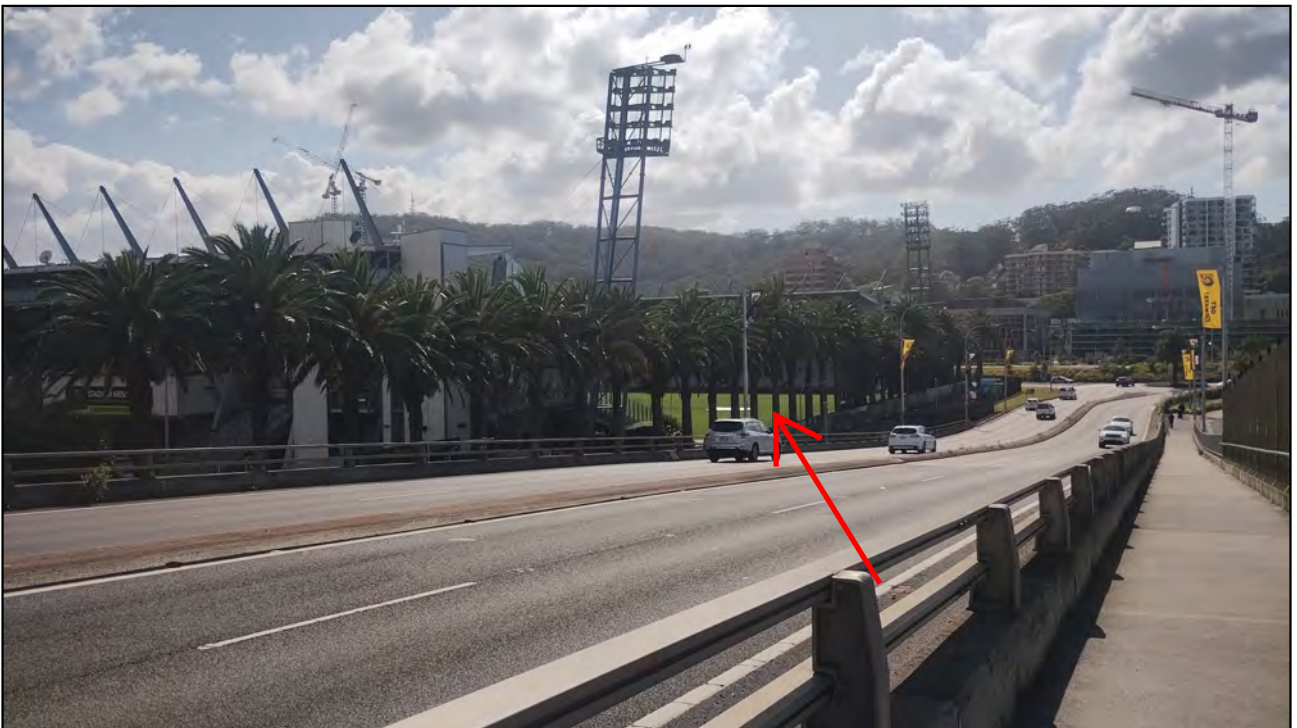


Photo P2-2: View from Brian McGowan Bridge. Stadium in the distance (arrow).

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 2) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 1
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P2-3: View of stadium facing north east.

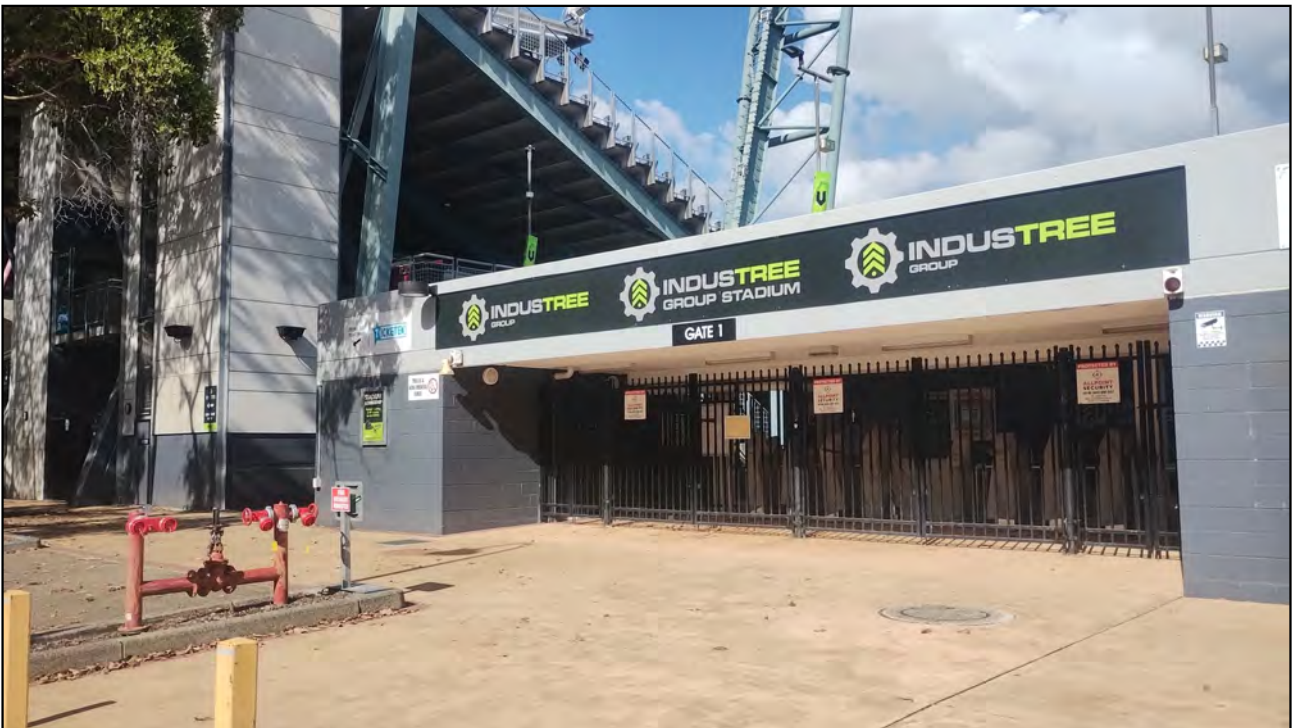


Photo P2-4: View of stadium from Dane Drive, facing south west.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 2) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 2
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P2-5: View of stadium from Brian McGowan Bridge.



Photo P2-6: Car park, west of the stadium.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 2) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 3
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P2-7: Gosford City Bowling Club, bowling greens.



Photos P2-8: Western portion of Gosford City Bowling Club.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 2) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 4
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P2-9: Car park, north of the bowling greens.

Note: Location and direction of photographs shown on Drawing 2, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 2) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 5
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



P3-1: Lion's Park. Gosford Olympic Pool in the distance (arrow).



P3-2: Lion's Park.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 1
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-3: Lion's Park. Private marina in the distance (arrow).



Photo P3-4: Gosford Swimming Pool.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 2
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-5: Gosford Swimming Pool car park.



Photo P3-6: Gosford Olympic Pool.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 3
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-7: Northern end of the swimming pool complex.



Photo P3-8: View of the waterfront. Gosford Olympic Pool (right) and Drifters Wharf in the distance (arrow).

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 4
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-9: Footpath / cycleway along waterfront.



Photo P3-10: Car park, north of Gosford Swimming Pool.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 5
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-11: Boat ramp.



Photo P3-12: Car park and Eat Street Cafe.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 6
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-13: Grassed open-space area.



Photo P3-14: Grassed open-space area.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 7
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-15: Grassed open-space area. Drifters Wharf in the distance (arrow).



Photo P3-16: Grassed open-space area. Drifters Wharf in the distance (arrow).

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 8
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0

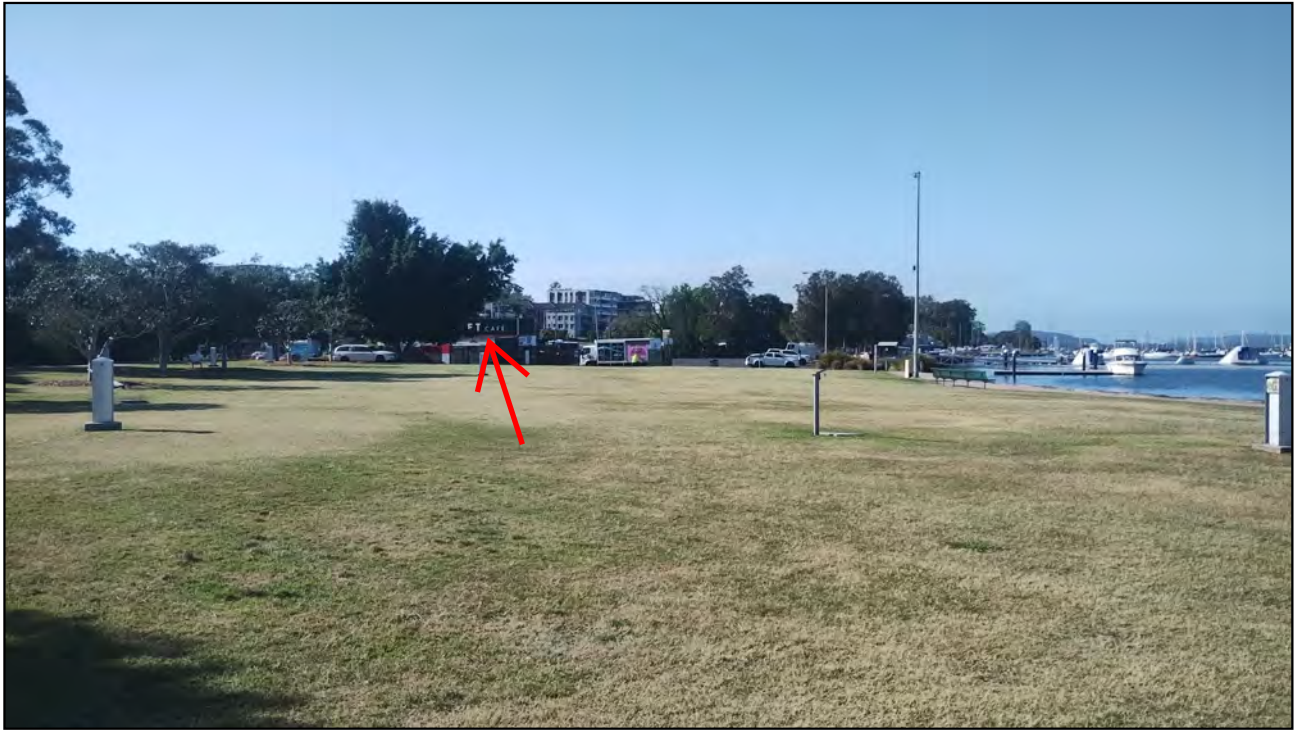


Photo P3-17: Grassed open-space area. Eat Street Cafe in the distance (arrow).



Photo P3-18: Drifters Wharf.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 9
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P3-19: Car park north of Drifters Wharf.



Photo P3-20: General rubbish (circled) adjacent the seawall.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 3) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 10
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P4-1: Gosford Scout Hall.



Photo P4-2: Close-up of Gosford Scout Hall.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 1
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P4-3: Amenities block (arrow) and Gosford Scout Hall in the distance.



Photo P4-4: Boat ramp (southern end of precinct).

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 2
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P4-5: Gosford Sailing Club (southern side).



Photo P4-6: Gosford Sailing Club (eastern side).

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 3
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



P4-7: Gosford Sailing Club (northern side).



P4-8: Private marina.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 4
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P4-9: Car park and open space area.



Photo P4-10: Open space area. Marina in the distance (arrow).

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 5
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



P4-11: Car park / open space area.



P4-12: Open space area, east of the car park.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 6
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0



Photo P4-13: Open space area, north of the Gosford Sailing Club.



Photo P4-14: Close-up of the waters edge, north of the Gosford Sailing Club.

Note: Location and direction of photographs shown on Drawing 3, Appendix A

CLIENT: Central Coast Council	TITLE: Site Photographs (Precinct 4) Gosford Waterfront Revitalisation Masterplan Gosford Waterfront, Central Coast Highway, Gosford		
PROJECT No: 225005.00			
OFFICE: Central Coast			
 Douglas Partners Geotechnics Environment Groundwater	DATE: 2.11.23	DRAWN BY: CLN	PHOTO PLATE No: 7
	SCALE: NA	REVIEWED BY: CLN	REVISION: 0

Appendix D

Table D1: Summary of Laboratory Results (Soil)

Table D2: Summary of Laboratory Results (Groundwater)

Table D3: Summary of Laboratory Results (Sediment)

Lab result

HIL/HSL value	EIL/ESL value

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

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

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

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

Notes:

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

b Reported naphthalene laboratory result obtained from BTEXN suite

Site Assessment Criteria (SAC):

Reference should be made to the SAC section of the report. Summary information as follows:

HIL C	Recreational / Public Open Space (NEPC, 2013)
HSL A/B (Precinct 1)	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
HSL D (Precincts 2 and 3)	Commercial / Industrial (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational / Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Table D1 (Continued) : Summary of Laboratory Results (Soil)

			OCP												PCB	Asbestos (Material)	Asbestos (Soil)			
			DDD	DDT+DDE+DDD ^c	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Total PCB	Trace Analysis	ACM >7mm Estimation	FA and AF Estimation	FA and AF Estimation	Asbestos (Summary)	
		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	-	0.01	-	0.001	-	
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	-	%(w/w)	g	%(w/w)	-	
Precinct 1																				
P1-1/0.1	0 - 0.1 m	20/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P1-1/0.5	0.4 - 0.5 m	20/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P1-1/PACM	0.4 - 0.5 m	20/10/23	-	-	-	-	-	-	-	-	-	-	-	-	AD	-	-	-	AD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P1-2/0.1	0 - 0.1 m	23/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P1-2/2.0	1.9 - 2 m	23/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P1-3/0.1	0 - 0.1 m	24/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P1-3/1.0	0.9 - 1 m	24/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
Precincts 3 and 4																				
P3-1/0.1	0 - 0.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-1/0.5	0.4 - 0.5 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-2/0.1	0 - 0.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-2/2.0	1.9 - 2 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-3/0.1	0 - 0.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-3/0.5	0.4 - 0.5 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-3/1.0	0.9 - 1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-4/0.1	0 - 0.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-4/0.5	0.4 - 0.5 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-4/2.0	1.9 - 2 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-5/0.1	0.04 - 0.15 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-5/1.0	0.9 - 1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-6/0.1	0.03 - 0.15 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P3-6/1.5	1.4 - 1.5 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-1/0.1	0 - 0.1 m	19/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-1/0.5	0.4 - 0.5 m	19/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-1/1.0	0.9 - 1 m	19/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-2/0.2	0.1 - 0.2 m	20/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-2/0.5	0.5 - 0.6 m	20/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-3/0.1	0 - 0.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-4/0.1	0 - 0.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	<0.01	-	<0.001	NAD	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						
P4-4/1.1	1 - 1.1 m	30/10/23	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	
			- -	400 180	- -	- 180	10 -	70 -	20 -	340 -	10 -	10 -	400 -	1 -						

Lab result

HIL/HSL value

EIL/ESL value

HIL/HSL exceedance

EIL/ESL exceedance

HIL/HSL and EIL/ESL exceedance

ML exceedance

ML and HIL/HSL or EIL/ESL exceedance

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

Blue = DC exceedance

HSL 0-<1 Exceedance

Bold = Lab detections

- = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable

NL = Non limiting

AD = Asbestos detected

NAD = No asbestos detected

HIL = Health investigation level

HSL = Health screening level (excluding DC)

EIL = Ecological investigation level

ESL = Ecological screening level

ML = Management Limit

DC = Direct Contact HSL

Notes:

c

EIL criteria applies to DDT only

Site Assessment Criteria (SAC):	
Reference should be made to the SAC section of the report. Summary information as follows:	
HIL C	Recreational / Public Open Space (NEPC, 2013)
HSL A/B (Precinct 1)	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
HSL D (Precincts 2 and 3)	Commercial / Industrial (vapour intrusion) (NEPC, 2013)
DC HSL C	Direct contact HSL C Recreational /Open space (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Appendix D, Laboratory Summary Table
Gosford Waterfront, Central Coast Highway, Gosford

225005.00.R.002.Rev0
December 2023

Table D2: Summary of Laboratory Results (Groundwater)

		METALS - Dissolved								TRH				BTEX				PAH					Phenols	PFAS		
		Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	F1 (C6-C10-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (<C16-C24)	F4 (C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Anthracene	Naphthalene	Benzo(a)pyrene (BaP)	Fluoranthene	Phenanthrene	Total Phenolics	Sum of PFHxS and PFOS	PFDA	PFOS
	PQL	1	0.1	1	1	1	0.05	1	1	10	50	100	100	1	1	1	1	0.1	0.1	0.1	0.1	0.1	50	0.0002	0.0002	0.0002
Human Health ^a	-	-	-	-	-	-	-	-	-	1000	1000	-	-	800	NL	NL	NL	-	NL	-	-	-	-	-	-	-
Acquatic Ecosystems ^{b,c}	13 ^d	0.7 ^A	4.4 ^B	1.3 ^B	4.4 ^B	0.1 ^A	7 ^A	8 ^B	-	-	-	-	-	500 ^A	180 ^B	80 ^B	75 ^B	0.01 ^A	50 ^A	0.1 ^A	1 ^A	0.6 ^A	400 ^B	-	19 ^B	0.00023 ^{c,d}
Recreational ^{d,e}	100	20	500	20000	100	10	200	-	-	-	-	-	-	10	8000	3000	6000	-	-	0.1	-	-	-	2	10	-
Sample ID	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW1	07/11/23	2	<0.1	<1	<1	<1	<0.05	7	26	<10	<50	<100	<100	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<0.0002	<0.0002	<0.0002
MW2	07/11/23	6	<0.1	1	2	<1	<0.05	9	3	<10	<50	<100	<100	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	0.0033	0.005	0.0021
QA_GW	07/11/23	8	<0.1	<1	<1	<1	<0.05	10	12	<10	<50	<100	<100	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
MW3	07/11/23	<1	1.3	<1	3	5	<0.05	17	670	<10	<50	<100	<100	<1	<1	<1	<1	<0.1	<0.1	<0.1	0.1	<0.1	<50	0.013	0.017	0.0086

Notes:

- * QA/QC replicate of sample listed directly below the primary sample
- PQL Practical quantitation limit
- No criterion / not defined / not tested / not applicable
- Shaded cell is exceedance of guideline value. Where one or more guideline value is exceeded, the cell is shaded to the colour of the highest guideline value exceeded
- ^a NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013), health screening level, sand, 2-4m
- ^b ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality
- ^c HEPA (2018) PFAS National Environmental Management Plan
- ^d NHMRC (2008) Guidelines for Managing Risk in Recreational Water
- ^A Marine, 99% level of protection (LOP) for bioaccumulative chemicals
- ^B Marine, 95 % LOP
- ^C Freshwater, 95% LOP
- ^D Interim marine, 99 % LOP

Table D3: Summary of Laboratory Results (Sediment)

Table D3: Summary of Laboratory Results (Sediment)						Field ID	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10	P1-SS11	P1-SS12	P3-SS1
						Date	30 Oct 2023	30 Oct 2023	31 Oct 2023	30 Oct 2023	31 Oct 2023	30 Oct 2023	31 Oct 2023	31 Oct 2023	27 Oct 2023	27 Oct 2023	27 Oct 2023	30 Oct 2023	30 Oct 2023
						Depth	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1
Matrix Description							Sand	Sandy Silt	Silt	Sandy Silt	Sand	Silt	Silt	Silt	Sandy Silt	Sandy Silt	Silt	Sandy Silt	Sandy Silt
		Unit	PQL	Toxicant DGV for Sediment Quality ^a	Toxicant DGV for Sediment Quality (GV-high) ^a														
Organic	TOC %	%	0.01	-	-		0.14**	2.3	3.5*	2*	0.14* **	2.3	3.5*	3.5	2*	2*	4.3	2*	1.8
Metals	Arsenic	mg/kg	4	20	70		<4	13	14	9	<4	13	14	15	12	14	19	14	8
	Cadmium	mg/kg	0.4	1.5	10		<0.4	<0.4	<0.6	<0.4	<0.4	<0.6	<0.6	<0.6	<0.6	<0.6	<0.9	<0.6	<0.4
	Chromium (III+VI)	mg/kg	1	80	370		3	17	20	12	9	23	21	22	23	19	30	22	12
	Copper	mg/kg	1	65	270		7	22	26	21	20	39	33	34	46	51	51	32	18
	Lead	mg/kg	1	50	220		7	37	37	36	14	58	44	52	66	49	65	45	27
	Mercury	mg/kg	0.1	0.15	1		<0.1	<0.1	0.1	<0.1	<0.1	0.2	0.1	0.1	0.1	0.1	0.1	<0.1	<0.1
	Nickel	mg/kg	1	21	52		2	7	8	5	7	9	9	9	9	8	12	9	6
	Zinc	mg/kg	1	200	410		25	100	120	92	100	150	150	170	160	130	190	140	87
TRH	C10-C36 Fraction (Sum)	mg/kg	50	280	550		<50	<50	<50	<50	490	<50	<100	<100	240	<50	<150	<50	<50
	>C10-C40 Fraction (Sum)	mg/kg	50	-	-		<50	<50	<50	<50	680	<50	<100	<100	390	<50	<150	<50	<50
BTEX	Naphthalene (VOC)	mg/kg	1	-	-		<1	<2	<2	<1	<1	<1	<2	<2	<1	<1	<3	<2	<1
	Benzene	mg/kg	0.2	-	-		<0.2	<0.4	<0.4	<0.2	<0.2	<0.2	<0.4	<0.4	<0.2	<0.2	<0.6	<0.4	<0.2
	Toluene	mg/kg	0.5	-	-		<0.5	<1	<1	<0.5	<0.5	<0.5	<1	<1	<0.5	<0.5	<2	<1	<0.5
	Ethylbenzene	mg/kg	1	-	-		<1	<2	<2	<1	<1	<1	<2	<2	<1	<1	<3	<2	<1
	Xylene Total	mg/kg	1	-	-		<1	<2	<2	<1	<1	<1	<2	<2	<1	<1	<3	<2	<1
PAH	PAHs (Sum of positives)	mg/kg	0.05	10	50		<0.05	0.17 ^A	<0.05	0.2 ^A	2.55 ^A	0.52 ^A	<0.1	<0.1	3.5 ^A	0.32 ^A	<0.15	<0.05	<0.05
Phenols	Phenolics Total	mg/kg	5	-	-		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
OCP	4,4-DDE	mg/kg	0.1	0.0014	0.007		<0.001	<0.001	<0.001	<0.001	<0.001	0.0005 ^A	0.0004 ^A	<0.001	0.00085 ^A	<0.001	<0.001	<0.001	<0.001
	DDD	mg/kg	0.1	0.0035	0.009		<0.001	<0.001	<0.001	<0.001	0.006 ^A	<0.001	<0.001	<0.001	0.00055 ^A	0.0007 ^A	<0.001	<0.001	<0.001
	DDT	mg/kg	0.1	0.0012	0.005		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00265 ^A	<0.001	<0.001	<0.001
	Chlordane (cis)	mg/kg	0.1	0.0045	0.009		<0.001	<0.001	<0.001	<0.001	0.013 ^A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Chlordane (trans)	mg/kg	0.1	0.0045	0.009		<0.001	<0.001	<0.001	0.00065 ^A	0.037 ^A	<0.001	0.0003 ^A	<0.001	0.00065 ^A	<0.001	<0.001	<0.001	<0.001
	Dieldrin	mg/kg	0.1	0.0028	0.007		<0.001	<0.001	<0.001	<0.001	0.0315 ^A	<0.001	<0.001	<0.001	0.00055 ^A	<0.001	<0.001	<0.001	<0.001
	Endrin	mg/kg	0.1	0.0027	0.06		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	γ-BHC (Lindane)	mg/kg	0.1	0.0009	0.0014		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Organotins	Tributyltin as SN	mg/kg	0.0005	0.009	0.07		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
PCBs	PCBs (Sum of total)	mg/kg	0.1	0.034	0.28		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

- Notes
- QAQC sample listed directly next to primary sample
No criterion / not defined / not tested / not applicable
Shaded cell / **bold red** is exceedance of guideline value.
- a

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality
- *

Assumed organic carbon (OC) % based on OC% of similar sediment matrix. An average value has been adopted.
- **

Given the OC% was <0.2%, the OC% has been adjusted to 0.2%
- A

Values have been normalised based on OC% (for PAH, OCP, PCB and TBT where contaminant concentrations are > PQL)

						Field ID	P3-SS2	P4-SS1	P4-SS2	P4-SS3	QA_SS1	QA_SS2
						Date	30 Oct 2023	30 Oct 2023	30 Oct 2023	30 Oct 2023	30 Oct 2023	30 Oct 2023
						Depth	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1	0 - 0.1
		Matrix Description					Sandy Silt	Sand	Silty Sand	Sandy Silt	Sandy Silt	Sandy Silt
		Unit	PQL	Toxicant DGV for Sediment Quality ^a	Toxicant DGV for Sediment Quality (GV-high) ^a							
Organic	TOC %	%	0.01	-	-	2*		0.14* **	2*	2*	2*	2*
Metals	Arsenic	mg/kg	4	20	70	11		<4	<4	8	13	15
	Cadmium	mg/kg	0.4	1.5	10	<0.4		<0.4	<0.4	<0.4	<0.4	<0.6
	Chromium (III+VI)	mg/kg	1	80	370	17		2	3	9	17	22
	Copper	mg/kg	1	65	270	21		2	4	17	22	31
	Lead	mg/kg	1	50	220	36		4	6	19	37	43
	Mercury	mg/kg	0.1	0.15	1	<0.1		<0.1	<0.1	<0.1	<0.1	0.1
	Nickel	mg/kg	1	21	52	7		<1	1	4	7	9
	Zinc	mg/kg	1	200	410	97		9	18	56	99	130
TRH	C10-C36 Fraction (Sum)	mg/kg	50	280	550	<50		<50	<50	<50	<50	<50
	>C10-C40 Fraction (Sum)	mg/kg	50	-	-	<50		<50	<50	<50	130	<50
BTEX	Naphthalene (VOC)	mg/kg	1	-	-	<1		<1	<1	<1	<1	<2
	Benzene	mg/kg	0.2	-	-	<0.2		<0.2	<0.2	<0.2	<0.2	<0.4
	Toluene	mg/kg	0.5	-	-	<0.5		<0.5	<0.5	<0.5	<0.5	<1
	Ethylbenzene	mg/kg	1	-	-	<1		<1	<1	<1	<1	<2
	Xylene Total	mg/kg	1	-	-	<1		<1	<1	<1	<1	<2
PAH	PAHs (Sum of positives)	mg/kg	0.05	10	50	<0.05		<0.05	<0.05	<0.05	1.4 ^A	0.28 ^A
Phenols	Phenolics Total	mg/kg	5	-	-	<5		<5	<5	<5	-	-
OCP	4,4-DDE	mg/kg	0.1	0.0014	0.007	<0.001		<0.001	<0.001	<0.001	-	-
	DDD	mg/kg	0.1	0.0035	0.009	<0.001		<0.001	<0.001	<0.001	-	-
	DDT	mg/kg	0.1	0.0012	0.005	<0.001		<0.001	<0.001	<0.001	-	-
	Chlordane (cis)	mg/kg	0.1	0.0045	0.009	<0.001		<0.001	<0.001	<0.001	-	-
	Chlordane (trans)	mg/kg	0.1	0.0045	0.009	<0.001		<0.001	<0.001	<0.001	-	-
	Dieldrin	mg/kg	0.1	0.0028	0.007	<0.001		<0.001	<0.001	<0.001	-	-
	Endrin	mg/kg	0.1	0.0027	0.06	<0.001		<0.001	<0.001	<0.001	-	-
	g-BHC (Lindane)	mg/kg	0.1	0.0009	0.0014	<0.001		<0.001	<0.001	<0.001	-	-
Organotins	Tributyltin as SN	mg/kg	0.0005	0.009	0.07	<0.0005		<0.0005	<0.0005	<0.0005	-	-
PCBs	PCBs (Sum of total)	mg/kg	0.1	0.034	0.28	<0.005		<0.005	<0.005	<0.005	-	-

- Notes
- QAQC sample listed directly next to primary sample
No criterion / not defined / not tested / not applicable
Shaded cell / **bold red** is exceedance of guideline value.
- a

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality
- *

Assumed organic carbon (OC) % based on OC% of similar sediment matrix. An average value has been adopted.
- **

Given the OC% was <0.2%, the OC% has been adjusted to 0.2%
- A

Values have been normalised based on OC% (for PAH, OCP, PCB and TBT where contaminant concentrations are > PQL)

Appendix E

Borehole Logs

Sediment Sample Descriptions

Terminology, Symbols and Abbreviations

Soil Descriptions

Rock Descriptions

Sampling, Testing and Excavation Methodology

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD
COORDINATE: E:345321.6, N:6299890.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-1
PROJECT No: 225005.00
DATE: 20/10/23
SHEET: 1 of 2

CONDITIONS ENCOUNTERED														SAMPLE		TESTING							
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
					ORIGIN (#)	CONSIS. (1)	DENSITY (1)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)									
Free groundwater observed 20/10/23	1	0.20	FILL / Sandy SILT, with gravel: dark brown; low plasticity; fine to medium sand; fine to coarse, sub-angular gravel; trace organics (topsoil).		FILL											ES	0.10	PID	<1ppm	Concrete Arising Bentonite Sand backfill	50mm		
		0.70			FILL	NA	w<PL								B	0.20							
															ES	0.50	PID	<1ppm					
															ES	0.80	PID	<1ppm					
	1		FILL / Sandy CLAY: dark brown orange; low plasticity; fine sand; single fragment of fibrous material (suspected asbestos).		FILL										ES	1.00	PID	<1ppm					
		1.40																					
															ES	1.50	SPT	4,3,5 N=8 PID<1ppm					
	2		FILL / Sandy CLAY, with gravel: brown; low to medium plasticity; fine sand; fine to medium, sub-angular gravel.			EST	D								ES	1.95							
															ES	2.50	PID	<1ppm					
		2.90		SAND (SW), with gravel, trace silt: dark grey; fine to coarse; fine to medium, sub-angular gravel; trace organics.					W														
														ES	3.00	SPT	0,0,0 N=0 PID<1ppm						
												</											

NOTES: (1) Soil origin is "probable" unless otherwise stated. (2) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 5.1m, NMLC

CASING: to 5.1m

REMARKS: CPT P1-1 performed adjacent to bore

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD
COORDINATE: E:345321.6, N:6299890.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-1
PROJECT No: 225005.00
DATE: 20/10/23
SHEET: 2 of 2

CONDITIONS ENCOUNTERED													SAMPLE			TESTING				
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE	
					ORIGIN (#)	CONSIS. ^(*) DENSITY. ^(†)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS						SAMPLE REMARKS
	5		[CONT] SANDSTONE: pale grey mottled red brown, medium grained					MW		100	83		CN, RF 10.26m: JT, 50°, PR, CN, RF 10.40m: JT, 10°, IR, CN, RF 10.44-10.56m: JT, 80°, IR, CN, RF, decomposed seam 11.07m: JT, 10°, IR, INF Clay, RF 11.51m: JT, 65°, UN, CN, RF							
	11																		100	78
	10		Borehole discontinued at 11.60m depth. Limit of Investigation.																	
	12																			
	13																			
	14																			
	15																			
	16																			
	17																			
	18																			
	19																			

NOTES: ^(*)Soil origin is "probable" unless otherwise stated. ^(†)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 5.1m, NMLC

CASING: to 5.1m

REMARKS: CPT P1-1 performed adjacent to bore

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD
COORDINATE: E:345321.6, N:6299890.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-1
PROJECT No: 225005.00
DATE: 20/10/23
SHEET: 1 of 1



5.10-10.00 m depth



10.00-11.60 m depth

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD
COORDINATE: E:345436.4, N:6299873.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-2
PROJECT No: 225005.00
DATE: 23/10/23
SHEET: 1 of 3

CONDITIONS ENCOUNTERED														SAMPLE		TESTING			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK						SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
					ORIGIN (#)	CONSIS. ⁽¹⁾ DENSITY. ⁽²⁾	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)						
Free groundwater observed 23/10/23	1	0.30	FILL / Silty SAND, trace gravel: brown; fine; fine to medium, sub-angular gravel; trace organics (topsoil).		FILL		D								ES		0.10	PID	<1ppm
		0.80			FILL		M								ES		0.50	PID	<1ppm
	1	1.00	FILL / Silty SAND, with gravel: brown; fine; fine to medium, sub-angular gravel.		FILL	NA									ES		1.00	PID	<1ppm
		1.90	FILL / Sandy CLAY, trace cobbles: dark brown; medium to high plasticity; fine sand.		FILL		w>PL								ES		1.50		
		2.00			FILL										SPT		2.00	SPT	3,2,3 N=5 PID < 1ppm
		2.50	FILL / Sandy CLAY, trace gravel: grey mottled pale grey; medium to high plasticity; fine sand; fine to medium, sub-angular gravel; hydrogen sulfide odour noted.		FILL										ES		2.70	PID	<1ppm
		3.00	Silty SAND (SM): dark grey; fine to coarse; trace organics.		EST	VL to L	W								SPT		3.20	SPT	1,0,0 N=0 PID < 1ppm
		3.45			EST										ES		3.45		
		4.00			EST												4.00		
		4.30	Clayey SAND (SC): grey; fine to medium.		EST										SPT		4.45	SPT	0,0,0 N=0 PID < 1ppm
		5.00			EST												5.00		
		5.45			EST	MD	W								SPT		5.45	SPT	3,4,4 N=8 PID < 1ppm
		6.00			EST												6.00		
		6.45			EST										SPT		6.45	SPT	6,10,12 N=22
	7.00	CLAY (CH), trace sand: grey; high plasticity; fine sand.		F to St												7.50	SPT	3,4,4 N=8 PP = 100kPa	
	7.95			F to St												7.95			
	8.00			ALV		w>PL													
	9.00			ALV	St to VSt												9.00		
	9.45			ALV											SPT		9.45	SPT	9,8,9 N=17 PP = 150kPa

NOTES: ⁽¹⁾Soil origin is "probable" unless otherwise stated. ⁽²⁾Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: (1) Soil origin is "probable" unless otherwise stated. (2) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK/MLG

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 26.7m, NMLC

CASING: to 26.7m

REMARKS: CPT P1-2 performed adjacent to bore

Refer to explanatory notes for symbol and abbreviation definitions

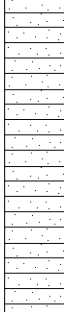
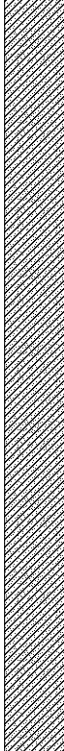
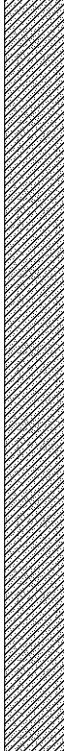


BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD
COORDINATE: E:345436.4, N:6299873.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-2
PROJECT No: 225005.00
DATE: 23/10/23
SHEET: 2 of 3

CONDITIONS ENCOUNTERED														SAMPLE				TESTING		
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
					ORIGIN (#)	CONSISTENCY ⁽¹⁾ DENSITY ⁽²⁾	MOISTURE	WEATH.	DEPTH (m)	STRENGTH ⁽³⁾	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS						
			[CONT] CLAY (CH), trace sand: grey; high plasticity; fine sand.		ALV	St to VSt														
			Sandy CLAY (CI-CH): grey; medium to high plasticity; fine to medium sand.		ALV	F to St	w>PL													
			Clayey SAND (SC): grey; fine to medium.		ALV	MD or D	W													
			15.20m-18.10m: brown orange		ALV	MD or D	W													
			CLAY (CH), with sand: grey; high plasticity; fine sand.		ALV	St	w>PL													
NOTES: ⁽¹⁾ Soil origin is "probable" unless otherwise stated. ⁽²⁾ Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.																				

NOTES: ⁽¹⁾ Soil origin is "probable" unless otherwise stated. ⁽²⁾ Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK/MLG

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 26.7m, NMLC

CASING: to 26.7m

REMARKS: CPT P1-2 performed adjacent to bore

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD
COORDINATE: E:345436.4, N:6299873.7
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-2
PROJECT No: 225005.00
DATE: 23/10/23
SHEET: 3 of 3

CONDITIONS ENCOUNTERED													SAMPLE		TESTING				
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
				ORIGIN ^(#)	CONSIS. ⁽¹⁾ DENSITY ⁽¹⁾	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS						
RL (m)																			
	19	[CONT] CLAY (CH), with sand; grey; high plasticity; fine sand.																	
	21																		
	22			ALV															
	23																		
	24																		
	24.10	Sandy CLAY (CI), trace gravel: grey mottled brown orange; medium plasticity; fine to medium sand; fine to medium, sub-angular gravel.																	
	25			ALV possibly RS															
	26																		
	26.70	SANDSTONE: pale grey, medium to coarse grained																	
	27																		
	27.60	CORE LOSS: 27.60m to 27.65m																	
	27.65																		
	28	SANDSTONE: pale grey, medium to coarse grained																	
	29	Borehole discontinued at 27.71m depth. Terminated due to artesian upflows and hole instability.																	

NOTES: ^(#) Soil origin is "probable" unless otherwise stated. ⁽¹⁾ Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK/MLG

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 26.7m, NMLC

CASING: to 26.7m

REMARKS: CPT P1-2 performed adjacent to bore

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

CLIENT: Central Coast Council

PROJECT: Gosford Waterfront Revitalisation Masterplan

LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.4 AHD

COORDINATE: E:345436.4, N:6299873.7

DATUM/GRID: MGA2020 Zone 56

DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-2

PROJECT No: 225005.00

DATE: 23/10/23

SHEET: 1 of 1



26.70-27.71 m depth

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.2 AHD
COORDINATE: E:345556.6, N:6299826.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-3
PROJECT No: 225005.00
DATE: 24/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED										SAMPLE		TESTING AND REMARKS		
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
Free groundwater observed 24/10/23	1	0.30	FILL / Sandy SILT, with gravel: brown; low plasticity; fine sand; fine, sub-angular to rounded gravel; trace organics; (topsoil).		FILL			w<PL		ES		0.10	PID	<1ppm
								ES			0.50	PID	<1ppm	
	1		FILL / Silty Gravelly SAND: brown; fine to medium; fine to coarse gravel.		FILL			M		ES		1.00	PID	<1ppm
	1.20		FILL / GRAVEL: grey; fine to coarse, sub-angular to angular; ballast.		FILL			W		ES	SPT	1.50	SPT	4,2,2 N=4 PID < 1ppm
	2									1.95				
	2.20		Clayey Sandy SILT / Silty CLAY: grey brown; low plasticity; fine to medium sand.		EST			w>PL		ES		2.50	PID	<1ppm
	3									ES		3.00	PID	<1ppm
										D		3.50	PID	<1ppm
	4									D		4.00	PID	<1ppm
										D		4.50	PID	<1ppm
	5									D		5.00	PID	<1ppm
												6		
												7		
												8		
												9		

Generated with CORE-GS by GeroC - Soil Log - 19/12/2023 8:46:02 PM

PLANT: MD300-019	OP
METHOD: 125mm Ø AD/T	
REMARKS: Attempted 6x bores. CPT P1-3 performed adjacent to bore	

OPERATOR: Traccess Drilling

LOGGED: MLG
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.5 AHD
COORDINATE: E:345537.6, N:6299856.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P1-4
PROJECT No: 225005.00
DATE: 25/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED											SAMPLE			TESTING AND REMARKS	
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	
25/10/23 No free groundwater observed		0.40	FILL / Sandy SILT: brown; low plasticity; fine to medium sand; trace organics.		FILL	NA		w<PL		ES		0.10	PID	<1ppm	
			FILL / Silty Gravelly SAND: brown; fine to medium; fine to medium gravel.		FILL					ES		0.50	PID	<1ppm	
	1		Borehole discontinued at 1.00m depth. Refusal on hard surface. Auger spinning.					ES			0.95	PID	<1ppm		
		2										2			
		3										3			
		4										4			
		5										5			
		6										6			
		7										7			
		8										8			
		9										9			

NOTES: ^(#)Soil origin is "probable" unless otherwise stated. ^(*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019
METHOD: 125mm Ø AD/T
REMARKS:

OPERATOR: Traccess Drilling

LOGGED: MLG
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.7 AHD
COORDINATE: E:345780.0, N:6299525.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P3-1
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED														SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS							
Free groundwater observed 30/10/23		0.20	FILL / Silty SAND, trace gravel: dark grey; fine to medium; fine to medium, sub-angular gravel; trace organics (topsoil).		FILL			D		ES		0.10	PID	<1ppm 5 10 15 DCB/150 <1ppm 32 <1ppm 21 <1ppm 30 ref							
			FILL / Sandy CLAY: brown orange; low plasticity; fine to medium sand.		FILL			w<PL		ES	0.50	PID									
	1				FILL					ES	1.00	PID									
	1.50				FILL					ES	1.60	PID									
		1.90	FILL / Clayey Sandy SILT: dark grey and grey brown; low plasticity; fine to medium sand.		FILL			w=PL		ES		2.00	PID	<1ppm							
	2				FILL			w>PL to w=LL		ES	2.50	PID									
	2.70				FILL					ES	2.80	PID									
	3				FILL					ES	3.60	PID									
		2.70	Silty SAND (SM): grey brown; fine to medium.		EST	(VL) or (L)		W		ES		2.80	PID	<1ppm							
	3																				
	3.50	Sandy CLAY (CH): grey; high plasticity; fine sand.		ALV	(St)		w>PL		ES		3.60	PID	<1ppm								
4																					
	4	Borehole discontinued at 3.90m depth. Limit of Investigation.										4									

NOTES: ^(*)Soil origin is "probable" unless otherwise stated. ^(*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS:

OPERATOR: Douglas Partners

LOGGED: JK
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.7 AHD
COORDINATE: E:345805.5, N:6299489.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P3-2
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED														SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS							
Free groundwater observed 31/10/23	▼	0.30	FILL / Silty SAND, trace gravel: dark grey; fine to medium; fine gravel; trace organics (topsoil).		FILL			D		ES		0.10	PID	DCP9/15D <1ppm 5 10 15 30 ref 35							
			FILL / Sandy CLAY: orange brown; low to medium plasticity; fine to medium sand.		FILL					ES		0.50	PID	<1ppm							
		1			FILL					ES		1.00	PID	<1ppm							
		1.40	FILL / Silty Sandy CLAY: dark grey; low to medium plasticity; fine sand.		FILL					ES		1.50	PID	<1ppm							
		1.80	FILL / Sandy CLAY: orange brown and pale grey; low plasticity; fine sand.		FILL	NA		w>PL		ES		2.00	PID	<1ppm							
		2			FILL					ES											
		2.30	Silty SAND (SM): grey; fine to medium; trace organics.		EST	(VL) or (L)		W		ES											
		3	3.00m: trace shells																		
		4	Borehole discontinued at 3.50m depth. Limit of Investigation.																		

NOTES: ^(#)Soil origin is "probable" unless otherwise stated. ^(*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS:

OPERATOR: Douglas Partners

LOGGED: JK
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 2.1 AHD
COORDINATE: E:345844.5, N:6299476.3
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P3-3
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED														SAMPLE				TESTING AND REMARKS			
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS							
Free groundwater observed 30/10/23	▼	0.30	FILL / Sandy SILT, with gravel: dark grey; low plasticity; fine to medium sand; fine to medium, sub-angular gravel; trace organics (topsoil).		FILL			w<PL		ES		0.10	PID	<1ppm							
		0.60	FILL / Silty Sandy CLAY: brown to grey brown; low to medium plasticity; fine to medium sand.		FILL					ES	0.50	PID	<1ppm								
		1.30	FILL / Clayey SAND: brown and orange brown and grey; fine.		FILL			D		ES	1.00	PID	<1ppm								
		2.40	FILL / Sandy CLAY, trace gravel: pale grey and brown orange; low to medium plasticity; fine sand; fine, sub-angular gravel.		FILL			ES		1.50	PID	<1ppm									
		2.80	FILL / Clayey SAND: grey brown; fine.		FILL			w<PL		ES	2.00	PID	<1ppm								
		3.00	Silty SAND (SM): dark grey; fine to medium; trace shells.		EST	(VL) or (L)		W		ES	3.00	PID	<1ppm								
		Borehole discontinued at 3.20m depth. Limit of Investigation.																			

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS:

OPERATOR: Douglas Partners

LOGGED: JK
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 2.0 AHD
COORDINATE: E:345842.4, N:6299433.2
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P3-4
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED										SAMPLE			TESTING AND REMARKS										
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS									
Free groundwater observed 27/10/23	1	0.20	FILL / Sandy SILT: grey; low plasticity; fine sand; (topsoil).		FILL			w<PL		ES		0.10	PID	<1ppm	5	10	15						
																					34		
																						44	
		ES			0.50					PID	<1ppm											30	
		ES			1.00					PID	<1ppm												
		ES			1.50					PID	<1ppm												
	2	1.80	FILL / Silty Sandy CLAY: dark grey and orange brown and pale grey; low plasticity; fine to medium sand.		FILL			w>PL		ES		2.00	PID	<1ppm									
	3	2.60	Silty SAND (SM): grey; fine to medium.					W		ES		2.70	PID	<1ppm									
	4		Borehole discontinued at 3.50m depth. Limit of Investigation.																				

NOTES: ^(*)Soil origin is "probable" unless otherwise stated. ^(*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS:

OPERATOR: Douglas Partners

LOGGED: MLG
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.3 AHD
COORDINATE: E:345857.4, N:6299393.9
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P3-5
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

[illegible]

PLANT: Utility Mounted Rig

OPERATOR: Douglas Partners

LOGGED: JK

METHOD: 60mm Ø Continuous Push Tube Sampler

CASING: Nil

REMARKS: CPT P3-5 performed adjacent to bore

Generated with CORE-GS by Geroc - Soil Log - 19/12/2023 8:46:35 PM

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.5 AHD
COORDINATE: E:345863.6, N:6299335.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P3-6
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS												
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS. ⁽¹⁾	DENSITY. ⁽¹⁾	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE					
Free groundwater observed 20/10/23	0.03		SPRAY SEAL: Bitumen		FILL	NA		M		ES		0.10	PID	<1ppm	 Concrete Bentonite Sand backfill 50mm						
	0.50		FILL / Clayey Gravelly SAND: brown and orange brown and grey; fine to medium; fine to medium, sub-angular to sub-rounded gravel.																		
	1																				
	1.30		FILL / CLAY: grey brown; high plasticity.																		
	1.80		Silty SAND (SM): grey to dark grey; fine to coarse; trace shells.																		
	2				EST	(VL) or (L)		W		ES		2.00	PID	<1ppm							
	3.00		Clayey Silty SAND (SC): grey; fine to coarse.		ALV					D		3.00	PID	<1ppm							
	4		Borehole discontinued at 4.00m depth. Limit of Investigation.							D		4.00	PID	<1ppm							

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS: CPT P3-6 performed adjacent to bore

OPERATOR: Douglas Partners

LOGGED: MLG
CASING: Nil



Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.0 AHD
COORDINATE: E:345804.1, N:6298995.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-1
PROJECT No: 225005.00
DATE: 19/10/23
SHEET: 1 of 3

CONDITIONS ENCOUNTERED														SAMPLE				TESTING		
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
					ORIGIN ^(#)	CONSIS ^(*) DENSITY ^(*)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)	DEFECTS & REMARKS						
Free groundwater observed 19/10/23		0.40	FILL / Sandy SILT: dark brown; low plasticity; fine sand; trace organics (topsoil).		FILL		w<PL									ES		0.10	PID	<1ppm
		0.80	FILL / Clayey SAND: orange brown; fine.		FILL	NA	M									ES		0.50	PID	<1ppm
		1	FILL / Silty CLAY: orange brown; low plasticity.		FILL		w>PL									ES		1.00	PID	<1ppm
		1.30	FILL / Silty CLAY: grey brown; high plasticity.		FILL											ES		1.50		
		1.55	Sandy SILT (ML): dark grey; low plasticity; fine sand; trace shells.													SPT		1.70	SPT	3,2,3 N=5 PID < 1ppm
		2														ES		1.95		
																ES				
																ES		2.50	PID	<1ppm
		3			EST	VS	w>LL									ES		3.00		
																SPT		3.45	SPT	0,0,0 N=0 PID < 1ppm
																ES				
		4														SPT		4.00	SPT	0,0,0 N=0 PID < 1ppm
																ES		4.45		
		4.80	SAND (SP), with silt: dark grey and pale grey; fine.		EST	L	W									SPT		5.00	SPT	1,2,4 N=6 PID < 1ppm
																ES		5.45		
		6.00	Sandy CLAY (CL): pale grey; low plasticity; fine sand.		ALV	F to St	w>PL									SPT		6.50	SPT	6,5,3 N=8 PID < 1ppm
																		6.95		
		7																		
		7.30	CLAY (CH), trace sand: orange brown mottled grey; high plasticity; fine sand.		RS	St	w>PL									SPT		8.00	SPT	2,4,4 N=8 PID < 1ppm PP = 110-170kPa
																		8.45		
	8																			
																	9			
	9														SPT		9.50	SPT	3,6,6 N=12 PID < 1ppm PP = 200kPa	

NOTES: ^(#) Soil origin is "probable" unless otherwise stated. ^(*) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: ¹Soil origin is "probable" unless otherwise stated. ²Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 13.1m, NMLC

CASING: to 3m

REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.0 AHD
COORDINATE: E:345804.1, N:6298995.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-1
PROJECT No: 225005.00
DATE: 19/10/23
SHEET: 2 of 3

CONDITIONS ENCOUNTERED														SAMPLE				TESTING	
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
				ORIGIN (#)	CONSIS. (1)	DENSITY (1)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)						
	9	[CONT] CLAY (CH), trace sand: orange brown mottled grey; high plasticity; fine sand.																	
	11	11.00m: Sandy CLAY			St														
	12			RS			w>PL												
	13				VSt														
	13.10	CLAY (CH), with sand: pale grey mottled red brown; high plasticity; fine sand.		XWM	VSt		w>PL												
	14	SANDSTONE: pale grey mottled red brown																	
	15	15.00m-15.50m: bands of Sandy CLAY																	
	16																		
	16.35	SANDSTONE: brown orange, medium grained																	
	17																		
	17.86	SILTSTONE: dark grey																	
	18																		
	19																		

14.48m: P, 30-50°, PR, INF, RF

14.67m: P, 30-60°, PR, INF, RF

15.05m: CS

15.40m: CZ

15.45m: JT, 30-60°, PR, CN, RF

15.70m: JT, 30-50°, PR, CN, RF

16.34m: JT, 30-50°, PR, INF, VR

16.67m: JT, 50-75°, PR, CN, RF

16.72m: JT, 30-50°, PR, CN, RF

16.81-16.99m: JT x1, 50-60°, PR, CN, RF

17.44m: P, 10°, PR, CN, RF

17.54m: JT, 30-50°, PR, CN, RF

17.77m: P, 30-45°, PR, TI, RF

17.86-17.98m: JT x2, 50-60°, PR, CN, RF

18.06m: JT, 50-60°, PR, CN, RF

18.63m: JT, 50-60°, PR, INF, RF

19.13m: P, 30-60°, PR, CN, RF

19.39m: P, 30-50°, PR, CN, RF

19.42m: P, 45°, PR, CN, RF

19.63m: P, 45°, PR, CN, RF

14.00

17.86

19.70

19.93

100

100

100

85

0

0

27

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

85

VL

VL

L

M

14.00

17.86

19.70

19.93

100

100

100

<

PLANT: MD300-019 **OPERATOR:** Tracess Drilling **LOGGED:** JK
METHOD: 125mm Ø AD/T to 3.0m, wash bore to 13.1m, NMLC **CASING:** to 3m
REMARKS:



Refer to explanatory notes for symbol and abbreviation definitions

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.0 AHD
COORDINATE: E:345804.1, N:6298995.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-1
PROJECT No: 225005.00
DATE: 19/10/23
SHEET: 3 of 3

CONDITIONS ENCOUNTERED														SAMPLE						TESTING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK							SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
				ORIGIN (#)	CONSIS. ^(*)	DENSITY. ^(*)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)							DEFECTS & REMARKS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	16	[CONT] SILTSTONE: dark grey																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK

METHOD: 125mm Ø AD/T to 3.0m, wash bore to 13.1m, NMLC

CASING: to 3m

REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.0 AHD
COORDINATE: E:345804.1, N:6298995.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-1
PROJECT No: 225005.00
DATE: 19/10/23
SHEET: 1 of 1



13.10-18.00 m depth



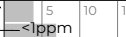
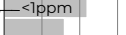
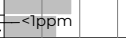
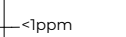
18.00-22.16 m depth

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.2 AHD
COORDINATE: E:345799.5, N:6298918.5
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-2
PROJECT No: 225005.00
DATE: 20/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED													SAMPLE			TESTING		
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK						SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
				ORIGIN (#)	CONSIS. (V)	DENSITY (V)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY	RQD						
20/10/23 Free groundwater observed	0.06	SPRAY SEAL		FILL										ES		0.20	PID	
	0.30	FILL / Sandy SILT, with gravel: dark brown; low plasticity; fine to medium sand.		FILL	NA									ES		0.50	PID	
	1	FILL / Sandy CLAY, trace gravel: dark brown; low plasticity; fine sand; fine, sub-angular gravel.		FILL		w>PL								ES		1.00	PID	
	1.30																	
	1.60	Sandy SILT (ML): dark grey to brown; low plasticity; trace organics.		EST	St									SPT		1.50-1.60	SPT	7,11,15 N=26 PID=<1ppm
	2	Sandy CLAY (CI), trace gravel: pale grey mottled red brown; medium plasticity; fine sand; fine, sub-angular gravel.		XWM	VSt	w<PL								ES		2.00	PID	
	2.70													ES		2.50	PID	
	3	CLAYSTONE: pale grey mottled red brown																
	3.35																	
	4	SANDSTONE: orange brown and pale light grey, fine to coarse grained																
	5																	
	6																	
	7																	
	8																	
	9																	

PLANT: MD300-019

OPERATOR: Traccess Drilling

LOGGED: JK

METHOD: 125mm Ø AD/T to 2.7m, then NMLC

CASING: to 2.7m

REMARKS:

Refer to explanatory notes for symbol and abbreviation definitions



CORE PHOTO LOG

CLIENT: Central Coast Council

PROJECT: Gosford Waterfront Revitalisation Masterplan

LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.2 AHD

COORDINATE: E:345799.5, N:6298918.5

DATUM/GRID: MGA2020 Zone 56

DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-2

PROJECT No: 225005.00

DATE: 20/10/23

SHEET: 1 of 1



2.70-7.00 m depth



7.00-8.64 m depth

BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.2 AHD
COORDINATE: E:345797.9, N:6298958.1
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-3
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS			
GROUNDWATER	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (M) DENSITY (M)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
RL (m) 27/10/23 Free groundwater observed	0.10	FILL / Sandy SILT: brown; low plasticity; fine to medium sand; with organics; with concrete.		FILL	NA	D		ES	0.10	PID	<1ppm	5 10 15 ref
	0.60	FILL / Sandy CLAY: brown and orange brown and grey; low plasticity; fine to coarse sand.		FILL	NA	w<PL		ES	0.70	PID	<1ppm	
	1.20	FILL / Silty Sandy CLAY: grey brown; high plasticity; fine to medium sand.		FILL		w>PL		ES	1.30	PID	<1ppm	
	1.90	Silty SAND (SM): grey; fine to medium.		EST	(VL) or (L)	W		ES	2.00	PID	<1ppm	
Borehole discontinued at 2.30m depth. Limit of Investigation.												
	3									3		
	4									4		

NOTES: #Soil origin is "probable" unless otherwise stated. *Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS:

OPERATOR: Douglas Partners

LOGGED: MLG
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Central Coast Council
PROJECT: Gosford Waterfront Revitalisation Masterplan
LOCATION: Central Coast Highway, Gosford, NSW

SURFACE LEVEL: 1.3 AHD
COORDINATE: E:345835.6, N:6298987.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: P4-4
PROJECT No: 225005.00
DATE: 30/10/23
SHEET: 1 of 1

CONDITIONS ENCOUNTERED							SAMPLE			TESTING AND REMARKS								
GROUNDWATER	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN(#)	CONSIS. ^(*) DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE			
Free groundwater observed 27/10/23	▼	0.10	FILL / Silty SAND: brown; fine to medium.		FILL	NA	D		ES		0.10	PID						
		0.50	FILL / Sandy Gravelly CLAY: dark red brown and grey and brown; low plasticity; fine to medium sand.		FILL		NA		B		0.50	PID	<1ppm		26			
		0.60					ES			0.60	PID	<1ppm						
		0.90	FILL / Silty Sandy CLAY: brown; low plasticity; fine to medium sand.		FILL	w<PL	ES			0.80			1.10		PID	<1ppm		
		1.10				ES			1.10									
		1.60				ES			1.60	PID	<1ppm							
		2.00	Silty SAND (SM): dark grey; fine to medium.			(VL) or (L)	W		ES		1.60							
		2.00																
		3.00																
		4.00	Borehole discontinued at 4.00m depth. Limit of Investigation.															

NOTES: ^(*)Soil origin is "probable" unless otherwise stated. ^(*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Utility Mounted Rig
METHOD: 60mm Ø Continuous Push Tube Sampler
REMARKS:

OPERATOR: Douglas Partners

LOGGED: MLG
CASING: Nil

Refer to explanatory notes for symbol and abbreviation definitions



Surface Sediment Sample Descriptions

Sample ID	Depth (m)	Sample Date	Sediment Description	Logged	Eastings	Northings
P1-SS1	0-0.1	30/10/2023	(SP) SAND, brown, sand fraction fine, very loose, alluvial	HJS	345321.4	6299871.4
P1-SS2	0-0.1	30/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, contains organics (sea weed), very soft, alluvial	HJS	345280.3	6299760.9
P1-SS3	0-0.1	31/10/2023	(ML) SILT with sand, dark grey, silt fraction low plasticity, sand fraction fine, contains organics (sea weed), very soft, alluvial	HJS	345250.5	6299668.6
P1-SS4	0-0.1	30/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, contains organics (sea weed), very soft, alluvial	HJS	345422.4	6299847.1
P1-SS5	0-0.1	31/10/2023	(SP) SAND, trace silt, dark grey, sand fraction fine to medium, contains organics (sea weed), traces of shell fragments, very soft, alluvial	HJS	345545.0	6299807.0
P1-SS6	0-0.1	30/10/2023	(ML) SILT with sand trace clay, dark grey, silt fraction low plasticity, sand fraction fine, alluvial	HJS	345471.3	6299713.1
P1-SS7	0-0.1	31/10/2023	(ML) SILT with sand, dark grey, silt fraction low plasticity, sand fraction fine, very soft, alluvial	HJS	345399.1	6299625.0
P1-SS8	0-0.1	31/10/2023	(ML) SILT with sand, dark grey, silt fraction low plasticity, sand fraction fine, very soft, alluvial	HJS	345455.2	6299573.4
P1-SS9	0-0.1	27/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, very soft, alluvial	HJS	345575.0	6299726.0
P1-SS10	0-0.1	27/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, very soft, alluvial	HJS	345616.0	6299654.0
P1-SS11	0-0.1	27/10/2023	(ML) SILT with clay, dark grey, silt fraction low plasticity, very soft, alluvial	HJS	345551.0	6299589.0
P1-SS12	0-0.1	30/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, very soft, alluvial	HJS	345502.0	6299540.0
P3-SS1	0-0.1	30/10/2023	(ML) Sandy SILT, dark brown-dark grey, silt fraction low plasticity, sand fraction fine, contains organics (sea weed), very soft, alluvial	HJS	345663.0	6299542.0
P3-SS2	0-0.1	30/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, very soft, alluvial	HJS	345662.8	6299505.9
P4-SS1	0-0.1	30/10/2023	(SP) SAND, brown, sand fraction fine, contains organics (sea weed), very loose, alluvial	HJS	345848.9	6299094.4
P4-SS2	0-0.1	30/10/2023	(SM) Silty SAND, dark brown-dark grey, sand fraction fine, contains organics (sea weed), very loose, alluvial	HJS	345836.7	6299096.3
P4-SS3	0-0.1	30/10/2023	(ML) Sandy SILT, dark grey, silt fraction low plasticity, sand fraction fine, contains organics (sea weed), very soft, alluvial	HJS	345820.6	6299098.5

Introduction to Terminology, Symbols and Abbreviations

Douglas Partners' reports, investigation logs, and other correspondence may use terminology which has quantitative or qualitative connotations. To remove ambiguity or uncertainty surrounding the use of such terms, the following sets of notes pages may be attached Douglas Partners' reports, depending on the work performed and conditions encountered:

- Soil Descriptions;
- Rock Descriptions; and
- Sampling, insitu testing, and drilling methodologies

In addition to these pages, the following notes generally apply to most documents.

Abbreviation Codes

Site conditions may also be presented in a number of different formats, such as investigation logs, field mapping, or as a written summary. In some of these formats textual or symbolic terminology may be presented using textual abbreviation codes or graphic symbols, and, where commonly used, these are listed alongside the terminology definition. For ease of identification in these note pages, textual codes are presented in these notes in the following style **XW**. Code usage conforms with the following guidelines:

- Textual codes are case insensitive, although herein they are generally presented in upper case; and
- Textual codes are contextual (i.e. the same or similar combinations of characters may be used in different contexts with different meanings (for example `PL` is used for plastic limit in the context of soil moisture condition, as well as in `PL(A)` for point load test result in the testing results column)).

Data Integrity Codes

Subsurface investigation data recorded by Douglas Partners is generally managed in a highly structured database environment, where records "span" between a top and bottom depth interval. Depth interval "gaps" between records are considered to introduce ambiguity, and, where appropriate, our practice guidelines may require contiguous data sets. Recording meaningful data is not always appropriate (for example assigning a "strength" to a concrete pavement) and the following codes may be used to maintain contiguity in such circumstances.

Term	Description	Abbreviation Code
Core loss	No core recovery	KL
Unknown	Information was not available to allow classification of the property. For example, when auguring in loose, saturated sand auger cuttings may not be returned.	UK
No data	Information required to allow classification of the property was not available. For example, if drilling is commenced from the base of a hole predrilled by others	ND
Not Applicable	Derivation of the properties not appropriate or beyond the scope of the investigation. For example, providing a description of the strength of a concrete pavement	NA

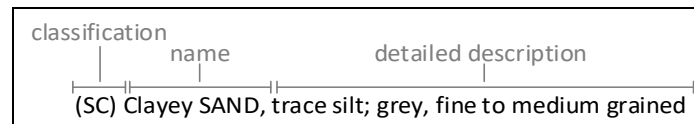
Graphic Symbols

Douglas Partners' logs contain a "graphic" column which provides a pictorial representation of the basic composition of the material. The symbols used are directly representing the material name stated in the adjacent "Description of Strata" column, and as such no specific graphic symbology legend has been provided in these notes.

intentionally blank

Introduction

All materials which are not considered to be “in-situ rock” are described in general accordance with the soil description model of AS 1726-2017 Part 6.1.3, and can be broken down into the following description structure:



The “classification” comprises a two character “group symbol” providing a general summary of dominant soil characteristics. The “name” summarises the particle sizes within the soil which most influence its behaviour. The detailed description presents more information about composition, condition, structure, and origin of the soil.

Classification, naming and description of soils require the relative proportion of particles of different sizes within the whole soil mixture to be considered.

Particle size designation and Behaviour Model

Solid particles within a soil are differentiated on the basis of size.

The engineering behaviour properties of a soil can subsequently be modelled to be either “fine grained” (also known as “cohesive” behaviour) or “coarse grained” (“non cohesive” behaviour), depending on the relative proportion of fine or coarse fractions in the soil mixture.

Particle Size Designation	Particle Size (mm)	Behaviour Model	
		Behaviour	Approximate Dry Mass
Boulder	>200	Excluded from particle behaviour model as “oversize”	
Cobble	63 - 200		
Gravel ¹	2.36 - 63	Coarse	>65%
Sand ¹	0.075 - 2.36		
Silt	0.002 - 0.075	Fine	>35%
Clay	<0.002		

¹ – refer grain size subdivision descriptions below

The behaviour model boundaries defined above are not precise, and the material behaviour should be assumed from the name given to the material (which considers the particle fraction which dominates the behaviour, refer “component proportions” below), rather than strict observance of the proportions of particle sizes. For example, if a material is named a “Sandy CLAY”, this is indicative that the material exhibits fine grained behaviour, even if the dry mass of coarse grained material may exceed 65%.

Component proportions

The relative proportion of the dry mass of each particle size fraction is assessed to be a “primary”, “secondary”, or “minor” component of the soil mixture, depending on its influence over the soil behaviour.

Component Proportion Designation	Definition ¹	Relative Proportion	
		In Fine Grained Soil	In Coarse Grained Soil
Primary	The component (particle size designation, refer above) which dominates the engineering behaviour of the soil	The clay/silt component with the greater proportion	The sand/gravel component with the greater proportion
Secondary	Any component which is not the primary, but is significant to the engineering properties of the soil	Any component with greater than 30% proportion	Any granular component with greater than 30%; or Any fine component with greater than 12%
Minor ²	Present in the soil, but not significant to its engineering properties	All other components	All other components

¹ As defined in AS1726-2017 6.1.4.4

² In the detailed material description, minor components are split into two further sub-categories. Refer “identification of minor components” below.

Composite Materials

In certain situations, a lithology description may describe more than one material, for example, collectively describing a layer of interbedded sand and clay. In such a scenario, the two materials would be described independently, with the names preceded or followed by a statement describing the arrangement by which the materials co-exist. For example, “INTERBEDDED Silty CLAY AND SAND”.

Classification

The soil classification comprises a two character group symbol. The first character identifies the primary component. The second character identifies either the grading or presence of fines in a coarse grained soil, or the plasticity in a fine grained soil. Refer AS1726-2017 6.1.6 for further clarification.

Soil Name

For most soils, the name is derived with the primary component included as the noun (in upper case), preceded by any secondary components stated in an adjective form. In this way, the soil name also describes the general composition and indicates the dominant behaviour of the material.

Component ¹	Prominence in Soil Name
Primary	Noun (eg "CLAY")
Secondary	Adjective modifier (eg "Sandy")
Minor	No influence

¹ – for determination of component proportions, refer component proportions on previous page

For materials which cannot be disaggregated, or which are not comprised of rock or mineral fragments, the names "ORGANIC MATTER" or "ARTIFICIAL MATERIAL" may be used, in accordance with AS1726-2017 Table 14.

Commercial or colloquial names are not used for the soil name where a component derived name is possible (for example "Gravelly SAND" rather than "CRACKER DUST").

Materials of "fill" or "topsoil" origin are generally assigned a name derived from the primary/secondary component (where appropriate). In log descriptions this is preceded by uppercase "FILL" or "TOPSOIL". Origin uncertainty is indicated in the description by the characters (?), with the degree of uncertainty described (using the terms "probably" or "possibly" in the origin column, or at the end of the description).

Identification of minor components

Minor components are identified in the soil description immediately following the soil name. The minor component fraction is usually preceded with a term indicating the relative proportion of the component.

Minor Component Proportion Term	Relative Proportion	
	In Fine Grained Soil	In Coarse Grained Soil
With	All fractions: 15-30%	Clay/silt: 5-12% sand/gravel: 15-30%
Trace	All fractions: 0-15%	Clay/silt: 0-5% sand/gravel: 0-15%

The terms "with" and "trace" generally apply only to gravel or fine particle fractions. Where cobbles/boulders are encountered in minor proportions (generally less than about 12%) the term "occasional" may be used. This term describes the sporadic distribution of the material within the confines of the investigation excavation only, and there may be considerable variation in proportion over a wider area which is difficult to factually characterise due to the relative size of the particles and the investigation methods.

Soil Composition

Plasticity

Descriptive Term	Laboratory liquid limit range	
	Silt	Clay
Non-plastic materials	Not applicable	Not applicable
Low plasticity	≤50	≤35
Medium plasticity	Not applicable	>35 and ≤50
High plasticity	>50	>50

Note, Plasticity descriptions generally describe the plasticity behaviour of the whole of the fine grained soil, not individual fine grained fractions.

Grain Size

Type	Particle size (mm)	
	Coarse	Fine
Gravel	19 - 63	6.7 - 19
	6.7 - 19	2.36 - 6.7
	2.36 - 6.7	0.6 - 2.36
Sand	0.6 - 2.36	0.21 - 0.6
	0.21 - 0.6	0.075 - 0.21
	0.075 - 0.21	

Grading

Grading Term	Particle size (mm)
Well	A good representation of all particle sizes
Poorly	An excess or deficiency of particular sizes within the specified range
Uniformly	Essentially of one size
Gap	A deficiency of a particular size or size range within the total range

Note, AS1726-2017 provides terminology for additional attributes not listed here.

Soil Condition

Moisture

The moisture condition of soils is assessed relative to the plastic limit for fine grained soils, while for coarse grained soils it is assessed based on the appearance and feel of the material. The moisture condition of a material is considered to be independent of stratigraphy (although commonly these are related), and this data is presented in its own column on logs.

Applicability	Term	Tactile Assessment	Abbreviation code
Fine	Dry of plastic limit	Hard and friable or powdery	w<PL
	Near plastic limit	Can be moulded	w=PL
	Wet of plastic limit	Water residue remains on hands when handling	w>PL
	Near liquid limit	"oozes" when agitated	w=LL
	Wet of liquid limit	"oozes"	w>LL
Coarse	Dry	Non-cohesive and free running	D
	Moist	Feels cool, darkened in colour, particles may stick together	M
	Wet	Feels cool, darkened in colour, particles may stick together, free water forms when handling	W

The abbreviation code **NDF**, meaning "not-assessable due to drilling fluid use" may also be used.

Note, observations relating to free ground water or drilling fluids are provided independent of soil moisture condition.

Consistency/Density/Compaction/Cementation/Extremely Weathered Material

These concepts give an indication of how the material may respond to applied forces (when considered in conjunction with other attributes of the soil). This behaviour can vary independent of the composition of the material, and on logs these are described in an independent column and are generally mutually exclusive (i.e it is inappropriate to describe both consistency and compaction at the same time). The method by which the behaviour is described depends on the behaviour model and other characteristics of the soil as follows:

- In fine grained soils, the "consistency" describes the ease with which the soil can be remoulded, and is generally correlated against the materials undrained shear strength;
- In granular materials, the relative density describes how tightly packed the particles are, and is generally correlated against the density index;
- In anthropogenically modified materials, the compaction of the material is described qualitatively;
- In cemented soils (both natural and anthropogenic), the cemented "strength" is described qualitatively, relative to the difficulty with which the material is disaggregated; and
- In soils of extremely weathered material origin, the engineering behaviour may be governed by relic rock features, and expected behaviour needs to be assessed based the overall material description.

Quantitative engineering performance of these materials may be determined by laboratory testing or estimated by correlated field tests (for example penetration or shear vane testing). In some cases, performance may be assessed by tactile or other subjective methods, in which case investigation logs will show the estimated value enclosed in round brackets, for example (VS).

Consistency (fine grained soils)

Consistency Term	Tactile Assessment	Undrained Shear Strength (kPa)	Abbreviation Code
Very soft	Extrudes between fingers when squeezed	<12	VS
Soft	Mouldable with light finger pressure	>12 - ≤25	S
Firm	Mouldable with strong finger pressure	>25 - ≤50	F
Stiff	Cannot be moulded by fingers	>50 - ≤100	St
Very stiff	Indented by thumbnail	>100 - ≤200	VSt
Hard	Indented by thumbnail with difficulty	>200	H
Friable	Easily crumbled or broken into small pieces by hand	-	Fr

Relative Density (coarse grained soils)

Relative Density Term	Density Index	Abbreviation Code
Very loose	<15	VL
Loose	>15 - ≤35	L
Medium dense	>35 - ≤65	MD
Dense	>65 - ≤85	D
Very dense	>85	VD

Note, tactile assessment of relative density is difficult, and generally requires penetration testing, hence a tactile assessment guide is not provided.

Soil Descriptions

Terminology
Symbols
Abbreviations

Compaction (anthropogenically modified soil)

Compaction Term	Abbreviation Code
Well compacted	WC
Poorly compacted	PC
Moderately compacted	MC
Variably compacted	VC

Cementation (natural and anthropogenic)

Cementation Term	Abbreviation Code
Moderately cemented	MOD
Weakly cemented	WEK

Extremely Weathered Material

AS1726-2017 considers weathered material to be soil if the unconfined compressive strength is less than 0.6 MPa (i.e. less than very low strength rock). These materials may be identified as “extremely weathered material” in reports and by the abbreviation code **XWM** on log sheets. This identification is not correlated to any specific qualitative or quantitative behaviour, and the engineering properties of this material must therefore be assessed according to engineering principles with reference to any relic rock structure, fabric, or texture described in the description.

Soil Origin

Term	Description	Abbreviation Code
Residual	Derived from in-situ weathering of the underlying rock	RS
Extremely weathered material	Formed from in-situ weathering of geological formations. Has strength of less than ‘very low’ as per as1726 but retains the structure or fabric of the parent rock.	XWM
Alluvial	Deposited by streams and rivers	ALV
Estuarine	Deposited in coastal estuaries	EST
Marine	Deposited in a marine environment	MAR
Lacustrine	Deposited in freshwater lakes	LAC
Aeolian	Carried and deposited by wind	AEO
Colluvial	Soil and rock debris transported down slopes by gravity	COL
Slopewash	Thin layers of soil and rock debris gradually and slowly deposited by gravity and possibly water	SW
Topsoil	Mantle of surface soil, often with high levels of organic material	TOP
Fill	Any material which has been moved by man	FILL
Littoral	Deposited on the lake or seashore	LIT
Unidentifiable	Not able to be identified	UID

Cobbles and Boulders

The presence of particles considered to be “oversize” may be described using one of the following strategies:

- Oversize encountered in a minor proportion (when considered relative to the wider area) are noted in the soil description; or
- Where a significant proportion of oversize is encountered, the cobbles/boulders are described independent of the soil description, in a similar manner to composite soils (described above) but qualified with “MIXTURE OF”.

intentionally blank

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

¹ Rock strength classification is based on UCS. The UCS to $I_{s(50)}$ ratio varies significantly for different rock types and specific ratios may be required for each site. The point load Index ranges shown above are as suggested in AS1726 and should not be relied upon without supporting evidence.

The following abbreviation codes are used for soil layers or seams of material “within rock” but for which the equivalent UCS strength is less than 0.6 MPa.

Scenario	Abbreviation Code
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The properties of the material encountered over this interval are described in the “Description of Strata” and soil properties columns.	SOIL
The material encountered has an equivalent UCS strength of less than 0.6 MPa, and therefore is considered to be soil (as per Note 1 of Table 20 of AS 1726-2017). The prominence of the material is such that it can be considered to be a seam (as defined in Table 22 of AS1726-2017) and the properties of the material are described in the defect column.	SEAM

Degree of Weathering

The degree of weathering of rock is classified as follows:

Weathering Term	Description	Abbreviation Code
Residual Soil ¹	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.	RS
Extremely weathered ¹	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	XW
Highly weathered	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.	HW
Moderately weathered	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.	MW
Slightly weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.	SW
Fresh	No signs of decomposition or staining.	FR
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	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.	DW

¹ The parent rock type, of which the residual/extremely weathered material is a derivative, will be stated in the description (where discernible).

Degree of Alteration

The degree of alteration of the rock material (physical or chemical changes caused by hot gasses or liquids at depth) is classified as follows:

Term	Description	Abbreviation Code
Extremely altered	Material is altered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.	XA
Highly altered	The whole of the rock material is discoloured, usually by staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is changed by alteration. Some primary minerals are altered to clay minerals. Porosity may be increased by leaching or may be decreased due to precipitation of secondary materials in pores.	HA
Moderately altered	The whole of the rock material is discoloured, usually by 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.	MA
Slightly altered	Rock is slightly discoloured but shows little or no change of strength from fresh rock	SA
Note: If HA and MA cannot be differentiated use DA (see below)		
Distinctly altered	Rock strength usually changed by alteration. The rock may be highly discoloured, usually by staining or bleaching. Porosity may be increased by leaching or may be decreased due to precipitation of secondary minerals in pores.	DA

Degree of Fracturing

The following descriptive classification apply to the spacing of natural occurring fractures in the rock mass. It includes bedding plane partings, joints and other defects, but excludes drilling breaks. These terms are generally not required on investigation logs where fracture spacing is presented as a histogram, and where used are presented in an unabbreviated format.

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:

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

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

These terms may be used to describe the spacing of bedding partings in sedimentary rocks. Where used, these terms are generally presented in an unabbreviated format

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

Rock Descriptions

Terminology
Symbols
Abbreviations

Defect Descriptions

Defect Type

Term	Abbreviation Code
Bedding plane	B
Infilled seam	IS
Cleavage	CV
Crushed zone	CZ
Decomposed seam	DS
Fault	F
Joint	JT
Lamination	LAM
Parting	P
Shear zone	SZ
Vein	VN
Drilling/handling break	DB , HB
Fracture	FC

Rock Defect Orientation

Term	Abbreviation Code
Horizontal	H
Vertical	V
Sub-horizontal	SH
Sub-vertical	SV

Rock Defect Coating

Term	Abbreviation Code
Clean	CN
Coating	CT
Healed	HE
Infilled	INF
Stained	SN
Tight	TI
Veneer	VNR

Rock Defect Infill

Term	Abbreviation Code
Calcite	CA
Carbonaceous	CBS
Clay	CLAY
Iron oxide	FE
Manganese	MN

intentionally blank

Rock Defect Shape/Planarity

Term	Abbreviation Code
Curved	CU
Irregular	IR
Planar	PR
Stepped	ST
Undulating	UN

Rock Defect Roughness

Term	Abbreviation Code
Polished	PO
Rough	RF
Slickensided	SL
Smooth	SM
Very rough	VR

Defect Orientation

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

intentionally blank

Sampling and Testing

A record of samples retained, and field testing performed is usually shown on a Douglas Partners' log with samples appearing to the left of a depth scale, and selected field and laboratory testing (including results, where relevant) appearing to the right of the scale, as illustrated below:

SAMPLE			DEPTH (m)	TESTING	
SAMPLE REMARKS	TYPE	INTERVAL		TEST TYPE	RESULTS AND REMARKS
	SPT		1.0 1.45	SPT	4,9,11 N=20

Sampling

The type or intended purpose for which a sample was taken is indicated by the following abbreviation codes.

Sample Type	Code
Auger sample	A
Bulk sample	B
Core sample	C
Disturbed sample	D
Sample from SPT test	SPT
Environmental sample	ES
Gas sample	G
Undisturbed tube sample	U ¹
Water sample	W
Piston sample	P
Core sample for unconfined compressive strength testing	UCS
Material Sample	MT

¹ – numeric suffixes indicate tube diameter/width in mm

The above codes only indicate that a sample was retained, and not that testing was scheduled or performed.

Field and Laboratory Testing

A record that field and laboratory testing was performed is indicated by the following abbreviation codes.

Test Type	Code
Pocket penetrometer (kPa)	PP
Photo ionisation detector (ppm)	PID
Standard Penetration Test x/y = x blows for y mm penetration HB = hammer bouncing HW = fell under weight of hammer	SPT
Shear vane (kPa)	V
Unconfined compressive strength, (MPa)	UCS

Field and laboratory testing (continued)

Test Type	Code
Point load test, (MPa), axial (A), diametric (D), irregular (I)	PLT(L)
Dynamic cone penetrometer, followed by blow count penetration increment in mm (cone tip, generally in accordance with AS1289.6.3.2)	DCP/150
Perth sand penetrometer, followed by blow count penetration increment in mm (flat tip, generally in accordance with AS1289.6.3.3)	PSP/150

Groundwater Observations

▷	seepage/inflow
▽	standing or observed water level
NFGWO	no free groundwater observed
OBS	observations obscured by drilling fluids

Drilling or Excavation Methods/Tools

The drilling/excavation methods used to perform the investigation may be shown either in a dedicated column down the left-hand edge of the log, or stated in the log footer. In some circumstances abbreviation codes may be used.

Method	Abbreviation Code
Toothed bucket	TB ¹
Mud/blade bucket	MB ¹
Ripping tyne/ripper	R
Rock breaker/hydraulic hammer	RB
Hand auger	HA ¹
NMLC series coring	NMLC
HMLC series coring	HMLC
NQ coring	NQ3
HQ coring	HQ3
PQ coring	PQ3
Push tube	PT ¹
Rock roller	RR ¹
Solid flight auger. Suffixes: /T = tungsten carbide tip, /V = v-shaped tip	AD ¹
Sonic drilling	SON ¹
Vibrocure	VC ¹
Wash bore (unspecified bit type)	WB ¹
Existing exposure	X
Hand tools (unspecified)	HAND
Predrilled	PD
Diatube	DT ¹
Hollow flight auger	HSA ¹
Vacuum excavation	VE

¹ – numeric suffixes indicate tool diameter/width in mm

Appendix F

Site Assessment Criteria

Appendix F

Site Assessment Criteria

F1.0 Introduction

F1.1 Guidelines

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

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- CRC CARE Health screening levels for petroleum hydrocarbons in soil and groundwater (CRC CARE, 2011).
- HEPA PFAS National Environmental Management Plan (NEMP) (HEPA, 2020).
- ANZG Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018).
- NHMRC Guidelines for Managing Risks In Recreational Water (NHMRC, 2008).
- ANZECC Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000).

F1.2 General

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

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

- Soil type: Sand (based on soil type encountered– see Logs, Appendix E. It is noted that a sand soil type is also most conservative for application of the SAC);
- Land use: Based on correspondence with Council, the following was understood regarding the proposed land uses:
 - o Precinct 1 – Proposed land use to include residential (apartments / units), commercial and recreational land uses; and
 - o Precincts 3 and 4 – retail / commercial and recreational land uses.

Given that at the time of preparing the PSI, the layout of proposed buildings and areas of open space within each precinct had not been confirmed, a conservative SAC was adopted as summarised below:

- o Precinct 1 - Residential (Land Use Category B for application of the health screening levels (HSL) for vapour intrusion);
- o Precincts 3 and 4 – Commercial (Land Use Category D for application of the HSL for vapour intrusion); and
- o Precincts 1, 3 and 4 – Recreational (Land Use Category C for application of other SAC).

F2.0 Soils

F2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table F1 and Table F2.

Table F1: Health Investigation Levels (mg/kg)

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

Contaminant	HIL-C
Endrin	20
Heptachlor	10
HCB	10
Methoxychlor	400
PCB	
PCB	1

Table F2: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B (Precinct 1)	HSL-D (Precincts 3 and 4)
SAND	0 m to <1 m	0 m to <1 m
Benzene	0.5	3
Toluene	160	NL
Ethylbenzene	55	NL
Xylenes	40	230
Naphthalene	3	NL
TRH F1	45	260
TRH F2	110	NL

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

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

The HSL for direct contact derived from CRC CARE (2011) are in Table F3.

Table F3: Health Screening Levels for Direct Contact (mg/kg)

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

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX
 TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene
 IMW intrusive maintenance worker

F2.2 Asbestos in Soil

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

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

The HSL are in Table F4.

Table F4: Health Screening Levels for Asbestos

Form of Asbestos	HSL-C
ACM	0.02%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.

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

F2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table F6, with inputs into their derivation shown in Table F5.

Table F5: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years)	Given the likely source of soil contaminants (i.e. historical site use / fill), the contamination is considered as "aged"
pH	6.6	Based on the average of two laboratory analysed samples (P3-1/0.1 and P4-3/0.1)
CEC	5 cmol _c /kg	DP notes the average of the two laboratory analysed samples was 3.8 cmol _c /kg, however, DP has opted to use the lowest CEC value given in Table 1B(1) of NEPC (2013) instead.
Clay content	1%	Estimate, based on a 'sand' soil type
Traffic volumes	High	The site is located in an urban / developed area
State / Territory	NSW	The site is located in NSW

Table F6: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	120
Nickel	35
Chromium III	200
Lead	1100
Zinc	350
PAH	
Naphthalene	170
OCP	
DDT	180

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

F2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table F7.

Table F7: Ecological Screening Levels (mg/kg)

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

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

F2.5 Management Limits

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

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

The adopted management limits are in Table F8.

Table F8: Management Limits (mg/kg)

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

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

F3.0 Groundwater

F3.1 Introduction

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (CSM). The receptors, exposure points and pathways are summarised in Table F9.

Table F9: Summary of Potential Receptors and Potential Risks

Receptor	Location	Exposure Point	Exposure Pathway
Surface water aquatic ecosystem	Down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Exposure to contaminants.
Human health (occupants of buildings)	On site.	Enclosed buildings (existing or proposed).	Inhalation of VOC (including TRH and BTEX) overlying VOC impacted groundwater via the vapour intrusion pathway.
Human recreation (eg: swimming)	On site / down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Ingestion / dermal absorption of contaminants during recreational activities (eg: swimming).

The rationale for the selection of GIL is in Table F10.

Table F10: Groundwater Investigation Level Rationale

Receptor / Beneficial Use	Criteria	Source	Comments / Rationale
Aquatic Ecosystems	DGV ¹ for slightly to moderately disturbed marine waters.	ANZG (2018)	- Marine water (i.e. Brisbane Water) 99% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants - The 'freshwater' guideline was applied for contaminants where no marine guideline value exists.
	Ecological water quality guidelines values (PFAS): - Interim marine; 99% Species Protection	HEPA (2020)	Marine water 99% LOP (recommended for slightly to moderately disturbed systems) Screening values were only available for PFOS and PFOA at the time of this investigation.
Human Health (vapour intrusion – occupants of buildings)	Precinct 2 HSL A/B (Low-high density residential) for vapour intrusion - applying sand; - depth range of 2 m to <4 m	NEPC (2013) and CRC CARE (2011)	- A sand soil type has been conservatively adopted. - A depth range of 2 m to <4 m has been used as an initial screen – see discussion below (Page 11)
	Precincts 3 and 4 HSL D (Commercial/ industrial) for vapour intrusion - applying sand; - depth range of 2 m to <4 m		
Recreational	Guideline value	NHMRC (2008)	The recreation water guideline values are based on the drinking water guideline values (x 10), to account for ingestion of water (up to 200 mL) whilst undertaking recreational activities.
	Recreational water quality guideline value (PFAS)	HEPA (2020), Table 1	

% LOP - percentage level of protection of species

HSL - health screening level

DGV – default guideline value

The use of the HSLs requires consideration of a number of factors such as land use, soil type and depth of contamination. A specific limitation that affects the use of groundwater HSLs for this investigation is the shallow depth to groundwater (i.e. groundwater is less than 2 m depth). The HSLs adopted for this investigation were based on a generic groundwater depth of between 2 m and 4 m. It is acknowledged that this may not be appropriate for this site. Development of more appropriate HSLs could be undertaken using the CRC Care Risk / Health Based Criteria Model, however, given the non-detectable groundwater VOC concentrations, further development of site specific HSLs was not considered to be warranted.

F3.2 Water Criteria for Aquatic Ecosystems

The DGV for the protection of aquatic ecosystems derived from ANZG (2018) are in Table F11.

Table F11: Default Guideline Values (DGV) for Protection of Aquatic Ecosystems (µg/L)

Contaminant	Fresh Water	Marine Water
Metals		
Arsenic	24 (As III) ^B / 13 (As V) ^B	-
Cadmium	-	0.7 ^A
Chromium (VI)	-	4.4 ^B
Copper	-	1.3 ^B
Lead	-	4.4 ^B
Mercury (inorganic)	-	0.1 ^A
Nickel	-	7 ^A
Zinc	-	8 ^B
BTEX		
Benzene	-	500 ^A
Toluene	-	180 ^B
Ethylbenzene	-	80 ^B
m-Xylene	-	75 ^B
PAH		
B(a)P	-	0.1 ^A
Anthracene	-	0.01 ^A
Fluoranthene	-	1.0 ^A
Phenanthrene	-	0.6 ^A
Naphthalene	-	50 ^A
Phenols		
Phenol	-	400 ^B
Pentachlorophenol	-	11 ^A

Notes:

A – 99% Species Protection Level

B – 95% Species Protection Level

The ecological water quality guideline values for PFAS derived from HEPA (2020) are in Table F12.

Table F12: Ecological water quality guideline values for Protection of Aquatic Ecosystems (µg/L)

Contaminant / LOP	Interim Marine Water
PFOS 99% LOP	0.00023
PFOA 99% LOP	19

F3.3 Health Screening Levels for Vapour Intrusion

The HSL for vapour intrusion are in Table F13. It is noted that HSL-D is more appropriate for Precincts 3 and 4, however, as an initial screen, all groundwater samples were assessed conservatively against HSL A & B. For reference, the HSL – D values are also presented in below Table F13.

Table F13: Groundwater Health Screening Levels for Vapour Intrusion (µg/L)

Contaminant	HSL-A&B (Precinct 1)	HSL-D (Precincts 3 and 4)	Solubility Limit
SAND	2 m to <4 m	2 m to <4 m	-
Benzene	800	5000	59 000
Toluene	NL	NL	61 000
Ethylbenzene	NL	NL	3900
Xylenes	NL	NL	21 000
Naphthalene	NL	NL	170
TRH F1	1000	6000	9000
TRH F2	1000	NL	3000

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

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

F3.4 Water Criteria for Recreational Water

The recreational water guideline values are presented in Table F14, derived from NHMRC (2008). The recreational water guidelines values are based on the drinking water guideline values (x10) to account for ingestion of water (up to 200 mL) whilst undertaking recreational activities. The recreational water values for PFAS are given in Table F15.

Table F14: Recreational Water Values (µg/L)

Contaminant	Guideline Value (Recreational Water)
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	500
Copper	20000
Lead	100
Mercury (inorganic)	10
Nickel	200
Zinc	NC
BTEX	
Benzene	10
Ethylbenzene	3000
Toluene	8000
Xylene	6000
PAH	
BaP	0.1

Table F15: Recreational Water Values (PFAS) (µg/L)

Contaminant / LOP	Recreational Water Quality
PFOS + PFHxS	2
PFOA	10

F4.0 Sediment

The sediment guideline values derived from ANZG (2018) are given in Table F16.

Table F16: Guideline values for sediment quality

Contaminant	Guideline value (DGV)	GV-high
Metals	(mg/kg dry weight)	
Cadmium	1.5	10
Chromium	80	370
Copper	65	270
Lead	50	220
Mercury	0.15	1.0
Nickel	21	52
Zinc	200	410
Metalloids	(mg/kg dry weight)	
Arsenic	20	70
Organometallics^a	(µg/kg dry weight, 1% OC)	
Tributyltin (as Tin)	9.0	70
Organics^a	(µg/kg dry weight, 1% OC)	
Total PAHs (sum of PAHs)	10,000	50,000
Total DDT	1.2	5.0
p,p'-DDE	1.4	7.0
o,p'- + p,p'-DDD	3.5	9.0
Chlordane	4.5	9.0
Dieldrin	2.8	7.0
Endrin	2.7	60
Total PCBs	34	280
Organics	(mg/kg dry weight)	
Total petroleum hydrocarbons (TPHs)	280	550

^a - Normalised to 1% OC within the limits of 0.2 to 10%.

F5.0 References

- ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australia and New Zealand Environment and Conservation Council.
- ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.
- CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater*. Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.
- HEPA. (2020). *PFAS National Environmental Management Plan (NEMP)*. Version 2.0: Heads of EPAs Australia and New Zealand and Australian Government Department of the Environment.
- NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.
- NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water*.
- NHMRC, NRMMC. (2016). *Australian Drinking Water Guidelines 6 2011, Version 3.2*. Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

Douglas Partners Pty Ltd

Appendix G

Field Work Methodology

Appendix G

Field Work Methodology

G1.0 Guidelines

The following key guidelines were consulted for the field work methodology:

- NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013).
- HEPA PFAS National Environmental Management Plan (NEMP) (HEPA, 2020).

G1.0 Field Work

Field work was undertaken by DP geotechnical engineers adequately trained in environmental sampling. Soil and sediment sampling was undertaken in October 2023, and groundwater sampling was undertaken in November 2023.

The field work comprised intrusive investigation in Precincts 1, 3 and 4 as outlined below:

Precinct 1

- Drilling of four boreholes (Bores P1-1 to P1-4) using a drilling rig fitted with a solid flight auger. Bores P1-1 and P1-2 were progressed below depths of 3 m using wash boring, and NMLC;
- Collection of 12 surface sediment samples (Samples P1-SS1 to P1-SS12); and
- Conversion of one borehole (Bore P1-1) to a groundwater monitoring well (MW1), followed by groundwater well development and sampling.

Precinct 3

- Drilling of six boreholes (Bores P3-1 to P3-6) using a utility mounted drilling rig fitted with a push-tube sampler;
- Collection of two surface sediment samples (Samples P3-SS1 and P3-SS2); and
- Conversion of one borehole (Bore P3-6) to a groundwater monitoring well (MW2), followed by groundwater well development and sampling.

Precinct 4

- Drilling of two boreholes (Bores P4-1 and P4-2) using a drilling rig fitted with a solid flight auger. Bore P4-1 was progressed below depths of 3 m using wash boring, and NMLC, and Bore P4-2 was progressed below depths of 2.7 m using NMLC;
- Drilling of two boreholes (Bores P4-3 and P4-4) using a utility mounted drilling rig fitted with a push-tube sampler;
- Collection of three surface sediment samples (Samples P4- SS1 to P4-SS3); and;
- Conversion of one borehole (Bore P4-4) to a groundwater monitoring well (MW3), followed by groundwater well development and sampling.

The sampling procedures adopted are outlined below, and the general sample handling procedure is given in Section G5. The decontamination procedure adopted is outlined in Section G6.

G2.0 Soil Sampling

Soil sampling was carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprised:

- Collection of soil samples at the nominated sample depth from the push tube or solid flight auger;
- Use of disposable nitrile gloves when collecting all samples. Gloves were replaced prior to the collection of each sample thereby minimising potential for cross-contamination;
- Transfer of samples into a new laboratory prepared glass jar with Teflon lined lids, capping immediately and minimising headspace within the sample jar;
- Collection of ~ 500 mL samples for fibrous asbestos and asbestos fines (FA and AF) analysis;
- Collection of 10% replicate samples for quality control (QC) purposes; and
- Collection of replicate samples in zip-lock bags for PID (photoionisation detector) screening.

G2.1 Field Testing

Field testing was carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprised:

PID Field Test:

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;
- Allow the headspace in the PID zip-lock bag samples to equilibrate; and
- Screen using the PID.

G3.0 Groundwater Sampling

G3.1 Monitoring Well Installation

Monitoring wells were constructed using PFAS-free materials comprising class 18 uPVC machine slotted screen and blank sections with screw threaded joints. The screened section of each well was backfilled with a washed sand filter pack to approximately 0.5 m above the screened interval. Each well was completed with a hydrated bentonite plug of at least 0.5 m thick and then compacted drill cuttings to the surface, finished with a flush gatic cover.

G3.2 Monitoring Well Development

Groundwater monitoring wells were developed as soon as practicable following well installation. The purpose of well development was to remove sediments and/or drilling fluid introduced to the well during drilling and to facilitate connection of the monitoring well to the aquifer. The wells were developed by pumping / bailing to remove a minimum of five well volumes, or until dry.

G3.3 Groundwater Sampling

Groundwater sampling was carried out in accordance with DP standard operating procedures. Groundwater samples were collected using a positive displacement low flow bladder pump via the micro-purge (minimal drawdown) method. The method minimises aeration of the sample and disturbance to the water column thereby enhancing the quality of results for oxygen sensitive analytes.

The general sampling procedure comprised:

- Use of an electronic interface probe to measure the static water level (SWL) of the bores and also to detect light non-aqueous phase liquids (LNAPL), if present;
- Fitting the pump with a well-dedicated bladder and tubing;
- Lowering of the pump into the well then clamping at the approximate mid-point of the well screen. The pump was set to the lowest possible flow rate that could produce laminar flow to minimise drawdown of the water column;
- Recording of groundwater field parameters including pH, EC, redox potential, dissolved oxygen and temperature, measured using a calibrated water quality meter, by continuously passing purged water through a flow cell; and
- Following stabilisation of field parameters (see Table G1 below), groundwater samples were collected in appropriately preserved bottles (e.g laboratory-prepared bottle specific for PFAS), minimising headspace within the sample bottle and capping immediately. For analysis of metals, the relevant sample was filtered in the field using an in-line disposable 0.45 µm filter.

Table G1: Stabilisation criteria for groundwater sampling

Parameter	Stabilisation Criteria
pH	+/- 0.1
Electrical Conductivity (EC)	+/- 3%
Oxidation/reduction potential / redox	+/- 10 mV
Dissolved Oxygen	+/- 0.3 mg/L

G4.0 Sediment Sampling

The general sampling procedure comprised the following:

- Collection of samples from sediments (depths of 0-0.1 m) using a Petite Ponar Grab Sampler (see Figure G1 below);
- Use of disposal nitrile gloves to transfer the sample into the sampling jar;
- Recording of field conditions at the time of sampling and sediment properties such as composition, texture / consistency, grain size and colour.



Figure G1: Petite Ponar Grab Sampler.

G5.0 Sample handling and management

The general sample handling and management comprised the following:

- Labelling of sample jars or bottles (as relevant) with individual and unique identification including project number, sample ID, and date of sampling. Appropriate jars / bottles were used, depending on the analysis to be undertaken (eg acid-washed and preserved jars for metals in water);
- Placement of samples into a cooled, insulated and sealed container for transport to the laboratory; and;
- Use of chain of custody documentation.

G6.0 Decontamination Procedure

The decontamination procedure adopted comprised the following:

- Disposable sampling equipment, including gloves (for soil and water sampling), pump bladders and tubing (i.e. for groundwater sampling), were replaced between collection of each sample;
- Non-disposal sampling equipment (e.g interface probe, pump and cable) was decontaminated as follows:
 1. Removing individual parts (if applicable);
 2. Decontaminating by rinsing in a diluted Liquinox solution; and
 3. Rinsing in demineralised water

G7.0 References

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

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

Douglas Partners Pty Ltd

Appendix H

Data Quality Objectives

Appendix H

Data Quality Objective

1.0 Data Quality Objectives

The PSI has been devised broadly in accordance with the seven-step data quality objectives (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation was to assess the contamination status of the site with respect to the proposed land use. The investigation was undertaken as the site is to be redeveloped. A preliminary conceptual site model (CSM) has been prepared (Section 9) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Reviewer, Project Manager and field staff.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the CSM (Section 9). The CSM identified the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Appendix F. The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population (if applicable) falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective will be derived and a decision made on whether (or not) further assessment and / or remediation will be required.
3: Identify the information inputs	Inputs to the investigation included: • Review of site history information and previous reports (Sections 6 and 7); • Observations made during the site walkover (Section 8); • The lithology of the site as described in the logs and field observations and recorded groundwater field parameters (Section 12.1); • Photoionization detector (PID) readings, used on-site to screen soils for VOC, and used to inform sample selection for laboratory analysis; • Laboratory results of samples, analysed using NATA accredited laboratories and methods, where possible; • Field and laboratory QC data (see Appendix I); and • Adopted SAC (see Appendix F).

Step	Summary
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in Section 16 of the report.
5: Develop the analytical approach (or decision rule)	• The decision rule is to compare all analytical results with SAC (Appendix F), based on NEPC (2013)); • Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible; • Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s). • Initial comparisons will be with individual results then, where required (and applicable), summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) will be applied to assess potential risks posed by the site contamination; • Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Appendix I.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site exceed human health and environmental SAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site comply with human health and environmental SAC and as such, do not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Given the limited data points and the judgmental sampling plan adopted, the use of statistics was not considered to be appropriate for this preliminary investigation.
7: Optimise the design for obtaining data	Sampling design and procedures that were implemented to optimise data collection for achieving the DQOs included the following: • Suitably experienced engineers and scientists were chosen to conduct field work and sample analysis interpretation; • Professional judgement to identify and sample potentially affected areas; and • Only NATA accredited laboratories using NATA endorsed methods were used to perform laboratory analysis whenever possible. Further details regarding the adopted sampling plan are presented in Section 10 of the report.

2.0 References

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

Douglas Partners Pty Ltd

Appendix I

Quality Assurance / Quality Control

Appendix I

Quality Assurance and Quality Control

I1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table I1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included at the end of this appendix.

Table I1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation for the analyses performed	C*
Holding times	Various based on type of analysis	PC (see Section I1.1)
Intra-laboratory replicates	10% of primary samples; <30% RPD	PC (see Section I1.2)
Rinsates	1 per sampling event; <PQL	PC (see Section I1.3)
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As per laboratory certificate	PC (see Section I1.4)
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	PC (see Section 11.4)
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	PC (see Section 11.4)
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:

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

* It is noted that the asbestos analysis (FA/AF analysis) is reported outside the scope of NATA accreditation.

11.1 Holding Time

A recommended holding time exceedance was noted for analysis of OCP and PCB in sediment (Lab Report 336824-A) due to the delay in transferring samples from Envirolab (Sydney) to the Perth laboratory.

DP notes that analysis of samples marginally past the holding time is not considered to significantly affect the data quality. The delay is unlikely to have caused decay of PCB and OCP from a concentration above the lowest SAC to a concentration <PQL.

11.2 Replicate Analysis

The following should be noted:

- For certain contaminants, the PQL was raised in some samples. Where both the primary and QA sample are below the respective PQLs, the relative percentage difference has been calculated to be zero.

The RPD results were all within the acceptable range, with the exception of those indicated in bold in Tables QA1 to QA3. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred, particularly for groundwater;
- The number of replicate pairs being collected from fill soils which by its nature is heterogeneous;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- The majority of RPD within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the data quality indicators.

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

11.3 Rinsate Blank

The following comment was made in the respective ELS laboratory reports (Appendix J, Laboratory Reports 336823, 336824, 337031) regarding the detectable TRH concentrations in some of the rinsate samples:

- *The positive result in the rinsate sample is due to a single peak with no hydrocarbon profile that is consistent with the use of plastic containers.*

DP considers a single peak isn't consistent with cross contamination from TRH in the field.

The following comment was made in ELS Laboratory Report 337300 in relation to the groundwater rinsate blank sample:

- *vTRH & BTEXN in Water NEPM - TRH C6-C9/C6-C10 Results are positive (or in part positive) due to the presence of THMs within the sample 337300-8.*

Due to human error, tap water was used for the rinsate sample, instead of the laboratory supplied DI water (confirmed by further correspondence with the laboratory). DP considers that the concentrations of TRH reported in the rinsate sample is not associated with cross contamination from TRH in the field.

11.4 Additional Laboratory Report Comments

A summary of the laboratory report comments is presented in Table I2 below.

Table I2: Summary of Laboratory Report Comments for Primary Laboratory (ELS)

Laboratory Report / DP Reference	Analyte	Laboratory Comment
336823 (R00) / Batch 1	Metals	Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 336823-1 for Pb. Therefore a triplicate result has been issued as laboratory sample number 336823-14.
336824 (R01) / Batch 2 - Sediment	TRH / BTEX	- The PQL has been raised due to the high moisture content in samples 336824-2,3,7,8,11,12 and 19 resulting in a high dilution factor. - The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.
	PAH	The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.
	OC	The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.
	PCB	The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.
	Metals	The PQL for Cd has been raised due to the high moisture content in sample/s 336824-3,6,7,8,9,10,11,12 and 19 resulting in a high dilution factor.
336824-A Sediment	N/A	- Matrix spike outlier exists - Surrogates / extracted ISTD outliers exist - Duplicate outliers exist
337031 (R00) / Batch 3 - Soil	Metals	- Acid Extractable Metals in Soil: - The laboratory RPD acceptance criteria has been exceeded for 337031-11 for Ni. Therefore a triplicate result has been issued as laboratory sample number 337031-24. - The laboratory RPD acceptance criteria has been exceeded for 337031-17 for Cr. Therefore a triplicate result has been issued as laboratory sample number 337031-25.

337300 (R00) / Batch 4 – Soil and GW	PFAS	For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).
337483 (R00) / Batch 5 – 500ml	Asbestos	All samples analysed as received. However, sample 337483-13 was below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. DP notes that the remaining 13 sample were of an adequate sample volume.

Overall, the number of anomalies noted by the laboratory are relatively small compared to the number of samples analysed. DP regards the QC data to be sufficient to be acceptable for this assessment.

12.0 Data Quality Indicators

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

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

Table I3: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Boreholes positioned to provide general site coverage, and to target potential areas of environmental concern.
	Preparation of borehole logs, sample location plan and chain of custody records.
	Preparation of field groundwater sampling sheets.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the conceptual site model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Generally satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section I1.
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 a NATA registered laboratory.
	Generally satisfactory results for field and laboratory QC samples (see Section I1).
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQO.
	Samples were generally extracted and analysed within holding times (see Section I1.1).
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates (see Section I1.2).
	Generally satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Generally satisfactory results for all field and laboratory QC samples.

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

I3.0 Conclusion

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

I4.0 References

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

Douglas Partners Pty Ltd

Table QA1: Relative Percentage Difference Results – Intra-laboratory Replicates (Soil)

			Metals								TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene ^b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
Sample ID	Depth (m)	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
QA2	0 - 0.1	30/10/23	<4	<0.4	5	10	25	<0.1	4	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
P3-1	0 - 0.1	30/10/23	<4	<0.4	5	11	28	<0.1	3	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.06	<0.5	0.56
		Difference	0	0	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.01	0	0.51
		RPD	0%	0%	0%	10%	11%	0%	29%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%	0%	167%
QA4	0 - 0.1	30/10/23	<4	<0.4	5	5	36	<0.1	3	29	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
P3-3	0 - 0.1	30/10/23	<4	<0.4	10	5	33	<0.1	5	22	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
		Difference	0	0	5	0	3	0	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	67%	0%	9%	0%	50%	27%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
QA5	0.4 - 0.5	30/10/23	<4	<0.4	21	4	10	<0.1	7	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.2	<0.5	1.9
P3-4	0.4 - 0.5	30/10/23	<4	<0.4	21	4	11	<0.1	8	8	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	0.2	<0.5	2.4
		Difference	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
		RPD	0%	0%	0%	0%	10%	0%	13%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	23%
QA1	0.03 - 0.15	30/10/23	<4	<0.4	29	<1	4	<0.1	1	2	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
P3-6	0.03 - 0.15	30/10/23	<4	<0.4	29	<1	5	<0.1	2	3	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
		Difference	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	0%	0%	22%	0%	67%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table QA2: Relative Percentage Difference Results – Intra-laboratory Replicates (Sediment)

			Metals								TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene ^b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
Sample ID	Depth (m)	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
QA_SS1	0 - 0.1	30/10/23	13	<0.4	17	22	37	<0.1	7	99	<25	<50	<25	<50	130	<100	<0.2	<0.5	<1	<1	<0.1	0.3	<0.5	2.8
P1-SS2	0 - 0.1	30/10/23	13	<0.4	17	22	37	<0.1	7	100	<50	<50	<50	<50	<100	<100	<0.4	<1	<2	<2	<0.1	<0.05	<0.5	0.4
		Difference	0	0	0	0	0	0	0	1	0	0	0	0	30	0	0	0	0	0	0	0.25	0	2.4
		RPD	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	26%	0%	0%	0%	0%	0%	0%	143%	0%	150%
QA_SS2	0 - 0.1	30/10/23	15	<0.6	22	31	43	0.1	9	130	<50	<50	<50	<50	<100	<100	<0.4	<1	<2	<2	<0.1	0.09	<0.5	0.56
P1-SS12	0 - 0.1	30/10/23	14	<0.6	22	32	45	<0.1	9	140	<50	<50	<50	<50	<100	<100	<0.4	<1	<2	<2	<0.1	<0.05	<0.5	<0.05
		Difference	1	0	0	1	2	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0.04	0	0.51
		RPD	7%	0%	0%	3%	5%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	57%	0%	167%

Table QA3: Relative Percentage Difference Results – Intra-laboratory Replicates (Groundwater)

Sample ID	Sample Date	Units	Metals								TRH				BTEX				PAH				
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Anthracene	Naphthalene	Benzo(a)pyrene (BaP)	Fluoranthene	Phenanthrene
MW2	07/11/23	µg/L	6	<0.1	1	2	<1	<0.05	9	3	<10	<50	<100	<100	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1
QA_GW	07/11/23	µg/L	8	<0.1	<1	<1	<1	<0.05	10	12	<10	<50	<100	<100	<1	<1	<1	<1	<0.1	<0.1	<0.1	<0.1	<0.1
	Difference		2	0	0	1	0	0	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	RPD		29%	0%	0%	67%	0%	0%	11%	120%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Appendix J

Laboratory Certificates of Analysis and Chain-of-Custody Documentation

CERTIFICATE OF ANALYSIS 336823

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00 Gosford (Batch 1)</u>
Number of Samples	11 Soil, 2 Water
Date samples received	02/11/2023
Date completed instructions received	02/11/2023

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	09/11/2023
Date of Issue	09/11/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Dragana Tomas, Senior Chemist
 Liam Timmins, Organics Supervisor
 Loren Bardwell, Development Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference	UNITS	P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	99	93	103	84	105

vTRH(C6-C10)/BTEXN in Soil

Our Reference		336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference	UNITS	P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	96	102	100	104	91

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		336823-11
Your Reference	UNITS	P4-2/0.5
Depth		0.5-0.6
Date Sampled		20/10/23
Type of sample		Soil
Date extracted	-	06/11/2023
Date analysed	-	07/11/2023
TRH C ₆ - C ₉	mg/kg	<25
TRH C ₆ - C ₁₀	mg/kg	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	94

svTRH (C10-C40) in Soil						
Our Reference	UNITS	336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference		P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	160	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	160	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	320	<50	<50	<50	<50
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	270	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	110	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	380	<50	<50	<50	<50
Surrogate o-Terphenyl	%	102	105	108	96	105

svTRH (C10-C40) in Soil						
Our Reference	UNITS	336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference		P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	54	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	360	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	310	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	720	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	110	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	110	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	540	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	590	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	1,200	<50	<50	<50	<50
Surrogate o-Terphenyl	%	119	94	108	96	105

svTRH (C10-C40) in Soil		
Our Reference		336823-11
Your Reference	UNITS	P4-2/0.5
Depth		0.5-0.6
Date Sampled		20/10/23
Type of sample		Soil
Date extracted	-	06/11/2023
Date analysed	-	07/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
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	%	82

PAHs in Soil						
Our Reference		336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference	UNITS	P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Naphthalene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.9	0.3	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	2.2	0.5	<0.1	0.3	<0.1
Anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	2.2	1.4	0.1	1.1	0.2
Pyrene	mg/kg	4.1	1.8	<0.1	1	0.2
Benzo(a)anthracene	mg/kg	2.2	1.1	<0.1	0.5	<0.1
Chrysene	mg/kg	2.4	0.9	<0.1	0.5	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	3.7	2	<0.2	1	<0.2
Benzo(a)pyrene	mg/kg	3.3	1.5	<0.05	0.55	0.08
Indeno(1,2,3-c,d)pyrene	mg/kg	2.0	1	<0.1	0.5	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.3	0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.7	0.7	<0.1	0.3	<0.1
Total +ve PAH's	mg/kg	26	11	0.1	5.7	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	4.4	2.1	<0.5	0.8	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	4.4	2.1	<0.5	0.8	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	4.4	2.1	<0.5	0.9	<0.5
Surrogate p-Terphenyl-d14	%	111	109	114	111	113

PAHs in Soil						
Our Reference		336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference	UNITS	P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
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	0.2	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	2.7	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	5.0	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	5.2	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	2.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	1.5	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	4.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	3.2	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	2.2	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	1.7	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	29	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	4.3	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	4.3	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	4.3	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	108	111	113	110	108

PAHs in Soil		
Our Reference		336823-11
Your Reference	UNITS	P4-2/0.5
Depth		0.5-0.6
Date Sampled		20/10/23
Type of sample		Soil
Date extracted	-	07/11/2023
Date analysed	-	08/11/2023
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	100

Organochlorine Pesticides in soil						
Our Reference		336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference	UNITS	P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
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
Mirex	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	%	111	108	115	114	113

Organochlorine Pesticides in soil						
Our Reference		336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference	UNITS	P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
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
Mirex	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	%	108	109	111	109	107

Organochlorine Pesticides in soil		
Our Reference		336823-11
Your Reference	UNITS	P4-2/0.5
Depth		0.5-0.6
Date Sampled		20/10/23
Type of sample		Soil
Date extracted	-	07/11/2023
Date analysed	-	08/11/2023
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Mirex	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	108

PCBs in Soil						
Our Reference		336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference	UNITS	P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
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	%	111	108	115	114	113

PCBs in Soil						
Our Reference		336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference	UNITS	P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
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	%	108	109	111	109	107

PCBs in Soil		
Our Reference		336823-11
Your Reference	UNITS	P4-2/0.5
Depth		0.5-0.6
Date Sampled		20/10/23
Type of sample		Soil
Date extracted	-	07/11/2023
Date analysed	-	08/11/2023
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	108

Acid Extractable metals in soil

Our Reference		336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference	UNITS	P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	24	11	48	8	8
Copper	mg/kg	9	7	9	7	22
Lead	mg/kg	21	19	14	15	17
Mercury	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1
Nickel	mg/kg	4	2	3	3	10
Zinc	mg/kg	40	23	15	23	36

Acid Extractable metals in soil

Our Reference		336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference	UNITS	P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	4	7	10	10
Copper	mg/kg	13	5	1	1	10
Lead	mg/kg	80	8	7	18	9
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	2	<1	1	18
Zinc	mg/kg	67	24	4	22	13

Acid Extractable metals in soil			
Our Reference		336823-11	336823-14
Your Reference	UNITS	P4-2/0.5	P1-1/0.1 - [TRIPLICATE]
Depth		0.5-0.6	0-0.1
Date Sampled		20/10/23	20/10/23
Type of sample		Soil	Soil
Date prepared	-	06/11/2023	06/11/2023
Date analysed	-	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	5	24
Copper	mg/kg	2	13
Lead	mg/kg	8	20
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	<1	3
Zinc	mg/kg	2	35

Moisture						
Our Reference	UNITS	336823-1	336823-2	336823-3	336823-4	336823-5
Your Reference		P1-1/0.1	P1-1/0.5	P1-2/0.1	P1-2/2.0	P1-3/0.1
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		20/10/23	20/10/23	23/10/23	23/10/23	24/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Moisture	%	9.4	14	6.1	16	5.0

Moisture						
Our Reference	UNITS	336823-6	336823-7	336823-8	336823-9	336823-10
Your Reference		P1-3/1.0	P4-1/0.1	P4-1/0.5	P4-1/1.0	P4-2/0.2
Depth		0.9-1	0-0.1	0.4-0.5	0.9-1	0.1-0.2
Date Sampled		24/10/23	19/10/23	19/10/23	19/10/23	20/10/23
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Moisture	%	11	12	9.8	17	11

Moisture		
Our Reference	UNITS	336823-11
Your Reference		P4-2/0.5
Depth		0.5-0.6
Date Sampled		20/10/23
Type of sample		Soil
Date prepared	-	06/11/2023
Date analysed	-	07/11/2023
Moisture	%	12

vTRH(C6-C10)/BTEXN in Water			
Our Reference		336823-12	336823-13
Your Reference	UNITS	RB1	RB2
Depth		-	-
Date Sampled		19/10/23	23/10/23
Type of sample		Water	Water
Date extracted	-	04/11/2023	04/11/2023
Date analysed	-	06/11/2023	06/11/2023
TRH C ₆ - C ₉	µg/L	<10	<10
TRH C ₆ - C ₁₀	µg/L	<10	<10
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	5	5
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	103	103
Surrogate Toluene-d8	%	100	100
Surrogate 4-Bromofluorobenzene	%	107	108

svTRH (C10-C40) in Water			
Our Reference		336823-12	336823-13
Your Reference	UNITS	RB1	RB2
Depth		-	-
Date Sampled		19/10/23	23/10/23
Type of sample		Water	Water
Date extracted	-	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023
TRH C ₁₀ - C ₁₄	µg/L	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	100	110
TRH C ₂₉ - C ₃₆	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	100	110
TRH >C ₁₀ - C ₁₆	µg/L	110	110
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	110	110
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	110	110
Surrogate o-Terphenyl	%	78	82

Metals in Waters - Acid extractable			
Our Reference		336823-12	336823-13
Your Reference	UNITS	RB1	RB2
Depth		-	-
Date Sampled		19/10/23	23/10/23
Type of sample		Water	Water
Date prepared	-	06/11/2023	06/11/2023
Date analysed	-	06/11/2023	06/11/2023
Arsenic - Total	mg/L	<0.05	<0.05
Cadmium - Total	mg/L	<0.01	<0.01
Chromium - Total	mg/L	<0.01	<0.01
Copper - Total	mg/L	<0.01	<0.01
Lead - Total	mg/L	<0.03	<0.03
Mercury - Total	mg/L	<0.0005	<0.0005
Nickel - Total	mg/L	<0.02	<0.02
Zinc - Total	mg/L	<0.02	<0.02

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
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-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS. 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-022/025	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	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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)-BTX 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)-BTX 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.

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	336823-2
Date extracted	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Date analysed	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	1	<25	<25	0	116	110
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	1	<25	<25	0	116	110
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	116	110
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	116	106
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	110	106
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	118	113
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	118	113
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	104	1	99	100	1	102	93

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	06/11/2023	06/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	07/11/2023	07/11/2023		[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	94	95	1	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	336823-2
Date extracted	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Date analysed	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	136	119
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	160	140	13	121	113
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	160	160	0	100	111
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	136	119
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	270	240	12	121	113
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	110	120	9	100	111
Surrogate o-Terphenyl	%		Org-020	97	1	102	109	7	123	136

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	06/11/2023	06/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	07/11/2023	07/11/2023		[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	82	81	1	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	336823-2
Date extracted	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Date analysed	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	105	103
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	0.9	0.8	12	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	111
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	103	100
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	2.2	1.5	38	106	97
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.2	40	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	2.2	1.7	26	114	86
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	4.1	3.2	25	107	85
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	2.2	1.8	20	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	2.4	1.8	29	89	73
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	3.7	3.0	21	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	3.3	2.8	16	114	116
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	2.0	1.7	16	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.2	40	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	1.7	1.3	27	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	109	1	111	110	1	112	113

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	08/11/2023	08/11/2023		[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	100	101	1	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	336823-2
Date extracted	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Date analysed	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	78
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	85
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	97	95
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	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	123	123
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	129	126
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	121
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	90	94
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	125	126
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	111	1	111	110	1	114	112

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	08/11/2023	08/11/2023		[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]
Mirex	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	108	109	1	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	336823-2
Date extracted	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Date analysed	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Aroclor 1016	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	113	100
Aroclor 1260	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	111	1	111	110	1	114	112

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	08/11/2023	08/11/2023		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	[NT]	11	108	109	1	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	336823-2
Date prepared	-			06/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
Date analysed	-			08/11/2023	1	08/11/2023	08/11/2023		08/11/2023	08/11/2023
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	111	87
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	104	94
Chromium	mg/kg	1	Metals-020	<1	1	24	18	29	109	98
Copper	mg/kg	1	Metals-020	<1	1	9	8	12	107	102
Lead	mg/kg	1	Metals-020	<1	1	21	13	47	108	98
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	108	100
Nickel	mg/kg	1	Metals-020	<1	1	4	3	29	108	99
Zinc	mg/kg	1	Metals-020	<1	1	40	28	35	107	98

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			04/11/2023	12	04/11/2023	06/11/2023		04/11/2023	[NT]
Date analysed	-			06/11/2023	12	06/11/2023	07/11/2023		06/11/2023	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	12	<10	<10	0	96	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	12	<10	<10	0	96	[NT]
Benzene	µg/L	1	Org-023	<1	12	<1	<1	0	86	[NT]
Toluene	µg/L	1	Org-023	<1	12	5	5	0	93	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	12	<1	<1	0	99	[NT]
m+p-xylene	µg/L	2	Org-023	<2	12	<2	<2	0	100	[NT]
o-xylene	µg/L	1	Org-023	<1	12	<1	<1	0	98	[NT]
Naphthalene	µg/L	1	Org-023	<1	12	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	101	12	103	98	5	100	[NT]
Surrogate Toluene-d8	%		Org-023	100	12	100	100	0	102	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	108	12	107	113	5	98	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			06/11/2023	[NT]	[NT]	[NT]	[NT]	06/11/2023	[NT]
Date analysed	-			06/11/2023	[NT]	[NT]	[NT]	[NT]	06/11/2023	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	83	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	91	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-020	83	[NT]	[NT]	[NT]	[NT]	75	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			06/11/2023	[NT]	[NT]	[NT]	[NT]	06/11/2023	[NT]
Date analysed	-			06/11/2023	[NT]	[NT]	[NT]	[NT]	06/11/2023	[NT]
Arsenic - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	101	[NT]
Cadmium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chromium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	100	[NT]
Copper - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	104	[NT]
Lead - Total	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	106	[NT]
Mercury - Total	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	109	[NT]
Nickel - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	106	[NT]
Zinc - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	93	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

TRH Water(C10-C40) NEPM - The positive result in the rinsate sample is due to a single peak with no hydrocarbon profile that is consistent with the use of plastic containers.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 336823-1 for Pb. Therefore a triplicate result has been issued as laboratory sample number 336823-14.

Project No: 225005.00				Suburb: Gosford (Batch 1)				To: Envirolab Services			
Project Manager: Chamali N				Order Number:				Sampler: MLG			
Email: Chamali.n@douglaspartners.com.au				Attn: Sample Receipt							
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day								(02) 9910 6200 samplereceipt@envirolab.com.au			
Prior Storage: ☒ Fridge ☐ Freezer ☐ Esky ☐ Shelf								Do samples contain 'potential' HBM? ☐ No ☐ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)			

Lab ID	Sample ID			Date Sampled	Sample Type S - soil W - water M - Material	Container Type G - glass P - plastic	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To				Combo 5	Metals, TRH, BTEX									
1	P1-1/0.1	0	0.1	20/10/23	S	G	x										
2	P1-1/0.5	0.4	0.5	20/10/23	S	G	x										
3	P1-2/0.1	0	0.1	23/10/23	S	G	x										
4	P1-2/2.0	1.9	2	23/10/23	S	G	x										
5	P1-3/0.1	0	0.1	24/10/23	S	G	x										
6	P1-3/1.0	0.9	1	24/10/23	S	G	x										
7	P4-1/0.1	0	0.1	19/10/23	S	G	x										
8	P4-1/0.5	0.4	0.5	19/10/23	S	G	x										
9	P4-1/1.0	0.9	1	19/10/23	S	G	x										
10	P4-2/0.2	0.1	0.2	20/10/23	S	G	x										
11	P4-2/0.5	0.5	0.6	20/10/23	S	G	x										
12	RB1			19/10/23	W	G/P		x									
13	RB2			23/10/23	W	G/P		x									

Envirolab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9910 6200
 Job No: 336822

Date Received: 2/11/23
 Time Received: 11:50
 Received By: HLS
 Temp: Cool/Ambient
 Cooling: Ice/Icepack
 Security: Intact/Broken/None

Metals to analyse:				LAB RECEIPT			
Number of samples in container:				Transported to laboratory by: Courier			
Send results to: Douglas Partners Pty Ltd				Lab Ref. No:			
Address: Unit 5, 3 Teamster Close, Tuggerah NSW				Received by:			
Phone: (02) 4351 1422				Date & Time:			
Relinquished by: CLN				Signed: <i>Chamali N</i>			
Date: 1/11/2023				Signed:			

CERTIFICATE OF ANALYSIS 337031

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00, Gosford (Batch 3 Soil)</u>
Number of Samples	21 Soil, 2 Water
Date samples received	03/11/2023
Date completed instructions received	06/11/2023

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	13/11/2023
Date of Issue	13/11/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Diana Korniewicz, Chemist
 Diego Bigolin, Inorganics Supervisor
 Liam Timmins, Organics Supervisor
 Loren Bardwell, Development Chemist
 Tim Toll, Chemist (FAS)

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference	UNITS	P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	93	87	105	95	93

vTRH(C6-C10)/BTEXN in Soil

Our Reference		337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference	UNITS	P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	103	85	99	83	80

vTRH(C6-C10)/BTEXN in Soil

Our Reference		337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference	UNITS	P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	103	91	98	91	95

vTRH(C6-C10)/BTEXN in Soil

Our Reference		337031-16	337031-17	337031-18	337031-19	337031-20
Your Reference	UNITS	P4-4	P4-4	QA1	QA2	QA4
Depth		0-0.1	1-1.1	-	-	-
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
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	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	100	107	102	105

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		337031-21
Your Reference	UNITS	QA5
Depth		-
Date Sampled		30/10/2023
Type of sample		Soil
Date extracted	-	07/11/2023
Date analysed	-	07/11/2023
TRH C ₆ - C ₉	mg/kg	<25
TRH C ₆ - C ₁₀	mg/kg	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	107

svTRH (C10-C40) in Soil						
Our Reference	UNITS	337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference		P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	74	76	77	78	79

svTRH (C10-C40) in Soil						
Our Reference	UNITS	337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference		P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	75	75	80	79	83

svTRH (C10-C40) in Soil

Our Reference		337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference	UNITS	P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	73	77	75	76	75

svTRH (C10-C40) in Soil

Our Reference		337031-16	337031-17	337031-18	337031-19	337031-20
Your Reference	UNITS	P4-4	P4-4	QA1	QA2	QA4
Depth		0-0.1	1-1.1	-	-	-
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
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
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
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	%	76	76	73	74	74

svTRH (C10-C40) in Soil		
Our Reference		337031-21
Your Reference	UNITS	QA5
Depth		-
Date Sampled		30/10/2023
Type of sample		Soil
Date extracted	-	07/11/2023
Date analysed	-	08/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
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	%	73

PAHs in Soil						
Our Reference		337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference	UNITS	P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	0.2	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.2	<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	0.06	<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	0.56	<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 <i>p</i> -Terphenyl-d14	%	90	93	92	94	95

PAHs in Soil						
Our Reference		337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference	UNITS	P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	1.2	0.3	<0.1
Anthracene	mg/kg	<0.1	<0.1	1.6	0.4	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	2.6	0.6	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.5	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.9	0.2	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.7	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.8	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.98	0.2	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.5	0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.7	0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	10	2.4	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	1.4	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	1.4	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	1.4	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	93	95	92	90

PAHs in Soil						
Our Reference		337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference	UNITS	P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	0.2
Fluoranthene	mg/kg	<0.1	0.4	<0.1	<0.1	0.3
Pyrene	mg/kg	<0.1	0.3	<0.1	<0.1	0.3
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	0.1
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	1.4	<0.05	<0.05	1.2
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	92	92	93	93

PAHs in Soil						
Our Reference		337031-16	337031-17	337031-18	337031-19	337031-20
Your Reference	UNITS	P4-4	P4-4	QA1	QA2	QA4
Depth		0-0.1	1-1.1	-	-	-
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	0.2	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.2	<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	0.06	<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	0.4	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	93	92	91	91

PAHs in Soil		
Our Reference		337031-21
Your Reference	UNITS	QA5
Depth		-
Date Sampled		30/10/2023
Type of sample		Soil
Date extracted	-	07/11/2023
Date analysed	-	09/11/2023
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.2
Anthracene	mg/kg	0.3
Fluoranthene	mg/kg	0.4
Pyrene	mg/kg	0.4
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1
Total +ve PAH's	mg/kg	1.9
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	92

Organochlorine Pesticides in soil						
Our Reference		337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference	UNITS	P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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
Mirex	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	%	95	98	99	99	99

Organochlorine Pesticides in soil						
Our Reference	UNITS	337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference		P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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
Mirex	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	%	97	98	94	97	97

Organochlorine Pesticides in soil						
Our Reference		337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference	UNITS	P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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
Mirex	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	%	99	98	98	98	100

Organochlorine Pesticides in soil			
Our Reference		337031-16	337031-17
Your Reference	UNITS	P4-4	P4-4
Depth		0-0.1	1-1.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023
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
Mirex	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	99	97

PCBs in Soil						
Our Reference	UNITS	337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference		P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	%	95	98	99	99	99

PCBs in Soil						
Our Reference	UNITS	337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference		P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	%	97	98	94	97	97

PCBs in Soil						
Our Reference	UNITS	337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference		P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
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	%	99	98	98	98	100

PCBs in Soil			
Our Reference	UNITS	337031-16	337031-17
Your Reference		P4-4	P4-4
Depth		0-0.1	1-1.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023
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	%	99	97

Acid Extractable metals in soil

Our Reference		337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference	UNITS	P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	9	3	9	10
Copper	mg/kg	11	3	3	2	5
Lead	mg/kg	28	12	12	8	33
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	<1	1	1	5
Zinc	mg/kg	22	6	11	3	22

Acid Extractable metals in soil

Our Reference		337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference	UNITS	P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	9	7	8	21	11
Copper	mg/kg	2	1	10	4	3
Lead	mg/kg	9	10	40	11	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	<1	2	8	3
Zinc	mg/kg	5	4	32	8	20

Acid Extractable metals in soil

Our Reference		337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference	UNITS	P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	8	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	23	19	29	13	9
Copper	mg/kg	<1	2	<1	3	6
Lead	mg/kg	3	16	5	14	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	2	2	2	4
Zinc	mg/kg	2	13	3	5	13

Acid Extractable metals in soil

Our Reference		337031-16	337031-17	337031-18	337031-19	337031-20
Your Reference	UNITS	P4-4	P4-4	QA1	QA2	QA4
Depth		0-0.1	1-1.1	-	-	-
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	6	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	11	29	5	5
Copper	mg/kg	2	2	<1	10	5
Lead	mg/kg	8	48	4	25	36
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	1	1	4	3
Zinc	mg/kg	15	46	2	22	29

Acid Extractable metals in soil				
Our Reference		337031-21	337031-24	337031-25
Your Reference	UNITS	QA5	P3-5 - [TRIPLICATE]	P4-4 - [TRIPLICATE]
Depth		-	0.04-0.15	1-1.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023
Arsenic	mg/kg	<4	<4	5
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	21	27	6
Copper	mg/kg	4	<1	2
Lead	mg/kg	10	4	47
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	7	3	<1
Zinc	mg/kg	8	2	46

Moisture						
Our Reference	UNITS	337031-1	337031-2	337031-3	337031-4	337031-5
Your Reference		P3-1	P3-1	P3-2	P3-2	P3-3
Depth		0-0.1	0.4-0.5	0-0.1	1.9-2	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Moisture	%	12	7.6	5.8	5.6	7.7

Moisture						
Our Reference	UNITS	337031-6	337031-7	337031-8	337031-9	337031-10
Your Reference		P3-3	P3-3	P3-4	P3-4	P3-4
Depth		0.4-0.5	0.9-1	0-0.1	0.4-0.5	1.9-2
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Moisture	%	11	11	11	7.5	20

Moisture						
Our Reference	UNITS	337031-11	337031-12	337031-13	337031-14	337031-15
Your Reference		P3-5	P3-5	P3-6	P3-6	P4-3
Depth		0.04-0.15	0.9-1	0.03-0.15	1.4-1.5	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Moisture	%	7.1	18	6.1	19	9.9

Moisture						
Our Reference	UNITS	337031-16	337031-17	337031-18	337031-19	337031-20
Your Reference		P4-4	P4-4	QA1	QA2	QA4
Depth		0-0.1	1-1.1	-	-	-
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Moisture	%	5.4	16	5.8	13	7.5

Moisture		
Our Reference		337031-21
Your Reference	UNITS	QA5
Depth		-
Date Sampled		30/10/2023
Type of sample		Soil
Date prepared	-	07/11/2023
Date analysed	-	08/11/2023
Moisture	%	7.8

Misc Inorg - Soil			
Our Reference		337031-1	337031-15
Your Reference	UNITS	P3-1	P4-3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date prepared	-	03/11/2023	03/11/2023
Date analysed	-	08/11/2023	08/11/2023
pH 1:5 soil:water	pH Units	5.9	7.3

CEC			
Our Reference		337031-1	337031-15
Your Reference	UNITS	P3-1	P4-3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date prepared	-	10/11/2023	10/11/2023
Date analysed	-	10/11/2023	10/11/2023
Exchangeable Ca	meq/100g	1.9	3.3
Exchangeable K	meq/100g	0.1	0.2
Exchangeable Mg	meq/100g	0.7	1.0
Exchangeable Na	meq/100g	0.2	0.2
Cation Exchange Capacity	meq/100g	2.9	4.8

vTRH(C6-C10)/BTEXN in Water			
Our Reference		337031-22	337031-23
Your Reference	UNITS	RB3	RB4
Depth		-	-
Date Sampled		30/10/2023	30/10/2023
Type of sample		Water	Water
Date extracted	-	06/11/2023	06/11/2023
Date analysed	-	07/11/2023	07/11/2023
TRH C ₆ - C ₉	µg/L	<10	<10
TRH C ₆ - C ₁₀	µg/L	<10	<10
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	4	4
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	100	105
Surrogate Toluene-d8	%	102	96
Surrogate 4-Bromofluorobenzene	%	111	113

svTRH (C10-C40) in Water			
Our Reference		337031-22	337031-23
Your Reference	UNITS	RB3	RB4
Depth		-	-
Date Sampled		30/10/2023	30/10/2023
Type of sample		Water	Water
Date extracted	-	07/11/2023	07/11/2023
Date analysed	-	08/11/2023	08/11/2023
TRH C ₁₀ - C ₁₄	µg/L	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	<100	100
TRH C ₂₉ - C ₃₆	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	100
TRH >C ₁₀ - C ₁₆	µg/L	100	110
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	100	110
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	100	110
Surrogate o-Terphenyl	%	86	92

Metals in Waters - Acid extractable			
Our Reference		337031-22	337031-23
Your Reference	UNITS	RB3	RB4
Depth		-	-
Date Sampled		30/10/2023	30/10/2023
Type of sample		Water	Water
Date prepared	-	08/11/2023	08/11/2023
Date analysed	-	08/11/2023	08/11/2023
Arsenic - Total	mg/L	<0.05	<0.05
Cadmium - Total	mg/L	<0.01	<0.01
Chromium - Total	mg/L	<0.01	<0.01
Copper - Total	mg/L	<0.01	<0.01
Lead - Total	mg/L	<0.03	<0.03
Mercury - Total	mg/L	<0.0005	<0.0005
Nickel - Total	mg/L	<0.02	<0.02
Zinc - Total	mg/L	<0.02	<0.02

Method ID	Methodology Summary
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.
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-OES 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-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS. 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-022/025	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	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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)-BTX 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)-BTX 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.

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	337031-2
Date extracted	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	1	<25	<25	0	108	112
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	1	<25	<25	0	108	112
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	110	115
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	105	109
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	107	110
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	109	112
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	107	111
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	100	1	93	97	4	103	103

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	337031-21
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	07/11/2023
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	11	<25	<25	0	96	104
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	11	<25	<25	0	96	104
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	100	107
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	95	102
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	94	103
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	96	106
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	95	102
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	103	94	9	91	88

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]	17	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	17	07/11/2023	07/11/2023		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	17	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	17	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	17	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	17	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	17	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	17	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	17	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	17	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	17	100	106	6	[NT]	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	337031-2
Date extracted	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			08/11/2023	1	08/11/2023	08/11/2023		08/11/2023	08/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	99	93
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	<100	<100	0	100	98
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	<100	<100	0	100	95
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	99	93
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	<100	<100	0	100	98
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	<100	<100	0	100	95
Surrogate o-Terphenyl	%		Org-020	76	1	74	75	1	87	81

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	337031-21
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			[NT]	11	08/11/2023	08/11/2023		08/11/2023	08/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	11	<50	<50	0	110	101
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	11	<100	<100	0	100	106
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	11	<100	<100	0	129	97
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	11	<50	<50	0	110	101
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	11	<100	<100	0	100	106
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	11	<100	<100	0	129	97
Surrogate o-Terphenyl	%		Org-020	[NT]	11	73	76	4	94	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]	17	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	17	08/11/2023	08/11/2023		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	17	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	17	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	17	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	17	76	74	3	[NT]	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	337031-2
Date extracted	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			09/11/2023	1	09/11/2023	09/11/2023		09/11/2023	09/11/2023
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	97
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	93	95
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	73	75
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	0.2	0.2	0	92	96
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	97	102
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	91	93
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	0.06	<0.05	18	86	96
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	92	1	90	94	4	95	99

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	337031-21
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			[NT]	11	09/11/2023	09/11/2023		09/11/2023	09/11/2023
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	101	99
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	99	97
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	93	92
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	75	73
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	98	98
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	99	99
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	91	103
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	94	114
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	93	94	1	99	95

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	17	09/11/2023	09/11/2023		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	17	0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	17	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	17	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	17	93	91	2	[NT]	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	337031-2
Date extracted	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			09/11/2023	1	09/11/2023	09/11/2023		09/11/2023	09/11/2023
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	96
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	94	94
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	87	91
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	99	103
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	102
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	103	107
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	114
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	74	78
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	90	96
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	120	120
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	98	1	95	96	1	103	104

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	[NT]
Date analysed	-			[NT]	11	09/11/2023	09/11/2023		09/11/2023	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	104	[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	102	[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	103	[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	105	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	106	[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	111	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	114	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	90	[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	102	[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	140	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	99	102	3	109	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	17	09/11/2023	09/11/2023		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	17	97	96	1	[NT]	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	337031-2
Date extracted	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			09/11/2023	1	09/11/2023	09/11/2023		09/11/2023	09/11/2023
Aroclor 1016	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	101	100
Aroclor 1260	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	98	1	95	96	1	103	104

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	[NT]
Date analysed	-			[NT]	11	09/11/2023	09/11/2023		09/11/2023	[NT]
Aroclor 1016	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	104	[NT]
Aroclor 1260	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	[NT]	11	99	102	3	109	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	17	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	17	09/11/2023	09/11/2023		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021/022/025	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	[NT]	17	97	96	1	[NT]	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	337031-2
Date prepared	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			08/11/2023	1	08/11/2023	08/11/2023		08/11/2023	08/11/2023
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	117	106
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	106	96
Chromium	mg/kg	1	Metals-020	<1	1	5	5	0	123	107
Copper	mg/kg	1	Metals-020	<1	1	11	10	10	120	115
Lead	mg/kg	1	Metals-020	<1	1	28	24	15	122	103
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	112	108
Nickel	mg/kg	1	Metals-020	<1	1	3	3	0	114	104
Zinc	mg/kg	1	Metals-020	<1	1	22	19	15	109	94

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	337031-21
Date prepared	-			[NT]	11	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			[NT]	11	08/11/2023	08/11/2023		08/11/2023	08/11/2023
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	115	114
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	102	98
Chromium	mg/kg	1	Metals-020	[NT]	11	23	28	20	120	117
Copper	mg/kg	1	Metals-020	[NT]	11	<1	<1	0	118	122
Lead	mg/kg	1	Metals-020	[NT]	11	3	3	0	122	108
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	112	119
Nickel	mg/kg	1	Metals-020	[NT]	11	2	8	120	111	108
Zinc	mg/kg	1	Metals-020	[NT]	11	2	2	0	105	99

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	17	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	17	08/11/2023	08/11/2023		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	17	6	5	18	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	17	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	17	11	6	59	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	17	2	2	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	17	48	45	6	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	17	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	17	1	<1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	17	46	45	2	[NT]	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date prepared	-			03/11/2023	[NT]	[NT]	[NT]	[NT]	03/11/2023	[NT]
Date analysed	-			08/11/2023	[NT]	[NT]	[NT]	[NT]	08/11/2023	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: CEC					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			10/11/2023	15	10/11/2023	10/11/2023		10/11/2023	[NT]
Date analysed	-			10/11/2023	15	10/11/2023	10/11/2023		10/11/2023	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	15	3.3	3.8	14	104	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	15	0.2	0.1	67	114	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	15	1.0	1.0	0	106	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	15	0.2	0.2	0	106	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			06/11/2023	22	06/11/2023	07/11/2023		06/11/2023	[NT]
Date analysed	-			07/11/2023	22	07/11/2023	08/11/2023		07/11/2023	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	22	<10	<10	0	109	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	22	<10	<10	0	109	[NT]
Benzene	µg/L	1	Org-023	<1	22	<1	<1	0	98	[NT]
Toluene	µg/L	1	Org-023	<1	22	4	3	29	103	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	22	<1	<1	0	115	[NT]
m+p-xylene	µg/L	2	Org-023	<2	22	<2	<2	0	114	[NT]
o-xylene	µg/L	1	Org-023	<1	22	<1	<1	0	115	[NT]
Naphthalene	µg/L	1	Org-023	<1	22	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	95	22	100	100	0	101	[NT]
Surrogate Toluene-d8	%		Org-023	97	22	102	100	2	104	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	112	22	111	100	10	106	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			07/11/2023	[NT]	[NT]	[NT]	[NT]	07/11/2023	[NT]
Date analysed	-			07/11/2023	[NT]	[NT]	[NT]	[NT]	07/11/2023	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	105	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
Surrogate o-Terphenyl	%		Org-020	85	[NT]	[NT]	[NT]	[NT]	84	[NT]

Client Reference: 225005.00, Gosford (Batch 3 Soil)

QUALITY CONTROL: Metals in Waters - Acid extractable					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			08/11/2023	[NT]	[NT]	[NT]	[NT]	08/11/2023	[NT]
Date analysed	-			08/11/2023	[NT]	[NT]	[NT]	[NT]	08/11/2023	[NT]
Arsenic - Total	mg/L	0.05	Metals-020	<0.05	[NT]	[NT]	[NT]	[NT]	118	[NT]
Cadmium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	109	[NT]
Chromium - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	119	[NT]
Copper - Total	mg/L	0.01	Metals-020	<0.01	[NT]	[NT]	[NT]	[NT]	118	[NT]
Lead - Total	mg/L	0.03	Metals-020	<0.03	[NT]	[NT]	[NT]	[NT]	117	[NT]
Mercury - Total	mg/L	0.0005	Metals-021	<0.0005	[NT]	[NT]	[NT]	[NT]	103	[NT]
Nickel - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	119	[NT]
Zinc - Total	mg/L	0.02	Metals-020	<0.02	[NT]	[NT]	[NT]	[NT]	112	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

TRH Water(C10-C40) NEPM - The positive result in the rinsate sample is due to a single peak with no hydrocarbon profile that is consistent with the use of plastic containers.

Acid Extractable Metals in Soil:

- The laboratory RPD acceptance criteria has been exceeded for 337031-11 for Ni. Therefore a triplicate result has been issued as laboratory sample number 337031-24.
- The laboratory RPD acceptance criteria has been exceeded for 337031-17 for Cr. Therefore a triplicate result has been issued as laboratory sample number 337031-25.

COV: 6/11/23 0942

Project No: 225005.00		Suburb: Gosford (Batch 3- Soil)		To: Envirolab Services	
Project Manager: Chamali N		Order Number:		Sampler: MLG / JK	
Email: Chamali.n@douglaspartners.com.au				Attn: Sample Receipt	
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day				(02) 9910 6200 samplereceipt@envirolab.com.au	
Prior Storage: ☒ Fridge ☐ Freezer ☐ Esky ☐ Shelf		Do samples contain 'potential' HBM? ☐ No ☐ Yes		(If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID			Date Sampled	Sample Type S - soil W - water M - Material	Container Type G - glass P - plastic Combo 5	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To														
1	P3-1/0.1	0	0.1	30/10/23	S	G	x										
2	P3-1/0.5	0.4	0.5	30/10/23	S	G	x										
3	P3-2/0.1	0	0.1	30/10/23	S	G	x										
4	P3-2/2.0	1.9	2	30/10/23	S	G	x										
5	P3-3/0.1	0	0.1	30/10/23	S	G	x										
6	P3-3/0.5	0.4	0.5	30/10/23	S	G	x										
7	P3-3/1.0	0.9	1	30/10/23	S	G	x										
8	P3-4/0.1	0	0.1	30/10/23	S	G	x										
9	P3-4/0.5	0.4	0.5	30/10/23	S	G	x										
10	P3-4/2.0	1.9	2	30/10/23	S	G	x										
11	P3-5/0.1	0.04	0.15	30/10/23	S	G	x										
12	P3-5/1.0	0.9	1	30/10/23	S	G	x										
13	P3-6/0.1	0.03	0.15	30/10/23	S	G	x										
14	P3-6/1.5	1.4	1.5	30/10/23	S	G	x										

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 5200

Job No: 337031

Date Received: 6/11/23

Time Received: 11:00

Received By: OL

Temp: Cool/Ambient 15°C

Cooling: Ice pack

Security: Intact/Broken/None

Metals to analyse:		LAB RECEIPT	
Number of samples in container:		Transported to laboratory by: Courier	
Send results to: Douglas Partners Pty Ltd		Lab Ref. No: 337031	
Address: Unit 5, 3 Teamster Close, Tuggerah NSW		Received by: Da Hyun Lee	
Phone: (02) 4351 1422		Date & Time: 3/11/23 09:00	
Relinquished by: CLN		Signed: <i>[Signature]</i>	
Date: 2/11/2023		Signed: <i>[Signature]</i>	

Rev 6/August 2022

CERTIFICATE OF ANALYSIS 336823-A

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00 Gosford (Batch 1)</u>
Number of Samples	Additional analysis
Date samples received	02/11/2023
Date completed instructions received	24/11/2023

Analysis Details

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

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

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

Report Details

Date results requested by	01/12/2023
Date of Issue	01/12/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By
Dragana Tomas, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

sTPH in Soil (C10-C40)-Silica		
Our Reference		336823-A-6
Your Reference	UNITS	P1-3/1.0
Depth		0.9-1
Date Sampled		24/10/23
Type of sample		Soil
Date extracted	-	27/11/2023
Date analysed	-	29/11/2023
TPH C ₁₀ - C ₁₄	mg/kg	<50
TPH C ₁₅ - C ₂₈	mg/kg	290
TPH C ₂₉ - C ₃₆	mg/kg	270
TPH >C ₁₀ -C ₁₆	mg/kg	83
TPH >C ₁₆ -C ₃₄	mg/kg	400
TPH >C ₃₄ -C ₄₀	mg/kg	260
Surrogate 1-Chlorooctadecane	%	95

PAHs in Water Leach			
Our Reference		336823-A-1	336823-A-6
Your Reference	UNITS	P1-1/0.1	P1-3/1.0
Depth		0-0.1	0.9-1
Date Sampled		20/10/23	24/10/23
Type of sample		Soil	Soil
Date extracted	-	28/11/2023	28/11/2023
Date analysed	-	29/11/2023	29/11/2023
pH of final Leachate	pH units	<0.1	<0.1
Naphthalene in ASLP	µg/L	<0.1	<0.1
Acenaphthylene in ASLP	µg/L	<0.1	<0.1
Acenaphthene in ASLP	µg/L	<0.1	<0.1
Fluorene in ASLP	µg/L	0.14	<0.1
Phenanthrene in ASLP	µg/L	0.37	<0.1
Anthracene in ASLP	µg/L	<0.1	<0.1
Fluoranthene in ASLP	µg/L	0.15	<0.1
Pyrene in ASLP	µg/L	0.26	<0.1
Benzo(a)anthracene in ASLP	µg/L	<0.1	<0.1
Chrysene in ASLP	µg/L	0.11	<0.1
Benzo(b,k)fluoranthene in ASLP	µg/L	<0.2	<0.2
Benzo(a)pyrene in ASLP	µg/L	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene - ASLP	µg/L	<0.1	<0.1
Dibenzo(a,h)anthracene in ASLP	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene in ASLP	µg/L	<0.1	<0.1
Surrogate <i>p</i> -Terphenyl-d ₁₄	%	79	63

PAHs in TCLP (USEPA 1311)			
Our Reference		336823-A-1	336823-A-6
Your Reference	UNITS	P1-1/0.1	P1-3/1.0
Depth		0-0.1	0.9-1
Date Sampled		20/10/23	24/10/23
Type of sample		Soil	Soil
pH of soil for fluid# determ.	pH units	7.7	6.6
pH of soil TCLP (after HCl)	pH units	4.5	1.6
Extraction fluid used		1	1
pH of final Leachate	pH units	4.9	5.0
Date extracted	-	28/11/2023	28/11/2023
Date analysed	-	29/11/2023	29/11/2023
Naphthalene in TCLP	mg/L	<0.0001	<0.0001
Acenaphthylene in TCLP	mg/L	<0.0001	<0.0001
Acenaphthene in TCLP	mg/L	<0.0001	<0.0001
Fluorene in TCLP	mg/L	0.0001	<0.0001
Phenanthrene in TCLP	mg/L	0.0006	<0.0001
Anthracene in TCLP	mg/L	<0.0001	<0.0001
Fluoranthene in TCLP	mg/L	<0.0001	<0.0001
Pyrene in TCLP	mg/L	0.0001	<0.0001
Benzo(a)anthracene in TCLP	mg/L	<0.0001	<0.0001
Chrysene in TCLP	mg/L	<0.0001	<0.0001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.0002	<0.0002
Benzo(a)pyrene in TCLP	mg/L	<0.0001	<0.0001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.0001	<0.0001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.0001	<0.0001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.0001	<0.0001
Total +ve PAH's	mg/L	0.0008	NIL (+)VE
Surrogate p-Terphenyl-d14	%	80	92

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
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-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025 ASLP	ASLP Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: sTPH in Soil (C10-C40)-Silica					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			27/11/2023	6	27/11/2023	27/11/2023		27/11/2023	[NT]
Date analysed	-			29/11/2023	6	29/11/2023	29/11/2023		29/11/2023	[NT]
TPH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	6	<50	<50	0	94	[NT]
TPH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	6	290	270	7	100	[NT]
TPH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	6	270	260	4	114	[NT]
TPH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	6	83	69	18	94	[NT]
TPH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	6	400	390	3	100	[NT]
TPH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	6	260	260	0	114	[NT]
Surrogate 1-Chlorooctadecane	%		Org-020	88	6	95	93	2	95	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: PAHs in Water Leach					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			28/11/2023	[NT]	[NT]	[NT]	[NT]	28/11/2023	[NT]
Date analysed	-			29/11/2023	[NT]	[NT]	[NT]	[NT]	29/11/2023	[NT]
Naphthalene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	71	[NT]
Acenaphthylene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	67	[NT]
Fluorene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	69	[NT]
Phenanthrene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	66	[NT]
Anthracene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	69	[NT]
Pyrene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Benzo(a)anthracene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	66	[NT]
Benzo(b)fluoranthene in ASLP	µg/L	0.2	Org-022/025 ASLP	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Indeno(1,2,3-c,d)pyrene - ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in ASLP	µg/L	0.1	Org-022/025 ASLP	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d ₁₄	%		Org-022/025 ASLP	81	[NT]	[NT]	[NT]	[NT]	69	[NT]

Client Reference: 225005.00 Gosford (Batch 1)

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			28/11/2023	[NT]	[NT]	[NT]	[NT]	28/11/2023	[NT]
Date analysed	-			29/11/2023	[NT]	[NT]	[NT]	[NT]	29/11/2023	[NT]
Naphthalene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Acenaphthylene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	85	[NT]
Fluorene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Phenanthrene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	83	[NT]
Anthracene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	88	[NT]
Pyrene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	86	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	84	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.0002	Org-022/025	<0.0002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	107	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.0001	Org-022/025	<0.0001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	78	[NT]	[NT]	[NT]	[NT]	85	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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.

CHAIN OF CUSTODY DESPATCH SHEET

Project No: 225005.00	Suburb: Gosford (Additional Analysis)	To: Envirolab Services
Project Manager: Chamali N	Order Number:	Sampler: MLG/HS/JK
Email: Chamali.n@douglaspartners.com.au		Attn: Sample Receipt
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day		(02) 9910 6200 samplereceipt@envirolab.com.au
Prior Storage: ☒ Fridge ☐ Freezer ☐ Esky ☐ Shelf		
Do samples contain 'potential' HBM? ☐ No ☐ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water M - Material	G - glass P - plastic	TCLP ASLP (PAH)	Silica gel clean-up									
1	P1-1/0.1	0	0.1	20/10/23	S	G	x										Samples already with lab
6	P1-3/1.0	0.9	1	24/10/23	S	G	x	x									Samples already with lab
	P1-SS5	0	0.1	31/10/23	S	G		x									Samples already with lab

Metals to analyse:		LAB RECEIPT	
Number of samples in container:	Transported to laboratory by: N/A	Lab Ref. No: 336823-A	
Send results to: Douglas Partners Pty Ltd		Received by: A-BM	
Address: Unit 5, 3 Teamster Close, Tuggerah NSW	Phone: (02) 4351 1422	Date & Time: 24/11/23 1857	
Relinquished by: CLN	Date:	Signed: <i>Chamali N</i>	Signed: <i>[Signature]</i>

CERTIFICATE OF ANALYSIS 337483

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00, Gosford (Batch 5-500ml)</u>
Number of Samples	14 Soil
Date samples received	10/11/2023
Date completed instructions received	10/11/2023

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	17/11/2023
Date of Issue	17/11/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Asbestos Approved By

Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

Asbestos ID - soils NEPM - ASB-001

Our Reference		337483-1	337483-2	337483-3	337483-4	337483-5
Your Reference	UNITS	P1-1/0.1	P1-2/0.1	P1-3/0.1	P1-1/0.5	P4-1/0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		20/10/2023	23/10/2023	24/10/2023	20/10/2023	19/10/2023
Date analysed	-	17/11/2023	17/11/2023	17/11/2023	17/11/2023	17/11/2023
Sample mass tested	g	820.46	626.61	939.87	521.99	815
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	—	—	—	—	—
FA and AF Estimation*	g	—	—	—	—	—
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001

Our Reference		337483-6	337483-7	337483-8	337483-9	337483-10
Your Reference	UNITS	P4-2/0.2	P4-3/0.1	P4-4/0.1	P3-1/0.1	P3-2/0.1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		20/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Date analysed	-	17/11/2023	17/11/2023	17/11/2023	17/11/2023	17/11/2023
Sample mass tested	g	514.94	1,031.94	915.12	862.07	1,038.48
Sample Description	-	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	—	—	—	—	—
FA and AF Estimation*	g	—	—	—	—	—
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001					
Our Reference		337483-11	337483-12	337483-13	337483-14
Your Reference	UNITS	P3-3/0.1	P3-4/0.1	P3-5/0.1	P3-6/0.1
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023
Date analysed	-	17/11/2023	17/11/2023	17/11/2023	17/11/2023
Sample mass tested	g	969	937.61	287.53	887.81
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Orange coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos ^{#1}	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	—	—	—	—
FA and AF Estimation*	g	—	—	—	—
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

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.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. NOTE ^{#1} Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) NOTE ^{#2} The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

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

Report Comments

Asbestos-ID in soil: NEPM

This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, sample 337483-13 was below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

Project No: 225005.00	Suburb: Gosford (Batch 5- 500ml)	To: Envirolab Services
Project Manager: Chamali N	Order Number:	Sampler: MLG / JK
Email: Chamali.n@douglaspartners.com.au		Attn: Sample Receipt
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day		(02) 9910 6200 samplereceipt@envirolab.com.au

Prior Storage: ☒ Fridge ☐ Freezer ☐ Esky ☒ Shelf **Do samples contain 'potential' HBM?** ☐ No ☐ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water M - Material	G - glass P - plastic	Asbestos (NEPM)										
1	P1-1/0.1	0	0.1	20/10/23	S	P	x										
2	P1-2/0.1	0	0.1	23/10/23	S	P	x										
3	P1-3/0.1	0	0.1	24/10/23	S	P	x										
4	P1-1/0.5	0.4	0.5	20/10/23	S	P	x										
5	P4-1/0.1	0	0.1	19/10/23	S	P	x										
6	P4-2/0.2	0.1	0.2	20/10/23	S	P	x										
7	P4-3/0.1	0	0.1	30/10/23	S	P	x										
8	P4-4/0.1	0	0.1	30/10/23	S	P	x										
9	P3-1/0.1	0	0.1	30/10/23	S	P	x										
10	P3-2/0.1	0	0.1	30/10/23	S	P	x										
11	P3-3/0.1	0	0.1	30/10/23	S	P	x										
12	P3-4/0.1	0	0.1	30/10/23	S	P	x										
13	P3-5/0.1	0.04	0.15	30/10/23	S	P	x										
14	P3-6/0.1	0.03	0.15	30/10/23	S	P	x										

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

Job No: 337483

Date Received: 10/11/23
Time Received: 10:10
Received By: ABM
Temp: 2000/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Metals to analyse:		LAB RECEIPT	
Number of samples in container:	Transported to laboratory by: Courier	Lab Ref. No: 337483	
Send results to: Douglas Partners Pty Ltd		Received by: ABM	
Address: Unit 5, 3 Teamster Close, Tuggerah NSW	Phone: (02) 4351 1422	Date & Time: 10/11/23 1040	
Relinquished by: CLN	Date: 9/11/2023	Signed: <i>Chamali N</i>	Signed: <i>ABM</i>

CERTIFICATE OF ANALYSIS 337300

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00, Gosford (Batch 4 - Soil and GW)</u>
Number of Samples	1 Material, 2 Soil, 5 Water
Date samples received	08/11/2023
Date completed instructions received	08/11/2023

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	15/11/2023
Date of Issue	15/11/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Asbestos Approved By

Analysed by Asbestos Approved Analyst: Anthony Clark
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Diana Korniewicz, Chemist
 Diego Bigolin, Inorganics Supervisor
 Dragana Tomas, Senior Chemist
 Liam Timmins, Organics Supervisor
 Lucy Zhu, Asbestos Supervisor
 Phalak Inthakesone, Organics Development Manager, Sydney
 Steven Luong, Senior Chemist
 Tabitha Roberts, Chemist
 Tim Toll, Chemist (FAS)

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		337300-2	337300-3
Your Reference	UNITS	P4-3/2.0	P3-3/3.0
Depth		1.9-2	2.9-3
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	10/11/2023	10/11/2023
Date analysed	-	13/11/2023	13/11/2023
TRH C ₆ - C ₉	mg/kg	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	79	80

svTRH (C10-C40) in Soil			
Our Reference		337300-2	337300-3
Your Reference	UNITS	P4-3/2.0	P3-3/3.0
Depth		1.9-2	2.9-3
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	10/11/2023	10/11/2023
Date analysed	-	11/11/2023	11/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	96	96

PAHs in Soil			
Our Reference		337300-2	337300-3
Your Reference	UNITS	P4-3/2.0	P3-3/3.0
Depth		1.9-2	2.9-3
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	10/11/2023	10/11/2023
Date analysed	-	15/11/2023	15/11/2023
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	0.2	0.1
Pyrene	mg/kg	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	0.4	0.1
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 <i>p</i> -Terphenyl-d14	%	108	106

Acid Extractable metals in soil			
Our Reference		337300-2	337300-3
Your Reference	UNITS	P4-3/2.0	P3-3/3.0
Depth		1.9-2	2.9-3
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date prepared	-	10/11/2023	10/11/2023
Date analysed	-	10/11/2023	10/11/2023
Arsenic	mg/kg	8	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	8	3
Copper	mg/kg	2	2
Lead	mg/kg	7	4
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	3	1
Zinc	mg/kg	10	7

Moisture			
Our Reference		337300-2	337300-3
Your Reference	UNITS	P4-3/2.0	P3-3/3.0
Depth		1.9-2	2.9-3
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date prepared	-	10/11/2023	10/11/2023
Date analysed	-	13/11/2023	13/11/2023
Moisture	%	24	24

Asbestos ID - materials		
Our Reference	UNITS	337300-1
Your Reference		P1-1/PACM
Depth		-
Date Sampled		20/10/2023
Type of sample		Material
Date analysed	-	13/11/2023
Mass / Dimension of Sample	-	70x50x5mm
Sample Description	-	Brown fibrous sheet
Asbestos ID in materials	-	Chrysotile asbestos detected
Trace Analysis	-	[NT]

vTRH(C6-C10)/BTEXN in Water						
Our Reference		337300-4	337300-5	337300-6	337300-7	337300-8
Your Reference	UNITS	MW1	MW2	MW3	QA_GW	RB_GW
Depth		-	-	-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Date analysed	-	10/11/2023	10/11/2023	10/11/2023	10/11/2023	10/11/2023
TRH C ₆ - C ₉	µg/L	<10	<10	<10	<10	110
TRH C ₆ - C ₁₀	µg/L	<10	<10	<10	<10	110
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10	<10	110
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	100	99	99	99	101
Surrogate Toluene-d8	%	101	100	99	97	101
Surrogate 4-Bromofluorobenzene	%	101	103	102	102	101

svTRH (C10-C40) in Water						
Our Reference		337300-4	337300-5	337300-6	337300-7	337300-8
Your Reference	UNITS	MW1	MW2	MW3	QA_GW	RB_GW
Depth		-	-	-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	13/11/2023	13/11/2023	13/11/2023	13/11/2023	13/11/2023
Date analysed	-	13/11/2023	13/11/2023	13/11/2023	13/11/2023	13/11/2023
TRH C ₁₀ - C ₁₄	µg/L	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆	µg/L	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100	<100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	73	74	97	97	86

PAHs in Water					
Our Reference		337300-4	337300-5	337300-6	337300-7
Your Reference	UNITS	MW1	MW2	MW3	QA_GW
Depth		-	-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water	Water
Date extracted	-	13/11/2023	13/11/2023	13/11/2023	13/11/2023
Date analysed	-	14/11/2023	14/11/2023	14/11/2023	14/11/2023
Naphthalene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	0.1	<0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	<0.1	<0.1	0.10	<0.1
Surrogate <i>p</i> -Terphenyl-d14	%	86	91	107	106

HM in water - dissolved						
Our Reference		337300-4	337300-5	337300-6	337300-7	337300-8
Your Reference	UNITS	MW1	MW2	MW3	QA_GW	RB_GW
Depth		-	-	-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water	Water	Water
Date prepared	-	10/11/2023	10/11/2023	10/11/2023	10/11/2023	10/11/2023
Date analysed	-	10/11/2023	10/11/2023	10/11/2023	10/11/2023	10/11/2023
Arsenic-Dissolved	µg/L	2	6	<1	8	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	1.3	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	1	<1	<1	<1
Copper-Dissolved	µg/L	<1	2	3	<1	4
Lead-Dissolved	µg/L	<1	<1	5	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	7	9	17	10	<1
Zinc-Dissolved	µg/L	26	3	670	12	5

Total Phenolics in Water				
Our Reference		337300-4	337300-5	337300-6
Your Reference	UNITS	MW1	MW2	MW3
Depth		-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water
Date extracted	-	10/11/2023	10/11/2023	10/11/2023
Date analysed	-	10/11/2023	10/11/2023	10/11/2023
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05

PFAS in Waters Trace Extended				
Our Reference		337300-4	337300-5	337300-6
Your Reference	UNITS	MW1	MW2	MW3
Depth		-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water
Date prepared	-	14/11/2023	14/11/2023	14/11/2023
Date analysed	-	14/11/2023	14/11/2023	14/11/2023
Perfluorobutanesulfonic acid	µg/L	<0.0004	<0.0004	0.0075
Perfluoropentanesulfonic acid	µg/L	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid - PFHxS	µg/L	<0.0002	0.001	0.0040
Perfluoroheptanesulfonic acid	µg/L	<0.001	<0.001	<0.001
Perfluorooctanesulfonic acid PFOS	µg/L	<0.0002	0.0021	0.0086
Perfluorodecanesulfonic acid	µg/L	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	<0.002	<0.02	<0.02
Perfluoropentanoic acid	µg/L	<0.002	0.007	0.006
Perfluorohexanoic acid	µg/L	<0.0004	0.003	0.0049
Perfluoroheptanoic acid	µg/L	<0.0004	0.004	0.004
Perfluorooctanoic acid PFOA	µg/L	<0.0002	0.0050	0.017
Perfluorononanoic acid	µg/L	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	<0.05	<0.05	<0.05
4:2 FTS	µg/L	<0.001	<0.001	<0.001
6:2 FTS	µg/L	<0.0004	0.0043	<0.0004
8:2 FTS	µg/L	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	<0.05	<0.05	<0.05
N-Ethyl perfluorooctanesulfonamide	µg/L	<0.1	<0.1	<0.1
N-Me perfluorooctanesulfonamid oethanol	µg/L	<0.05	<0.05	<0.05
N-Et perfluorooctanesulfonamid oethanol	µg/L	<0.5	<0.5	<0.5
MePerfluorooctanesulf- amid oacetic acid	µg/L	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	<0.002	<0.002	<0.002
Surrogate ¹³ C ₈ PFOS	%	97	102	102
Surrogate ¹³ C ₂ PFOA	%	103	108	110
Extracted ISTD ¹³ C ₃ PFBS	%	74	72	85
Extracted ISTD ¹⁸ O ₂ PFHxS	%	92	108	118
Extracted ISTD ¹³ C ₄ PFOS	%	79	82	86

PFAS in Waters Trace Extended				
Our Reference		337300-4	337300-5	337300-6
Your Reference	UNITS	MW1	MW2	MW3
Depth		-	-	-
Date Sampled		07/11/2023	07/11/2023	07/11/2023
Type of sample		Water	Water	Water
Extracted ISTD ¹³ C ₄ PFBA	%	35	#	#
Extracted ISTD ¹³ C ₃ PFPeA	%	67	33	39
Extracted ISTD ¹³ C ₂ PFHxA	%	96	67	87
Extracted ISTD ¹³ C ₄ PFHpA	%	98	76	94
Extracted ISTD ¹³ C ₄ PFOA	%	85	76	85
Extracted ISTD ¹³ C ₅ PFNA	%	98	93	106
Extracted ISTD ¹³ C ₂ PFDA	%	88	109	125
Extracted ISTD ¹³ C ₂ PFUnDA	%	94	126	126
Extracted ISTD ¹³ C ₂ PFDoDA	%	82	95	88
Extracted ISTD ¹³ C ₂ PFTeDA	%	89	106	107
Extracted ISTD ¹³ C ₂ 4:2FTS	%	117	#	#
Extracted ISTD ¹³ C ₂ 6:2FTS	%	105	#	#
Extracted ISTD ¹³ C ₂ 8:2FTS	%	99	#	#
Extracted ISTD ¹³ C ₈ FOSA	%	83	63	89
Extracted ISTD d ₃ N MeFOSA	%	111	114	124
Extracted ISTD d ₅ N EtFOSA	%	112	116	132
Extracted ISTD d ₇ N MeFOSE	%	100	94	98
Extracted ISTD d ₉ N EtFOSE	%	115	109	112
Extracted ISTD d ₃ N MeFOSAA	%	66	73	91
Extracted ISTD d ₅ N EtFOSAA	%	90	121	129
Total Positive PFHxS & PFOS	µg/L	<0.0002	0.0033	0.013
Total Positive PFOS & PFOA	µg/L	<0.0002	0.0071	0.025
Total Positive PFAS	µg/L	<0.0002	0.027	0.051

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.
Metals-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements. Salt forms (e.g. FeO, PbO, ZnO) are determined stoichiometrically from the base metal concentration.
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-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.

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	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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)-BTX 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)-BTX 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.
Org-029	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLPs/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Date analysed	-			13/11/2023	[NT]	[NT]	[NT]	[NT]	13/11/2023	[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]	85	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	74	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	78	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	88	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	94	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Date analysed	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	107	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
Surrogate o-Terphenyl	%		Org-020	96	[NT]	[NT]	[NT]	[NT]	98	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Date analysed	-			15/11/2023	[NT]	[NT]	[NT]	[NT]	15/11/2023	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	[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]	105	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	102	[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]	109	[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]	77	[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]	86	[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	109	[NT]	[NT]	[NT]	[NT]	101	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Date analysed	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	107	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			09/11/2023	8	09/11/2023	14/11/2023		09/11/2023	[NT]
Date analysed	-			10/11/2023	8	10/11/2023	15/11/2023		10/11/2023	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	8	110	82	29	92	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	8	110	83	28	92	[NT]
Benzene	µg/L	1	Org-023	<1	8	<1	<1	0	88	[NT]
Toluene	µg/L	1	Org-023	<1	8	<1	<1	0	89	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	8	<1	<1	0	92	[NT]
m+p-xylene	µg/L	2	Org-023	<2	8	<2	<2	0	95	[NT]
o-xylene	µg/L	1	Org-023	<1	8	<1	<1	0	93	[NT]
Naphthalene	µg/L	1	Org-023	<1	8	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	98	8	101	97	4	100	[NT]
Surrogate Toluene-d8	%		Org-023	98	8	101	96	5	99	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	101	8	101	112	10	104	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			13/11/2023	4	13/11/2023	13/11/2023		13/11/2023	[NT]
Date analysed	-			13/11/2023	4	13/11/2023	13/11/2023		13/11/2023	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	4	<50	<50	0	101	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	4	<100	<100	0	115	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	4	<100	<100	0	114	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	4	<50	<50	0	101	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	4	<100	<100	0	115	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	4	<100	<100	0	114	[NT]
Surrogate o-Terphenyl	%		Org-020	60	4	73	86	16	92	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: PAHs in Water					Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1
Date extracted	-			13/11/2023	4	13/11/2023	13/11/2023		13/11/2023
Date analysed	-			14/11/2023	4	14/11/2023	14/11/2023		14/11/2023
Naphthalene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	86
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	82
Fluorene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	79
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	84
Anthracene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	85
Pyrene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	89
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	77
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	4	<0.2	<0.2	0	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	85
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	4	<0.1	<0.1	0	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	87	4	86	98	13	98

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	337300-5
Date prepared	-			10/11/2023	4	10/11/2023	10/11/2023		10/11/2023	10/11/2023
Date analysed	-			10/11/2023	4	10/11/2023	10/11/2023		10/11/2023	10/11/2023
Arsenic-Dissolved	µg/L	1	Metals-022	<1	4	2	[NT]		91	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	4	<0.1	[NT]		92	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	4	<1	[NT]		96	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	4	<1	[NT]		94	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	4	<1	[NT]		96	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	4	<0.05	<0.05	0	106	87
Nickel-Dissolved	µg/L	1	Metals-022	<1	4	7	[NT]		94	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	4	26	[NT]		94	[NT]

QUALITY CONTROL: Total Phenolics in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Date analysed	-			10/11/2023	[NT]	[NT]	[NT]	[NT]	10/11/2023	[NT]
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	[NT]	[NT]	102	[NT]

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: PFAS in Waters Trace Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	337300-5
Date prepared	-			14/11/2023	4	14/11/2023	14/11/2023		14/11/2023	14/11/2023
Date analysed	-			14/11/2023	4	14/11/2023	14/11/2023		14/11/2023	14/11/2023
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	111	106
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	4	<0.001	<0.001	0	109	106
Perfluorohexanesulfonic acid - PFHxS	µg/L	0.0002	Org-029	<0.0002	4	<0.0002	<0.0002	0	108	94
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	4	<0.001	<0.001	0	103	119
Perfluorooctanesulfonic acid PFOS	µg/L	0.0002	Org-029	<0.0002	4	<0.0002	<0.0002	0	111	105
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	95	79
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	105	79
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	108	89
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	110	85
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	110	101
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	4	<0.0002	<0.0002	0	107	107
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	4	<0.001	<0.001	0	116	116
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	103	82
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	110	83
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	4	<0.005	<0.005	0	108	97
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	4	<0.01	<0.01	0	103	122
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	4	<0.05	<0.05	0	112	101
4:2 FTS	µg/L	0.001	Org-029	<0.001	4	<0.001	<0.001	0	116	104
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	110	95
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	4	<0.0004	<0.0004	0	107	103
10:2 FTS	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	120	135
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	4	<0.01	<0.01	0	110	81
N-Methyl perfluorooctane sulfonamide	µg/L	0.05	Org-029	<0.05	4	<0.05	<0.05	0	108	105
N-Ethyl perfluorooctanesulfon amide	µg/L	0.1	Org-029	<0.1	4	<0.1	<0.1	0	107	113
N-Me perfluorooctanesulfonamid oethanol	µg/L	0.05	Org-029	<0.05	4	<0.05	<0.05	0	107	83
N-Et perfluorooctanesulfonamid oethanol	µg/L	0.5	Org-029	<0.5	4	<0.5	<0.5	0	108	105
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	108	114
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	4	<0.002	<0.002	0	114	107
Surrogate ¹³ C ₈ PFOS	%		Org-029	104	4	97	102	5	99	104
Surrogate ¹³ C ₂ PFOA	%		Org-029	97	4	103	103	0	101	160

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: PFAS in Waters Trace Extended					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	337300-5
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	55	4	74	76	3	57	78
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	66	4	92	97	5	84	113
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	55	4	79	78	1	74	82
Extracted ISTD ¹³ C ₄ PFBA	%		Org-029	76	4	35	35	0	90	#
Extracted ISTD ¹³ C ₃ PFPeA	%		Org-029	69	4	67	70	4	80	34
Extracted ISTD ¹³ C ₂ PFHxA	%		Org-029	84	4	96	113	16	96	75
Extracted ISTD ¹³ C ₄ PFHpA	%		Org-029	75	4	98	103	5	87	83
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	75	4	85	94	10	84	74
Extracted ISTD ¹³ C ₅ PFNA	%		Org-029	79	4	98	107	9	93	94
Extracted ISTD ¹³ C ₂ PFDA	%		Org-029	63	4	88	98	11	76	105
Extracted ISTD ¹³ C ₂ PFUnDA	%		Org-029	68	4	94	103	9	79	120
Extracted ISTD ¹³ C ₂ PFDoDA	%		Org-029	69	4	82	90	9	77	90
Extracted ISTD ¹³ C ₂ PFTeDA	%		Org-029	60	4	89	104	16	79	110
Extracted ISTD ¹³ C ₂ 4:2FTS	%		Org-029	79	4	117	126	7	89	175
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	87	4	105	112	6	82	#
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	85	4	99	95	4	90	190
Extracted ISTD ¹³ C ₈ FOSA	%		Org-029	70	4	83	86	4	81	67
Extracted ISTD d ₃ N MeFOSA	%		Org-029	118	4	111	113	2	107	106
Extracted ISTD d ₅ N EtFOSA	%		Org-029	119	4	112	113	1	110	111
Extracted ISTD d ₇ N MeFOSE	%		Org-029	105	4	100	103	3	100	75

Client Reference: 225005.00, Gosford (Batch 4 - Soil and GW)

QUALITY CONTROL: PFAS in Waters Trace Extended						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	337300-5
Extracted ISTD d ₉ N EtFOSE	%		Org-029	115	4	115	113	2	112	108
Extracted ISTD d ₃ N MeFOSAA	%		Org-029	69	4	66	78	17	72	73
Extracted ISTD d ₅ N EtFOSAA	%		Org-029	93	4	90	100	11	77	124

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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

vTRH & BTEXN in Water NEPM - TRH C6-C9/C6-C10 Results are positive (or in part positive) due to the presence of THMs within the sample 337300-8.

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

PFAS: For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

Project No:		225005.00		Suburb:		Gosford (Batch 4- Soil and GW)						To:		Envirolab Services							
Project Manager:		Chamali N		Order Number:								Sampler:		MLG / JK							
Email:		Chamali.n@douglaspartners.com.au										Attn:		Sample Receipt							
Turnaround time:		☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day										(02) 9910 6200		samplereceipt@envirolab.com.au							
Prior Storage:		☒ Fridge ☐ Freezer ☐ Esky ☐ Shelf		Do samples contain 'potential' HBM?		☐ No ☐ Yes						(If YES, then handle, transport and store in accordance with FPM HAZID)									
Lab ID	Sample ID			Date Sampled	Sample Type S - soil W - water M - Material	Container Type G - glass P - plastic	Analytes												Notes/ Preservation/ Additional Requirements		
	Location / Other ID	Depth From	Depth To				Combo 3	Asbestos ID	Metals, TRH, BTEX	Combo 4L + PFAS	Combo 3L										
1	P1-1/PACM			20/10/23	M			x													
2	P4-3/2.0	1.9	2	30/10/23	S			x													
3	P3-3/3.0	2.9	3	30/10/23	S			x													
4	MW1			7/11/23	W						x						Metals, TRH, BTEX, PAH (low), phenols, PFAS (trace)				
5	MW2			7/11/23	W						x										
6	MW3			7/11/23	W						x										
7	QA_GW			7/11/23	W							x									
8	RB_GW			7/11/23	W																
Metals to analyse:														LAB RECEIPT							
Number of samples in container:				Transported to laboratory by:				Courier				Lab Ref. No: 337300									
Send results to: Douglas Partners Pty Ltd												Received by: ELS SYD, Sarah P									
Address: Unit 5, 3 Teamster Close, Tuggerah NSW				Phone: (02) 4351 1422								Date & Time: 08/11/23, 1420									
Relinquished by: CLN				Date: 7/11/2023				Signed: Chamali N				Signed: [Signature]									

CERTIFICATE OF ANALYSIS 336824

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00 Gosford (Batch 2-Sediment)</u>
Number of Samples	19 Soil, 2 Water
Date samples received	02/11/2023
Date completed instructions received	02/11/2023

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	09/11/2023
Date of Issue	14/11/2023
Reissue Details	This report replaces R00 created on 09/11/2023 due to: revised report with reporting units cahnged for TOC results.
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Diego Bigolin, Inorganics Supervisor
 Dragana Tomas, Senior Chemist
 Hannah Nguyen, Metals Supervisor
 Jenny He, Senior Chemist
 Steven Luong, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
TRH C ₆ - C ₉	mg/kg	<25	<50	<50	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<50	<50	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<50	<50	<25	<25
Benzene	mg/kg	<0.2	<0.4	<0.4	<0.2	<0.2
Toluene	mg/kg	<0.5	<1	<1	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<2	<2	<1	<1
m+p-xylene	mg/kg	<2	<4	<4	<2	<2
o-Xylene	mg/kg	<1	<2	<2	<1	<1
Naphthalene	mg/kg	<1	<2	<2	<1	<1
Total +ve Xylenes	mg/kg	<1	<2	<2	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	81	76	91	88

vTRH(C6-C10)/BTEXN in Soil

Our Reference		336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference	UNITS	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
TRH C ₆ - C ₉	mg/kg	<25	<50	<50	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<50	<50	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<50	<50	<25	<25
Benzene	mg/kg	<0.2	<0.4	<0.4	<0.2	<0.2
Toluene	mg/kg	<0.5	<1	<1	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<2	<2	<1	<1
m+p-xylene	mg/kg	<2	<4	<4	<2	<2
o-Xylene	mg/kg	<1	<2	<2	<1	<1
Naphthalene	mg/kg	<1	<2	<2	<1	<1
Total +ve Xylenes	mg/kg	<1	<2	<2	<1	<1
Surrogate aaa-Trifluorotoluene	%	81	80	81	77	82

vTRH(C6-C10)/BTEXN in Soil

Our Reference		336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
TRH C ₆ - C ₉	mg/kg	<75	<50	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<75	<50	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<75	<50	<25	<25	<25
Benzene	mg/kg	<0.6	<0.4	<0.2	<0.2	<0.2
Toluene	mg/kg	<2	<1	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<3	<2	<1	<1	<1
m+p-xylene	mg/kg	<6	<4	<2	<2	<2
o-Xylene	mg/kg	<3	<2	<1	<1	<1
Naphthalene	mg/kg	<3	<2	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<2	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	76	87	91	80	85

vTRH(C6-C10)/BTEXN in Soil

Our Reference		336824-16	336824-17	336824-18	336824-19
Your Reference	UNITS	P4-SS2	P4-SS3	QA_SS1	QA_SS2
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<50
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<50
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<50
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.4
Toluene	mg/kg	<0.5	<0.5	<0.5	<1
Ethylbenzene	mg/kg	<1	<1	<1	<2
m+p-xylene	mg/kg	<2	<2	<2	<4
o-Xylene	mg/kg	<1	<1	<1	<2
Naphthalene	mg/kg	<1	<1	<1	<2
Total +ve Xylenes	mg/kg	<1	<1	<1	<2
Surrogate aaa-Trifluorotoluene	%	91	87	82	84

svTRH (C10-C40) in Soil						
Our Reference		336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	200
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	240
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	490
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	56
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	56
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	430
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	200
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	680
Surrogate o-Terphenyl	%	115	138	121	129	134

svTRH (C10-C40) in Soil						
Our Reference		336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference	UNITS	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50	<100	<100	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<200	<200	100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<200	<200	140	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<100	<100	240	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<100	<100	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<100	<100	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<200	<200	240	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<200	<200	150	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<100	<100	390	<50
Surrogate o-Terphenyl	%	89	132	134	124	134

svTRH (C10-C40) in Soil

Our Reference		336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<150	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<300	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<300	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<150	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<150	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<150	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<300	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<300	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<150	<50	<50	<50	<50
Surrogate o-Terphenyl	%	125	124	119	119	126

svTRH (C10-C40) in Soil

Our Reference		336824-16	336824-17	336824-18	336824-19
Your Reference	UNITS	P4-SS2	P4-SS3	QA_SS1	QA_SS2
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	130	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	130	<50
Surrogate o-Terphenyl	%	130	122	125	124

PAHs in Soil						
Our Reference		336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
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	0.2	<0.1	0.2	0.2
Pyrene	mg/kg	<0.1	0.1	<0.1	0.1	0.2
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	0.06	0.09
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	0.4	<0.05	0.4	0.51
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 <i>p</i> -Terphenyl-d14	%	92	90	97	91	94

PAHs in Soil						
Our Reference		336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference	UNITS	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
Naphthalene	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.2	<0.2	0.6	<0.1
Anthracene	mg/kg	<0.1	<0.2	<0.2	0.1	<0.1
Fluoranthene	mg/kg	0.3	<0.2	<0.2	1.4	0.2
Pyrene	mg/kg	0.3	<0.2	<0.2	1.3	0.2
Benzo(a)anthracene	mg/kg	0.2	<0.2	<0.2	0.6	0.2
Chrysene	mg/kg	<0.1	<0.2	<0.2	0.4	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.4	<0.4	0.9	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	0.62	0.08
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.2	<0.2	0.4	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.2	<0.2	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.2	<0.2	0.5	<0.1
Total +ve PAH's	mg/kg	1.2	<0.1	<0.1	7.0	0.64
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<1	<1	0.9	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<1	<1	0.9	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<1	<1	0.9	<0.5
Surrogate p-Terphenyl-d14	%	96	93	98	101	91

PAHs in Soil						
Our Reference		336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
Naphthalene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.6	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.2	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.15	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<1.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<1.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<1.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	92	94	92	88

PAHs in Soil					
Our Reference		336824-16	336824-17	336824-18	336824-19
Your Reference	UNITS	P4-SS2	P4-SS3	QA_SS1	QA_SS2
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.6	0.1
Pyrene	mg/kg	<0.1	<0.1	0.5	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.3	0.2
Chrysene	mg/kg	<0.1	<0.1	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.4	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.3	0.09
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.2	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	2.8	0.56
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	93	85	99	93

Organochlorine Pesticides in soil						
Our Reference		336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
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
Mirex	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	%	101	104	109	103	101

Organochlorine Pesticides in soil						
Our Reference	UNITS	336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference		P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
alpha-BHC	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
HCB	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Mirex	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Surrogate TCMX	%	107	106	105	106	99

Organochlorine Pesticides in soil						
Our Reference		336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
alpha-BHC	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	98	100	99	96

Organochlorine Pesticides in soil			
Our Reference		336824-16	336824-17
Your Reference	UNITS	P4-SS2	P4-SS3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023
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
Mirex	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	105	101

PCBs in Soil						
Our Reference		336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
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	%	101	104	109	103	101

PCBs in Soil						
Our Reference		336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference	UNITS	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
Aroclor 1016	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.2	<0.2	<0.1	<0.1
Surrogate TCMX	%	107	106	105	106	99

PCBs in Soil						
Our Reference		336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	3/11/2023	3/11/2023	3/11/2023	3/11/2023	03/11/2023
Date analysed	-	04/11/2023	04/11/2023	04/11/2023	04/11/2023	04/11/2023
Aroclor 1016	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.3	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	98	100	99	96

PCBs in Soil			
Our Reference		336824-16	336824-17
Your Reference	UNITS	P4-SS2	P4-SS3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	3/11/2023	3/11/2023
Date analysed	-	04/11/2023	04/11/2023
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	%	105	101

Acid Extractable metals in soil						
Our Reference		336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Arsenic	mg/kg	<4	13	14	9	<4
Cadmium	mg/kg	<0.4	<0.4	<0.6	<0.4	<0.4
Chromium	mg/kg	3	17	20	12	9
Copper	mg/kg	7	22	26	21	20
Lead	mg/kg	7	37	37	36	14
Mercury	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Nickel	mg/kg	2	7	8	5	7
Zinc	mg/kg	25	100	120	92	100

Acid Extractable metals in soil						
Our Reference		336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference	UNITS	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Arsenic	mg/kg	13	14	15	12	14
Cadmium	mg/kg	<0.6	<0.6	<0.6	<0.6	<0.6
Chromium	mg/kg	23	21	22	23	19
Copper	mg/kg	39	33	34	46	51
Lead	mg/kg	58	44	52	66	49
Mercury	mg/kg	0.2	0.1	0.1	0.1	0.1
Nickel	mg/kg	9	9	9	9	8
Zinc	mg/kg	150	150	170	160	130

Acid Extractable metals in soil

Our Reference		336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Arsenic	mg/kg	19	14	8	11	<4
Cadmium	mg/kg	<0.9	<0.6	<0.4	<0.4	<0.4
Chromium	mg/kg	30	22	12	17	2
Copper	mg/kg	51	32	18	21	2
Lead	mg/kg	65	45	27	36	4
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	12	9	6	7	<1
Zinc	mg/kg	190	140	87	97	9

Acid Extractable metals in soil

Our Reference		336824-16	336824-17	336824-18	336824-19
Your Reference	UNITS	P4-SS2	P4-SS3	QA_SS1	QA_SS2
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Arsenic	mg/kg	<4	8	13	15
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.6
Chromium	mg/kg	3	9	17	22
Copper	mg/kg	4	17	22	31
Lead	mg/kg	6	19	37	43
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1
Nickel	mg/kg	1	4	7	9
Zinc	mg/kg	18	56	99	130

Misc Soil - Inorg						
Our Reference	UNITS	336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference		P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference	UNITS	336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference		P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg						
Our Reference	UNITS	336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference		P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg			
Our Reference	UNITS	336824-16	336824-17
Your Reference		P4-SS2	P4-SS3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date prepared	-	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023
Total Phenolics (as Phenol)	mg/kg	<5	<5

Moisture						
Our Reference	UNITS	336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference		P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Moisture	%	21	47	59	37	33

Moisture						
Our Reference	UNITS	336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference		P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Moisture	%	52	60	60	50	50

Moisture						
Our Reference	UNITS	336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference		P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Moisture	%	72	58	40	48	17

Moisture					
Our Reference	UNITS	336824-16	336824-17	336824-18	336824-19
Your Reference		P4-SS2	P4-SS3	QA_SS1	QA_SS2
Depth		0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	03/11/2023	03/11/2023	03/11/2023	03/11/2023
Date analysed	-	06/11/2023	06/11/2023	06/11/2023	06/11/2023
Moisture	%	22	38	47	59

Misc Inorg - Soil						
Our Reference	UNITS	336824-1	336824-2	336824-6	336824-8	336824-11
Your Reference		P1-SS1	P1-SS2	P1-SS6	P1-SS8	P1-SS11
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	30/10/2023	31/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Date analysed	-	08/11/2023	08/11/2023	08/11/2023	08/11/2023	08/11/2023
Total Organic Carbon in soil/solids	%	0.14	2.3	2.3	3.5	4.3

Misc Inorg - Soil		
Our Reference	UNITS	336824-13
Your Reference		P3-SS1
Depth		0-0.1
Date Sampled		30/10/2023
Type of sample		Soil
Date prepared	-	08/11/2023
Date analysed	-	08/11/2023
Total Organic Carbon in soil/solids	%	1.8

Tributyl Tin in Soil						
Our Reference	UNITS	336824-1	336824-2	336824-3	336824-4	336824-5
Your Reference		P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Tributyltin as Sn	µg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate Tripropyltin	%	65	77	111	83	103

Tributyl Tin in Soil						
Our Reference	UNITS	336824-6	336824-7	336824-8	336824-9	336824-10
Your Reference		P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Tributyltin as Sn	µg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate Tripropyltin	%	86	93	93	92	104

Tributyl Tin in Soil						
Our Reference	UNITS	336824-11	336824-12	336824-13	336824-14	336824-15
Your Reference		P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/11/2023	07/11/2023	07/11/2023	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023	09/11/2023	09/11/2023	09/11/2023
Tributyltin as Sn	µg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate Tripropyltin	%	124	105	94	98	101

Tributyl Tin in Soil			
Our Reference	UNITS	336824-16	336824-17
Your Reference		P4-SS2	P4-SS3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Date extracted	-	07/11/2023	07/11/2023
Date analysed	-	09/11/2023	09/11/2023
Tributyltin as Sn	µg/kg	<0.5	<0.5
Surrogate Tripropyltin	%	101	113

vTRH(C6-C10)/MBTEXN in Water			
Our Reference		336824-20	336824-21
Your Reference	UNITS	RB1_SS1	RB2_SS1
Depth		-	-
Date Sampled		27/10/2023	30/10/2023
Type of sample		Water	Water
Date extracted	-	02/11/2023	02/11/2023
Date analysed	-	03/11/2023	03/11/2023
TRH C ₆ - C ₉	µg/L	<10	<10
TRH C ₆ - C ₁₀	µg/L	<10	<10
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10
MTBE	µg/L	<1	<1
Benzene	µg/L	<1	<1
Toluene	µg/L	5	5
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	101	102
Surrogate Toluene-d8	%	98	99
Surrogate 4-Bromofluorobenzene	%	106	106

svTRH (C10-C40) in Water			
Our Reference		336824-20	336824-21
Your Reference	UNITS	RB1_SS1	RB2_SS1
Depth		-	-
Date Sampled		27/10/2023	30/10/2023
Type of sample		Water	Water
Date extracted	-	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023
TRH C ₁₀ - C ₁₄	µg/L	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	100	<100
TRH C ₂₉ - C ₃₆	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	100	<50
TRH >C ₁₀ - C ₁₆	µg/L	120	110
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	120	110
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	120	110
Surrogate o-Terphenyl	%	94	88

Metals in Waters - Acid extractable			
Our Reference		336824-20	336824-21
Your Reference	UNITS	RB1_SS1	RB2_SS1
Depth		-	-
Date Sampled		27/10/2023	30/10/2023
Type of sample		Water	Water
Date prepared	-	03/11/2023	03/11/2023
Date analysed	-	03/11/2023	03/11/2023
Arsenic - Total	mg/L	<0.05	<0.05
Cadmium - Total	mg/L	<0.01	<0.01
Chromium - Total	mg/L	<0.01	<0.01
Copper - Total	mg/L	<0.01	<0.01
Lead - Total	mg/L	<0.03	<0.03
Mercury - Total	mg/L	<0.0005	<0.0005
Nickel - Total	mg/L	<0.02	<0.02
Zinc - Total	mg/L	<0.02	<0.02

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
INORG-137	Total Carbon Nitrogen Sulfur by high temperature catalytic combustion with IR detection.
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-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
Org-021/022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS. 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-022/025	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	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
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)-BTX 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)-BTX 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.
ORG-25	Determination of Organometallic Compounds by derivatisation and analysis by GC-MSMS.

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date extracted	-			08/11/2023	1	03/11/2023	03/11/2023		03/11/2023	03/11/2023
Date analysed	-			09/11/2023	1	06/11/2023	06/11/2023		06/11/2023	06/11/2023
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	1	<25	<25	0	109	101
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	1	<25	<25	0	109	101
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	110	102
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	110	101
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	102	94
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	112	103
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	103	95
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	95	1	89	90	1	98	86

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	03/11/2023	03/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	06/11/2023	06/11/2023		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-023	[NT]	11	<75	<75	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	[NT]	11	<75	<75	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.6	<0.6	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<3	<3	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<6	<6	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<3	<3	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	11	<3	<3	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	76	75	1	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date extracted	-			03/11/2023	1	03/11/2023	03/11/2023		03/11/2023	03/11/2023
Date analysed	-			04/11/2023	1	04/11/2023	04/11/2023		04/11/2023	04/11/2023
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	119	117
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	<100	<100	0	117	125
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	<100	<100	0	100	118
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	119	117
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	<100	110	10	117	125
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	<100	<100	0	100	118
Surrogate o-Terphenyl	%		Org-020	102	1	115	121	5	117	130

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	03/11/2023	03/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	04/11/2023	04/11/2023		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	[NT]	11	<150	<150	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	[NT]	11	<300	<300	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	[NT]	11	<300	<300	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	[NT]	11	<150	<150	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	[NT]	11	<300	<300	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	[NT]	11	<300	<300	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	125	120	4	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date extracted	-			3/11/2023	1	3/11/2023	3/11/2023		3/11/2023	3/11/2023
Date analysed	-			04/11/2023	1	04/11/2023	04/11/2023		04/11/2023	04/11/2023
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	93
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	89	97
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	90
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	92
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	90	88
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	93	97
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	67	67
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	0.1	67	86	92
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	92	1	92	98	6	83	90

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	3/11/2023	3/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	04/11/2023	04/11/2023		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.6	<0.6	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	94	90	4	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date extracted	-			3/11/2023	1	3/11/2023	3/11/2023		3/11/2023	3/11/2023
Date analysed	-			04/11/2023	1	04/11/2023	04/11/2023		04/11/2023	04/11/2023
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	100
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	86	98
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	89	87
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	85	89
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	90
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	105
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	110
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	78	98
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	82	94
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	120
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	96	1	101	107	6	93	98

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	3/11/2023	3/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	04/11/2023	04/11/2023		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Mirex	mg/kg	0.1	Org-022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	103	100	3	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date extracted	-			3/11/2023	1	3/11/2023	3/11/2023		3/11/2023	3/11/2023
Date analysed	-			04/11/2023	1	04/11/2023	04/11/2023		04/11/2023	04/11/2023
Aroclor 1016	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	94	80
Aroclor 1260	mg/kg	0.1	Org-021/022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	96	1	101	107	6	93	98

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	3/11/2023	3/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	04/11/2023	04/11/2023		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021/022/025	[NT]	11	<0.3	<0.3	0	[NT]	[NT]
Surrogate TCMX	%		Org-021/022/025	[NT]	11	103	100	3	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date prepared	-			03/11/2023	1	03/11/2023	03/11/2023		03/11/2023	03/11/2023
Date analysed	-			03/11/2023	1	03/11/2023	03/11/2023		03/11/2023	03/11/2023
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	108	108
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	95	92
Chromium	mg/kg	1	Metals-020	<1	1	3	3	0	107	101
Copper	mg/kg	1	Metals-020	<1	1	7	8	13	107	113
Lead	mg/kg	1	Metals-020	<1	1	7	7	0	105	97
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	97	96
Nickel	mg/kg	1	Metals-020	<1	1	2	2	0	100	98
Zinc	mg/kg	1	Metals-020	<1	1	25	26	4	98	92

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	03/11/2023	03/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	03/11/2023	03/11/2023		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	19	22	15	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.9	<0.9	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	30	30	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	51	49	4	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	65	62	5	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	0.1	0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	12	11	9	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	190	190	0	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Misc Soil - Inorg					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	336824-2
Date prepared	-			03/11/2023	1	03/11/2023	03/11/2023		03/11/2023	03/11/2023
Date analysed	-			03/11/2023	1	03/11/2023	03/11/2023		03/11/2023	03/11/2023
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	1	<5	<5	0	96	106

QUALITY CONTROL: Misc Soil - Inorg					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	03/11/2023	03/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	03/11/2023	03/11/2023		[NT]	[NT]
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	[NT]	11	<5	<5	0	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Misc Inorg - Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			08/11/2023	1	08/11/2023	08/11/2023		08/11/2023	[NT]
Date analysed	-			08/11/2023	1	08/11/2023	08/11/2023		08/11/2023	[NT]
Total Organic Carbon in soil/solids	%	0.01	INORG-137	<0.01	1	0.14	0.13	7	103	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Tributyl Tin in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	336824-2
Date extracted	-			07/11/2023	1	07/11/2023	07/11/2023		07/11/2023	07/11/2023
Date analysed	-			09/11/2023	1	09/11/2023	09/11/2023		09/11/2023	09/11/2023
Tributyltin as Sn	µg/kg	0.5	ORG-25	<0.5	1	<0.5	<0.5	0	102	109
Surrogate Tripropyltin	%		ORG-25	113	1	65	65	0	97	87

QUALITY CONTROL: Tributyl Tin in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	07/11/2023	07/11/2023		[NT]	[NT]
Date analysed	-			[NT]	11	09/11/2023	09/11/2023		[NT]	[NT]
Tributyltin as Sn	µg/kg	0.5	ORG-25	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Surrogate Tripropyltin	%		ORG-25	[NT]	11	124	86	36	[NT]	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: vTRH(C6-C10)/MBTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			02/11/2023	20	02/11/2023	03/11/2023		02/11/2023	[NT]
Date analysed	-			03/11/2023	20	03/11/2023	06/11/2023		03/11/2023	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	20	<10	<10	0	101	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	20	<10	<10	0	101	[NT]
MTBE	µg/L	1	Org-023	<1	20	<1	<1	0	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	20	<1	<1	0	95	[NT]
Toluene	µg/L	1	Org-023	<1	20	5	5	0	100	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	20	<1	<1	0	103	[NT]
m+p-xylene	µg/L	2	Org-023	<2	20	<2	<2	0	104	[NT]
o-xylene	µg/L	1	Org-023	<1	20	<1	<1	0	104	[NT]
Naphthalene	µg/L	1	Org-023	<1	20	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	100	20	101	102	1	98	[NT]
Surrogate Toluene-d8	%		Org-023	99	20	98	99	1	102	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	103	20	106	107	1	97	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			03/11/2023	[NT]	[NT]	[NT]	[NT]	03/11/2023	[NT]
Date analysed	-			03/11/2023	[NT]	[NT]	[NT]	[NT]	03/11/2023	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	110	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate o-Terphenyl	%		Org-020	89	[NT]	[NT]	[NT]	[NT]	94	[NT]

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: Metals in Waters - Acid extractable						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			03/11/2023	20	03/11/2023	03/11/2023		03/11/2023	[NT]
Date analysed	-			03/11/2023	20	03/11/2023	03/11/2023		03/11/2023	[NT]
Arsenic - Total	mg/L	0.05	Metals-020	<0.05	20	<0.05	<0.05	0	115	[NT]
Cadmium - Total	mg/L	0.01	Metals-020	<0.01	20	<0.01	<0.01	0	105	[NT]
Chromium - Total	mg/L	0.01	Metals-020	<0.01	20	<0.01	<0.01	0	109	[NT]
Copper - Total	mg/L	0.01	Metals-020	<0.01	20	<0.01	<0.01	0	109	[NT]
Lead - Total	mg/L	0.03	Metals-020	<0.03	20	<0.03	<0.03	0	109	[NT]
Mercury - Total	mg/L	0.0005	Metals-021	<0.0005	20	<0.0005	[NT]		108	[NT]
Nickel - Total	mg/L	0.02	Metals-020	<0.02	20	<0.02	<0.02	0	110	[NT]
Zinc - Total	mg/L	0.02	Metals-020	<0.02	20	<0.02	<0.02	0	110	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

vTRH & BTEXN in Soil NEPM - The PQL has been raised due to the high moisture content in samples 336824-2,3,7,8,11,12 and 19 resulting in a high dilution factor.

TRH Soil C10-C40 NEPM - The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.

PAHs in Soil - The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.

OC's in Soil - The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.

PCBs in Soil - The PQL has been raised due to the high moisture content in sample/s 336824-7,8,11,11d, resulting in a high dilution factor.

8 metals in soil - The PQL for Cd has been raised due to the high moisture content in sample/s 336824-3,6,7,8,9,10,11,12 and 19 resulting in a high dilution factor.

TRH Water(C10-C40) NEPM - The positive result in the rinsate sample is due to a single peak with no hydrocarbon profile that is consistent with the use of plastic containers.

Project No: 225005.00				Suburb: Gosford (Batch 2 - Sediment)				To: Envirolab Services			
Project Manager: Chamali N				Order Number:				Sampler: HJS			
Email: Chamali.n@douglaspartners.com.au				Attn: Sample Receipt							
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day								(02) 9910 6200 samlereceipt@envirolab.com.au			
Prior Storage: ☒ Fridge ☐ Freezer ☐ Esky ☐ Shelf				Do samples contain 'potential' HBM? ☐ No ☐ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)							

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes										Notes/ Preservation/ Additional Requirements	
	Location / Other ID	Depth From	Depth To		S - soil W - water M - Material	G - glass P - plastic	Combo 7 + TBT	TOC (%)										
1	P1-SS1	0	0.1	30/10/23	S	G	x	x										Please upload all sediment results to Esdat online
2	P1-SS2	0	0.1	30/10/23	S	G	x	x										
3	P1-SS3	0	0.1	31/10/23	S	G	x											
4	P1-SS4	0	0.1	30/10/23	S	G	x											
5	P1-SS5	0	0.1	31/10/23	S	G	x											
6	P1-SS6	0	0.1	30/10/23	S	G	x	x										
7	P1-SS7	0	0.1	31/10/23	S	G	x											
8	P1-SS8	0	0.1	31/10/23	S	G	x	x										
9	P1-SS9	0	0.1	27/10/23	S	G	x											
10	P1-SS10	0	0.1	27/10/23	S	G	x											
11	P1-SS11	0	0.1	27/10/23	S	G	x	x										
12	P1-SS12	0	0.1	30/10/23	S	G	x											
13	P3-SS1	0	0.1	30/10/23	S	G	x	x										
14	P3-SS2	0	0.1	30/10/23	S	G	x											

Metals to analyse:

Number of samples in container:

Send results to: Douglas Partners Pty Ltd

Address: Unit 5, 3 Teamster Close, Tuggerah NSW

Relinquished by: CLN

Transported to laboratory by: Courier

Phone: (02) 4351 1422

Date: 1/11/2023

Signed: *Amel N*

LAB RECEIPT

Lab Ref. No: 336824

Received by: *Christine Ho* 1100g

Date & Time: 2/11/23

Signed: *[Signature]*

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

Job No: 336824

Date Received: 2/11/23

Time Received: 1100

Received By: CH

Temp/ Cool/Ambient: 15°C

Cooling: Ice/ Repack

Security: Intact/Broken/None

Project No: 225005.00					Suburb: Gosford (Batch 2 - Sediment)					To: Envirolab Services							
Project Manager: Chamali N										Dispatch date: 45231							
Lab ID	Sample ID			Date Sampled	Sample Type S - soil W - water M - Material	Container Type G - glass P - plastic	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To				Combo 7 + TBT	TOC (%)	Combo 3	Metals, TRH, BTEX							
15	P4-SS1	0	0.1	30/10/23	S	G	x	x									
16	P4-SS2	0	0.1	30/10/23	S	G	x	x									
17	P4-SS3	0	0.1	30/10/23	S	G	x	x									
18	QA_SS1	0	0.1	30/10/23	S	G			x								
19	QA_SS2	0	0.1	30/10/23	S	G			x								
20	RB1_SS1			27/10/23	W	G/P				x							
21	RB2_SS1			30/10/23	W	G/P				x							

336824 CH.
2/11/23

CERTIFICATE OF ANALYSIS 336824-A

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00 Gosford (Batch 2-Sediment)</u>
Number of Samples	19 Soil, 2 Water
Date samples received	02/11/2023
Date completed instructions received	22/11/2023

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	01/12/2023
Date of Issue	01/12/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Greta Petzold, Operation Manager

Authorised By

Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in Sediment

Our Reference		336824-A-1	336824-A-2	336824-A-3	336824-A-4	336824-A-5
Your Reference	UNITS	P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Refer to attached report	-	27/11	27/11	27/11	27/11	27/11

Organochlorine Pesticides in Sediment

Our Reference		336824-A-6	336824-A-7	336824-A-8	336824-A-9	336824-A-10
Your Reference	UNITS	P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Refer to attached report	-	27/11	27/11	27/11	27/11	27/11

Organochlorine Pesticides in Sediment

Our Reference		336824-A-11	336824-A-12	336824-A-13	336824-A-14	336824-A-15
Your Reference	UNITS	P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Refer to attached report	-	27/11	27/11	27/11	27/11	27/11

Organochlorine Pesticides in Sediment

Our Reference		336824-A-16	336824-A-17
Your Reference	UNITS	P4-SS2	P4-SS3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Refer to attached report	-	27/11	27/11

PCBs in Sediment						
Our Reference	UNITS	336824-A-1	336824-A-2	336824-A-3	336824-A-4	336824-A-5
Your Reference		P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Refer to attached report	-	01/12	01/12	01/12	01/12	01/12

PCBs in Sediment						
Our Reference	UNITS	336824-A-6	336824-A-7	336824-A-8	336824-A-9	336824-A-10
Your Reference		P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Refer to attached report	-	01/12	01/12	01/12	01/12	01/12

PCBs in Sediment						
Our Reference	UNITS	336824-A-11	336824-A-12	336824-A-13	336824-A-14	336824-A-15
Your Reference		P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
Date Sampled		27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Type of sample		Soil	Soil	Soil	Soil	Soil
Refer to attached report	-	01/12	01/12	01/12	01/12	01/12

PCBs in Sediment			
Our Reference	UNITS	336824-A-16	336824-A-17
Your Reference		P4-SS2	P4-SS3
Depth		0-0.1	0-0.1
Date Sampled		30/10/2023	30/10/2023
Type of sample		Soil	Soil
Refer to attached report	-	01/12	01/12

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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

OC's & PCB's in Sediment analysed by MPL Laboratories. Report No. PEK1820
View attached report

Certificate of Analysis PEK1820

Client Details

Client	Envirolab (Sydney)
Contact	Jacinta Hurst
Address	12 Ashley St, Chatswood, NSW, 2067

Sample Details

Your Reference	336824-A
Number of Samples	17 Soil
Date Samples Received	24/11/2023
Date Instructions Received	24/11/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	01/12/2023
Date of Issue	01/12/2023

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

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

Authorisation Details

Results Approved By	Heram Halim, Operations Manager Travis Carey, Organics Supervisor
Laboratory Manager	Michael Kubiak

Certificate of Analysis PEK1820

Samples in this Report

Envirolab ID	Sample ID	Description	Matrix	Date Sampled	Date Received
PEK1820-01	336824-A-1	P1-SS1	Soil	30/10/2023	24/11/2023
PEK1820-02	336824-A-2	P1-SS2	Soil	30/10/2023	24/11/2023
PEK1820-03	336824-A-3	P1-SS3	Soil	31/10/2023	24/11/2023
PEK1820-04	336824-A-4	P1-SS4	Soil	30/10/2023	24/11/2023
PEK1820-05	336824-A-5	P1-SS5	Soil	31/10/2023	24/11/2023
PEK1820-06	336824-A-6	P1-SS6	Soil	30/10/2023	24/11/2023
PEK1820-07	336824-A-7	P1-SS7	Soil	31/10/2023	24/11/2023
PEK1820-08	336824-A-8	P1-SS8	Soil	31/10/2023	24/11/2023
PEK1820-09	336824-A-9	P1-SS9	Soil	27/10/2023	24/11/2023
PEK1820-10	336824-A-10	P1-SS10	Soil	27/10/2023	24/11/2023
PEK1820-11	336824-A-11	P1-SS11	Soil	27/10/2023	24/11/2023
PEK1820-12	336824-A-12	P1-SS12	Soil	30/10/2023	24/11/2023
PEK1820-13	336824-A-13	P3-SS1	Soil	30/10/2023	24/11/2023
PEK1820-14	336824-A-14	P3-SS2	Soil	30/10/2023	24/11/2023
PEK1820-15	336824-A-15	P4-SS1	Soil	30/10/2023	24/11/2023
PEK1820-16	336824-A-16	P4-SS2	Soil	30/10/2023	24/11/2023
PEK1820-17	336824-A-17	P4-SS3	Soil	30/10/2023	24/11/2023

Certificate of Analysis PEK1820

Organochlorine Pesticides - NAGD (Soil)

Envirolab ID Your Reference	Units	PQL	PEK1820-01 336824-A-1 P1-SS1 30/10/2023	PEK1820-02 336824-A-2 P1-SS2 30/10/2023	PEK1820-03 336824-A-3 P1-SS3 31/10/2023	PEK1820-04 336824-A-4 P1-SS4 30/10/2023	PEK1820-05 336824-A-5 P1-SS5 31/10/2023
Date Sampled							
alpha-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobenzene	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
beta-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
gamma-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
delta-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Heptachlor	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aldrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Heptachlor epoxide	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-Chlordane	µg/kg	1.0	<1.0	<1.0	<1.0	1.3	7.4
cis-Chlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	2.6
Oxychlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan I	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDE	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dieldrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	6.3
Endrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDD	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	1.2
Endosulfan II	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDT	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan sulfate	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methoxychlor	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate 2-Chlorophenol-D4	%		41.4 [2]	25.4 [2]	28.4 [2]	19.1 [2]	35.7 [2]

Envirolab ID Your Reference	Units	PQL	PEK1820-06 336824-A-6 P1-SS6 30/10/2023	PEK1820-07 336824-A-7 P1-SS7 31/10/2023	PEK1820-08 336824-A-8 P1-SS8 31/10/2023	PEK1820-09 336824-A-9 P1-SS9 27/10/2023	PEK1820-10 336824-A-10 P1-SS10 27/10/2023
Date Sampled							
alpha-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobenzene	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
beta-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
gamma-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
delta-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Heptachlor	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aldrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Heptachlor epoxide	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-Chlordane	µg/kg	1.0	<1.0	1.2	<1.0	1.3	<1.0
cis-Chlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Oxychlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan I	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDE	µg/kg	1.0	1.2	1.3	<1.0	1.7	<1.0
Dieldrin	µg/kg	1.0	<1.0	<1.0	<1.0	1.1	<1.0
Endrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDD	µg/kg	1.0	<1.0	<1.0	<1.0	1.1	1.4
Endosulfan II	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDT	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	5.3
Endosulfan sulfate	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methoxychlor	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Certificate of Analysis PEK1820

Organochlorine Pesticides - NAGD (Soil)

Envirolab ID	Units	PQL	PEK1820-06	PEK1820-07	PEK1820-08	PEK1820-09	PEK1820-10
Your Reference			336824-A-6	336824-A-7	336824-A-8	336824-A-9	336824-A-10
Date Sampled			P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
			30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023

Surrogate 2-Chlorophenol-D4	%		29.8 [2]	15.2 [2]	22.3 [2]	20.6 [2]	33.2 [2]
-----------------------------	---	--	----------	----------	----------	----------	----------

Envirolab ID	Units	PQL	PEK1820-11	PEK1820-12	PEK1820-13	PEK1820-14	PEK1820-15
Your Reference			336824-A-11	336824-A-12	336824-A-13	336824-A-14	336824-A-15
Date Sampled			P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
			27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023

alpha-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hexachlorobenzene	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
beta-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
gamma-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
delta-BHC	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Heptachlor	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Aldrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Heptachlor epoxide	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-Chlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis-Chlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Oxychlordane	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan I	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDE	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dieldrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endrin	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDD	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan II	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4,4'-DDT	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Endosulfan sulfate	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Methoxychlor	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate 2-Chlorophenol-D4	%		45.3 [2]	29.7 [2]	26.2 [2]	18.5 [2]	54.0 [2]

Envirolab ID	Units	PQL	PEK1820-16	PEK1820-17
Your Reference			336824-A-16	336824-A-17
Date Sampled			P4-SS2	P4-SS3
			30/10/2023	30/10/2023

alpha-BHC	µg/kg	1.0	<1.0	<1.0
Hexachlorobenzene	µg/kg	1.0	<1.0	<1.0
beta-BHC	µg/kg	1.0	<1.0	<1.0
gamma-BHC	µg/kg	1.0	<1.0	<1.0
delta-BHC	µg/kg	1.0	<1.0	<1.0
Heptachlor	µg/kg	1.0	<1.0	<1.0
Aldrin	µg/kg	1.0	<1.0	<1.0
Heptachlor epoxide	µg/kg	1.0	<1.0	<1.0
trans-Chlordane	µg/kg	1.0	<1.0	<1.0
cis-Chlordane	µg/kg	1.0	<1.0	<1.0
Oxychlordane	µg/kg	1.0	<1.0	<1.0
Endosulfan I	µg/kg	1.0	<1.0	<1.0
4,4'-DDE	µg/kg	1.0	<1.0	<1.0
Dieldrin	µg/kg	1.0	<1.0	<1.0
Endrin	µg/kg	1.0	<1.0	<1.0

Certificate of Analysis PEK1820

Organochlorine Pesticides - NAGD (Soil)

Envirolab ID Your Reference	Units	PQL	PEK1820-16 336824-A-16 P4-SS2 30/10/2023	PEK1820-17 336824-A-17 P4-SS3 30/10/2023
Date Sampled				
4,4'-DDD	µg/kg	1.0	<1.0	<1.0
Endosulfan II	µg/kg	1.0	<1.0	<1.0
4,4'-DDT	µg/kg	1.0	<1.0	<1.0
Endosulfan sulfate	µg/kg	1.0	<1.0	<1.0
Methoxychlor	µg/kg	1.0	<1.0	<1.0
Surrogate 2-Chlorophenol-D4	%		44.6 [2]	39.0 [2]

Certificate of Analysis PEK1820

Polychlorinated Biphenyls - NAGD (Soil)

Envirolab ID	Units	PQL	PEK1820-01	PEK1820-02	PEK1820-03	PEK1820-04	PEK1820-05
Your Reference			336824-A-1	336824-A-2	336824-A-3	336824-A-4	336824-A-5
			P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Date Sampled			30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Total PCBs	µg/kg	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Surrogate 2-Fluorobiphenyl	%		54.4 [2]	44.2 [2]	66.4	36.9 [2]	55.8 [2]

Envirolab ID	Units	PQL	PEK1820-06	PEK1820-07	PEK1820-08	PEK1820-09	PEK1820-10
Your Reference			336824-A-6	336824-A-7	336824-A-8	336824-A-9	336824-A-10
			P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Date Sampled			30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Total PCBs	µg/kg	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Surrogate 2-Fluorobiphenyl	%		43.3 [2]	28.3 [2]	29.3 [2]	30.2 [2]	39.5 [2]

Envirolab ID	Units	PQL	PEK1820-11	PEK1820-12	PEK1820-13	PEK1820-14	PEK1820-15
Your Reference			336824-A-11	336824-A-12	336824-A-13	336824-A-14	336824-A-15
			P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Date Sampled			27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Total PCBs	µg/kg	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Surrogate 2-Fluorobiphenyl	%		47.8 [2]	36.8 [2]	38.7 [2]	32.0 [2]	57.3 [2]

Envirolab ID	Units	PQL	PEK1820-16	PEK1820-17
Your Reference			336824-A-16	336824-A-17
			P4-SS2	P4-SS3
Date Sampled			30/10/2023	30/10/2023
Total PCBs	µg/kg	5.0	<5.0	<5.0
Surrogate 2-Fluorobiphenyl	%		58.0 [2]	62.7

Certificate of Analysis PEK1820

Inorganics - Moisture (Soil)

Envirolab ID	Units	PQL	PEK1820-01	PEK1820-02	PEK1820-03	PEK1820-04	PEK1820-05
Your Reference			336824-A-1	336824-A-2	336824-A-3	336824-A-4	336824-A-5
			P1-SS1	P1-SS2	P1-SS3	P1-SS4	P1-SS5
Date Sampled			30/10/2023	30/10/2023	31/10/2023	30/10/2023	31/10/2023
Moisture	%	0.10	22	47	12	45	52

Envirolab ID	Units	PQL	PEK1820-06	PEK1820-07	PEK1820-08	PEK1820-09	PEK1820-10
Your Reference			336824-A-6	336824-A-7	336824-A-8	336824-A-9	336824-A-10
			P1-SS6	P1-SS7	P1-SS8	P1-SS9	P1-SS10
Date Sampled			30/10/2023	31/10/2023	31/10/2023	27/10/2023	27/10/2023
Moisture	%	0.10	44	64	23	65	65

Envirolab ID	Units	PQL	PEK1820-11	PEK1820-12	PEK1820-13	PEK1820-14	PEK1820-15
Your Reference			336824-A-11	336824-A-12	336824-A-13	336824-A-14	336824-A-15
			P1-SS11	P1-SS12	P3-SS1	P3-SS2	P4-SS1
Date Sampled			27/10/2023	30/10/2023	30/10/2023	30/10/2023	30/10/2023
Moisture	%	0.10	65	53	39	44	18

Envirolab ID	Units	PQL	PEK1820-16	PEK1820-17
Your Reference			336824-A-16	336824-A-17
			P4-SS2	P4-SS3
Date Sampled			30/10/2023	30/10/2023
Moisture	%	0.10	23	36

Certificate of Analysis PEK1820

Result Comments

Identifier	Description
[2]	Surrogate recovery was outside routine acceptance criteria (60-140%) due to sample matrix effects. This may be due to the presence of carbon and/or other artefacts. An acceptable recovery was achieved for the LCS surrogates.

Certificate of Analysis PEK1820

Method Summary

Method ID	Methodology Summary
INORG-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ORG-022_OC	Determination of semi-volatile organic compounds (SVOCs) by GC-MS. Water samples are extracted by LLE and soils using DCM/Acetone/Methanol.
ORG-025	Determination of semi-volatile organic compounds (SVOCs) by GC-MS-MS. Water samples are extracted by LLE and soils/solids using DCM/Acetone/Methanol.

Certificate of Analysis PEK1820

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

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.

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.

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.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Certificate of Analysis PEK1820

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.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

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 QAQC tables for details (available on request); <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; 60-140% for organics (+/-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 typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

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. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

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 or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PEK1820

Client Details

Client	Envirolab (Sydney)
Your Reference	336824-A
Date Issued	01/12/2023

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	No	Surrogates / Extracted ISTD Outliers Exist - See detailed list below
QC Frequency	Yes	No Outliers

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PEK1820

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
OCP NAGD Soil	9-11	27/10/2023	27/11/2023	01/12/2023	No
	4, 6, 12-17	30/10/2023	27/11/2023	01/12/2023	No
	1-2	30/10/2023	27/11/2023	30/11/2023	No
	3, 5, 7-8	31/10/2023	27/11/2023	01/12/2023	No
PCB Congeners NAGD Soil	9-11	27/10/2023	27/11/2023	01/12/2023	No
	4, 6, 12-17	30/10/2023	27/11/2023	01/12/2023	No
	1-2	30/10/2023	27/11/2023	30/11/2023	No
	3, 5, 7-8	31/10/2023	27/11/2023	01/12/2023	No
Moisture Soil	9-11	27/10/2023	27/11/2023	29/11/2023	No
	1-2, 4, 6, 12-17	30/10/2023	27/11/2023	29/11/2023	No
	3, 5, 7-8	31/10/2023	27/11/2023	29/11/2023	No

Outliers: Duplicates

| () | Batch

Sample ID	Duplicate ID	Analyte	% Limits	RPD
-----------	--------------	---------	----------	-----

Outliers: Matrix Spike

ORG-022_OC | Organochlorine Pesticides - NAGD (Soil) | Batch BEK3129

Sample ID	Analyte	% Limits	% Recovery
PEK1820-02	2-Chlorophenol-D4	60 - 140	36.9[2]

ORG-025 | Polychlorinated Biphenyls - NAGD (Soil) | Batch BEK3129

Sample ID	Analyte	% Limits	% Recovery
PEK1820-02	2-Fluorobiphenyl	60 - 140	50.3[2]

Data Quality Assessment Summary PEK1820

Outliers: Surrogate / Extracted Internal Standards

ORG-022_OC | Organochlorine Pesticides - NAGD (Matrix) | Batch BEK3129

Sample ID	Analyte	% Limits	% Recovery
PEK1820-01	2-Chlorophenol-D4	60 - 140	41.4% [2]
PEK1820-02	2-Chlorophenol-D4	60 - 140	25.4% [2]
PEK1820-03	2-Chlorophenol-D4	60 - 140	28.4% [2]
PEK1820-04	2-Chlorophenol-D4	60 - 140	19.1% [2]
PEK1820-05	2-Chlorophenol-D4	60 - 140	35.7% [2]
PEK1820-06	2-Chlorophenol-D4	60 - 140	29.8% [2]
PEK1820-07	2-Chlorophenol-D4	60 - 140	15.2% [2]
PEK1820-08	2-Chlorophenol-D4	60 - 140	22.3% [2]
PEK1820-09	2-Chlorophenol-D4	60 - 140	20.6% [2]
PEK1820-10	2-Chlorophenol-D4	60 - 140	33.2% [2]
PEK1820-11	2-Chlorophenol-D4	60 - 140	45.3% [2]
PEK1820-12	2-Chlorophenol-D4	60 - 140	29.7% [2]
PEK1820-13	2-Chlorophenol-D4	60 - 140	26.2% [2]
PEK1820-14	2-Chlorophenol-D4	60 - 140	18.5% [2]
PEK1820-15	2-Chlorophenol-D4	60 - 140	54.0% [2]
PEK1820-16	2-Chlorophenol-D4	60 - 140	44.6% [2]
PEK1820-17	2-Chlorophenol-D4	60 - 140	39.0% [2]

ORG-025 | Polychlorinated Biphenyls - NAGD (Matrix) | Batch BEK3129

Sample ID	Analyte	% Limits	% Recovery
PEK1820-01	2-Fluorobiphenyl	60 - 140	54.4% [2]
PEK1820-02	2-Fluorobiphenyl	60 - 140	44.2% [2]
PEK1820-04	2-Fluorobiphenyl	60 - 140	36.9% [2]
PEK1820-05	2-Fluorobiphenyl	60 - 140	55.8% [2]
PEK1820-06	2-Fluorobiphenyl	60 - 140	43.3% [2]
PEK1820-07	2-Fluorobiphenyl	60 - 140	28.3% [2]
PEK1820-08	2-Fluorobiphenyl	60 - 140	29.3% [2]
PEK1820-09	2-Fluorobiphenyl	60 - 140	30.2% [2]
PEK1820-10	2-Fluorobiphenyl	60 - 140	39.5% [2]
PEK1820-11	2-Fluorobiphenyl	60 - 140	47.8% [2]
PEK1820-12	2-Fluorobiphenyl	60 - 140	36.8% [2]
PEK1820-13	2-Fluorobiphenyl	60 - 140	38.7% [2]
PEK1820-14	2-Fluorobiphenyl	60 - 140	32.0% [2]
PEK1820-15	2-Fluorobiphenyl	60 - 140	57.3% [2]
PEK1820-16	2-Fluorobiphenyl	60 - 140	58.0% [2]

Quality Control PEK1820

ORG-022_OC | Organochlorine Pesticides - NAGD (Soil) | Batch BEK3129

Analyte	Units	PQL	Blank	DUP1	DUP2	LCS %	Spike % PEK1820-02
				PEK1820-01	PEK1820-09		
				Samp QC RPD %	Samp QC RPD %		
alpha-BHC	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	90.0	96.8
Hexachlorobenzene	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
beta-BHC	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	97.9	118
gamma-BHC	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
delta-BHC	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
Heptachlor	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	92.8	88.1
Aldrin	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	84.1	##[1]
Heptachlor epoxide	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	87.2	93.3
trans-Chlordane	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	1.31 1.68 24.6	[NA]	[NA]
cis-Chlordane	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
Oxychlordane	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
Endosulfan I	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
4,4'-DDE	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	1.74 2.32 28.6	90.5	84.1
Dieldrin	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	1.06 1.51 34.8	91.7	104
Endrin	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	104	122
4,4'-DDD	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	1.12 1.38 20.6	91.6	100
Endosulfan II	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
4,4'-DDT	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
Endosulfan sulfate	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	92.4	133
Methoxychlor	µg/kg	1.0	<1.0	<1.0 <1.0 [NA]	<1.0 <1.0 [NA]	[NA]	[NA]
Surrogate 2-Chlorophenol-D4	%		60.3	41.4 32.9 [2]	20.6 22.9 [2]	69.0	36.9[2]

ORG-025 | Polychlorinated Biphenyls - NAGD (Soil) | Batch BEK3129

Analyte	Units	PQL	Blank	DUP1	DUP2	LCS %	Spike % PEK1820-02
				PEK1820-01	PEK1820-09		
				Samp QC RPD %	Samp QC RPD %		
PCB C103	µg/kg			<0.50 <0.50 [NA]	<0.50 <0.50 [NA]	88.3	82.2
Total PCBs	µg/kg	5.0	<5.0	<5.0 <5.0 [NA]	<5.0 6.35 200	[NA]	[NA]
Surrogate 2-Fluorobiphenyl	%		63.2	54.4 56.9 [2]	30.2 35.3 [2]	68.8	50.3[2]

INORG-008 | Inorganics - Moisture (Soil) | Batch BEK3122

Analyte	Units	PQL	Blank	DUP1	DUP2	LCS %
				PEK1820-01	PEK1820-11	
				Samp QC RPD %	Samp QC RPD %	
Moisture	%	0.1		21.8 20.7 5.12	65.4 70.8 7.93	[NA]

QC Comments

Identifier	Description
[1]	Spike recovery is outside routine acceptance criteria (60-140%). Where recoveries of <20% and >200% are attributable to matrix interference effects, there will be a high uncertainty associated with the parent result.
[2]	Surrogate recovery was outside routine acceptance criteria (60-140%) due to sample matrix effects. This may be due to the presence of carbon and/or other artefacts. An acceptable recovery was achieved for the LCS surrogates.

CERTIFICATE OF ANALYSIS 336824-B

Client Details

Client	Douglas Partners Tuggerah
Attention	Chamali Nagodavithane
Address	Unit 5, 3 Teamster Close, Tuggerah, NSW, 2259

Sample Details

Your Reference	<u>225005.00 Gosford (Batch 2-Sediment)</u>
Number of Samples	Additional analysis
Date samples received	02/11/2023
Date completed instructions received	24/11/2023

Analysis Details

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

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

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

Report Details

Date results requested by	01/12/2023
Date of Issue	29/11/2023
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By
Dragana Tomas, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

sTPH in Soil (C10-C40)-Silica		
Our Reference		336824-B-5
Your Reference	UNITS	P1-SS5
Depth		0-0.1
Date Sampled		31/10/2023
Type of sample		Soil
Date extracted	-	27/11/2023
Date analysed	-	29/11/2023
TPH C ₁₀ - C ₁₄	mg/kg	<50
TPH C ₁₅ - C ₂₈	mg/kg	<100
TPH C ₂₉ - C ₃₆	mg/kg	110
TPH >C ₁₀ -C ₁₆	mg/kg	<50
TPH >C ₁₆ -C ₃₄	mg/kg	150
TPH >C ₃₄ -C ₄₀	mg/kg	<100
Surrogate 1-Chlorooctadecane	%	85

Method ID	Methodology Summary
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.

Client Reference: 225005.00 Gosford (Batch 2-Sediment)

QUALITY CONTROL: sTPH in Soil (C10-C40)-Silica					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			27/11/2023	5	27/11/2023	27/11/2023		27/11/2023	[NT]
Date analysed	-			29/11/2023	5	29/11/2023	29/11/2023		29/11/2023	[NT]
TPH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	5	<50	<50	0	94	[NT]
TPH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	5	<100	<100	0	100	[NT]
TPH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	5	110	130	17	114	[NT]
TPH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	5	<50	<50	0	94	[NT]
TPH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	5	150	180	18	100	[NT]
TPH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	5	<100	140	33	114	[NT]
Surrogate 1-Chlorooctadecane	%		Org-020	88	5	85	92	8	95	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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.

CHAIN OF CUSTODY DESPATCH SHEET

Project No: 225005.00	Suburb: Gosford (Additional Analysis)	To: Envirolab Services
Project Manager: Chamali N	Order Number:	Sampler: MLG/HS/JK
Email: Chamali.n@douglaspartners.com.au	Attn: Sample Receipt	
Turnaround time: ☒ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☐ Same day	(02) 9910 6200 samplereceipt@envirolab.com.au	
Prior Storage: ☒ Fridge ☐ Freezer ☐ Esky ☐ Shelf	Do samples contain 'potential' HBM? ☐ No ☐ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)	

Lab ID	Sample ID			Date Sampled	Sample Type	Container Type	Analytes										Notes/ Preservation/ Additional Requirements
	Location / Other ID	Depth From	Depth To		S - soil W - water M - Material	G - glass P - plastic	TCLP, ASLP (PAH)	Silica gel clean-up									
	P1-1/0.1	0	0.1	20/10/23	S	G	x										Samples already with lab
	P1-3/1.0	0.9	1	24/10/23	S	G	x	x									Samples already with lab
5	P1-SS5	0	0.1	31/10/23	S	G		x									Samples already with lab

Metals to analyse:		LAB RECEIPT	
Number of samples in container:	Transported to laboratory by: N/A	Lab Ref. No: 336824-B	
Send results to: Douglas Partners Pty Ltd		Received by: A-BM	
Address: Unit 5, 3 Teamster Close, Tuggerah NSW	Phone: (02) 4351 1422	Date & Time: 24/11/23 1857	
Relinquished by: CLN	Date:	Signed: <i>Chamali N</i>	Signed: <i>[Signature]</i>