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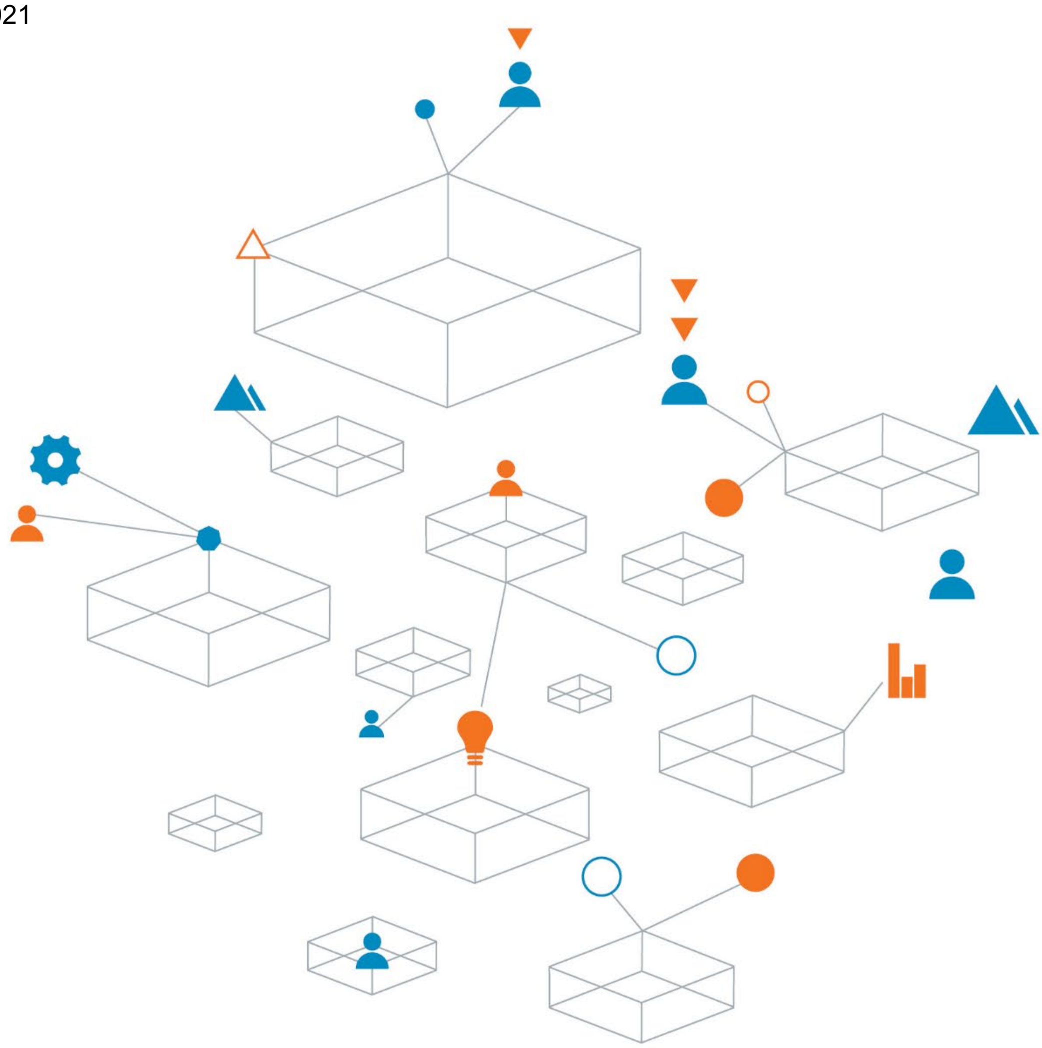
GHT Holdings Pty Ltd
Additional Site Contamination Investigation - 107 - 117 Swan Street, Morpeth NSW
754-NTLEN271167-R01 Rev 1

26 May 2021



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projects

Additional Site Contamination Investigation - 107 - 117 Swan Street, Morpeth NSW

Prepared for
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Executive Summary

The results of the generic Tier 1 assessment undertaken at the Site identified exceedances of the health-based criterion for cPAH across the proposed development area. All other potential contaminants, except for TRH and Benzene, were assessed within the respective Tier 1 assessment criteria ($95UCL_{AVE}$ concentrations compared with the relevant guideline values). TRH and BTEX were identified along the northern boundary at levels that would represent hotspot concentrations requiring further assessment and management. In order to manage these risks, the preparation of a Remediation Action Plan (RAP) is recommended. The RAP must include the delineation of the hydrocarbon contamination identified at the northern boundary, a study of remediation options, selection of a preferred remediation strategy and validation of the Site as remediated.

To address the potentially unacceptable health risk posed by cPAH in soil, a Tier 2 Human Health Risk Assessment was undertaken to derive site-specific risk-based criteria for likely future activities and receptors on the site.

The site-specific risk-based criteria (RBC) for carcinogenic PAHs in soil were derived to be protective of future exposures to the more sensitive users of the site. Based on available data, exposure assumptions and constraints of the exposure assessment model, the calculated 95% UCL concentration of carcinogenic PAHs in:

Surficial soils to 0.5 mbgs at the site are below the derived retirement village residential RBC and short-stay child resident RBC for BaP_{TEQ} and, therefore, the potential health risks to future residents (including short-stay children) at the site to residual PAH impact in soils is considered low and acceptable; and

Soils deeper than 0.5 mbgs were below the BaP_{TEQ} RBC for grounds keepers, maintenance workers and construction workers, therefore, the potential health risks to future workers is considered low and acceptable.

A Tier 1 evaluation of Total PAH concentrations (relating to the non-carcinogenic PAHs) measured across the site were below the NEPM health screening criteria. Further, the concentration of both carcinogenic and total PAHs across the site were below the NEPM health screening criteria relevant to future commercial works on the site.

The process for deriving the RBC conservatively assumed the bioavailability of PAHs in soils was 100 percent and that all landscaped areas where potentially exposed and not covered by any surface covering that would prevent or minimise direct contact. Whilst the 95% UCL concentration of carcinogenic PAHs was below the derived RBCs, four individual locations exceeded the short-stay child residential RBC. One of these locations is in the central area of the site within the footprint of the proposed buildings and on locations is near the central southern site boundary in the area of the proposed hardstand driveway. Two isolated locations are in the north-east corner of the site, which are potentially within private open space areas.

As a precautionary measure it is recommended that the landscaping in this area includes the placement of 0.5m of clean soil and/or mulch to minimise access to the impacted soil by residents.

It is recommended all subsurface works are managed via a site specific EMP in order to mitigate potentially impacted soils being brought to the surface where cross contamination or residential exposures may occur.

Coffey considers that the site can be made suitable for the proposed development within the assumptions of the Tier 2 Risk Assessment and the comparison of the investigation data with the calculated site-specific risk-based criteria and the implementation of the following recommendations:

- A Remediation Action Plan must be prepared for the delineation assessment, remediation and validation of the hydrocarbon impact identified along the northern boundary. The RAP must focus on the delineation of the hydrocarbon contamination and must contain requirements for further assessment works and procedures to remediate identified contamination and validate the Site as remediated.

- In order to manage the identified ecological exceedances (heavy metals and TRH (including the multiple exceedances of the ESL (Urban, Residential and Public Open Space) for TRH F3), existing fill soils are to be excluded from reuse within areas identified for landscaping. The fill materials must be excavated, and residual soils exposed prior to the commencement of landscaping activities. The excavated material is suitable for reuse beneath buildings and hardstand (pavement, car parks and roadways).
- Landscaping Plans must be prepared in line with the following recommendations:
  - Existing site fill soils will not be used within proposed landscape areas. Sandy fill material to be removed from landscaping areas to expose underlying natural residual silty clay material.
  - Imported soil mix (appropriate for proposed species) to proposed planting depth. Existing sandy-fill site soil to be first removed exposing underlying natural residual silty clay material.
- Validation of the excavated site fill and confirmed exposure of residual soil must be undertaken by a suitably qualified environmental scientist prior to landscaping. As this will most likely occur after the RAP has been executed and validated, an addendum report must be prepared for inclusion in the validation report.
- The stockpile SP1 currently located on the hardstand area in the north-eastern corner may be reused on site beneath buildings and hardstand (pavement, car parks and roadways). The stockpiled material must not be reused within the landscaping areas as the TRH F3 impacts are similar to the general site fill soils. Should the stockpile SP1 require offsite disposal the classification is in line with that outlined in Section 8.3 that the soil has been assessed as **General Solid Waste (SCC1/ TCLP1) – (non-putrescible).**
- Preparation of a site-specific Environmental Management Plan (EMP) for subsurface works in order to mitigate potentially impacted soils being brought to the surface where cross contamination or residential exposures may occur.
- Preparation of an Unexpected Finds Protocol (UFP) document to guide the management of unexpected finds during development including contaminated materials and heritage items.

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Appendices

1. Introduction

Coffey Services Australia Pty Ltd (Coffey) was commissioned by GHT Holdings Pty Ltd (GHT) to undertake an Additional Site Contamination Investigation for the proposed development of senior residences at 107 – 117 Swan Street, Morpeth NSW (the Site), the site location is shown on Figure 1 in the Appendices.

Based on information provided by GHT, Coffey understands the proposed development is to be used as a retirement village (i.e. seniors residence), which will include construction of three two-storey apartment blocks, comprising a total of 11 three bed apartments. Development plans are included in Appendix I.

A previous Phase Two Soil Contamination Assessment, dated 4th November 2019 and Remediation Action Plan (RAP), dated 26th July 2019 were prepared for the site by Pacific Environmental. Coffey reviewed these documents and a data gap assessment was reported in Coffey ref: *Site Contamination Data Review and Sampling Analysis and Quality Plan for further Assessments – DA17-515 - 107-117 Swan Street, Morpeth, NSW 754-NTLEN271167-L01, dated 9 March 2020*. Following the completion of the review and data gap assessment, Coffey concluded that further assessment works were warranted. Coffey provided the scope for the assessment and a Sampling and Analysis Quality Plan (SAQP) for the recommended works. GHT engaged Coffey to complete the required assessments in order to inform the Development Application being considered by the Maitland City Council (Council)

This report was prepared in accordance with the NSW EPA *Guidelines for Consultants Reporting on contaminated land: Contaminated land guidelines (2020) and Planning Guidelines for SEPP 55 State Environmental Planning Policy 55 – Remediation of Land.*

1.1. Objective

The objectives of the assessment were to:

- Identify and assess the soil at previously inaccessible locations (i.e. beneath the building slabs and within areas previously excluded due to heritage considerations);
- Undertake the assessment as per the sampling, analysis and quality plan (SAQP) included in 754-NTLEN271167-L01;
- Complete data assessment using the combined historical and current assessment data;
- Prepare a conceptual site model (CSM) to identify source, pathway and receptor (SPR) linkages;
- Provide a preliminary in-situ waste classification of the fill at the Site;
- Provide a waste classification of an existing stockpile of material onsite;
- Assess the suitability of the Site from a contamination perspective for the proposed development; and
- Make recommendations for remediation and/or management of contaminated areas onsite by preparation of a RAP.

1.2. Scope of Works

The scope of works completed during this assessment included:

- The preparation and implementation of a project specific health, safety, security and environmental (HSSE) plan for field related activities;
- Location of underground services by a qualified and experienced service locator prior to the commencement of intrusive works;
- Field assessment program, including:
  - Soil sampling from nineteen (19) boreholes (BH1 – BH19);

  - Collection of ten (10) soil samples from an existing stockpile of excavated material (SP1) located on a concrete hardstand (former building footing in the north eastern corner of the Site).
- Laboratory analysis of soil samples for nominated Contaminants of Potential Concern (COPCs) including:
  - Total Recoverable Hydrocarbons (TRH);
  - Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
  - Polycyclic Aromatic Hydrocarbons (PAH);
  - Heavy Metals (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn);
  - Asbestos (presence/absence).
- Data appraisal and interpretation;
- Completion of a human health risk assessment for the development of site-specific guideline values for carcinogenic PAH (cPAH) measured as benzo(a)pyrene TEQ (BaP_{TEQ}); and
- Preparation of a Contamination Investigation report (this document) in accordance with the NSW EPA Guidelines for Consultants reporting on Contaminated Land: Contaminated Land Guidelines (2020) and Planning Guidelines for SEPP 55 State Environmental Planning Policy 55 – Remediation of Land.

2. Site Information

2.1. Site Identification

The site location and site plan are presented in Figures 1 and 2 in the Appendices. Site identification details are provided in Table 2-1 below.

Table 2-1: Site Identification Summary

Site Address	107 – 117 Swan Street, Morpeth NSW 2321
Current Site Ownership	GHT Holdings Pty Ltd
Property and Site Area	0.28Ha
Site Identification Details	Lot 1 & 3 DP 538510 and Lot 321 DP 1226898
Current Zoning	RU1 General Residential
Current Site Use	The Site is currently comprised of a derelict house (western portion) and vacant concrete and brick building slab (eastern portion), with grasses and trees in the southern vacant area of the Site. An excavation around the concrete building slab to approximately 1m depth has generated a stockpile of material (placed on building slab in the north eastern corner of the Site).
Proposed Site Use	Proposed three two-storey apartment blocks, comprising a total of 11 three bed apartments.
Adjoining Site Use	• North: Swan Street with commercial properties and the Hunter River beyond; • East: William Street followed by Commercial (veterinarian) and residential properties; • South: Residential Properties followed by Close Street; and • West; Market Street followed by Commercial and Residential Properties, including Noel and Daphne Unicomb Park.
Site Coordinates	371462 m E 6378377 m S (north-eastern boundary corner). *Taken from Google Earth.

Photographs illustrating site conditions during Coffey's site investigation are presented in Appendix G.

2.2. Geology and Soils

A review of Newcastle Coalfield 1:100,000 Regional Geology (Series Sheet 9231 and part of 9131, 9132 and 9232 Edition 1 1995) indicates the Site is located within the Tomago Coal Measures typically comprising sandstone, minor siltstone, claystone, coal and tuff.

Soil Landscape information was accessed through the NSW eSPade v2.1 online database (https://www.environment.nsw.gov.au/eSpade2WebApp). Regional soils are typically shallow to moderately deep (25 - <100 cm), imperfectly drained Brown and Yellow Kurosols (Yellow Podzolic Soils and Soloths); and moderately deep to deep (50 - <150 cm), imperfectly drained Red, Brown and Yellow Kurosols (Red and Yellow Podzolic Soils and Soloths).

Locally on the site, Coffey encountered:

- Fills comprising sandy gravels to clayey sand to depths ranging from 0.2m to 1.4m although generally less than 0.5m
- Residual soil clay to sandy clay high dark brown to black (potential remnant coal seam)
- Residual soil clay to sandy clay to gravelly sandy clay high white to pale brown overlying (potentially remnant tuff)
- Shale with minor iron stone beds

2.3. Regional Topography and Drainage

Available topographic information indicates the site is at an elevation of approximately 13 – 16m Australian Height Datum (AHD). The site is located on the southern side of Swan Street and is generally flat with a gentle slope towards the north.

The landform is described by undulating rises to rolling low hills. Slopes are 3 - 15%, local relief is 10 - 50 m and elevation is 10 - 90 m. Crests are broad (250 - 400 m). Sideslopes are long and gently inclined (350 - 750 m), with some very long footslopes up to 2000 m long. Occasional short steep sideslopes occur, with common terracetting. Drainage lines are deeply incised and narrow (2 - 3 m). Rock outcrop is generally absent.

Rain falling on the site is expected to infiltrate into the site soils. Excess run-off from the site is expected to flow to the north towards the Hunter River located approximately 65m north of the site.

2.4. Regional Hydrogeology

Regional groundwater beneath the site is anticipated to be present in the fractured rock at depths less than 5mbgs. A shallow perched groundwater probably exists at the residual soil/ weathered rock interface, between 1 and 5 mbgs. This perched aquifer may be discontinuous and exist only after prolonged rainfall.

Regional groundwater flow is anticipated to follow the general slope of the region to the north, likely discharging into the Hunter River approximately 65m north of the site.

2.5. Review of Previous Assessments

2.5.1. Phase Two Soil Contamination Assessment (Revision 2), 107-117 Swan Street, Morpeth, NSW, Pacific Environmental, 4 November 2019

The report presented the findings of a Phase Two Contamination Assessment (CA) undertaken at the Site by Pacific Environmental Pty Limited (PE). Coffey inferred from the report that the objective of the CA was to investigate the extent of contamination related to historical contaminating activities that occurred onsite. This included use of the site as a ferrous foundry and as a mechanics workshop/service station. The report also included an assessment of residual hydrocarbon contamination impact to local Council perimeter stormwater drainage resulting from previously undertaken remediation works associated with the removal of service station infrastructure at the Site. This was requested by Council.

The scope of works as reported in the CA was as follows:

- *"An inspection of the site on the 26th July 2018 and undertaking the drilling of nine (9) temporary soil sample inspection wells and the taking of thirteen (13) soil samples, including one (1) field duplicate), plus a field rinsate, laboratory prepared spike and blank;*
- *Have the sampled soils analysed by a NATA Certified laboratory for a range of analytes accepted by the NSW EPA and of sufficient spread to characterize the site soils;*
- *An inspection of the site on the 11th June 2019 and conducting an intrusive soil sampling of the areas around the site, with eight (8) additional soil samples from eight (8) temporary shallow sampling bores and two water samples from impounded site water (including one field duplicate);*
- *Have the sampled soils analysed by a NATA Certified laboratory for a range of analytes accepted by the NSW EPA and of sufficient spread to characterize the site;*
- *Review the site history to assist in characterizing the site and ensure that the sampling program is adequate;*
- *Report on the findings of the site investigation in accordance with the NEPM A Criteria."*

Soil Sampling

Sampling, to compete the scope for the CA was undertaken in July 2018. The sampling programme included the drilling of boreholes at nine (9) locations and the collection of thirteen (13) primary soil samples. The historical sampling locations are shown in the attached Figure 2. Quality assurance samples included, one (1) field duplicate, a rinsate blank and a laboratory prepared spike and blank sample pair. Samples were collected from a range of depths 0.3m – 2.7m below ground surface (bgs). It was also reported that:

"seven (7) inspection wells were drilled to 2.5m BGL to visually check for buried demolition waste, asbestos and field sampling with a PID meter (all readings were +/- 5% of background levels and all less than 5ppm)."

At the request of Council, additional sampling was undertaken on the 11th June 2019, to assess the impact of previously completed remediation works at the Site on the local Council perimeter stormwater drainage system. Surface soil samples were collected from six (6) locations along the Council drain as shown in the attached Figure 2. In addition, two surface water samples were collected from localised ponding in excavations onsite. Two samples were also collected from a stockpile onsite.

Results Summary

The site soils were assessed against the National Environment Protection (Assessment of Site Contamination) Measure 1999 (2013) (ASC NEPM) Health Investigation Levels and Health Screening Levels for a Residential A (access to site soils) exposure scenario. The data was also assessed against the Ecological Screening Levels (ESL's) for Urban Residential and Public Open Space land use. The contaminants of potential concern (COPC) examined included total recoverable hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene and Xylene (BTEX), Polycyclic Aromatic Hydrocarbons (PAH), Organochlorine Pesticides (OCP), Organophosphorus Pesticides (OCP) and Heavy Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc).

It was reported that contaminant concentrations exceeded the site assessment criteria as follows:

- *"**Sample B/B-D 0.7m BGL** which exhibited Lead concentrations of 1,900mg/kg and 1,400mg/kg (which are not considered significant after a 95% Confidence Limit Assessment); TRH F3 C16-C34 of 5,900mg/kg.*
- ***Sample F 0.3m BGL** which exhibits TRH F3 CD16-C34 concentration of 9,300mg/kg.*
- ***Sample I 0.4 BGL** which exhibits B(a)P concentration of 3.5mg/Kg (which is not considered significant after a 95% Confidence Limit Assessment).*
- ***Samples I2 and J2** exhibited excessive TRH F3 concentrations and indicate that the remediation stockpile has not, at 11th June 2019, reached a concentration of TRH F3 suitable for re-use on site. This level is expected to be achieved by early September 2019."*

Conclusions

The following was concluded in the report:

"After a review of the site in accordance with the NEPM Schedule B1 criteria the following findings are applicable:

- *The site soils have a significant history that may preclude the development or use of the site for the accepted criteria for residential development with access to soils or commercial/industrial development;*
- *The site exhibits no visual or documentary evidence that would preclude its meeting the NEPM A Criteria for analytes analysed, following remediation of hydrocarbons at the identified areas shown at **Appendix B**;*

- *Further intrusive investigation of the areas marked at* ***Appendix I*** *and the analysis of samples are to include:*
  - *TRH;*
  - *PAH;*
  - *Copper;*
  - *Tin;*
  - *Zinc.*
  - *Asbestos fibres.*

This program is to be undertaken when Heritage Approval for excavations is granted and when the existing residences are demolished.

- *Remediation action is recommended for the identified areas shown at Appendix A. Following this remediation (by bioremediation on the existing concrete slab the site will be suitable for residential development with access to the soils;*
- *The soils analysis reveals that the site soils are heavily and naturally affected by gum leaf that creates an illusion of hydrocarbon contamination beyond that indicated by TRH laboratory analysis without silica gel clean-up;*
- *The site remediation works have not impacted the adjoining street drainage system;*
- *The laboratory analysis of the two (2) water samples from the impounded water in the remediation excavations revealed no impact from the previous hydrocarbon contamination in the soils – reference* ***Appendix D- COMPARISION OF LABORATORY ANALYSIS WITH ELAVENT (sic) GUIDELINES****."*

2.5.2. Remediation Action Plan, 107-117 Swan Street, Morpeth, NSW, dated 26 July 2019.

A Remediation Action Plan (RAP) was prepared by PE in July 2019 to address the hydrocarbon contamination issues identified on site. The RAP recommended a preferred strategy of excavation of impacted site soils and bioremediation of the impacted resulting stockpiles on-site for proposed onsite reuse.

2.5.3. Site Contamination Data Review and SAQP for further Assessments – DA17-515 – 107-117 Swan Street, Morpeth NSW

Coffey completed a review of the PE Phase 2 CA report and RAP discussed in Sections 2.5.1 and 2.5.2. Coffey confirmed areas requiring additional assessment including areas beneath existing building structures and areas excluded from previous investigations as result of heritage issues. One outcome of the data review was a change in the land use setting and site assessment criteria (SAC) and as a result the ASC NEPM guideline values proposed for the Site.

The PE CA (2019) adopted the ASC NEPM HIL/HSL[1] A and ESL[2] Urban Residential and Public Open Space as the site assessment criteria. The choice of Residential A as the SAC was considered by Coffey to be overly conservative for the proposed development i.e. a multi-unit complex with extensive areas of hardstand cover and limited access to existing site soils (boundary and decorative

[1] Health Investigation Level (HIL); Health Screening Level (HSL)
[2] Ecological Screening Level (ESL); Ecological Investigation Level (EIL)

landscaping only). Also, the proposed development is primarily for seniors residential and is not expected to have young children in residence full time.

Typically, the HIL/HSL A are applied to low density, residential land use scenarios with garden beds and accessible soil areas. The land use scenario is defined in Section 3.1 of the ASC NEPM Schedule B7, Derivation of Health-Based Investigation Levels as follows:

"HIL A - Residential scenario with garden/accessible soil (home-grown produce <10% fruit and vegetable intake and no poultry; includes childcare centres, preschools, primary schools"

The land-use scenario is further described in Section 3.2.1 of Schedule B7 as follows:

"Residential land use includes a variety of building densities, ranging from separate low-density dwellings to high-density unit blocks. The residential land use scenario considered in the derivation of the HIL A values is low-density residential, including a sizeable garden (referring to the presence of sufficiently large areas of soil in a garden that may be accessible on a daily basis by young children and adults)."

The development as proposed is a medium-density multi-unit residential complex constructed on a ground-level slab with a high proportion of the surface outside the buildings sealed by paving and hardstand parking. The complex does not include large areas of soil in a garden setting that is accessible by young children or adults. The current landscaping plan (Appendix I) shows shrubs and trees planted around the boundary with a few decorative landscaping beds within the property boundary.

The land use scenario most relevant to the development was therefore identified as Residential B, defined in Section 3.1 of Schedule B7 of the ASC NEPM as follows:

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

The land-use scenario if further described in Section 3.2.2 of Schedule B7 as follows:

"The residential land use scenario considered for the HIL B values is high-density residential, not including a private garden. This land use scenario assumes typical residential unit blocks, consisting of multistorey buildings where living areas are on the ground floor (constructed on a ground level slab or above subsurface structures including basement car parks or storage areas).

Occupants of the buildings considered in the development of the HIL B values have access to yard spaces that are largely covered by permanent paving, with some small areas of landscaping or lawns. Opportunities for direct access to soil by residents of these buildings are therefore minimal but there may be some potential for residents to inhale, ingest or come into direct dermal contact with dust (particulates) derived from the soil on the site."

Results

Coffey compared the results of the 2018 data (relevant to the site suitability for the proposed use) against the HIL/HSL B values from the ASC NEPM. Coffey identified the following during the data review and comparison against the revised SAC:

Health Criteria Exceedances

The reassessment identified one exceedance of the HIL B for lead (1200mg/kg) as follows:

- B 0.7: 1900mg/kg

The reassessment also identified two exceedances of the HSL A/B for TRH F2 (110mg/kg) as follows:

- B-D 0.7: 170mg/kg (higher concentration from the duplicate pair (B/B-D))
- F 0.3: 130mg/kg

As the exceedances did not represent a hotspot (greater than 2.5 times the SAC) for either lead or TRH F2 at the impacted locations, the 95% $UCL_{AVERAGE}$ was calculated using the USEPA ProUCL 5.1 software package for Lead and TRH F2 respectively using the assessment data. The results were as follows:

- The 95% $UCL_{AVERAGE}$ for Lead was calculated to be: 1034mg/kg.
- The 95% $UCL_{AVERAGE\ for\ TRH}$ F2 was calculated to be: 110.4mg/kg.

Both TRH F2 and Lead were below the adopted health SAC for the site.

Ecological Criteria Exceedances

The CA identified exceedances of TRH F2 ESL (120mg/kg) at the following locations:

- B-D 0.7: 170mg/kg (higher concentration from the duplicate pair (B/B-D))
- F 0.3: 130mg/kg

The CA identified exceedances of TRH F3 ESL (300mg/kg) at the following locations:

- B-D 0.7: 10,000mg/kg (higher concentration from the duplicate pair (B/B-D))
- C 0.9: 460mg/kg
- D 0.7: 810mg/kg
- F 0.3: 9,300mg/kg
- I 0.4: 370mg/kg

Management Limits

The CA identified exceedances of TRH F3 Management Limits for Residential, parkland and public open space (2,500mg/kg (for coarse soil)) at the following locations:

- B-D 0.7: 10,000mg/kg (higher concentration from the duplicate pair (B/B-D))
- F 0.3: 9,300mg/kg

Suitability for Proposed Use

Human Health Suitability

The Site has been assessed against the ASC NEPM HIL/HSL B Residential with minimal access to soils land use criteria. None of the exceedances identified were a hot-spot i.e. greater than 2.5 times the relevant guideline value and as such the average concentration for the assessed COPC were considered. 95% $UCL_{AVERAGE}$ concentrations for both lead and TRH F2 were calculated and compared to the respective health criteria. 95% $UCL_{AVERAGE}$ concentrations for both lead and TRH were below the relevant guideline values. From a health perspective, the site as assessed to date shows no exceedances of the relevant guideline values. Site suitability however cannot yet be assessed as there are identified unassessed areas that will require consideration for further assessment. These include areas not accessible as a result of there being existing buildings requiring demolition and areas that were inaccessible as a result of heritage considerations. These areas will be further assessed following the demolition of all existing site structures and surface clearance from a hazardous material perspective (i.e. bonded asbestos from the demolition activities). The assessment will be further detailed in section 5 of this report as part of the proposed sampling and analysis quality plan (SAQP) for further assessments to be undertaken at the Site.

Ecological Health Suitability

The Site has been assessed against the ASC NEPM ESL/EIL A/B Urban Residential and Public Open Space Criteria for suitability from an ecological perspective. Exceedances were identified in the TRH F2 and F3 parameters. The TRH F2 exceedances were not hot spots as previously defined and as such a 95% $UCL_{AVERAGE}$ calculation was completed resulting in an average below the respective guideline value.

The TRH F3 component however showed multiple exceedances in the upper 0 – 1.0m bgs soil profile with concentrations that were significantly greater than the ESL A/B criteria (i.e. hotspots were identified, requiring management and/or remediation). Given the toxicity of the TRH F3 to soil invertebrates, management actions should be considered in relation to the future proposed layout of the Site. Most of the areas impacted will be capped by the developed site structures such as pavement, hardstand areas and the main foundation slabs for the building. There are however areas that will be included in the external landscaping which will utilise existing site soils amended with compost. These areas should be assessed for TRH F3 impact with management and/or remediation considered should there be significant exceedances identified. The remainder of the Site can be managed as part of the development with the impacted areas essentially contained beneath the impermeable site structures previously identified.

The additional assessment of proposed landscaping areas should form part of the additional assessment works to be carried out following the demolition and removal of existing site structures and areas currently access limited as a result of heritage considerations.

Management Limits

The Site has been assessed against the ASC NEPM Management Limits for Residential, parkland and public open space. Exceedances were identified in the TRH F3 component only. Two (2) exceedances were identified in the upper 0 – 1.0m bgs soil profile with concentrations that were well above the relevant Management Limit (i.e. hotspots were identified, requiring management and/or remediation). The management actions should be considered in relation to the future proposed layout of the Site. The actions required will mirror those previously discussed for the TRH F3 ESL exceedances identified. As previously stated, most of the impacted areas will be capped by the developed site structures such as pavement, hardstand areas and the main foundation slabs for the building. The areas forming portions of the external landscaping will be assessed for TRH F3 impact with management and/or remediation considered should unacceptable contaminant concentrations be identified. The remainder of the Site can be managed as part of the development with the impacted areas essentially contained beneath the impermeable site structures.

The assessment of proposed landscaping areas should form part of the additional assessment works to be carried out following the demolition and removal of existing site structures and areas currently access limited as a result of heritage considerations.

Sampling and Analysis Quality Plan

Coffey proposed further assessments to complete investigations in previously unassessed areas of the Site. These include areas that will be accessible following the completion of demolition activities at the Site and areas currently access limited as a result of heritage concerns. Following the completion of demolition activities and the granting of access to the section of the Site currently impacted by heritage issues, an additional assessment will be required to fill the data gaps related to the fill beneath the former buildings and possible impacts from the demolition activities; and assess the heritage areas related to the contamination status of the fill. The proposed assessment was detailed in the sampling and analysis quality plan (SAQP) the intent of which was to outline and guide the proposed investigative works.

3. Sampling and Analysis Quality Plan

Further assessments have been undertaken to complete investigations in previously unassessed areas of the Site. These include areas that will be accessible following the completion of demolition activities at the Site and areas that were previously access limited as a result of heritage concerns. This additional assessment addresses the characteristics of the fill beneath the building slabs and possible impacts from the demolition activities; and assesses the heritage areas related to the contamination status of the fill. Details of the assessment undertaken are provided in the following sampling and analysis quality plan (SAQP).

3.1. Preliminary Conceptual Site Model

Based on the results of the data review and data gap assessment completed by Coffey, the preliminary conceptual site model (pCSM) of impacts related to the soil has been updated to reflect identified COC's. These are included in Table 3-1, Table 3-2 and Table 3-3.

Table 3-1: Potential Areas and Chemicals of Environmental Concern

AEC	Contaminating Activity	Identified COCs	Likelihood of Contamination*	Relevant Samples Targeting AEC
Entire Site	Fill impacted by previous site activity (foundry activities, mechanic workshop and service station operation)	Lead and TRH F2 calculated as 95% $UCL_{AVERAGE}$ and identified TRH F3 ESL exceedances	High (TRH F2 and F3)	TRH F3 ESL exceedances identified as follows: • B-D 0.7: 10,000mg/kg • C 0.9: 460mg/kg; • D 0.7: 810mg/kg; • F 0.3: 9,300mg/kg; and • I 0.4: 370mg/kg.

Table 3-2: Affected media, receptors and transport mechanisms

Consideration	Information
Source of Contamination	Shallow soil – fill material <1.0m bgs
Transport Mechanisms & Exposure Pathways	Direct dermal contact with contaminated soil Ingestion of contaminated soil Inhalation of airborne dusts Ingestion of soil by invertebrate populations (proposed landscaping areas only) Ingestion of soil/soil invertebrates by transitory wildlife (proposed landscaping areas only)
Receptors of Contamination	***Construction/maintenance workers involved in excavation*** Exposure via dermal contact with soil and incidental ingestion of soil. Exposure via inhalation of airborne dusts. ***Future Site Users*** Minimal incidental exposure via dermal contact, and ingestion/inhalation of soil and dust given the intent of the proposed development to cover the majority of the extent of the site surfaces with foundation slab, car parking, concrete pavement and landscaping.

	Groundwater Leaching of contaminants is not expected into groundwater as the depth to groundwater is >10m bgs and the site is underlain by low permeability shale/ironstone residual rock at 2-3 m bgs). ***Soil Invertebrates*** Ingestion of soil by soil invertebrates in areas of the site identified for landscaping ***Transitory Wildlife*** Potential impact to transitory wildlife in contact with site soils and the invertebrate species therein in sections of the site identified for landscaping

Table 3-3: Summary of identified key potential exposure pathways

Receptor	Exposure Pathway	Comment
Construction/ Maintenance Workers	Potentially Complete	There is a potential for workers conducting subsurface works to be exposed to soils containing potential contaminants via dermal contact and ingestion of soils.
Future site residents	Not Complete	Future site residents may have incidental contact with the landscaping areas containing mainly low health risk TRH F3 contaminants.
Groundwater	Not complete	Given the depth to groundwater (>10m bgs) and the shallow 2-3m bgs depth to low permeability residual rock, the potential for groundwater contamination is considered low.
Soil Invertebrates	Potentially Complete	Soil invertebrates may be impacted by TRH F3 species identified in the upper 0 – 1.0m bgs soil profile in sections of the site impacted by historic activities.
Transitory Wildlife	Potentially Complete	Birds and other transitory wildlife species may be in contact with ameliorated site soils and the soil invertebrates therein

3.2. Project Data Quality Objectives

As stated in ASC NEPM *Schedule B2 Appendix B*, the DQO process is used to “define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site”.

The seven-step development of DQO for this assessment is provided below:

3.2.1. Step 1: State the Problem

- The Site has been historically used for commercial and industrial activity over a long period and the nature and extent of contamination is not fully known. Future proposed use of the Site is for senior residences and the proposed change of use requires an understanding of the potential risks to the potential resident population presented by possible land contamination resulting from the historical activities.

- The risk of identified contamination will be assessed, and a decision made as to whether the retention of identified contamination on site will pose an unacceptable risk to human health or the environment.

3.2.2. Step 2: Identify the Decision

- Contamination assessment has identified impact from the historic activities, primarily related to lead and TRH contamination, including previous foundry operation and mechanical workshop including operation of a service station. This assessment will inform the contamination status of the previously unassessed areas.
- The investigation will assess whether contamination exists in locations which may result in a complete exposure pathway to future potential receptors.
- Comparisons of assessed contaminant levels have been made with the adopted site assessment criteria based on residential use with limited access to soil.

3.2.3. Step 3: Identify Inputs to the Decision

The sections of the Site that have been identified for assessment include areas related to the historic activities onsite (foundry operation, mechanics workshop and service station operations). These have been investigated by accessing soils below existing building slabs and the granting of access to heritage locations. The assessment also incorporates areas proposed for future landscaping which were specifically assessed for potential TRH F3 contamination.

The main inputs are:

- Number of soil samples collected (Table 4-2).
- Sample layout recommended to achieve the above objectives (Figure 2, Appendices).
- Suite of analytes to be tested (Section 4.3).

Other inputs to assessing the above include:

- A review of site history and previous assessments completed at the Site.
- Relevant laboratory analyses undertaken at NATA accredited laboratories using analytical methods consistent with methods recommended in ASC NEPM Schedule B3, Guideline on Analysis of Potentially Contaminated Soil.
- Outcome of quality assessment of relevant data.
- Applicable contaminated land guidelines endorsed by NSW EPA.
- Concept design for the future residences and the proposed site layout including landscaping areas (Appendix I).

3.2.4. Step 4: Define the Study Boundaries

The study boundaries are defined by the boundaries of the site as shown in Figure 2, Appendices. Vertically, the site boundary will generally be to the top of the moderately weathered rock (drill rig refusal), typically between 2-3m bgs to characterise the fill.

3.2.5. Step 5: Develop a Decision Rule

The decision rule for soil for each chemical/layer to assess the suitability of the site will be as follows:

- QA/QC assessment indicates that the data is usable.
- Where contaminant concentrations for each sample are below the adopted investigation levels, then no further assessment/remediation is required with respect to that chemical/media/area.
- Where contaminant concentrations are reported above the adopted investigation levels and results are amenable to statistical assessment, the 95th percentile upper confidence limit of the average concentration will be calculated for comparison to the relevant investigation level,

provided that no single result is more than 2.5 times the relevant criterion and the standard deviation of the data set is not more than 50% of the relevant criterion.

- Impacts of future development (construction of buildings, hardstand, landscaping areas, flood mitigation infilling) on the accessibility of existing soils to future site users.
- Decisions on laboratory data are discussed in Step 7 and included as data quality indicators (DQIs).

3.2.6. Step 6: Specify Limits of Decision Errors

There are two types of decision errors:

- Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area.
- Measurement errors, which occur during sample collection, handling, preparation, analysis and data reduction.

These errors may lead the decision maker to make the following errors:

- Deciding that the site is not contaminated and, therefore, the site is suitable for proposed open space use when the reverse is true.
- Deciding that the site is contaminated and, therefore, the site is not suitable for the proposed change in use from commercial/industrial to residential with minimal access to site soils when the reverse is true.

The null hypothesis for this study is:

- Contaminant concentrations within the soil beneath the site are more than the adopted investigation levels.

An assessment will be made as to the likelihood of a decision error being made based on the results of a QA/QC assessment and the closeness of the data to assessment criteria. Additionally, statistical assessment may be used, where applicable, such as calculating the 95% Upper Confidence Limit (UCL) of an average concentration, to manage potential of error in decision making.

The investigation levels for assessment are nominated in Section 5 of this report.

3.2.7. Step 7: Optimise the Design for Obtaining Data

Based on the previous Steps 1 to 6 of the DQO process, the optimal design for obtaining the required data is presented in the following sections (i.e. proposed field and laboratory programs).

4. Sampling and analysis plan

4.1. Sampling locations

Sample locations were selected in general accordance with the minimum recommend sampling density listed in Table A in the NSW EPA (1995) Contaminated Sites: Sampling Design Guidelines for the area being assessed. Nine (9) locations were previously sampled in the Phase 2 CA (PE 2019) and twenty-one (21) additional locations were sampled for this assessment (Coffey 2020). The total number of sample locations used in this assessment was in excess of the minimum recommended for site characterisation (9 samples on an evenly spaced square grid) for a 2,800m^2 site.

Twenty-one (21) boreholes (BH01-BH21) were drilled using a 5-tonne excavator with a 350mm auger attachment under supervision of a Coffey Environmental Scientist between 22nd June and 24th June 2020. Boreholes were advanced to approximately 2.0 mbgs with the logging of the soil profile undertaken at each location.

4.2. Sampling methodology

The field investigation works followed the methodology outlined in Table 4-1 below.

Table 4-1: Field Investigation Methodology

Activity	Detail/ Comments
Below Ground Service Clearance	Dial Before You Dig (DBYD) service plans for the site and surrounding area were reviewed prior to commencement of intrusive investigation works. Investigation locations were scanned by a suitably qualified and experienced underground services clearance sub-contractor using an electromagnetic detector.
Soil Sampling	Soil samples from twenty-one (21) borehole locations (BH01-BH21) were collected directly from the drill auger after first stopping prior to target depth, clearing the auger and then advancing to target depth for the final sample. Samples were collected from near surface 0.0-0.2m bgs, 0.8-1.0m bgs and 1.8-2.0m bgs (or were contamination was observed at other depths) from each borehole.
Soil Logging	Soil samples were logged by a suitably qualified and experienced Coffey Scientist in accordance with Coffey's relevant Standard Operating Procedures (SOPs), which is consistent with Section 7.3, Field Description of Soils, in Schedule B2 of the ASC NEPM (1999, 2013). Presence or absence of anthropogenic material and contamination (i.e. odours or staining) is recorded on the geological logs which are presented in Appendix F
Soil Screening	Soil samples were screened in the field using the headspace method for the presence of ionisable volatile organic compounds (VOCs) using a Photoionization Detector (PID) fitted with a 10.6eV lamp. The PID was bump tested and fresh air calibrated at the start of each day. Calibration certificates are presented in Appendix H Headspace screening results are recorded on the borehole logs presented in Appendix F.
Sample Handling and Transportation	Samples were collected, stored and transported in general accordance with Coffey's SOPs.

Activity	Detail/ Comments
	Soil samples were placed into laboratory prepared and supplied glass jars, fitted with Teflon lined seals to limit possible volatile loss. Sample jars were filled to minimise headspace. Separate samples for asbestos analysis were collected and placed in double zip lock bags. The samples were placed into ice chilled coolers and dispatched to NATA accredited laboratories for analysis under chain of custody (COC) control. COCs are included with the laboratory certificates in Appendix B.
QA/QC Samples	To measure the accuracy and precision of the data generated by the field and laboratory procedures for this assessment, Coffey collected and analysed the following quality assurance/ quality control (QA/QC) samples: • Four intra-laboratory (blind) duplicate soil samples; • Four inter-laboratory (split) duplicate soil samples; • One trip spike per day of sampling (three), to assess specific semi-volatile and volatile recoveries; • One trip blank per day of sampling (three), to assess whether contamination may have been introduced to the samples during transport and field handling procedures; and • One rinsate blank per day of using reusable sampling equipment (one), to assess whether contamination may have been transferred between sampling locations via the hand auger cutter (24th June 2020 only).

4.3. Analytical Schedule

Soil samples were analysed by Eurofins | MGT in Sydney (primary laboratory), and ALS in Sydney (secondary laboratory). Both laboratories are NATA accredited for the analytes selected.

Primary soil samples were submitted for analysis for a suite of chemicals of potential concern (COPC) as summarised in Table 4-2. Samples were selected to achieve characterisation of the soils at the site and targeting indicators of contaminations such as staining, noxious odours or elevated headspace screening results measured during sampling.

Table 4-2: Summary of Soil Analysis

Chemical of Concern	No. Primary Soil Samples
Heavy Metals	76
TRH	76
BTEX	76
PAH	76
Asbestos	26

Notes: Heavy Metals (arsenic, cadmium, total chromium, copper, lead, mercury (inorganic), nickel, zinc), TRH= total recoverable hydrocarbons, BTEXN= benzene, toluene, ethylbenzene, xylenes, naphthalene, PAH= Polycyclic aromatic hydrocarbons

5. Assessment Criteria

Assessment criteria for the investigation were selected for relevance to the future use of the proposed development with Health Investigation Level (HIL-B) selected. The HIL-B exposure scenario is described as ‘residential with minimal access to soil.

The criteria presented below relate to a Tier 1 exposure scenario based on conservative generic site characteristics. Where concentrations of a contaminant exceed the generic assessment criteria, then further consideration of the specific exposure scenario is required which may warrant further investigation, assessment or the development of a strategy to mitigate the potential risks identified.

5.1. Health Assessment Criteria

The development as proposed is a medium-density multi-unit residential complex constructed on a ground-level slab with of the majority of the area around the buildings sealed by paving and hardstand parking. The complex does not include large areas of soil in a garden setting that is accessible by adults. There are very small lawn spaces assigned to each unit. Young children are not expected to be included as residents because this development is intended for occupation by seniors. The current development plan shows landscaping established (primarily turf) just inside the property boundaries, separated from the units by hardstand.

Coffey considers that the exposure scenario most relevant to the development is Residential B, defined in Section 3.1 of Schedule B7 of the ASC NEPM as follows:

> *“Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as units, high-rise buildings and apartments.”*

The land-use scenario if further described in Section 3.2.2 of Schedule B7 as follows:

> *“The residential land use scenario considered for the HIL B values is high-density residential, not including a private garden. This land use scenario assumes typical residential unit blocks, consisting of multistorey buildings where living areas are on the ground floor (constructed on a ground level slab or above subsurface structures including basement car parks or storage areas).*
>
> *Occupants of the buildings considered in the development of the HIL B values have access to yard spaces that are largely covered by permanent paving, with some small areas of landscaping or lawns. Opportunities for direct access to soil by residents of these buildings are therefore minimal but there may be some potential for residents to inhale, ingest or come into direct dermal contact with dust (particulates) derived from the soil on the site.”*

Chemicals with sufficient volatility to pose potential health risks via vapour inhalation pathway; namely TRH F1 and F2 fractions, BTEX and naphthalene concentrations were compared to the soils Health Screening Levels (HSLs) for vapour intrusion applicable to residential uses (i.e. HSL A & HSL B) listed in Table 1A(2) in Schedule B1 of the ASC NEPM for areas of the Site that will be located beneath residential building structures. For open space areas (possible communal areas) the HSL C applicable to recreational/open space areas has been used.

The adopted HSLs apply to a coarse soil.

The HILs for heavy metals, PAH and carcinogenic PAH are selected from relevant values in Table 1A (1) in Schedule B1 of the ASC NEPM. Adopted values for HILs are summarised in Table 5-1.

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Table 5-1: Summary of HILs in Soil

Analyte	HILs for Residential B (mg/kg)
Arsenic (total)	500
Cadmium	150
Chromium (VI)[3]	500
Copper	30,000
Lead	1,200
Mercury (inorganic)	120
Nickel	1200
Zinc	60,000
Carcinogenic PAH (cPAH) measured as Benzo(a)pyrene TEQ (BaP_{TEQ})	4
Total PAH	400

The HSLs for TRH, BTEX and naphthalene in soils are summarised in Table 5-2. The dominant soil texture for fill and residual materials have been adopted as indicated.

Table 5-2: Summary of Health Screening Levels in Soil (HSL A/B with HSL C in brackets)

Chemical	HSL A & B – Residential (C – Open Space)		
	0m to <1m (Sand)	1m to <2m (Clay)	2m to <4m (Clay)
Benzene	0.5 (NL)	1 (NL)	2 (NL)
Toluene	160 (NL)	NL (NL)	NL (NL)
Ethylbenzene	55 (NL)	NL (NL)	NL (NL)
Xylenes	40 (NL)	310 (NL)	NL (NL)
Naphthalene	3 (NL)	NL (NL)	NL (NL)
F1 (TPH C_6-C_{10} – BTEX)	45 (NL)	90 (NL)	150 (NL)
F2 (TPH > C_{10}-C_{16} – Naphthalene)	110 (NL)	NL (NL)	NL (NL)

5.2. Ecological Criteria

To assess te potential impact on terrestrial ecosystems from contamination within the upper 2m of soil / fill material, the ASC NEPM (2013) presents ecological investigation levels (EILs) and ecological screening levels (ESLs) for different settings (e.g. areas of ecological significance, urban residential / public open space, commercial).

Section 3.5.1 of NEPM Schedule B5a states that the aim of the EILs is that varying levels of protection will be provided to the following ecological receptors at all sites:

- *"Biota supporting ecological processed including microorganisms and soil invertebrates*
- *Native flora and fauna*
- *Introduced flora and fauna*

[3] Total Chromium analysed as part of this investigation. Cr VI analysis triggered in Total Chromium exceeds the SAC.

- *Transitory or permanent wildlife."*

Further, ASC NEPM (2013) states: "*Commercial and industrial land, particularly in long-established industrial areas, is often heavily contamination by past activities or fill materials used to level the area. In these cases, jurisdictions may determine that HILs are the most appropriate soil quality criteria and that EILs are not applicable. In many cases, the only generic ecological value for this land use will be 'transitory wildlife'.*"

The Site has an established history of industrial land use including foundry operations and mechanic workshop and service station operations. A change from commercial/industrial to residential land use is however being proposed for the Site. The change of use will reflect that of the general surrounding community, so the consideration of ecological levels is applicable for the proposed development. The Site will ultimately comprise mainly impervious materials, with the main buildings constructed on a ground level slab with significant areas of covered pavement and hardstand for parking. Landscaping will be provided in specific areas only such as the boundaries and a few decorative landscaped spaces. The landscaping plan incorporates the use of existing site soils ameliorated with compost and as such the soil conditions should be amenable to soil invertebrates and other microorganisms.

Based on this ESL's and EIL's are considered appropriate for the assessment within the landscaping areas. ESL's and EIL's are not applicable for areas below pavement and building slabs.

Site-specific EILs were derived for heavy metals (calculation sheets included in Appendix C) in soils as per ASC NEPM and are summarised in Table 5-3.

Table 5-3: Summary of Site Specific EILs in Soil

Chemical	EIL Urban Residential/ Public Open Space (mg/kg)
Arsenic	100
Chromium	480
Copper	110
Lead	1100
Nickel	370
Zinc	260
Naphthalene	170

The ESLs for TRH, BTEX and Benzo(a)pyrene in soils from Schedule B1 in the ASC NEPM are summarised in Table 5-4.

Table 5-4: Summary of ESLs in Soil

Chemical	ESL – Urban Residential and public open space (for coarse grained soils) (mg/kg)
F1 C_6-C_{10}	180
F2 C_{10}-C_{16}	120
F3 > C_{16}-C_{34}	300
F4 > C_{34}-C_{40}	2800
Benzene	50
Toluene	85
Ethylbenzene	70
Xylenes	105
Benzo(a)pyrene	0.7

5.3. Management Limits

In accordance with Section 2.9 of Schedule B1 of the ASC NEPM, consideration of Management Limits for petroleum hydrocarbons has been included to assess the potential for accumulation of explosive vapours, the potential risk to buried infrastructure, or the formation of phase separated hydrocarbons (PSH). Management Limits are applicable to petroleum hydrocarbon compounds only. They are specific screening levels that are utilised following the application of relevant human health and ecological risks and risks to groundwater resources. The limits are typically applied to operating sites that have been historically impacted by sub-surface leakage of petroleum compounds and when decommissioning industrial and commercial sites. Given the history of petroleum use and storage at the Site, the management limits will apply to the Site given the consideration of the change of use from an industrial/commercial historical usage to a more sensitive (Residential B) land use scenario. In such a case, the management of any residual hydrocarbon consideration must be undertaken considering the proposed development and the management of contamination required.

A summary of the adopted management limits for this site is provided in Table 5-5.

Table 5-5: Summary of Site Management Limits

Chemical	Soil Type	Residential, parkland and public open space (mg/kg)
F1: TRH C_6-C_{10}	Coarse	700
F2: TRH C_{10}-C_{16}	Coarse	1000
F3: TRH C_{16}-C_{34}	Coarse	2500
F4: TRH C_{34}-C_{40}	Coarse	10,000

6. Data Quality Indicators

Data Quality Indicators (DQIs) are used to show that the DQOs have been met. DQIs for the project are based on the field and laboratory considerations in the table in the NEPM Schedule B2 Appendix B, (NEPC, 2013), which include:

- Completeness – a measure of the amount of usable data (expressed as %) from a data collection activity;
- Comparability – the confidence (expressed qualitatively) that may be considered to be equivalent for each sampling and analytical event;
- Representativeness – the confidence (expressed qualitatively) that data are representative of each media present on the site;
- Precision – A quantitative measure of variability (or reproducibility) of data;
- Accuracy – a quantitative measure of the closeness of reported data to the true value; and
- The QA review will include a check of performance against the DQIs.

The DQIs adopted for this investigation and means by which they will be assessed is discussed in Table 6-1 to Table 6-5.

Table 6-1: Data Quality Indicators (DQIs) - Completeness

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Completeness	Critical locations sampled	Samples collected from all locations with no deviation from the sampling plan, without reasonable justification.	Critical samples analysed according to sampling plan.	Samples were analysed for COPCs (TRH, BTEX, PAH, Metals, & Asbestos).
	Samples collected	Samples collected in accordance with Coffey's SOPs during the assessment.	Identified COPCs included.	As above.
	Standard Operating Procedures (SOPs) appropriate and complied with	No departure from Coffey's SOPs without reasonable justification.	Appropriate methods and LORs	Samples were analysed by laboratories NATA accredited, for the analyses to be performed and appropriate methods were used. LORs were less than assessment criteria.
	Experienced sampler	Experienced Coffey Environmental Scientists conducted the sampling.	Sample documentation complete	Chain of custody records (COCs) were returned, signed and dated by laboratory. NATA endorsed laboratory certificates were provided. Field logs were in accordance with Coffey SOPs.
	Documentation correct	Appropriate chain of custody (COC) records are provided. Sample Receipt Notifications (SRN) from the laboratory report that	Sample holding times were complied with	Samples were analysed within holding times specified in Schedule B3 of the ASC NEPM.

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
		samples were received in good condition. Current calibration certificates for the PID & WQM are provided and the PID instrument was bump tested daily.		

Table 6-2: Data Quality Indicators (DQIs) - Comparability

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Comparability	Same SOPs used on each occasion	Coffey SOPs were implemented for this current work. Based on the review of the PE reporting, Coffey notes that the sampling methodology utilised during the PE investigations were generally similar to Coffey's SOP's and also general standard practice.	Same sample analytical methods used.	The same NATA accredited primary laboratory (Eurofins MGT) was used to undertake analyses of primary and duplicate samples collected for both the PE investigation and this Coffey investigation. The laboratory used the same analytical methods for each sample for each analytical parameter
	Experienced sampler	Experienced Coffey Environmental Scientists will conduct the sampling.	Same sample LORs	As above
	Climatic conditions (temperature, rainfall, wind etc.)	Sampling for this work was completed in fine sunny weather. Climatic conditions did not cause issues for comparability of data.	Same laboratories	As above
	Same types of samples collected	Samples were collected in the appropriate laboratory supplied container specific to the analyses performed.	Same units	As above

Table 6-3: Data Quality Indicators (DQIs) - Representativeness

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Representativeness	Appropriate media sampled according to sample plan	Soil samples were collected and analysed in accordance with Coffey's SOPs.	Appropriate media sampled according to sample plan	Collected samples were analysed by NATA accredited laboratories.
	All media identified in sample plan	Soil collected and analysed in accordance with Coffey's SOPs.		

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
	SOPs appropriate and complied	Coffey's SOPs were implemented, with the exception of collection of disturbed samples directly from the auger where a potential loss of volatiles could occur. PID readings and analytical results confirmed that volatiles were not detected in the soils samples.	Analysis of field duplicates	Laboratory duplicates were analysed in general accordance with ASC NEPM (2013).

Table 6-4: Data Quality Indicators (DQIs) - Precision

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Precision	SOPs appropriate and complied with	Coffey SOPs were implemented.	Analysis of laboratory duplicates	RPD values for inter-laboratory duplicates and recovery of matrix spikes are acceptable.
	Analysis of field duplicates	As for laboratory considerations	Analysis of field duplicates	Duplicates were analysed at a frequency of greater than: • 5% intra laboratory duplicates; • 5% inter laboratory duplicates. RPDs were calculated and compared to relevant acceptance criteria. 30% for concentrations more than 10 times the LOR and 50% for concentrations less than 10 times the LOR (Standards Australia 1997)

Table 6-5: Data Quality Indicators (DQIs) - Accuracy

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Accuracy	SOP appropriate and complied with	Coffey SOPs were implemented		
	Field blanks	A trip blank sample was collected using laboratory supplied distilled water.	Field blanks	A laboratory prepared trip blank was included for each sample set (i.e. esky) where volatile compounds are requested for analysis (as defined in AS4482.2-1999 and Schedule B2 in the ASC NEPM). Analysis of the trip blank included TRH F1 and BTEX.

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
	Trip blanks	Because the chemical of concern was potentially volatile, trip blanks prepared by the laboratory were carried into the field and transported with samples to the laboratory.	Method blank	Method blanks were analysed as recommended in Schedule B3 of the ASC NEPM. Results to be less than LOR.
			Laboratory duplicate and Matrix spike	RPD values for laboratory control duplicates and recovery of matrix spikes are within acceptance limits. Where RPDs and matrix spikes do not meet acceptance limits, justification for the use of such data will be required or additional analysis may need to be considered.

7. Quality Assurance/ Quality Control

The following QA/QC assessment addresses data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations and the processes for assessment of data quality provided in Section 19 (Appendix C) of Schedule B2 Guideline on Site Characterisation of the ASC NEPM. The QA/QC information presented within this report relates to the sampling undertaken by Coffey during this activity and excludes historical PE data.

7.1. Field QA/QC

QA/QC procedures implemented for this project included:

- Sampling performed by qualified Coffey Environmental professionals in accordance with Coffey's SOPs which are based on industry accepted protocols for environmental sampling and are consistent with Schedule B2 of the ASC NEPM; and
- The following intra-laboratory and inter-laboratory samples were collected and submitted for laboratory as listed in Table 7-1.

Table 7-1: QA-QC Samples

Primary Sample	Date	Sample Matrix	Intra-laboratory (blind) duplicate	Inter-laboratory (split) duplicate
BH2_0.0-0.2	22/06/2020	Soil	QC1	QC2
BH7_0.0-0.2	23/06/2020	Soil	QC3	QC4
BH9_0.0-0.2	23/06/2020	Soil	QC5	QC6
BH16_0.0-0.2	23/06/2020	Soil	QC7	QC8
SP1-1	24/06/2020	Soil	QC9	QC10

As part of the assessment 76 primary samples were collected for analysis.

Five blind duplicate and five split duplicate QC samples were analysed from the soil samples. In summary, these duplicate samples satisfy the 1 in 20 sample rates recommended in Coffey's SOPs and Section 8.2 of Australian Standard (AS 4482.1-2005) *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil. Part 1: Non-volatile and Semi-volatile Compounds*.

Calculated RPD values from collected primary, blind duplicate and split duplicate QC samples for soil, are listed in Table LR3 of Appendix A.

Results generally reported RPDs below the control limits except for arsenic, copper, lead, mercury, nickel, multiple TPH compounds and multiple components of the total PAH were above the adopted RPD acceptance limits.

These RPD exceedances are characteristic of localised heterogeneity of fill material as observed during field work. Coffey notes that the split duplicate samples were collected from fill material, with the consistency of black, fine to coarse grained slag particles, attributable to the historical operation of a foundry on part of the site. The discrepancy in concentrations, particularly heavy metals and PAHs is likely to be associated with the following:

- Differing abundances of fine fractions which typically adsorb metals; and
- Variability in composition of the primary and QC samples collected in the field and potentially in the laboratory sub-samples taken from field samples for analysis could also contribute to the variation in RPD.

Coffey accepts the variability and notes that several factors, including some beyond Coffey's control, are likely to have influenced the observed differences in RPD results. In response to the observed variability, Coffey adopted the higher value in our assessment.

In order to assess potential cross contamination by volatile hydrocarbons between samples during the storage of samples on-site and then during transport to the laboratories, a trip blank was placed into each esky and analysed for volatile TRH and BTEX.

All trip blank samples reported concentrations below the laboratory LOR.

Trip spikes were also included in the sample batch to assess potential for loss of volatile compounds during transport to the laboratory. No material loss of volatiles was identified in the trip spike samples analysed which reported recoveries within the 70 – 130% acceptance limit.

Trip blank and trip spike results are included in the Appendix A, Table LR4.

7.2. Data quality assessment

Based on an assessment of the field and laboratory QA/QC information, Coffey considers that the data obtained is representative of subsurface conditions at the sampling locations at the time of sampling. Overall, it is assessed that the results are acceptable for the purposes of this investigation.

8. Results

8.1. Field Headspace Screening

Soil samples were headspace screened for presence of volatile hydrocarbons using a PID. The PID readings were reported between 0.0 ppm and 1702 ppm, indicating that volatile hydrocarbons were likely to be present at reportable concentrations (excess of 100ppm).

Individual PID readings are reported on the borehole logs presented in Appendix F.

8.2. Soil Results

Soil analytical results compared to the site assessment criteria are provided in Table LR1 (Appendix A). Soil analytical results for preliminary waste classification are provided in Table LR2 (Appendix A). Copies of the laboratory reports are provided in (Appendix B). Sampling locations are shown on Figure 2, Appendices.

8.2.1. Health-based Investigation and Screening Levels

Soil samples reported chemical concentrations less than the adopted Tier 1 health-based investigation and screening levels in samples analysed, except for the following samples summarised in Table 8-1 (table includes data for historical samples). The exceedances represent individual sample locations assessed at a Tier 1 level. Site suitability will be based on 95% UCL_{AVE} concentrations of all relevant sample data where not impacted by hotspot concentrations (i.e. greater than 2.5 times the relevant guideline value and standard deviation of data set more than 50% investigation level) or the use of Tier 2 assessments. HIL B exceedances have been plotted and are included as Figure 3, Appendices.

Table 8-1: ASC NEPM 2013 HIL-B/HSL A/B and HSL C exceedances[4] aligned with proposed development

Analyte (SAC)	Samples (Concentrations)	Context with Proposed Development
Lead (1200mg/kg)	• BH8 0.0-0.2 (2100mg/kg) • BH9 0.0-0.2 (1800mg/kg) • B 0.7 (1900mg/kg)	• BH8 below car park/pavement • BH9 landscaping area • B 0.7 below slab or pavement
Carcinogenic PAH (4mg/kg, measured as BaP_{TEQ})	• BH1 0.0-0.2 (40mg/kg) • BH5 0.0-0.2 (11mg/kg) • BH6 0.0-0.2 (5.7mg/kg) • BH7 0.0-0.2 (11mg/kg) • BH17B 0.0-0.2 (23mg/kg) • BH19 0.0-0.2 (28mg/kg) • BH21 0.0-0.2 (45mg/kg)	• BH1 below car park/pavement • BH5 landscaping area • BH6 landscaping area • BH7 landscaping area • BH17B landscaping area • BH19 below building slab • BH21 below building slab
TRH F1 (HSL A/B 90mg/kg) TRH F1 (HSL C NL)	• BH17B 1.8-2.0 (160mg/kg)	• BH17B landscaping area
TRH F2 (HSL A/B 110mg/kg) TRH F2 (HSL C NL)	• BH9 0.0-0.2 (300mg/kg) • BH13 0.0-0.2 (180mg/kg) • BH14 0.2-0.4 (2,298mg/kg)	• BH9 landscaping area (HSL C NL) • BH13 below building slab • BH14 landscaping area (HSL C NL)

- [4] cPAH exceedances identified in BH19 1.8-2.0 (4.6mg/kg) and BH21 1.3-1.5 (5.7mg/kg) are low-reliability and have been excluded. The impact is identified in the residual material and given the nature of the contaminant is most likely a result of cross-contamination from upper fill layer

Analyte (SAC)	Samples (Concentrations)	Context with Proposed Development
	• BH19 0.0-0.2 (205.4mg/kg)	• BH19 below building slab
Benzene (HSL A/B 0.5mg/kg (0 - <1m), 1mg/kg (1 - <2m), 2mg/kg (2 - <4m) Benzene (HSL C NL)	• BH17B 0.8-1.0 (4.5mg/kg) • BH17B 1.8-2.0 (4.7mg/kg) • BH17B 2.2-2.3 (9.3mg/kg)	• BH17B landscaping area

Notes: HSL A/B applicable to areas below building slabs, HSL C applicable to car parks, roads and open space areas.

8.2.2. Ecological Investigation and Screening Levels

The soil samples reported chemical concentrations less than the adopted ecological investigation/ screening levels except for the following samples summarised in Table 8-2 (table includes data for historical samples). The exceedances represent individual sample locations assessed at a Tier 1 level. Site suitability will be based on 95% UCL_{AVE} concentrations of all relevant sample data where not impacted by hotspot concentrations (i.e. greater than 2.5 times the relevant guideline value and standard deviation of data set more than 50% investigation level) or implementation of appropriate contamination management protocols as part of the proposed development. The ESL/EIL exceedances data has been plotted in Figure 6, Appendices.

Table 8-2: ASC NEPM 2013 EIL/ESL (Urban Residential and Public Open Space) exceedances (applicable to landscape areas only)

Analyte (SAC)	Samples (Concentrations)
Lead (1100mg/kg)	• BH9 0.0-0.2 (1800mg/kg)
Copper (110mg/kg)	• BH3 0.0-0.2 (330mg/kg) • BH6 0.0-0.2 (140mg/kg) • BH7 0.0-0.2 (150mg/kg) • BH9 0.0-0.2 (120mg/kg) • BH16 0.0-0.2 (520mg/kg) • G 0.6 (4300mg/kg)
Zinc (260mg/kg)	• BH3 0.0-0.2 (890mg/kg) • BH5 0.0-0.2 (430mg/kg) • BH6 0.0-0.2 (540mg/kg) • BH7 0.0-0.2 (340mg/kg) • BH11 0.0-0.2 zinc (560mg/kg) • BH14 0.2-0.4 zinc (360mg/kg) • BH16 0.0-0.2 (530mg/kg) • BH21 0.0-0.2 (950mg/kg) • G 0.6 (1600mg/kg)
TRH F1 (180mg/kg)	• BH17B 1.8-2.0 (160mg/kg)
TRH F2 (120mg/kg)	• BH9 0.0-0.2 (300mg/kg) • BH14 0.2-0.4 (2298mg/kg)
TRH F3 (300mg/kg)	• BH5 0.0-0.2 (740mg/kg) • BH7_0.0-0.2 (480mg/kg) • BH8_0.0-0.2 (3,700mg/kg) • BH9_0.0-0.2 (4,400mg/kg) • BH11_0.0-0.2 (630mg/kg) • BH14_0.0-0.2 (320mg/kg)

	• BH14_0.2-0.4 (2,500mg/kg) • BH17B_0.0-0.2 (1,200mg/kg) • BH21_0.0-0.2 (810mg/kg)

8.2.3. Management Limits

Soil samples reported chemical concentrations below the adopted management limits with the exception of the following samples. The exceedances of the management limits have been plotted in Figure 7, Appendices.

- BH8_0.0-0.2 C16-C34 (3700mg/kg);
- BH9_0.0-0.2 C16-C34 (4400mg/kg);
- BH13_0.0-0.2 C16-C34 (7000mg/kg);
- BH14_0.2-0.4 C10-C16 (2300mg/kg); and
- B 0.7 (10000mg/kg)
- F 0.3 (9300mg/kg)

8.2.4. Asbestos

Twenty-six (26) soil samples were analysed for the presence/ absence of asbestos fibres in soil. Each sample analysed reported no presence of asbestos in soil. A summary of asbestos in soil results is presented in Table LR2 (Appendix A).

It is noted that bonded fragments of asbestos cement sheet were observed within the house (not yet demolished) in the western portion of the site. An asbestos clearance of inside the house will need to be completed prior to demolition and following the demolition of the building on the site.

8.3. Preliminary Waste Classification

A preliminary in-situ waste classification was undertaken using analytical soil data reported following the laboratory analysis of 76 soil samples for waste classification purposes. The waste classification data has been included as Figures 4 and 5 in the Appendices.

STEP 1: Is the Waste Special Waste?	No.
STEP 2: Is the Waste Liquid Waste?	No
STEP 3: Is the Waste Pre-classified?	No
STEP 4: Does the waste possess hazardous characteristics	Yes
STEP 5: Chemical characterisation of the soil materials	The analysis of seventy-six (76) soil samples reported concentrations of COPC's below the respective CT1 assessment threshold, except for: • BH1_0.0-0.2 Nickel (95mg/kg), Total PAHs (345.6mg/kg); • BH1_0.8-1.0 Nickel (45mg/kg), BaP (0.9mg/kg); • BH3_0.0-0.2 lead (320mg/kg); • BH5_0.8-1.0 lead (110mg/kg), BaP (1.3mg/kg); • BH5_1.8-2.0 BaP (2.4mg/kg); • BH6_0.0-0.2 nickel (41mg/kg); • BH7_0.0-0.2 lead (310mg/kg); • BH8_0.0-0.2 nickel (88mg/kg); • BH9_0.0-0.2 cadmium (43mg/kg);

	• BH10_0.0-0.2 lead (250mg/kg); • BH10_0.8-1.0 lead (160mg/kg); • BH11_0.0-0.2 chromium (170mg/kg); • BH13_0.0-0.2 lead (280mg/kg); • BH14_0.2-0.4 lead (120mg/kg); • BH16_1.8-2.0 lead (110mg/kg); • BH17B_0.0-0.2 nickel (72mg/kg); • BH17B_1.8-2.0 lead (230mg/kg); • BH18_0.0-0.2 nickel (54mg/kg); • BH19_0.0-0.2 nickel (58mg/kg), Total PAHs (395.3mg/kg); • BH19_1.8-2.0 BaP (3.1mg/kg); • BH21_0.0-0.2 Total PAHs (386.7mg/kg); • SP1-3 BaP (1.1mg/kg); • SP1-6 BaP (0.6mg/kg); • SP1-7 Nickel (80mg/kg); and • SP1-9 BaP (1.6mg/kg). Concentrations exceeding the Restricted Solid Waste CT2 threshold were: • BH1_0.0-0.2 BaP (23mg/kg); • BH1_0.8-1.0 lead (660mg/kg); • BH4_0.0-0.2 lead (440mg/kg); • BH5_0.0-0.2 lead (470mg/kg), BaP (6.8mg/kg); • BH6_0.0-0.2 lead (970mg/kg), BaP (3.4mg/kg); • BH7_0.0-0.2 BaP (6.5mg/kg); • BH8_0.0-0.2 lead (2100mg/kg); • BH9_0.0-0.2 lead (1800mg/kg); • BH11_0.0-0.2 lead (660mg/kg); • BH16_0.0-0.2 lead (460mg/kg); • BH17B_0.0-0.2 BaP (13mg/kg); • BH18_0.0-0.2 lead (600mg/kg); • BH19_0.0-0.2 lead (770mg/kg), BaP (17mg/kg); • BH21_0.0-0.2 lead (250mg/kg), BaP (29mg/kg); • SP1-1 lead (880mg/kg); • SP1-2 lead (1700mg/kg); • SP1-3 lead (760mg/kg); and • SP1-4 lead (900mg/kg). Results are tabulated in Table LR2 – (Appendix A).
STEP 6: Is the waste putrescible or non-putrescible?	Non-putrescible
Toxicity Characteristic Leaching Procedure	Toxicity Characteristic Leaching Procedure (TCLP) testing was carried out to assess the leachable properties of the contaminants exceeding the CT1 and CT2 thresholds. The following samples with the highest concentrations of benzo(a)pyrene and metals were selected for TCLP analysis: • Benzo(a)pyrene on sample BH1_0.0-0.2 and BH21_0.0-0.2; and • Lead on sample SP1-7 and BH8_0.0-0.2. The results of this analysis were each sample tested was reported below the TCLP1 thresholds for General Solid Waste (with leaching), the results were as follows: • Benzo(a)pyrene in sample BH1_0.0-0.2 (<0.001mg/L) and BH21_0.0-0.2 (<0.001mg/L); and • Lead in sample BH8_0.0-0.2 (0.15mg/L) and SP1-7 (0.12mg/L);

	As the highest concentrations of benzo(a)pyrene and metals reported TCLPs concentrations below the laboratory Level of Reporting (LOR) and/ or SCC1/ TCLP1 thresholds, we assume that samples with lower concentrations would report similar TCLP results and be below the SCC1/ TCLP thresholds because sources of contamination on the site did not vary. TCLP results are reported in Table LR2 (Appendix A).
Waste Classification Conclusion	Based on the laboratory results and field observations, Coffey assesses that the soil has a classification **General Solid Waste – (non-putrescible).**

Coffey notes that the in-situ waste classification is preliminary only. Excavations during development works may reveal soil conditions that differ from those encountered during the in-situ assessment, which may require further assessment prior to offsite disposal. An Unexpected Finds Protocol (UFP) should be implemented during excavation works at the site as stated in Section 10.1 of this report.

9. Discussion

9.1. Tier 1 Assessment

The site investigation data has been subjected to a Tier 1 (generic) screening evaluation to establish whether there is potential for unacceptable ecological or health risk associated with primarily heavy metal, cPAH and hydrocarbon impacts at the site. The generic screening criteria have been selected based on the preliminary Conceptual Site Model (Section 3.1).

The generic screening criteria are generally derived based on conservative assumptions relating to land use, receptor behaviour, site, building and soil characteristics. The ASC NEPM health investigation levels (HILs) HIL-B and Health Screening Levels (HSLs) HSL A/B were adopted based on the Residential B (minimum access to soils) exposure scenario.

9.1.1. Ecological Considerations

Exceedances of the generic Ecological Investigation Levels and Ecological Screening Levels (Urban Residential and Open Space) were recorded for lead, copper, zinc, TRH F1, F2, F3 and benzo(a)pyrene (BaP). The hydrocarbon exceedances are the most significant concern from a management perspective. TRH F1 and F2 were primarily found impacting soils along the northern boundary, a location suspected to contain residual hydrocarbon impact from historical use as a service station. The TRH F3 is more widely distributed across the site with multiple exceedances identified in the upper 1.0m soil layer. The comparison of site data to the generic screening criteria (ESL Urban residential and public open space) for TRH F3 summarised in Table 9-1.

Table 9-1: Tier 1 screening comparison of impact at different depths and the NEPM ESL Urban/Residential criteria

Chemical of concern	Tier 1 ecological screening criteria (1) [mg/kg]	Depth range (2) [m]	Number of soil samples	Concentration range (3) [mg/kg]	95% UCL concentration [mg/kg]
TRH F3	300	0.0 – 1.0	52	<100 – 10,000	2420
		>1.0	24	<100 – 460	189

The proposed development will result in most of the Site being covered by a combination of building structures, roads and covered parking areas. The only areas exposed will be the landscaping areas (see Architectural Plans in Appendix I). The soils below the buildings and hardstand areas will be isolated and the ecological impacts related to soil quality on the site are not relevant. In the landscaping areas, the possibility remains that soils containing elevated TRH F3 could potentially impact invertebrate populations. In order to manage this, landscaping will not be carried out within the fill soils onsite. The fill materials within landscaping areas must be excavated exposing the residual soil. The fill material so excavated must either be placed beneath buildings and other hardstand surfaces (pavements, roads and carparks) or disposed offsite to landfill.

The placement of fill soils beneath buildings and hardstand surfaces will also manage the heavy metal and BaP EIL exceedances. The TRH F1 and F2 will require further assessment and management, particularly along the northern boundary, where it is suspected residual hydrocarbon contamination exists as a result of the historical use of that area for a service station.

9.1.2. Health Considerations

None of the assessed soils contained heavy metals at concentrations that would be considered a hotspot (i.e. greater than 2.5 times the relevant HIL-B guideline value and standard deviation of data set more than 50% of the investigation level). The calculated UCL 95_{AV} concentrations were all below the respective HIL-B guideline values (Appendix D). There were therefore no exceedances of the Tier 1 investigation levels for the heavy metals assessed.

There were two measured exceedances of the HSL A/B for TRH F2 (BH13 0.0-0.2m (180mg/kg) and BH14 0.2-0.4m (2298mg/kg). All other samples were below the relevant generic HSL A/B. There was one exceedance of the generic HSL A/B for TRH F1 (BH17B 1.8-2.0m (160mg/kg)). There were also exceedances of the generic HSL A/B for Benzene also at BH17B at three depths 0.8-1.0, 1.8-2.0 and 2.2-2.3mbgs. The TRH and benzene exceedances are most likely related to residual impact of the former service station operation along the northern site boundary. The underground fuel storage tanks were located within footpath just outside the perimeter of the Site (typical for the time period of operation) along the street frontage. It was reported in the PE Phase 2 assessment report that the tanks were removed in 1999, however, there appears to be some residual contamination along the northern boundary given the depths at which the exceedances have been identified.

The vertical impact would be minimised by the presence of weathered shale and ironstone at approximately 2.5 – 2.6mbgs across the site. High-plasticity residual clay was also present from approximately 0.5m bgs to 2.3 – 2.5m bgs. As a result, any petroleum contamination could potentially migrate vertically through the clay and into shale fractures (although the shale is relatively low permeability) and horizontally along the residual clay and weathered rock. The horizontal and vertical extent of the hydrocarbon impact along the northern boundary is an unknown and given that buildings will be constructed in the section of the site it is imperative to better understand the impact and develop a strategy for remediation/management.

Carcinogenic PAH (cPAH) measured as benzo(a)pyrene TEQ (BaP_{TEQ}) were identified across the site, primarily within the upper 1.0m soil layer. This is most likely a result of residual contamination impact in fill materials related to the previous site usages including a foundry and mechanical workshop. The comparison of site data to the generic screening criteria (HIL-B) for BaP_{TEQ} is summarised in Table 9-2.

Table 9-2: Tier 1 screening comparison of impact at different depths and the NEPM HIL-B criteria (including historical PE data)

Chemical of concern	Tier 1 health screening criteria (1) [mg/kg]	Depth range (2) [m]	Number of soil samples	Concentration range (3) [mg/kg]	95% UCL concentration [mg/kg]
cPAH as BaP_{TEQ}	4	0.0 – 1.0	55	<0.6 – 45	9.03
		>1.0	21	<0.6 – 5.7	2.6

The 95% UCL_{AV} BaP_{TEQ} in the 0.0 – 1.0mbgs (11.0mg/kg) exceeded the generic HIL-B site assessment criteria adopted for comparison. The 95% UCL_{AV} BaP_{TEQ} concentration in the >1.0mbgs layer was below the generic HIL-B site assessment criteria.

Given the variable distribution of the BaP_{TEQ} in the fill material, remediation was not considered to be a practical approach as the delineation of multiple impacted areas would have resulted in a greatly increased sampling and analytical burden. As such, the exceedance of the Tier 1 (generic) guidance value triggered a Tier 2 (site specific) assessment as outlined in Section 2.4, Schedule B4 of the ASC NEPM. The Tier 2 assessment was undertaken, and the results are discussed in Section 9.1.3, with the assessment details included as Appendix E. The Tier 2 assessment provided a site-specific evaluation of potential human health risk and the development of site-specific risk-based criteria (RBC) for comparison with the site data. The RBC have been derived considering the specific conditions of the site as well as the intended users and specific exposure scenarios. The derived Tier 2 RBC's are more realistic than the generic Tier 1 screening levels but still provide appropriate protection of human health.

9.1.3. cPAH Tier 2 Assessment

Given the indication of potentially unacceptable human health risk from comparison of results against the generic Tier 1 site assessment criteria, a site-specific human health risk assessment (HHRA) of the cPAH impact was undertaken to investigate whether a potentially unacceptable health risk may exist for the future users of the proposed senior residences.

The purpose of this HHRA was to evaluate the potential impacts to human health associated with PAH impacted soil identified at the site via the derivation of site-specific risk-based criteria (RBC) for future receptor populations based on the proposed development. The HHRA addresses the following receptor populations:

- Future residents at the retirement village.
- Future commercial workers associated with the retirement village.
- Future workers who may be involved in maintenance of the site, including grounds keepers, and undertaking subsurface works such as utilities repairs or installation.
- Workers involved in construction of the retirement village undertaking subsurface works.

The health risk assessment was conducted in accordance with the '*National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013'* (NEPC, 2013), referred to herein as the NEPM and the '*Guidelines for Assessing Human Health Risks from Environmental Hazards*' (enHealth, 2012). The provisions within the NEPM are:

- Guideline on Site-Specific Health Risk Assessment Methodology, Schedule B4; and
- Guideline on Derivation Health-Based Investigation Levels Schedule B7.

The HHRA report presenting details of the Tier 2 risk assessment and the methodology used to derive the RBC is included as Appendix E in this document.

Site-specific RBC were derived for future residential users and workers at the proposed seniors' residences. The relevant RBC's are presented in Table 9-3.

Table 9-3: RBC for direct contact exposure pathways with Carcinogenic PAH in soil/dust at the proposed seniors' residences

COPC	RBC senior resident (mg/kg)	RBC Child – short stay resident (mg/kg)	RBC Groundkeepers (mg/kg)	RBC Maintenance workers (mg/kg)	RBC Construction workers (mg/kg)
cPAH, measured as BaP_{TEQ}	52	20	57	270	1,000

9.1.4. Application of Site-Specific RBC

To apply the RBC to assess the non-threshold PAHs identified in residual soil at the site, the reported concentrations of carcinogenic PAHs should be multiplied by the respective TEF and the resulting values summed for comparison with the benzo[a]pyrene (BaP_{TEQ}) RBCL. It is noted that most laboratories do this calculation and report BaP_{TEQ}. This process has been followed using the data collected for the additional assessment.

It is recommended the RBC for future residents (including short-stay children) and grounds keepers is applicable to soils at the surface to approximately 0.5 m depth as potential exposure to this soil is considered to be the most sensitive of several scenarios evaluated in this HHRA. Maintenance and construction workers may be exposed to soils at depths 0.5 m or greater therefore the RBC for maintenance workers would be the most applicable to both groups of receptors.

The assessment of potential health risks associated with PAHs identified in shallow soils at the site to 0.5 m depth required comparison of the senior resident and short-stay child resident RBCs to the reported carcinogenic PAH concentrations.

The calculated maximum and 95% UCL BaP_{TEQ} concentrations for carcinogenic PAHs in surface soils to 0.5 m depth and the derived RBC for future senior residents and short-stay child residents, are presented in Table 9-4.

Table 9-4: BaP_{TEQ} concentrations in surface soils to 0.5 m and comparison with BaP_{TEQ} RBC for future retirement village residents

Receptor	**RBC** [mg/kg]	Soil concentration range of **BaP_{TEQ}** 0.0 – 0.5 mbgs [mg/kg]	**95% UCL soil** concentration **BaP_{TEQ}** [mg/kg]
Retirement village resident RBC: BaP_{TEQ} (mg/kg)	**52**	<0.6 – 45 (1)	12.5
Child – short stay resident BaP_{TEQ} (mg/kg)	**20**		

1. *Two exceedances of the RBC noted*

A comparison of the RBC derived to be protective of future retirement village residents (including short stay child residents) with reported BaP_{TEQ} concentrations in soils to 0.5mbgs in the recent investigations has been undertaken. This indicates the carcinogenic PAH concentrations are below the risk-based concentration for BaP_{TEQ} in all locations with the exception of four samples: BH1_0.0-0.2 (40 mg/kg), BH17B_0.0-0.2 (23 mg/kg), BH19_0.0-0.2 (29 mg/kg) and BH21_0.0-0.2 (45 mg/kg). A comparison of the retirement village resident and short stay child residential RBC with the calculated 95% UCL BaP_{TEQ} concentration in soils to 0.5 mbgs indicates the carcinogenic PAH concentrations are well below the risk-based concentration for BaP_{TEQ}.

Whilst four individual locations exceeded the RBC for children, the potential exposures to retirement village residents and short-stay child residents are likely to be minimal as exceedances are located at two isolated locations in the north-east corner of the site, which are potentially within private open space areas, one location in the central area of the site within the footprint of the proposed buildings and one location near the central southern site boundary in the area of the proposed hardstand driveway.

The 95% UCL concentration is a more reasonable basis for overall exposures to future residents (including short-stay children) and the potential risk to these residents is considered to be low and acceptable, based on the available data, assumptions and exposure modelling.

The assessment of potential health risks to grounds keepers, maintenance workers and construction workers, associated with PAHs identified in soils below 0.5mbgs, has been conducted based on comparison of the derived RBC for those workers.

The maximum reported concentrations for the carcinogenic PAHs, and the calculated cPAH concentration (expressed as BaP_{TEQ}) in soils below 0.5 mbgs, are presented in Table 9-5.

Table 9-5: Determination of cPAH concentrations in soils and comparison with RBC for future maintenance and construction workers

Receptor population	**RBC [mg/kg as BaP_{TEQ}]**	**Soil concentration range of cPAH [mg/kg] > 0.5 mbgs**	**95% UCL soil concentration cPAH [mg/kg] > 0.5 mbgs**
Grounds keeper RBC: BaP_{TEQ}	**57**	0.6 – 5.7	1.54
Maintenance RBC: BaP_{TEQ}	**270**		
Construction RBC: BaP_{TEQ}	**1,000**		

A comparison of the RBC derived to be protective of future workers with the maximum reported BaP TEQ concentration in soils >0.5 mbgs in the recent DSI investigations indicates the carcinogenic PAH concentrations are below the BaPTEQ risk-based concentration for future maintenance and grounds keeping and as well as sub-surface construction works. Potential exposures to future workers are therefore considered to be acceptable based on the assumptions on the available data, exposure assumptions and exposure modelling.

9.2. Conceptual Site Model

Based on this investigation and the results of the HHRA, an updated conceptual site model (CSM) has been developed.

9.2.1. Areas of environmental concern and chemicals of concern

Table 9-6: Summary of potential AECs and COCs

AEC	Potentially Contaminating Activity	COCs	Likelihood of Contamination	Comments
Entire site	Former site activities impacting quality of fill in upper 1.0m layer	cPAH, TRH F3	Medium to High	cPAH and TRH F3 contamination identified in the Site soils at variable concentrations
Northern boundary in vicinity of former petroleum tanks and service station operation	Former site activities impacting quality of fill and residual soils to depths 2.2-2.3m bgs.	TRH and Benzene	Medium to High	TRH and benzene contamination identified along the northern boundary. Extent of impact unknown. Potential to have migrated horizontally along the boundary east-west and also south, beneath site buildings.

9.2.2. Potentially affected media, receptors and transport mechanisms

Table 9-7: Summary of potentially, receptors and transport mechanisms

Consideration	Information
Potentially Affected Media	Fill material and natural residual soil
Potential Transport Mechanisms & Exposure Pathways	Direct dermal contact with contaminated soil Incidental ingestion of contaminated soil Inhalation of contaminated soil as dust Inhalation of hydrocarbon vapour (northern boundary)
Potential Receptors of Contamination	**Construction/ maintenance workers** Potential exposure via dermal contact with soil and ingestion/inhalation of soil, dust generally; and potential exposure to hydrocarbon vapours for workers in shallow trench on northern boundary. **Future Residents** Potential exposure via dermal contact, and ingestion/ inhalation of soil, dust and hydrocarbon vapours in indoor air if ground floor buildings are close to the northern boundary.

	Surface Water Potential for surface water runoff to impact Hunter River (100m North and downgradient) during site development works

9.2.3. Exposure pathways

Table 9-8: Summary of the potential receptors and pathways of contaminants

Receptor	Point of Exposure	Exposure Pathway	
		Dust Inhalation	**Direct Contact**
Residents	Uncovered Areas (landscaping etc.)	Negligible or Incomplete	Potentially Complete
Grounds Keepers	Surficial Soils.	Negligible or Incomplete	Potentially Complete
Construction Workers	Surface and sub-surface soils exposed during the period of construction.	Potentially Complete	Potentially Complete
Maintenance Workers	1m deep sub-surface maintenance trench.	Potentially Complete	Potentially Complete

10. Conclusions and Recommendations

The results of the generic Tier 1 assessment undertaken at the Site identified exceedances of the health-based criterion for cPAH across the proposed development area. All other potential contaminants, except for TRH and Benzene, were assessed within the respective Tier 1 assessment criteria ($95UCL_{AVE}$ concentrations compared with the relevant guideline values). TRH and BTEX were identified along the northern boundary at levels that would represent hotspot concentrations requiring further assessment and management. In order to manage these risks, the preparation of a Remediation Action Plan (RAP) is recommended. The RAP must include the delineation of the hydrocarbon contamination identified at the northern boundary, a study of remediation options, selection of a preferred remediation strategy and validation of the Site as remediated.

To address the potentially unacceptable health risk posed by cPAH in soil, a Tier 2 Human Health Risk Assessment was undertaken to derive site-specific risk-based criteria for likely future activities and receptors on the site.

The site-specific risk-based criteria (RBC) for carcinogenic PAHs in soil were derived to be protective of future exposures to the more sensitive users of the site. Based on available data, exposure assumptions and constraints of the exposure assessment model, the calculated 95% UCL concentration of carcinogenic PAHs in:

Surficial soils to 0.5 mbgs at the site are below the derived retirement village residential RBC and short-stay child resident RBC for BaP_{TEQ} and, therefore, the potential health risks to future residents (including short-stay children) at the site to residual PAH impact in soils is considered low and acceptable; and

Soils deeper than 0.5 mbgs were below the BaP_{TEQ} RBC for grounds keepers, maintenance workers and construction workers, therefore, the potential health risks to future workers is considered low and acceptable.

A Tier 1 evaluation of Total PAH concentrations (relating to the non-carcinogenic PAHs) measured across the site were below the NEPM health screening criteria. Further, the concentration of both carcinogenic and total PAHs across the site were below the NEPM health screening criteria relevant to future commercial works on the site.

The process for deriving the RBC conservatively assumed the bioavailability of PAHs in soils was 100 percent and that all landscaped areas where potentially exposed and not covered by any surface covering that would prevent or minimise direct contact. Whilst the 95% UCL concentration of carcinogenic PAHs was below the derived RBCs, four individual locations exceeded the short-stay child residential RBC. One of these locations is in the central area of the site within the footprint of the proposed buildings and on locations is near the central southern site boundary in the area of the proposed hardstand driveway. Two isolated locations are in the north-east corner of the site, which are potentially within private open space areas.

As a precautionary measure it is recommended that the landscaping in this area includes the placement of 0.5m of clean soil and/or mulch to minimise access to the impacted soil by residents.

It is recommended all subsurface works are managed via a site specific EMP in order to mitigate potentially impacted soils being brought to the surface where cross contamination or residential exposures may occur.

10.1. Land Use Suitability

Coffey considers that the site can be made suitable for the proposed development within the assumptions of the Tier 2 Risk Assessment and the comparison of the investigation data with the calculated site-specific risk-based criteria and the implementation of the following recommendations:

- A Remediation Action Plan must be prepared for the delineation assessment, remediation and validation of the hydrocarbon impact identified along the northern boundary. The RAP must focus on the delineation of the hydrocarbon contamination and must contain requirements for further assessment works and procedures to remediate identified contamination and validate the Site as remediated.

- In order to manage the identified ecological exceedances (heavy metals and TRH (including the multiple exceedances of the ESL (Urban, Residential and Public Open Space) for TRH F3), existing fill soils are to be excluded from reuse within areas identified for landscaping. The fill materials must be excavated, and residual soils exposed prior to the commencement of landscaping activities. The excavated material is suitable for reuse beneath buildings and hardstand (pavement, car parks and roadways).
- Landscaping Plans must be prepared in line with the following recommendations:
  - Existing site fill soils will not be used within proposed landscape areas. Sandy fill material to be removed from landscaping areas to expose underlying natural residual silty clay material.
  - Imported soil mix (appropriate for proposed species) to proposed planting depth. Existing sandy-fill site soil to be first removed exposing underlying natural residual silty clay material.
- Validation of the excavated site fill and confirmed exposure of residual soil must be undertaken by a suitably qualified environmental scientist prior to landscaping. As this will most likely occur after the RAP has been executed and validated, an addendum report must be prepared for inclusion in the validation report.
- The stockpile SP1 currently located on the hardstand area in the north-eastern corner may be reused on site beneath buildings and hardstand (pavement, car parks and roadways). The stockpiled material must not be reused within the landscaping areas as the TRH F3 impacts are similar to the general site fill soils. Should the stockpile SP1 require offsite disposal the classification is in line with that outlined in Section 8.3 that the soil has been assessed as **General Solid Waste (SCC1/ TCLP1) – (non-putrescible).**
- Preparation of a site-specific Environmental Management Plan (EMP) for subsurface works in order to mitigate potentially impacted soils being brought to the surface where cross contamination or residential exposures may occur.
- Preparation of an Unexpected Finds Protocol (UFP) document to guide the management of unexpected finds during development including contaminated materials and heritage items.

We draw your attention to the enclosed sheet entitled “Important information about your Coffey Environmental Report” which should be read in conjunction with this text. We trust that this report meets your requirements. If you require further information regarding this report, please do not hesitate to contact Paul Wright by email: paul.wright@coffey.com or by mobile phone 0417667296.

For and behalf of Coffey.

Paul Wright
Senior Associate

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

MAP PROJECTION: GDA2020 MGA ZONE 56

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Scale (metres) 1:20000

drawn	SR / AW	coffey A TETRA TECH COMPANY	client:	GHT HOLDINGS PTY LTD
approved	PW		project:	DETAILED SITE INVESTIGATION - DA17-515 107-117 SWAN STREET, MORPETH, NSW
date	31/08/2020		title:	SITE LOCATION PLAN
scale	AS SHOWN		project no:	754-NTLEN271167-R01
original size	A4		figure no:	FIGURE 1 rev: A

PLOT DATE: 31/08/2020 11:30:06 AM DWG FILE: F:\1. PROJECTS\1. SYDENENV\OTHER OFFICES\NTL-ENNNTLEN271167\CAD\754-NTLEN271167-R01.DWG

LEGEND

- SITE BOUNDARY
- STOCKPILE SP1
- BOREHOLE LOCATION
- STOCKPILE SAMPLE LOCATION
- DETAILED INVESTIGATION SAMPLES COLLECTED ON THE 4/8/2018 BY PE
- LOCAL COUNCIL DRAINAGE IMPACT SAMPLES

revision

no.	description	drawn	approved	date
A	ORIGINAL ISSUE	SR/AW	PW	31/08/2020

MAP PROJECTION: GDA2020 MGA ZONE 56

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Scale (metres) 1:250

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drawn	SR / AW
approved	PW
date	31/08/2020
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: GHT HOLDINGS PTY LTD

project: DETAILED SITE INVESTIGATION - DA17-515
107-117 SWAN STREET, MORPETH, NSW

title: BOREHOLE LOCATION PLAN

project no: 754-NTLEN271167-R01 figure no: FIGURE 2 rev: A

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no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

revision

MAP PROJECTION: GDA2020 MGA ZONE 56

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Scale (metres) 1:250

drawn	SR / AW
approved	PW
date	13/07/2020
scale	AS SHOWN
original size	A3

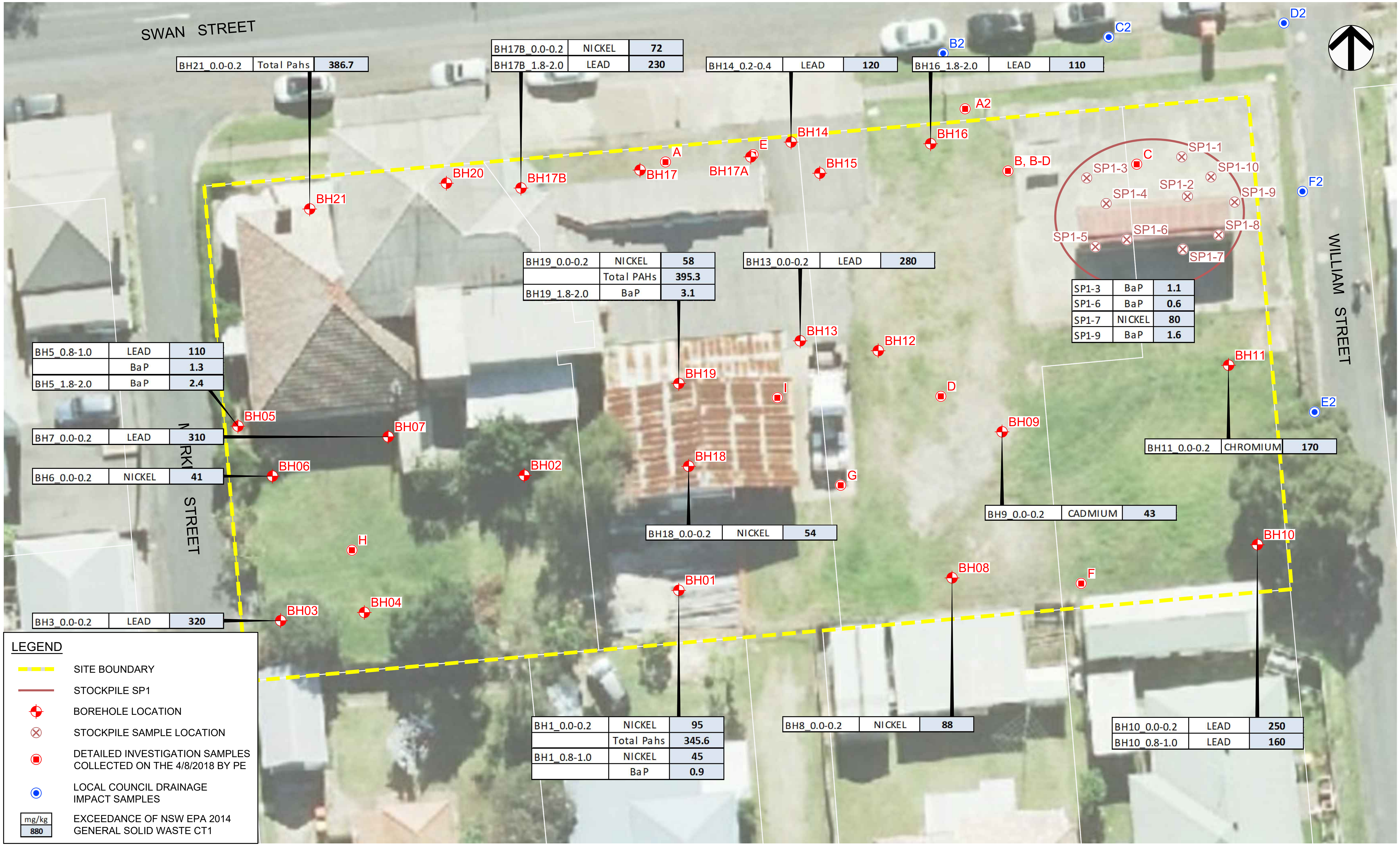
coffey
A TETRA TECH COMPANY

client: GHT HOLDINGS PTY LTD

project: DETAILED SITE INVESTIGATION - DA17-515
107-117 SWAN STREET, MORPETH, NSW

title: EXCEEDANCE OF NEMP 2013- HIL B CRITERIA

project no: 754-NTLEN271167-R01 figure no: FIGURE 3 rev: A



LEGEND

- SITE BOUNDARY
- STOCKPILE SP1
- BOREHOLE LOCATION
- STOCKPILE SAMPLE LOCATION
- DETAILED INVESTIGATION SAMPLES COLLECTED ON THE 4/8/2018 BY PE
- LOCAL COUNCIL DRAINAGE IMPACT SAMPLES
- mg/kg 880 — EXCEEDANCE OF NSW EPA 2014 GENERAL SOLID WASTE CT1

no.	description	drawn	approved	date
A	ORIGINAL ISSUE	SR/AW	PW	31/08/2020

revision

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Scale (metres) 1:250

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approved	PW
date	31/08/2020
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: GHT HOLDINGS PTY LTD

project: DETAILED SITE INVESTIGATION - DA17-515
107-117 SWAN STREET, MORPETH, NSW

title: GENERAL SOLID WASTE EXCEEDANCES

project no: 754-NTLEN271167-R01 | figure no: FIGURE 4 | rev: A

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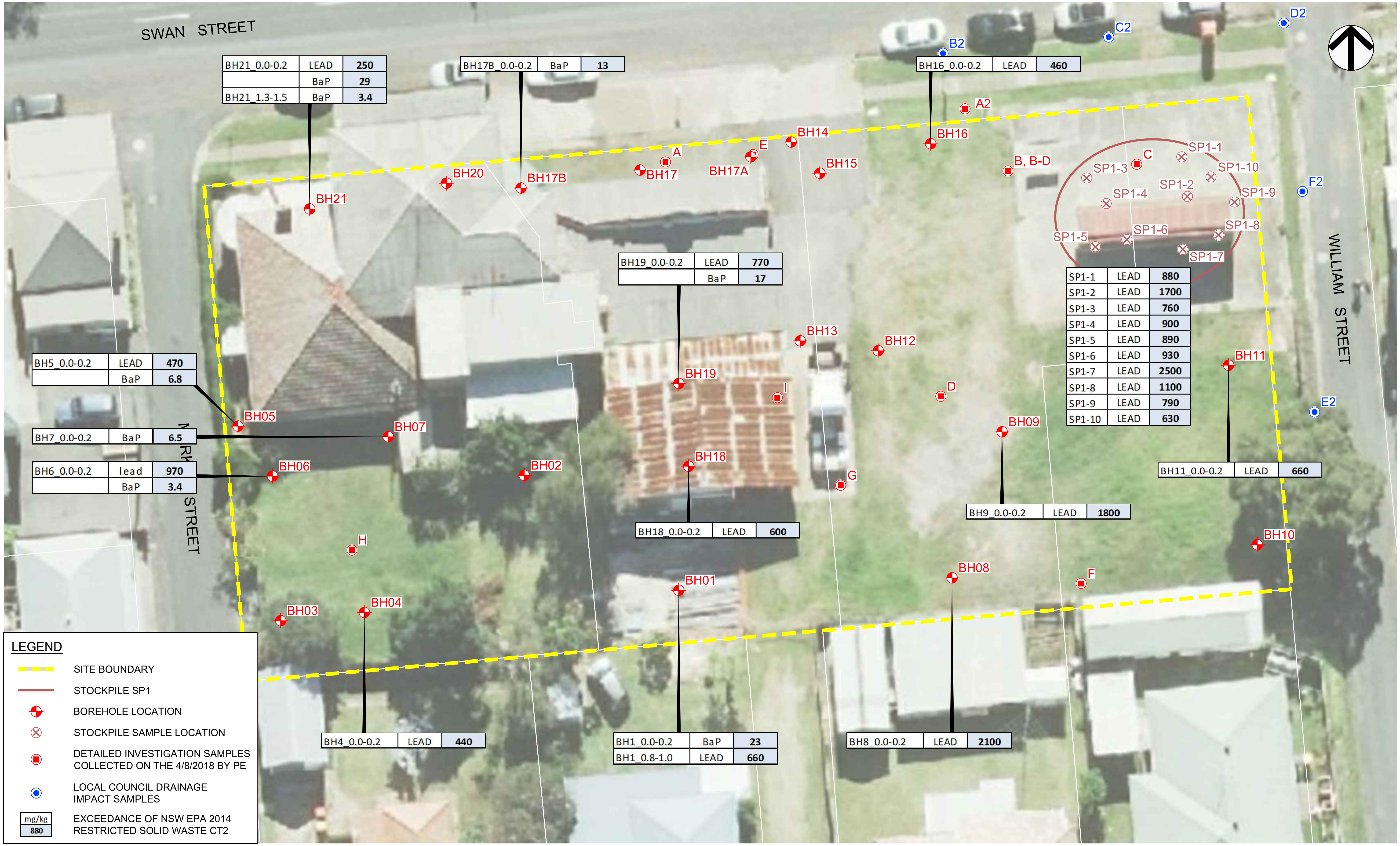

no.	description	drawn	approved	date
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revision

MAP PROJECTION: GDA2020 MGA ZONE 56

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Scale (metres) 1:250

drawn	SR / AW
approved	PW
date	31/08/2020
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: GHT HOLDINGS PTY LTD

project: DETAILED SITE INVESTIGATION - DA17-515
107-117 SWAN STREET, MORPETH, NSW

title: RESTRICTED SOLID WASTE EXCEEDANCES

project no: 754-NTLEN271167-R01 figure no: FIGURE 5 rev: A

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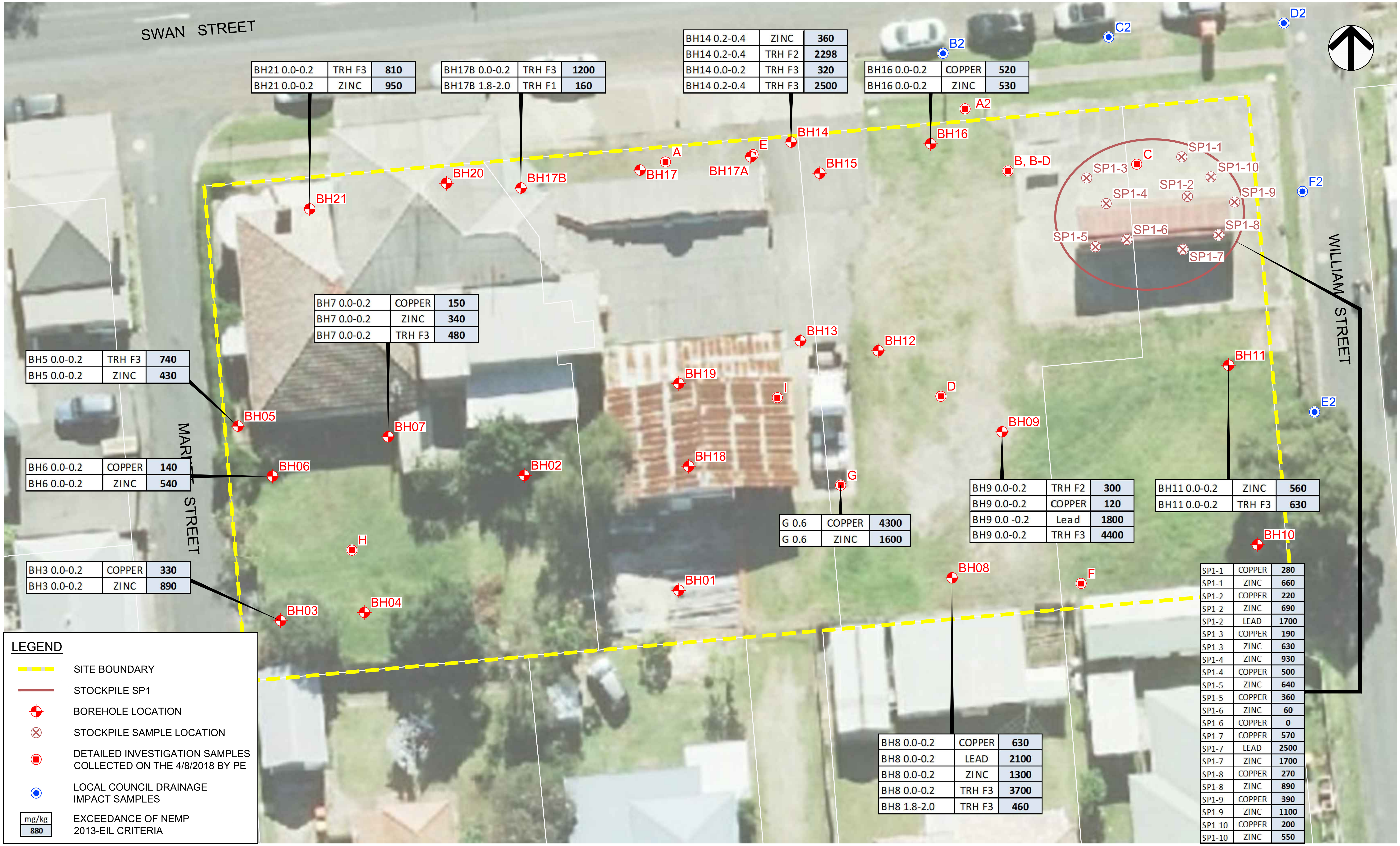

revision no.	description	drawn	approved	date
A	ORIGINAL ISSUE	SR/AW	PW	31/08/2020

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drawn	SR / AW
approved	PW
date	31/08/2020
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: GHT HOLDINGS PTY LTD

project: DETAILED SITE INVESTIGATION - DA17-515
107-117 SWAN STREET, MORPETH, NSW

title: EXCEEDANCE OF NEMP 2013
ECOLOGICAL INVESTIGATION/SCREENING LEVELS

project no: 754-NTLEN271167-R01 figure no: FIGURE 6 rev: A

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LEGEND

- SITE BOUNDARY
- STOCKPILE SP1
- BOREHOLE LOCATION
- STOCKPILE SAMPLE LOCATION
- DETAILED INVESTIGATION SAMPLES COLLECTED ON THE 4/8/2018 BY PE
- LOCAL COUNCIL DRAINAGE IMPACT SAMPLES
- mg/kg 880 — EXCEEDANCE OF NEMP 2013-MANAGEMENT LIMITS

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A	ORIGINAL ISSUE	SR/AW	PW	31/08/2020

MAP PROJECTION: GDA2020 MGA ZONE 56

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Scale (metres) 1:250

drawn	SR / AW
approved	PW
date	31/08/2020
scale	AS SHOWN
original size	A3

coffey
A TETRA TECH COMPANY

client: GHT HOLDINGS PTY LTD

project: DETAILED SITE INVESTIGATION - DA17-515
107-117 SWAN STREET, MORPETH, NSW

title: EXCEEDANCE OF NEMP 2013-MANAGEMENT LIMITS

project no: 754-NTLEN271167-R01 figure no: FIGURE 7 rev: A

Appendix A – Summary Data Tables

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0
											BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0
											0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0
											22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				8.9	46	2.6	3.4	3.8	3.6	11	4.5
	Cadmium	mg/kg	0.4	20	150						<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.7	<0.4
	Chromium	mg/kg	5				480				25	27	<5	20	8	5.8	15	5.6
	Copper	mg/kg	5	6000	30000		110				66	1500	<5	28	<5	9.3	330	<5
	Iron	mg/kg	20								-	-	4200	-	-	-	-	-
	Iron (%)	%	0.01								-	-	0.42	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				85	660	5.3	78	21	30	320	9.7
	Mercury	mg/kg	0.1	40	120						0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.5	<0.1
	Nickel	mg/kg	5	400	1200		370				95	45	<5	15	<5	<5	18	<5
	Zinc	mg/kg	5	7400	60000		260				72	280	16	130	24	74	890	34
Inorganic	% Clay	%	1								-	-	17	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								23	27	24	15	27	24	28	23
	pH (Lab)	pH_Units	0.1								-	-	4.2	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<500	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								<1000	120	<100	<100	<100	<100	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					<500	<50	<50	<50	<50	<50	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				<1000	120	<100	<100	<100	<100	<100	<100
	C34-C40 (F4)	mg/kg	100			10000	2800				<1000	<100	<100	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5								32	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5								23	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								40	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						40	1.4	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								40	1.7	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								16	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								24	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								23	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								54	1.6	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
	Fluorene	mg/kg	0.5								1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								15	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								56	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								55	1.3	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
	Total PAHs	mg/kg	0.5	300	400						345.6	8.3	<0.5	<0.5	<0.5	<0.5	1.2	<0.5
TPH	C10 - C14	mg/kg	20								<200	<20	<20	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50								<500	75	<50	<50	<50	<50	<50	<50
	C29 - C36	mg/kg	50								<500	55	<50	<50	<50	<50	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50								<500	130	<50	<50	<50	<50	<50	<50
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH3_1.8-2.0	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2
											BH3_1.8-2.0	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2
											1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2
											22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				3.4	8.6	2.8	8.8	6.4	4.3	3.7	12
	Cadmium	mg/kg	0.4	20	150						<0.4	<0.4	<0.4	<0.4	0.5	<0.4	<0.4	0.5
	Chromium	mg/kg	5				480				<5	29	6.6	5.6	17	11	<5	32
	Copper	mg/kg	5	6000	30000		110				<5	110	5.6	<5	79	15	7.9	140
	Iron	mg/kg	20								-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				<5	440	28	18	470	110	43	970
	Mercury	mg/kg	0.1	40	120						<0.1	0.2	<0.1	<0.1	0.3	0.1	<0.1	0.5
	Nickel	mg/kg	5	400	1200		370				<5	30	<5	<5	19	<5	<5	41
	Zinc	mg/kg	5	7400	60000		260				20	260	22	30	430	110	70	540
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								22	24	26	23	15	28	26	24
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<50	<50	<50	<50	51.1	<50	<50	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								<100	<100	<100	<100	1022	130	160	280
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					<50	<50	<50	<50	52	<50	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				<100	<100	<100	<100	740	130	160	280
	C34-C40 (F4)	mg/kg	100			10000	2800				<100	<100	<100	<100	230	<100	<100	<100
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	0.9	<0.5	0.5	0.6
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	2.1	0.6	1.1	1.4
	Benzo(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	11	1.9	3.5	5.3
	Benzo(a)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	6.8	1.3	2.4	3.4
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								<0.5	<0.5	<0.5	<0.5	11	1.8	3.3	5.7
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						0.6	0.6	0.6	0.6	11	2	3.5	5.7
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.2	1.2	1.2	1.2	11	2.3	3.8	5.7
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	2.6	<0.5	0.9	1.8
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	7.6	1.1	2.3	3.6
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	8.5	1.4	2.7	4
	Benzo[b+j]fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	5	0.9	1.6	3.1
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.9
	Fluoranthene	mg/kg	0.5								<0.5	0.6	<0.5	<0.5	19	5.2	9.2	12
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.6
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	2.7	0.5	1	1.6
	Naphthalene	mg/kg	0.5					5			<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	12	2.1	5.4	6.7
	Pyrene	mg/kg	0.5								<0.5	0.6	<0.5	<0.5	17	3.4	6.2	10
	Total PAHs	mg/kg	0.5	300	400						<0.5	1.2	<0.5	<0.5	98.2	18.4	36.8	55
TPH	C10 - C14	mg/kg	20								<20	<20	<20	<20	28	<20	<20	<20
	C15 - C28	mg/kg	50								<50	<50	<50	<50	500	110	150	210
	C29 - C36	mg/kg	50								<50	<50	<50	<50	310	<50	<50	100
	C10 - C36 (Sum of total)	mg/kg	50								<50	<50	<50	<50	838	110	150	310
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH6_0.8-1.0	BH6_1.8-2.0	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0
											BH6_0.8-1.0	BH6_1.8-2.0	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0
											0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0
											22-Jun-20	22-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				3.6	2.6	9.5	4.1	<2	14	2.8	39
	Cadmium	mg/kg	0.4	20	150						<0.4	<0.4	0.5	<0.4	<0.4	7.2	<0.4	<0.4
	Chromium	mg/kg	5				480				7	6.2	24	11	<5	42	<5	<5
	Copper	mg/kg	5	6000	30000		110				<5	<5	150	38	<5	630	5.4	5.5
	Iron	mg/kg	20								-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				13	28	310	46	<5	2100	15	19
	Mercury	mg/kg	0.1	40	120						<0.1	<0.1	0.2	<0.1	<0.1	0.2	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370				<5	<5	23	<5	<5	88	<5	<5
	Zinc	mg/kg	5	7400	60000		260				13	20	340	50	9	1300	21	81
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								27	29	18	27	30	32	31	22
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<50	<50	<50	<50	<50	96	<50	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								<100	<100	590	<100	<100	5596	<100	700
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					<50	<50	<50	<50	<50	96	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				<100	<100	480	<100	<100	3700	<100	460
	C34-C40 (F4)	mg/kg	100			10000	2800				<100	<100	110	<100	<100	1800	<100	240
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	1.4	<0.5	<1	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	3.7	<0.5	<1	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5								<0.5	<0.5	11	<0.5	<1	0.6	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5								<0.5	<0.5	6.5	<0.5	<1	0.8	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								<0.5	<0.5	11	<0.5	<1	1	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						0.6	0.6	11	0.6	1.2	1.3	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.2	1.2	11	1.2	2.4	1.6	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	2.6	<0.5	<1	0.9	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	6.9	<0.5	<1	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	8.4	<0.5	<1	0.6	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								<0.5	<0.5	6.5	<0.5	<1	0.8	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	1.4	<0.5	<1	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	<0.5	21	<0.5	<1	1.3	<0.5	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	1.3	<0.5	<1	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	2.9	<0.5	<1	0.6	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			<0.5	<0.5	0.5	<0.5	<1	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	11	<0.5	<1	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	<0.5	17	<0.5	<1	1.1	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400						<0.5	<0.5	102.1	<0.5	<1	6.7	<0.5	<0.5
TPH	C10 - C14	mg/kg	20								<20	<20	<20	<20	<20	71	<20	<20
	C15 - C28	mg/kg	50								<50	<50	360	<50	<50	1700	<50	230
	C29 - C36	mg/kg	50								<50	<50	160	<50	<50	2600	<50	270
	C10 - C36 (Sum of total)	mg/kg	50								<50	<50	520	<50	<50	4371	<50	500
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
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											BH9_0.0-0.2	BH9_0.8-1.0	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0
											BH9_0.0-0.2	BH9_0.8-1.0	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0
											0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0
											23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay								
Heavy Metal	Arsenic	mg/kg	2	100	500		100				18	5.2	2.7	4.8	5.1	2.5	6.9	5
	Cadmium	mg/kg	0.4	20	150						43	<0.4	<0.4	<0.4	<0.4	<0.4	1.2	<0.4
	Chromium	mg/kg	5				480				20	8.5	<5	10	11	<5	170	10
	Copper	mg/kg	5	6000	30000		110				120	<5	<5	43	29	<5	73	<5
	Iron	mg/kg	20								-	-	-	-	15,000	-	-	-
	Iron (%)	%	0.01								-	-	-	-	1.5	-	-	-
	Lead	mg/kg	5	300	1200		1100				1800	16	40	250	160	30	660	14
	Mercury	mg/kg	0.1	40	120						0.3	<0.1	<0.1	1.2	0.7	<0.1	0.4	<0.1
	Nickel	mg/kg	5	400	1200		370				24	<5	<5	10	8.5	<5	23	<5
	Zinc	mg/kg	5	7400	60000		260				240	32	24	130	140	24	560	19
Inorganic	% Clay	%	1								-	-	-	-	15	-	-	-
	Moisture Content (dried @ 103°C)	%	1								11	32	22	18	25	24	22	28
	pH (Lab)	pH_Units	0.1								-	-	-	-	6.9	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	300	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								7500	<100	<100	470	<100	<100	1130	<100
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					300	<50	<50	<50	<50	<50	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				4400	<100	<100	180	<100	<100	630	<100
	C34-C40 (F4)	mg/kg	100			10000	2800				2800	<100	<100	290	<100	<100	500	<100
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5								0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5								0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						1.1	0.6	0.6	0.6	0.6	0.6	0.7	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.4	1.2	1.2	1.2	1.2	1.2	1.3	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								0.7	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								1.1	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								1.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5								1.8	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5
	Total PAHs	mg/kg	0.5	300	400						9.4	<0.5	<0.5	<0.5	<0.5	<0.5	3.2	<0.5
TPH	C10 - C14	mg/kg	20								170	<20	<20	<20	<20	<20	26	<20
	C15 - C28	mg/kg	50								2000	<50	<50	69	63	<50	260	<50
	C29 - C36	mg/kg	50								3800	<50	<50	170	<50	<50	450	<50
	C10 - C36 (Sum of total)	mg/kg	50								5970	<50	<50	239	63	<50	736	<50
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

											Coffey DSI- 22-24.06.2020							
											BH11_1.8-2.0	BH12_0.0-0.2	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0
											BH11_1.8-2.0	BH12_0.0-0.2	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0
											1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.0-0.2	0.2-0.4	0.8-1.0
											23-Jun-20	23-Jun-20	23-Jun-20	22-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay								
Heavy Metal	Arsenic	mg/kg	2	100	500		100				3	3.8	4.8	7.1	4.7	6.9	14	4.6
	Cadmium	mg/kg	0.4	20	150						<0.4	0.6	<0.4	<0.4	4.2	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480				12	10	9.4	<5	17	11	9	11
	Copper	mg/kg	5	6000	30000		110				17	120	19	<5	100	19	67	6.3
	Iron	mg/kg	20								-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				87	91	55	<5	280	13	120	18
	Mercury	mg/kg	0.1	40	120						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
	Nickel	mg/kg	5	400	1200		370				5.9	15	5.5	<5	16	11	8.4	<5
	Zinc	mg/kg	5	7400	60000		260				57	120	37	18	220	49	360	26
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								26	22	22	20	20	10	14	33
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	0.7
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<50	<50	<50	<50	180	<50	2298	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								290	390	<100	<100	12,480	710	4800	100
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	24	34
	C10-C16	mg/kg	50			1000					<50	<50	<50	<50	180	<50	2300	<50
	C16-C34 (F3)	mg/kg	100			3500	300				180	200	<100	<100	7000	320	2500	100
	C34-C40 (F4)	mg/kg	100			10000	2800				110	190	<100	<100	5300	390	<100	<100
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	24	34
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5								<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						0.6	1	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.2	1.3	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	0.8	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.9	<0.5
	Pyrene	mg/kg	0.5								<0.5	0.7	<0.5	<0.5	0.9	<0.5	0.9	<0.5
	Total PAHs	mg/kg	0.5	300	400						<0.5	2.1	<0.5	<0.5	0.9	<0.5	9.6	<0.5
TPH	C10 - C14	mg/kg	20								<20	<20	<20	<20	72	<20	1000	23
	C15 - C28	mg/kg	50								92	110	<50	<50	3000	120	3800	63
	C29 - C36	mg/kg	50								110	120	<50	<50	<50	270	87	100
	C10 - C36 (Sum of total)	mg/kg	50								202	230	<50	<50	3072	390	4887	186
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0
											BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0
											1.4-1.6	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0
											23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				3.6	<2	33	5.7	4.7	4.9	2.6	6.1
	Cadmium	mg/kg	0.4	20	150						<0.4	<0.4	<0.4	<0.4	<0.4	0.6	<0.4	<0.4
	Chromium	mg/kg	5				480				<5	<5	14	9.6	9.5	14	14	10
	Copper	mg/kg	5	6000	30000		110				<5	<5	22	6.8	9	520	5.4	38
	Iron	mg/kg	20								-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				53	53	39	34	36	460	21	110
	Mercury	mg/kg	0.1	40	120						<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370				<5	<5	6.8	<5	<5	13	<5	<5
	Zinc	mg/kg	5	7400	60000		260				14	5.9	51	21	24	530	23	51
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								37	36	9.3	33	30	13	32	31
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	82	<50	61	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								182	<100	1071	<100	<100	130	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					82	<50	61	<50	<50	<50	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				100	<100	490	<100	<100	130	<100	<100
	C34-C40 (F4)	mg/kg	100			10000	2800				<100	<100	520	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5
	Benzo(a)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.6	<0.5
TPH	C10 - C14	mg/kg	20								39	<20	33	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50								140	<50	240	<50	<50	86	<50	<50
	C29 - C36	mg/kg	50								<50	<50	360	<50	<50	61	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50								179	<50	633	<50	<50	147	<50	<50
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed

EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH17B_0.0-0.2	BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0
											BH17B_0.0-0.2	BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0
											0.0-0.2	0.8-1.0	1.8-2.0	2.2-2.3	0.0-0.2	0.8-1.0	1.8-2.0
											23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				3.6	3.5	4.3	<2	32	2.6	4.8
	Cadmium	mg/kg	0.4	20	150						<0.4	<0.4	<0.4	<0.4	0.8	<0.4	<0.4
	Chromium	mg/kg	5				480				19	13	7.1	<5	17	11	5.3
	Copper	mg/kg	5	6000	30000		110				17	<5	<5	<5	1000	<5	68
	Iron	mg/kg	20								-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				14	19	230	16	600	14	63
	Mercury	mg/kg	0.1	40	120						<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370				72	<5	<5	<5	54	<5	5.8
	Zinc	mg/kg	5	7400	60000		260				50	13	7.2	<5	830	33	110
Inorganic	% Clay	%	1								-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								8.9	36	31	21	18	29	27
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<2.5	<5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<500	<50	58	<50	94	<50	<50
	C6 - C9	mg/kg	20								<20	<20	180	<200	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								1200	<100	<100	<100	2104	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	160	140	<20	<20	<20
	C10-C16	mg/kg	50			1000					<500	<50	58	<50	94	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				1200	<100	<100	<100	1800	<100	<100
	C34-C40 (F4)	mg/kg	100			10000	2800				<1000	<100	<100	<100	210	<100	<100
	C6 - C10	mg/kg	20			800					<20	26	250	290	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								3.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								5.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5								14	<0.5	<0.5	<0.5	0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5								13	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								23	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						23	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								23	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								8.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5								11	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								13	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								4.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								20	<0.5	<0.5	<0.5	1.1	<0.5	<0.5
	Fluorene	mg/kg	0.5								1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								7.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			<0.5	<0.5	2	1.7	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								12	<0.5	<0.5	<0.5	1	<0.5	<0.5
	Pyrene	mg/kg	0.5								22	<0.5	<0.5	<0.5	0.8	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400						148.8	<0.5	2	1.7	3.4	<0.5	<0.5
TPH	C10 - C14	mg/kg	20								<200	<20	91	34	62	<20	<20
	C15 - C28	mg/kg	50								740	<50	<50	<50	1200	<50	<50
	C29 - C36	mg/kg	50								630	<50	<50	<50	790	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50								1370	<50	91	<50	2052	<50	<50
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	4.5	4.7	9.3	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	1	10	12	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	3.4	21	54	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	2.8	44	53	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	1.3	15	21	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	4.1	59	73	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

![coffey A TETRA TECH COMPANY]

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
											BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
											0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	0.0-0.2
											23-Jun-20	23-Jun-20	23-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				27	6.4	3.8	2.8	11	5.2
	Cadmium	mg/kg	0.4	20	150						0.6	<0.4	<0.4	<0.4	<0.4	1
	Chromium	mg/kg	5				480				11	11	<5	7.7	11	11
	Copper	mg/kg	5	6000	30000		110				470	17	24	8.3	<5	100
	Iron	mg/kg	20								-	-	11,000	-	-	-
	Iron (%)	%	0.01								-	-	1.1	-	-	-
	Lead	mg/kg	5	300	1200		1100				770	41	30	32	21	250
	Mercury	mg/kg	0.1	40	120						0.7	<0.1	<0.1	<0.1	<0.1	0.2
	Nickel	mg/kg	5	400	1200		370				58	<5	<5	<5	<5	22
	Zinc	mg/kg	5	7400	60000		260				640	45	61	64	24	950
Inorganic	% Clay	%	1								-	-	17	-	-	-
	Moisture Content (dried @ 103°C)	%	1								18	31	24	10	32	12
	pH (Lab)	pH_Units	0.1								-	-	4.1	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	4.6	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	205.4	<50	<50	<50	<50	58
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								1940	<100	360	<100	<100	1018
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	22	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					210	<50	<50	<50	<50	58
	C16-C34 (F3)	mg/kg	100			3500	300				1500	<100	360	<100	<100	810
	C34-C40 (F4)	mg/kg	100			10000	2800				230	<100	<100	<100	<100	150
	C6 - C10	mg/kg	20			800					22	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	1.2
	Acenaphthylene	mg/kg	0.5								4.9	<0.5	1.3	<0.5	<0.5	2.7
	Anthracene	mg/kg	0.5								13	0.8	2.8	<0.5	<0.5	5.9
	Benzo(a)anthracene	mg/kg	0.5								31	1	5.5	<0.5	<0.5	27
	Benzo(a)pyrene	mg/kg	0.5								17	0.6	3.1	<0.5	<0.5	29
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								28	0.8	4.4	<0.5	<0.5	45
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						28	1.1	4.6	0.6	0.6	45
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								28	1.4	4.9	1.2	1.2	45
	Benzo(g,h,i)perylene	mg/kg	0.5								8	<0.5	1.2	<0.5	<0.5	21
	Benzo(k)fluoranthene	mg/kg	0.5								18	0.5	3.5	<0.5	<0.5	22
	Chrysene	mg/kg	0.5								25	1	4.4	<0.5	<0.5	24
	Benzo[b+j]fluoranthene	mg/kg	0.5								16	0.8	2.1	<0.5	<0.5	21
	Dibenz(a,h)anthracene	mg/kg	0.5								3.7	<0.5	<0.5	<0.5	<0.5	6.4
	Fluoranthene	mg/kg	0.5								98	2.2	15	1.1	<0.5	87
	Fluorene	mg/kg	0.5								2.7	<0.5	1	<0.5	<0.5	1.8
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								9.3	<0.5	1.3	<0.5	<0.5	18
	Naphthalene	mg/kg	0.5					5			7.7	<0.5	1.1	<0.5	<0.5	0.7
	Phenanthrene	mg/kg	0.5								78	1.6	14	0.6	<0.5	46
	Pyrene	mg/kg	0.5								63	1.6	10	0.8	<0.5	73
	Total PAHs	mg/kg	0.5	300	400						395.3	10.1	66.3	2.5	<0.5	386.7
TPH	C10 - C14	mg/kg	20								120	<20	23	<20	<20	31
	C15 - C28	mg/kg	50								1300	69	320	<50	<50	650
	C29 - C36	mg/kg	50								510	<50	77	<50	<50	350
	C10 - C36 (Sum of total)	mg/kg	50								1930	69	420	<50	<50	1031
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4	SP1-5	SP1-6	SP1-7	SP1-8
											BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4	SP1-5	SP1-6	SP1-7	SP1-8
											0.8-1.0	1.3-1.5	0.5	0.4	1.0	0.5	0.3	0.5	0.8	0.6
											24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				3.7	3.2	8	7.5	6.5	8.5	7.2	9.9	12	8.9
	Cadmium	mg/kg	0.4	20	150						<0.4	<0.4	1.4	1.7	1.8	3	2.1	2.3	15	2.9
	Chromium	mg/kg	5				480				8.6	7.4	33	21	21	34	22	38	45	20
	Copper	mg/kg	5	6000	30000		110				<5	38	280	220	180	500	360	230	570	270
	Iron	mg/kg	20								-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				15	40	880	1700	760	900	890	930	2500	1100
	Mercury	mg/kg	0.1	40	120						<0.1	<0.1	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4
	Nickel	mg/kg	5	400	1200		370				<5	<5	27	27	26	36	28	28	80	39
	Zinc	mg/kg	5	7400	60000		260				25	110	660	690	630	930	640	860	1700	890
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								31	30	16	18	13	10	14	17	23	17
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<50	<50	<50	<50	64	<50	<50	66	69	<50
	C6 - C9	mg/kg	20								<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100								<100	130	2880	2980	3724	1830	2120	6066	2549	2450
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000					<50	<50	<50	<50	64	<50	<50	66	69	<50
	C16-C34 (F3)	mg/kg	100			3500	300				<100	130	2200	2700	2800	1400	1600	4500	1800	1900
	C34-C40 (F4)	mg/kg	100			10000	2800				<100	<100	680	280	860	430	520	1500	680	550
	C6 - C10	mg/kg	20			800					<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5								<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5								<0.5	3.7	<0.5	0.8	1.3	0.8	0.5	0.6	0.6	<0.5
	Benzo(a)pyrene	mg/kg	0.5								<0.5	3.4	<0.5	0.7	1.1	0.8	0.7	0.9	0.6	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								<0.5	5.7	<0.5	0.9	1.5	1	0.8	1.1	0.7	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						0.6	5.7	0.6	1.2	1.7	1.3	1.1	1.4	1	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.2	5.7	1.2	1.5	2	1.6	1.4	1.7	1.3	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5								<0.5	2.7	<0.5	0.8	1.1	0.7	<0.5	0.9	0.6	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	3.4	<0.5	0.6	1.2	0.9	0.6	0.7	0.6	<0.5
	Chrysene	mg/kg	0.5								<0.5	3.1	<0.5	0.7	1.3	0.7	0.5	0.9	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5								<0.5	3.5	<0.5	<0.5	0.6	0.6	<0.5	0.6	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5								<0.5	9	0.7	1.5	1.8	1.3	0.8	1.4	0.7	0.6
	Fluorene	mg/kg	0.5								<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	2.4	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5			<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5								<0.5	4.5	<0.5	0.8	1.5	1.5	<0.5	1	0.5	<0.5
	Pyrene	mg/kg	0.5								<0.5	8.5	0.7	1.2	1.7	1.3	0.8	1.4	0.7	0.8
	Total PAHs	mg/kg	0.5	300	400						<0.5	46.2	1.4	7.1	12.2	9.3	3.9	8.4	4.3	1.4
TPH	C10 - C14	mg/kg	20								<20	<20	34	32	47	29	35	46	50	32
	C15 - C28	mg/kg	50								<50	86	1000	1200	1300	670	750	2100	830	890
	C29 - C36	mg/kg	50								<50	89	1400	1600	1800	870	1300	2800	1600	1200
	C10 - C36 (Sum of total)	mg/kg	50								<50	175	2434	2832	3147	1569	2085	4946	2480	2122
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	SP1-9 SP1-9 1 24-Jun-20 Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				15
	Cadmium	mg/kg	0.4	20	150						3.6
	Chromium	mg/kg	5				480				27
	Copper	mg/kg	5	6000	30000		110				390
	Iron	mg/kg	20								-
	Iron (%)	%	0.01								-
	Lead	mg/kg	5	300	1200		1100				790
	Mercury	mg/kg	0.1	40	120						0.4
	Nickel	mg/kg	5	400	1200		370				37
	Zinc	mg/kg	5	7400	60000		260				1100
Inorganic	% Clay	%	1								-
	Moisture Content (dried @ 103°C)	%	1								18
	pH (Lab)	pH_Units	0.1								-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	54
	C6 - C9	mg/kg	20								<20
	C10 - C40 (Sum of total)	mg/kg	100								1804
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20
	C10-C16	mg/kg	50			1000					54
	C16-C34 (F3)	mg/kg	100			3500	300				1200
	C34-C40 (F4)	mg/kg	100			10000	2800				550
	C6 - C10	mg/kg	20			800					<20
PAH	Acenaphthene	mg/kg	0.5								<0.5
	Acenaphthylene	mg/kg	0.5								<0.5
	Anthracene	mg/kg	0.5								0.9
	Benzo(a)anthracene	mg/kg	0.5								2.1
	Benzo(a)pyrene	mg/kg	0.5								1.6
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								2.2
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						2.4
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								2.7
	Benzo(g,h,i)perylene	mg/kg	0.5								0.9
	Benzo(k)fluoranthene	mg/kg	0.5								1.2
	Chrysene	mg/kg	0.5								1.7
	Benzo[b+j]fluoranthene	mg/kg	0.5								1.2
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5
	Fluoranthene	mg/kg	0.5								4.6
	Fluorene	mg/kg	0.5								<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								0.8
	Naphthalene	mg/kg	0.5					5			<0.5
	Phenanthrene	mg/kg	0.5								4.4
	Pyrene	mg/kg	0.5								3.8
	Total PAHs	mg/kg	0.5	300	400						23.2
TPH	C10 - C14	mg/kg	20								37
	C15 - C28	mg/kg	50								610
	C29 - C36	mg/kg	50								810
	C10 - C36 (Sum of total)	mg/kg	50								1457
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2
	Xylene (o)	mg/kg	0.1								<0.1
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

																				Pacif
											SP1-10	A	A	B	C	B-D*	D	E	E	F
											SP1-10	A	A	B	C	Duplicate of D	D	E	E	F
											0.8	0.3	2.1	0.7	0.9	-	0.7	0.6	2.7	0.3
											24-Jun-20	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay										
Heavy Metal	Arsenic	mg/kg	2	100	500		100				6.2	2.8	<2	7.8	5.7	7	5	6.2	4.6	5
	Cadmium	mg/kg	0.4	20	150						2.4	<0.4	<0.4	<0.4	<0.4	0.5	1.5	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480				15	9.3	<5	15	16	16	11	15	5.1	14
	Copper	mg/kg	5	6000	30000		110				200	12	<5	86	410	100	32	21	6.6	48
	Iron	mg/kg	20								-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				630	13	21	1900	420	1400	200	290	110	330
	Mercury	mg/kg	0.1	40	120						0.4	<0.1	<0.1	2	0.8	2.7	<0.1	0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370				24	<5	<5	23	9.3	21	7.2	13	<5	14
	Zinc	mg/kg	5	7400	60000		260				550	39	18	520	1200	780	1500	85	9.6	190
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								14	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	<0.5	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<50	-	-	-	-	-	-	-	-	-
	C6 - C9	mg/kg	20								<20	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100								2500	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	30	<20	<20	<20	<20	<40	<40	<20
	C10-C16	mg/kg	50			1000					<50	<50	<50	97	<50	<50	<50	<50	<50	130
	C16-C34 (F3)	mg/kg	100			3500	300				1600	<100	<100	5900	460	10,000	<100	<100	<100	9300
	C34-C40 (F4)	mg/kg	100			10000	2800				900	<100	<100	910	130	1400	160	<100	<100	4000
	C6 - C10	mg/kg	20			800					<20	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5								0.7	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5								0.7	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								0.9	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								1.5	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5								0.6	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5								0.6	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5								0.8	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5								2	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								<0.5	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5					5			<0.5	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5								1.3	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5								1.5	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	300	400						8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TPH	C10 - C14	mg/kg	20								36	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50								660	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50								1300	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50								1996	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	0.4	0.1	0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2								<0.2	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1								<0.1	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.3	<0.3	0.6	0.6	<0.3	<0.6	<0.6	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

											ic Environmental July 2018 - June 2019										
											F	G	H	I	A	B	C	D	E	F	I
											F	G	H	I	A	B	C	D	E	F	I
											2	0.6	0.6	0.4	-	-	-	-	-	-	-
											26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19
											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay											
Heavy Metal	Arsenic	mg/kg	2	100	500		100				16	64	4.3	13	-	-	-	-	-	-	-
	Cadmium	mg/kg	0.4	20	150						<0.4	0.9	<0.4	0.5	-	-	-	-	-	-	-
	Chromium	mg/kg	5				480				5	28	10	14	-	-	-	-	-	-	-
	Copper	mg/kg	5	6000	30000		110				26	4300	18	400	-	-	-	-	-	-	-
	Iron	mg/kg	20								-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01								-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100				46	1100	23	470	380	620	150	89	170	460	550
	Mercury	mg/kg	0.1	40	120						<0.1	0.2	<0.1	0.9	-	-	-	-	-	-	-
	Nickel	mg/kg	5	400	1200		370				<5	52	<5	67	-	-	-	-	-	-	-
	Zinc	mg/kg	5	7400	60000		260				59	1600	70	950	-	-	-	-	-	-	-
Inorganic	% Clay	%	1								-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1								-	-	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1								-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	-	-	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	-	-	-	-	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20								-	-	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100								-	-	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<20	<20	<40	<20	<20	<20	<20	<20	<20	<20	<40
	C10-C16	mg/kg	50			1000					<50	<50	<50	59	58	<50	<50	<50	<50	<50	<50
	C16-C34 (F3)	mg/kg	100			3500	300				<100	310	<100	370	400	170	390	<100	260	220	4700
	C34-C40 (F4)	mg/kg	100			10000	2800				<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1600
	C6 - C10	mg/kg	20			800					-	-	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						<0.5	1.4	<0.5	3.5	<0.5	1.3	1.3	1.3	11	4	3.2
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5					5			-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5								-	-	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	300	400						<0.5	1.1	<0.5	24.8	2	11.1	9.6	10.9	83.3	29.7	25.3
TPH	C10 - C14	mg/kg	20								-	-	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50								-	-	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50								-	-	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50								-	-	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1					0.5	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
	Ethylbenzene	mg/kg	0.1					55	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
	Toluene	mg/kg	0.1					160	NL	NL	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-
	Xylene (m & p)	mg/kg	0.2								-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1								-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3					40	310	NL	<0.3	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	0.4	-	-	-

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Sand	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	J** Duplicate of I - 11-Jun-19 Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100				-
	Cadmium	mg/kg	0.4	20	150						-
	Chromium	mg/kg	5				480				-
	Copper	mg/kg	5	6000	30000		110				-
	Iron	mg/kg	20								-
	Iron (%)	%	0.01								-
	Lead	mg/kg	5	300	1200		1100				660
	Mercury	mg/kg	0.1	40	120						-
	Nickel	mg/kg	5	400	1200		370				-
	Zinc	mg/kg	5	7400	60000		260				-
Inorganic	% Clay	%	1								-
	Moisture Content (dried @ 103°C)	%	1								-
	pH (Lab)	pH_Units	0.1								-
Organic	Naphthalene	mg/kg	0.5				170	3	NL	NL	-
	F2-NAPHTHALENE	mg/kg	50				120	110	NL	NL	<50
	C6 - C9	mg/kg	20								-
	C10 - C40 (Sum of total)	mg/kg	100								-
	C6-C10 less BTEX (F1)	mg/kg	20				180	45	90	150	<40
	C10-C16	mg/kg	50			1000					<50
	C16-C34 (F3)	mg/kg	100			3500	300				3600
	C34-C40 (F4)	mg/kg	100			10000	2800				1300
	C6 - C10	mg/kg	20			800					-
PAH	Acenaphthene	mg/kg	0.5								-
	Acenaphthylene	mg/kg	0.5								-
	Anthracene	mg/kg	0.5								-
	Benzo(a)anthracene	mg/kg	0.5								-
	Benzo(a)pyrene	mg/kg	0.5								-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5								-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4						1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5								-
	Benzo(g,h,i)perylene	mg/kg	0.5								-
	Benzo(k)fluoranthene	mg/kg	0.5								-
	Chrysene	mg/kg	0.5								-
	Benzo[b+j]fluoranthene	mg/kg	0.5								-
	Dibenz(a,h)anthracene	mg/kg	0.5								-
	Fluoranthene	mg/kg	0.5								-
	Fluorene	mg/kg	0.5								-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5								-
	Naphthalene	mg/kg	0.5					5			-
	Phenanthrene	mg/kg	0.5								-
	Pyrene	mg/kg	0.5								-
	Total PAHs	mg/kg	0.5	300	400						9.3
TPH	C10 - C14	mg/kg	20								-
	C15 - C28	mg/kg	50								-
	C29 - C36	mg/kg	50								-
	C10 - C36 (Sum of total)	mg/kg	50								-
Volatile	Benzene	mg/kg	0.1					0.5	1	2	-
	Ethylbenzene	mg/kg	0.1					55	NL	NL	-
	Toluene	mg/kg	0.1					160	NL	NL	-
	Xylene (m & p)	mg/kg	0.2								-
	Xylene (o)	mg/kg	0.1								-
	Xylene Total	mg/kg	0.3					40	310	NL	-

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR2
Waste Classification
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

					Field_ID	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0
					LocCode	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0
					Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0
					PID Result	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
					Sampled_Date-Time	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
					Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	CT1 NSW 2014 General Solid Waste (No Leaching)	CT2 NSW 2014 Restricted Solid Waste (No Leaching)																	
Heavy Metal	Arsenic	mg/kg	2	100	400	8.9	46	2.6	3.4	3.8	3.6	11	4.5	3.4	8.6	2.8	8.8	6.4	4.3	3.7	12	3.6
	Cadmium	mg/kg	0.4	20	80	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.7	<0.4	<0.4	<0.4	<0.4	<0.4	0.5	<0.4	<0.4	0.5	<0.4
	Chromium	mg/kg	5	100	400	25	27	<5	20	8	5.8	15	5.6	<5	29	6.6	5.6	17	11	<5	32	7
	Copper	mg/kg	5			66	1500	<5	28	<5	9.3	330	<5	<5	110	5.6	<5	79	15	7.9	140	<5
	Iron	mg/kg	20			-	-	4200	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01			-	-	0.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	100	400	85	660	5.3	78	21	30	320	9.7	<5	440	28	18	470	110	43	970	13
	Mercury	mg/kg	0.1	4	16	0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	0.2	<0.1	<0.1	0.3	0.1	<0.1	0.5	<0.1
	Nickel	mg/kg	5	40	160	95	45	<5	15	<5	<5	18	<5	<5	30	<5	<5	19	<5	<5	41	<5
	Zinc	mg/kg	5			72	280	16	130	24	74	890	34	20	260	22	30	430	110	70	540	13
Inorganic	% Clay	%	1			-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1			23	27	24	15	27	24	28	23	22	24	26	23	15	28	26	24	27
	pH (Lab)	pH_Units	0.1			-	-	4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50			<500	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	51.1	<50	<50	<50	<50
	C6 - C9	mg/kg	20	650	2600	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100			<1000	120	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1022	130	160	280	<100
	C6-C10 less BTEX (F1)	mg/kg	20			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			<500	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	52	<50	<50	<50	<50
	C16-C34	mg/kg	100			<1000	120	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	740	130	160	280	<100
	C34-C40	mg/kg	100			<1000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	230	<100	<100	<100	<100
	C6 - C10	mg/kg	20			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	0.5	0.6	<0.5
	Anthracene	mg/kg	0.5			14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.1	0.6	1.1	1.4	<0.5
	Benzo(a)anthracene	mg/kg	0.5			32	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	1.9	3.5	5.3	<0.5
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	23	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.8	1.3	2.4	3.4	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5			40	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	1.8	3.3	5.7	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5			40	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	11	2	3.5	5.7	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5			40	1.7	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	11	2.3	3.8	5.7	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5			16	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.6	<0.5	0.9	1.8	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5			20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	7.6	1.1	2.3	3.6	<0.5
	Chrysene	mg/kg	0.5			24	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.5	1.4	2.7	4	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5			23	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	5	0.9	1.6	3.1	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.9	<0.5
	Fluoranthene	mg/kg	0.5			54	1.6	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.6	<0.5	<0.5	19	5.2	9.2	12	<0.5
	Fluorene	mg/kg	0.5			1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.6	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			15	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.7	0.5	1	1.6	<0.5
	Naphthalene	mg/kg	0.5			1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			56	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	2.1	5.4	6.7	<0.5
	Pyrene	mg/kg	0.5			55	1.3	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.6	<0.5	<0.5	17	3.4	6.2	10	<0.5
	Total PAHs	mg/kg	0.5	200	800	345.6	8.3	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	1.2	<0.5	<0.5	98.2	18.4	36.8	55	<0.5
TPH	C10 - C14	mg/kg	20			<200	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	28	<20	<20	<20	<20
	C15 - C28	mg/kg	50			<500	75	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	500	110	150	210	<50
	C29 - C36	mg/kg	50			<500	55	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	310	<50	<50	100	<50
	C10 - C36 (Sum of total)	mg/kg	50	10000	40000	<500	130	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	838	110	150	310	<50
Volatile	Benzene	mg/kg	0.1	10	40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	600	2400	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	288	1152	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3	1000	4000	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Asbestos (Presence/ Absence)	%				NAD	-	-	NAD	-	-	NAD	-	-	NAD	-	-	NAD	-	-	NAD	-

Result	Exceeds criteria for NSW 2014 General Solid Waste CT1
Result	Exceeds criteria for NSW 2014 General Solid Waste (SCC1/ TCLP1 - with leaching)
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste CT2
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste (SCC2/ TCLP2 - with leaching)
-	Not Analysed
NAD	No Asbestos Detected

coffey
A TETRA TECH COMPANY

Table LR2
Waste Classification
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

					Field_ID	BH6_1.8-2.0	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
					LocCode	BH6_1.8-2.0	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
					Sample_Depth_Range	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2
					PID Result	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
					Sampled_Date-Time	22-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
					Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	CT1 NSW 2014 General Solid Waste (No Leaching)	CT2 NSW 2014 Restricted Solid Waste (No Leaching)																	
Heavy Metal	Arsenic	mg/kg	2	100	400	2.6	9.5	4.1	<2	14	2.8	39	18	5.2	2.7	4.8	5.1	2.5	6.9	5	3	3.8
	Cadmium	mg/kg	0.4	20	80	<0.4	0.5	<0.4	<0.4	7.2	<0.4	<0.4	43	<0.4	<0.4	<0.4	<0.4	<0.4	1.2	<0.4	<0.4	0.6
	Chromium	mg/kg	5	100	400	6.2	24	11	<5	42	<5	<5	20	8.5	<5	10	11	<5	170	10	12	10
	Copper	mg/kg	5			<5	150	38	<5	630	5.4	5.5	120	<5	<5	43	29	<5	73	<5	17	120
	Iron	mg/kg	20			-	-	-	-	-	-	-	-	-	-	-	15,000	-	-	-	-	-
	Iron (%)	%	0.01			-	-	-	-	-	-	-	-	-	-	-	1.5	-	-	-	-	-
	Lead	mg/kg	5	100	400	28	310	46	<5	2100	15	19	1800	16	40	250	160	30	660	14	87	91
	Mercury	mg/kg	0.1	4	16	<0.1	0.2	<0.1	<0.1	0.2	<0.1	<0.1	0.3	<0.1	<0.1	1.2	0.7	<0.1	0.4	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	40	160	<5	23	<5	<5	88	<5	<5	24	<5	<5	10	8.5	<5	23	<5	5.9	15
	Zinc	mg/kg	5			20	340	50	9	1300	21	81	240	32	24	130	140	24	560	19	57	120
Inorganic	% Clay	%	1			-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1			29	18	27	30	32	31	22	11	32	22	18	25	24	22	28	26	22
	pH (Lab)	pH_Units	0.1			-	-	-	-	-	-	-	-	-	-	-	6.9	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50			<50	<50	<50	<50	96	<50	<50	300	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20	650	2600	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100			<100	590	<100	<100	5596	<100	700	7500	<100	<100	470	<100	<100	1130	<100	290	390
	C6-C10 less BTEX (F1)	mg/kg	20			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			<50	<50	<50	<50	96	<50	<50	300	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			<100	480	<100	<100	3700	<100	460	4400	<100	<100	180	<100	<100	630	<100	180	200
	C34-C40	mg/kg	100			<100	110	<100	<100	1800	<100	240	2800	<100	<100	290	<100	<100	500	<100	110	190
	C6 - C10	mg/kg	20			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			<0.5	1.4	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5			<0.5	3.7	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5			<0.5	11	<0.5	<1	0.6	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	<0.5	6.5	<0.5	<1	0.8	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5			<0.5	11	<0.5	<1	1	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5			0.6	11	0.6	1.2	1.3	0.6	0.6	1.1	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5			1.2	11	1.2	2.4	1.6	1.2	1.2	1.4	1.2	1.2	1.2	1.2	1.2	1.3	1.2	1.2	1.3
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	2.6	<0.5	<1	0.9	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5			<0.5	6.9	<0.5	<1	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5			<0.5	8.4	<0.5	<1	0.6	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5			<0.5	6.5	<0.5	<1	0.8	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	1.4	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			<0.5	21	<0.5	<1	1.3	<0.5	<0.5	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	0.8
	Fluorene	mg/kg	0.5			<0.5	1.3	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	2.9	<0.5	<1	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5			<0.5	0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			<0.5	11	<0.5	<1	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5			<0.5	17	<0.5	<1	1.1	<0.5	<0.5	1.8	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	0.7
	Total PAHs	mg/kg	0.5	200	800	<0.5	102.1	<0.5	<1	6.7	<0.5	<0.5	9.4	<0.5	<0.5	<0.5	<0.5	<0.5	3.2	<0.5	<0.5	2.1
TPH	C10 - C14	mg/kg	20			<20	<20	<20	<20	71	<20	<20	170	<20	<20	<20	<20	<20	26	<20	<20	<20
	C15 - C28	mg/kg	50			<50	360	<50	<50	1700	<50	230	2000	<50	<50	69	63	<50	260	<50	92	110
	C29 - C36	mg/kg	50			<50	160	<50	<50	2600	<50	270	3800	<50	<50	170	<50	<50	450	<50	110	120
	C10 - C36 (Sum of total)	mg/kg	50	10000	40000	<50	520	<50	<50	4371	<50	500	5970	<50	<50	239	63	<50	736	<50	202	230
Volatile	Benzene	mg/kg	0.1	10	40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	600	2400	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	288	1152	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1			<0.1	<0.1	<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	<0.1	<0.1
	Xylene Total	mg/kg	0.3	1000	4000	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Asbestos (Presence/ Absence)	%				-	NAD	-	-	NAD	-	-	NAD	-	-	NAD	-	-	NAD	-	-	NAD

Result	Exceeds criteria for NSW 2014 General Solid Waste CT1
Result	Exceeds criteria for NSW 2014 General Solid Waste (SCC1/ TCLP1 - with leaching)
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste CT2
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste (SCC2/ TCLP2 - with leaching)
-	Not Analysed
NAD	No Asbestos Detected

Table LR2
Waste Classification
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

					Field_ID	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0	BH17B_0.0-0.2	BH17B_0.8-1.0
					LocCode	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0	BH17B_0.0-0.2	BH17B_0.8-1.0
					Sample_Depth_Range	0.8-1.0	1.8-2.0	0.0-0.2	0.0-0.2	0.2-0.4	0.8-1.0	1.4-1.6	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0
					PID Result	0.0	0.0	0.0	0.7	105.6	1.5	170	10.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	35.7
					Sampled_Date-Time	23-Jun-20	22-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
					Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	CT1 NSW 2014 General Solid Waste (No Leaching)	CT2 NSW 2014 Restricted Solid Waste (No Leaching)																
Heavy Metal	Arsenic	mg/kg	2	100	400	4.8	7.1	4.7	6.9	14	4.6	3.6	<2	33	5.7	4.7	4.9	2.6	6.1	3.6	3.5
	Cadmium	mg/kg	0.4	20	80	<0.4	<0.4	4.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<0.4
	Chromium	mg/kg	5	100	400	9.4	<5	17	11	9	11	<5	<5	14	9.6	9.5	14	14	10	19	13
	Copper	mg/kg	5			19	<5	100	19	67	6.3	<5	<5	22	6.8	9	520	5.4	38	17	<5
	Iron	mg/kg	20			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	100	400	55	<5	280	13	120	18	53	53	39	34	36	460	21	110	14	19
	Mercury	mg/kg	0.1	4	16	<0.1	<0.1	<0.1	<0.1	0.2	<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	5	40	160	5.5	<5	16	11	8.4	<5	<5	<5	6.8	<5	<5	13	<5	<5	72	<5
	Zinc	mg/kg	5			37	18	220	49	360	26	14	5.9	51	21	24	530	23	51	50	13
Inorganic	% Clay	%	1			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1			22	20	20	10	14	33	37	36	9.3	33	30	13	32	31	8.9	36
	pH (Lab)	pH_Units	0.1			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	2.2	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50			<50	<50	180	<50	2298	<50	82	<50	61	<50	<50	<50	<50	<50	<500	<50
	C6 - C9	mg/kg	20	650	2600	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100			<100	<100	12,480	710	4800	100	182	<100	1071	<100	<100	130	<100	<100	1200	<100
	C6-C10 less BTEX (F1)	mg/kg	20			<20	<20	<20	<20	24	34	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			<50	<50	180	<50	2300	<50	82	<50	61	<50	<50	<50	<50	<50	<500	<50
	C16-C34	mg/kg	100			<100	<100	7000	320	2500	100	100	<100	490	<100	<100	130	<100	<100	1200	<100
	C34-C40	mg/kg	100			<100	<100	5300	390	<100	<100	<100	<100	520	<100	<100	<100	<100	<100	<1000	<100
	C6 - C10	mg/kg	20			<20	<20	<20	<20	24	34	<20	<20	<20	<20	<20	<20	<20	<20	<20	26
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.6	<0.5
	Anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	5.9	<0.5
	Benzo(a)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	14	<0.5
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	23	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	23	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5			1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	23	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.4	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	<0.5
	Chrysene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.7	<0.5
	Fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	20	<0.5
	Fluorene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	7.7	<0.5
	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.5	<0.5	12	<0.5
	Pyrene	mg/kg	0.5			<0.5	<0.5	0.9	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	22	<0.5
	Total PAHs	mg/kg	0.5	200	800	<0.5	<0.5	0.9	<0.5	9.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.6	<0.5	148.8	<0.5
TPH	C10 - C14	mg/kg	20			<20	<20	72	<20	1000	23	39	<20	33	<20	<20	<20	<20	<20	<200	<20
	C15 - C28	mg/kg	50			<50	<50	3000	120	3800	63	140	<50	240	<50	<50	86	<50	<50	740	<50
	C29 - C36	mg/kg	50			<50	<50	<50	270	87	100	<50	<50	360	<50	<50	61	<50	<50	630	<50
	C10 - C36 (Sum of total)	mg/kg	50	10000	40000	<50	<50	3072	390	4887	186	179	<50	633	<50	<50	147	<50	<50	1370	<50
Volatile	Benzene	mg/kg	0.1	10	40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.5
	Ethylbenzene	mg/kg	0.1	600	2400	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1
	Toluene	mg/kg	0.1	288	1152	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.4
	Xylene (m & p)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2.8
	Xylene (o)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3
	Xylene Total	mg/kg	0.3	1000	4000	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	4.1
	Asbestos (Presence/ Absence)	%				-	-	NAD	NAD	-	-	-	-	NAD	-	-	NAD	-	-	NAD	-

Result	Exceeds criteria for NSW 2014 General Solid Waste CT1
Result	Exceeds criteria for NSW 2014 General Solid Waste (SCC1/ TCLP1 - with leaching)
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste CT2
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste (SCC2/ TCLP2 - with leaching)
-	Not Analysed
NAD	No Asbestos Detected

coffey
A TETRA TECH COMPANY

Table LR2
Waste Classification
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

					Field_ID	BH17B_1.8-2.0	BH17B_2.2-2.3	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2	BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4
					LocCode	BH17B_1.8-2.0	BH17B_2.2-2.3	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2	BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4
					Sample_Depth_Range	1.8-2.0	2.2-2.3	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	0.0-0.2	0.8-1.0	1.3-1.5	0.5	0.4	1.0	0.5
					PID Result	1702	370	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
					Sampled_Date-Time	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
					Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	CT1 NSW 2014 General Solid Waste (No Leaching)	CT2 NSW 2014 Restricted Solid Waste (No Leaching)																	
Heavy Metal	Arsenic	mg/kg	2	100	400	4.3	<2	32	2.6	4.8	27	6.4	3.8	2.8	11	5.2	3.7	3.2	8	7.5	6.5	8.5
	Cadmium	mg/kg	0.4	20	80	<0.4	<0.4	0.8	<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<0.4	1	<0.4	<0.4	1.4	1.7	1.8	3
	Chromium	mg/kg	5	100	400	7.1	<5	17	11	5.3	11	11	<5	7.7	11	11	8.6	7.4	33	21	21	34
	Copper	mg/kg	5			<5	<5	1000	<5	68	470	17	24	8.3	<5	100	<5	38	280	220	180	500
	Iron	mg/kg	20			-	-	-	-	-	-	-	11,000	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01			-	-	-	-	-	-	-	1.1	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	100	400	230	16	600	14	63	770	41	30	32	21	250	15	40	880	1700	760	900
	Mercury	mg/kg	0.1	4	16	<0.1	<0.1	0.3	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.4	0.3	0.3	0.3
	Nickel	mg/kg	5	40	160	<5	<5	54	<5	5.8	58	<5	<5	<5	<5	22	<5	<5	27	27	26	36
	Zinc	mg/kg	5			7.2	<5	830	33	110	640	45	61	64	24	950	25	110	660	690	630	930
Inorganic	% Clay	%	1			-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1			31	21	18	29	27	18	31	24	10	32	12	31	30	16	18	13	10
	pH (Lab)	pH_Units	0.1			-	-	-	-	-	-	-	4.1	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5			<2.5	<5	<0.5	<0.5	<0.5	4.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50			58	<50	94	<50	<50	205.4	<50	<50	<50	<50	58	<50	<50	<50	<50	64	<50
	C6 - C9	mg/kg	20	650	2600	180	<200	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100			<100	<100	2104	<100	<100	1940	<100	360	<100	<100	1018	<100	130	2880	2980	3724	1830
	C6-C10 less BTEX (F1)	mg/kg	20			160	140	<20	<20	<20	22	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			58	<50	94	<50	<50	210	<50	<50	<50	<50	58	<50	<50	<50	<50	64	<50
	C16-C34	mg/kg	100			<100	<100	1800	<100	<100	1500	<100	360	<100	<100	810	<100	130	2200	2700	2800	1400
	C34-C40	mg/kg	100			<100	<100	210	<100	<100	230	<100	<100	<100	<100	150	<100	<100	680	280	860	430
	C6 - C10	mg/kg	20			250	290	<20	<20	<20	22	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	4.9	<0.5	1.3	<0.5	<0.5	2.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	13	0.8	2.8	<0.5	<0.5	5.9	<0.5	1.1	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5			<0.5	<0.5	0.5	<0.5	<0.5	31	1	5.5	<0.5	<0.5	27	<0.5	3.7	<0.5	0.8	1.3	0.8
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	<0.5	<0.5	<0.5	<0.5	<0.5	17	0.6	3.1	<0.5	<0.5	29	<0.5	3.4	<0.5	0.7	1.1	0.8
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	28	0.8	4.4	<0.5	<0.5	45	<0.5	5.7	<0.5	0.9	1.5	1
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5			0.6	0.6	0.6	0.6	0.6	28	1.1	4.6	0.6	0.6	45	0.6	5.7	0.6	1.2	1.7	1.3
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5			1.2	1.2	1.2	1.2	1.2	28	1.4	4.9	1.2	1.2	45	1.2	5.7	1.2	1.5	2	1.6
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	8	<0.5	1.2	<0.5	<0.5	21	<0.5	2.7	<0.5	0.8	1.1	0.7
	Benzo(k)fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	18	0.5	3.5	<0.5	<0.5	22	<0.5	3.4	<0.5	0.6	1.2	0.9
	Chrysene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	25	1	4.4	<0.5	<0.5	24	<0.5	3.1	<0.5	0.7	1.3	0.7
	Benzo[b+j]fluoranthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	16	0.8	2.1	<0.5	<0.5	21	<0.5	3.5	<0.5	<0.5	0.6	0.6
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	3.7	<0.5	<0.5	<0.5	<0.5	6.4	<0.5	0.9	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5			<0.5	<0.5	1.1	<0.5	<0.5	98	2.2	15	1.1	<0.5	87	<0.5	9	0.7	1.5	1.8	1.3
	Fluorene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	2.7	<0.5	1	<0.5	<0.5	1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	9.3	<0.5	1.3	<0.5	<0.5	18	<0.5	2.4	<0.5	<0.5	0.6	<0.5
	Naphthalene	mg/kg	0.5			2	1.7	<0.5	<0.5	<0.5	7.7	<0.5	1.1	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	0.7
	Phenanthrene	mg/kg	0.5			<0.5	<0.5	1	<0.5	<0.5	78	1.6	14	0.6	<0.5	46	<0.5	4.5	<0.5	0.8	1.5	1.5
	Pyrene	mg/kg	0.5			<0.5	<0.5	0.8	<0.5	<0.5	63	1.6	10	0.8	<0.5	73	<0.5	8.5	0.7	1.2	1.7	1.3
	Total PAHs	mg/kg	0.5	200	800	2	1.7	3.4	<0.5	<0.5	395.3	10.1	66.3	2.5	<0.5	386.7	<0.5	46.2	1.4	7.1	12.2	9.3
TPH	C10 - C14	mg/kg	20			91	34	62	<20	<20	120	<20	23	<20	<20	31	<20	<20	34	32	47	29
	C15 - C28	mg/kg	50			<50	<50	1200	<50	<50	1300	69	320	<50	<50	650	<50	86	1000	1200	1300	670
	C29 - C36	mg/kg	50			<50	<50	790	<50	<50	510	<50	77	<50	<50	350	<50	89	1400	1600	1800	870
	C10 - C36 (Sum of total)	mg/kg	50	10000	40000	91	<50	2052	<50	<50	1930	69	420	<50	<50	1031	<50	175	2434	2832	3147	1569
Volatile	Benzene	mg/kg	0.1	10	40	4.7	9.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	600	2400	10	12	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	288	1152	21	54	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2			44	53	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1			15	21	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3	1000	4000	59	73	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
	Asbestos (Presence/ Absence)	%				-	-	NAD	-	-	NAD	-	-	NAD	-	NAD	-	-	NAD	-	NAD	-

Result	Exceeds criteria for NSW 2014 General Solid Waste CT1
Result	Exceeds criteria for NSW 2014 General Solid Waste (SCC1/ TCLP1 - with leaching)
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste CT2
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste (SCC2/ TCLP2 - with leaching)
-	Not Analysed
NAD	No Asbestos Detected

coffey
A TETRA TECH COMPANY

Table LR2
Waste Classification
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

					Field_ID	SP1-5	SP1-6	SP1-7	SP1-8	SP1-9	SP1-10	A	A	B	C	B-D*	D	E	E	F	F	G	H	I	A	B
					LocCode	SP1-5	SP1-6	SP1-7	SP1-8	SP1-9	SP1-10	A	A	B	C	Duplicate of D	D	E	E	F	F	G	H	I	A	B
					Sample_Depth_Range	0.3	0.5	0.8	0.6	1	0.8	0.3	2.1	0.7	0.9	0.7	0.7	0.6	2.7	0.3	2	0.6	0.6	0.4	-	-
					PID Result	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
					Sampled_Date-Time	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	11-Jun-19	11-Jun-19
					Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	CT1 NSW 2014 General Solid Waste (No Leaching)	CT2 NSW 2014 Restricted Solid Waste (No Leaching)																					
Heavy Metal	Arsenic	mg/kg	2	100	400	7.2	9.9	12	8.9	15	6.2	2.8	<2	7.8	5.7	7	5	6.2	4.6	5	16	64	4.3	13	-	-
	Cadmium	mg/kg	0.4	20	80	2.1	2.3	15	2.9	3.6	2.4	<0.4	<0.4	<0.4	<0.4	0.5	1.5	<0.4	<0.4	<0.4	<0.4	0.9	<0.4	0.5	-	-
	Chromium	mg/kg	5	100	400	22	38	45	20	27	15	9.3	<5	15	16	16	11	15	5.1	14	5	28	10	14	-	-
	Copper	mg/kg	5			360	230	570	270	390	200	12	<5	86	410	100	32	21	6.6	48	26	4300	18	400	-	-
	Iron	mg/kg	20			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	100	400	890	930	2500	1100	790	630	13	21	1900	420	1400	200	290	110	330	46	1100	23	470	380	620
	Mercury	mg/kg	0.1	4	16	0.3	0.3	0.4	0.4	0.4	0.4	<0.1	<0.1	2	0.8	2.7	<0.1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	0.9	-	-
	Nickel	mg/kg	5	40	160	28	28	80	39	37	24	<5	<5	23	9.3	21	7.2	13	<5	14	<5	52	<5	67	-	-
	Zinc	mg/kg	5			640	860	1700	890	1100	550	39	18	520	1200	780	1500	85	9.6	190	59	1600	70	950	-	-
Inorganic	% Clay	%	1			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1			14	17	23	17	18	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50			<50	66	69	<50	54	<50	-	-	-	-	-	-	-	-	-	-	-	-	-	<50	<50
	C6 - C9	mg/kg	20	650	2600	<20	<20	<20	<20	<20	<20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100			2120	6066	2549	2450	1804	2500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20			<20	<20	<20	<20	<20	<20	<20	30	<20	<20	<20	<20	<40	<40	<20	<20	<20	<40	<20	<20	<20
	C10-C16	mg/kg	50			<50	66	69	<50	54	<50	<50	<50	97	<50	<50	<50	<50	<50	130	<50	<50	<50	59	58	<50
	C16-C34	mg/kg	100			1600	4500	1800	1900	1200	1600	<100	<100	5900	460	10,000	<100	<100	<100	9300	<100	310	<100	370	400	170
	C34-C40	mg/kg	100			520	1500	680	550	550	900	<100	<100	910	130	1400	160	<100	<100	4000	<100	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			<20	<20	<20	<20	<20	<20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	0.9	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5			0.5	0.6	0.6	<0.5	2.1	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	0.7	0.9	0.6	<0.5	1.6	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5			0.8	1.1	0.7	<0.5	2.2	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5			1.1	1.4	1	0.6	2.4	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	<0.5	3.5	<0.5	1.3
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5			1.4	1.7	1.3	1.2	2.7	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5			<0.5	0.9	0.6	<0.5	0.9	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5			0.6	0.7	0.6	<0.5	1.2	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5			0.5	0.9	<0.5	<0.5	1.7	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5			<0.5	0.6	<0.5	<0.5	1.2	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5			0.8	1.4	0.7	0.6	4.6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	0.8	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5			<0.5	1	0.5	<0.5	4.4	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5			0.8	1.4	0.7	0.8	3.8	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	200	800	3.9	8.4	4.3	1.4	23.2	8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	24.8	2	11.1
TPH	C10 - C14	mg/kg	20			35	46	50	32	37	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50			750	2100	830	890	610	660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50			1300	2800	1600	1200	810	1300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50	10000	40000	2085	4946	2480	2122	1457	1996	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1	10	40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	600	2400	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	288	1152	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2			<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3	1000	4000	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.6	0.6	<0.3	<0.6	<0.6	<0.3	<0.3	<0.3	<0.6	<0.3	<0.3	<0.3
	Asbestos (Presence/ Absence)	%				NAD	-	NAD	-	NAD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Result	Exceeds criteria for NSW 2014 General Solid Waste CT1
Result	Exceeds criteria for NSW 2014 General Solid Waste (SCC1/ TCLP1 - with leaching)
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste CT2
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste (SCC2/ TCLP2 - with leaching)
-	Not Analysed
NAD	No Asbestos Detected

Table LR2
Waste Classification
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

					Field_ID	C	D	E	F	I	J**
					LocCode	C	D	E	F	I	Duplicate of I
					Sample_Depth_Range	-	-	-	-	-	-
					PID Result	-	-	-	-	-	-
					Sampled_Date-Time	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19
					Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	CT1 NSW 2014 General Solid Waste (No Leaching)	CT2 NSW 2014 Restricted Solid Waste (No Leaching)						
Heavy Metal	Arsenic	mg/kg	2	100	400	-	-	-	-	-	-
	Cadmium	mg/kg	0.4	20	80	-	-	-	-	-	-
	Chromium	mg/kg	5	100	400	-	-	-	-	-	-
	Copper	mg/kg	5			-	-	-	-	-	-
	Iron	mg/kg	20			-	-	-	-	-	-
	Iron (%)	%	0.01			-	-	-	-	-	-
	Lead	mg/kg	5	100	400	150	89	170	460	550	660
	Mercury	mg/kg	0.1	4	16	-	-	-	-	-	-
	Nickel	mg/kg	5	40	160	-	-	-	-	-	-
	Zinc	mg/kg	5			-	-	-	-	-	-
Inorganic	% Clay	%	1			-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1			-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1			-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5			-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50			<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20	650	2600	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100			-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20			<20	<20	<20	<20	<40	<40
	C10-C16	mg/kg	50			<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			390	<100	260	220	4700	3600
	C34-C40	mg/kg	100			<100	<100	<100	<100	1600	1300
	C6 - C10	mg/kg	20			-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5			-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5			-	-	-	-	-	-
	Anthracene	mg/kg	0.5			-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5			-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5	0.8	3.2	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5			-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5			1.3	1.3	11	4	3.2	1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5			-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5			-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5			-	-	-	-	-	-
	Chrysene	mg/kg	0.5			-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5			-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5			-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5			-	-	-	-	-	-
	Fluorene	mg/kg	0.5			-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5			-	-	-	-	-	-
	Naphthalene	mg/kg	0.5			-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5			-	-	-	-	-	-
	Pyrene	mg/kg	0.5			-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	200	800	9.6	10.9	83.3	29.7	25.3	9.3
TPH	C10 - C14	mg/kg	20			-	-	-	-	-	-
	C15 - C28	mg/kg	50			-	-	-	-	-	-
	C29 - C36	mg/kg	50			-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50	10000	40000	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1	10	40	<0.1	<0.1	-	-	-	-
	Ethylbenzene	mg/kg	0.1	600	2400	<0.1	<0.1	-	-	-	-
	Toluene	mg/kg	0.1	288	1152	<0.1	<0.1	-	-	-	-
	Xylene (m & p)	mg/kg	0.2			-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1			-	-	-	-	-	-
	Xylene Total	mg/kg	0.3	1000	4000	<0.3	0.4	-	-	-	-
	Asbestos (Presence/ Absence)	%				-	-	-	-	-	-

Result	Exceeds criteria for NSW 2014 General Solid Waste CT1
Result	Exceeds criteria for NSW 2014 General Solid Waste (SCC1/ TCLP1 - with leaching)
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste CT2
Result	Exceeds criteria for NSW 2014 Restricted Solid Waste (SCC2/ TCLP2 - with leaching)
-	Not Analysed
NAD	No Asbestos Detected

Table LR3
QA/QC Results
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Field Duplicates (SOIL)
Filter: SDG in('24 Jun 2020')

			SDG	24-Jun-20	24-Jun-20		24-Jun-20	Interlab_D		24-Jun-20	24-Jun-20		24-Jun-20	Interlab_D		24-Jun-20	24-Jun-20	
			Field ID	BH2_0.0-0.2	QC1	**RPD**	BH2_0.0-0.2	QC2	**RPD**	BH7_0.0-0.2	QC3	**RPD**	BH7_0.0-0.2	QC4	**RPD**	BH9_0.0-0.2	QC5	**RPD**
			Sampled Date/Time	6/22/2020	6/22/2020		6/22/2020	6/22/2020		6/23/2020	6/23/2020		6/23/2020	6/23/2020		6/23/2020	6/23/2020	
Method_Type	**ChemName**	**Units**	**EQL**															
Organic	C6-C10 less BTEX (F1)	mg/kg	20 (Primary): 10 (Int	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0
Volatile	Benzene	mg/kg	0.1 (Primary): 0.2 (In	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.1	0
	Ethylbenzene	mg/kg	0.1 (Primary): 0.5 (In	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0	0.1	<0.1	0
	Toluene	mg/kg	0.1 (Primary): 0.5 (In	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0
	Xylene (m & p)	mg/kg	0.2 (Primary): 0.5 (In	<0.2	<0.2	0	<0.2	<0.5	0	<0.2	<0.2	0	<0.2	<0.5	0	**0.4**	**<0.2**	**67**
	Xylene (o)	mg/kg	0.1 (Primary): 0.5 (In	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0	**0.2**	**<0.1**	**67**
	Xylene Total	mg/kg	0.3 (Primary): 0.5 (In	<0.3	<0.3	0	<0.3	<0.5	0	<0.3	<0.3	0	<0.3	<0.5	0	0.5	<0.3	50
Inorganic	Moisture Content (dried @ 103°C)	%	1	15.0	12.0	22	15.0			18.0	17.0	6	18.0			11.0	9.2	18
Heavy Metal	Arsenic	mg/kg	2 (Primary): 5 (Interl	**3.4**	**<2.0**	**52**	3.4	<5.0	0	9.5	8.8	8	9.5	8.0	17	**18.0**	**10.0**	**57**
	Cadmium	mg/kg	0.4 (Primary): 1 (Inte	<0.4	<0.4	0	<0.4	<1.0	0	0.5	0.6	18	0.5	<1.0	0	43.0	35.0	21
	Chromium	mg/kg	5 (Primary): 2 (Interl	20.0	13.0	42	20.0	13.0	42	24.0	28.0	15	24.0	18.0	29	20.0	18.0	11
	Copper	mg/kg	5	**28.0**	**10.0**	**95**	**28.0**	**13.0**	**73**	150.0	160.0	6	150.0	124.0	19	**120.0**	**64.0**	**61**
	Lead	mg/kg	5	**78.0**	**22.0**	**112**	**78.0**	**30.0**	**89**	310.0	360.0	15	310.0	246.0	23	**1800.0**	**470.0**	**117**
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	0.2	0.2	0	**0.2**	**0.1**	**67**	**0.3**	**<0.1**	**100**
	Nickel	mg/kg	5 (Primary): 2 (Interl	15.0	9.3	47	15.0	10.0	40	23.0	26.0	12	23.0	25.0	8	**24.0**	**11.0**	**74**
	Zinc	mg/kg	5	**130.0**	**48.0**	**92**	**130.0**	**67.0**	**64**	340.0	330.0	3	340.0	376.0	10	240.0	190.0	23
Organic	Naphthalene	mg/kg	0.5 (Primary): 1 (Inte	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	**<0.5**	**<1.0 - 1.0**	**67**	<0.5	<0.5	0
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	1.4	1.6	13	1.4	1.3	7	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	3.7	4.1	10	3.7	2.8	28	<0.5	<0.5	0
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	11.0	11.0	0	**11.0**	**7.5**	**38**	0.6	<0.5	18
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	6.5	6.5	0	6.5	6.1	6	0.6	<0.5	18
	Benzo(a)pyrene TEQ (lower bound) *	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	11.0	11.0	0	11.0	9.0	20	**0.9**	**<0.5**	**57**
	Benzo(a)pyrene TEQ (medium bound) *	mg/kg	0.5	0.6	0.6	0	0.6	0.6	0	11.0	11.0	0	11.0	9.0	20	**1.1**	**0.6**	**59**
	Benzo(a)pyrene TEQ (upper bound) *	mg/kg	0.5	1.2	1.2	0	1.2	1.2	0	11.0	11.0	0	11.0	9.0	20	1.4	1.2	15
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	2.6	2.9	11	2.6	2.7	4	0.7	<0.5	33
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	6.9	6.3	9	**6.9**	**3.2**	**73**	0.8	<0.5	46
	Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	8.4	7.8	7	8.4	6.4	27	0.7	<0.5	33
	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	6.5	7.8	18	6.5	7.4	13	**1.1**	**<0.5**	**75**
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	1.4	1.9	30	**1.4**	**0.7**	**67**	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	21.0	18.0	15	21.0	17.4	19	**1.5**	**0.6**	**86**
	Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	1.3	1.3	0	**1.3**	**0.6**	**74**	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	2.9	3.6	22	2.9	2.6	11	<0.5	<0.5	0
	Naphthalene	mg/kg	0.5 (Primary): 1 (Inte	<0.5	<0.5	0	<0.5	<0.5	0	0.5	0.6	18	**0.5**	**<1.0 - 1.0**	**67**	0.6	<0.5	18
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	11.0	12.0	9	11.0	8.8	22	1.0	0.6	50
	Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	17.0	15.0	13	17.0	14.0	19	**1.8**	**0.7**	**88**
	Total PAHs	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	102.1	100.4	2	102.1	82.5	21	**9.4**	**1.9**	**133**
Organic	F2-NAPHTHALENE	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	**300.0**	**150.0**	**67**
	C6 - C9	mg/kg	20 (Primary): 10 (Int	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0
	C10 - C40 (Sum of total)	mg/kg	100 (Primary): 50 (In	<100.0	<100.0	0	<100.0	<50.0	0	590.0	370.0	46	590.0	380.0	43	**7500.0**	**4650.0**	**47**
	C10-C16	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	**300.0**	**150.0**	**67**
	C16-C34	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0	480.0	370.0	26	480.0	380.0	23	**4400.0**	**2800.0**	**44**
	C34-C40	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0	110.0	<100.0	10	110.0	<100.0	10	**2800.0**	**1700.0**	**49**
	C6 - C10	mg/kg	20 (Primary): 10 (Int	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0
TPH	C10 - C14	mg/kg	20 (Primary): 50 (Int	<20.0	<20.0	0	<20.0	<50.0	0	**<20.0**	**36.0**	**57**	<20.0	<50.0	0	**170.0**	**94.0**	**58**
	C15 - C28	mg/kg	50 (Primary): 100 (In	<50.0	<50.0	0	<50.0	<100.0	0	360.0	310.0	15	360.0	270.0	29	**2000.0**	**1300.0**	**42**
	C29 - C36	mg/kg	50 (Primary): 100 (In	<50.0	<50.0	0	<50.0	<100.0	0	160.0	150.0	6	160.0	160.0	0	**3800.0**	**2000.0**	**62**
	C10 - C36 (Sum of total)	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	520.0	496.0	5	520.0	430.0	19	**5970.0**	**3394.0**	**55**

*RPDs have only been considered where a concentration is greater than 0 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 30 (10-20 x EQL); 30 (> 20 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Table LR3
QA/QC Results
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Field Duplicates (SOIL)
Filter: SDG in('24 Jun 2020')

			SDG	24-Jun-20	Interlab_D		24-Jun-20	24-Jun-20		24-Jun-20	Interlab_D		24-Jun-20	24-Jun-20		24-Jun-20	Interlab_D	
			Field ID	BH9_0.0-0.2	QC6	**RPD**	BH16_0.0-0.2	QC7	**RPD**	BH16_0.0-0.2	QC8	**RPD**	SP1-1	QC9	**RPD**	SP1-1	QC10	**RPD**
			Sampled Date/Time	6/23/2020	6/23/2020		6/23/2020	6/23/2020		6/23/2020	6/23/2020		6/24/2020	6/24/2020		6/24/2020	6/24/2020	
Method_Type	**ChemName**	**Units**	**EQL**															
Organic	C6-C10 less BTEX (F1)	mg/kg	20 (Primary): 10 (Int	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0
Volatile	Benzene	mg/kg	0.1 (Primary): 0.2 (In	<0.1	<0.2	0	<0.1	<0.1	0	<0.1	<0.2	0	<0.1	<0.1	0	<0.1	<0.2	0
	Ethylbenzene	mg/kg	0.1 (Primary): 0.5 (In	0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0
	Toluene	mg/kg	0.1 (Primary): 0.5 (In	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0
	Xylene (m & p)	mg/kg	0.2 (Primary): 0.5 (In	0.4	<0.5	0	<0.2	<0.2	0	<0.2	<0.5	0	<0.2	<0.2	0	<0.2	<0.5	0
	Xylene (o)	mg/kg	0.1 (Primary): 0.5 (In	0.2	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0	<0.1	<0.1	0	<0.1	<0.5	0
	Xylene Total	mg/kg	0.3 (Primary): 0.5 (In	0.5	<0.5	0	<0.3	<0.3	0	<0.3	<0.5	0	<0.3	<0.3	0	<0.3	<0.5	0
Inorganic	Moisture Content (dried @ 103°C)	%	1	11.0			13.0	14.0	7	13.0			16.0	15.0	6	16.0		
Heavy Metal	Arsenic	mg/kg	2 (Primary): 5 (Interl	18.0	12.0	40	**4.9**	**13.0**	**91**	4.9	6.0	20	8.0	10.0	22	8.0	6.0	29
	Cadmium	mg/kg	0.4 (Primary): 1 (Inte	43.0	34.0	23	0.6	1.0	50	0.6	<1.0	0	1.4	1.9	30	1.4	2.0	35
	Chromium	mg/kg	5 (Primary): 2 (Interl	20.0	18.0	11	**14.0**	**41.0**	**98**	14.0	13.0	7	33.0	25.0	28	**33.0**	**12.0**	**93**
	Copper	mg/kg	5	120.0	104.0	14	520.0	550.0	6	520.0	469.0	10	**280.0**	**560.0**	**67**	280.0	271.0	3
	Lead	mg/kg	5	**1800.0**	**470.0**	**117**	**460.0**	**240.0**	**63**	**460.0**	**269.0**	**52**	**880.0**	**1200.0**	**31**	**880.0**	**549.0**	**46**
	Mercury	mg/kg	0.1	0.3	0.2	40	<0.1	<0.1	0	<0.1	<0.1	0	0.4	0.4	0	0.4	0.3	29
	Nickel	mg/kg	5 (Primary): 2 (Interl	24.0	20.0	18	13.0	18.0	32	13.0	13.0	0	27.0	36.0	29	27.0	19.0	35
	Zinc	mg/kg	5	**240.0**	**168.0**	**35**	530.0	670.0	23	**530.0**	**367.0**	**36**	**660.0**	**1000.0**	**41**	660.0	589.0	11
Organic	Naphthalene	mg/kg	0.5 (Primary): 1 (Inte	<0.5	<1.0 - 0.6	18	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(a)anthracene	mg/kg	0.5	0.6	0.9	40	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	0.7	33	<0.5	<0.5	0
	Benzo(a)pyrene	mg/kg	0.5	0.6	0.8	29	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	0.6	18	<0.5	<0.5	0
	Benzo(a)pyrene TEQ (lower bound) *	mg/kg	0.5	0.9	1.2	29	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	0.7	33	<0.5	<0.5	0
	Benzo(a)pyrene TEQ (medium bound) *	mg/kg	0.5	1.1	1.4	24	0.6	0.6	0	0.6	0.6	0	0.6	1.0	50	0.6	0.6	0
	Benzo(a)pyrene TEQ (upper bound) *	mg/kg	0.5	1.4	1.6	13	1.2	1.2	0	1.2	1.2	0	1.2	1.3	8	1.2	1.2	0
	Benzo(g,h,i)perylene	mg/kg	0.5	0.7	0.8	13	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	0.8	0.5	46	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	0.5	0	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	0.7	1.0	35	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	0.5	0	<0.5	<0.5	0
	Benzo[b+j]fluoranthene	mg/kg	0.5	1.1	1.4	24	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	0.6	18
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	**1.5**	**2.8**	**60**	<0.5	<0.5	0	<0.5	<0.5	0	**0.7**	**1.8**	**88**	0.7	0.9	25
	Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	0.6	18	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Naphthalene	mg/kg	0.5 (Primary): 1 (Inte	0.6	<1.0 - 0.6	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
	Phenanthrene	mg/kg	0.5	1.0	1.3	26	<0.5	<0.5	0	<0.5	<0.5	0	**<0.5**	**1.8**	**113**	<0.5	0.6	18
	Pyrene	mg/kg	0.5	**1.8**	**3.2**	**56**	<0.5	<0.5	0	<0.5	<0.5	0	**0.7**	**1.2**	**53**	0.7	0.9	25
	Total PAHs	mg/kg	0.5	**9.4**	**13.9**	**39**	<0.5	<0.5	0	<0.5	<0.5	0	**1.4**	**7.1**	**134**	**1.4**	**3.0**	**73**
Organic	F2-NAPHTHALENE	mg/kg	50	300.0	310.0	3	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
	C6 - C9	mg/kg	20 (Primary): 10 (Int	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0
	C10 - C40 (Sum of total)	mg/kg	100 (Primary): 50 (In	**7500.0**	**11100.0**	**39**	130.0	210.0	47	**130.0**	**<50.0**	**89**	**2880.0**	**1430.0**	**67**	**2880.0**	**1450.0**	**66**
	C10-C16	mg/kg	50	300.0	310.0	3	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
	C16-C34	mg/kg	100	**4400.0**	**6620.0**	**40**	130.0	210.0	47	130.0	<100.0	26	**2200.0**	**1000.0**	**75**	**2200.0**	**990.0**	**76**
	C34-C40	mg/kg	100	**2800.0**	**4210.0**	**40**	<100.0	<100.0	0	<100.0	<100.0	0	680.0	430.0	45	680.0	460.0	39
	C6 - C10	mg/kg	20 (Primary): 10 (Int	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0	<20.0	<20.0	0	<20.0	<10.0	0
TPH	C10 - C14	mg/kg	20 (Primary): 50 (Int	170.0	190.0	11	<20.0	<20.0	0	<20.0	<50.0	0	34.0	25.0	31	34.0	<50.0	0
	C15 - C28	mg/kg	50 (Primary): 100 (In	**2000.0**	**3020.0**	**41**	86.0	130.0	41	86.0	<100.0	0	**1000.0**	**500.0**	**67**	**1000.0**	**410.0**	**84**
	C29 - C36	mg/kg	50 (Primary): 100 (In	**3800.0**	**5300.0**	**33**	61.0	98.0	47	61.0	<100.0	0	**1400.0**	**680.0**	**69**	**1400.0**	**760.0**	**59**
	C10 - C36 (Sum of total)	mg/kg	50	**5970.0**	**8510.0**	**35**	147.0	228.0	43	**147.0**	**<50.0**	**98**	**2434.0**	**1205.0**	**68**	**2434.0**	**1170.0**	**70**

*RPDs have only been considered where a concentration is greater than 0 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 3(
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratorie

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Table LR4
Blank/Spike/Rinsate Results
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Field Blanks (WATER)
Filter: SDG in('24 Jun 2020')

			SDG	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
			Field ID	RB1	TB1	TB2	TB3
			Sampled_Date/Time	6/23/2020	6/22/2020	6/23/2020	6/24/2020
			Sample Type	Rinsate	Trip_B	Trip_B	Trip_B
Method_Type	**ChemName**	**Units**	**EQL**				
Heavy Metal	Arsenic	mg/l	0.001	<0.001			
	Cadmium	mg/l	0.0002	<0.0002			
	Chromium	mg/l	0.001	<0.001			
	Copper	mg/l	0.001	<0.001			
	Lead	mg/l	0.001	<0.001			
	Mercury	mg/l	0.0001	<0.0001			
	Nickel	mg/l	0.001	<0.001			
	Zinc	mg/l	0.005	<0.005			
Organic	Naphthalene	µg/l	10	<10	<10	<10	<10
	F2-NAPHTHALENE	mg/l	0.05	<0.05			
	C6 - C9	µg/l	20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	µg/l	100	<100			
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
	C10-C16	mg/l	0.05	<0.05			
	C16-C34	mg/l	0.1	<0.1			
	C34-C40	mg/l	0.1	<0.1			
	C6 - C10	mg/l	0.02	<0.02	<0.02	<0.02	<0.02
PAH	Acenaphthene	µg/l	1	<1			
	Acenaphthylene	µg/l	1	<1			
	Anthracene	µg/l	1	<1			
	Benzo(a)anthracene	µg/l	1	<1			
	Benzo(a)pyrene	µg/l	1	<1			
	Benzo(g,h,i)perylene	µg/l	1	<1			
	Benzo(k)fluoranthene	µg/l	1	<1			
	Chrysene	µg/l	1	<1			
	Benzo[b+j]fluoranthene	mg/l	0.001	<0.001			
	Dibenz(a,h)anthracene	µg/l	1	<1			
	Fluoranthene	µg/l	1	<1			
	Fluorene	µg/l	1	<1			
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1			
	Naphthalene	µg/l	1	<1			
	Phenanthrene	µg/l	1	<1			
	Pyrene	µg/l	1	<1			
	Total PAHs	µg/l	1	<1			
TPH	C10 - C14	µg/l	50	<50			
	C15 - C28	µg/l	100	<100			
	C29 - C36	µg/l	100	<100			
	C10 - C36 (Sum of total)	µg/l	100	<100			
Volatile	Benzene	µg/l	1	<1	<1	<1	<1
	Ethylbenzene	µg/l	1	<1	<1	<1	<1
	Toluene	µg/l	1	<1	<1	<1	<1
	Xylene (m & p)	µg/l	2	<2	<2	<2	<2
	Xylene (o)	µg/l	1	<1	<1	<1	<1
	Xylene Total	µg/l	3	<3	<3	<3	<3

Appendix B – Laboratory Reports

Reference No. ____________

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
A TETRA TECH COMPANY

Consigning Office: Warabrook
Report Results to: Paul Wright
Invoices to: general.admin@coffey.com

Mobile: (02) 4028 9700 Email: paul.wright@coffey.com
Phone: (02) 4028 9700 Email: sam.ramsey@coffey.com

Project No: NTLEN271167 Task No: Lab
Project Name: DSI-107 Swan St, Morpeth Laboratory: Eurofins
Sampler's Name: Sam Ramsey Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH1_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH1_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH1_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH2_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH2_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH2_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH3_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH3_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH3_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH4_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH4_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH4_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH5_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH5_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH5_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH6_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH6_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH6_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH7_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH7_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name: K. Foley	Date: 24/6/20
Coffey Environments	Time:	Company: Eurofins NTLE	Time: 2.00pm.
Name:	Date:	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☑
All Documentation is in Proper Order ☑
Samples Received Properly Chilled ☑
Lab. Ref/Batch No. 727695
Temp 8.2

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
A TETRA TECH COMPANY

Consigning Office: Warabrook
Report Results to: Paul Wright — Mobile: (02) 4028 9700 — Email: paul.wright@coffey.com
Invoices to: general.admin@coffey.com — Phone: (02) 4028 9700 — Email: sam.ramsey@coffey.com

Project No: NTLEN271167 — Task No: Lab
Project Name: DSI-107 Swan St, Morpeth — Laboratory: Eurofins
Sampler's Name: Sam Ramsey — Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH7_1.8-2	23.06.20	PM	Soil	Jar	5 day	X					
	BH8_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH8_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH8_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH9_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH9_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH9_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH10_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH10_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH10_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH11_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH11_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH11_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH12_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH12_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH13_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH13_0.3-0.4	23.06.20	PM	Soil	Jar	5 day				X		
	BH14_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH14_0.2-0.4	23.06.20	PM	Soil	Jar	5 day	X					
	BH14_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date:	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐

Lab. Ref/Batch No. 727695

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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Invoices to: general.admin@coffey.com | Phone: (02) 4028 9700 | Email: sam.ramsey@coffey.com

Project No: NTLEN271167 | Task No: Lab
Project Name: DSI-107 Swan St, Morpeth | Laboratory: Eurofins
Sampler's Name: Sam Ramsey | Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH14_1.4-1.6	23.06.20	PM	Soil	Jar	5 day	X					
	BH14_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH15_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH15_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH15_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH16_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH16_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH16_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17_0.0-0.2	23.06.20	PM	Soil	Jar	5 day				X		
	BH17_0.3-0.4	23.06.20	PM	Soil	Jar	5 day				X		
	BH17B_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH17B_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17B_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17B_2.2-2.3	23.06.20	PM	Soil	Jar	5 day	X					
	BH18_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH18_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH18_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH19_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH19_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH19_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐

Lab. Ref/Batch No. 727695

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

coffey
TETRA TECH COMPANY

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Mobile: (02) 4028 9700 Email: paul.wright@coffey.com
Phone: (02) 4028 9700 Email: sam.ramsey@coffey.com

Project No: NTLEN271167 Task No: Lab
Project Name: DSI-107 Swan St, Morpeth Laboratory: Eurofins
Sampler's Name: Sam Ramsey Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH20_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH20_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH21_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_1.3-1.5	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-1	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-2	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-3	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-4	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-5	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-6	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-7	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-8	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-9	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-10	24.06.20	PM	Soil	Jar	5 day				X		
	TB1	22.06.20	PM	Water	2 X V	5 day		X				
	TS1	22.06.20	PM	Water	2 x V	5 day		X				
	QC1	22.06.20	PM	Soil	Jar	5 day	X					
	QC2	22.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC3	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No. 727695

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
TETRA TECH COMPANY

Consigning Office: Warabrook
Report Results to: Paul Wright — Mobile: (02) 4028 9700 — Email: paul.wright@coffey.com
Invoices to: general.admin@coffey.com — Phone: (02) 4028 9700 — Email: sam.ramsey@coffey.com

Project No: NTLEN271167 | Task No: Lab
Project Name: DSI-107 Swan St, Morpeth | Laboratory: Eurofins
Sampler's Name: Sam Ramsey | Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	NOTES
	QC4	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	QC5	23.06.20	PM	Soil	Jar	5 day	X				
	QC6	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	QC7	23.06.20	PM	Soil	Jar	5 day	X				
	QC8	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	QC9	24.06.20	PM	Soil	Jar	5 day				X	
	QC10	24.06.20	PM	Soil	Jar	5 day				X	Send to ALS
	TB2	23.06.20	PM	Water	2 x V	5 day		X			
	TS2	23.06.20	PM	Water	2 x V	5 day		X			
	RB1	24.06.20	PM	Water	2 x V, P, G	5 day	X				
	TS3	24.06.20	PM	Water	2 x V	5 day		X			
	TB3	24.06.20	PM	Water	2 x V	5 day		X			

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No. 727695

***Container Type & Preservation Codes:** P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

#AU04_Enviro_Sample_NSW

To: #AU08_EnviroSampleNTL
Subject: RE: COC samples dropped Coffey

From: Ramsey, Sam <Sam.Ramsey@coffey.com>
Sent: Thursday, 25 June 2020 7:44 AM
To: #AU08_EnviroSampleNTL <EnviroSampleNTL@eurofins.com>
Subject: RE: COC samples dropped Coffey

Can I please add suite R21 (NEPM screen) to samples BH1_1.8-2.0, BH10_0.8-1.0 and BH19_1.8-2.0.

Thanks,

Sam Ramsey
Environmental Scientist

t: +61 2 4028 9700
m: +61 437 359 127

We've moved!

Our new address is
16 Callistemon Close
Warabrook, NSW 2304

From: EnviroSampleNTL@eurofins.com <EnviroSampleNTL@eurofins.com>
Sent: Wednesday, June 24, 2020 2:03 PM
To: Ramsey, Sam <Sam.Ramsey@coffey.com>
Subject: RE: COC samples dropped Coffey

Thanks Sam

From: Ramsey, Sam <Sam.Ramsey@coffey.com>
Sent: Wednesday, 24 June 2020 1:59 PM
To: Andrew Black <AndrewBlack@eurofins.com>
Cc: #AU08_EnviroSampleNTL <EnviroSampleNTL@eurofins.com>
Subject: COC samples dropped Coffey

Hey,

Please see the attached COC for the samples I dropped off this afternoon.

Regards,

Sam Ramsey
Environmental Scientist

#AU04_Enviro_Sample_NSW

To:	Ramsey, Sam; Wright, Paul
Subject:	RE: Eurofins Sample Receipt Advice - Report 727695 : Site DSI-107 SWAN ST MORPETH (NTLEN271167)

From: Ramsey, Sam [mailto:Sam.Ramsey@coffey.com]
Sent: Thursday, 25 June 2020 12:33 PM
To: #AU04_Enviro_Sample_NSW; Wright, Paul
Subject: RE: Eurofins Sample Receipt Advice - Report 727695 : Site DSI-107 SWAN ST MORPETH (NTLEN271167)

Hi,
Can we please put the extra sample BH12_1.8-2.0 for Suite B7 analysis.

Thank you,

Sam Ramsey
Environmental Scientist

t: +61 2 4028 9700
m: +61 437 359 127

We've moved!

Our new address is
16 Callistemon Close
Warabrook, NSW 2304

From: EnviroSampleNSW@eurofins.com <EnviroSampleNSW@eurofins.com>
Sent: Thursday, June 25, 2020 12:13 PM
To: Wright, Paul <Paul.Wright@coffey.com>
Cc: Ramsey, Sam <Sam.Ramsey@coffey.com>
Subject: Eurofins Sample Receipt Advice - Report 727695 : Site DSI-107 SWAN ST MORPETH (NTLEN271167)

Dear Valued Client,
Splits sent to ALS. Extra Jar received placed on hold (BH12_1.8-2.0)
Please find attached a Sample Receipt Advice (SRA), a Summary Sheet and a scanned copy of your Chain-of-Custody (COC). It is important that you check this documentation to ensure that the details are correct such as the Client Job Number, Turn Around Time, any comments in the Notes section and sample numbers as well as the requested analysis. If there are any irregularities then please contact your Eurofins | mgt Analytical Services Manager as soon as possible to make certain that they get changed.

Regards

Luca Dominici
Sample Receipt

Eurofins | Environmental Testing
Unit F3, Parkview Building
16 Mars Road
LANE COVE WEST NSW 2066
AUSTRALIA
Phone: +61 02 9900 8421
Email: EnviroSampleNSW@eurofins.com
Website:environment.eurofins.com.au

EnviroNote 1098 - Melbourne PFAS Accreditation
EnviroNote 1103 - NATA Accreditation for Dioxins

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
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Project No:	NTLEN271167	Task No:	Lab
Project Name:	DSI-107 Swan St, Morpeth	Laboratory:	Eurofins
Sampler's Name: Sam Ramsey		Project Manager: Paul Wright	
Special Instructions:	Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)		

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH1_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH1_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH1_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH2_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH2_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH2_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH3_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH3_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH3_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH4_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH4_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH4_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH5_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH5_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH5_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH6_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH6_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH6_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH7_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH7_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

coffey
A TETRA TECH COMPANY

Consigning Office:Warabrook

Report Results to: Paul Wright — Mobile: (02) 4028 9700 — Email: paul.wright@coffey.com

Invoices to: general.admin@coffey.com — Phone: (02) 4028 9700 — Email: sam.ramsey@coffey.com

Project No: NTLEN271167 — Task No: Lab

Project Name: DSI-107 Swan St, Morpeth — Laboratory: Eurofins

Sampler's Name: Sam Ramsey — Project Manager: Paul Wright

Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P / A)	NOTES
	BH7_1.8-2	23.06.20	PM	Soil	Jar	5 day	X					
	BH8_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH8_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH8_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH9_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH9_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH9_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH10_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH10_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH10_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH11_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH11_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH11_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH12_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH12_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH13_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH13_0.3-0.4	23.06.20	PM	Soil	Jar	5 day				X		
	BH14_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH14_0.2-0.4	23.06.20	PM	Soil	Jar	5 day	X					
	BH14_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J -** Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C -** Hydrochloric Acid Preserved, **S -** Sulphuric Acid Preserved, **I -** Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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A TETRA TECH COMPANY

Consigning Office:Warabrook
Report Results to: Paul Wright — Mobile: (02) 4028 9700 — Email: paul.wright@coffey.com
Invoices to: general.admin@coffey.com — Phone: (02) 4028 9700 — Email: sam.ramsey@coffey.com

Project No: NTLEN271167	Task No: Lab
Project Name: DSI-107 Swan St, Morpeth	Laboratory: Eurofins
Sampler's Name: Sam Ramsey	Project Manager: Paul Wright
Special Instructions:	Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/A)	NOTES
	BH14_1.4-1.6	23.06.20	PM	Soil	Jar	5 day	X					
	BH14_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH15_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH15_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH15_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH16_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH16_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH16_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17_0.0-0.2	23.06.20	PM	Soil	Jar	5 day				X		
	BH17_0.3-0.4	23.06.20	PM	Soil	Jar	5 day				X		
	BH17B_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH17B_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17B_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17B_2.2-2.3	23.06.20	PM	Soil	Jar	5 day	X					
	BH18_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH18_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH18_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH19_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH19_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH19_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
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Project Name:	DSI-107 Swan St, Morpeth	Laboratory:	Eurofins
Sampler's Name: Sam Ramsey		Project Manager: Paul Wright	
Special Instructions:	Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)		

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix *(Soil...etc)*	Container Type & Preservative*	T-A-T *(specify)*	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/A)	NOTES
	BH20_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH20_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH21_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_1.3-1.5	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-1	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-2	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-3	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-4	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-5	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-6	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-7	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-8	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-9	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-10	24.06.20	PM	Soil	Jar	5 day	X					
	TB1	22.06.20	PM	Water	2 X V	5 day		X				
	TS1	22.06.20	PM	Water	2 x V	5 day		X				
	QC1	22.06.20	PM	Soil	Jar	5 day	X					
	QC2	22.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC3	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

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Consigning Office:Warabrook

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Project No:	NTLEN271167	Task No:	Lab
Project Name:	DSI-107 Swan St, Morpeth	Laboratory:	Eurofins
Sampler's Name: Sam Ramsey		Project Manager: Paul Wright	
Special Instructions:	Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)		

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix *(Soil...etc)*	Container Type & Preservative*	T-A-T *(specify)*	Suite B7	Suite B1	Suite S26	Hold		NOTES
	QC4	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC5	23.06.20	PM	Soil	Jar	5 day	X					
	QC6	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC7	23.06.20	PM	Soil	Jar	5 day	X					
	QC8	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC9	24.06.20	PM	Soil	Jar	5 day	X					
	QC10	24.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	TB2	23.06.20	PM	Water	2 x V	5 day		X				
	TS2	23.06.20	PM	Water	2 x V	5 day		X				
	RB1	24.06.20	PM	Water	2 x V, P, G	5 day	X					
	TS3	24.06.20	PM	Water	2 x V	5 day		X				
	TB3	24.06.20	PM	Water	2 x V	5 day		X				

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)

- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

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NATA # 1261 Site # 18217

Brisbane
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NATA # 1261 Site # 20794

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

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

Sample Receipt Advice

Company name: **Coffey Environments P/L N'castle**

Contact name: Paul Wright
Project name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167
COC number: Not provided
Turn around time: 5 Day
Date/Time received: Jun 24, 2020 2:00 PM
Eurofins reference: **727695**

Sample information

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

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins Sample Receipt : 8.2 degrees Celsius.

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

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

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

☑ Appropriate sample containers have been used.

☑ Sample containers for volatile analysis received with zero headspace.

☑ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

Splits sent to ALS.

Contact notes

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

Andrew Black on Phone : (+61) 2 9900 8490 or by e.mail: AndrewBlack@eurofins.com

Results will be delivered electronically via e.mail to Paul Wright - paul.wright@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Environments P/L N'castle email address.

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42907	X		X		X		
2	BH2_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42908	X		X		X		
3	BH3_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42909	X		X		X		
4	BH4_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42910	X		X		X		
5	BH5_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42911	X		X		X		
6	BH6_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42912	X		X		X		
7	BH7_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42913	X		X		X		
8	BH8_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42914	X		X		X		
9	BH9_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42915	X		X		X		
10	BH10_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42916	X		X		X		

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Environment Testing

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

Australia

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Phone : 0800 856 450
IANZ # 1290

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
11	BH11_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42917	X		X		X		
12	BH12_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42918	X		X		X		
13	BH13_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42919	X		X		X		
14	BH14_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42920	X		X		X		
15	BH15_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42921	X		X		X		
16	BH16_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42922	X		X		X		
17	BH17B_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42923	X		X		X		
18	BH18_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42924	X		X		X		
19	BH19_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42925	X		X		X		
20	BH20_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42926	X		X		X		
21	BH21_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42927	X		X		X		
22	BH1_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42928			X		X		

Australia

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IANZ # 1290

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
23	BH1_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42929			X	X	X		
24	BH2_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42930			X		X		
25	BH2_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42931			X		X		
26	BH3_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42932			X		X		
27	BH3_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42933			X		X		
28	BH4_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42934			X		X		
29	BH4_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42935			X		X		
30	BH5_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42936			X		X		
31	BH5_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42937			X		X		
32	BH6_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42938			X		X		
33	BH6_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42939			X		X		
34	BH7_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42940			X		X		
35	BH7_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42941			X		X		

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

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NATA # 1261 Site # 20794

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Site # 23736

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NSW 2304

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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
36	BH8_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42942			X		X		
37	BH8_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42943			X		X		
38	BH9_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42944			X		X		
39	BH9_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42945			X		X		
40	BH10_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42946			X	X	X		
41	BH10_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42947			X		X		
42	BH11_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42948			X		X		
43	BH11_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42949			X		X		
44	BH12_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42950			X		X		
45	BH14_0.2-0.4	Jun 23, 2020		Soil	S20-Jn42951			X		X		
46	BH14_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42952			X		X		
47	BH14_1.4-1.6	Jun 23, 2020		Soil	S20-Jn42953			X		X		
48	BH14_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42954			X		X		

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
49	BH15_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42955			X		X		
50	BH15_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42956			X		X		
51	BH16_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42957			X		X		
52	BH16_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42958			X		X		
53	BH17B_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42959			X		X		
54	BH17B_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42960			X		X		
55	BH17B_2.2-2.3	Jun 23, 2020		Soil	S20-Jn42961			X		X		
56	BH18_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42962			X		X		
57	BH18_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42963			X		X		
58	BH19_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42964			X		X		
59	BH19_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42965			X	X	X		

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Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
60	BH20_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42966			X		X		
61	BH21_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42967			X		X		
62	BH21_1.3-1.5	Jun 24, 2020		Soil	S20-Jn42968			X		X		
63	TB1	Jun 22, 2020		Water	S20-Jn42969						X	
64	TS1	Jun 22, 2020		Water	S20-Jn42970							X
65	QC1	Jun 22, 2020		Soil	S20-Jn42971			X		X		
66	QC3	Jun 23, 2020		Soil	S20-Jn42972			X		X		
67	QC5	Jun 23, 2020		Soil	S20-Jn42973			X		X		
68	QC7	Jun 23, 2020		Soil	S20-Jn42974			X		X		
69	TB2	Jun 23, 2020		Water	S20-Jn42975						X	
70	TS2	Jun 23, 2020		Water	S20-Jn42976							X
71	RB1	Jun 23, 2020		Water	S20-Jn42977					X		
72	TS3	Jun 24, 2020		Water	S20-Jn42978							X

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NATA # 1261 Site # 20794

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NATA # 1261
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Company Name:	Coffey Environments P/L N'castle	**Order No.:**		**Received:**	Jun 24, 2020 2:00 PM
Address:	16 Callistemon Close	**Report #:**	727695	**Due:**	Jul 1, 2020
	Warabrook	**Phone:**	02 4016 2300	**Priority:**	5 Day
	NSW 2304	**Fax:**	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
73	TB3	Jun 24, 2020		Water	S20-Jn42979						X	
74	BH13_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42980		X					
75	BH17_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42981		X					
76	BH17_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42982		X					
77	SP1-1	Jun 24, 2020		Soil	S20-Jn42983	X		X		X		
78	SP1-2	Jun 24, 2020		Soil	S20-Jn42984			X		X		
79	SP1-3	Jun 24, 2020		Soil	S20-Jn42985	X		X		X		
80	SP1-4	Jun 24, 2020		Soil	S20-Jn42986			X		X		
81	SP1-5	Jun 24, 2020		Soil	S20-Jn42987	X		X		X		
82	SP1-6	Jun 24, 2020		Soil	S20-Jn42988			X		X		
83	SP1-7	Jun 24, 2020		Soil	S20-Jn42989	X		X		X		
84	SP1-8	Jun 24, 2020		Soil	S20-Jn42990			X		X		
85	SP1-9	Jun 24, 2020		Soil	S20-Jn42991	X		X		X		

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Address:	16 Callistemon Close Warabrook NSW 2304	**Report #:**	727695	**Due:**	Jul 1, 2020
		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail							Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271										X			
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794										X			
Perth Laboratory - NATA Site # 23736													
86	SP1-10	Jun 24, 2020		Soil	S20-Jn42992				X		X		
87	QC9	Jun 24, 2020		Soil	S20-Jn42993			X					
88	BH12_1.8-2.0	Jun 22, 2020		Soil	S20-Jn43132				X		X		
Test Counts							26	4	77	3	78	3	3

Environment Testing

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd Newcastle
16 Callistemon Close
Warabrook
NSW 2304

Attention:	Paul Wright
Report	727695-V2-AID
Project Name	DSI-107 SWAN ST MORPETH
Project ID	NTLEN271167
Received Date	Jun 24, 2020
Date Reported	Jul 09, 2020

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name DSI-107 SWAN ST MORPETH
Project ID NTLEN271167
Date Sampled Jun 22, 2020 to Jun 24, 2020
Report 727695-V2-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
BH1_0.0-0.2	20-Jn42907	Jun 22, 2020	Approximate Sample 163g Sample consisted of: Brown coarse-grained soil, rocks and ash-like material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH2_0.0-0.2	20-Jn42908	Jun 22, 2020	Approximate Sample 292g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH3_0.0-0.2	20-Jn42909	Jun 22, 2020	Approximate Sample 291g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH4_0.0-0.2	20-Jn42910	Jun 22, 2020	Approximate Sample 174g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH5_0.0-0.2	20-Jn42911	Jun 22, 2020	Approximate Sample 315g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH6_0.0-0.2	20-Jn42912	Jun 22, 2020	Approximate Sample 241g Sample consisted of: Brown coarse-grained soil, rocks, bituminous material and organic debris	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH7_0.0-0.2	20-Jn42913	Jun 23, 2020	Approximate Sample 250g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH8_0.0-0.2	20-Jn42914	Jun 23, 2020	Approximate Sample 264g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
BH9_0.0-0.2	20-Jn42915	Jun 23, 2020	Approximate Sample 211g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH10_0.0-0.2	20-Jn42916	Jun 23, 2020	Approximate Sample 197g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH11_0.0-0.2	20-Jn42917	Jun 23, 2020	Approximate Sample 230g Sample consisted of: Brown coarse-grained soil, rocks and organic debris	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH12_0.0-0.2	20-Jn42918	Jun 23, 2020	Approximate Sample 173g Sample consisted of: Brown coarse-grained soil, rocks and ash-like material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH13_0.0-0.2	20-Jn42919	Jun 23, 2020	Approximate Sample 203g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH14_0.0-0.2	20-Jn42920	Jun 23, 2020	Approximate Sample 368g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH15_0.0-0.2	20-Jn42921	Jun 23, 2020	Approximate Sample 180g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH16_0.0-0.2	20-Jn42922	Jun 23, 2020	Approximate Sample 277g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH17B_0.0-0.2	20-Jn42923	Jun 23, 2020	Approximate Sample 241g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH18_0.0-0.2	20-Jn42924	Jun 23, 2020	Approximate Sample 228g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH19_0.0-0.2	20-Jn42925	Jun 23, 2020	Approximate Sample 185g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH20_0.0-0.2	20-Jn42926	Jun 24, 2020	Approximate Sample 161g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
BH21_0.0-0.2	20-Jn42927	Jun 24, 2020	Approximate Sample 136g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

NATA Accredited
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Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
SP1-1	20-Jn42983	Jun 24, 2020	Approximate Sample 46g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SP1-3	20-Jn42985	Jun 24, 2020	Approximate Sample 51g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SP1-5	20-Jn42987	Jun 24, 2020	Approximate Sample 57g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SP1-7	20-Jn42989	Jun 24, 2020	Approximate Sample 46g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
SP1-9	20-Jn42991	Jun 24, 2020	Approximate Sample 50g Sample consisted of: Brown coarse-grained soil, rocks and bituminous material	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Jun 29, 2020	Indefinite

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
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Received: Jun 24, 2020 2:00 PM
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Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42907	X		X		X		
2	BH2_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42908	X		X		X		
3	BH3_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42909	X		X		X		
4	BH4_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42910	X		X		X		
5	BH5_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42911	X		X		X		
6	BH6_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42912	X		X		X		
7	BH7_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42913	X		X		X		
8	BH8_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42914	X		X		X		
9	BH9_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42915	X		X		X		
10	BH10_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42916	X		X		X		

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Address:	16 Callistemon Close Warabrook NSW 2304	**Report #:**	727695	**Due:**	Jul 9, 2020
		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
11	BH11_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42917	X		X		X		
12	BH12_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42918	X		X		X		
13	BH13_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42919	X		X		X		
14	BH14_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42920	X		X		X		
15	BH15_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42921	X		X		X		
16	BH16_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42922	X		X		X		
17	BH17B_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42923	X		X		X		
18	BH18_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42924	X		X		X		
19	BH19_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42925	X		X		X		
20	BH20_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42926	X		X		X		
21	BH21_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42927	X		X		X		
22	BH1_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42928			X		X		

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Rolleston, Christchurch 7675
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IANZ # 1290

Company Name:	Coffey Environments P/L N'castle	**Order No.:**		**Received:**	Jun 24, 2020 2:00 PM
Address:	16 Callistemon Close Warabrook NSW 2304	**Report #:**	727695	**Due:**	Jul 9, 2020
		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
23	BH1_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42929			X	X	X		
24	BH2_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42930			X		X		
25	BH2_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42931			X		X		
26	BH3_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42932			X		X		
27	BH3_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42933			X		X		
28	BH4_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42934			X		X		
29	BH4_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42935			X		X		
30	BH5_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42936			X		X		
31	BH5_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42937			X		X		
32	BH6_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42938			X		X		
33	BH6_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42939			X		X		
34	BH7_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42940			X		X		
35	BH7_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42941			X		X		

Company Name:	Coffey Environments P/L N'castle	**Order No.:**		**Received:**	Jun 24, 2020 2:00 PM
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Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
36	BH8_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42942			X		X		
37	BH8_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42943			X		X		
38	BH9_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42944			X		X		
39	BH9_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42945			X		X		
40	BH10_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42946			X	X	X		
41	BH10_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42947			X		X		
42	BH11_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42948			X		X		
43	BH11_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42949			X		X		
44	BH12_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42950			X		X		
45	BH14_0.2-0.4	Jun 23, 2020		Soil	S20-Jn42951			X		X		
46	BH14_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42952			X		X		
47	BH14_1.4-1.6	Jun 23, 2020		Soil	S20-Jn42953			X		X		
48	BH14_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42954			X		X		

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 9, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
49	BH15_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42955			X		X		
50	BH15_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42956			X		X		
51	BH16_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42957			X		X		
52	BH16_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42958			X		X		
53	BH17B_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42959			X		X		
54	BH17B_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42960			X		X		
55	BH17B_2.2-2.3	Jun 23, 2020		Soil	S20-Jn42961			X		X		
56	BH18_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42962			X		X		
57	BH18_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42963			X		X		
58	BH19_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42964			X		X		
59	BH19_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42965			X	X	X		

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	Warabrook	**Phone:**	02 4016 2300	**Priority:**	5 Day
	NSW 2304	**Fax:**	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
60	BH20_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42966			X		X		
61	BH21_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42967			X		X		
62	BH21_1.3-1.5	Jun 24, 2020		Soil	S20-Jn42968			X		X		
63	TB1	Jun 22, 2020		Water	S20-Jn42969						X	
64	TS1	Jun 22, 2020		Water	S20-Jn42970							X
65	QC1	Jun 22, 2020		Soil	S20-Jn42971			X		X		
66	QC3	Jun 23, 2020		Soil	S20-Jn42972			X		X		
67	QC5	Jun 23, 2020		Soil	S20-Jn42973			X		X		
68	QC7	Jun 23, 2020		Soil	S20-Jn42974			X		X		
69	TB2	Jun 23, 2020		Water	S20-Jn42975						X	
70	TS2	Jun 23, 2020		Water	S20-Jn42976							X
71	RB1	Jun 23, 2020		Water	S20-Jn42977					X		
72	TS3	Jun 24, 2020		Water	S20-Jn42978							X

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IANZ # 1290

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		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
73	TB3	Jun 24, 2020		Water	S20-Jn42979						X	
74	BH13_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42980		X					
75	BH17_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42981		X					
76	BH17_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42982		X					
77	SP1-1	Jun 24, 2020		Soil	S20-Jn42983	X		X		X		
78	SP1-2	Jun 24, 2020		Soil	S20-Jn42984			X		X		
79	SP1-3	Jun 24, 2020		Soil	S20-Jn42985	X		X		X		
80	SP1-4	Jun 24, 2020		Soil	S20-Jn42986			X		X		
81	SP1-5	Jun 24, 2020		Soil	S20-Jn42987	X		X		X		
82	SP1-6	Jun 24, 2020		Soil	S20-Jn42988			X		X		
83	SP1-7	Jun 24, 2020		Soil	S20-Jn42989	X		X		X		
84	SP1-8	Jun 24, 2020		Soil	S20-Jn42990			X		X		
85	SP1-9	Jun 24, 2020		Soil	S20-Jn42991	X		X		X		

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 9, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
86	SP1-10	Jun 24, 2020		Soil	S20-Jn42992			X		X		
87	QC9	Jun 24, 2020		Soil	S20-Jn42993			X		X		
88	BH12_1.8-2.0	Jun 22, 2020		Soil	S20-Jn43132			X		X		
Test Counts						26	3	78	3	79	3	3

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to “non-bonded / friable”.
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory’s remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

S20-Jn42983, S20-Jn42985, S20-Jn42987, S20-Jn42989, S20-Jn42991: The samples received were not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. Valid sub-sampling procedures were applied so as to ensure that the sub-samples to be analysed accurately represented the samples received.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Asbestos Counter/Identifier:

Sayeed Abu	Senior Analyst-Asbestos (NSW)

Authorised by:

Chamath JHM Annakkage	Senior Analyst-Asbestos (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd Newcastle
16 Callistemon Close
Warabrook
NSW 2304

Attention: **Paul Wright**

Report	**727695-S-V2**
Project name	DSI-107 SWAN ST MORPETH
Project ID	NTLEN271167
Received Date	Jun 24, 2020

Client Sample ID			G01 BH1_0.0-0.2	BH2_0.0-0.2	BH3_0.0-0.2	BH4_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42907	S20-Jn42908	S20-Jn42909	S20-Jn42910
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 200	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 500	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 500	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 500	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	79	95	72	77
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene N02	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) N04	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 500	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) N01	50	mg/kg	< 500	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 1000	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 1000	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 1000	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	40	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	40	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	40	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	3.2	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	14	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	32	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	23	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene N07	0.5	mg/kg	23	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	16	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	20	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	24	< 0.5	< 0.5	< 0.5

Client Sample ID			G01 BH1_0.0-0.2	BH2_0.0-0.2	BH3_0.0-0.2	BH4_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42907	S20-Jn42908	S20-Jn42909	S20-Jn42910
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a.h)anthracene	0.5	mg/kg	7.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	54	< 0.5	0.6	0.6
Fluorene	0.5	mg/kg	1.8	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	15	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	1.1	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	56	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	55	< 0.5	0.6	0.6
Total PAH*	0.5	mg/kg	345.6	< 0.5	1.2	1.2
2-Fluorobiphenyl (surr.)	1	%	77	71	71	74
p-Terphenyl-d14 (surr.)	1	%	90	118	94	105
Heavy Metals						
Arsenic	2	mg/kg	8.9	3.4	11	8.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4	0.7	< 0.4
Chromium	5	mg/kg	25	20	15	29
Copper	5	mg/kg	66	28	330	110
Lead	5	mg/kg	85	78	320	440
Mercury	0.1	mg/kg	0.1	< 0.1	0.5	0.2
Nickel	5	mg/kg	95	15	18	30
Zinc	5	mg/kg	72	130	890	260
% Moisture	1	%	23	15	28	24

Client Sample ID			BH5_0.0-0.2	BH6_0.0-0.2	BH7_0.0-0.2	BH8_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42911	S20-Jn42912	S20-Jn42913	S20-Jn42914
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	28	< 20	< 20	71
TRH C15-C28	50	mg/kg	500	210	360	1700
TRH C29-C36	50	mg/kg	310	100	160	2600
TRH C10-C36 (Total)	50	mg/kg	838	310	520	4371
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	88	127	94	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene N02	0.5	mg/kg	0.9	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) N04	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	52	< 50	< 50	96
TRH >C10-C16 less Naphthalene (F2) N01	50	mg/kg	51.1	< 50	< 50	96
TRH >C16-C34	100	mg/kg	740	280	480	3700

Client Sample ID			BH5_0.0-0.2	BH6_0.0-0.2	BH7_0.0-0.2	BH8_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42911	S20-Jn42912	S20-Jn42913	S20-Jn42914
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C34-C40	100	mg/kg	230	< 100	110	1800
TRH >C10-C40 (total)*	100	mg/kg	1022	280	590	5596
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	11	5.7	11	1.0
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	11	5.7	11	1.3
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	11	5.7	11	1.6
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	0.9	0.6	1.4	< 0.5
Anthracene	0.5	mg/kg	2.1	1.4	3.7	< 0.5
Benz(a)anthracene	0.5	mg/kg	11	5.3	11	0.6
Benzo(a)pyrene	0.5	mg/kg	6.8	3.4	6.5	0.8
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	5.0	3.1	6.5	0.8
Benzo(g.h.i)perylene	0.5	mg/kg	2.6	1.8	2.6	0.9
Benzo(k)fluoranthene	0.5	mg/kg	7.6	3.6	6.9	< 0.5
Chrysene	0.5	mg/kg	8.5	4.0	8.4	0.6
Dibenz(a.h)anthracene	0.5	mg/kg	1.1	0.9	1.4	< 0.5
Fluoranthene	0.5	mg/kg	19	12	21	1.3
Fluorene	0.5	mg/kg	1.1	0.6	1.3	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	2.7	1.6	2.9	0.6
Naphthalene	0.5	mg/kg	0.8	< 0.5	0.5	< 0.5
Phenanthrene	0.5	mg/kg	12	6.7	11	< 0.5
Pyrene	0.5	mg/kg	17	10	17	1.1
Total PAH*	0.5	mg/kg	98.2	55	102.1	6.7
2-Fluorobiphenyl (surr.)	1	%	63	74	59	71
p-Terphenyl-d14 (surr.)	1	%	82	109	103	94
Heavy Metals						
Arsenic	2	mg/kg	6.4	12	9.5	14
Cadmium	0.4	mg/kg	0.5	0.5	0.5	7.2
Chromium	5	mg/kg	17	32	24	42
Copper	5	mg/kg	79	140	150	630
Lead	5	mg/kg	470	970	310	2100
Mercury	0.1	mg/kg	0.3	0.5	0.2	0.2
Nickel	5	mg/kg	19	41	23	88
Zinc	5	mg/kg	430	540	340	1300
% Moisture	1	%	15	24	18	32

Client Sample ID			BH9_0.0-0.2	BH10_0.0-0.2	BH11_0.0-0.2	BH12_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42915	S20-Jn42916	S20-Jn42917	S20-Jn42918
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	170	< 20	26	< 20
TRH C15-C28	50	mg/kg	2000	69	260	110
TRH C29-C36	50	mg/kg	3800	170	450	120
TRH C10-C36 (Total)	50	mg/kg	5970	239	736	230

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Environment Testing

Client Sample ID			BH9_0.0-0.2	BH10_0.0-0.2	BH11_0.0-0.2	BH12_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42915	S20-Jn42916	S20-Jn42917	S20-Jn42918
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	0.4	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	0.5	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	102	101	91	53
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	300	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	300	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	4400	180	630	200
TRH >C34-C40	100	mg/kg	2800	290	500	190
TRH >C10-C40 (total)*	100	mg/kg	7500	470	1130	390
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	0.9	< 0.5	< 0.5	0.6
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.1	0.6	0.7	1.0
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.4	1.2	1.3	1.3
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	0.6	< 0.5	< 0.5	0.6
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	1.1	< 0.5	0.9	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	0.7	< 0.5	0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	0.8	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	1.5	< 0.5	0.9	0.8
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	1.0	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	1.8	< 0.5	0.9	0.7
Total PAH*	0.5	mg/kg	9.4	< 0.5	3.2	2.1
2-Fluorobiphenyl (surr.)	1	%	80	69	78	64
p-Terphenyl-d14 (surr.)	1	%	114	98	100	84
Heavy Metals						
Arsenic	2	mg/kg	18	4.8	6.9	3.8
Cadmium	0.4	mg/kg	43	< 0.4	1.2	0.6
Chromium	5	mg/kg	20	10	170	10
Copper	5	mg/kg	120	43	73	120
Lead	5	mg/kg	1800	250	660	91
Mercury	0.1	mg/kg	0.3	1.2	0.4	< 0.1
Nickel	5	mg/kg	24	10	23	15
Zinc	5	mg/kg	240	130	560	120
% Moisture	1	%	11	18	22	22

Client Sample ID			BH13_0.0-0.2	BH14_0.0-0.2	BH15_0.0-0.2	BH16_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42919	S20-Jn42920	S20-Jn42921	S20-Jn42922
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	72	< 20	33	< 20
TRH C15-C28	50	mg/kg	3000	120	240	86
TRH C29-C36	50	mg/kg	< 50	270	360	61
TRH C10-C36 (Total)	50	mg/kg	3072	390	633	147
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	99	125	135	93
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	180	< 50	61	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	180	< 50	61	< 50
TRH >C16-C34	100	mg/kg	7000	320	490	130
TRH >C34-C40	100	mg/kg	5300	390	520	< 100
TRH >C10-C40 (total)*	100	mg/kg	12480	710	1071	130
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.9	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	0.9	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	61	52	50	54
p-Terphenyl-d14 (surr.)	1	%	99	88	77	96

Client Sample ID			BH13_0.0-0.2	BH14_0.0-0.2	BH15_0.0-0.2	BH16_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42919	S20-Jn42920	S20-Jn42921	S20-Jn42922
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	4.7	6.9	33	4.9
Cadmium	0.4	mg/kg	4.2	< 0.4	< 0.4	0.6
Chromium	5	mg/kg	17	11	14	14
Copper	5	mg/kg	100	19	22	520
Lead	5	mg/kg	280	13	39	460
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Nickel	5	mg/kg	16	11	6.8	13
Zinc	5	mg/kg	220	49	51	530
% Moisture	1	%	20	10	9.3	13

Client Sample ID			BH17B_0.0-0.2	BH18_0.0-0.2	BH19_0.0-0.2	BH20_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42923	S20-Jn42924	S20-Jn42925	S20-Jn42926
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 200	62	120	< 20
TRH C15-C28	50	mg/kg	740	1200	1300	< 50
TRH C29-C36	50	mg/kg	630	790	510	< 50
TRH C10-C36 (Total)	50	mg/kg	1370	2052	1930	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	98	88	71	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	4.6	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	22	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	22	< 20
TRH >C10-C16	50	mg/kg	< 500	94	210	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 500	94	205.4	< 50
TRH >C16-C34	100	mg/kg	1200	1800	1500	< 100
TRH >C34-C40	100	mg/kg	< 1000	210	230	< 100
TRH >C10-C40 (total)*	100	mg/kg	1200	2104	1940	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	23	< 0.5	28	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	23	0.6	28	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	23	1.2	28	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	3.6	< 0.5	4.9	< 0.5
Anthracene	0.5	mg/kg	5.9	< 0.5	13	< 0.5
Benz(a)anthracene	0.5	mg/kg	14	0.5	31	< 0.5
Benzo(a)pyrene	0.5	mg/kg	13	< 0.5	17	< 0.5

Client Sample ID			BH17B_0.0-0.2	BH18_0.0-0.2	BH19_0.0-0.2	BH20_0.0-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42923	S20-Jn42924	S20-Jn42925	S20-Jn42926
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	13	< 0.5	16	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	8.4	< 0.5	8.0	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	12	< 0.5	18	< 0.5
Chrysene	0.5	mg/kg	11	< 0.5	25	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	4.7	< 0.5	3.7	< 0.5
Fluoranthene	0.5	mg/kg	20	1.1	98	1.1
Fluorene	0.5	mg/kg	1.5	< 0.5	2.7	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	7.7	< 0.5	9.3	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	7.7	< 0.5
Phenanthrene	0.5	mg/kg	12	1.0	78	0.6
Pyrene	0.5	mg/kg	22	0.8	63	0.8
Total PAH*	0.5	mg/kg	148.8	3.4	395.3	2.5
2-Fluorobiphenyl (surr.)	1	%	93	121	102	97
p-Terphenyl-d14 (surr.)	1	%	114	148	124	121
Heavy Metals						
Arsenic	2	mg/kg	3.6	32	27	2.8
Cadmium	0.4	mg/kg	< 0.4	0.8	0.6	< 0.4
Chromium	5	mg/kg	19	17	11	7.7
Copper	5	mg/kg	17	1000	470	8.3
Lead	5	mg/kg	14	600	770	32
Mercury	0.1	mg/kg	< 0.1	0.3	0.7	< 0.1
Nickel	5	mg/kg	72	54	58	< 5
Zinc	5	mg/kg	50	830	640	64
% Moisture	1	%	8.9	18	18	10

Client Sample ID			BH21_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42927	S20-Jn42928	S20-Jn42929	S20-Jn42930
Date Sampled			Jun 24, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	31	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	650	75	< 50	< 50
TRH C29-C36	50	mg/kg	350	55	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	1031	130	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	128	120	76	73

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Client Sample ID			BH21_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42927	S20-Jn42928	S20-Jn42929	S20-Jn42930
Date Sampled			Jun 24, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	58	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	58	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	810	120	< 100	< 100
TRH >C34-C40	100	mg/kg	150	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	1018	120	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	45	1.2	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	45	1.4	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	45	1.7	1.2	1.2
Acenaphthene	0.5	mg/kg	1.2	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	2.7	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	5.9	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	27	0.6	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	29	0.9	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	21	0.7	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	21	0.7	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	22	0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	24	0.6	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	6.4	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	87	1.6	< 0.5	< 0.5
Fluorene	0.5	mg/kg	1.8	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	18	0.6	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	46	0.8	< 0.5	< 0.5
Pyrene	0.5	mg/kg	73	1.3	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	386.7	8.3	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	100	81	104	101
p-Terphenyl-d14 (surr.)	1	%	121	126	122	119
Heavy Metals						
Arsenic	2	mg/kg	5.2	46	2.6	3.8
Cadmium	0.4	mg/kg	1.0	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	11	27	< 5	8.0
Copper	5	mg/kg	100	1500	< 5	< 5
Iron	20	mg/kg	-	-	4200	-
Lead	5	mg/kg	250	660	5.3	21
Mercury	0.1	mg/kg	0.2	0.2	< 0.1	< 0.1
Nickel	5	mg/kg	22	45	< 5	< 5
Zinc	5	mg/kg	950	280	16	24
% Moisture	1	%	12	27	24	27
% Clay	1	%	-	-	17	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	43	-
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	0.1	pH Units	-	-	4.2	-
Total Organic Carbon	0.1	%	-	-	0.4	-
Heavy Metals						
Iron (%)	0.01	%	-	-	0.42	-

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Environment Testing

Client Sample ID			BH21_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42927	S20-Jn42928	S20-Jn42929	S20-Jn42930
Date Sampled			Jun 24, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	24	-

Client Sample ID			BH2_1.8-2.0	BH3_0.8-1.0	BH3_1.8-2.0	BH4_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42931	S20-Jn42932	S20-Jn42933	S20-Jn42934
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	61	93	107	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			BH2_1.8-2.0	BH3_0.8-1.0	BH3_1.8-2.0	BH4_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42931	S20-Jn42932	S20-Jn42933	S20-Jn42934
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	100	61	84	88
p-Terphenyl-d14 (surr.)	1	%	116	75	95	118
Heavy Metals						
Arsenic	2	mg/kg	3.6	4.5	3.4	2.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	5.8	5.6	< 5	6.6
Copper	5	mg/kg	9.3	< 5	< 5	5.6
Lead	5	mg/kg	30	9.7	< 5	28
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	74	34	20	22
% Moisture	1	%	24	23	22	26

Client Sample ID			BH4_1.8-2.0	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42935	S20-Jn42936	S20-Jn42937	S20-Jn42938
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	110	150	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	110	150	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	66	95	85	82
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	130	160	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	130	160	< 100

Client Sample ID			BH4_1.8-2.0	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42935	S20-Jn42936	S20-Jn42937	S20-Jn42938
Date Sampled			Jun 22, 2020	Jun 22, 2020	Jun 22, 2020	Jun 22, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	1.8	3.3	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	2.0	3.5	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	2.3	3.8	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	0.6	1.1	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	1.9	3.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	1.3	2.4	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	0.9	1.6	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	0.9	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	1.1	2.3	< 0.5
Chrysene	0.5	mg/kg	< 0.5	1.4	2.7	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	5.2	9.2	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	0.5	1.0	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	2.1	5.4	< 0.5
Pyrene	0.5	mg/kg	< 0.5	3.4	6.2	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	18.4	36.8	< 0.5
2-Fluorobiphenyl (surr.)	1	%	90	89	100	93
p-Terphenyl-d14 (surr.)	1	%	114	112	120	120
Heavy Metals						
Arsenic	2	mg/kg	8.8	4.3	3.7	3.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	5.6	11	< 5	7.0
Copper	5	mg/kg	< 5	15	7.9	< 5
Lead	5	mg/kg	18	110	43	13
Mercury	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	30	110	70	13
% Moisture	1	%	23	28	26	27

Client Sample ID			BH6_1.8-2.0	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42939	S20-Jn42940	S20-Jn42941	S20-Jn42942
Date Sampled			Jun 22, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50

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Client Sample ID			BH6_1.8-2.0	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42939	S20-Jn42940	S20-Jn42941	S20-Jn42942
Date Sampled			Jun 22, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	86	89	95	103
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	1.2	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	2.4	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 1	< 0.5
2-Fluorobiphenyl (surr.)	1	%	110	94	110	102
p-Terphenyl-d14 (surr.)	1	%	123	114	124	91
Heavy Metals						
Arsenic	2	mg/kg	2.6	4.1	< 2	2.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	6.2	11	< 5	< 5
Copper	5	mg/kg	< 5	38	< 5	5.4
Lead	5	mg/kg	28	46	< 5	15
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	20	50	9.0	21
% Moisture	1	%	29	27	30	31

Client Sample ID			BH8_1.8-2.0	BH9_0.8-1.0	BH9_1.8-2.0	BH10_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42943	S20-Jn42944	S20-Jn42945	S20-Jn42946
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	230	< 50	< 50	63
TRH C29-C36	50	mg/kg	270	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	500	< 50	< 50	63
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	61	87	84	69
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	460	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	240	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	700	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	104	102	114	101
p-Terphenyl-d14 (surr.)	1	%	108	97	110	97

Client Sample ID			BH8_1.8-2.0	BH9_0.8-1.0	BH9_1.8-2.0	BH10_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42943	S20-Jn42944	S20-Jn42945	S20-Jn42946
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	39	5.2	2.7	5.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	8.5	< 5	11
Copper	5	mg/kg	5.5	< 5	< 5	29
Iron	20	mg/kg	-	-	-	15000
Lead	5	mg/kg	19	16	40	160
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.7
Nickel	5	mg/kg	< 5	< 5	< 5	8.5
Zinc	5	mg/kg	81	32	24	140
% Moisture	1	%	22	32	22	25
% Clay	1	%	-	-	-	15
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	-	230
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	0.1	pH Units	-	-	-	6.9
Total Organic Carbon	0.1	%	-	-	-	4.5
Heavy Metals						
Iron (%)	0.01	%	-	-	-	1.5
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	43

Client Sample ID			BH10_1.8-2.0	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42947	S20-Jn42948	S20-Jn42949	S20-Jn42950
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	92	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	110	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	202	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	73	98	101	136
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	180	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	110	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	290	< 100

Client Sample ID			BH10_1.8-2.0	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42947	S20-Jn42948	S20-Jn42949	S20-Jn42950
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	102	104	106	99
p-Terphenyl-d14 (surr.)	1	%	99	104	103	102
Heavy Metals						
Arsenic	2	mg/kg	2.5	5.0	3.0	4.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	< 5	10	12	9.4
Copper	5	mg/kg	< 5	< 5	17	19
Lead	5	mg/kg	30	14	87	55
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	5.9	5.5
Zinc	5	mg/kg	24	19	57	37
% Moisture	1	%	24	28	26	22

Client Sample ID			BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42951	S20-Jn42952	S20-Jn42953	S20-Jn42954
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	1000	23	39	< 20
TRH C15-C28	50	mg/kg	3800	63	140	< 50
TRH C29-C36	50	mg/kg	87	100	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	4887	186	179	< 50

Client Sample ID			BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42951	S20-Jn42952	S20-Jn42953	S20-Jn42954
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	88	139	INT	79
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	2.2	0.7	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	24	34	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	24	34	< 20	< 20
TRH >C10-C16	50	mg/kg	2300	< 50	82	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	2297.8	< 50	82	< 50
TRH >C16-C34	100	mg/kg	2500	100	100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	4800	100	182	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	0.9	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	2.1	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	2.1	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	2.9	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.9	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	9.6	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	106	95	104	110
p-Terphenyl-d14 (surr.)	1	%	INT	104	101	127
Heavy Metals						
Arsenic	2	mg/kg	14	4.6	3.6	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	9.0	11	< 5	< 5
Copper	5	mg/kg	67	6.3	< 5	< 5
Lead	5	mg/kg	120	18	53	53
Mercury	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	8.4	< 5	< 5	< 5
Zinc	5	mg/kg	360	26	14	5.9
% Moisture	1	%	14	33	37	36

Eurofins Environment Testing

Client Sample ID			BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.8-1.0	BH16_1.8-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42955	S20-Jn42956	S20-Jn42957	S20-Jn42958
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	INT	149	72	67
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	3.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	4.6	< 0.5
2-Fluorobiphenyl (surr.)	1	%	108	115	106	86
p-Terphenyl-d14 (surr.)	1	%	119	128	83	113

Client Sample ID			BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.8-1.0	BH16_1.8-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42955	S20-Jn42956	S20-Jn42957	S20-Jn42958
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	5.7	4.7	2.6	6.1
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	9.6	9.5	14	10
Copper	5	mg/kg	6.8	9.0	5.4	38
Lead	5	mg/kg	34	36	21	110
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	21	24	23	51
% Moisture	1	%	33	30	32	31

Client Sample ID			BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3	BH18_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42959	S20-Jn42960	S20-Jn42961	S20-Jn42962
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	180	< 200	< 20
TRH C10-C14	20	mg/kg	< 20	91	34	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	91	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	4.5	4.7	9.3	< 0.1
Toluene	0.1	mg/kg	3.4	21	54	< 0.1
Ethylbenzene	0.1	mg/kg	1.0	10	12	< 0.1
m&p-Xylenes	0.2	mg/kg	2.8	44	53	< 0.2
o-Xylene	0.1	mg/kg	1.3	15	21	< 0.1
Xylenes - Total*	0.3	mg/kg	4.1	59	73	< 0.3
4-Bromofluorobenzene (surr.)	1	%	64	51	95	91
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 2.5	< 5	< 0.5
TRH C6-C10	20	mg/kg	26	250	290	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	160	140	< 20
TRH >C10-C16	50	mg/kg	< 50	58	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	58	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3	BH18_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42959	S20-Jn42960	S20-Jn42961	S20-Jn42962
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	2.0	1.7	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	2	1.7	< 0.5
2-Fluorobiphenyl (surr.)	1	%	62	82	73	76
p-Terphenyl-d14 (surr.)	1	%	112	118	103	111
Heavy Metals						
Arsenic	2	mg/kg	3.5	4.3	< 2	2.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	13	7.1	< 5	11
Copper	5	mg/kg	< 5	< 5	< 5	< 5
Lead	5	mg/kg	19	230	16	14
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	13	7.2	< 5	33
% Moisture	1	%	36	31	21	29

Client Sample ID			BH18_1.8-2.0	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42963	S20-Jn42964	S20-Jn42965	S20-Jn42966
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	23	< 20
TRH C15-C28	50	mg/kg	< 50	69	320	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	77	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	69	420	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	74	67	137	INT

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Environment Testing

Client Sample ID			BH18_1.8-2.0	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42963	S20-Jn42964	S20-Jn42965	S20-Jn42966
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene N02	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) N04	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) N01	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	360	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	360	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	0.8	4.4	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	1.1	4.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.4	4.9	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	1.3	< 0.5
Anthracene	0.5	mg/kg	< 0.5	0.8	2.8	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	1.0	5.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	0.6	3.1	< 0.5
Benzo(b&j)fluoranthene N07	0.5	mg/kg	< 0.5	0.8	2.1	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	1.2	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	0.5	3.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	1.0	4.4	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	2.2	15	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	1.0	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	1.3	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	1.1	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	1.6	14	< 0.5
Pyrene	0.5	mg/kg	< 0.5	1.6	10	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	10.1	66.3	< 0.5
2-Fluorobiphenyl (surr.)	1	%	73	97	109	94
p-Terphenyl-d14 (surr.)	1	%	104	136	124	93
Heavy Metals						
Arsenic	2	mg/kg	4.8	6.4	3.8	11
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	5.3	11	< 5	11
Copper	5	mg/kg	68	17	24	< 5
Iron	20	mg/kg	-	-	11000	-
Lead	5	mg/kg	63	41	30	21
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	5.8	< 5	< 5	< 5
Zinc	5	mg/kg	110	45	61	24
% Moisture	1	%	27	31	24	32
% Clay	1	%	-	-	17	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	38	-
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	0.1	pH Units	-	-	4.1	-
Total Organic Carbon	0.1	%	-	-	0.4	-
Heavy Metals						
Iron (%)	0.01	%	-	-	1.1	-

Environment Testing

Client Sample ID			BH18_1.8-2.0	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.8-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42963	S20-Jn42964	S20-Jn42965	S20-Jn42966
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 23, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	30	-

Client Sample ID			BH21_0.8-1.0	BH21_1.3-1.5	QC1	QC3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42967	S20-Jn42968	S20-Jn42971	S20-Jn42972
Date Sampled			Jun 24, 2020	Jun 24, 2020	Jun 22, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	36
TRH C15-C28	50	mg/kg	< 50	86	< 50	310
TRH C29-C36	50	mg/kg	< 50	89	< 50	150
TRH C10-C36 (Total)	50	mg/kg	< 50	175	< 50	496
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	99	93	129	INT
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	130	< 100	370
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	130	< 100	370
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	5.7	< 0.5	11
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	5.7	0.6	11
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	5.7	1.2	11
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.6
Anthracene	0.5	mg/kg	< 0.5	1.1	< 0.5	4.1
Benz(a)anthracene	0.5	mg/kg	< 0.5	3.7	< 0.5	11
Benzo(a)pyrene	0.5	mg/kg	< 0.5	3.4	< 0.5	6.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	3.5	< 0.5	7.8
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	2.7	< 0.5	2.9
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	3.4	< 0.5	6.3
Chrysene	0.5	mg/kg	< 0.5	3.1	< 0.5	7.8
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	0.9	< 0.5	1.9
Fluoranthene	0.5	mg/kg	< 0.5	9.0	< 0.5	18
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	1.3
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	2.4	< 0.5	3.6
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.6

Client Sample ID			BH21_0.8-1.0	BH21_1.3-1.5	QC1	QC3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42967	S20-Jn42968	S20-Jn42971	S20-Jn42972
Date Sampled			Jun 24, 2020	Jun 24, 2020	Jun 22, 2020	Jun 23, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Phenanthrene	0.5	mg/kg	< 0.5	4.5	< 0.5	12
Pyrene	0.5	mg/kg	< 0.5	8.5	< 0.5	15
Total PAH*	0.5	mg/kg	< 0.5	46.2	< 0.5	100.4
2-Fluorobiphenyl (surr.)	1	%	65	103	101	110
p-Terphenyl-d14 (surr.)	1	%	76	113	112	112
Heavy Metals						
Arsenic	2	mg/kg	3.7	3.2	< 2	8.8
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	0.6
Chromium	5	mg/kg	8.6	7.4	13	28
Copper	5	mg/kg	< 5	38	10	160
Lead	5	mg/kg	15	40	22	360
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2
Nickel	5	mg/kg	< 5	< 5	9.3	26
Zinc	5	mg/kg	25	110	48	330
% Moisture	1	%	31	30	12	17

Client Sample ID			QC5	QC7	SP1-1	SP1-2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42973	S20-Jn42974	S20-Jn42983	S20-Jn42984
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	94	< 20	34	32
TRH C15-C28	50	mg/kg	1300	130	1000	1200
TRH C29-C36	50	mg/kg	2000	98	1400	1600
TRH C10-C36 (Total)	50	mg/kg	3394	228	2434	2832
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	83	INT	65	58
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	150	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	150	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	2800	210	2200	2700
TRH >C34-C40	100	mg/kg	1700	< 100	680	280
TRH >C10-C40 (total)*	100	mg/kg	4650	210	2880	2980

Client Sample ID			QC5	QC7	SP1-1	SP1-2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42973	S20-Jn42974	S20-Jn42983	S20-Jn42984
Date Sampled			Jun 23, 2020	Jun 23, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.9
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	1.2
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.5
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.8
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.7
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.8
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.6
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.7
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.6	< 0.5	0.7	1.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	0.6	< 0.5	< 0.5	0.8
Pyrene	0.5	mg/kg	0.7	< 0.5	0.7	1.2
Total PAH*	0.5	mg/kg	1.9	< 0.5	1.4	7.1
2-Fluorobiphenyl (surr.)	1	%	102	71	INT	INT
p-Terphenyl-d14 (surr.)	1	%	113	95	INT	INT
Heavy Metals						
Arsenic	2	mg/kg	10	13	8.0	7.5
Cadmium	0.4	mg/kg	35	1.0	1.4	1.7
Chromium	5	mg/kg	18	41	33	21
Copper	5	mg/kg	64	550	280	220
Lead	5	mg/kg	470	240	880	1700
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.4	0.3
Nickel	5	mg/kg	11	18	27	27
Zinc	5	mg/kg	190	670	660	690
% Moisture	1	%	9.2	14	16	18

Client Sample ID			SP1-3	SP1-4	SP1-5	SP1-6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42985	S20-Jn42986	S20-Jn42987	S20-Jn42988
Date Sampled			Jun 24, 2020	Jun 24, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	47	29	35	46
TRH C15-C28	50	mg/kg	1300	670	750	2100
TRH C29-C36	50	mg/kg	1800	870	1300	2800
TRH C10-C36 (Total)	50	mg/kg	3147	1569	2085	4946

Client Sample ID			SP1-3	SP1-4	SP1-5	SP1-6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42985	S20-Jn42986	S20-Jn42987	S20-Jn42988
Date Sampled			Jun 24, 2020	Jun 24, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	65	60	INT	69
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	64	< 50	< 50	66
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	64	< 50	< 50	66
TRH >C16-C34	100	mg/kg	2800	1400	1600	4500
TRH >C34-C40	100	mg/kg	860	430	520	1500
TRH >C10-C40 (total)*	100	mg/kg	3724	1830	2120	6066
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	1.5	1.0	0.8	1.1
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.7	1.3	1.1	1.4
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	2.0	1.6	1.4	1.7
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	1.3	0.8	0.5	0.6
Benzo(a)pyrene	0.5	mg/kg	1.1	0.8	0.7	0.9
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	0.6	0.6	< 0.5	0.6
Benzo(g.h.i)perylene	0.5	mg/kg	1.1	0.7	< 0.5	0.9
Benzo(k)fluoranthene	0.5	mg/kg	1.2	0.9	0.6	0.7
Chrysene	0.5	mg/kg	1.3	0.7	0.5	0.9
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	1.8	1.3	0.8	1.4
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	0.6	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	0.7	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	1.5	1.5	< 0.5	1.0
Pyrene	0.5	mg/kg	1.7	1.3	0.8	1.4
Total PAH*	0.5	mg/kg	12.2	9.3	3.9	8.4
2-Fluorobiphenyl (surr.)	1	%	INT	INT	INT	INT
p-Terphenyl-d14 (surr.)	1	%	50	61	67	55
Heavy Metals						
Arsenic	2	mg/kg	6.5	8.5	7.2	9.9
Cadmium	0.4	mg/kg	1.8	3.0	2.1	2.3
Chromium	5	mg/kg	21	34	22	38
Copper	5	mg/kg	180	500	360	230
Lead	5	mg/kg	760	900	890	930
Mercury	0.1	mg/kg	0.3	0.3	0.3	0.3
Nickel	5	mg/kg	26	36	28	28
Zinc	5	mg/kg	630	930	640	860
% Moisture	1	%	13	10	14	17

Environment Testing

Client Sample ID			SP1-7	SP1-8	SP1-9	SP1-10
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42989	S20-Jn42990	S20-Jn42991	S20-Jn42992
Date Sampled			Jun 24, 2020	Jun 24, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	50	32	37	36
TRH C15-C28	50	mg/kg	830	890	610	660
TRH C29-C36	50	mg/kg	1600	1200	810	1300
TRH C10-C36 (Total)	50	mg/kg	2480	2122	1457	1996
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	INT	62	74	71
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	69	< 50	54	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	69	< 50	54	< 50
TRH >C16-C34	100	mg/kg	1800	1900	1200	1600
TRH >C34-C40	100	mg/kg	680	550	550	900
TRH >C10-C40 (total)*	100	mg/kg	2549	2450	1804	2500
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	0.7	< 0.5	2.2	0.9
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.0	0.6	2.4	1.2
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.3	1.2	2.7	1.5
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	0.9	< 0.5
Benz(a)anthracene	0.5	mg/kg	0.6	< 0.5	2.1	0.7
Benzo(a)pyrene	0.5	mg/kg	0.6	< 0.5	1.6	0.7
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	1.2	0.8
Benzo(g.h.i)perylene	0.5	mg/kg	0.6	< 0.5	0.9	0.6
Benzo(k)fluoranthene	0.5	mg/kg	0.6	< 0.5	1.2	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	1.7	0.6
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.7	0.6	4.6	2.0
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	0.8	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	0.5	< 0.5	4.4	1.3
Pyrene	0.5	mg/kg	0.7	0.8	3.8	1.5
Total PAH*	0.5	mg/kg	4.3	1.4	23.2	8.2
2-Fluorobiphenyl (surr.)	1	%	INT	INT	63	76
p-Terphenyl-d14 (surr.)	1	%	51	68	71	92

Client Sample ID			SP1-7	SP1-8	SP1-9	SP1-10
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Jn42989	S20-Jn42990	S20-Jn42991	S20-Jn42992
Date Sampled			Jun 24, 2020	Jun 24, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	12	8.9	15	6.2
Cadmium	0.4	mg/kg	15	2.9	3.6	2.4
Chromium	5	mg/kg	45	20	27	15
Copper	5	mg/kg	570	270	390	200
Lead	5	mg/kg	2500	1100	790	630
Mercury	0.1	mg/kg	0.4	0.4	0.4	0.4
Nickel	5	mg/kg	80	39	37	24
Zinc	5	mg/kg	1700	890	1100	550
% Moisture	1	%	23	17	18	14

Client Sample ID			QC9	BH12_1.8-2.0
Sample Matrix			Soil	Soil
Eurofins Sample No.			S20-Jn42993	S20-Jn43132
Date Sampled			Jun 24, 2020	Jun 22, 2020
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	25	< 20
TRH C15-C28	50	mg/kg	500	< 50
TRH C29-C36	50	mg/kg	680	< 50
TRH C10-C36 (Total)	50	mg/kg	1205	< 50
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	107	73
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	1000	< 100
TRH >C34-C40	100	mg/kg	430	< 100
TRH >C10-C40 (total)*	100	mg/kg	1430	< 100
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	0.7	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	1.0	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.3	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	0.7	< 0.5
Benzo(a)pyrene	0.5	mg/kg	0.6	< 0.5

Client Sample ID			QC9	BH12_1.8-2.0
Sample Matrix			Soil	Soil
Eurofins Sample No.			S20-Jn42993	S20-Jn43132
Date Sampled			Jun 24, 2020	Jun 22, 2020
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	0.5	< 0.5
Chrysene	0.5	mg/kg	0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	1.8	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	1.8	< 0.5
Pyrene	0.5	mg/kg	1.2	< 0.5
Total PAH*	0.5	mg/kg	7.1	< 0.5
2-Fluorobiphenyl (surr.)	1	%	81	75
p-Terphenyl-d14 (surr.)	1	%	90	91
Heavy Metals				
Arsenic	2	mg/kg	10	7.1
Cadmium	0.4	mg/kg	1.9	< 0.4
Chromium	5	mg/kg	25	< 5
Copper	5	mg/kg	560	< 5
Lead	5	mg/kg	1200	< 5
Mercury	0.1	mg/kg	0.4	< 0.1
Nickel	5	mg/kg	36	< 5
Zinc	5	mg/kg	1000	18
% Moisture	1	%	15	20

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jul 08, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Jul 08, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 08, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 08, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 08, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	Jul 08, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
NEPM Screen for Soil Classification			
Heavy Metals	Sydney	Jun 29, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Clay	Brisbane	Jun 30, 2020	0 Days
- Method: LTM-GEN-7040			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	Jun 29, 2020	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (units)(1:5 soil:CaCl2 extract at 25°C as rec.)	Sydney	Jul 01, 2020	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Total Organic Carbon	Melbourne	Jun 30, 2020	28 Days
- Method: LTM-INO-4060 Total Organic Carbon in water and soil			
Cation Exchange Capacity	Melbourne	Jun 30, 2020	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			
% Moisture	Sydney	Jul 08, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42907	X		X		X		
2	BH2_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42908	X		X		X		
3	BH3_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42909	X		X		X		
4	BH4_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42910	X		X		X		
5	BH5_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42911	X		X		X		
6	BH6_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42912	X		X		X		
7	BH7_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42913	X		X		X		
8	BH8_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42914	X		X		X		
9	BH9_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42915	X		X		X		
10	BH10_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42916	X		X		X		

eurofins Environment Testing

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Company Name: Coffey Environments P/L N'castle
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NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
11	BH11_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42917	X		X		X		
12	BH12_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42918	X		X		X		
13	BH13_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42919	X		X		X		
14	BH14_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42920	X		X		X		
15	BH15_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42921	X		X		X		
16	BH16_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42922	X		X		X		
17	BH17B_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42923	X		X		X		
18	BH18_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42924	X		X		X		
19	BH19_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42925	X		X		X		
20	BH20_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42926	X		X		X		
21	BH21_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42927	X		X		X		
22	BH1_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42928			X		X		

eurofins Environment Testing

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Company Name:	Coffey Environments P/L N'castle	**Order No.:**	
Address:	16 Callistemon Close Warabrook NSW 2304	**Report #:**	727695
		Phone:	02 4016 2300
		Fax:	02 4016 2380
Project Name:	DSI-107 SWAN ST MORPETH		
Project ID:	NTLEN271167		

Received:	Jun 24, 2020 2:00 PM
Due:	Jul 1, 2020
Priority:	5 Day
Contact Name:	Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
23	BH1_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42929			X	X	X		
24	BH2_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42930			X		X		
25	BH2_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42931			X		X		
26	BH3_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42932			X		X		
27	BH3_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42933			X		X		
28	BH4_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42934			X		X		
29	BH4_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42935			X		X		
30	BH5_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42936			X		X		
31	BH5_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42937			X		X		
32	BH6_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42938			X		X		
33	BH6_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42939			X		X		
34	BH7_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42940			X		X		
35	BH7_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42941			X		X		

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Company Name:	Coffey Environments P/L N'castle	**Order No.:**		**Received:**	Jun 24, 2020 2:00 PM
Address:	16 Callistemon Close Warabrook NSW 2304	**Report #:**	727695	**Due:**	Jul 1, 2020
		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
36	BH8_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42942			X		X		
37	BH8_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42943			X		X		
38	BH9_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42944			X		X		
39	BH9_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42945			X		X		
40	BH10_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42946			X	X	X		
41	BH10_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42947			X		X		
42	BH11_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42948			X		X		
43	BH11_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42949			X		X		
44	BH12_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42950			X		X		
45	BH14_0.2-0.4	Jun 23, 2020		Soil	S20-Jn42951			X		X		
46	BH14_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42952			X		X		
47	BH14_1.4-1.6	Jun 23, 2020		Soil	S20-Jn42953			X		X		
48	BH14_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42954			X		X		

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Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Eurofins Analytical Services Manager : Andrew Black

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
49	BH15_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42955			X		X		
50	BH15_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42956			X		X		
51	BH16_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42957			X		X		
52	BH16_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42958			X		X		
53	BH17B_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42959			X		X		
54	BH17B_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42960			X		X		
55	BH17B_2.2-2.3	Jun 23, 2020		Soil	S20-Jn42961			X		X		
56	BH18_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42962			X		X		
57	BH18_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42963			X		X		
58	BH19_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42964			X		X		
59	BH19_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42965			X	X	X		

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
60	BH20_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42966			X		X		
61	BH21_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42967			X		X		
62	BH21_1.3-1.5	Jun 24, 2020		Soil	S20-Jn42968			X		X		
63	TB1	Jun 22, 2020		Water	S20-Jn42969						X	
64	TS1	Jun 22, 2020		Water	S20-Jn42970							X
65	QC1	Jun 22, 2020		Soil	S20-Jn42971			X		X		
66	QC3	Jun 23, 2020		Soil	S20-Jn42972			X		X		
67	QC5	Jun 23, 2020		Soil	S20-Jn42973			X		X		
68	QC7	Jun 23, 2020		Soil	S20-Jn42974			X		X		
69	TB2	Jun 23, 2020		Water	S20-Jn42975						X	
70	TS2	Jun 23, 2020		Water	S20-Jn42976							X
71	RB1	Jun 23, 2020		Water	S20-Jn42977					X		
72	TS3	Jun 24, 2020		Water	S20-Jn42978							X

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
73	TB3	Jun 24, 2020		Water	S20-Jn42979						X	
74	BH13_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42980		X					
75	BH17_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42981		X					
76	BH17_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42982		X					
77	SP1-1	Jun 24, 2020		Soil	S20-Jn42983	X		X		X		
78	SP1-2	Jun 24, 2020		Soil	S20-Jn42984			X		X		
79	SP1-3	Jun 24, 2020		Soil	S20-Jn42985	X		X		X		
80	SP1-4	Jun 24, 2020		Soil	S20-Jn42986			X		X		
81	SP1-5	Jun 24, 2020		Soil	S20-Jn42987	X		X		X		
82	SP1-6	Jun 24, 2020		Soil	S20-Jn42988			X		X		
83	SP1-7	Jun 24, 2020		Soil	S20-Jn42989	X		X		X		
84	SP1-8	Jun 24, 2020		Soil	S20-Jn42990			X		X		
85	SP1-9	Jun 24, 2020		Soil	S20-Jn42991	X		X		X		

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
86	SP1-10	Jun 24, 2020		Soil	S20-Jn42992			X		X		
87	QC9	Jun 24, 2020		Soil	S20-Jn42993		X					
88	BH12_1.8-2.0	Jun 22, 2020		Soil	S20-Jn43132			X		X		
Test Counts						26	4	77	3	78	3	3

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 20			20	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Iron (%)	%	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	70			70-130	Pass	
TRH C10-C14	%	80			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	99			70-130	Pass	
Toluene	%	72			70-130	Pass	
Ethylbenzene	%	102			70-130	Pass	
m&p-Xylenes	%	109			70-130	Pass	
o-Xylene	%	100			70-130	Pass	
Xylenes - Total*	%	106			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	103			70-130	Pass	
TRH C6-C10	%	70			70-130	Pass	
TRH >C10-C16	%	79			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	98			70-130	Pass	
Acenaphthylene	%	104			70-130	Pass	
Anthracene	%	120			70-130	Pass	
Benz(a)anthracene	%	125			70-130	Pass	
Benzo(a)pyrene	%	103			70-130	Pass	
Benzo(b&j)fluoranthene	%	127			70-130	Pass	
Benzo(g.h.i)perylene	%	115			70-130	Pass	
Benzo(k)fluoranthene	%	106			70-130	Pass	
Chrysene	%	112			70-130	Pass	
Dibenz(a.h)anthracene	%	96			70-130	Pass	
Fluoranthene	%	104			70-130	Pass	
Fluorene	%	110			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	122			70-130	Pass	
Naphthalene	%	96			70-130	Pass	
Phenanthrene	%	109			70-130	Pass	
Pyrene	%	109			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	107			70-130	Pass	
Cadmium	%	111			70-130	Pass	
Chromium	%	103			70-130	Pass	
Copper	%	103			70-130	Pass	
Iron	%	109			70-130	Pass	
Lead	%	102			70-130	Pass	
Mercury	%	93			70-130	Pass	
Nickel	%	107			70-130	Pass	
Zinc	%	110			70-130	Pass	
LCS - % Recovery							
% Clay	%	97			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	87			70-130	Pass	
Total Organic Carbon	%	101			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Heavy Metals									
Iron (%)			%	105			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S20-Jn51639	NCP	%	72			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S20-Jn51639	NCP	%	71			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Jn43192	NCP	%	78			70-130	Pass	
Acenaphthylene	S20-Jn43192	NCP	%	83			70-130	Pass	
Anthracene	S20-Jn43192	NCP	%	99			70-130	Pass	
Benz(a)anthracene	S20-Jn43192	NCP	%	121			70-130	Pass	
Benzo(a)pyrene	S20-Jn43192	NCP	%	85			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Jn43192	NCP	%	127			70-130	Pass	
Benzo(g.h.i)perylene	S20-Jn43192	NCP	%	84			70-130	Pass	
Benzo(k)fluoranthene	S20-Jn43192	NCP	%	88			70-130	Pass	
Chrysene	S20-Jn43192	NCP	%	89			70-130	Pass	
Dibenz(a.h)anthracene	S20-Jn43192	NCP	%	101			70-130	Pass	
Fluoranthene	S20-Jn43192	NCP	%	85			70-130	Pass	
Fluorene	S20-Jn43192	NCP	%	88			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Jn43192	NCP	%	94			70-130	Pass	
Naphthalene	S20-Jn43192	NCP	%	80			70-130	Pass	
Phenanthrene	S20-Jn43192	NCP	%	86			70-130	Pass	
Pyrene	S20-Jn43192	NCP	%	86			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Jn42910	CP	%	124			70-130	Pass	
Cadmium	S20-Jn42910	CP	%	117			70-130	Pass	
Chromium	S20-Jn42910	CP	%	112			70-130	Pass	
Lead	S20-Jn42910	CP	%	97			70-130	Pass	
Nickel	S20-Jn42910	CP	%	121			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S20-Jn42912	CP	%	91			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-Jn42912	CP	%	109			70-130	Pass	
Toluene	S20-Jn42912	CP	%	116			70-130	Pass	
Ethylbenzene	S20-Jn42912	CP	%	114			70-130	Pass	
m&p-Xylenes	S20-Jn42912	CP	%	124			70-130	Pass	
o-Xylene	S20-Jn42912	CP	%	117			70-130	Pass	
Xylenes - Total*	S20-Jn42912	CP	%	122			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S20-Jn42912	CP	%	94			70-130	Pass	
TRH C6-C10	S20-Jn42912	CP	%	93			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Jn42930	CP	%	99			70-130	Pass	
Cadmium	S20-Jn42930	CP	%	105			70-130	Pass	

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Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium	S20-Jn42930	CP	%	104			70-130	Pass	
Copper	S20-Jn42930	CP	%	103			70-130	Pass	
Lead	S20-Jn42930	CP	%	120			70-130	Pass	
Mercury	S20-Jn42930	CP	%	121			70-130	Pass	
Nickel	S20-Jn42930	CP	%	103			70-130	Pass	
Zinc	S20-Jn42930	CP	%	100			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-Jn42932	CP	%	108			70-130	Pass	
Toluene	S20-Jn42932	CP	%	90			70-130	Pass	
Ethylbenzene	S20-Jn42932	CP	%	97			70-130	Pass	
m&p-Xylenes	S20-Jn42932	CP	%	123			70-130	Pass	
o-Xylene	S20-Jn42932	CP	%	111			70-130	Pass	
Xylenes - Total*	S20-Jn42932	CP	%	119			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S20-Jn42932	CP	%	116			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-Jn42942	CP	%	95			70-130	Pass	
Toluene	S20-Jn42942	CP	%	97			70-130	Pass	
Ethylbenzene	S20-Jn42942	CP	%	90			70-130	Pass	
m&p-Xylenes	S20-Jn42942	CP	%	74			70-130	Pass	
o-Xylene	S20-Jn42942	CP	%	71			70-130	Pass	
Xylenes - Total*	S20-Jn42942	CP	%	73			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S20-Jn42942	CP	%	83			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Jn42950	CP	%	99			70-130	Pass	
Cadmium	S20-Jn42950	CP	%	104			70-130	Pass	
Chromium	S20-Jn42950	CP	%	95			70-130	Pass	
Copper	S20-Jn42950	CP	%	113			70-130	Pass	
Mercury	S20-Jn42950	CP	%	104			70-130	Pass	
Nickel	S20-Jn42950	CP	%	103			70-130	Pass	
Zinc	S20-Jn42950	CP	%	121			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S20-Jn42952	CP	%	74			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S20-Jn42952	CP	%	87			70-130	Pass	
Toluene	S20-Jn42952	CP	%	100			70-130	Pass	
Ethylbenzene	S20-Jn42952	CP	%	112			70-130	Pass	
m&p-Xylenes	S20-Jn42952	CP	%	115			70-130	Pass	
o-Xylene	S20-Jn42952	CP	%	117			70-130	Pass	
Xylenes - Total*	S20-Jn42952	CP	%	116			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Benz(a)anthracene	S20-Jn42964	CP	%	112			70-130	Pass	
Benzo(a)pyrene	S20-Jn42964	CP	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Jn42964	CP	%	108			70-130	Pass	
Benzo(g.h.i)perylene	S20-Jn42964	CP	%	119			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(k)fluoranthene	S20-Jn42964	CP	%	98			70-130	Pass	
Chrysene	S20-Jn42964	CP	%	97			70-130	Pass	
Dibenz(a.h)anthracene	S20-Jn42964	CP	%	122			70-130	Pass	
Fluoranthene	S20-Jn42964	CP	%	127			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Jn42964	CP	%	121			70-130	Pass	
Pyrene	S20-Jn42964	CP	%	110			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S20-Jn42966	CP	%	111			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S20-Jn42966	CP	%	97			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Jn42972	CP	%	90			70-130	Pass	
Cadmium	S20-Jn42972	CP	%	90			70-130	Pass	
Chromium	S20-Jn42972	CP	%	88			70-130	Pass	
Mercury	S20-Jn42972	CP	%	101			70-130	Pass	
Nickel	S20-Jn42972	CP	%	93			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42909	CP	mg/kg	11	10	11	30%	Pass	
Cadmium	S20-Jn42909	CP	mg/kg	0.7	0.9	26	30%	Pass	
Chromium	S20-Jn42909	CP	mg/kg	15	19	21	30%	Pass	
Copper	S20-Jn42909	CP	mg/kg	330	210	43	30%	Fail	Q02
Lead	S20-Jn42909	CP	mg/kg	320	340	6.0	30%	Pass	
Mercury	S20-Jn42909	CP	mg/kg	0.5	0.5	12	30%	Pass	
Nickel	S20-Jn42909	CP	mg/kg	18	20	10	30%	Pass	
Zinc	S20-Jn42909	CP	mg/kg	890	1000	14	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S20-Jn42911	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S20-Jn42911	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S20-Jn42911	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S20-Jn42911	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S20-Jn42911	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S20-Jn42911	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S20-Jn42911	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S20-Jn42911	CP	mg/kg	0.9	1.2	24	30%	Pass	
TRH C6-C10	S20-Jn42911	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S20-Jn42915	CP	mg/kg	170	160	6.0	30%	Pass	
TRH C15-C28	S20-Jn42915	CP	mg/kg	2000	2000	1.0	30%	Pass	
TRH C29-C36	S20-Jn42915	CP	mg/kg	3800	4200	9.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S20-Jn42915	CP	mg/kg	300	270	10	30%	Pass	
TRH >C16-C34	S20-Jn42915	CP	mg/kg	4400	4500	3.0	30%	Pass	
TRH >C34-C40	S20-Jn42915	CP	mg/kg	2800	3100	8.0	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Jn42915	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Jn42915	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Jn42915	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Jn42915	CP	mg/kg	0.6	0.8	42	30%	Fail	Q15
Benzo(a)pyrene	S20-Jn42915	CP	mg/kg	0.6	0.9	42	30%	Fail	Q15
Benzo(b&j)fluoranthene	S20-Jn42915	CP	mg/kg	1.1	1.1	2.0	30%	Pass	
Benzo(g.h.i)perylene	S20-Jn42915	CP	mg/kg	0.7	0.7	4.0	30%	Pass	
Benzo(k)fluoranthene	S20-Jn42915	CP	mg/kg	0.8	0.7	15	30%	Pass	
Chrysene	S20-Jn42915	CP	mg/kg	0.7	0.7	3.0	30%	Pass	
Dibenz(a.h)anthracene	S20-Jn42915	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Jn42915	CP	mg/kg	1.5	1.9	23	30%	Pass	
Fluorene	S20-Jn42915	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Jn42915	CP	mg/kg	< 0.5	0.5	5.0	30%	Pass	
Naphthalene	S20-Jn42915	CP	mg/kg	0.6	< 0.5	34	30%	Fail	Q15
Phenanthrene	S20-Jn42915	CP	mg/kg	1.0	1.4	35	30%	Fail	Q15
Pyrene	S20-Jn42915	CP	mg/kg	1.8	2.1	13	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42916	CP	%	18	18	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42919	CP	mg/kg	4.7	3.7	22	30%	Pass	
Cadmium	S20-Jn42919	CP	mg/kg	4.2	4.5	8.0	30%	Pass	
Chromium	S20-Jn42919	CP	mg/kg	17	15	16	30%	Pass	
Copper	S20-Jn42919	CP	mg/kg	100	100	1.0	30%	Pass	
Lead	S20-Jn42919	CP	mg/kg	280	280	1.0	30%	Pass	
Mercury	S20-Jn42919	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-Jn42919	CP	mg/kg	16	12	28	30%	Pass	
Zinc	S20-Jn42919	CP	mg/kg	220	200	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42926	CP	%	10	11	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42929	CP	mg/kg	2.6	2.2	17	30%	Pass	
Cadmium	S20-Jn42929	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Jn42929	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S20-Jn42929	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S20-Jn42929	CP	mg/kg	5.3	< 5	18	30%	Pass	
Mercury	S20-Jn42929	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-Jn42929	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S20-Jn42929	CP	mg/kg	16	15	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-Jn42929	CP	uS/cm	43	44	4.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(g.h.i)perylene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Jn42930	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S20-Jn42931	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S20-Jn42931	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S20-Jn42931	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S20-Jn42931	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S20-Jn42931	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S20-Jn42931	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	S20-Jn42931	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S20-Jn42931	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S20-Jn42931	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42936	CP	%	28	27	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42939	CP	mg/kg	2.6	< 2	37	30%	Fail	Q15
Cadmium	S20-Jn42939	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Jn42939	CP	mg/kg	6.2	5.2	19	30%	Pass	
Mercury	S20-Jn42939	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-Jn42939	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S20-Jn42945	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S20-Jn42945	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S20-Jn42945	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S20-Jn42945	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S20-Jn42945	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S20-Jn42945	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(k)fluoranthene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Jn42945	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42946	CP	%	25	26	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42949	CP	mg/kg	3.0	3.0	1.0	30%	Pass	
Cadmium	S20-Jn42949	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Jn42949	CP	mg/kg	12	8.6	36	30%	Fail	Q15
Copper	S20-Jn42949	CP	mg/kg	17	9.9	53	30%	Fail	Q15
Iron	S20-Jn42949	CP	mg/kg	11000	10000	11	30%	Pass	
Lead	S20-Jn42949	CP	mg/kg	87	56	43	30%	Fail	Q15
Mercury	S20-Jn42949	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-Jn42949	CP	mg/kg	5.9	< 5	53	30%	Fail	Q15
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42956	CP	%	30	31	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42959	CP	mg/kg	3.5	3.1	10	30%	Pass	
Cadmium	S20-Jn42959	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Jn42959	CP	mg/kg	13	11	18	30%	Pass	
Copper	S20-Jn42959	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S20-Jn42959	CP	mg/kg	19	18	4.0	30%	Pass	
Mercury	S20-Jn42959	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-Jn42959	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S20-Jn42959	CP	mg/kg	13	12	12	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42965	CP	mg/kg	3.8	3.4	12	30%	Pass	
Cadmium	S20-Jn42965	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Jn42965	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S20-Jn42965	CP	mg/kg	24	25	5.0	30%	Pass	
Iron	S20-Jn42965	CP	mg/kg	11000	9300	12	30%	Pass	
Lead	S20-Jn42965	CP	mg/kg	30	36	17	30%	Pass	
Mercury	S20-Jn42965	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	S20-Jn42965	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S20-Jn42965	CP	mg/kg	61	53	13	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42966	CP	%	32	32	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S20-Jn42984	CP	mg/kg	32	< 20	91	30%	Fail	Q15
TRH C15-C28	S20-Jn42984	CP	mg/kg	1200	870	35	30%	Fail	Q15
TRH C29-C36	S20-Jn42984	CP	mg/kg	1600	1400	18	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S20-Jn42984	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S20-Jn42984	CP	mg/kg	2700	1900	33	30%	Fail	Q15
TRH >C34-C40	S20-Jn42984	CP	mg/kg	280	170	48	30%	Fail	Q15
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Jn42984	CP	mg/kg	0.8	0.7	11	30%	Pass	
Benzo(a)pyrene	S20-Jn42984	CP	mg/kg	0.7	0.7	8.0	30%	Pass	
Benzo(b&j)fluoranthene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-Jn42984	CP	mg/kg	0.8	0.8	3.0	30%	Pass	
Benzo(k)fluoranthene	S20-Jn42984	CP	mg/kg	0.6	0.6	3.0	30%	Pass	
Chrysene	S20-Jn42984	CP	mg/kg	0.7	0.8	16	30%	Pass	
Dibenz(a.h)anthracene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Jn42984	CP	mg/kg	1.5	0.9	<1	30%	Pass	
Fluorene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Jn42984	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Jn42984	CP	mg/kg	0.8	0.8	<1	30%	Pass	
Pyrene	S20-Jn42984	CP	mg/kg	1.2	1.0	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42992	CP	%	14	19	29	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Jn42993	CP	%	15	15	5.0	30%	Pass	

Comments

Splits sent to ALS.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
G01	The LORs have been raised due to matrix interference
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Andrew Black	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Jonathon Angell	Senior Analyst-Inorganic (QLD)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)
Scott Beddoes	Senior Analyst-Inorganic (VIC)

Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd Newcastle
16 Callistemon Close
Warabrook
NSW 2304

Attention: **Paul Wright**

Report	**727695-W-V2**
Project name	DSI-107 SWAN ST MORPETH
Project ID	NTLEN271167
Received Date	Jun 24, 2020

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TB1** **Water** **S20-Jn42969** **Jun 22, 2020**	**TS1** **Water** **S20-Jn42970** **Jun 22, 2020**	**TB2** **Water** **S20-Jn42975** **Jun 23, 2020**	**TS2** **Water** **S20-Jn42976** **Jun 23, 2020**
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	-	< 0.01	-
TRH C6-C10	0.02	mg/L	< 0.02	-	< 0.02	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	-	< 0.02	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	< 0.02	-	< 0.02	-
BTEX						
Benzene	0.001	mg/L	< 0.001	-	< 0.001	-
Toluene	0.001	mg/L	< 0.001	-	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	-	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	-	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	-	< 0.001	-
Xylenes - Total*	0.003	mg/L	< 0.003	-	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	96	-	101	-
TRH C6-C10	1	%	-	72	-	76
Total Recoverable Hydrocarbons						
Naphthalene	1	%	-	100	-	100
TRH C6-C9	1	%	-	76	-	79
BTEX						
Benzene	1	%	-	110	-	110
Ethylbenzene	1	%	-	97	-	100
m&p-Xylenes	1	%	-	100	-	100
o-Xylene	1	%	-	98	-	100
Toluene	1	%	-	110	-	110
Xylenes - Total	1	%	-	99	-	100
4-Bromofluorobenzene (surr.)	1	%	-	100	-	103

Environment Testing

Client Sample ID			RB1	TS3	TB3
Sample Matrix			Water	Water	Water
Eurofins Sample No.			S20-Jn42977	S20-Jn42978	S20-Jn42979
Date Sampled			Jun 23, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.01	mg/L	< 0.01	-	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	-	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	-	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	-	-
TRH >C16-C34	0.1	mg/L	< 0.1	-	-
TRH >C34-C40	0.1	mg/L	< 0.1	-	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	-	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	< 0.02	-	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	-	-
TRH C15-C28	0.1	mg/L	< 0.1	-	-
TRH C29-C36	0.1	mg/L	< 0.1	-	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	-	-
BTEX					
Benzene	0.001	mg/L	< 0.001	-	< 0.001
Toluene	0.001	mg/L	< 0.001	-	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	-	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	-	< 0.002
o-Xylene	0.001	mg/L	< 0.001	-	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	-	< 0.003
4-Bromofluorobenzene (surr.)	1	%	108	-	109
TRH C6-C10	1	%	-	80	-
Total Recoverable Hydrocarbons					
Naphthalene	1	%	-	120	-
TRH C6-C9	1	%	-	80	-
BTEX					
Benzene	1	%	-	130	-
Ethylbenzene	1	%	-	120	-
m&p-Xylenes	1	%	-	110	-
o-Xylene	1	%	-	110	-
Toluene	1	%	-	130	-
Xylenes - Total	1	%	-	110	-
4-Bromofluorobenzene (surr.)	1	%	-	113	-
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.001	mg/L	< 0.001	-	-
Acenaphthylene	0.001	mg/L	< 0.001	-	-
Anthracene	0.001	mg/L	< 0.001	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	-	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	-	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	-	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	-	-
Chrysene	0.001	mg/L	< 0.001	-	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	-	-
Fluoranthene	0.001	mg/L	< 0.001	-	-
Fluorene	0.001	mg/L	< 0.001	-	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	-	-

Environment Testing

Client Sample ID			RB1	TS3	TB3
Sample Matrix			Water	Water	Water
Eurofins Sample No.			S20-Jn42977	S20-Jn42978	S20-Jn42979
Date Sampled			Jun 23, 2020	Jun 24, 2020	Jun 24, 2020
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Naphthalene	0.001	mg/L	< 0.001	-	-
Phenanthrene	0.001	mg/L	< 0.001	-	-
Pyrene	0.001	mg/L	< 0.001	-	-
Total PAH*	0.001	mg/L	< 0.001	-	-
2-Fluorobiphenyl (surr.)	1	%	111	-	-
p-Terphenyl-d14 (surr.)	1	%	75	-	-
Heavy Metals					
Arsenic	0.001	mg/L	< 0.001	-	-
Cadmium	0.0002	mg/L	< 0.0002	-	-
Chromium	0.001	mg/L	< 0.001	-	-
Copper	0.001	mg/L	< 0.001	-	-
Lead	0.001	mg/L	< 0.001	-	-
Mercury	0.0001	mg/L	< 0.0001	-	-
Nickel	0.001	mg/L	< 0.001	-	-
Zinc	0.005	mg/L	< 0.005	-	-

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons	Sydney	Jun 25, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jun 25, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jun 25, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Jun 25, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jun 25, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Jun 25, 2020	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Metals M8	Sydney	Jun 25, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

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IANZ # 1290

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close, Warabrook, NSW 2304

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	BH1_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42907	X		X		X		
2	BH2_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42908	X		X		X		
3	BH3_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42909	X		X		X		
4	BH4_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42910	X		X		X		
5	BH5_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42911	X		X		X		
6	BH6_0.0-0.2	Jun 22, 2020		Soil	S20-Jn42912	X		X		X		
7	BH7_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42913	X		X		X		
8	BH8_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42914	X		X		X		
9	BH9_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42915	X		X		X		
10	BH10_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42916	X		X		X		

eurofins
Environment Testing

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

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Rolleston, Christchurch 7675
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Company Name:	Coffey Environments P/L N'castle	**Order No.:**		**Received:**	Jun 24, 2020 2:00 PM
Address:	16 Callistemon Close Warabrook NSW 2304	**Report #:**	727695	**Due:**	Jul 1, 2020
		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
11	BH11_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42917	X		X		X		
12	BH12_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42918	X		X		X		
13	BH13_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42919	X		X		X		
14	BH14_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42920	X		X		X		
15	BH15_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42921	X		X		X		
16	BH16_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42922	X		X		X		
17	BH17B_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42923	X		X		X		
18	BH18_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42924	X		X		X		
19	BH19_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42925	X		X		X		
20	BH20_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42926	X		X		X		
21	BH21_0.0-0.2	Jun 24, 2020		Soil	S20-Jn42927	X		X		X		
22	BH1_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42928			X		X		

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Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close, Warabrook, NSW 2304

Order No.:
Report #: 727695
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jun 24, 2020 2:00 PM
Due: Jul 1, 2020
Priority: 5 Day
Contact Name: Paul Wright

Project Name: DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
23	BH1_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42929			X	X	X		
24	BH2_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42930			X		X		
25	BH2_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42931			X		X		
26	BH3_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42932			X		X		
27	BH3_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42933			X		X		
28	BH4_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42934			X		X		
29	BH4_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42935			X		X		
30	BH5_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42936			X		X		
31	BH5_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42937			X		X		
32	BH6_0.8-1.0	Jun 22, 2020		Soil	S20-Jn42938			X		X		
33	BH6_1.8-2.0	Jun 22, 2020		Soil	S20-Jn42939			X		X		
34	BH7_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42940			X		X		
35	BH7_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42941			X		X		

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
36	BH8_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42942			X		X		
37	BH8_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42943			X		X		
38	BH9_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42944			X		X		
39	BH9_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42945			X		X		
40	BH10_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42946			X	X	X		
41	BH10_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42947			X		X		
42	BH11_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42948			X		X		
43	BH11_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42949			X		X		
44	BH12_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42950			X		X		
45	BH14_0.2-0.4	Jun 23, 2020		Soil	S20-Jn42951			X		X		
46	BH14_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42952			X		X		
47	BH14_1.4-1.6	Jun 23, 2020		Soil	S20-Jn42953			X		X		
48	BH14_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42954			X		X		

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		Phone:	02 4016 2300	**Priority:**	5 Day
		Fax:	02 4016 2380	**Contact Name:**	Paul Wright
Project Name:	DSI-107 SWAN ST MORPETH				
Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	HOLD	Moisture Set	NEPM Screen for Soil Classification	Eurofins | mgt Suite B7	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
49	BH15_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42955			X		X		
50	BH15_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42956			X		X		
51	BH16_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42957			X		X		
52	BH16_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42958			X		X		
53	BH17B_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42959			X		X		
54	BH17B_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42960			X		X		
55	BH17B_2.2-2.3	Jun 23, 2020		Soil	S20-Jn42961			X		X		
56	BH18_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42962			X		X		
57	BH18_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42963			X		X		
58	BH19_0.8-1.0	Jun 23, 2020		Soil	S20-Jn42964			X		X		
59	BH19_1.8-2.0	Jun 23, 2020		Soil	S20-Jn42965			X	X	X		

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Project ID:	NTLEN271167				

Eurofins Analytical Services Manager : Andrew Black

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
60	BH20_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42966			X		X		
61	BH21_0.8-1.0	Jun 24, 2020		Soil	S20-Jn42967			X		X		
62	BH21_1.3-1.5	Jun 24, 2020		Soil	S20-Jn42968			X		X		
63	TB1	Jun 22, 2020		Water	S20-Jn42969						X	
64	TS1	Jun 22, 2020		Water	S20-Jn42970							X
65	QC1	Jun 22, 2020		Soil	S20-Jn42971			X		X		
66	QC3	Jun 23, 2020		Soil	S20-Jn42972			X		X		
67	QC5	Jun 23, 2020		Soil	S20-Jn42973			X		X		
68	QC7	Jun 23, 2020		Soil	S20-Jn42974			X		X		
69	TB2	Jun 23, 2020		Water	S20-Jn42975						X	
70	TS2	Jun 23, 2020		Water	S20-Jn42976							X
71	RB1	Jun 23, 2020		Water	S20-Jn42977					X		
72	TS3	Jun 24, 2020		Water	S20-Jn42978							X

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Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
73	TB3	Jun 24, 2020		Water	S20-Jn42979						X	
74	BH13_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42980		X					
75	BH17_0.0-0.2	Jun 23, 2020		Soil	S20-Jn42981		X					
76	BH17_0.3-0.4	Jun 23, 2020		Soil	S20-Jn42982		X					
77	SP1-1	Jun 24, 2020		Soil	S20-Jn42983	X		X		X		
78	SP1-2	Jun 24, 2020		Soil	S20-Jn42984			X		X		
79	SP1-3	Jun 24, 2020		Soil	S20-Jn42985	X		X		X		
80	SP1-4	Jun 24, 2020		Soil	S20-Jn42986			X		X		
81	SP1-5	Jun 24, 2020		Soil	S20-Jn42987	X		X		X		
82	SP1-6	Jun 24, 2020		Soil	S20-Jn42988			X		X		
83	SP1-7	Jun 24, 2020		Soil	S20-Jn42989	X		X		X		
84	SP1-8	Jun 24, 2020		Soil	S20-Jn42990			X		X		
85	SP1-9	Jun 24, 2020		Soil	S20-Jn42991	X		X		X		

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Melbourne Laboratory - NATA Site # 1254 & 14271									X			
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794									X			
Perth Laboratory - NATA Site # 23736												
86	SP1-10	Jun 24, 2020		Soil	S20-Jn42992			X		X		
87	QC9	Jun 24, 2020		Soil	S20-Jn42993		X					
88	BH12_1.8-2.0	Jun 22, 2020		Soil	S20-Jn43132			X		X		
Test Counts						26	4	77	3	78	3	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	93			70-130	Pass	
TRH C6-C10	%	90			70-130	Pass	
TRH >C10-C16	%	106			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	90			70-130	Pass	
TRH C10-C14	%	112			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	95			70-130	Pass	
Toluene	%	94			70-130	Pass	
Ethylbenzene	%	95			70-130	Pass	
m&p-Xylenes	%	95			70-130	Pass	
o-Xylene	%	92			70-130	Pass	
Xylenes - Total*	%	94			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Jn41175	NCP	%	91			70-130	Pass	
Cadmium	S20-Jn41175	NCP	%	94			70-130	Pass	
Chromium	S20-Jn41175	NCP	%	97			70-130	Pass	
Copper	S20-Jn41175	NCP	%	94			70-130	Pass	
Lead	S20-Jn41175	NCP	%	92			70-130	Pass	
Mercury	S20-Jn41175	NCP	%	102			70-130	Pass	
Nickel	S20-Jn41175	NCP	%	95			70-130	Pass	
Zinc	S20-Jn41175	NCP	%	89			70-130	Pass	

Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	N20-Jn42746	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	N20-Jn42746	NCP	mg/L	0.05	0.07	42	30%	Fail	Q15
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	N20-Jn42746	NCP	mg/L	0.03	0.05	43	30%	Fail	Q15
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	N20-Jn42746	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	N20-Jn42746	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	N20-Jn42746	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	N20-Jn42746	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	N20-Jn42746	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	N20-Jn42746	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Jn42977	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	S20-Jn42977	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S20-Jn42977	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S20-Jn42977	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	S20-Jn42977	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S20-Jn42977	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S20-Jn42977	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S20-Jn42977	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

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

Authorised By

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

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

CERTIFICATE OF ANALYSIS

Work Order	: **ES2022200**	Page	: 1 of 6
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: PAUL WRIGHT	Contact	: Customer Services ES
Address	: LEVEL 19, 799 PACIFIC HIGHWAY Tower B - Citadel Tower CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4016 2300	Telephone	: +61-2-8784 8555
Project	: NTLEN271167 DSI-107 SWAN ST, MORPETH	Date Samples Received	: 26-Jun-2020 13:00
Order number	: ----	Date Analysis Commenced	: 29-Jun-2020
C-O-C number	: ----	Issue Date	: 03-Jul-2020 16:38
Sampler	: SAM RAMSEY		
Site	:		
Quote number	: EN/222		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP071: Results of samples QC4 and QC6 have been confirmed by re-extraction and re-analysis.
- EP071: Results of sample QC10 have been confirmed by re-extraction and re-analysis.
- EG035: Positive Hg result ES2022200 #3 has been confirmed by reanalysis.
- EG005: Poor precision was obtained for Copper and Zinc on sample ES2022200-5. Results have been confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC2	QC4	QC6	QC8	QC10
			Client sampling date / time	22-Jun-2020 00:00	23-Jun-2020 00:00	23-Jun-2020 00:00	23-Jun-2020 00:00	24-Jun-2020 00:00
Compound	CAS Number	LOR	Unit	ES2022200-001	ES2022200-002	ES2022200-003	ES2022200-004	ES2022200-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	12.0	17.2	11.1	12.8	15.4
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	8	12	6	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	34	<1	2
Chromium	7440-47-3	2	mg/kg	13	18	18	13	12
Copper	7440-50-8	5	mg/kg	13	124	104	469	271
Lead	7439-92-1	5	mg/kg	30	246	470	269	549
Nickel	7440-02-0	2	mg/kg	10	25	20	13	19
Zinc	7440-66-6	5	mg/kg	67	376	168	367	589
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.1	0.2	<0.1	0.3
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	1.0	0.6	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	1.3	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	0.6	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	8.8	1.3	<0.5	0.6
Anthracene	120-12-7	0.5	mg/kg	<0.5	2.8	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	17.4	2.8	<0.5	0.9
Pyrene	129-00-0	0.5	mg/kg	<0.5	14.0	3.2	<0.5	0.9
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	7.5	0.9	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	6.4	1.0	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	7.4	1.4	<0.5	0.6
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3.2	0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6.1	0.8	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	2.6	0.6	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	0.7	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	2.7	0.8	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	82.5	13.9	<0.5	3.0
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	9.0	1.2	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	9.0	1.4	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	9.0	1.6	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC2	QC4	QC6	QC8	QC10
			Client sampling date / time	22-Jun-2020 00:00	23-Jun-2020 00:00	23-Jun-2020 00:00	23-Jun-2020 00:00	24-Jun-2020 00:00
Compound	CAS Number	LOR	Unit	ES2022200-001	ES2022200-002	ES2022200-003	ES2022200-004	ES2022200-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	**190**	<50	<50
C15 - C28 Fraction	----	100	mg/kg	<100	**270**	**3020**	<100	**410**
C29 - C36 Fraction	----	100	mg/kg	<100	**160**	**5300**	<100	**760**
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	**430**	**8510**	<50	**1170**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	**310**	<50	<50
>C16 - C34 Fraction	----	100	mg/kg	<100	**380**	**6620**	<100	**990**
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	**4210**	<100	**460**
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	**380**	**11100**	<50	**1450**
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	**310**	<50	<50
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**72.0**	**70.8**	**72.7**	**71.8**	**84.0**
2-Chlorophenol-D4	93951-73-6	0.5	%	**76.6**	**79.1**	**79.9**	**79.8**	**87.1**
2.4.6-Tribromophenol	118-79-6	0.5	%	**59.0**	**69.6**	**81.3**	**72.8**	**74.6**
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**90.1**	**91.7**	**91.0**	**94.0**	**93.0**
Anthracene-d10	1719-06-8	0.5	%	**104**	**95.0**	**93.2**	**104**	**95.5**
4-Terphenyl-d14	1718-51-0	0.5	%	**91.4**	**94.0**	**89.7**	**95.6**	**89.9**
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**98.6**	**107**	**107**	**100**	**85.8**
Toluene-D8	2037-26-5	0.2	%	**104**	**113**	**114**	**105**	**84.9**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	QC2	QC4	QC6	QC8	QC10
			Client sampling date / time	22-Jun-2020 00:00	23-Jun-2020 00:00	23-Jun-2020 00:00	23-Jun-2020 00:00	24-Jun-2020 00:00
Compound	CAS Number	LOR	Unit	ES2022200-001	ES2022200-002	ES2022200-003	ES2022200-004	ES2022200-005
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	113	119	115	106	86.7

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	Recovery Limits (%) High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2022200**	Page	: 1 of 11
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: PAUL WRIGHT	Contact	: Customer Services ES
Address	: LEVEL 19, 799 PACIFIC HIGHWAY Tower B - Citadel Tower CHATSWOOD NSW, AUSTRALIA 2067	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 4016 2300	Telephone	: +61-2-8784 8555
Project	: NTLEN271167 DSI-107 SWAN ST, MORPETH	Date Samples Received	: 26-Jun-2020
Order number	: ----	Date Analysis Commenced	: 29-Jun-2020
C-O-C number	: ----	Issue Date	: 03-Jul-2020
Sampler	: SAM RAMSEY		
Site	:		
Quote number	: EN/222		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3107975)									
ES2020560-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	7	10	33.3	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	2	3	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	5	6	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	28	28	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	43	42	3.15	No Limit
EW2002958-002	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	17	18	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	8	8	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	12	11	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	25	25	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	20	16	25.2	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	57	46	20.6	0% - 50%
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 3110386)									
ES2022200-005	QC10	EG005T: Cadmium	7440-43-9	1	mg/kg	2	2	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	12	15	24.3	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	19	21	10.2	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	12	67.2	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	271	# 398	38.0	0% - 20%
		EG005T: Lead	7439-92-1	5	mg/kg	549	555	1.03	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	589	# 876	39.3	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3107978)									
ES2021884-003	Anonymous	EA055: Moisture Content	----	0.1	%	14.2	14.2	0.00	0% - 50%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 3107978) - continued									
ES2022327-003	Anonymous	EA055: Moisture Content	----	0.1	%	51.8	50.1	3.35	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3107974)									
ES2020560-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.2	0.00	No Limit
EW2002958-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3110387)									
ES2022200-005	QC10	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.3	0.3	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3104695)									
ES2022050-032	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3109902)									
ES2022007-002	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.2	1.2	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	1.2	1.2	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	0.6	0.6	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	0.7	0.7	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3109902) - continued									
ES2022007-002	Anonymous	EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.7	0.6	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	4.4	4.8	8.70	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	0.8	0.7	0.00	No Limit
EW2002981-002	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3104698)									
ES2022050-032	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3106247)									
ES2021884-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EW2002958-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3109088)									
ES2022200-005	QC10	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES2022409-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3109903)									
ES2022007-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
				Laboratory Duplicate (DUP) Report					
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3109903) - continued									
ES2022007-002	Anonymous	EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EW2002981-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3104698)									
ES2022050-032	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3106247)									
ES2021884-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EW2002958-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3109088)									
ES2022200-005	QC10	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES2022409-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3109903)									
ES2022007-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EW2002981-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 3106247)									
ES2021884-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EW2002958-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 3109088)									
ES2022200-005	QC10	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 3109088) - continued									
ES2022200-005	QC10	EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES2022409-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3107975)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	98 mg/kg	122	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	105	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	15.4 mg/kg	130	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	48 mg/kg	119	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	50 mg/kg	118	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	12.4 mg/kg	117	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	115 mg/kg	108	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3110386)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	98 mg/kg	113	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	83.6	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	15.4 mg/kg	120	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	48 mg/kg	109	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	50 mg/kg	108	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	12.4 mg/kg	110	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	115 mg/kg	105	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3107974)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.0847 mg/kg	89.1	70.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3110387)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.0847 mg/kg	88.9	70.0	105
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3104695)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	88.1	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	90.3	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	90.0	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	90.3	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.0	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	96.7	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	100	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	97.7	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	83.3	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	87.8	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	81.5	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	94.6	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	89.8	70.0	126

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3104695) - continued								
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	83.1	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	80.2	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	81.0	63.0	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3109902)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	89.9	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	86.4	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	87.5	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	84.6	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	93.8	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	94.5	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	92.2	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	90.7	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	83.2	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	86.6	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	76.8	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	91.5	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	91.1	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	87.5	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	85.2	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.3	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3104698)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	94.2	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	89.7	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	93.1	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3106247)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	114	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3109088)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	96.9	68.4	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3109903)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	97.0	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	106	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	103	71.0	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3104698)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	90.8	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	88.9	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	74.7	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3106247)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3106247) - continued								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	114	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3109088)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	106	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3109903)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	104	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	106	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	79.8	63.0	131
EP080: BTEXN (QCLot: 3106247)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	105	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	108	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	106	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	111	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	105	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	99.9	63.0	119
EP080: BTEXN (QCLot: 3109088)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	81.4	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	81.5	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	87.5	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	99.2	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	83.6	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	86.3	63.0	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	Recovery Limits (%) High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3107975)							
ES2020560-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	94.5	70.0	130
		EG005T: Cadmium	7440-43-9	12.5 mg/kg	97.5	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	97.5	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	103	70.0	130
		EG005T: Lead	7439-92-1	50 mg/kg	89.4	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	100	70.0	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3107975) - continued							
ES2020560-001	Anonymous	EG005T: Zinc	7440-66-6	50 mg/kg	97.5	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 3110386)							
ES2022200-005	QC10	EG005T: Arsenic	7440-38-2	50 mg/kg	101	70.0	130
		EG005T: Cadmium	7440-43-9	12.5 mg/kg	101	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	119	70.0	130
		EG005T: Copper	7440-50-8	50 mg/kg	# Not Determined	70.0	130
		EG005T: Lead	7439-92-1	50 mg/kg	# Not Determined	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	105	70.0	130
		EG005T: Zinc	7440-66-6	50 mg/kg	# Not Determined	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3107974)							
ES2020560-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	91.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3110387)							
ES2022200-005	QC10	EG035T: Mercury	7439-97-6	5 mg/kg	87.0	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3104695)							
ES2022050-032	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	92.1	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	98.6	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3109902)							
ES2022007-002	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	79.9	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	80.6	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3104698)							
ES2022050-032	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	101	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	86.2	53.0	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	70.5	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3106247)							
ES2021884-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	102	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3109088)							
ES2022200-005	QC10	EP080: C6 - C9 Fraction	----	32.5 mg/kg	95.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3109903)							
ES2022007-002	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	95.3	73.0	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	114	53.0	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	121	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3104698)							
ES2022050-032	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	105	73.0	137

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%) Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3104698) - continued							
ES2022050-032	Anonymous	EP071: >C16 - C34 Fraction	----	3223 mg/kg	77.8	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	61.4	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3106247)							
ES2021884-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	101	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3109088)							
ES2022200-005	QC10	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	111	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3109903)							
ES2022007-002	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	98.3	73.0	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	117	53.0	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	112	52.0	132
EP080: BTEXN (QCLot: 3106247)							
ES2021884-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	81.5	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	91.1	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	87.9	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	92.6	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	87.4	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	79.7	70.0	130
EP080: BTEXN (QCLot: 3109088)							
ES2022200-005	QC10	EP080: Benzene	71-43-2	2.5 mg/kg	84.4	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	86.5	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	93.0	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	91.0	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	98.8	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	98.3	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2022200**	Page	: 1 of 6
Client	: **COFFEY ENVIRONMENTS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: PAUL WRIGHT	Telephone	: +61-2-8784 8555
Project	: NTLEN271167 DSI-107 SWAN ST, MORPETH	Date Samples Received	: 26-Jun-2020
Site	:	Issue Date	: 03-Jul-2020
Sampler	: SAM RAMSEY	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005(ED093)T: Total Metals by ICP-AES	ES2022200--005	QC10	**Copper**	7440-50-8	38.0 %	0% - 20%	**RPD exceeds LOR based limits**
EG005(ED093)T: Total Metals by ICP-AES	ES2022200--005	QC10	**Zinc**	7440-66-6	39.3 %	0% - 20%	**RPD exceeds LOR based limits**
Matrix Spike (MS) Recoveries							
EG005(ED093)T: Total Metals by ICP-AES	ES2022200--005	QC10	**Copper**	7440-50-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG005(ED093)T: Total Metals by ICP-AES	ES2022200--005	QC10	**Lead**	7439-92-1	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**
EG005(ED093)T: Total Metals by ICP-AES	ES2022200--005	QC10	**Zinc**	7440-66-6	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation*			*Analysis*		
		Date extracted	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QC2	**22-Jun-2020**	**----**	----	----	**29-Jun-2020**	06-Jul-2020	✓
Soil Glass Jar - Unpreserved (EA055) QC4, QC6, QC8	**23-Jun-2020**	**----**	----	----	**29-Jun-2020**	07-Jul-2020	✓
Soil Glass Jar - Unpreserved (EA055) QC10	**24-Jun-2020**	**----**	----	----	**30-Jun-2020**	08-Jul-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QC2	**22-Jun-2020**	**29-Jun-2020**	19-Dec-2020	✓	**29-Jun-2020**	19-Dec-2020	✓
Soil Glass Jar - Unpreserved (EG005T) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	20-Dec-2020	✓	**29-Jun-2020**	20-Dec-2020	✓
Soil Glass Jar - Unpreserved (EG005T) QC10	**24-Jun-2020**	**30-Jun-2020**	21-Dec-2020	✓	**30-Jun-2020**	21-Dec-2020	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QC2	**22-Jun-2020**	**29-Jun-2020**	20-Jul-2020	✓	**30-Jun-2020**	20-Jul-2020	✓
Soil Glass Jar - Unpreserved (EG035T) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	21-Jul-2020	✓	**30-Jun-2020**	21-Jul-2020	✓
Soil Glass Jar - Unpreserved (EG035T) QC10	**24-Jun-2020**	**30-Jun-2020**	22-Jul-2020	✓	**01-Jul-2020**	22-Jul-2020	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM)) QC2	**22-Jun-2020**	**29-Jun-2020**	06-Jul-2020	✓	**30-Jun-2020**	08-Aug-2020	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	07-Jul-2020	✓	**30-Jun-2020**	08-Aug-2020	✓
Soil Glass Jar - Unpreserved (EP075(SIM)) QC10	**24-Jun-2020**	**30-Jun-2020**	08-Jul-2020	✓	**01-Jul-2020**	09-Aug-2020	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080) QC2	**22-Jun-2020**	**29-Jun-2020**	06-Jul-2020	✓	**29-Jun-2020**	06-Jul-2020	✓
Soil Glass Jar - Unpreserved (EP071) QC2	**22-Jun-2020**	**29-Jun-2020**	06-Jul-2020	✓	**30-Jun-2020**	08-Aug-2020	✓
Soil Glass Jar - Unpreserved (EP080) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	07-Jul-2020	✓	**29-Jun-2020**	07-Jul-2020	✓
Soil Glass Jar - Unpreserved (EP071) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	07-Jul-2020	✓	**30-Jun-2020**	08-Aug-2020	✓
Soil Glass Jar - Unpreserved (EP080) QC10	**24-Jun-2020**	**30-Jun-2020**	08-Jul-2020	✓	**01-Jul-2020**	08-Jul-2020	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation: Date extracted	Due for extraction	Evaluation	Analysis: Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) QC2	**22-Jun-2020**	**29-Jun-2020**	06-Jul-2020	✓	**29-Jun-2020**	06-Jul-2020	✓
Soil Glass Jar - Unpreserved (EP071) QC2	**22-Jun-2020**	**29-Jun-2020**	06-Jul-2020	✓	**30-Jun-2020**	08-Aug-2020	✓
Soil Glass Jar - Unpreserved (EP080) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	07-Jul-2020	✓	**29-Jun-2020**	07-Jul-2020	✓
Soil Glass Jar - Unpreserved (EP071) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	07-Jul-2020	✓	**30-Jun-2020**	08-Aug-2020	✓
Soil Glass Jar - Unpreserved (EP080) QC10	**24-Jun-2020**	**30-Jun-2020**	08-Jul-2020	✓	**01-Jul-2020**	08-Jul-2020	✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) QC2	**22-Jun-2020**	**29-Jun-2020**	06-Jul-2020	✓	**29-Jun-2020**	06-Jul-2020	✓
Soil Glass Jar - Unpreserved (EP080) QC4, QC6, QC8	**23-Jun-2020**	**29-Jun-2020**	07-Jul-2020	✓	**29-Jun-2020**	07-Jul-2020	✓
Soil Glass Jar - Unpreserved (EP080) QC10	**24-Jun-2020**	**30-Jun-2020**	08-Jul-2020	✓	**01-Jul-2020**	08-Jul-2020	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	3	18	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	18	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	20	**15.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	18	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	30	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	**10.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	18	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	30	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 6.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270E. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260D. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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A TETRA TECH COMPANY

Consigning Office: Warabrook
Report Results to: Paul Wright
Invoices to: general.admin@coffey.com

Mobile: (02) 4028 9700 Email: paul.wright@coffey.com
Phone: (02) 4028 9700 Email: sam.ramsey@coffey.com

Project No: NTLEN271167 Task No: Lab
Project Name: DSI-107 Swan St, Morpeth Laboratory: Eurofins
Sampler's Name: Sam Ramsey Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/A)	NOTES
	BH20_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH20_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH21_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_1.3-1.5	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-1	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-2	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-3	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-4	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-5	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-6	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-7	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-8	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-9	24.06.20	PM	Soil	Jar	5 day				X		
	SP1-10	24.06.20	PM	Soil	Jar	5 day				X		
	TB1	22.06.20	PM	Water	2 X V	5 day		X				
	TS1	22.06.20	PM	Water	2 x V	5 day		X				
	QC1	22.06.20	PM	Soil	Jar	5 day	X					
1	QC2	22.06.20	PM	Soil	Jar	5 day			X	Send to ALS		
	QC3	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY

Name: Sam Ramsey Date: 24/06/2020
Coffey Environments Time:
Name: Date:
Company: Time:

x
Name: Sep M, Date: 26/06/2020
Company: ALS Time: 1200
Name: Date:
Company: Time:

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☐
All Documentation is in Proper Order ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

Environmental Division
Sydney
Work Order Reference
ES2022200

Telephone : + 61-2-8784 8555

rec: TAS: 26/6/20 4pm

5.3°C

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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Invoices to: general.admin@coffey.com — Phone: (02) 4028 9700 — Email: sam.ramsey@coffey.com

Project No: NTLEN271167 — Task No: — Lab
Project Name: DSI-107 Swan St, Morpeth — Laboratory: Eurofins
Sampler's Name: Sam Ramsey — Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold		NOTES
2	QC4	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC5	23.06.20	PM	Soil	Jar	5 day	X					
3	QC6	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC7	23.06.20	PM	Soil	Jar	5 day	X					
4	QC8	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC9	24.06.20	PM	Soil	Jar	5 day				X		
5	QC10	24.06.20	PM	Soil	Jar	5 day				X	Send to ALS	
	TB2	23.06.20	PM	Water	2 x V	5 day		X				
	TS2	23.06.20	PM	Water	2 x V	5 day		X				
	RB1	24.06.20	PM	Water	2 x V, P, G	5 day	X					
	TS3	24.06.20	PM	Water	2 x V	5 day		X				
	TB3	24.06.20	PM	Water	2 x V	5 day		X				

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name: Sep M	Date: 26/06/2020
Coffey Environments	Time:	Company: ALS	Time: 1300
Name:	Date:	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
All Samples Recieved in Good Condition ☐
All Documentation is in Proper Order ☐
Samples Received Properly Chilled ☐
Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

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UPDATED COC

Project No: NTLEN271167 | Task No: Lab
Project Name: DSI-107 Swan St, Morpeth | Laboratory: Eurofins
Sampler's Name: Sam Ramsey | Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH1_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH1_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH1_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH2_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH2_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH2_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH3_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH3_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH3_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH4_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH4_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH4_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH5_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH5_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH5_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH6_0.0-0.2	22.06.20	PM	Soil	Jar	5 day	X				X	
	BH6_0.8-1.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH6_1.8-2.0	22.06.20	PM	Soil	Jar	5 day	X					
	BH7_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH7_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x		Sample Receipt Advice: (Lab Use Only)	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:	All Samples Recieved in Good Condition	☐
Coffey Environments	Time:	Company:	Time:	All Documentation is in Proper Order	☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled	☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.	

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

Environmental Division
Sydney
Work Order Reference
ES2022200

Telephone : + 61-2-8784 8555

29.6.2020
11:50am
1/5

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Project No: NTLEN271167 — Task No: Lab
Project Name: DSI-107 Swan St, Morpeth — Laboratory: Eurofins
Sampler's Name: Sam Ramsey — Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH7_1.8-2	23.06.20	PM	Soil	Jar	5 day	X					
	BH8_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH8_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH8_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH9_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH9_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH9_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH10_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH10_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH10_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH11_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH11_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH11_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH12_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH12_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH13_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH13_0.3-0.4	23.06.20	PM	Soil	Jar	5 day				X		
	BH14_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH14_0.2-0.4	23.06.20	PM	Soil	Jar	5 day	X					
	BH14_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- *All Documentation is in Proper Order* ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes:** **P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

ARS
2/5

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Project No: NTLEN271167 — Task No: Lab
Project Name: DSI-107 Swan St, Morpeth — Laboratory: Eurofins
Sampler's Name: Sam Ramsey — Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/ A)	NOTES
	BH14_1.4-1.6	23.06.20	PM	Soil	Jar	5 day	X					
	BH14_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH15_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH15_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH15_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH16_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH16_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH16_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17_0.0-0.2	23.06.20	PM	Soil	Jar	5 day				X		
	BH17_0.3-0.4	23.06.20	PM	Soil	Jar	5 day				X		
	BH17B_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH17B_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17B_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH17B_2.2-2.3	23.06.20	PM	Soil	Jar	5 day	X					
	BH18_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH18_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH18_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH19_0.0-0.2	23.06.20	PM	Soil	Jar	5 day	X				X	
	BH19_0.8-1.0	23.06.20	PM	Soil	Jar	5 day	X					
	BH19_1.8-2.0	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

CW
3/5

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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Project No: NTLEN271167 | Task No: Lab
Project Name: DSI-107 Swan St, Morpeth | Laboratory: Eurofins
Sampler's Name: Sam Ramsey | Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	Asbestos (P/A)	NOTES
	BH20_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH20_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_0.0-0.2	24.06.20	PM	Soil	Jar	5 day	X				X	
	BH21_0.8-1.0	24.06.20	PM	Soil	Jar	5 day	X					
	BH21_1.3-1.5	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-1	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-2	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-3	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-4	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-5	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-6	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-7	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-8	24.06.20	PM	Soil	Jar	5 day	X					
	SP1-9	24.06.20	PM	Soil	Jar	5 day	X				X	
	SP1-10	24.06.20	PM	Soil	Jar	5 day	X					
	TB1	22.06.20	PM	Water	2 X V	5 day		X				
	TS1	22.06.20	PM	Water	2 x V	5 day		X				
	QC1	22.06.20	PM	Soil	Jar	5 day	X					
	QC2	22.06.20	PM	Soil	Jar	5 day			X		Send to ALS	
	QC3	23.06.20	PM	Soil	Jar	5 day	X					

RELINQUISHED BY		x		Sample Receipt Advice: (Lab Use Only)
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:	All Samples Recieved in Good Condition ☐
Coffey Environments	Time:	Company:	Time:	All Documentation is in Proper Order ☐
Name:	Date: →	Name:	Date:	Samples Received Properly Chilled ☐
Company:	Time:	Company:	Time:	Lab. Ref/Batch No.

*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

48
45

Reference No. ____________

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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Project No: NTLEN271167 — Task No: Lab
Project Name: DSI-107 Swan St, Morpeth — Laboratory: Eurofins
Sampler's Name: Sam Ramsey — Project Manager: Paul Wright
Special Instructions: Standard TAT - Send QC2, QC4, QC6, QC8, QC10 to ALS (Suite S26)

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)	Suite B7	Suite B1	Suite S26	Hold	NOTES
	QC4	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	QC5	23.06.20	PM	Soil	Jar	5 day	X				
	QC6	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	QC7	23.06.20	PM	Soil	Jar	5 day	X				
	QC8	23.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	QC9	24.06.20	PM	Soil	Jar	5 day	X				
	QC10	24.06.20	PM	Soil	Jar	5 day			X		Send to ALS
	TB2	23.06.20	PM	Water	2 x V	5 day		X			
	TS2	23.06.20	PM	Water	2 x V	5 day		X			
	RB1	24.06.20	PM	Water	2 x V, P, G	5 day	X				
	TS3	24.06.20	PM	Water	2 x V	5 day		X			
	TB3	24.06.20	PM	Water	2 x V	5 day		X			

RELINQUISHED BY		x	
Name: Sam Ramsey	Date: 24/06/2020	Name:	Date:
Coffey Environments	Time:	Company:	Time:
Name:	Date: →	Name:	Date:
Company:	Time:	Company:	Time:

Sample Receipt Advice: (Lab Use Only)
- All Samples Recieved in Good Condition ☐
- All Documentation is in Proper Order ☐
- Samples Received Properly Chilled ☐
- Lab. Ref/Batch No.

***Container Type & Preservation Codes: P** - Plastic, **G**- Glass Bottle, **J** - Glass Jar, **V**- Vial, **Z** - Ziplock bag, **N** - Nitric Acid Preserved, **C** - Hydrochloric Acid Preserved, **S** - Sulphuric Acid Preserved, **I** - Ice, **ST** - Sodium Thiosulfate, **NP** - No Preservative

5/5.

#AU04_Enviro_Sample_NSW

To: Ryan Gilbert
Subject: RE: Eurofins Test Results - Report 727695 : Site DSI-107 SWAN ST MORPETH (NTLEN271167)

From: Ramsey, Sam
Sent: Friday, 10 July 2020 12:07:40 AM (UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
To: Andrew Black
Subject: RE: Eurofins Test Results - Report 727695 : Site DSI-107 SWAN ST MORPETH (NTLEN271167)

EXTERNAL EMAIL*

Thanks Andrew,

Can I please order a couple of TCLPs for this job, on a standard TAT.

SP1-7 TCLP for lead **Jn42989**
BH8_0.0-0.2 TCLP for lead **Jn42914**
BH21_0.0-0.2 TCLP for benzo(a)pyrene **Jn42927**
BH1_0.0-0.2TCLP for Benzo(a)pyrene **Jn42907**

Thanks

Sam Ramsey
Environmental Scientist

t: +61 2 4028 9700
m: +61 437 359 127

We've moved!

Our new address is
16 Callistemon Close
Warabrook, NSW 2304

Sample Receipt Advice

Company name:	**Coffey Environments P/L N'castle**
Contact name:	Paul Wright
Project name:	ADDITIONAL - DSI-107 SWAN ST MORPETH
Project ID:	NTLEN271167
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Jul 10, 2020 8:59 AM
Eurofins reference:	**730986**

Sample information

- ☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins Sample Receipt : 8.2 degrees Celsius.
- ☑ All samples have been received as described on the above COC.
- ☑ COC has been completed correctly.
- ☑ Attempt to chill was evident.
- ☑ Appropriately preserved sample containers have been used.
- ☑ All samples were received in good condition.
- ☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☑ Appropriate sample containers have been used.
- ☒ Split sample sent to requested external lab.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

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

Andrew Black on Phone : (+61) 2 9900 8490 or by e.mail: AndrewBlack@eurofins.com

Results will be delivered electronically via e.mail to Paul Wright - paul.wright@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Environments P/L N'castle email address.

eurofins Environment Testing

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

Australia

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

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

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

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

New Zealand

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

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

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: ADDITIONAL - DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 730986
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Jul 10, 2020 8:59 AM
Due: Jul 17, 2020
Priority: 5 Day
Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Benzo(a)pyrene	Lead	USA Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	SP1-7	Jun 22, 2020		US Leachate	S20-Jl17835		X	X
2	BH8_0.0-0.2	Jun 22, 2020		US Leachate	S20-Jl17836		X	X
3	BH21_0.0-0.2	Jun 22, 2020		US Leachate	S20-Jl17837	X		X
4	BH1_0.0-0.2	Jun 22, 2020		US Leachate	S20-Jl17838	X		X
Test Counts						2	2	4

Certificate of Analysis

Environment Testing

Coffey Environments Pty Ltd Newcastle
16 Callistemon Close
Warabrook
NSW 2304

Attention: **Paul Wright**

Report	**730986-L**
Project name	ADDITIONAL - DSI-107 SWAN ST MORPETH
Project ID	NTLEN271167
Received Date	Jul 10, 2020

Client Sample ID			**SP1-7**	**BH8_0.0-0.2**	**BH21_0.0-0.2**	**BH1_0.0-0.2**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S20-Jl17835**	**S20-Jl17836**	**S20-Jl17837**	**S20-Jl17838**
Date Sampled			**Jun 22, 2020**	**Jun 22, 2020**	**Jun 22, 2020**	**Jun 22, 2020**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.12	0.15	-	-
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	6.1	6.2	6.2	6.9
pH (off)	0.1	pH Units	5.2	5.1	5.5	5.2
pH (USA HCl addition)	0.1	pH Units	1.7	1.7	1.7	1.7
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.001	mg/L	-	-	< 0.001	< 0.001

Environment Testing

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jul 17, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Jul 14, 2020	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 14, 2020	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			

Company Name: Coffey Environments P/L N'castle
Address: 16 Callistemon Close
Warabrook
NSW 2304

Project Name: ADDITIONAL - DSI-107 SWAN ST MORPETH
Project ID: NTLEN271167

Order No.:
Report #: 730986
Phone: 02 4016 2300
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Contact Name: Paul Wright

Eurofins Analytical Services Manager : Andrew Black

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	SP1-7	Jun 22, 2020		US Leachate	S20-Jl17835		X	X
2	BH8_0.0-0.2	Jun 22, 2020		US Leachate	S20-Jl17836		X	X
3	BH21_0.0-0.2	Jun 22, 2020		US Leachate	S20-Jl17837	X		X
4	BH1_0.0-0.2	Jun 22, 2020		US Leachate	S20-Jl17838	X		X
Test Counts						2	2	4

eurofins

Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

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

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
Method Blank									
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene			mg/L	< 0.001			0.001	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	99			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S20-Jl17836	CP	%	95			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S20-Jl17835	CP	mg/L	0.12	0.11	12	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised By

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

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

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

Appendix C – EIL Calculations

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
32.3
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.1
Enter organic carbon content (%OC) (values from 0 to 50%)
1.8
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	30	50
Urban residential and open public spaces	55	110
Commercial and industrial	80	160

Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
32.3
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method)
1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	70
Urban residential and open public spaces	120	370
Commercial and industrial	240	630

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
16.3
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	80	160
Urban residential and open public spaces	200	480
Commercial and industrial	330	790

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
32.3
Enter soil pH (calcium chloride method) (values from 1 to 14)
5.1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
1
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	30	120
Urban residential and open public spaces	85	280
Commercial and industrial	130	390

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

Inputs
Select contaminant from list below
Naphthalene
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Naphthalene generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	10	10
Urban residential and open public spaces	170	170
Commercial and industrial	370	370

Appendix D –95% UCL_{AVE} Calculation Sheets

UCL Statistics for Uncensored Full Data Sets (BaP TEQ - 1.0m bgs)		
User Selected Options		
Date/Time of Computation	ProUCL 5.18/31/2020 1:26:16 PM	
From File	WorkSheet.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

C0

General Statistics			
Total Number of Observations	55	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	0.6	Mean	3.647
Maximum	45	Median	0.6
SD	9.15	Std. Error of Mean	1.234
Coefficient of Variation	2.509	Skewness	3.513
Normal GOF Test			
Shapiro Wilk Test Statistic	0.392	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.433	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.119	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.712	95% Adjusted-CLT UCL (Chen-1995)	6.301
		95% Modified-t UCL (Johnson-1978)	5.809
Gamma GOF Test			
A-D Test Statistic	13.18	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.814	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.401	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.127	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.513	k star (bias corrected MLE)	0.497
Theta hat (MLE)	7.114	Theta star (bias corrected MLE)	7.341
nu hat (MLE)	56.4	nu star (bias corrected)	54.65
MLE Mean (bias corrected)	3.647	MLE Sd (bias corrected)	5.174
		Approximate Chi Square Value (0.05)	38.67
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	38.3
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	5.155	95% Adjusted Gamma UCL (use when n<50)	5.204

	A	B	C	D	E	F	G	H	I	J	K	L
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.547	**Shapiro Wilk Lognormal GOF Test**					
53					5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.394	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.119	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-0.511					Mean of logged Data	0.0599
60					Maximum of Logged Data	3.807					SD of logged Data	1.187
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	3.263					90% Chebyshev (MVUE) UCL	3.351
64					95% Chebyshev (MVUE) UCL	3.917					97.5% Chebyshev (MVUE) UCL	4.702
65					99% Chebyshev (MVUE) UCL	6.245						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	5.677					95% Jackknife UCL	5.712
72					95% Standard Bootstrap UCL	5.661					95% Bootstrap-t UCL	7.39
73					95% Hall's Bootstrap UCL	6.123					95% Percentile Bootstrap UCL	5.818
74					95% BCA Bootstrap UCL	6.613						
75					90% Chebyshev(Mean, Sd) UCL	7.348					95% Chebyshev(Mean, Sd) UCL	9.025
76					97.5% Chebyshev(Mean, Sd) UCL	11.35					99% Chebyshev(Mean, Sd) UCL	15.92
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	9.025						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets (BaP TEQ > 1.0mbgs)											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.18/31/2020 1:30:43 PM								
5	From File			WorkSheet.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C1											
12												
13	General Statistics											
14	Total Number of Observations					21	Number of Distinct Observations					5
15							Number of Missing Observations					0
16	Minimum					0.6	Mean					1.2
17	Maximum					5.7	Median					0.6
18	SD					1.47	Std. Error of Mean					0.321
19	Coefficient of Variation					1.225	Skewness					2.417
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.472	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk Critical Value					0.908	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.468	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.188	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					1.753	95% Adjusted-CLT UCL (Chen-1995)					1.908
31							95% Modified-t UCL (Johnson-1978)					1.781
32												
33	Gamma GOF Test											
34	A-D Test Statistic					5.479	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.758	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.49	Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value					0.193	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					1.489	k star (bias corrected MLE)					1.308
42	Theta hat (MLE)					0.806	Theta star (bias corrected MLE)					0.917
43	nu hat (MLE)					62.54	nu star (bias corrected)					54.94
44	MLE Mean (bias corrected)					1.2	MLE Sd (bias corrected)					1.049
45							Approximate Chi Square Value (0.05)					38.9
46	Adjusted Level of Significance					0.0383	Adjusted Chi Square Value					37.87
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					1.695	95% Adjusted Gamma UCL (use when n<50)					1.741
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.495	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk Critical Value					0.908	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.48	Lilliefors Lognormal GOF Test					

	A	B	C	D	E	F	G	H	I	J	K	L
55					5% Lilliefors Critical Value	0.188	Data Not Lognormal at 5% Significance Level					
56	Data Not Lognormal at 5% Significance Level											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-0.511					Mean of logged Data	-0.19
60					Maximum of Logged Data	1.74					SD of logged Data	0.729
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	1.551					90% Chebyshev (MVUE) UCL	1.608
64					95% Chebyshev (MVUE) UCL	1.855					97.5% Chebyshev (MVUE) UCL	2.198
65					99% Chebyshev (MVUE) UCL	2.871						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	Data do not follow a Discernible Distribution (0.05)											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	1.728					95% Jackknife UCL	1.753
72					95% Standard Bootstrap UCL	1.72					95% Bootstrap-t UCL	2.196
73					95% Hall's Bootstrap UCL	1.651					95% Percentile Bootstrap UCL	1.748
74					95% BCA Bootstrap UCL	1.881						
75					90% Chebyshev(Mean, Sd) UCL	2.162					95% Chebyshev(Mean, Sd) UCL	2.598
76					97.5% Chebyshev(Mean, Sd) UCL	3.203					99% Chebyshev(Mean, Sd) UCL	4.392
77												
78	**Suggested UCL to Use**											
79					95% Chebyshev (Mean, Sd) UCL	2.598						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:19:23 AM
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BAP TEQ

General Statistics			
Total Number of Observations	94	Number of Distinct Observations	21
		Number of Missing Observations	0
Minimum	0.5	Mean	2.774
Maximum	45	Median	0.6
SD	7.164	Std. Error of Mean	0.739
Coefficient of Variation	2.582	Skewness	4.549
Normal GOF Test			
Shapiro Wilk Test Statistic	0.358	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.395	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.0916	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4.002	95% Adjusted-CLT UCL (Chen-1995)	4.36
		95% Modified-t UCL (Johnson-1978)	4.06
Gamma GOF Test			
A-D Test Statistic	17.43	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.806	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.337	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.0968	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.626	k star (bias corrected MLE)	0.614
Theta hat (MLE)	4.429	Theta star (bias corrected MLE)	4.522
nu hat (MLE)	117.8	nu star (bias corrected)	115.3
MLE Mean (bias corrected)	2.774	MLE Sd (bias corrected)	3.542
		Approximate Chi Square Value (0.05)	91.55
Adjusted Level of Significance	0.0474	Adjusted Chi Square Value	91.22
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	3.496	95% Adjusted Gamma UCL (use when n<50)	3.508
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.665	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.329	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0916	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	-0.693	Mean of logged Data	0.0403
60	Maximum of Logged Data	3.807	SD of logged Data	1.044
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	2.302	90% Chebyshev (MVUE) UCL	2.478
64	95% Chebyshev (MVUE) UCL	2.794	97.5% Chebyshev (MVUE) UCL	3.233
65	99% Chebyshev (MVUE) UCL	4.095		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	3.99	95% Jackknife UCL	4.002
72	95% Standard Bootstrap UCL	3.977	95% Bootstrap-t UCL	4.756
73	95% Hall's Bootstrap UCL	4.455	95% Percentile Bootstrap UCL	4.087
74	95% BCA Bootstrap UCL	4.432		
75	90% Chebyshev(Mean, Sd) UCL	4.991	95% Chebyshev(Mean, Sd) UCL	5.995
76	97.5% Chebyshev(Mean, Sd) UCL	7.389	99% Chebyshev(Mean, Sd) UCL	10.13
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	5.995		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.108-Jul-20 11:22:29 AM								
5	From File			WorkSheet_d.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Benzene											
12												
13	General Statistics											
14	Total Number of Observations					90	Number of Distinct Observations					4
15							Number of Missing Observations					0
16	Minimum					0.1	Mean					0.302
17	Maximum					9.3	Median					0.1
18	SD					1.168	Std. Error of Mean					0.123
19	Coefficient of Variation					3.866	Skewness					6.39
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.192	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.535	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.0936	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					0.507	95% Adjusted-CLT UCL (Chen-1995)					0.593
31							95% Modified-t UCL (Johnson-1978)					0.521
32												
33	Gamma GOF Test											
34	A-D Test Statistic					35.32	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.805	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.584	Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value					0.0987	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.632	k star (bias corrected MLE)					0.618
42	Theta hat (MLE)					0.478	Theta star (bias corrected MLE)					0.489
43	nu hat (MLE)					113.7	nu star (bias corrected)					111.3
44	MLE Mean (bias corrected)					0.302	MLE Sd (bias corrected)					0.384
45							Approximate Chi Square Value (0.05)					87.92
46	Adjusted Level of Significance					0.0473	Adjusted Chi Square Value					87.59
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					0.382	95% Adjusted Gamma UCL (use when n<50)					0.384
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.192	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0	Data Not Lognormal at 5% Significance Level					

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.54	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0936	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	-2.303	Mean of logged Data	-2.167
60	Maximum of Logged Data	2.23	SD of logged Data	0.736
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	0.176	90% Chebyshev (MVUE) UCL	0.188
64	95% Chebyshev (MVUE) UCL	0.206	97.5% Chebyshev (MVUE) UCL	0.23
65	99% Chebyshev (MVUE) UCL	0.278		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	0.505	95% Jackknife UCL	0.507
72	95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
73	95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
74	95% BCA Bootstrap UCL	N/A		
75	90% Chebyshev(Mean, Sd) UCL	0.672	95% Chebyshev(Mean, Sd) UCL	0.839
76	97.5% Chebyshev(Mean, Sd) UCL	1.071	99% Chebyshev(Mean, Sd) UCL	1.528
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	0.839		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:29:45 AM
From File	WorkSheet_k.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Benzo(a)pyrene

General Statistics

Total Number of Observations	73	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	0.5	Mean	1.979
Maximum	29	Median	0.5
SD	4.849	Std. Error of Mean	0.568
Coefficient of Variation	2.45	Skewness	4.229

Normal GOF Test

Shapiro Wilk Test Statistic	0.361	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.408	Lilliefors GOF Test
5% Lilliefors Critical Value	0.104	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.925	95% Adjusted-CLT UCL (Chen-1995)	3.213
		95% Modified-t UCL (Johnson-1978)	2.972

Gamma GOF Test

A-D Test Statistic	16.82	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.8	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.37	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.109	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.673	k star (bias corrected MLE)	0.654
Theta hat (MLE)	2.941	Theta star (bias corrected MLE)	3.024
nu hat (MLE)	98.26	nu star (bias corrected)	95.55
MLE Mean (bias corrected)	1.979	MLE Sd (bias corrected)	2.447
		Approximate Chi Square Value (0.05)	74.01
Adjusted Level of Significance	0.0467	Adjusted Chi Square Value	73.63

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.556	95% Adjusted Gamma UCL (use when n<50)	2.569

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.555	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level

54	Lilliefors Test Statistic	0.343	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.104	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	-0.693	Mean of logged Data	-0.22
60	Maximum of Logged Data	3.367	SD of logged Data	0.982
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	1.683	90% Chebyshev (MVUE) UCL	1.812
64	95% Chebyshev (MVUE) UCL	2.05	97.5% Chebyshev (MVUE) UCL	2.38
65	99% Chebyshev (MVUE) UCL	3.028		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	2.913	95% Jackknife UCL	2.925
72	95% Standard Bootstrap UCL	2.931	95% Bootstrap-t UCL	3.587
73	95% Hall's Bootstrap UCL	3.266	95% Percentile Bootstrap UCL	2.979
74	95% BCA Bootstrap UCL	3.381		
75	90% Chebyshev(Mean, Sd) UCL	3.682	95% Chebyshev(Mean, Sd) UCL	4.453
76	97.5% Chebyshev(Mean, Sd) UCL	5.524	99% Chebyshev(Mean, Sd) UCL	7.627
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	4.453		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.108-Jul-20 11:26:44 AM								
5	From File			WorkSheet_h.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C6-C10 less BTEX (F1)											
12												
13	General Statistics											
14	Total Number of Observations					94	Number of Distinct Observations					7
15							Number of Missing Observations					0
16	Minimum					20	Mean					24.13
17	Maximum					160	Median					20
18	SD					19.32	Std. Error of Mean					1.993
19	Coefficient of Variation					0.801	Skewness					6.216
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.239	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.478	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.0916	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					27.44	95% Adjusted-CLT UCL (Chen-1995)					28.77
31							95% Modified-t UCL (Johnson-1978)					27.65
32												
33	Gamma GOF Test											
34	A-D Test Statistic					28.05	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.754	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.502	Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value					0.0925	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					5.367	k star (bias corrected MLE)					5.203
42	Theta hat (MLE)					4.495	Theta star (bias corrected MLE)					4.637
43	nu hat (MLE)					1009	nu star (bias corrected)					978.2
44	MLE Mean (bias corrected)					24.13	MLE Sd (bias corrected)					10.58
45							Approximate Chi Square Value (0.05)					906.6
46	Adjusted Level of Significance					0.0474	Adjusted Chi Square Value					905.6
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					26.03	95% Adjusted Gamma UCL (use when n<50)					26.06
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.323	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0	Data Not Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
54	Lilliefors Test Statistic					0.503	Lilliefors Lognormal GOF Test					
55	5% Lilliefors Critical Value					0.0916	Data Not Lognormal at 5% Significance Level					
56	Data Not Lognormal at 5% Significance Level											
57												
58	Lognormal Statistics											
59	Minimum of Logged Data					2.996	Mean of logged Data					3.087
60	Maximum of Logged Data					5.075	SD of logged Data					0.331
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL					24.6	90% Chebyshev (MVUE) UCL					25.57
64	95% Chebyshev (MVUE) UCL					26.67	97.5% Chebyshev (MVUE) UCL					28.2
65	99% Chebyshev (MVUE) UCL					31.2						
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data do not follow a Discernible Distribution (0.05)											
69												
70	Nonparametric Distribution Free UCLs											
71	95% CLT UCL					27.41	95% Jackknife UCL					27.44
72	95% Standard Bootstrap UCL					27.36	95% Bootstrap-t UCL					36.1
73	95% Hall's Bootstrap UCL					41.9	95% Percentile Bootstrap UCL					27.7
74	95% BCA Bootstrap UCL					29.09						
75	90% Chebyshev(Mean, Sd) UCL					30.11	95% Chebyshev(Mean, Sd) UCL					32.81
76	97.5% Chebyshev(Mean, Sd) UCL					36.57	99% Chebyshev(Mean, Sd) UCL					43.95
77												
78	Suggested UCL to Use											
79	95% Student's-t UCL					27.44	or 95% Modified-t UCL					27.65
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:23:24 AM
From File	WorkSheet_e.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

C10-C16

General Statistics

Total Number of Observations	94	Number of Distinct Observations	19
		Number of Missing Observations	0
Minimum	50	Mean	92.96
Maximum	2300	Median	50
SD	241.3	Std. Error of Mean	24.89
Coefficient of Variation	2.596	Skewness	8.518

Normal GOF Test

Shapiro Wilk Test Statistic	0.2	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.429	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0916	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	134.3	95% Adjusted-CLT UCL (Chen-1995)	157.3
		95% Modified-t UCL (Johnson-1978)	137.9

Gamma GOF Test

A-D Test Statistic	26.54	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.775	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.412	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.0944	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.311	k star (bias corrected MLE)	1.277
Theta hat (MLE)	70.89	Theta star (bias corrected MLE)	72.82
nu hat (MLE)	246.5	nu star (bias corrected)	240
MLE Mean (bias corrected)	92.96	MLE Sd (bias corrected)	82.27
		Approximate Chi Square Value (0.05)	205.1
Adjusted Level of Significance	0.0474	Adjusted Chi Square Value	204.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	108.8	95% Adjusted Gamma UCL (use when n<50)	109

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.403	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
54					Lilliefors Test Statistic	0.406			Lilliefors Lognormal GOF Test			
55					5% Lilliefors Critical Value	0.0916			Data Not Lognormal at 5% Significance Level			
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	3.912					Mean of logged Data	4.105
60					Maximum of Logged Data	7.741					SD of logged Data	0.582
61												
62						Assuming Lognormal Distribution						
63					95% H-UCL	80.54					90% Chebyshev (MVUE) UCL	85.51
64					95% Chebyshev (MVUE) UCL	91.78					97.5% Chebyshev (MVUE) UCL	100.5
65					99% Chebyshev (MVUE) UCL	117.6						
66												
67						Nonparametric Distribution Free UCL Statistics						
68						Data do not follow a Discernible Distribution (0.05)						
69												
70						Nonparametric Distribution Free UCLs						
71					95% CLT UCL	133.9					95% Jackknife UCL	134.3
72					95% Standard Bootstrap UCL	133.4					95% Bootstrap-t UCL	269
73					95% Hall's Bootstrap UCL	257.9					95% Percentile Bootstrap UCL	137.4
74					95% BCA Bootstrap UCL	173.6						
75					90% Chebyshev(Mean, Sd) UCL	167.6					95% Chebyshev(Mean, Sd) UCL	201.4
76					97.5% Chebyshev(Mean, Sd) UCL	248.4					99% Chebyshev(Mean, Sd) UCL	340.6
77												
78						Suggested UCL to Use						
79					95% Chebyshev (Mean, Sd) UCL	201.4						
80												
81		Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
82		Recommendations are based upon data size, data distribution, and skewness.										
83		These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
84		However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
85												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.108-Jul-20 11:20:17 AM								
5	From File			WorkSheet_b.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	C16-C34											
12												
13	General Statistics											
14	Total Number of Observations					94	Number of Distinct Observations					42
15							Number of Missing Observations					0
16	Minimum					100	Mean					971.1
17	Maximum					10000	Median					125
18	SD					1866	Std. Error of Mean					192.4
19	Coefficient of Variation					1.921	Skewness					3.06
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.544	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.325	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.0916	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					1291	95% Adjusted-CLT UCL (Chen-1995)					1352
31							95% Modified-t UCL (Johnson-1978)					1301
32												
33	Gamma GOF Test											
34	A-D Test Statistic					10.78	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.815	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.262	Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value					0.0974	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.531	k star (bias corrected MLE)					0.521
42	Theta hat (MLE)					1828	Theta star (bias corrected MLE)					1863
43	nu hat (MLE)					99.86	nu star (bias corrected)					98
44	MLE Mean (bias corrected)					971.1	MLE Sd (bias corrected)					1345
45							Approximate Chi Square Value (0.05)					76.17
46	Adjusted Level of Significance					0.0474	Adjusted Chi Square Value					75.87
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					1249	95% Adjusted Gamma UCL (use when n<50)					1254
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.756	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0	Data Not Lognormal at 5% Significance Level					

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.269	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0916	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	4.605	Mean of logged Data	5.694
60	Maximum of Logged Data	9.21	SD of logged Data	1.41
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	1188	90% Chebyshev (MVUE) UCL	1248
64	95% Chebyshev (MVUE) UCL	1457	97.5% Chebyshev (MVUE) UCL	1748
65	99% Chebyshev (MVUE) UCL	2319		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	1288	95% Jackknife UCL	1291
72	95% Standard Bootstrap UCL	1287	95% Bootstrap-t UCL	1381
73	95% Hall's Bootstrap UCL	1382	95% Percentile Bootstrap UCL	1312
74	95% BCA Bootstrap UCL	1352		
75	90% Chebyshev(Mean, Sd) UCL	1548	95% Chebyshev(Mean, Sd) UCL	1810
76	97.5% Chebyshev(Mean, Sd) UCL	2173	99% Chebyshev(Mean, Sd) UCL	2886
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	1810		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

UCL Statistics for Uncensored Full Data Sets

User Selected Options			
Date/Time of Computation	ProUCL 5.108-Jul-20 11:24:28 AM		
From File	WorkSheet_f.xls		
Full Precision	OFF		
Confidence Coefficient	95%		
Number of Bootstrap Operations	2000		

Cadmium

General Statistics

Total Number of Observations	86	Number of Distinct Observations	22
		Number of Missing Observations	0
Minimum	0.4	Mean	1.449
Maximum	43	Median	0.4
SD	4.893	Std. Error of Mean	0.528
Coefficient of Variation	3.377	Skewness	7.646

Normal GOF Test

Shapiro Wilk Test Statistic	0.241	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.415	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0957	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.326	95% Adjusted-CLT UCL (Chen-1995)	2.782
		95% Modified-t UCL (Johnson-1978)	2.399

Gamma GOF Test

A-D Test Statistic	18.84	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.798	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.376	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.101	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.704	k star (bias corrected MLE)	0.687
Theta hat (MLE)	2.059	Theta star (bias corrected MLE)	2.11
nu hat (MLE)	121	nu star (bias corrected)	118.1
MLE Mean (bias corrected)	1.449	MLE Sd (bias corrected)	1.748
		Approximate Chi Square Value (0.05)	94.04
Adjusted Level of Significance	0.0472	Adjusted Chi Square Value	93.67

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.82	95% Adjusted Gamma UCL (use when n<50)	1.827

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.572	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.372	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0957	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	-0.916	Mean of logged Data	-0.488
60	Maximum of Logged Data	3.761	SD of logged Data	0.887
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	1.117	90% Chebyshev (MVUE) UCL	1.205
64	95% Chebyshev (MVUE) UCL	1.341	97.5% Chebyshev (MVUE) UCL	1.53
65	99% Chebyshev (MVUE) UCL	1.901		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	2.317	95% Jackknife UCL	2.326
72	95% Standard Bootstrap UCL	2.334	95% Bootstrap-t UCL	5.244
73	95% Hall's Bootstrap UCL	5.463	95% Percentile Bootstrap UCL	2.317
74	95% BCA Bootstrap UCL	2.974		
75	90% Chebyshev(Mean, Sd) UCL	3.032	95% Chebyshev(Mean, Sd) UCL	3.749
76	97.5% Chebyshev(Mean, Sd) UCL	4.744	99% Chebyshev(Mean, Sd) UCL	6.699
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	3.749		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:27:49 AM
From File	WorkSheet_i.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chromium

General Statistics

Total Number of Observations	86	Number of Distinct Observations	43
		Number of Missing Observations	0
Minimum	5	Mean	15.38
Maximum	170	Median	11
SD	19.14	Std. Error of Mean	2.064
Coefficient of Variation	1.245	Skewness	6.439

Normal GOF Test

Shapiro Wilk Test Statistic	0.473	Shapiro Wilk GOF Test	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.294	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.0957	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	18.81	95% Adjusted-CLT UCL (Chen-1995)	20.3
		95% Modified-t UCL (Johnson-1978)	19.05

Gamma GOF Test

A-D Test Statistic	2.646	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.766	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.156	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.0978	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.902	k star (bias corrected MLE)	1.843
Theta hat (MLE)	8.086	Theta star (bias corrected MLE)	8.343
nu hat (MLE)	327.1	nu star (bias corrected)	317
MLE Mean (bias corrected)	15.38	MLE Sd (bias corrected)	11.33
		Approximate Chi Square Value (0.05)	276.7
Adjusted Level of Significance	0.0472	Adjusted Chi Square Value	276.1

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	17.61	95% Adjusted Gamma UCL (use when n<50)	17.65

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk P Value	2.3222E-5	Data Not Lognormal at 5% Significance Level	

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.111	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0957	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	1.609	Mean of logged Data	2.447
60	Maximum of Logged Data	5.136	SD of logged Data	0.674
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	16.76	90% Chebyshev (MVUE) UCL	17.92
64	95% Chebyshev (MVUE) UCL	19.48	97.5% Chebyshev (MVUE) UCL	21.65
65	99% Chebyshev (MVUE) UCL	25.92		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	18.77	95% Jackknife UCL	18.81
72	95% Standard Bootstrap UCL	18.69	95% Bootstrap-t UCL	22.28
73	95% Hall's Bootstrap UCL	33.13	95% Percentile Bootstrap UCL	18.96
74	95% BCA Bootstrap UCL	20.72		
75	90% Chebyshev(Mean, Sd) UCL	21.57	95% Chebyshev(Mean, Sd) UCL	24.37
76	97.5% Chebyshev(Mean, Sd) UCL	28.27	99% Chebyshev(Mean, Sd) UCL	35.92
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	24.37		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:25:34 AM
From File	WorkSheet_g.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

F2-Napthalene

General Statistics

Total Number of Observations	81	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	50	Mean	97.98
Maximum	2298	Median	50
SD	259.4	Std. Error of Mean	28.82
Coefficient of Variation	2.647	Skewness	7.919

Normal GOF Test

Shapiro Wilk Test Statistic	0.208	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.433	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0985	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	145.9	95% Adjusted-CLT UCL (Chen-1995)	172.5
		95% Modified-t UCL (Johnson-1978)	150.2

Gamma GOF Test

A-D Test Statistic	23.55	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.778	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.428	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.102	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.195	k star (bias corrected MLE)	1.159
Theta hat (MLE)	81.99	Theta star (bias corrected MLE)	84.54
nu hat (MLE)	193.6	nu star (bias corrected)	187.8
MLE Mean (bias corrected)	97.98	MLE Sd (bias corrected)	91.01
		Approximate Chi Square Value (0.05)	157.1
Adjusted Level of Significance	0.047	Adjusted Chi Square Value	156.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	117.1	95% Adjusted Gamma UCL (use when n<50)	117.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.392	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.417	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0985	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	3.912	Mean of logged Data	4.111
60	Maximum of Logged Data	7.74	SD of logged Data	0.615
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	84.14	90% Chebyshev (MVUE) UCL	89.83
64	95% Chebyshev (MVUE) UCL	97.21	97.5% Chebyshev (MVUE) UCL	107.5
65	99% Chebyshev (MVUE) UCL	127.6		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	145.4	95% Jackknife UCL	145.9
72	95% Standard Bootstrap UCL	146	95% Bootstrap-t UCL	283.4
73	95% Hall's Bootstrap UCL	290	95% Percentile Bootstrap UCL	148.8
74	95% BCA Bootstrap UCL	186.5		
75	90% Chebyshev(Mean, Sd) UCL	184.4	95% Chebyshev(Mean, Sd) UCL	223.6
76	97.5% Chebyshev(Mean, Sd) UCL	278	99% Chebyshev(Mean, Sd) UCL	384.7
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	223.6		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:18:00 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead

General Statistics

Total Number of Observations	94	Number of Distinct Observations	67
		Number of Missing Observations	0
Minimum	5	Mean	350.1
Maximum	2500	Median	90
SD	510.7	Std. Error of Mean	52.67
Coefficient of Variation	1.459	Skewness	2.159

Normal GOF Test

Shapiro Wilk Test Statistic	0.701	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.25	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0916	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	437.6	95% Adjusted-CLT UCL (Chen-1995)	449.3
		95% Modified-t UCL (Johnson-1978)	439.6

Gamma GOF Test

A-D Test Statistic	2.572	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.815	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.0974	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.533	k star (bias corrected MLE)	0.523
Theta hat (MLE)	657	Theta star (bias corrected MLE)	669.4
nu hat (MLE)	100.2	nu star (bias corrected)	98.33
MLE Mean (bias corrected)	350.1	MLE Sd (bias corrected)	484.1
		Approximate Chi Square Value (0.05)	76.45
Adjusted Level of Significance	0.0474	Adjusted Chi Square Value	76.15

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	450.3	95% Adjusted Gamma UCL (use when n<50)	452.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.93	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	4.7081E-5	Data Not Lognormal at 5% Significance Level

	A–E	F	G–K	L
54	Lilliefors Test Statistic	0.106	Lilliefors Lognormal GOF Test	
55	5% Lilliefors Critical Value	0.0916	Data Not Lognormal at 5% Significance Level	
56	Data Not Lognormal at 5% Significance Level			
57				
58	Lognormal Statistics			
59	Minimum of Logged Data	1.609	Mean of logged Data	4.678
60	Maximum of Logged Data	7.824	SD of logged Data	1.7
61				
62	Assuming Lognormal Distribution			
63	95% H-UCL	777.3	90% Chebyshev (MVUE) UCL	777.2
64	95% Chebyshev (MVUE) UCL	930	97.5% Chebyshev (MVUE) UCL	1142
65	99% Chebyshev (MVUE) UCL	1559		
66				
67	Nonparametric Distribution Free UCL Statistics			
68	Data do not follow a Discernible Distribution (0.05)			
69				
70	Nonparametric Distribution Free UCLs			
71	95% CLT UCL	436.8	95% Jackknife UCL	437.6
72	95% Standard Bootstrap UCL	435.2	95% Bootstrap-t UCL	450.7
73	95% Hall's Bootstrap UCL	457.2	95% Percentile Bootstrap UCL	435.2
74	95% BCA Bootstrap UCL	452.5		
75	90% Chebyshev(Mean, Sd) UCL	508.1	95% Chebyshev(Mean, Sd) UCL	579.7
76	97.5% Chebyshev(Mean, Sd) UCL	679.1	99% Chebyshev(Mean, Sd) UCL	874.2
77				
78	Suggested UCL to Use			
79	95% Chebyshev (Mean, Sd) UCL	579.7		
80				
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
82	Recommendations are based upon data size, data distribution, and skewness.			
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
85				

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.108-Jul-20 11:28:45 AM
From File	WorkSheet_j.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Nickel

General Statistics

Total Number of Observations	86	Number of Distinct Observations	38
		Number of Missing Observations	0
Minimum	5	Mean	17.46
Maximum	95	Median	5.65
SD	20.41	Std. Error of Mean	2.2
Coefficient of Variation	1.169	Skewness	2.093

Normal GOF Test

Shapiro Wilk Test Statistic	0.671	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.271	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0957	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	21.12	95% Adjusted-CLT UCL (Chen-1995)	21.61
		95% Modified-t UCL (Johnson-1978)	21.2

Gamma GOF Test

A-D Test Statistic	7.915	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.271	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.0989	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.159	k star (bias corrected MLE)	1.126
Theta hat (MLE)	15.07	Theta star (bias corrected MLE)	15.5
nu hat (MLE)	199.3	nu star (bias corrected)	193.7
MLE Mean (bias corrected)	17.46	MLE Sd (bias corrected)	16.45
		Approximate Chi Square Value (0.05)	162.5
Adjusted Level of Significance	0.0472	Adjusted Chi Square Value	162

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	20.81	95% Adjusted Gamma UCL (use when n<50)	20.87

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.773	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level

Lilliefors Test Statistic	0.282	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.0957	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.609	Mean of logged Data	2.37
Maximum of Logged Data	4.554	SD of logged Data	0.929

Assuming Lognormal Distribution

95% H-UCL	20.5	90% Chebyshev (MVUE) UCL	22.11
95% Chebyshev (MVUE) UCL	24.72	97.5% Chebyshev (MVUE) UCL	28.34
99% Chebyshev (MVUE) UCL	35.45		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	21.08	95% Jackknife UCL	21.12
95% Standard Bootstrap UCL	21.19	95% Bootstrap-t UCL	21.85
95% Hall's Bootstrap UCL	21.66	95% Percentile Bootstrap UCL	21.17
95% BCA Bootstrap UCL	21.8		
90% Chebyshev(Mean, Sd) UCL	24.06	95% Chebyshev(Mean, Sd) UCL	27.05
97.5% Chebyshev(Mean, Sd) UCL	31.2	99% Chebyshev(Mean, Sd) UCL	39.35

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	27.05

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.108-Jul-20 11:21:23 AM								
5	From File			WorkSheet_c.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Total PAH											
12												
13	General Statistics											
14	Total Number of Observations					94	Number of Distinct Observations					43
15							Number of Missing Observations					0
16	Minimum					0.5	Mean					22.1
17	Maximum					395.3	Median					0.7
18	SD					69.08	Std. Error of Mean					7.125
19	Coefficient of Variation					3.126	Skewness					4.567
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.352	Shapiro Wilk GOF Test					
23	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic					0.387	Lilliefors GOF Test					
25	5% Lilliefors Critical Value					0.0916	Data Not Normal at 5% Significance Level					
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
30	95% Student's-t UCL					33.94	95% Adjusted-CLT UCL (Chen-1995)					37.4
31							95% Modified-t UCL (Johnson-1978)					34.5
32												
33	Gamma GOF Test											
34	A-D Test Statistic					11.9	Anderson-Darling Gamma GOF Test					
35	5% A-D Critical Value					0.867	Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic					0.254	Kolmogorov-Smirnov Gamma GOF Test					
37	5% K-S Critical Value					0.1	Data Not Gamma Distributed at 5% Significance Level					
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.303	k star (bias corrected MLE)					0.301
42	Theta hat (MLE)					72.83	Theta star (bias corrected MLE)					73.46
43	nu hat (MLE)					57.04	nu star (bias corrected)					56.56
44	MLE Mean (bias corrected)					22.1	MLE Sd (bias corrected)					40.29
45							Approximate Chi Square Value (0.05)					40.27
46	Adjusted Level of Significance					0.0474	Adjusted Chi Square Value					40.06
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					31.04	95% Adjusted Gamma UCL (use when n<50)					31.2
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.774	Shapiro Wilk Lognormal GOF Test					
53	5% Shapiro Wilk P Value					0	Data Not Lognormal at 5% Significance Level					

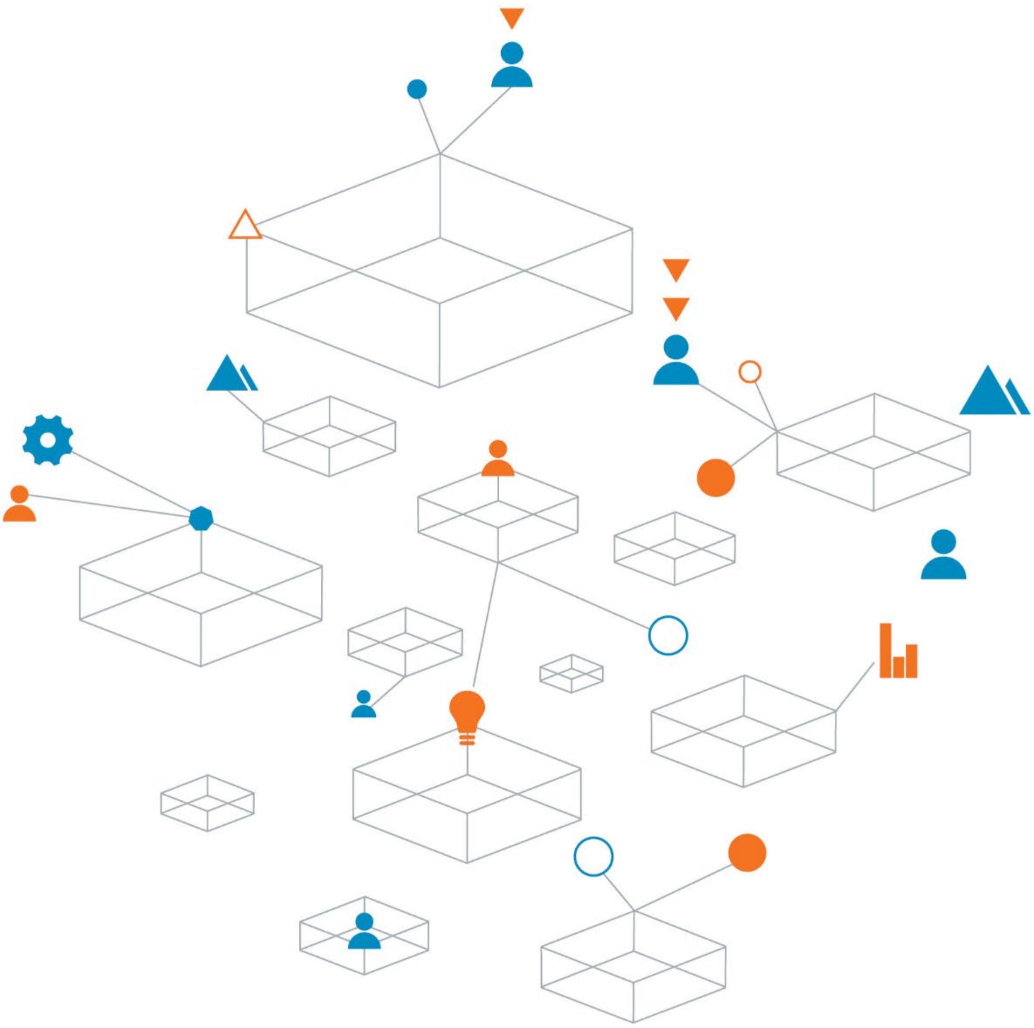
	A	B	C	D	E	F	G	H	I	J	K	L
54					Lilliefors Test Statistic	0.285			Lilliefors Lognormal GOF Test			
55					5% Lilliefors Critical Value	0.0916			Data Not Lognormal at 5% Significance Level			
56						Data Not Lognormal at 5% Significance Level						
57												
58						Lognormal Statistics						
59					Minimum of Logged Data	-0.693					Mean of logged Data	0.827
60					Maximum of Logged Data	5.98					SD of logged Data	1.923
61												
62						Assuming Lognormal Distribution						
63					95% H-UCL	28.08					90% Chebyshev (MVUE) UCL	26.41
64					95% Chebyshev (MVUE) UCL	32.13					97.5% Chebyshev (MVUE) UCL	40.08
65					99% Chebyshev (MVUE) UCL	55.68						
66												
67						Nonparametric Distribution Free UCL Statistics						
68						Data do not follow a Discernible Distribution (0.05)						
69												
70						Nonparametric Distribution Free UCLs						
71					95% CLT UCL	33.82					95% Jackknife UCL	33.94
72					95% Standard Bootstrap UCL	33.74					95% Bootstrap-t UCL	42.28
73					95% Hall's Bootstrap UCL	34.35					95% Percentile Bootstrap UCL	34.32
74					95% BCA Bootstrap UCL	38.1						
75					90% Chebyshev(Mean, Sd) UCL	43.47					95% Chebyshev(Mean, Sd) UCL	53.16
76					97.5% Chebyshev(Mean, Sd) UCL	66.59					99% Chebyshev(Mean, Sd) UCL	92.99
77												
78						Suggested UCL to Use						
79					95% Chebyshev (Mean, Sd) UCL	53.16						
80												
81						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
82						Recommendations are based upon data size, data distribution, and skewness.						
83						These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).						
84						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
85												

Appendix E – Tier 2 Risk Assessment Report

coffey
A TETRA TECH COMPANY

GHT Holdings Pty Ltd
Human Health Risk Assessment - 107 - 117 Swan Street Morpeth
754-NTLEN271167-R02 (Version 2)

26 May 2021



Trust is the cornerstone of all our projects

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Human Health Risk Assessment - 107 - 117 Swan Street Morpeth

Prepared for
GHT Holdings Pty Ltd

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26 May 2021

754-NTLEN271167-R02

Quality information

Revision history

Revision	Description	Date	Originator	Reviewer	Approver
V1	Version 1	28/08/2020	A. Wightwick	K. Teague	K. Teague
V2	Version 2	26/05/2021	A. Wightwick	K. Teague	K. Teague

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final V2	1	PDF	GHTY Holdings	26 May 2021

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Tables

Figures

Appendices

1. Introduction

GHT Holdings Pty Ltd (GHT) is proposing a residential development at 107 – 117 Swan Street, Morpeth NSW (the Site). It is understood that the proposed development is to be used as a retirement village (i.e. seniors residence), which will include construction of three two-storey apartment blocks, comprising a total of 11 three bed apartments. The location of the site is shown on **Figure 1-1**.

Figure 1-1: Site location

A phase two contamination assessment was undertaken at the site by Pacific Environmental Pty Ltd (PE) in 2018 and 2019. This identified that the site had previously been used for a range of historical contaminating activities including as a foundry and a mechanics workshop / service station. It is understood that the service station infrastructure had been removed and remediation works undertaken prior to 2019. The investigation undertaken by PE identified soil contamination on the soil including elevated concentrations of lead, polycyclic aromatic hydrocarbons (PAH) and total recoverable hydrocarbons in shallow and sub-surface soils. PE concluded that the site soils have a significant history that my precluded the development or use of the site for the residential development and further investigations and remediation was recommended. PE prepared a Remediation Action Plan (RAP) for the site in 2019.

Coffey were engaged by GHT to undertake a Detailed Site Investigation (DSI) in 2020. Investigations undertaken as part of the DSI indicated PAHs in a number of shallow and sub-surfaces at concentrations exceeding the health investigation levels of residential land use. A site-specific human health risk assessment (HHRA) was therefore required to evaluate the potential health risk associated with the measured PAH impact in soil for the future users of the site under the proposed development plans.

1.1. Objectives

The purpose of this HHRA was to evaluate the potential impacts to human health associated with PAH impacted soil identified at the site via the derivation of site-specific risk-based criteria (RBC) for future receptor populations based on the proposed development. The HHRA addresses the following receptor populations:

- Future residents at the retirement village.
- Future commercial workers associated with the retirement village.
- Future workers who may be involved in maintenance of the site, including grounds keepers, and undertaking subsurface works such as utilities repairs or installation.
- Workers involved in construction of the retirement village undertaking subsurface works.

1.2. Risk assessment approach

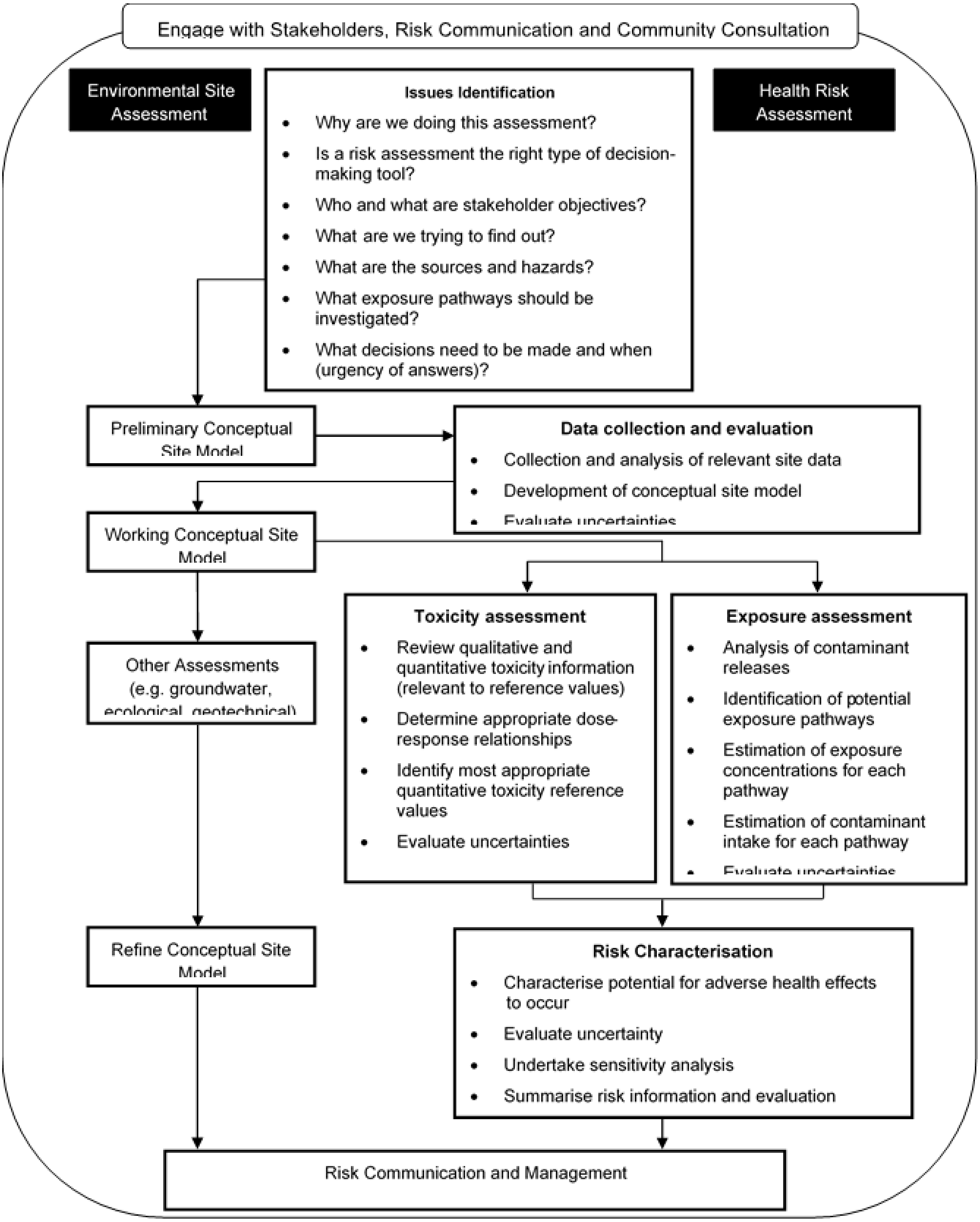
The health risk assessment approach was conducted in accordance with the '*National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013'* (NEPC, 2013), referred to herein as the NEPM and the '*Guidelines for Assessing Human Health Risks from Environmental Hazards*' (enHealth, 2012). The provisions within the NEPM are:

- Guideline on Site-Specific Health Risk Assessment Methodology, Schedule B4; and
- Guideline on Derivation Health-Based Investigation Levels Schedule B7.

The risk assessment process conducted as part of this HHRA comprises issue identification, data evaluation, toxicity assessment, exposure assessment and risk characterisation. The conceptual site model is generated based on the information collected in the previous environmental investigations at the site. Evaluation of uncertainty is part of each stage of works and ensures realistic information is provided in the assessment and the findings of this HHRA can be utilised as part of the risk management or risk communication processes as required

The methodology adopted can be summarised in **Figure 1-2**.

Site specific risk-based criteria were derived using the National Environmental Protection Council's '*HILs spreadsheet*' from the NEPM Toolbox. All the equations used in the spreadsheet are documented in Schedule B7, Appendix B 'Equations for Derivation of HILs and Interim HILs' within the NEPM (2013) .



Source: NEPC, 2013

Figure 1-2: Risk assessment process

2. Conceptual site model

2.1. Site development plans

The Site currently includes an existing derelict house (western portion) and is vacant with concrete and brick building footings present (eastern portion), and grasses and trees in the southern vacant area of the Site. An excavation around the concrete footing to approximately 1m below ground surface (mbgs) has resulted in a stockpile of material (placed on concrete footing). It is understood that this is related to previous site investigation and remediation works on the site.

Coffey understands the proposed development will include the construction of three 2-storey apartment blocks, comprising a total of 11 three bedroom apartments. . Each apartment includes a double garage and private open space which comprises a paved courtyard area and landscaped garden area. The total area of private open space for each apartment is indicated to be ~36m^2. Permeable paved walkways are planned between the three apartment blocks and other general areas of the site. Landscaped garden areas are proposed around the boundaries of the site, outside of the footprint of the apartment buildings and private open space. A concrete hardstand drive will be constructed along the southern side of the apartment buildings. Entry to this driveway is via each of the lane ways on the eastern and western boundaries of the site William Street (east of site) and Market Street (west of site). It is understood that the proposed development is to be used as a retirement village (i.e. senior citizens residence).

The ground level site layout plan, including proposed landscaping plan is shown on **Figure 2-1**. An aerial view of the proposed development, which shoes the private open space areas is shown on **Figure 2-2**.

A summary of the different areas of the areas is provided in **Table 2-1**.

Table 2-1: Summary of site areas (Source: Sorenson Design & Planning, File No. 2003016, dated 5/11/2020)

	Area (m^2)	Proportion of total site area (%)
Building footprint	1,309.1	48
Hardstand	562.0	21
Permeable paving	116.2	4
Landscaped area	331.1	12
Private open space	394.0	15
Total site area	**2,712.4**	

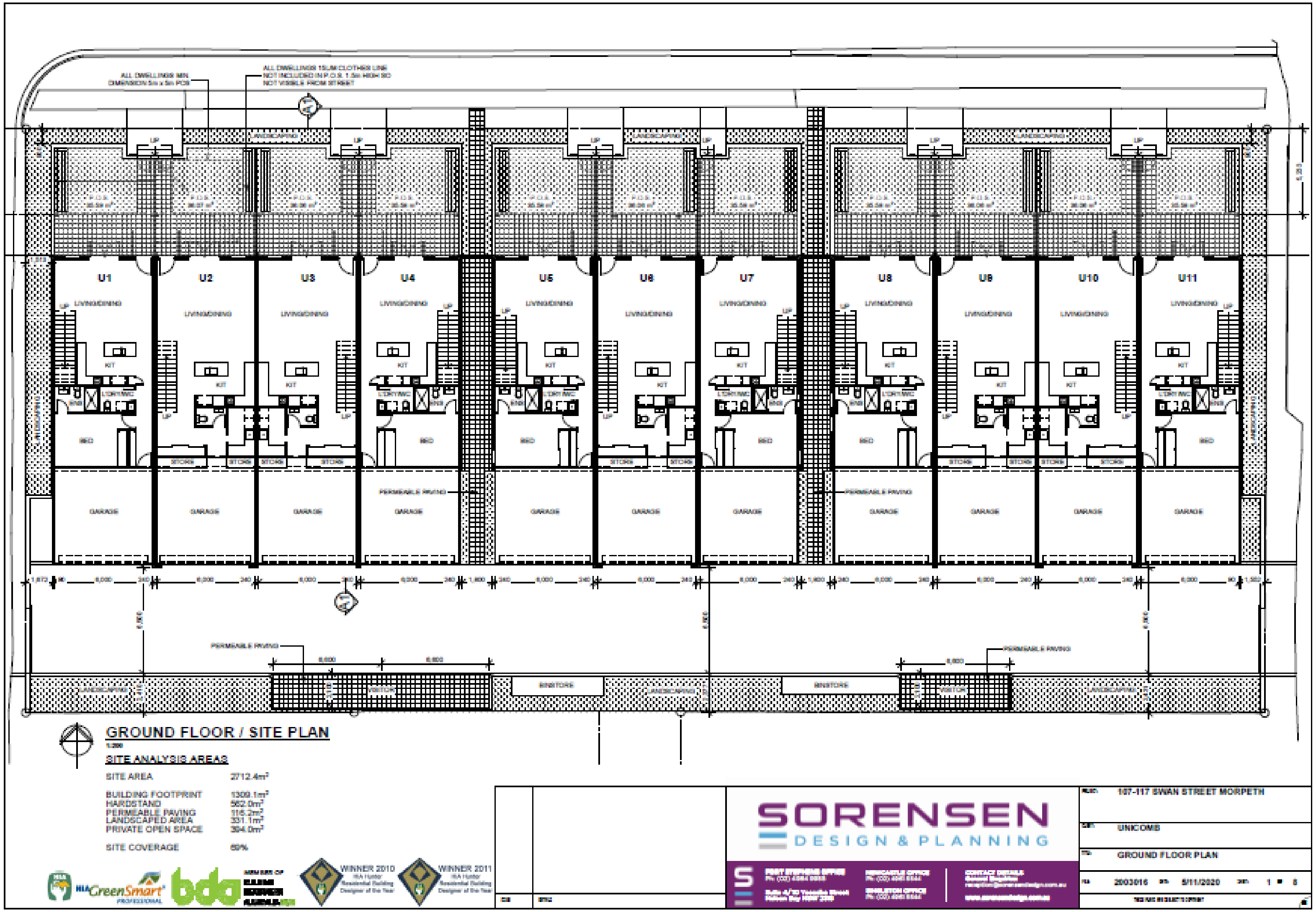


Figure 2-1: Ground level layout of proposed residential development (Source: Sorenson Design & Planning, File No. 2003016, dated 5/11/2020)

Figure 2-2: Aerial view of proposed residential development (Source: Sorenson Design & Planning, File No. 2003016, dated 5/11/2020)

2.2. Data evaluation

Data from the following environmental investigations undertaken at the site have been considered for this HHRA:

- Phase Two Soil Contamination Assessment (Revision 2), Pacific Environmental, 2019
- Detailed Site Investigation, Coffey, 2020

The Phase 2 Soil Contamination assessment undertaken by PE included soil sampling at nine borehole locations in 2018 and an additional six locations in 2019. The soil sampling locations are shown on **Figure 2-3**

The DSI completed by Coffey in 2020 included soil sampling at 23 locations. The soil sampling locations are shown on **Figure 2-4**

Figure 2-3: Soil sampling location plan Phase Two Soil Contamination Assessment 2018 – 2019 (Source: Adapted from - Pacific Environmental, Phase Two Soil Contamination Assessment, November 2019)

Figure 2-4: Soil sampling location plan Detailed Site Investigation 2020

Data from the 2019 Phase Two Contamination Assessment and the 2020 DSI investigations undertaken at the site have been subject to a Tier 1 screening evaluation to establish whether there is a potential for an unacceptable health risk associated with soil impacts at the site. The generic screening criteria have been selected based on the land use and proposed development described in the preliminary Conceptual Site Model. The data considered is tabulated in Appendix B.

The Tier 1 screening criteria are generally derived on the basis of conservative assumptions relating to land use, receptor behaviour, site, building and soil characteristics. The ASC NEPM (NEPC, 2013) health investigation levels (HILs) HIL-B were adopted based on the proposed future medium density Residential land use setting for site (with minimal soil access). The NEPM HIL C for commercial / industrial land use setting were also adopted to evaluate the potential health risks to future commercial workers, such as managerial, care or health workers. at the retirement village. Tier 1 screening criteria have not been established for construction workers and future subsurface workers.

The Tier 1 screening assessment has been undertaken based on reported concentrations of total PAHs and benzo[a]pyrene toxic equivalent (BaP_{TEQ}) concentrations for shallow soils (0 - ≤ 0.5 meters below ground surface (mbgs)) and sub-surface soils (> 0.5 mbgs).

The BaP_{TEQ} is a determination of carcinogenic PAHs based on the sum of relative potency to benzo[a]pyrene, this concept is discussed further in Section 5.1. A statistical assessment of the BaP_{TEQ} and total PAH concentrations was undertaken using ProUCL (Version 5.1.002), to determine 95% Upper Confidence Level (UCL) concentrations. The outputs from the ProUCL statistical assessment are provided in Appendix C and summarised in **Table 2-1**, in relation to the adopted Tier 1 screening criteria.

Table 2-2: Tier 1 screening comparison of impact at different depths and the NEPM HIL A and D criteria

Chemical of concern	Tier 1 health screening criteria [mg/kg]		Depth range [m]	Number of soil samples	Concentration range (1) [mg/kg]	95% UCL concentration [mg/kg]	Standard deviation [mg/kg]
	NEPM HIL B – Low density residential	NEPM HIL D – Commercial / industrial					
BaP_{TEQ} (2)	4	40	0.0 - ≤0.5	40	0.6 - **45**	**12.5**	10.5
			>0.5 – 2.3	55	0.6 – **5.7**	1.54	0.98
PAHs (total)	400	4000	0.0 - ≤0.5	40	<0.5 – **395**	145 (3)	101
			>0.5 – 2.3	55	<0.5 – 66.3	NC	NC

NC: Not calculated; Shading indicates exceedance of HIL A, Bold indicates exceedance of HIL D

1. Where 0.6mg/kg indicates no carcinogenic PAHs were detected.
2. Based on half the limit of reporting (LOR) for PAHs that were not detected above the LOR.
3. 97.5% Chebyshev UCL

2.3. Evaluation of exposure pathways

Exposure pathway identification is a four-step process involving the identification of contaminant sources, how contaminants are transported to other media and locations, which receptors may be exposed as a result and through what means the receptors are exposed. The complete exposure route linkage process is presented in **Figure 2-5**.

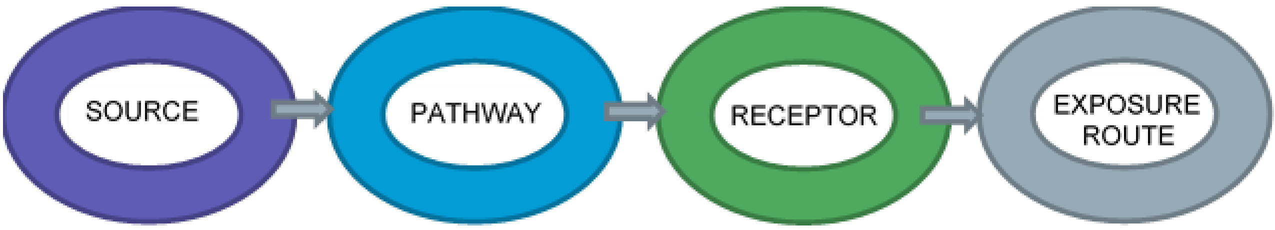


Figure 2-5: Source - Pathway - Receptor - Exposure Route Linkage Process

In order to identify which receptor groups may potentially be exposed to contaminants released to the environment as a result of the historical and proposed site activities, the contaminant sources and locations are determined based on the environmental investigations and other information sources. Once contaminants are released to the environment they may be transported to other media and other locations where receptors may be exposed. Environmental investigations are also required to measure contaminant concentrations at the point of exposure. An example of this process would be:

- **Source**: In this instance the source of PAHs measured in soil at the site are not known but are likely to be present as a result of historical activities, in particular operation of a foundry or from the importation of fill material.
- **Transport pathways**: The fate and transport mechanisms of contaminants once released from the source. This is usually via wind, water, sediments, soil, food etc. It is likely that PAHs entered surface soils from past industrial uses on the site. This contamination, along with any in imported fill, has likely been subsequently distributed across the site during various prior redevelopments. Leaching of PAHs to the underlying soils may also have occurred over time.
- **Receptors**: The point of exposure will depend on where the receptor is located. The receptors would include residents and commercial workers at the facility as wells as grounds keepers and maintenance works particularly those involved in subsurface activities.

- **Exposure route**: Once the source-pathway-receptor linkages have been identified, the potential direct and indirect routes of exposures can be determined. The route of exposure describes how a contaminant enters the body either via ingestion, inhalation and/or dermal contact.

The physico-chemical characteristics of the COPC and the behaviour of the receptor of interest, will determine the method of exposure and subsequent systemic absorption. An adverse effect can only occur where a complete exposure pathway exists.

2.3.1. Receptors of concern

Based on the proposed development of the site for a retirement village, the exposure assessment focussed on future residents and commercial workers involved in the running of the facility. Based on the medium density residential development and the proposed landscaping plan (i.e. limited private open space and landscaped areas) it is assumed that residents and commercial workers would have minimal access to soil and none or minimal (i.e. <5 % of annual consumption) edible produce would be grown for consumption.

It is acknowledged that children and adolescents visitors may periodically reside at the facility, however it has been assumed that this will not be for extended periods, hence they are not considered to be permanent residence. It is considered reasonable that children and adolescents may visit or live with residents at the facility (i.e. grandparents) for blocks of time, such as during school holidays, as such this scenario has been considered. It is understood that retirement villages have varying rules relating to stays of visitors, for those under 18 particularly. Typically, villages may allow grandchildren to stay at facilities for up to one month (https://www.villages.com.au/info-centre/post/retirement-villages/top-legal-questions-about-retirement-act). It is expected the children would have minimal access to soil given the development plans indicate no designated play areas and limited potential for lawn areas. The outside areas are largely paved with some landscaped areas.

PAH impacted soil has been reported at concentrations in excess of the nominated Tier 1 screening criteria for residents in both shallow soils (0 - ≤ 0.5mbgs) and sub-surface soils (> 0.5m). The 95% UCL concentration of BaP_{TEQ} was below the residential screening criteria in sub-surface soils. PAH impact in shallow soils (0 - ≤ 0.5mbgs) was reported at concentrations in excess of the nominated Tier 1 screening criteria for commercial workers, however the 95% UCL concentration of BaP_{TEQ} was below this screening criteria. Future residents and commercial workers could come into contact with impacted shallow soils or soils derived particulates as a result of dust generation.

Direct contact exposure pathways for future on-site residents have been considered in this assessment. Direct contact exposure pathways include dermal contact, incidental ingestion and particulate inhalation. Direct contact exposure pathways for future on-site commercial workers has not been considered as the 95% UCL concentrations for BaP_{TEQ} are below the applicable screening criteria. Similarly, direct contact exposures for future on-site residents have not been considered for sub-surface soils (> 0.5mbgs), as the 95% UCL concentrations for BaP_{TEQ} are below the applicable screening criteria

The PAHs detected in soils at the site are not considered to volatilise readily, therefore, potential inhalation of vapours by future on-site users is not considered to be a potentially complete exposure pathway.

Grounds keepers may come into contact with impacted shallow soils and maintenance workers may come into contact with impacted soils when undertaking subsurface maintenance works at the site. Construction workers are likely to be involved in sub-surface disturbance and excavation works and may be come into contact with impacted soils during the limited construction period of the facility. Direct contact exposures to these receptors have been considered, including dermal contact, incidental ingestion and particulate inhalation.

Other on-site receptors may also be present from time to time. This assessment has not considered transient exposure to occasional visitors, as chronic daily exposures to the identified regular users of the site are considered to represent more significant exposures. It has been assumed that the future residents at the facility will only be adults.

3. Exposure Assessment

Based on the identified source of contamination in surficial soils, potential transport pathways and selected receptor populations, the complete exposure pathways chosen for further evaluation in this assessment are presented in **Table 3-1**.

Table 3-1: Summary of the evaluation of on-site exposure scenarios associated with soil/dust

Receptor	Point of Exposure	Exposure Pathways			
		Vapour Inhalation	Particulate Inhalation	Dermal contact	Incident ingestion
Retirement village resident (Adult)	Shallow soil (≤ 0.5mbgs). Landscaped garden beds with minimal or disturbed covering of clean materials.	×	✓	✓	✓
	Sub-surface soils (>0.5mbgs) Landscaped garden beds with minimal or disturbed covering of clean materials	×	×	×	×
Child (short-stay resident) [1]	Shallow soil (≤ 0.5mbgs). Landscaped garden beds with minimal or disturbed covering of clean materials.	×	✓	✓	✓
	Sub-surface soils (>0.5mbgs) Landscaped garden beds with minimal or disturbed covering of clean materials	×	×	×	×
Commercial worker	Shallow soil (≤ 0.5mbgs) Landscaped garden beds with minimal or disturbed covering of clean materials.	×	×	×	×
	Sub-surface soils (>0.5mbgs) Landscaped garden beds with minimal or disturbed covering of clean materials	×	×	×	×
Grounds keepers	Shallow soils	×	✓	✓	✓
Maintenance workers.	1m deep sub-surface maintenance trench.	×	✓	✓	✓
Construction workers	Surface and sub-surface soils exposed during the period of construction	×	✓	✓	✓

✓ Exposure pathway may potentially be complete.
× Exposure pathway considered to be negligible or incomplete.

1, Conservative assumption that children may reside at the facility for up to 3 months per year

Modelling of the identified complete exposure pathways was conducted utilising the NEPC's '*HILs spreadsheet*' from the NEPM Toolbox. The input parameters for the NEPM spreadsheet and the rationale behind their adoption are detailed in the following sections.

3.1. Early lifetime exposures

Early lifetime exposures may be considered relevant where contaminants are known to act in a mutagenic mode of action that could cause cancer. Certain PAHs are known to cause direct damage to DNA and therefore exposures to these contaminants in early childhood may increase the risk of health effects. The potential toxicity and mode of action of some PAHs is discussed in greater detail in Section 4.

Early lifetime exposures have conservatively been considered in this HRA, however it is noted that such early lifetime exposures are likely to be limited due to the potential for limited access to impacted soils.

3.2. Exposure input parameters

Exposure parameters were selected to reflect potential behaviours and physiology of adult in the residential, grounds keeper and sub-surface maintenance worker scenarios. Direct contact exposure was estimated to reflect scenarios with no restrictions or controls on soil contact. In relation to the residential exposures it has been assumed that there is minimal access to soil, i.e. limited gardens and landscaped areas.

Residents are considered to be the most sensitive of the receptor populations included in the assessment, due to the frequency and extended duration of potential exposures to impacted soil.

The exposure duration of the residents has set based on an assumption that residents will commence residing at the facility in their later years of life.

The input parameters adopted in the RBC calculations for each receptor population and related scenarios modelled are presented in **Table 3-2** and **Table 3-3**.

Table 3-2: Retirement village residential exposure input parameters

ID	Parameter		Value	Reference
IRs	Soil and Dust Ingestion Rate [mg/day]	Adults	12.5	25% of HIL A assumption Schedule B7, Table 5 (NEPC, 2013)
SA	Surface Area of Skin [cm^2]	Adults	20,000	Schedule B7, Table 5 (NEPC, 2013)
	Exposed Skin [%]	Adults	31.5%	Schedule B7, Table 5 (NEPC, 2013)
AF	Soil-to-Skin Adherence Factor [mg/cm2/day]		0.5	Schedule B7, Table 5 (NEPC, 2013)
ET_O	Time Spent Outdoors [hr/day]		1	Schedule B7, Table 5 (NEPC, 2013)
ET_i	Time Spent Indoors [hr/day]		20	Schedule B7, Table 5 (NEPC, 2013)
RF	Lung Retention Factor		0.375	Schedule B7, Table 5 (NEPC, 2013)
PEF_O	Particulate Emission Factor [m^3/kg]		7.3E+10	Schedule B7, Table 5 (NEPC, 2013)
PEF_i	Indoor Air Dust Factor [m^3/kg]		2.6E+07	Schedule B7, Table 5 (NEPC, 2013)
TF	Fraction of indoor dust comprised of outdoor soil		0.5	Assumed 50% soil concentration present in dust, per Schedule B7, Table 5 (NEPC, 2013)
BW	Body weight [kg]	Adults	70	Schedule B7, Table 5 (NEPC, 2013)
EF	Exposure Frequency [day/year]		365	Schedule B7, Table 5 (NEPC, 2013)
ED	Exposure Duration [years]		20	Based on assumption that residents commence residing at the facility in their later years of life (i.e. 65+ years)
AT	Averaging Time [days]		25,550	Based on 365 days/year for 70 years for non-threshold chemicals (NEPC, 2013).

Table 3-3: Child short stay residential exposure input parameters

ID	Parameter		Value	Reference
IRs	Soil and Dust Ingestion Rate [mg/day]	Young children (0 – 5 years)	25	25% of HIL A assumption Schedule B7, Table 5 (NEPC, 2013)
SA	Surface Area of Skin [cm^2]	Young children (0 – 5 years)	2,700	Based on 44.3% of the total skin surface area. Schedule B7, Table 5 (NEPC, 2013)
AF	Soil-to-Skin Adherence Factor [mg/cm2/day]		0.5	Schedule B7, Table 5 (NEPC, 2013)
ET_O	Time Spent Outdoors [hr/day]		1	Schedule B7, Table 5 (NEPC, 2013)
ET_i	Time Spent Indoors [hr/day]		20	Schedule B7, Table 5 (NEPC, 2013)
RF	Lung Retention Factor		0.375	Schedule B7, Table 5 (NEPC, 2013)
PEF_O	Particulate Emission Factor [m^3/kg]		2.6E+07	Schedule B7, Table 5 (NEPC, 2013)
TF	Fraction of indoor dust comprised of outdoor soil		0.5	Assumed 50% soil concentration present in dust, per Schedule B7, Table 5 (NEPC, 2013)
BW	Body weight [kg]	Young children (0 – 5 years)	15	Schedule B7, Table 5 (NEPC, 2013)
EF	Exposure Frequency [day/year]		180	Based on assumption of child staying at residence for up to 6 months per year
ED	Exposure Duration [years]		6	Schedule B7, Table 5 (NEPC, 2013)
AT	Averaging Time [days]		25,550	Based on 365 days/year for 70 years for non-threshold chemicals (NEPC, 2013).

Table 3-4: Maintenance workers, grounds keeper and construction exposure input parameters

ID	Parameter		Value	Reference
IRs	Soil and Dust Ingestion Rate [mg/day]		330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
SA	Surface Area of Skin [cm^2]		20,000	Schedule B7, Table 5 (NEPC, 2013)
	Exposed Skin [%]		34%	Based on 34% total skin area of 20000 cm2 exposed (Friebel & Nadebaum, 2011)
AF	Soil-to-Skin Adherence Factor [mg/cm2/day]		0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012b)
ET	Time Spent Outdoors [hr/working day]		8	Based on an 8 hour work day (NEPC, 2013).
RF	Lung Retention Factor		0.375	Schedule B7, Table 5 (NEPC, 2013)
PEF	Particulate Emission Factor [m^3/kg]		4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
BW	Body weight [kg]		78	Based on average adult body weight (over 18yo male and female). enHealth (2012b)
EFx	Exposure Frequency [day/year]	Grounds keeper	48	Once a week for 48 weeks per year
		Maintenance Worker	10	Based on 2 weeks per year.
		Construction worker	80	Based on a 4 month construction period.
EDx	Exposure Duration [years]	Grounds keeper	30	Schedule B7, Table 5 (NEPC, 2013)
		Maintenance Worker	30	Schedule B7, Table 5 (NEPC, 2013)
		Construction worker	1	Based on a 4 month construction period.
AT	Averaging Time [days]		25,550	Based on 365 days/year for 70 years for non-threshold chemicals (NEPC, 2013).

4. Toxicity Assessment

4.1. Hazard Identification – Toxicity

Toxicity assessment provides an evaluation of the inherent toxicity of chemicals associated, in this instance, with site contamination. It is a process of determining whether human exposure to a chemical could cause an increase in the incidence of an adverse health condition, either cancerous or non-cancerous in nature. The toxicity assessment considers the following.

- The nature of adverse effects related to the exposure.
- The dose-response relationships.
- The weight of evidence for effects such as carcinogenicity.
- The relevance of animal data to humans.

The results of the toxicity assessment are an appreciation of the toxicity of the PAHs and a set of chemical-specific toxicity criteria that are used in the assessment of health risks from potential exposures to PAHs.

4.1.1. Adverse Health Effects

Adverse health effects in humans arising from exposure to hazardous substances are dependent on a large variety of factors. These factors include:

- The intrinsic toxicity of the substance.
- The intensity and duration of the exposure.
- The age and health status of the exposed individual.
- The concurrent exposure to other hazardous substances with similar toxic effects.

PAHs may comprise a large mixture of organic compounds that contain two or more fused aromatic rings. Whilst there are several hundred PAHs, only 16 individual PAHs are analysed in site investigations with benzo[a]pyrene (BaP) being the most comprehensively studied.

Studies on animals and humans have shown that long term PAH exposure can cause lung cancer (via inhalation), skin cancer (direct contact) (Fitzgerald, 2003), and possibly cancer at other sites in the body (IARC, 1998).

BaP studies have produced tumours in all nine animal species studied, but no human epidemiological studies on benzo[a]pyrene are available (IARC 1998). Both the International Agency for Research on Cancer (IARC 1998) (Group 2A) and the US EPA (2011) (Group B2) have classified BaP as a probable human carcinogen.

Whilst BaP has been shown to be carcinogenic via all routes of exposure, its carcinogenicity is a result of its metabolites which causes disruption to DNA and the potential formation of tumours. The types of tumours that develop are strongly related to the route of exposure.

4.1.2. Dose response assessment

COPC can generally be divided into the following two classes based on dose-response characteristics.

- Chemicals that exhibit no threshold.
- Chemicals that exhibit a threshold.

A threshold refers to a dose below which deleterious effects are not expected to occur. This is considered to result from biological mechanisms that have the ability to metabolise or excrete a toxin or repair damage up to a certain dose (enHealth, 2012a).

Whilst PAH mixtures contain both threshold and non-threshold compounds, it is the non-threshold PAHs that are considered to have the higher toxicity. BaP is universally present in PAH mixtures and is considered an indicator chemical as it has been studied extensively and is used to assess other non-threshold PAHs via the adoption of toxicity equivalence factors (TEFs). The TEF approach relates the toxicity of each individual PAH relative to that of BaP to assess their combined carcinogenic health effects.

To quantify the risk associated with a given exposure to non-threshold chemicals (i.e. carcinogens), the unit risk (UR) approach has been applied through the use of a cancer slope factor (SF). The SF is an upper-bound estimate of the probability of a response, in this case cancer, per unit intake of a chemical over a lifetime. The unit risk is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular level of a potential carcinogen. This approach is based on the Linearized Multistage Model (LMS) for dose-response characterisation which assumes a linear relationship between the origin and the lowest dose in a cancer study.

4.2. Toxicity reference values

Toxicity reference values (TRVs) and associated parameters were adopted from Schedule B7, Appendix A5 of the NEPM (The derivation of HILs for PAHs and Phenols) and the New Zealand Ministry for the Environment (MfE, 2011). The toxicity criteria adopted to evaluate the non-threshold health effect associated with BaP is summarised in **Table 4-1**.

Table 4-1: Toxicity criteria for benzo(a)pyrene - Non threshold

COPC	Classification of Carcinogenicity		TRV $(mg/kg\text{-}day)^{-1}$			Dermal Absorption Factor %	Gastro-intestinal absorption factor
	IARC (1)	USEPA (2)	Oral	Inhalation particulates	Dermal Contact		
Benzo[a]pyrene	Group 1	Class B2	0.5 (3)			2.6 (4)	1

1. IARC 2010. Cancer Classification: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), Group 3 (unclassifiable as to carcinogenicity in humans).
2. USEPA 2013. Cancer Classification: Class A (carcinogenic to humans); Class B (probable carcinogenic to humans); Class C (possibly carcinogenic to humans); Class D (unclassifiable as to carcinogenicity in humans).
3. WHO 2011. Note the TRV is converted to $(mg/m^3)^{-1}$ for the inhalation exposure pathway.
4. MfE 2011. Based on aged soil.

The NEPM adopts a dermal absorption factor (DAF) of 6% based on recommendations made by the MfE (2011). The DAF of 6% is based on the geometric mean of dermal absorption using freshly spiked soil from the following studies:

- Abdel-Rahman, Skowronski, & Turkall (2002)
- Moody, Jonca, Richardson, & Chu (2007)
- Wester, et al. (1990)

The NEPM and MfE note that the use of the DAF calculated on spiked soils is considered to be 'worst-case' and, therefore, it was adopted in the NEPM for the derivation of generic HILs on the basis that it would be protective of all sources. The MfE also calculated a DAF of 2.6% using data from aged soils. The MfE adopted the DAF of 2.6% in their *National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health* which came into effect in 2012. It is considered appropriate to adopt the DAF of 2.6% at the site given that PAHs are present in soils that have been in-situ for many years.

A threshold TRV for benzo[a]pyrene was not provided in the NEPM evaluation as the non-threshold approach was adopted. A review of toxicity studies in animals by the US EPA in 2017 relating to the threshold health effects associated with benzo[a]pyrene resulted in revised oral and inhalation TRVs for benzo[a]pyrene. The approach adopted in the derivation of RBC in this assessment however remains consistent with the NEPM's non-threshold approach.

Early-lifetime exposures are accounted for by application of an age-dependent adjustment factor (ADAF). For children under 2 the ADAF is equal to 10 and for ages 2 to 16 the ADAF is equal to 3 (USEPA, 2005)

5. Derivation of site-specific risk-based criteria

This assessment derived human health site specific RBC for the direct contact exposure pathways whereby the TRV associated with inhalation of particulates, incidental ingestion and dermal intake of contaminants was used to estimate the RBC in soil using the equations shown in **Table 5-1** (as defined in NEPM, 2013). The RBC are derived in order to be protective of human health and do not include assessment endpoints such as aesthetic (including odour impacts) impacts.

The derivation of RBC for each receptor population, and age group within a population where relevant, was undertaken using particulate inhalation, ingestion and dermal adsorption calculations consistent with enHealth (2012a) and NEPM (2013). The RBC calculations for each receptor are presented in Appendix D.

Table 5-1: Equations used to estimate risk-based criteria for non-threshold chemicals

Direct contact pathways – soil / dust		
Equation 1	Dermal contact	$RBC_{der}(mg/kg) = \frac{TR \times BW_x \times AT}{TRV_D \times SA_x \times AF \times DAF \times CF \times EF_x \times ED_x}$
Equation 2	Particulate inhalation	$RBC_{inh}(mg/kg) = \frac{TR \times AT \quad \times PEF}{TRV_i \times ET_x \times RF \times EF_x \times ED_x}$
Equation 3	Ingestion	$RBC_{ing}(mg/kg) = \frac{TR \times BW_x \times AT}{TRV_o \times IRs_x \times BA_o \times CF \times EF_x \times ED_x}$
Equation 4	Combined direct contact pathways	$RBC_{DC}(mg/kg) = \frac{1}{\left[\frac{1}{RBC_{der}}\right] + \left[\frac{1}{RBC_{inh}}\right] + \left[\frac{1}{RBC_{ing}}\right]}$

Where,

AF	= Soil Adherence Factor ($mg/cm^2/d$)
AT	= Averaging Time for non-threshold chemicals (based on 70 years) (days)
BA_o	= Bioavailability (unitless)
BW_x	= Body Weight for each receptor group x (kg)
CF	= Conversion Factor (10^{-6} kg/mg)
DAF	= Dermal Absorption Factor (unitless)
ED_x	= Exposure Duration for each receptor group x (year)
EF_x	= Exposure Frequency for each receptor group x (days/year)
ET_x	= Exposure Time for each receptor group x (hours/day)
IRs_x	= Soil/Dust Ingestion Rate by each receptor group x (mg/day)
PEF	= Particulate Emission Factor (m^3/kg)
RBC_{DC}	= direct contact site-specific target level for soil (mg/kg)
RBC_{der}	= dermal contact site-specific target level for soil (mg/kg)
RBC_{ing}	= ingestion site-specific target level for soil (mg/kg)
RBC_{inh}	= particulates inhalation site-specific target level for soil (mg/kg)
RF	= Lung Retention Factor (unitless)
SA_x	= Exposed Skin Area for each receptor group x (cm^2)
TR	= Target Risk (unitless)
TRV	= Toxicity reference value (chemical specific and exposure route specific) $(mg/kg/day)^{-1}$

5.1. Site-specific RBC for non-threshold PAHs

In order to assess exposure to all the identified non-threshold (carcinogenic) PAHs detected in soil at the site, the TEF approach as defined by USEPA (1993) and NEPM (2013), must be applied. Although PAHs are generally present in the environment as complex mixtures, international agencies such as the USEPA and Canadian Council of Ministers for the Environment have identified a number of the primary PAH pollutants as probable human carcinogens. The relative potency of these selected non-threshold PAHs can be described using toxic equivalence factors (TEF).

Toxic equivalency factors can be used in the assessment of mixtures when chemicals share structures similarities (i.e. dioxins, PCBs and PAHs) (enHealth 2012a) The TEF for each compound is defined as the ratio of the carcinogenic potency in relation to that of benzo[a]pyrene whereby a TEF that is less than 1 indicates that compound is considered to be a less potent carcinogen than benzo[a]pyrene. The environmental levels of these PAHs are expressed as benzo[a]pyrene equivalents (BaP_{TEQ}) where the product of the TEF for each PAH and the respective soil concentrations can be summed to provide an overall toxic equivalency quotient which represents overall PAH potency in terms of benzo[a]pyrene concentrations. The TEF for the selected carcinogenic PAHs are presented in **Table 5-2**.

Table 5-2: Toxic equivalence factors for PAHs

Chemical	Classification of Carcinogenicity (IARC)[(1)]	US EPA Classification [(2)] (IRIS, 2005)	TEF (NEPM, 2013)
Benzo[a]anthracene	Group 2BA	Group B2	0.1
Benzo[a]pyrene	Group 1	Group B2	1
Benzo(b+j)fluoranthene	Group 2B	Group B2	0.1
Benzo(k)fluoranthene	Group 2B	Group B2	0.1
Benzo(g,h,i)perylene	Group 3	Group D	0.01
Chrysene	Group 2B	Group B2	0.01
Dibenz(a,h)anthracene	Group 2A	Group B2	1
Indeno(1,2,3-c,d)pyrene	Group 2B	Group B2	0.1

Notes:

1. IARC Cancer Classification: Group 1 (carcinogenic to humans), Group 2A (probably carcinogenic to humans), Group 2B (possibly carcinogenic to humans), Group 3 (unclassifiable as to carcinogenicity in humans)
2. USEPA Cancer Classification: Group B2 (probable human carcinogen), Group C (possible human carcinogen), Group D (not classifiable as to human carcinogenicity).

The derived RBC for carcinogenic PAHs based on the BaP TEFs (BaP_{TEQ}) for future residents and workers at the site under the proposed development plans are presented in **Table 5-3**.

Table 5-3: RBC for direct contact exposure pathways with benzo[a]pyrene in soil/dust at the proposed retirement village

COPC	RBC Retirement village resident (mg/kg)	RBC Child – short stay resident (mg/kg)	RBC Groundkeepers (mg/kg)	RBC Maintenance workers (mg/kg)	RBC Construction workers (mg/kg)
BaP_{TEQ}	52	20	57	270	1,000

5.2. Application of the site-specific RBC

To apply the RBC to assess the non-threshold PAHs identified in residual soil at the site, the reported concentrations of carcinogenic PAHs should be multiplied by the respective TEF, as presented in **Table 5-2**, and the resulting values summed for comparison with the benzo[a]pyrene (BaP_{TEQ}) RBCL. It is noted that most laboratories do this calculation and report BaP_{TEQ}. This process has been followed using the data collected for the DSI as presented in **Table 6-1** in the following section.

It is recommended the RBC for future residents (including short-stay children) and grounds keepers is applicable to soils at the surface to approximately 0.5 mbgs as potential exposures to this soil is considered to be the most sensitive of those scenarios evaluated in this HRA. Maintenance and construction workers may be exposed to soils at depths 0.5 mbgs or greater therefore the RBC for maintenance workers would be the most applicable.

6. Risk Characterisation

The assessment of potential health risks associated with PAHs identified in shallow soils at the site to 0.5 mbgs, has been conducted based on comparison of the retirement village residential RBC and short-stay child resident to the reported carcinogenic PAH concentrations in the DSI investigations, as summarised in Section 2.2.

The calculated maximum and 95% UCL BaP_{TEQ} concentrations for carcinogenic PAHs in surface soils to 0.5 mbgs and the derived RBC for future retirement village residents and short-stay child residents, are presented in **Table 6-1**.

Table 6-1: BaP_{TEQ} concentrations in surface soils to 0.5 m and comparison with BaP_{TEQ} RBC for future retirement village residents

Receptor	**RBC** [mg/kg]	Soil concentration range of **BaPTEQ** 0.0 – 0.5 mbgs [mg/kg]	**95% UCL soil** concentration **BaP_{EQ}** [mg/kg]
Retirement village resident RBC: BaP_{TEQ} (mg/kg)	**52**	<0.6 **– 45** (1)	12.5
Child – short stay resident BaP_{TEQ} (mg/kg)	**20**		

1. Two exceedances of the RBC noted

A comparison of the RBC derived to be protective of future retirement village residents (including short stay child residents) with reported BaP_{TEQ} concentrations in soils to 0.5mbgs in the recent investigations has been undertaken. This indicates the carcinogenic PAH concentrations are below the risk-based concentration for BaP_{TEQ} in all locations with the exception of four samples: BH1_0.0-0.2 (40 mg/kg), BH17B_0.0-0.2 (23 mg/kg), BH19_0.0-0.2 (29 mg/kg) and BH21_0.0-0.2 (45 mg/kg). A comparison of the retirement village resident and short stay child residential RBC with the calculated 95% UCL BaP_{TEQ} concentration in soils to 0.5 mbgs indicates the carcinogenic PAH concentrations are well below the risk-based concentration for BaP_{TEQ}.

Whilst four individual locations exceeded the RBC for children, the potential exposures to retirement village residents and short-stay child residents are likely to be minimal as exceedances are located at two isolated locations in the north-east corner of the site, which are potentially within private open space areas, one location in the central area of the site within the footprint of the proposed buildings and one location near the central southern site boundary in the area of the proposed hardstand driveway.

The 95% UCL concentration is considered to be a more reasonable basis for overall exposures to future residents (including short-stay children) and the potential risk to these residents is considered to be low and acceptable, based on the available data, assumptions and exposure modelling.

The assessment of potential health risks to grounds keepers, maintenance workers and construction workers, associated with PAHs identified in soils below 0.5mbgs, has been conducted based on comparison of the derived RBC for those workers.

The maximum reported concentrations for the carcinogenic PAHs, and the calculated BaP_{TEQ} concentration in soils below 0.5 mbgs, are presented in **Table 6-2**.

Table 6-2: Determination of BaP_{TEQ} concentrations in soils and comparison with RBC for future maintenance and construction workers.

Receptor population	RBC [mg/kg]	Soil concentration range of BaP_{TEQ} [mg/kg] > 0.5 mbgs	95% UCL soil concentration BaP_{TEQ} [mg/kg] > 0.5 mbgs
Grounds keeper RBC: BaP_{TEQ}	**57**	0.6 – 5.7	1.54
Maintenance RBC: BaP_{TEQ}	**270**		
Construction RBC: BaP_{TEQ}	**1,000**		

A comparison of the RBC derived to be protective of future workers with the maximum reported BaP_{TEQ} concentration in soils >0.5 mbgs in the recent DSI investigations indicates the carcinogenic PAH concentrations are below the BaP_{TEQ} risk-based concentration for future maintenance and grounds keeping and as well as sub-surface construction works. Potential exposures to future workers are therefore considered to be acceptable based on the assumptions on the available data, exposure assumptions and exposure modelling.

7. Uncertainty Assessment

Risk assessments require a number of assumptions regarding site conditions, human exposure and chemical toxicity. Even though site-specific parameters were included (e.g. analytical data, development plans), it is not possible to fully describe site conditions and human activities at the site for the entire period of time considered in the risk assessment (i.e. 35 years for a recreational setting). The assumptions considered for this risk assessment were generally conservative in nature, to account for uncertainty and variability in the parameter estimates and to protect public health by providing a deliberate margin of safety. A qualitative appraisal of key uncertainties associated with this risk assessment has been presented below.

Toxicity parameters

- The toxicity criteria (for carcinogenic chemicals) used in this assessment are regarded as conservative, given that safety factors which add a level of conservatism (typically several orders of magnitude) are applied so as to take into account uncertainties related to data extrapolation. The toxicity criteria for the BaP is in accordance with Australian guidance. It is noted the toxicity criteria adopted by international environmental agencies for BaP does vary based on the studies reviewed and their policies and methods used. The NEPM adopted the 2011 WHO slope factor published for BaP. Whilst other approaches have been adopted by some international agencies, the MfE (2011) was not adopted as the method was not consistent with the National Health Medical Research Council.

Exposure assumptions

- A number of conservative exposure assumptions have been adopted in the risk assessment. For the seniors residential setting, it was assumed that the same individual would be exposed to the same analyte concentration (i.e. no degradation) for 21 hour/day, 365 days/year for 20 years. When combined, the various exposure parameters deliberately overestimate the most likely exposure.
- It has been assumed that the permanent residents at the facility are adults only. Chronic exposures to children and adolescents have been considered on the assumption that these receptors will only be short-stay residents (i.e. up to 6 months per year).
- It has been assumed that the limited private open space area for each apartment will not be sufficient to support a substantial home grown produce garden (i.e. < 5% of total annual vegetable and fruit consumption rate). It is also been assumed that ‘clean’ imported fill will be used to construct home produce gardens. As such we have not considered exposures related to the consumption of home grown produce.

Soil access assumptions

- It was conservatively assumed the surface of the landscaped areas of the site had no covering. It is considered likely that imported soil and mulch would be placed in landscaped areas which would minimise access to impacted soils and the generation of a dust from these soils.

COPC concentrations

- The 95% UCL concentration of carcinogenic PAHs reported at in surface soils to 0.5 mbgs at the area has been utilised for comparison with the derived RBC.

Bioavailability

- The bioavailability of PAHs in soil at the site was assumed to be 100%. This is considered to be a conservative assumption as it is generally acknowledged that not all the PAH present in soil would be available for absorption into the body (NEPM, 2013).

Taken as a whole, the assumptions used in the risk assessment are considered to be conservative and tend to adopt the Precautionary Principle (enHealth, 2012a) in estimating risk. The risk assessment presents conditional estimates based on a number of assumptions regarding exposure and toxicity. Thus, it is necessary to specify the assumptions in the risk assessment to place the risk estimates into perspective. Risk assessment methodologies reflect an iterative process of development and as such it should be recognised that this exposure assessment and risk assessment are based on existing methodologies and their limitations which may be subject to change.

8. Conclusion

The site-specific risk-based criteria (RBC) for carcinogenic PAHs in soil were derived to be protective of future exposures to the more sensitive users of the site. Based on available data, exposure assumptions and constraints of the exposure assessment model, the calculated 95% UCL concentration of carcinogenic PAHs in:

- Surficial soils to 0.5 mbgs at the site are below the derived retirement village residential RBC and short-stay child resident RBC for BaP_{TEQ} and, therefore, the potential health risks to future residents (including short-stay children) at the site to residual PAH impact in soils is considered low and acceptable; and
- Soils deeper than 0.5 mbgs were below the BaP_{TEQ} RBC for grounds keepers, maintenance workers and construction workers, therefore, the potential health risks to future workers is considered low and acceptable.

A Tier 1 evaluation of Total PAH concentrations (relating to the non-carcinogenic PAHs) measured across the site were below the NEPM health screening criteria. Further, the concentration of both carcinogenic and total PAHs across the site were below the NEPM health screening criteria relevant to future commercial works on the site.

The process for deriving the RBC conservatively assumed the bioavailability of PAHs in soils was 100 percent and that all landscaped areas where potentially exposed and not covered by any surface covering that would prevent or minimise direct contact. Whilst the 95% UCL concentration of carcinogenic PAHs was below the derived RBCs, four individual locations exceeded the short-stay child residential RBC. One of these locations is in the central area of the site within the footprint of the proposed buildings and on locations is near the central southern site boundary in the area of the proposed hardstand driveway. Two isolated locations are in the north-east corner of the site, which are potentially within private open space areas.

As a precautionary measure it is recommended that the landscaping in this area includes the placement of 0.5m of clean soil and/or mulch to minimise access to the impacted soil by residents.

It is recommended all subsurface works are managed via a site specific EMP in order to mitigate potentially impacted soils being brought to the surface where cross contamination or residential exposures may occur.

The derivation of risk-based criteria in this HHRA has been limited to addressing the impacts of selected substances, to an assumed receptor population under specific exposure scenarios, based on information available at the time of the assessment. The risk assessment approach presented does not consider a fully probabilistic estimate of risk, but presents conditional estimates based on a number of assumptions regarding exposure and toxicity consistent with the nationally endorsed regulatory approach. Further assessments would be required to assess risk where site uses vary from the assumed site conditions and/or exposure settings used in this risk assessment

All findings and conclusions presented in this report must be read in conjunction with the attached ‘Important information about your Coffey environmental report’ provided as Appendix A.

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Appendix A - Important information about your Coffey report

Important information about your Coffey Environmental Report

1 Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

2 Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination posed in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

3 Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

4 Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

5 Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

6 Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

7 Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

8 Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

9 Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

Appendix B – Tabulated soil data

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

											Field_ID	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0
											LocCode	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0
											Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0
											Sampled_Date-Time	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay									
Heavy Metal	Arsenic	mg/kg	2	100	500		100					8.9	46	2.6	3.4	3.8	3.6	11	4.5	3.4
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.7	<0.4	<0.4
	Chromium	mg/kg	5				480					25	27	<5	20	8	5.8	15	5.6	<5
	Copper	mg/kg	5	6000	30000		100					66	1500	<5	28	<5	9.3	330	<5	<5
	Iron	mg/kg	20									-	-	4200	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	0.42	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					85	660	5.3	78	21	30	320	9.7	<5
	Mercury	mg/kg	0.1	40	120							0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					95	45	<5	15	<5	<5	18	<5	<5
	Zinc	mg/kg	5	7400	60000		260					72	280	16	130	24	74	890	34	20
Inorganic	% Clay	%	1									-	-	17	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									23	27	24	15	27	24	28	23	22
	pH (Lab)	pH_Units	0.1									-	-	4.2	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<500	<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<1000	120	<100	<100	<100	<100	<100	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<500	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<1000	120	<100	<100	<100	<100	<100	<100	<100
	C34-C40	mg/kg	100			10000						<1000	<100	<100	<100	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									32	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									23	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									40	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							40	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									40	1.7	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									16	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									24	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									23	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									54	1.6	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	Fluorene	mg/kg	0.5									1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									15	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									56	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									55	1.3	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							345.6	8.3	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									<200	<20	<20	<20	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50									<500	75	<50	<50	<50	<50	<50	<50	<50
	C29 - C36	mg/kg	50									<500	55	<50	<50	<50	<50	<50	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50									<500	130	<50	<50	<50	<50	<50	<50	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteria for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay									
											Field_ID	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0	BH6_1.8-2.0
											LocCode	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0	BH6_1.8-2.0
											Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0
											Sampled_Date-Time	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					8.6	2.8	8.8	6.4	4.3	3.7	12	3.6	2.6
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	<0.4	0.5	<0.4	<0.4	0.5	<0.4	<0.4
	Chromium	mg/kg	5				480					29	6.6	5.6	17	11	<5	32	7	6.2
	Copper	mg/kg	5	6000	30000		100					110	5.6	<5	79	15	7.9	140	<5	<5
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					440	28	18	470	110	43	970	13	28
	Mercury	mg/kg	0.1	40	120							0.2	<0.1	<0.1	0.3	0.1	<0.1	0.5	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					30	<5	<5	19	<5	<5	41	<5	<5
	Zinc	mg/kg	5	7400	60000		260					260	22	30	430	110	70	540	13	20
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									24	26	23	15	28	26	24	27	29
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	51.1	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	<100	<100	1022	130	160	280	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	52	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<100	<100	<100	740	130	160	280	<100	<100
	C34-C40	mg/kg	100			10000						<100	<100	<100	230	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	0.9	<0.5	0.5	0.6	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	2.1	0.6	1.1	1.4	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	11	1.9	3.5	5.3	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	6.8	1.3	2.4	3.4	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	11	1.8	3.3	5.7	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	11	2	3.5	5.7	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	11	2.3	3.8	5.7	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	2.6	<0.5	0.9	1.8	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	7.6	1.1	2.3	3.6	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	8.5	1.4	2.7	4	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	5	0.9	1.6	3.1	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.9	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									0.6	<0.5	<0.5	19	5.2	9.2	12	<0.5	<0.5
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.6	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	2.7	0.5	1	1.6	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	12	2.1	5.4	6.7	<0.5	<0.5
	Pyrene	mg/kg	0.5									0.6	<0.5	<0.5	17	3.4	6.2	10	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							1.2	<0.5	<0.5	98.2	18.4	36.8	55	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									<20	<20	<20	28	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50									<50	<50	<50	500	110	150	210	<50	<50
	C29 - C36	mg/kg	50									<50	<50	<50	310	<50	<50	100	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50									<50	<50	<50	838	110	150	310	<50	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0
											Field_ID	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0
											LocCode	BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0
											Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0
											Sampled_Date-Time	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					9.5	4.1	<2	14	2.8	39	18	5.2
	Cadmium	mg/kg	0.4	20	150							0.5	<0.4	<0.4	7.2	<0.4	<0.4	43	<0.4
	Chromium	mg/kg	5				480					24	11	<5	42	<5	<5	20	8.5
	Copper	mg/kg	5	6000	30000		100					150	38	<5	630	5.4	5.5	120	<5
	Iron	mg/kg	20									-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					310	46	<5	2100	15	19	1800	16
	Mercury	mg/kg	0.1	40	120							0.2	<0.1	<0.1	0.2	<0.1	<0.1	0.3	<0.1
	Nickel	mg/kg	5	400	1200		370					23	<5	<5	88	<5	<5	24	<5
	Zinc	mg/kg	5	7400	60000		260					340	50	9	1300	21	81	240	32
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									18	27	30	32	31	22	11	32
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	96	<50	<50	300	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									590	<100	<100	5596	<100	700	7500	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	96	<50	<50	300	<50
	C16-C34	mg/kg	100			3500						480	<100	<100	3700	<100	460	4400	<100
	C34-C40	mg/kg	100			10000						110	<100	<100	1800	<100	240	2800	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									1.4	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									3.7	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									11	<0.5	<1	0.6	<0.5	<0.5	0.6	<0.5
	Benzo(a)pyrene	mg/kg	0.5									6.5	<0.5	<1	0.8	<0.5	<0.5	0.6	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									11	<0.5	<1	1	<0.5	<0.5	0.9	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							11	0.6	1.2	1.3	0.6	0.6	1.1	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									11	1.2	2.4	1.6	1.2	1.2	1.4	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									2.6	<0.5	<1	0.9	<0.5	<0.5	0.7	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									6.9	<0.5	<1	<0.5	<0.5	<0.5	0.8	<0.5
	Chrysene	mg/kg	0.5									8.4	<0.5	<1	0.6	<0.5	<0.5	0.7	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									6.5	<0.5	<1	0.8	<0.5	<0.5	1.1	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									1.4	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									21	<0.5	<1	1.3	<0.5	<0.5	1.5	<0.5
	Fluorene	mg/kg	0.5									1.3	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									2.9	<0.5	<1	0.6	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	<0.5
	Phenanthrene	mg/kg	0.5									11	<0.5	<1	<0.5	<0.5	<0.5	1	<0.5
	Pyrene	mg/kg	0.5									17	<0.5	<1	1.1	<0.5	<0.5	1.8	<0.5
	Total PAHs	mg/kg	0.5	300	400							102.1	<0.5	<1	6.7	<0.5	<0.5	9.4	<0.5
TPH	C10 - C14	mg/kg	20									<20	<20	<20	71	<20	<20	170	<20
	C15 - C28	mg/kg	50									360	<50	<50	1700	<50	230	2000	<50
	C29 - C36	mg/kg	50									160	<50	<50	2600	<50	270	3800	<50
	C10 - C36 (Sum of total)	mg/kg	50									520	<50	<50	4371	<50	500	5970	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.5	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Coffey DSI-

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay								
											Field_ID	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
											LocCode	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
											Sample_Depth_Range	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2
											Sampled_Date-Time	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					2.7	4.8	5.1	2.5	6.9	5	3	3.8
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	<0.4	<0.4	1.2	<0.4	<0.4	0.6
	Chromium	mg/kg	5				480					<5	10	11	<5	170	10	12	10
	Copper	mg/kg	5	6000	30000		100					<5	43	29	<5	73	<5	17	120
	Iron	mg/kg	20									-	-	15,000	-	-	-	-	-
	Iron (%)	%	0.01									-	-	1.5	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					40	250	160	30	660	14	87	91
	Mercury	mg/kg	0.1	40	120							<0.1	1.2	0.7	<0.1	0.4	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					<5	10	8.5	<5	23	<5	5.9	15
	Zinc	mg/kg	5	7400	60000		260					24	130	140	24	560	19	57	120
Inorganic	% Clay	%	1									-	-	15	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									22	18	25	24	22	28	26	22
	pH (Lab)	pH_Units	0.1									-	-	6.9	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	470	<100	<100	1130	<100	290	390
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<100	180	<100	<100	630	<100	180	200
	C34-C40	mg/kg	100			10000						<100	290	<100	<100	500	<100	110	190
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	0.6	0.7	0.6	0.6	1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	1.2	1.3	1.2	1.2	1.3
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	0.8
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	0.7
	Total PAHs	mg/kg	0.5	300	400							<0.5	<0.5	<0.5	<0.5	3.2	<0.5	<0.5	2.1
TPH	C10 - C14	mg/kg	20									<20	<20	<20	<20	26	<20	<20	<20
	C15 - C28	mg/kg	50									<50	69	63	<50	260	<50	92	110
	C29 - C36	mg/kg	50									<50	170	<50	<50	450	<50	110	120
	C10 - C36 (Sum of total)	mg/kg	50									<50	239	63	<50	736	<50	202	230
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

												22-24.06.2020								
											Field_ID	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2
											LocCode	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2
											Sample_Depth_Range	0.8-1.0	1.8-2.0	0.0-0.2	0.0-0.2	0.2-0.4	0.8-1.0	1.4-1.6	1.8-2.0	0.0-0.2
											Sampled_Date-Time	23-Jun-20	22-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay									
Heavy Metal	Arsenic	mg/kg	2	100	500		100					4.8	7.1	4.7	6.9	14	4.6	3.6	<2	33
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	4.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480					9.4	<5	17	11	9	11	<5	<5	14
	Copper	mg/kg	5	6000	30000		100					19	<5	100	19	67	6.3	<5	<5	22
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					55	<5	280	13	120	18	53	53	39
	Mercury	mg/kg	0.1	40	120							<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.2
	Nickel	mg/kg	5	400	1200		370					5.5	<5	16	11	8.4	<5	<5	<5	6.8
	Zinc	mg/kg	5	7400	60000		260					37	18	220	49	360	26	14	5.9	51
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									22	20	20	10	14	33	37	36	9.3
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	2.2	0.7	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	180	<50	2298	<50	82	<50	61
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	<100	12,480	710	4800	100	182	<100	1071
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	24	34	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	180	<50	2300	<50	82	<50	61
	C16-C34	mg/kg	100			3500						<100	<100	7000	320	2500	100	100	<100	490
	C34-C40	mg/kg	100			10000						<100	<100	5300	390	<100	<100	<100	<100	520
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	24	34	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									<0.5	<0.5	0.9	<0.5	0.9	<0.5	<0.5	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							<0.5	<0.5	0.9	<0.5	9.6	<0.5	<0.5	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									<20	<20	72	<20	1000	23	39	<20	33
	C15 - C28	mg/kg	50									<50	<50	3000	120	3800	63	140	<50	240
	C29 - C36	mg/kg	50									<50	<50	<50	270	87	100	<50	<50	360
	C10 - C36 (Sum of total)	mg/kg	50									<50	<50	3072	390	4887	186	179	<50	633
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3		
		110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0	BH17B_0.0-0.3	BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3
											LocCode	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0	BH17B_0.0-0.3	BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3
											Sample_Depth_Range	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	2.2-2.3
											Sampled_Date-Time	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					5.7	4.7	4.9	2.6	6.1	3.6	3.5	4.3	<2
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480					9.6	9.5	14	14	10	19	13	7.1	<5
	Copper	mg/kg	5	6000	30000		100					6.8	9	520	5.4	38	17	<5	<5	<5
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					34	36	460	21	110	14	19	230	16
	Mercury	mg/kg	0.1	40	120							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					<5	<5	13	<5	<5	72	<5	<5	<5
	Zinc	mg/kg	5	7400	60000		260					21	24	530	23	51	50	13	7.2	<5
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									33	30	13	32	31	8.9	36	31	21
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	<50	<50	<500	<50	58	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	180	<200
	C10 - C40 (Sum of total)	mg/kg	100									<100	<100	130	<100	<100	1200	<100	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	160	140
	C10-C16	mg/kg	50			1000						<50	<50	<50	<50	<50	<500	<50	58	<50
	C16-C34	mg/kg	100			3500						<100	<100	130	<100	<100	1200	<100	<100	<100
	C34-C40	mg/kg	100			10000						<100	<100	<100	<100	<100	<1000	<100	<100	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	26	250	290
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	3.6	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	0.6	<0.5	5.9	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	14	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	23	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	0.6	0.6	23	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	1.2	1.2	23	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	8.4	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	12	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	11	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	4.7	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	20	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	7.7	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2	1.7
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	3.5	<0.5	12	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	0.5	<0.5	22	<0.5	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							<0.5	<0.5	<0.5	4.6	<0.5	148.8	<0.5	2	1.7
TPH	C10 - C14	mg/kg	20									<20	<20	<20	<20	<20	<200	<20	91	34
	C15 - C28	mg/kg	50									<50	<50	86	<50	<50	740	<50	<50	<50
	C29 - C36	mg/kg	50									<50	<50	61	<50	<50	630	<50	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50									<50	<50	147	<50	<50	1370	<50	91	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.5	4.7	9.3
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	10	12
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.4	21	54
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2.8	44	53
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	15	21
	Xylene Total	mg/kg	0.3			110	310					<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	4.1	59	73

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

											Field_ID	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
											LocCode	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
											Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	0.0-0.2
											Sampled_Date-Time	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay									
Heavy Metal	Arsenic	mg/kg	2	100	500		100					32	2.6	4.8	27	6.4	3.8	2.8	11	5.2
	Cadmium	mg/kg	0.4	20	150							0.8	<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<0.4	1
	Chromium	mg/kg	5				480					17	11	5.3	11	11	<5	7.7	11	11
	Copper	mg/kg	5	6000	30000		100					1000	<5	68	470	17	24	8.3	<5	100
	Iron	mg/kg	20									-	-	-	-	-	11,000	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	1.1	-	-	-
	Lead	mg/kg	5	300	1200		1100					600	14	63	770	41	30	32	21	250
	Mercury	mg/kg	0.1	40	120							0.3	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	0.2
	Nickel	mg/kg	5	400	1200		370					54	<5	5.8	58	<5	<5	<5	<5	22
	Zinc	mg/kg	5	7400	60000		260					830	33	110	640	45	61	64	24	950
Inorganic	% Clay	%	1									-	-	-	-	-	17	-	-	-
	Moisture Content (dried @ 103°C)	%	1									18	29	27	18	31	24	10	32	12
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	4.1	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	4.6	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				94	<50	<50	205.4	<50	<50	<50	<50	58
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									2104	<100	<100	1940	<100	360	<100	<100	1018
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	22	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						94	<50	<50	210	<50	<50	<50	<50	58
	C16-C34	mg/kg	100			3500						1800	<100	<100	1500	<100	360	<100	<100	810
	C34-C40	mg/kg	100			10000						210	<100	<100	230	<100	<100	<100	<100	150
	C6 - C10	mg/kg	20			800						<20	<20	<20	22	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	4.9	<0.5	1.3	<0.5	<0.5	2.7
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	13	0.8	2.8	<0.5	<0.5	5.9
	Benzo(a)anthracene	mg/kg	0.5									0.5	<0.5	<0.5	31	1	5.5	<0.5	<0.5	27
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	17	0.6	3.1	<0.5	<0.5	29
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	28	0.8	4.4	<0.5	<0.5	45
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	28	1.1	4.6	0.6	0.6	45
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	28	1.4	4.9	1.2	1.2	45
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	8	<0.5	1.2	<0.5	<0.5	21
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	18	0.5	3.5	<0.5	<0.5	22
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	25	1	4.4	<0.5	<0.5	24
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	16	0.8	2.1	<0.5	<0.5	21
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	3.7	<0.5	<0.5	<0.5	<0.5	6.4
	Fluoranthene	mg/kg	0.5									1.1	<0.5	<0.5	98	2.2	15	1.1	<0.5	87
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	2.7	<0.5	1	<0.5	<0.5	1.8
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	9.3	<0.5	1.3	<0.5	<0.5	18
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	7.7	<0.5	1.1	<0.5	<0.5	0.7
	Phenanthrene	mg/kg	0.5									1	<0.5	<0.5	78	1.6	14	0.6	<0.5	46
	Pyrene	mg/kg	0.5									0.8	<0.5	<0.5	63	1.6	10	0.8	<0.5	73
	Total PAHs	mg/kg	0.5	300	400							3.4	<0.5	<0.5	395.3	10.1	66.3	2.5	<0.5	386.7
TPH	C10 - C14	mg/kg	20									62	<20	<20	120	<20	23	<20	<20	31
	C15 - C28	mg/kg	50									1200	<50	<50	1300	69	320	<50	<50	650
	C29 - C36	mg/kg	50									790	<50	<50	510	<50	77	<50	<50	350
	C10 - C36 (Sum of total)	mg/kg	50									2052	<50	<50	1930	69	420	<50	<50	1031
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

											Field_ID	BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4	SP1-5	SP1-6	SP1-7	SP1-8	SP1-9
											LocCode	BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4	SP1-5	SP1-6	SP1-7	SP1-8	SP1-9
											Sample_Depth_Range	0.8-1.0	1.3-1.5	0.5	0.4	1.0	0.5	0.3	0.5	0.8	0.6	1
											Sampled_Date-Time	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay											
Method_Type	ChemName	Units	EQL																			
Heavy Metal	Arsenic	mg/kg	2	100	500		100					3.7	3.2	8	7.5	6.5	8.5	7.2	9.9	12	8.9	15
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	1.4	1.7	1.8	3	2.1	2.3	15	2.9	3.6
	Chromium	mg/kg	5				480					8.6	7.4	33	21	21	34	22	38	45	20	27
	Copper	mg/kg	5	6000	30000		100					<5	38	280	220	180	500	360	230	570	270	390
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					15	40	880	1700	760	900	890	930	2500	1100	790
	Mercury	mg/kg	0.1	40	120							<0.1	<0.1	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
	Nickel	mg/kg	5	400	1200		370					<5	<5	27	27	26	36	28	28	80	39	37
	Zinc	mg/kg	5	7400	60000		260					25	110	660	690	630	930	640	860	1700	890	1100
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									31	30	16	18	13	10	14	17	23	17	18
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	<50	64	<50	<50	66	69	<50	54
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	130	2880	2980	3724	1830	2120	6066	2549	2450	1804
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	<50	64	<50	<50	66	69	<50	54
	C16-C34	mg/kg	100			3500						<100	130	2200	2700	2800	1400	1600	4500	1800	1900	1200
	C34-C40	mg/kg	100			10000						<100	<100	680	280	860	430	520	1500	680	550	550
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9
	Benzo(a)anthracene	mg/kg	0.5									<0.5	3.7	<0.5	0.8	1.3	0.8	0.5	0.6	0.6	<0.5	2.1
	Benzo(a)pyrene	mg/kg	0.5									<0.5	3.4	<0.5	0.7	1.1	0.8	0.7	0.9	0.6	<0.5	1.6
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	5.7	<0.5	0.9	1.5	1	0.8	1.1	0.7	<0.5	2.2
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	5.7	0.6	1.2	1.7	1.3	1.1	1.4	1	0.6	2.4
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	5.7	1.2	1.5	2	1.6	1.4	1.7	1.3	1.2	2.7
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	2.7	<0.5	0.8	1.1	0.7	<0.5	0.9	0.6	<0.5	0.9
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	3.4	<0.5	0.6	1.2	0.9	0.6	0.7	0.6	<0.5	1.2
	Chrysene	mg/kg	0.5									<0.5	3.1	<0.5	0.7	1.3	0.7	0.5	0.9	<0.5	<0.5	1.7
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	3.5	<0.5	<0.5	0.6	0.6	<0.5	0.6	<0.5	<0.5	1.2
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	9	0.7	1.5	1.8	1.3	0.8	1.4	0.7	0.6	4.6
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	2.4	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.8
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	4.5	<0.5	0.8	1.5	1.5	<0.5	1	0.5	<0.5	4.4
	Pyrene	mg/kg	0.5									<0.5	8.5	0.7	1.2	1.7	1.3	0.8	1.4	0.7	0.8	3.8
	Total PAHs	mg/kg	0.5	300	400							<0.5	46.2	1.4	7.1	12.2	9.3	3.9	8.4	4.3	1.4	23.2
TPH	C10 - C14	mg/kg	20									<20	<20	34	32	47	29	35	46	50	32	37
	C15 - C28	mg/kg	50									<50	86	1000	1200	1300	670	750	2100	830	890	610
	C29 - C36	mg/kg	50									<50	89	1400	1600	1800	870	1300	2800	1600	1200	810
	C10 - C36 (Sum of total)	mg/kg	50									<50	175	2434	2832	3147	1569	2085	4946	2480	2122	1457
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

																					Pacific
Field_ID												SP1-10	A	A	B	C	B-D*	D	E	E	F
LocCode												SP1-10	A	A	B	C	Duplicate of D	D	E	E	F
Sample_Depth_Range												0.8	0.3	2.1	0.7	0.9	-	0.7	0.6	2.7	0.3
Sampled_Date-Time												24-Jun-20	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18
Matrix_Description												Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay										
Heavy Metal	Arsenic	mg/kg	2	100	500		100					6.2	2.8	<2	7.8	5.7	7	5	6.2	4.6	5
	Cadmium	mg/kg	0.4	20	150							2.4	<0.4	<0.4	<0.4	<0.4	0.5	1.5	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480					15	9.3	<5	15	16	16	11	15	5.1	14
	Copper	mg/kg	5	6000	30000		100					200	12	<5	86	410	100	32	21	6.6	48
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					630	13	21	1900	420	1400	200	290	110	330
	Mercury	mg/kg	0.1	40	120							0.4	<0.1	<0.1	2	0.8	2.7	<0.1	0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					24	<5	<5	23	9.3	21	7.2	13	<5	14
	Zinc	mg/kg	5	7400	60000		260					550	39	18	520	1200	780	1500	85	9.6	190
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									14	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50					280				<50	-	-	-	-	-	-	-	-	-
	C6 - C9	mg/kg	20									<20	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100									2500	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	30	<20	<20	<20	<20	<40	<40	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	97	<50	<50	<50	<50	<50	130
	C16-C34	mg/kg	100			3500						1600	<100	<100	5900	460	10,000	<100	<100	<100	9300
	C34-C40	mg/kg	100			10000						900	<100	<100	910	130	1400	160	<100	<100	4000
	C6 - C10	mg/kg	20			800						<20	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5									0.7	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5									0.7	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									0.9	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.5	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5									0.6	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5									0.6	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5									0.8	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5									2	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5					5				<0.5	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5									1.3	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5									1.5	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	300	400							8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									36	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50									660	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50									1300	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50									1996	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	0.4	0.1	0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1									<0.1	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	0.6	0.6	<0.3	<0.6	<0.6	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

												Environmental July 2018 - June 2019											
	Field_ID											F	G	H	I	A	B	C	D	E	F	I	J**
	LocCode											F	G	H	I	A	B	C	D	E	F	I	Duplicate of I
	Sample_Depth_Range											2	0.6	0.6	0.4	-	-	-	-	-	-	-	-
	Sampled_Date-Time											26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19
	Matrix_Description											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay												
Heavy Metal	Arsenic	mg/kg	2	100	500		100					16	64	4.3	13	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	0.4	20	150							<0.4	0.9	<0.4	0.5	-	-	-	-	-	-	-	-
	Chromium	mg/kg	5				480					5	28	10	14	-	-	-	-	-	-	-	-
	Copper	mg/kg	5	6000	30000		100					26	4300	18	400	-	-	-	-	-	-	-	-
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					46	1100	23	470	380	620	150	89	170	460	550	660
	Mercury	mg/kg	0.1	40	120							<0.1	0.2	<0.1	0.9	-	-	-	-	-	-	-	-
	Nickel	mg/kg	5	400	1200		370					<5	52	<5	67	-	-	-	-	-	-	-	-
	Zinc	mg/kg	5	7400	60000		260					59	1600	70	950	-	-	-	-	-	-	-	-
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									-	-	-	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				-	-	-	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50					280				-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100									-	-	-	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<40	<20	<20	<20	<20	<20	<20	<20	<40	<40
	C10-C16	mg/kg	50			1000						<50	<50	<50	59	58	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<100	310	<100	370	400	170	390	<100	260	220	4700	3600
	C34-C40	mg/kg	100			10000						<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1600	1300
	C6 - C10	mg/kg	20			800						-	-	-	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							<0.5	1.4	<0.5	3.5	<0.5	1.3	1.3	1.3	11	4	3.2	1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5					5				-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	300	400							<0.5	1.1	<0.5	24.8	2	11.1	9.6	10.9	83.3	29.7	25.3	9.3
TPH	C10 - C14	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50									-	-	-	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50									-	-	-	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50									-	-	-	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
	Xylene (m & p)	mg/kg	0.2									-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1									-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	0.4	-	-	-	-

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Appendix C – ProUCL outputs

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.126/08/2020 4:16:33 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaP_TEQ <0.5m

General Statistics			
Total Number of Observations	40	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	0.6	Mean	5.258
Maximum	45	Median	1.1
SD	10.49	Std. Error of Mean	1.659
Coefficient of Variation	1.995	Skewness	2.809
Normal GOF Test			
Shapiro Wilk Test Statistic	0.512	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.358	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.052	95% Adjusted-CLT UCL (Chen-1995)	8.772
		95% Modified-t UCL (Johnson-1978)	8.175
Gamma GOF Test			
A-D Test Statistic	5.322	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.809	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.325	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.147	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.543	k star (bias corrected MLE)	0.519
Theta hat (MLE)	9.678	Theta star (bias corrected MLE)	10.13
nu hat (MLE)	43.46	nu star (bias corrected)	41.53
MLE Mean (bias corrected)	5.258	MLE Sd (bias corrected)	7.297
		Approximate Chi Square Value (0.05)	27.76
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	27.34
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	7.865	95% Adjusted Gamma UCL (use when n<50)	7.987
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.25	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.139	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	-0.511	Mean of logged Data	0.505
Maximum of Logged Data	3.807	SD of logged Data	1.333

Assuming Lognormal Distribution			
95% H-UCL	7.361	90% Chebyshev (MVUE) UCL	6.952
95% Chebyshev (MVUE) UCL	8.346	97.5% Chebyshev (MVUE) UCL	10.28
99% Chebyshev (MVUE) UCL	14.08		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs			
95% CLT UCL	7.986	95% Jackknife UCL	8.052
95% Standard Bootstrap UCL	7.9	95% Bootstrap-t UCL	9.358
95% Hall's Bootstrap UCL	8.74	95% Percentile Bootstrap UCL	8.14
95% BCA Bootstrap UCL	8.883		
90% Chebyshev(Mean, Sd) UCL	10.23	95% Chebyshev(Mean, Sd) UCL	12.49
97.5% Chebyshev(Mean, Sd) UCL	15.61	99% Chebyshev(Mean, Sd) UCL	21.76

Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	12.49		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BaP_TEQ>0.5m

General Statistics			
Total Number of Observations	55	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.6	Mean	0.964
Maximum	5.7	Median	0.6
SD	0.981	Std. Error of Mean	0.132
Coefficient of Variation	1.018	Skewness	3.527

Normal GOF Test		
Shapiro Wilk Test Statistic	0.444	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.426	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.119	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.185	95% Adjusted-CLT UCL (Chen-1995)	1.248
		95% Modified-t UCL (Johnson-1978)	1.195

Gamma GOF Test			
A-D Test Statistic	12.12	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.459	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.121	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.412	k star (bias corrected MLE)	2.293
Theta hat (MLE)	0.4	Theta star (bias corrected MLE)	0.42
nu hat (MLE)	265.3	nu star (bias corrected)	252.2
MLE Mean (bias corrected)	0.964	MLE Sd (bias corrected)	0.636
		Approximate Chi Square Value (0.05)	216.4
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	215.5
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	1.123	95% Adjusted Gamma UCL (use when n<50)	1.128
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.535	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.459	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.119	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.511	Mean of logged Data	-0.258
Maximum of Logged Data	1.74	SD of logged Data	0.549
Assuming Lognormal Distribution			
95% H-UCL	1.036	90% Chebyshev (MVUE) UCL	1.106
95% Chebyshev (MVUE) UCL	1.202	97.5% Chebyshev (MVUE) UCL	1.335
99% Chebyshev (MVUE) UCL	1.596		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.181	95% Jackknife UCL	1.185
95% Standard Bootstrap UCL	1.181	95% Bootstrap-t UCL	1.343
95% Hall's Bootstrap UCL	1.295	95% Percentile Bootstrap UCL	1.207
95% BCA Bootstrap UCL	1.278		
90% Chebyshev(Mean, Sd) UCL	1.36	95% Chebyshev(Mean, Sd) UCL	1.54
97.5% Chebyshev(Mean, Sd) UCL	1.79	99% Chebyshev(Mean, Sd) UCL	2.28
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	1.54		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

PAHs<0.5m

General Statistics			
Total Number of Observations	40	Number of Distinct Observations	30
		Number of Missing Observations	0
Minimum	0.5	Mean	45.39
Maximum	395.3	Median	6.9
SD	101	Std. Error of Mean	15.98
Coefficient of Variation	2.226	Skewness	2.853
Normal GOF Test			
Shapiro Wilk Test Statistic	0.493	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	72.3	95% Adjusted-CLT UCL (Chen-1995)	79.36
		95% Modified-t UCL (Johnson-1978)	73.5
Gamma GOF Test			
A-D Test Statistic	2.543	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.849	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.239	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.151	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.34	k star (bias corrected MLE)	0.331
Theta hat (MLE)	133.7	Theta star (bias corrected MLE)	137.2
nu hat (MLE)	27.16	nu star (bias corrected)	26.46
MLE Mean (bias corrected)	45.39	MLE Sd (bias corrected)	78.92
		Approximate Chi Square Value (0.05)	15.73
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	15.42
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	76.32	95% Adjusted Gamma UCL (use when n<50)	77.86
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.139	Data appear Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.693	Mean of logged Data	1.825
Maximum of Logged Data	5.98	SD of logged Data	2.079
Assuming Lognormal Distribution			
95% H-UCL	196.9	90% Chebyshev (MVUE) UCL	111.5
95% Chebyshev (MVUE) UCL	141	97.5% Chebyshev (MVUE) UCL	182
99% Chebyshev (MVUE) UCL	262.5		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	71.66	95% Jackknife UCL	72.3
95% Standard Bootstrap UCL	71.49	95% Bootstrap-t UCL	88.62
95% Hall's Bootstrap UCL	71.36	95% Percentile Bootstrap UCL	72.19
95% BCA Bootstrap UCL	81.78		
90% Chebyshev(Mean, Sd) UCL	93.31	95% Chebyshev(Mean, Sd) UCL	115
97.5% Chebyshev(Mean, Sd) UCL	145.2	99% Chebyshev(Mean, Sd) UCL	204.3
Suggested UCL to Use			
97.5% Chebyshev (Mean, Sd) UCL	145.2		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Appendix D – Risk calculations

Derivation of Investigation Levels
Retirement village resident (Adult)

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Young children (0-5 years)	IR_{SC}	mg/day		25% of HIL A assumption, Schedule B7, Table 5
	- Adults	IR_{SA}	mg/day	12.5	25% of HIL A assumption, Schedule B7, Table 5
Surface Area of Skin	- Young children (0-5 years)	SA_C	cm^2/day		Schedule B7, Table 5
	- Adults	SA_A	cm^2/day	6300	Schedule B7, Table 5
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.5	Schedule B7, Table 5
Time Spent Outdoors		ETo	hours	1	Schedule B7, Table 5
Time Spent Indoors		ETi	hours	20	Schedule B7, Table 5
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	7.3E+10	Calculated for scenario, refer to Equations 19 and 20 and assumptions in Schedule B7
Indoor Air Dust Factor		PEFi	(m^3/kg)	2.6E+07	As per Equation 21 based assumptions presented in Schedule B7
Fraction of indoor dust comprised of outdoor soil		TF	-	0.5	Assume 50% soil concentration present in dust as noted in Schedule B7
Indoor Air-to-Soil Gas Attenuation Factor		α	-	0.1	Value adopted as discussed in Section 5.5 of Schedule B7
Body weight	- Young children (0-5 years)	BW_C	kg		Schedule B7, Table 5
	- Adults	BW_A	kg	70	Schedule B7, Table 5
Exposure Frequency		EF	days/year	365	Schedule B7, Table 5
Exposure Duration	- Young children (0-5 years)	ED_C	years		Schedule B7, Table 5
	- Adults	ED_A	years	20	Schedule B7, Table 5
Averaging Time (non-carcinogenic)		AT_T	days	ED*365	Calculated based on ED for each relevant age group, multiplied by 24 hours for the assessment of inhalation exposures
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

Non-Threshold Effects - Lifetime Exposures [young child and adult]

Compound	Toxicity Reference Value Oral (TRV_O) (mg/kg/day)$^{-1}$	GI Absorption (GAF) (unitless)	Non-Threshold Slope Factor Dermal (SFd) (mg/kg/day)$^{-1}$	Oral Bioavailability BA_O (%)	Dermal Absorption Factor (DAF) (unitless)		Toxicity Reference Value Inhalation (TRV_I) (mg/m^3)$^{-1}$		Target Risk (TR)	Pathway Specific HILs (mg/kg)			Soil Vapour HIL (mg/m^3) (eqns 13 and 14)	Derived Interim Soil Gas IL - Threshold (to 1 or 2 s.f.) (mg/m3)	Derived Soil HIL (not rounded) (mg/kg) (eqn 2 for relevant pathways)	Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)	Notes
										Soil Ingestion (eqns 4 and 5)	Dermal (eqns 7 and 8)	Dust (eqns 10 and 11)					
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	3.9E+02	6.0E+01	4.0E+04			52	**50**	1

Based on aged soil impact (MfE 2011)

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

1 Refer to Appendix A for discussion on different calculations conducted for benzo(a)pyrene and basis for HIL adopted

Derivation of Investigation Levels
Child - Short stay resident

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Young children (0-5 years)	IR_{SC}	mg/day	25	50% of HIL A assumption, Schedule B7, Table 5
Surface Area of Skin	- Young children (0-5 years)	SA_C	cm^2/day	2700	As per enHealth (2012)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.5	Schedule B7, Table 5
Time Spent Outdoors		ETo	hours	1	Schedule B7, Table 5
Time Spent Indoors		ETi	hours	20	Schedule B7, Table 5
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	2.6E+07	As per Equation 21 based assumptions presented in Schedule B7
Body weight	- Young children (0-5 years)	BW_C	kg	15	Schedule B7, Table 5
Exposure Frequency		EF	days/year	180	Schedule B7, Table 5
Exposure Duration	- Young children (0-5 years)	ED_C	years	6	Schedule B7, Table 5
Averaging Time (non-carcinogenic)		AT_T	days	ED*365	Calculated based on ED for each relevant age group, multiplied by 24 hours for the assessment of inhalation exposures
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

Non-Threshold Effects - Lifetime Exposures [young child and adult]

Compound	Toxicity Reference Value Oral (TRV_O) (mg/kg/day)$^{-1}$	GI Absorption (GAF) (unitless)	Non-Threshold Slope Factor Dermal (SFd) (mg/kg/day)$^{-1}$	Oral Bioavailability BA_O (%)	Dermal Absorption Factor (DAF) (unitless)		Toxicity Reference Value Inhalation (TRV_I) (mg/m^3)$^{-1}$		Target Risk (TR)	Pathway Specific HILs (mg/kg): Soil Ingestion (eqns 4 and 5)	Dermal (eqns 7 and 8)	Dust (eqns 10 and 11)	Soil Vapour HIL (mg/m^3) (eqns 13 and 14)	Derived Interim Soil Gas IL - Threshold (to 1 or 2 s.f.) (mg/m3)	Derived Soil HIL (not rounded) (mg/kg) (eqn 2 for relevant pathways)	Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)	Notes
benzo(a)pyrene	0.5	1	0.5	100%	0.06		1.43E-01		1E-05	2.8E+02	8.8E+01	4.7E+04			66.9	**70**	1
benzo(a)pyrene (Early-Life)	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	5.3E+01	3.8E+01	1.7E+04			22.1	**20**	1

Based on aged soil impact (MfE 2011)

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

1 Refer to Appendix A for discussion on different calculations conducted for benzo(a)pyrene and basis for HIL adopted

Derivation of risk-based criteria:
Grounds Keepers

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Adults	IR_{SA}	mg/day	330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
Surface Area of Skin	- Adults	SA_A	cm^2/day	6800	Based on 34% total skin area of 20000 cm^2 exposed (Friebel & Nadebaum, 2011)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012)
Time Spent Outdoors		ETo	hours	8	Based on an 8 hour work day
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
Body weight	- Adults	BW_C	kg	78	enHealth (2012) based on average adult body weight (over 18yo male and female)
Exposure Frequency		EF	days/year	48	Based on 1 day for 48 weeks per year
Exposure Duration	- Adults	ED_C	years	30	Schedule B7, Table 5
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

Non-Threshold Effects - Lifetime Exposures [adult]

Compound	Toxicity Reference Value Oral (TRV_O) (mg/kg/day)$^{-1}$	GI Absorption (GAF) (unitless)	Non-Threshold Slope Factor Dermal (SFd) (mg/kg/day)$^{-1}$	Oral Bioavailability BA_O (%)	Dermal Absorption Factor (DAF) (unitless)		Toxicity Reference Value Inhalation (TRV_I) (mg/m^3)$^{-1}$		Target Risk (TR)	Pathway Specific HILs (mg/kg)				Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)
										Soil Ingestion (eqns 4 and 5)	Dermal (eqns 7 and 8)	Dust (eqns 10 and 11)		
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	8.4E+01	1.7E+02	4.4E+06		**57**

Based on aged soil impact (MfE 2011)

Derivation of risk-based criteria:
Maintenance Workers

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Adults	IR_{SA}	mg/day	330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
Surface Area of Skin	- Adults	SA_A	cm^2/day	6800	Based on 34% total skin area of 20000 cm^2 exposed (Friebel & Nadebaum, 2011)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012)
Time Spent Outdoors		ETo	hours	8	Based on an 8 hour work day
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
Body weight	- Adults	BW_C	kg	78	enHealth (2012) based on average adult body weight (over 18yo male and female)
Exposure Frequency		EF	days/year	10	Based on 2 weeks per year
Exposure Duration	- Adults	ED_C	years	30	Schedule B7, Table 5
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

Non-Threshold Effects - Lifetime Exposures [adult]										Pathway Specific HILs (mg/kg)				
Compound	**Toxicity Reference Value Oral (TRV_O)** (mg/kg/day)$^{-1}$	**GI Absorption (GAF)** (unitless)	**Non-Threshold Slope Factor Dermal (SFd)** (mg/kg/day)$^{-1}$	**Oral Bioavailability BA_O (%)**	**Dermal Absorption Factor (DAF)** (unitless)		**Toxicity Reference Value Inhalation (TRV_I)** (mg/m^3)$^{-1}$		**Target Risk (TR)**	**Soil Ingestion** (eqns 4 and 5)	**Dermal** (eqns 7 and 8)	**Dust** (eqns 10 and 11)		**Derived Soil HIL (to 1 or 2 s.f.)** (mg/kg)
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	4.0E+02	8.3E+02	2.1E+07		**270**
					Based on aged soil impact (MfE 2011)									

Derivation of risk-based criteria: Construction Workers

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Adults	IR_{SA}	mg/day	330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
Surface Area of Skin	- Adults	SA_A	cm^2/day	6800	Based on 34% total skin area of 20000 cm^2 exposed (Friebel & Nadebaum, 2011)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012)
Time Spent Outdoors		ETo	hours	8	Based on an 8 hour work day
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
Body weight	- Adults	BW_C	kg	78	enHealth (2012) based on average adult body weight (over 18yo male and female)
Exposure Frequency		EF	days/year	80	Based on 4 month construction period
Exposure Duration	- Adults	ED_C	years	1	Based on 4 month construction period
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

Non-Threshold Effects - Lifetime Exposures [adult]

Compound	Toxicity Reference Value Oral (TRV_O) $(mg/kg/day)^{-1}$	GI Absorption (GAF) (unitless)	Non-Threshold Slope Factor Dermal (SFd) $(mg/kg/day)^{-1}$	Oral Bioavailability BA_O (%)	Dermal Absorption Factor (DAF) (unitless)		Toxicity Reference Value Inhalation (TRV_I) $(mg/m^3)^{-1}$		Target Risk (TR)	Pathway Specific HILs (mg/kg)				Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)
										Soil Ingestion (eqns 4 and 5)	Dermal (eqns 7 and 8)	Dust (eqns 10 and 11)		
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	1.5E+03	3.1E+03	7.9E+07		**1000**

Based on aged soil impact (MfE 2011)

Appendix A - Important information about your Coffey report

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Important information about your Coffey Environmental Report

1 Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

2 Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination posed in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

3 Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

4 Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

5 Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

6 Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

7 Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

8 Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

9 Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

Appendix B – Tabulated soil data

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0
											Field_ID	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0
											LocCode	BH1_0.0-0.2	BH1_0.8-1.0	BH1_1.8-2.0	BH2_0.0-0.2	BH2_0.8-1.0	BH2_1.8-2.0	BH3_0.0-0.2	BH3_0.8-1.0	BH3_1.8-2.0
											Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0
											Sampled_Date-Time	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					8.9	46	2.6	3.4	3.8	3.6	11	4.5	3.4
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.7	<0.4	<0.4
	Chromium	mg/kg	5				480					25	27	<5	20	8	5.8	15	5.6	<5
	Copper	mg/kg	5	6000	30000		100					66	1500	<5	28	<5	9.3	330	<5	<5
	Iron	mg/kg	20									-	-	4200	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	0.42	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					85	660	5.3	78	21	30	320	9.7	<5
	Mercury	mg/kg	0.1	40	120							0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					95	45	<5	15	<5	<5	18	<5	<5
	Zinc	mg/kg	5	7400	60000		260					72	280	16	130	24	74	890	34	20
Inorganic	% Clay	%	1									-	-	17	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									23	27	24	15	27	24	28	23	22
	pH (Lab)	pH_Units	0.1									-	-	4.2	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<500	<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<1000	120	<100	<100	<100	<100	<100	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<500	<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<1000	120	<100	<100	<100	<100	<100	<100	<100
	C34-C40	mg/kg	100			10000						<1000	<100	<100	<100	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									3.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									32	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									23	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									40	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							40	1.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									40	1.7	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									16	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									20	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									24	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									23	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									7.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									54	1.6	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	Fluorene	mg/kg	0.5									1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									15	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									56	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									55	1.3	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							345.6	8.3	<0.5	<0.5	<0.5	<0.5	1.2	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									<200	<20	<20	<20	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50									<500	75	<50	<50	<50	<50	<50	<50	<50
	C29 - C36	mg/kg	50									<500	55	<50	<50	<50	<50	<50	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50									<500	130	<50	<50	<50	<50	<50	<50	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0	BH6_1.8-2.0
											Field_ID	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0	BH6_1.8-2.0
											LocCode	BH4_0.0-0.2	BH4_0.8-1.0	BH4_1.8-2.0	BH5_0.0-0.2	BH5_0.8-1.0	BH5_1.8-2.0	BH6_0.0-0.2	BH6_0.8-1.0	BH6_1.8-2.0
											Sample_Depth_Range	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0
											Sampled_Date-Time	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20	22-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					8.6	2.8	8.8	6.4	4.3	3.7	12	3.6	2.6
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	<0.4	0.5	<0.4	<0.4	0.5	<0.4	<0.4
	Chromium	mg/kg	5				480					29	6.6	5.6	17	11	<5	32	7	6.2
	Copper	mg/kg	5	6000	30000		100					110	5.6	<5	79	15	7.9	140	<5	<5
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					440	28	18	470	110	43	970	13	28
	Mercury	mg/kg	0.1	40	120							0.2	<0.1	<0.1	0.3	0.1	<0.1	0.5	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					30	<5	<5	19	<5	<5	41	<5	<5
	Zinc	mg/kg	5	7400	60000		260					260	22	30	430	110	70	540	13	20
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									24	26	23	15	28	26	24	27	29
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	51.1	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	<100	<100	1022	130	160	280	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	52	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<100	<100	<100	740	130	160	280	<100	<100
	C34-C40	mg/kg	100			10000						<100	<100	<100	230	<100	<100	<100	<100	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	0.9	<0.5	0.5	0.6	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	2.1	0.6	1.1	1.4	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	11	1.9	3.5	5.3	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	6.8	1.3	2.4	3.4	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	11	1.8	3.3	5.7	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	11	2	3.5	5.7	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	11	2.3	3.8	5.7	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	2.6	<0.5	0.9	1.8	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	7.6	1.1	2.3	3.6	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	8.5	1.4	2.7	4	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	5	0.9	1.6	3.1	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.9	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									0.6	<0.5	<0.5	19	5.2	9.2	12	<0.5	<0.5
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.6	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	2.7	0.5	1	1.6	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	12	2.1	5.4	6.7	<0.5	<0.5
	Pyrene	mg/kg	0.5									0.6	<0.5	<0.5	17	3.4	6.2	10	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							1.2	<0.5	<0.5	98.2	18.4	36.8	55	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									<20	<20	<20	28	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50									<50	<50	<50	500	110	150	210	<50	<50
	C29 - C36	mg/kg	50									<50	<50	<50	310	<50	<50	100	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50									<50	<50	<50	838	110	150	310	<50	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	Field_ID: BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0
	LocCode											BH7_0.0-0.2	BH7_0.8-1.0	BH7_1.8-2.0	BH8_0.0-0.2	BH8_0.8-1.0	BH8_1.8-2.0	BH9_0.0-0.2	BH9_0.8-1.0
	Sample_Depth_Range											0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0
	Sampled_Date-Time											23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
	Matrix_Description											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					9.5	4.1	<2	14	2.8	39	18	5.2
	Cadmium	mg/kg	0.4	20	150							0.5	<0.4	<0.4	7.2	<0.4	<0.4	43	<0.4
	Chromium	mg/kg	5				480					24	11	<5	42	<5	<5	20	8.5
	Copper	mg/kg	5	6000	30000		100					150	38	<5	630	5.4	5.5	120	<5
	Iron	mg/kg	20									-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					310	46	<5	2100	15	19	1800	16
	Mercury	mg/kg	0.1	40	120							0.2	<0.1	<0.1	0.2	<0.1	<0.1	0.3	<0.1
	Nickel	mg/kg	5	400	1200		370					23	<5	<5	88	<5	<5	24	<5
	Zinc	mg/kg	5	7400	60000		260					340	50	9	1300	21	81	240	32
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									18	27	30	32	31	22	11	32
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	96	<50	<50	300	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									590	<100	<100	5596	<100	700	7500	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	96	<50	<50	300	<50
	C16-C34	mg/kg	100			3500						480	<100	<100	3700	<100	460	4400	<100
	C34-C40	mg/kg	100			10000						110	<100	<100	1800	<100	240	2800	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									1.4	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									3.7	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									11	<0.5	<1	0.6	<0.5	<0.5	0.6	<0.5
	Benzo(a)pyrene	mg/kg	0.5									6.5	<0.5	<1	0.8	<0.5	<0.5	0.6	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									11	<0.5	<1	1	<0.5	<0.5	0.9	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							11	0.6	1.2	1.3	0.6	0.6	1.1	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									11	1.2	2.4	1.6	1.2	1.2	1.4	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									2.6	<0.5	<1	0.9	<0.5	<0.5	0.7	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									6.9	<0.5	<1	<0.5	<0.5	<0.5	0.8	<0.5
	Chrysene	mg/kg	0.5									8.4	<0.5	<1	0.6	<0.5	<0.5	0.7	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									6.5	<0.5	<1	0.8	<0.5	<0.5	1.1	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									1.4	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									21	<0.5	<1	1.3	<0.5	<0.5	1.5	<0.5
	Fluorene	mg/kg	0.5									1.3	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									2.9	<0.5	<1	0.6	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				0.5	<0.5	<1	<0.5	<0.5	<0.5	0.6	<0.5
	Phenanthrene	mg/kg	0.5									11	<0.5	<1	<0.5	<0.5	<0.5	1	<0.5
	Pyrene	mg/kg	0.5									17	<0.5	<1	1.1	<0.5	<0.5	1.8	<0.5
	Total PAHs	mg/kg	0.5	300	400							102.1	<0.5	<1	6.7	<0.5	<0.5	9.4	<0.5
TPH	C10 - C14	mg/kg	20									<20	<20	<20	71	<20	<20	170	<20
	C15 - C28	mg/kg	50									360	<50	<50	1700	<50	230	2000	<50
	C29 - C36	mg/kg	50									160	<50	<50	2600	<50	270	3800	<50
	C10 - C36 (Sum of total)	mg/kg	50									520	<50	<50	4371	<50	500	5970	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.5	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Coffey DSI-

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
											Field_ID	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
											LocCode	BH9_1.8-2.0	BH10_0.0-0.2	BH10_0.8-1.0	BH10_1.8-2.0	BH11_0.0-0.2	BH11_0.8-1.0	BH11_1.8-2.0	BH12_0.0-0.2
											Sample_Depth_Range	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2
											Sampled_Date-Time	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					2.7	4.8	5.1	2.5	6.9	5	3	3.8
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	<0.4	<0.4	1.2	<0.4	<0.4	0.6
	Chromium	mg/kg	5				480					<5	10	11	<5	170	10	12	10
	Copper	mg/kg	5	6000	30000		100					<5	43	29	<5	73	<5	17	120
	Iron	mg/kg	20									-	-	15,000	-	-	-	-	-
	Iron (%)	%	0.01									-	-	1.5	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					40	250	160	30	660	14	87	91
	Mercury	mg/kg	0.1	40	120							<0.1	1.2	0.7	<0.1	0.4	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					<5	10	8.5	<5	23	<5	5.9	15
	Zinc	mg/kg	5	7400	60000		260					24	130	140	24	560	19	57	120
Inorganic	% Clay	%	1									-	-	15	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									22	18	25	24	22	28	26	22
	pH (Lab)	pH_Units	0.1									-	-	6.9	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	470	<100	<100	1130	<100	290	390
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<100	180	<100	<100	630	<100	180	200
	C34-C40	mg/kg	100			10000						<100	290	<100	<100	500	<100	110	190
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	0.6	0.7	0.6	0.6	1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	1.2	1.3	1.2	1.2	1.3
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	0.8
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	0.7
	Total PAHs	mg/kg	0.5	300	400							<0.5	<0.5	<0.5	<0.5	3.2	<0.5	<0.5	2.1
TPH	C10 - C14	mg/kg	20									<20	<20	<20	<20	26	<20	<20	<20
	C15 - C28	mg/kg	50									<50	69	63	<50	260	<50	92	110
	C29 - C36	mg/kg	50									<50	170	<50	<50	450	<50	110	120
	C10 - C36 (Sum of total)	mg/kg	50									<50	239	63	<50	736	<50	202	230
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

22-24.06.2020

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2
												Field_ID								
											LocCode	BH12_0.8-1.0	BH12_1.8-2.0	BH13_0.0-0.2	BH14_0.0-0.2	BH14_0.2-0.4	BH14_0.8-1.0	BH14_1.4-1.6	BH14_1.8-2.0	BH15_0.0-0.2
											Sample_Depth_Range	0.8-1.0	1.8-2.0	0.0-0.2	0.0-0.2	0.2-0.4	0.8-1.0	1.4-1.6	1.8-2.0	0.0-0.2
											Sampled_Date-Time	23-Jun-20	22-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					4.8	7.1	4.7	6.9	14	4.6	3.6	<2	33
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	4.2	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480					9.4	<5	17	11	9	11	<5	<5	14
	Copper	mg/kg	5	6000	30000		100					19	<5	100	19	67	6.3	<5	<5	22
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					55	<5	280	13	120	18	53	53	39
	Mercury	mg/kg	0.1	40	120							<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.2
	Nickel	mg/kg	5	400	1200		370					5.5	<5	16	11	8.4	<5	<5	<5	6.8
	Zinc	mg/kg	5	7400	60000		260					37	18	220	49	360	26	14	5.9	51
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									22	20	20	10	14	33	37	36	9.3
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	2.2	0.7	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	180	<50	2298	<50	82	<50	61
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	<100	12,480	710	4800	100	182	<100	1071
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	24	34	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	180	<50	2300	<50	82	<50	61
	C16-C34	mg/kg	100			3500						<100	<100	7000	320	2500	100	100	<100	490
	C34-C40	mg/kg	100			10000						<100	<100	5300	390	<100	<100	<100	<100	520
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	24	34	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	2.1	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	2.9	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									<0.5	<0.5	0.9	<0.5	0.9	<0.5	<0.5	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							<0.5	<0.5	0.9	<0.5	9.6	<0.5	<0.5	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									<20	<20	72	<20	1000	23	39	<20	33
	C15 - C28	mg/kg	50									<50	<50	3000	120	3800	63	140	<50	240
	C29 - C36	mg/kg	50									<50	<50	<50	270	87	100	<50	<50	360
	C10 - C36 (Sum of total)	mg/kg	50									<50	<50	3072	390	4887	186	179	<50	633
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0	BH17B_0.0-0.2	BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3
LocCode												BH15_0.8-1.0	BH15_1.8-2.0	BH16_0.0-0.2	BH16_0.8-1.0	BH16_1.8-2.0	BH17B_0.0-0.2	BH17B_0.8-1.0	BH17B_1.8-2.0	BH17B_2.2-2.3
Sample_Depth_Range												0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	2.2-2.3
Sampled_Date-Time												23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20
Matrix_Description												Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					5.7	4.7	4.9	2.6	6.1	3.6	3.5	4.3	<2
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480					9.6	9.5	14	14	10	19	13	7.1	<5
	Copper	mg/kg	5	6000	30000		100					6.8	9	520	5.4	38	17	<5	<5	<5
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					34	36	460	21	110	14	19	230	16
	Mercury	mg/kg	0.1	40	120							<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					<5	<5	13	<5	<5	72	<5	<5	<5
	Zinc	mg/kg	5	7400	60000		260					21	24	530	23	51	50	13	7.2	<5
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									33	30	13	32	31	8.9	36	31	21
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	<50	<50	<500	<50	58	<50
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	180	<200
	C10 - C40 (Sum of total)	mg/kg	100									<100	<100	130	<100	<100	1200	<100	<100	<100
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	160	140
	C10-C16	mg/kg	50			1000						<50	<50	<50	<50	<50	<500	<50	58	<50
	C16-C34	mg/kg	100			3500						<100	<100	130	<100	<100	1200	<100	<100	<100
	C34-C40	mg/kg	100			10000						<100	<100	<100	<100	<100	<1000	<100	<100	<100
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	26	250	290
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	3.6	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	0.6	<0.5	5.9	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	14	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	23	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	0.6	0.6	23	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	1.2	1.2	23	1.2	1.2	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	8.4	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	12	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	11	<0.5	<0.5	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	13	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	4.7	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	20	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	7.7	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2	1.7
	Phenanthrene	mg/kg	0.5									<0.5	<0.5	<0.5	3.5	<0.5	12	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	0.5	<0.5	22	<0.5	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300	400							<0.5	<0.5	<0.5	4.6	<0.5	148.8	<0.5	2	1.7
TPH	C10 - C14	mg/kg	20									<20	<20	<20	<20	<20	<200	<20	91	34
	C15 - C28	mg/kg	50									<50	<50	86	<50	<50	740	<50	<50	<50
	C29 - C36	mg/kg	50									<50	<50	61	<50	<50	630	<50	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50									<50	<50	147	<50	<50	1370	<50	91	<50
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.5	4.7	9.3
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	10	12
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.4	21	54
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2.8	44	53
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.3	15	21
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	4.1	59	73

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteria for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
	Field_ID											BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
	LocCode											BH18_0.0-0.2	BH18_0.8-1.0	BH18_1.8-2.0	BH19_0.0-0.2	BH19_0.8-1.0	BH19_1.8-2.0	BH20_0.0-0.2	BH20_0.8-1.0	BH21_0.0-0.2
	Sample_Depth_Range											0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	1.8-2.0	0.0-0.2	0.8-1.0	0.0-0.2
	Sampled_Date-Time											23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	23-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
	Matrix_Description											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					32	2.6	4.8	27	6.4	3.8	2.8	11	5.2
	Cadmium	mg/kg	0.4	20	150							0.8	<0.4	<0.4	0.6	<0.4	<0.4	<0.4	<0.4	1
	Chromium	mg/kg	5				480					17	11	5.3	11	11	<5	7.7	11	11
	Copper	mg/kg	5	6000	30000		100					1000	<5	68	470	17	24	8.3	<5	100
	Iron	mg/kg	20									-	-	-	-	-	11,000	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	1.1	-	-	-
	Lead	mg/kg	5	300	1200		1100					600	14	63	770	41	30	32	21	250
	Mercury	mg/kg	0.1	40	120							0.3	<0.1	<0.1	0.7	<0.1	<0.1	<0.1	<0.1	0.2
	Nickel	mg/kg	5	400	1200		370					54	<5	5.8	58	<5	<5	<5	<5	22
	Zinc	mg/kg	5	7400	60000		260					830	33	110	640	45	61	64	24	950
Inorganic	% Clay	%	1									-	-	-	-	-	17	-	-	-
	Moisture Content (dried @ 103°C)	%	1									18	29	27	18	31	24	10	32	12
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	4.1	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	4.6	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				94	<50	<50	205.4	<50	<50	<50	<50	58
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									2104	<100	<100	1940	<100	360	<100	<100	1018
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	22	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						94	<50	<50	210	<50	<50	<50	<50	58
	C16-C34	mg/kg	100			3500						1800	<100	<100	1500	<100	360	<100	<100	810
	C34-C40	mg/kg	100			10000						210	<100	<100	230	<100	<100	<100	<100	150
	C6 - C10	mg/kg	20			800						<20	<20	<20	22	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	4.9	<0.5	1.3	<0.5	<0.5	2.7
	Anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	13	0.8	2.8	<0.5	<0.5	5.9
	Benzo(a)anthracene	mg/kg	0.5									0.5	<0.5	<0.5	31	1	5.5	<0.5	<0.5	27
	Benzo(a)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	17	0.6	3.1	<0.5	<0.5	29
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	<0.5	<0.5	28	0.8	4.4	<0.5	<0.5	45
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	0.6	0.6	28	1.1	4.6	0.6	0.6	45
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	1.2	1.2	28	1.4	4.9	1.2	1.2	45
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	<0.5	<0.5	8	<0.5	1.2	<0.5	<0.5	21
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	18	0.5	3.5	<0.5	<0.5	22
	Chrysene	mg/kg	0.5									<0.5	<0.5	<0.5	25	1	4.4	<0.5	<0.5	24
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	<0.5	<0.5	16	0.8	2.1	<0.5	<0.5	21
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	<0.5	<0.5	3.7	<0.5	<0.5	<0.5	<0.5	6.4
	Fluoranthene	mg/kg	0.5									1.1	<0.5	<0.5	98	2.2	15	1.1	<0.5	87
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	2.7	<0.5	1	<0.5	<0.5	1.8
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	<0.5	<0.5	9.3	<0.5	1.3	<0.5	<0.5	18
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	7.7	<0.5	1.1	<0.5	<0.5	0.7
	Phenanthrene	mg/kg	0.5									1	<0.5	<0.5	78	1.6	14	0.6	<0.5	46
	Pyrene	mg/kg	0.5									0.8	<0.5	<0.5	63	1.6	10	0.8	<0.5	73
	Total PAHs	mg/kg	0.5	300	400							3.4	<0.5	<0.5	395.3	10.1	66.3	2.5	<0.5	386.7
TPH	C10 - C14	mg/kg	20									62	<20	<20	120	<20	23	<20	<20	31
	C15 - C28	mg/kg	50									1200	<50	<50	1300	69	320	<50	<50	650
	C29 - C36	mg/kg	50									790	<50	<50	510	<50	77	<50	<50	350
	C10 - C36 (Sum of total)	mg/kg	50									2052	<50	<50	1930	69	420	<50	<50	1031
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4	SP1-5	SP1-6	SP1-7	SP1-8	SP1-9
	LocCode											BH21_0.8-1.0	BH21_1.3-1.5	SP1-1	SP1-2	SP1-3	SP1-4	SP1-5	SP1-6	SP1-7	SP1-8	SP1-9
	Sample_Depth_Range											0.8-1.0	1.3-1.5	0.5	0.4	1.0	0.5	0.3	0.5	0.8	0.6	1
	Sampled_Date-Time											24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20	24-Jun-20
	Matrix_Description											Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					3.7	3.2	8	7.5	6.5	8.5	7.2	9.9	12	8.9	15
	Cadmium	mg/kg	0.4	20	150							<0.4	<0.4	1.4	1.7	1.8	3	2.1	2.3	15	2.9	3.6
	Chromium	mg/kg	5				480					8.6	7.4	33	21	21	34	22	38	45	20	27
	Copper	mg/kg	5	6000	30000		100					<5	38	280	220	180	500	360	230	570	270	390
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					15	40	880	1700	760	900	890	930	2500	1100	790
	Mercury	mg/kg	0.1	40	120							<0.1	<0.1	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
	Nickel	mg/kg	5	400	1200		370					<5	<5	27	27	26	36	28	28	80	39	37
	Zinc	mg/kg	5	7400	60000		260					25	110	660	690	630	930	640	860	1700	890	1100
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									31	30	16	18	13	10	14	17	23	17	18
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F2-NAPHTHALENE	mg/kg	50					280				<50	<50	<50	<50	64	<50	<50	66	69	<50	54
	C6 - C9	mg/kg	20									<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10 - C40 (Sum of total)	mg/kg	100									<100	130	2880	2980	3724	1830	2120	6066	2549	2450	1804
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	<50	64	<50	<50	66	69	<50	54
	C16-C34	mg/kg	100			3500						<100	130	2200	2700	2800	1400	1600	4500	1800	1900	1200
	C34-C40	mg/kg	100			10000						<100	<100	680	280	860	430	520	1500	680	550	550
	C6 - C10	mg/kg	20			800						<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
PAH	Acenaphthene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5									<0.5	1.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9
	Benzo(a)anthracene	mg/kg	0.5									<0.5	3.7	<0.5	0.8	1.3	0.8	0.5	0.6	0.6	<0.5	2.1
	Benzo(a)pyrene	mg/kg	0.5									<0.5	3.4	<0.5	0.7	1.1	0.8	0.7	0.9	0.6	<0.5	1.6
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									<0.5	5.7	<0.5	0.9	1.5	1	0.8	1.1	0.7	<0.5	2.2
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							0.6	5.7	0.6	1.2	1.7	1.3	1.1	1.4	1	0.6	2.4
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.2	5.7	1.2	1.5	2	1.6	1.4	1.7	1.3	1.2	2.7
	Benzo(g,h,i)perylene	mg/kg	0.5									<0.5	2.7	<0.5	0.8	1.1	0.7	<0.5	0.9	0.6	<0.5	0.9
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	3.4	<0.5	0.6	1.2	0.9	0.6	0.7	0.6	<0.5	1.2
	Chrysene	mg/kg	0.5									<0.5	3.1	<0.5	0.7	1.3	0.7	0.5	0.9	<0.5	<0.5	1.7
	Benzo[b+j]fluoranthene	mg/kg	0.5									<0.5	3.5	<0.5	<0.5	0.6	0.6	<0.5	0.6	<0.5	<0.5	1.2
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5									<0.5	9	0.7	1.5	1.8	1.3	0.8	1.4	0.7	0.6	4.6
	Fluorene	mg/kg	0.5									<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	2.4	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.8
	Naphthalene	mg/kg	0.5					5				<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5									<0.5	4.5	<0.5	0.8	1.5	1.5	<0.5	1	0.5	<0.5	4.4
	Pyrene	mg/kg	0.5									<0.5	8.5	0.7	1.2	1.7	1.3	0.8	1.4	0.7	0.8	3.8
	Total PAHs	mg/kg	0.5	300	400							<0.5	46.2	1.4	7.1	12.2	9.3	3.9	8.4	4.3	1.4	23.2
TPH	C10 - C14	mg/kg	20									<20	<20	34	32	47	29	35	46	50	32	37
	C15 - C28	mg/kg	50									<50	86	1000	1200	1300	670	750	2100	830	890	610
	C29 - C36	mg/kg	50									<50	89	1400	1600	1800	870	1300	2800	1600	1200	810
	C10 - C36 (Sum of total)	mg/kg	50									<50	175	2434	2832	3147	1569	2085	4946	2480	2122	1457
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

											Field_ID	SP1-10	A	A	B	C	B-D*	D	E	E	F
																					Pacific
											LocCode	SP1-10	A	A	B	C	Duplicate of D	D	E	E	F
											Sample_Depth_Range	0.8	0.3	2.1	0.7	0.9	-	0.7	0.6	2.7	0.3
											Sampled_Date-Time	24-Jun-20	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Method_Type	**ChemName**	**Units**	**EQL**	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay										
Heavy Metal	Arsenic	mg/kg	2	100	500		100					6.2	2.8	<2	7.8	5.7	7	5	6.2	4.6	5
	Cadmium	mg/kg	0.4	20	150							2.4	<0.4	<0.4	<0.4	<0.4	0.5	1.5	<0.4	<0.4	<0.4
	Chromium	mg/kg	5				480					15	9.3	<5	15	16	16	11	15	5.1	14
	Copper	mg/kg	5	6000	30000		100					200	12	<5	86	410	100	32	21	6.6	48
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					630	13	21	1900	420	1400	200	290	110	330
	Mercury	mg/kg	0.1	40	120							0.4	<0.1	<0.1	2	0.8	2.7	<0.1	0.1	<0.1	<0.1
	Nickel	mg/kg	5	400	1200		370					24	<5	<5	23	9.3	21	7.2	13	<5	14
	Zinc	mg/kg	5	7400	60000		260					550	39	18	520	1200	780	1500	85	9.6	190
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									14	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				<0.5	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50					280				<50	-	-	-	-	-	-	-	-	-
	C6 - C9	mg/kg	20									<20	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100									2500	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	30	<20	<20	<20	<20	<40	<40	<20
	C10-C16	mg/kg	50			1000						<50	<50	<50	97	<50	<50	<50	<50	<50	130
	C16-C34	mg/kg	100			3500						1600	<100	<100	5900	460	10,000	<100	<100	<100	9300
	C34-C40	mg/kg	100			10000						900	<100	<100	910	130	1400	160	<100	<100	4000
	C6 - C10	mg/kg	20			800						<20	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5									0.7	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5									0.7	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									0.9	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							1.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									1.5	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5									0.6	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5									0.6	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5									0.8	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5									2	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									<0.5	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5					5				<0.5	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5									1.3	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5									1.5	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	300	400							8.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TPH	C10 - C14	mg/kg	20									36	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50									660	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50									1300	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50									1996	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	0.4	0.1	0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2									<0.2	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1									<0.1	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.3	<0.3	0.6	0.6	<0.3	<0.6	<0.6	<0.3

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

coffey
A TETRA TECH COMPANY

Table LR1
HILs/ HSLs/EILs/Management Limits
DSI - GHT Holdings
107-117 Swan Street, Morpeth
754-NTLEN271167-R01

Method_Type	ChemName	Units	EQL	NEPM 2013 HILs Residential A Soil	NEPM 2013 HILs Residential B Soil	NEPM 2013 Mgmt Limits Residential, parkland and public open space, Fine Soil	NEPM 2013 Environmental Investigation/ Screening Levels	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 0 to <1m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 1m to <2m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 2m to <4m, Clay	NEPM 2013 Residential Soil HSL A/B for Vapour Intrusion, 4m+, Clay	Environmental July 2018 - June 2019											
											Field_ID	F	G	H	I	A	B	C	D	E	F	I	J**
											LocCode	F	G	H	I	A	B	C	D	E	F	I	Duplicate of I
											Sample_Depth_Range	2	0.6	0.6	0.4	-	-	-	-	-	-	-	-
											Sampled_Date-Time	26-Jul-18	26-Jul-18	26-Jul-18	26-Jul-18	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19	11-Jun-19
											Matrix_Description	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Heavy Metal	Arsenic	mg/kg	2	100	500		100					16	64	4.3	13	-	-	-	-	-	-	-	-
	Cadmium	mg/kg	0.4	20	150							<0.4	0.9	<0.4	0.5	-	-	-	-	-	-	-	-
	Chromium	mg/kg	5				480					5	28	10	14	-	-	-	-	-	-	-	-
	Copper	mg/kg	5	6000	30000		100					26	4300	18	400	-	-	-	-	-	-	-	-
	Iron	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-	-
	Iron (%)	%	0.01									-	-	-	-	-	-	-	-	-	-	-	-
	Lead	mg/kg	5	300	1200		1100					46	1100	23	470	380	620	150	89	170	460	550	660
	Mercury	mg/kg	0.1	40	120							<0.1	0.2	<0.1	0.9	-	-	-	-	-	-	-	-
	Nickel	mg/kg	5	400	1200		370					<5	52	<5	67	-	-	-	-	-	-	-	-
	Zinc	mg/kg	5	7400	60000		260					59	1600	70	950	-	-	-	-	-	-	-	-
Inorganic	% Clay	%	1									-	-	-	-	-	-	-	-	-	-	-	-
	Moisture Content (dried @ 103°C)	%	1									-	-	-	-	-	-	-	-	-	-	-	-
	pH (Lab)	pH_Units	0.1									-	-	-	-	-	-	-	-	-	-	-	-
Organic	Naphthalene	mg/kg	0.5				170	5				-	-	-	-	-	-	-	-	-	-	-	-
	F2-NAPHTHALENE	mg/kg	50					280				-	-	-	-	<50	<50	<50	<50	<50	<50	<50	<50
	C6 - C9	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-	-
	C10 - C40 (Sum of total)	mg/kg	100									-	-	-	-	-	-	-	-	-	-	-	-
	C6-C10 less BTEX (F1)	mg/kg	20					50	90			<20	<20	<40	<20	<20	<20	<20	<20	<20	<20	<40	<40
	C10-C16	mg/kg	50			1000						<50	<50	<50	59	58	<50	<50	<50	<50	<50	<50	<50
	C16-C34	mg/kg	100			3500						<100	310	<100	370	400	170	390	<100	260	220	4700	3600
	C34-C40	mg/kg	100			10000						<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1600	1300
	C6 - C10	mg/kg	20			800						-	-	-	-	-	-	-	-	-	-	-	-
PAH	Acenaphthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Acenaphthylene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Anthracene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)anthracene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	3	4							<0.5	1.4	<0.5	3.5	<0.5	1.3	1.3	1.3	11	4	3.2	1
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(g,h,i)perylene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo(k)fluoranthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Chrysene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Benzo[b+j]fluoranthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Dibenz(a,h)anthracene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Fluoranthene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Fluorene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Naphthalene	mg/kg	0.5					5				-	-	-	-	-	-	-	-	-	-	-	-
	Phenanthrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Pyrene	mg/kg	0.5									-	-	-	-	-	-	-	-	-	-	-	-
	Total PAHs	mg/kg	0.5	300	400							<0.5	1.1	<0.5	24.8	2	11.1	9.6	10.9	83.3	29.7	25.3	9.3
TPH	C10 - C14	mg/kg	20									-	-	-	-	-	-	-	-	-	-	-	-
	C15 - C28	mg/kg	50									-	-	-	-	-	-	-	-	-	-	-	-
	C29 - C36	mg/kg	50									-	-	-	-	-	-	-	-	-	-	-	-
	C10 - C36 (Sum of total)	mg/kg	50									-	-	-	-	-	-	-	-	-	-	-	-
Volatile	Benzene	mg/kg	0.1					0.7	1	2	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
	Ethylbenzene	mg/kg	0.1									<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
	Toluene	mg/kg	0.1					480				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-
	Xylene (m & p)	mg/kg	0.2									-	-	-	-	-	-	-	-	-	-	-	-
	Xylene (o)	mg/kg	0.1									-	-	-	-	-	-	-	-	-	-	-	-
	Xylene Total	mg/kg	0.3					110	310			<0.3	<0.3	<0.6	<0.3	<0.3	<0.3	<0.3	0.4	-	-	-	-

Result	Exceeds criteria for NEPM 2013 HILs - Residential A
Result	Exceeds criteria for NEPM 2013 HILs - Residential B
Result	Exceeds criteria for NEPM 2013 Management Limits TPH - Residential/ Public Open Space
Result	Exceeds criteria for NEPM 2013 EILs/ ESLs
Result	Exceeds criteris for NEPM 2013 HSL - Residential A/B 0-4m
-	Not analysed
	EILs based on pH 5, TOC 1.8, CEC 32.3, iron 1%, clay 16.33%

Appendix C – ProUCL outputs

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.126/08/2020 4:16:33 PM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaP_TEQ <0.5m

General Statistics			
Total Number of Observations	40	Number of Distinct Observations	17
		Number of Missing Observations	0
Minimum	0.6	Mean	5.258
Maximum	45	Median	1.1
SD	10.49	Std. Error of Mean	1.659
Coefficient of Variation	1.995	Skewness	2.809
Normal GOF Test			
Shapiro Wilk Test Statistic	0.512	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.358	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.052	95% Adjusted-CLT UCL (Chen-1995)	8.772
		95% Modified-t UCL (Johnson-1978)	8.175
Gamma GOF Test			
A-D Test Statistic	5.322	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.809	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.325	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.147	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.543	k star (bias corrected MLE)	0.519
Theta hat (MLE)	9.678	Theta star (bias corrected MLE)	10.13
nu hat (MLE)	43.46	nu star (bias corrected)	41.53
MLE Mean (bias corrected)	5.258	MLE Sd (bias corrected)	7.297
		Approximate Chi Square Value (0.05)	27.76
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	27.34
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	7.865	95% Adjusted Gamma UCL (use when n<50)	7.987
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.25	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.139	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	-0.511	Mean of logged Data	0.505
Maximum of Logged Data	3.807	SD of logged Data	1.333
Assuming Lognormal Distribution			
95% H-UCL	7.361	90% Chebyshev (MVUE) UCL	6.952
95% Chebyshev (MVUE) UCL	8.346	97.5% Chebyshev (MVUE) UCL	10.28
99% Chebyshev (MVUE) UCL	14.08		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	7.986	95% Jackknife UCL	8.052
95% Standard Bootstrap UCL	7.9	95% Bootstrap-t UCL	9.358
95% Hall's Bootstrap UCL	8.74	95% Percentile Bootstrap UCL	8.14
95% BCA Bootstrap UCL	8.883		
90% Chebyshev(Mean, Sd) UCL	10.23	95% Chebyshev(Mean, Sd) UCL	12.49
97.5% Chebyshev(Mean, Sd) UCL	15.61	99% Chebyshev(Mean, Sd) UCL	21.76
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	12.49		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
BaP_TEQ>0.5m			
General Statistics			
Total Number of Observations	55	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.6	Mean	0.964
Maximum	5.7	Median	0.6
SD	0.981	Std. Error of Mean	0.132
Coefficient of Variation	1.018	Skewness	3.527
Normal GOF Test			
Shapiro Wilk Test Statistic	0.444	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.426	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.119	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.185	95% Adjusted-CLT UCL (Chen-1995)	1.248
		95% Modified-t UCL (Johnson-1978)	1.195

Gamma GOF Test			
A-D Test Statistic	12.12	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.459	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.121	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	2.412	k star (bias corrected MLE)	2.293
Theta hat (MLE)	0.4	Theta star (bias corrected MLE)	0.42
nu hat (MLE)	265.3	nu star (bias corrected)	252.2
MLE Mean (bias corrected)	0.964	MLE Sd (bias corrected)	0.636
		Approximate Chi Square Value (0.05)	216.4
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	215.5
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	1.123	95% Adjusted Gamma UCL (use when n<50)	1.128
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.535	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.459	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.119	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.511	Mean of logged Data	-0.258
Maximum of Logged Data	1.74	SD of logged Data	0.549
Assuming Lognormal Distribution			
95% H-UCL	1.036	90% Chebyshev (MVUE) UCL	1.106
95% Chebyshev (MVUE) UCL	1.202	97.5% Chebyshev (MVUE) UCL	1.335
99% Chebyshev (MVUE) UCL	1.596		
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.181	95% Jackknife UCL	1.185
95% Standard Bootstrap UCL	1.181	95% Bootstrap-t UCL	1.343
95% Hall's Bootstrap UCL	1.295	95% Percentile Bootstrap UCL	1.207
95% BCA Bootstrap UCL	1.278		
90% Chebyshev(Mean, Sd) UCL	1.36	95% Chebyshev(Mean, Sd) UCL	1.54
97.5% Chebyshev(Mean, Sd) UCL	1.79	99% Chebyshev(Mean, Sd) UCL	2.28
Suggested UCL to Use			
95% Chebyshev (Mean, Sd) UCL	1.54		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

PAHs<0.5m

General Statistics			
Total Number of Observations	40	Number of Distinct Observations	30
		Number of Missing Observations	0
Minimum	0.5	Mean	45.39
Maximum	395.3	Median	6.9
SD	101	Std. Error of Mean	15.98
Coefficient of Variation	2.226	Skewness	2.853
Normal GOF Test			
Shapiro Wilk Test Statistic	0.493	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	72.3	95% Adjusted-CLT UCL (Chen-1995)	79.36
		95% Modified-t UCL (Johnson-1978)	73.5
Gamma GOF Test			
A-D Test Statistic	2.543	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.849	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.239	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.151	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.34	k star (bias corrected MLE)	0.331
Theta hat (MLE)	133.7	Theta star (bias corrected MLE)	137.2
nu hat (MLE)	27.16	nu star (bias corrected)	26.46
MLE Mean (bias corrected)	45.39	MLE Sd (bias corrected)	78.92
		Approximate Chi Square Value (0.05)	15.73
Adjusted Level of Significance	0.044	Adjusted Chi Square Value	15.42
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	76.32	95% Adjusted Gamma UCL (use when n<50)	77.86
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.139	Data appear Lognormal at 5% Significance Level	
Data appear Approximate Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.693	Mean of logged Data	1.825
Maximum of Logged Data	5.98	SD of logged Data	2.079
Assuming Lognormal Distribution			
95% H-UCL	196.9	90% Chebyshev (MVUE) UCL	111.5
95% Chebyshev (MVUE) UCL	141	97.5% Chebyshev (MVUE) UCL	182
99% Chebyshev (MVUE) UCL	262.5		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	71.66	95% Jackknife UCL	72.3
95% Standard Bootstrap UCL	71.49	95% Bootstrap-t UCL	88.62
95% Hall's Bootstrap UCL	71.36	95% Percentile Bootstrap UCL	72.19
95% BCA Bootstrap UCL	81.78		
90% Chebyshev(Mean, Sd) UCL	93.31	95% Chebyshev(Mean, Sd) UCL	115
97.5% Chebyshev(Mean, Sd) UCL	145.2	99% Chebyshev(Mean, Sd) UCL	204.3
Suggested UCL to Use			
97.5% Chebyshev (Mean, Sd) UCL	145.2		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Appendix D – Risk calculations

Derivation of Investigation Levels
Retirement village resident (Adult)

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Young children (0-5 years)	IR_{SC}	mg/day		25% of HIL A assumption, Schedule B7, Table 5
	- Adults	IR_{SA}	mg/day	12.5	25% of HIL A assumption, Schedule B7, Table 5
Surface Area of Skin	- Young children (0-5 years)	SA_C	cm^2/day		Schedule B7, Table 5
	- Adults	SA_A	cm^2/day	6300	Schedule B7, Table 5
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.5	Schedule B7, Table 5
Time Spent Outdoors		ETo	hours	1	Schedule B7, Table 5
Time Spent Indoors		ETi	hours	20	Schedule B7, Table 5
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	7.3E+10	Calculated for scenario, refer to Equations 19 and 20 and assumptions in Schedule B7
Indoor Air Dust Factor		PEFi	(m^3/kg)	2.6E+07	As per Equation 21 based assumptions presented in Schedule B7
Fraction of indoor dust comprised of outdoor soil		TF	-	0.5	Assume 50% soil concentration present in dust as noted in Schedule B7
Indoor Air-to-Soil Gas Attenuation Factor		α	-	0.1	Value adopted as discussed in Section 5.5 of Schedule B7
Body weight	- Young children (0-5 years)	BW_C	kg		Schedule B7, Table 5
	- Adults	BW_A	kg	70	Schedule B7, Table 5
Exposure Frequency		EF	days/year	365	Schedule B7, Table 5
Exposure Duration	- Young children (0-5 years)	ED_C	years		Schedule B7, Table 5
	- Adults	ED_A	years	20	Schedule B7, Table 5
Averaging Time (non-carcinogenic)		AT_T	days	ED*365	Calculated based on ED for each relevant age group, multiplied by 24 hours for the assessment of inhalation exposures
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

Non-Threshold Effects - Lifetime Exposures [young child and adult]

Compound	Toxicity Reference Value Oral (TRV_O) (mg/kg/day)$^{-1}$	GI Absorption (GAF) (unitless)	Non-Threshold Slope Factor Dermal (SFd) (mg/kg/day)$^{-1}$	Oral Bioavailability BA_O (%)	Dermal Absorption Factor (DAF) (unitless)		Toxicity Reference Value Inhalation (TRV_I) (mg/m^3)$^{-1}$		Target Risk (TR)	Pathway Specific HILs (mg/kg): Soil Ingestion (eqns 4 and 5)	Pathway Specific HILs (mg/kg): Dermal (eqns 7 and 8)	Pathway Specific HILs (mg/kg): Dust (eqns 10 and 11)	Soil Vapour HIL (mg/m^3) (eqns 13 and 14)	Derived Interim Soil Gas IL - Threshold (to 1 or 2 s.f.) (mg/m3)	Derived Soil HIL (not rounded) (mg/kg) (eqn 2 for relevant pathways)	Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)	Notes
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	3.9E+02	6.0E+01	4.0E+04			52	**50**	1

Based on aged soil impact (MfE 2011)

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)
1 Refer to Appendix A for discussion on different calculations conducted for benzo(a)pyrene and basis for HIL adopted

Derivation of Investigation Levels
Retirement village visitor (child)

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Young children (0-5 years)	IR_{SC}	mg/day	25	25% of HIL A assumption, Schedule B7, Table 5
	- Adults	IR_{SA}	mg/day		25% of HIL A assumption, Schedule B7, Table 5
Surface Area of Skin	- Young children (0-5 years)	SA_C	cm^2/day	2700	Schedule B7, Table 5
	- Adults	SA_A	cm^2/day		Schedule B7, Table 5
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.5	Schedule B7, Table 5
Time Spent Outdoors		ETo	hours	1	Schedule B7, Table 5
Time Spent Indoors		ETi	hours	20	Schedule B7, Table 5
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	7.3E+10	Calculated for scenario, refer to Equations 19 and 20 and assumptions in Schedule B7
Indoor Air Dust Factor		PEFi	(m^3/kg)	2.6E+07	As per Equation 21 based assumptions presented in Schedule B7
Fraction of indoor dust comprised of outdoor soil		TF	-	0.5	Assume 50% soil concentration present in dust as noted in Schedule B7
Indoor Air-to-Soil Gas Attenuation Factor		α	-	0.1	Value adopted as discussed in Section 5.5 of Schedule B7
Body weight	- Young children (0-5 years)	BW_C	kg	15	Schedule B7, Table 5
	- Adults	BW_A	kg		Schedule B7, Table 5
Exposure Frequency		EF	days/year	365	Schedule B7, Table 5
Exposure Duration	- Young children (0-5 years)	ED_C	years	6	Schedule B7, Table 5
	- Adults	ED_A	years		Schedule B7, Table 5
Averaging Time (non-carcinogenic)		AT_T	days	ED*365	Calculated based on ED for each relevant age group, multiplied by 24 hours for the assessment of inhalation exposures
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

Non-Threshold Effects - Lifetime Exposures [young child and adult]

Compound	Toxicity Reference Value	GI Absorption	Non-Threshold Slope Factor	Oral Bioavailability	Dermal Absorption		Toxicity Reference	Non-Threshold Slope Factor		Target Risk	Pathway Specific			Soil Vapour	Derived Interim Soil Gas IL -	Derived Soil HIL (not rounded)	Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)	Notes
											Soil Ingestion (eqns 4 and 5)	**Dermal** (eqns 7 and 8)	**Dust** (eqns 10 and 11)					
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01	0.5		1E-05	1.4E+02	1.0E+02	1.3E+05			58	**60**	1

Based on aged soil impact (MfE 2011)

NA Pathway not of significance for chemical assessed (refer to Appendix A for chemical-specific details)

1 Refer to Appendix A for discussion on different calculations conducted for benzo(a)pyrene and basis for HIL adopted

Derivation of risk-based criteria:
Grounds Keepers

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Adults	IR_{SA}	mg/day	330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
Surface Area of Skin	- Adults	SA_A	cm^2/day	6800	Based on 34% total skin area of 20000 cm^2 exposed (Friebel & Nadebaum, 2011)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012)
Time Spent Outdoors		ETo	hours	8	Based on an 8 hour work day
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
Body weight	- Adults	BW_C	kg	78	enHealth (2012) based on average adult body weight (over 18yo male and female)
Exposure Frequency		EF	days/year	48	Based on 1 day for 48 weeks per year
Exposure Duration	- Adults	ED_C	years	30	Schedule B7, Table 5
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

Non-Threshold Effects - Lifetime Exposures [adult]														
Compound	**Toxicity Reference Value Oral (TRV_O)** (mg/kg/day)$^{-1}$	**GI Absorption (GAF)** (unitless)	**Non-Threshold Slope Factor Dermal (SFd)** (mg/kg/day)$^{-1}$	**Oral Bioavailability BA_O (%)**	**Dermal Absorption Factor (DAF)** (unitless)		**Toxicity Reference Value Inhalation (TRV_I)** (mg/m^3)$^{-1}$		**Target Risk (TR)**	**Pathway Specific HILs (mg/kg)**				**Derived Soil HIL (to 1 or 2 s.f.)** (mg/kg)
										Soil Ingestion (eqns 4 and 5)	**Dermal** (eqns 7 and 8)	**Dust** (eqns 10 and 11)		
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	8.4E+01	1.7E+02	4.4E+06		**57**

Based on aged soil impact (MfE 2011)

Derivation of risk-based criteria:
Maintenance Workers

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Adults	IR_{SA}	mg/day	330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
Surface Area of Skin	- Adults	SA_A	cm^2/day	6800	Based on 34% total skin area of 20000 cm^2 exposed (Friebel & Nadebaum, 2011)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012)
Time Spent Outdoors		ETo	hours	8	Based on an 8 hour work day
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
Body weight	- Adults	BW_C	kg	78	enHealth (2012) based on average adult body weight (over 18yo male and female)
Exposure Frequency		EF	days/year	10	Based on 2 weeks per year
Exposure Duration	- Adults	ED_C	years	30	Schedule B7, Table 5
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

Non-Threshold Effects - Lifetime Exposures [adult]														
Compound	**Toxicity Reference Value Oral (TRV_O)** $(mg/kg/day)^{-1}$	**GI Absorption (GAF)** (unitless)	**Non-Threshold Slope Factor Dermal (SFd)** $(mg/kg/day)^{-1}$	**Oral Bioavailability BA_O (%)**	**Dermal Absorption Factor (DAF)** (unitless)		**Toxicity Reference Value Inhalation (TRV_I)** $(mg/m^3)^{-1}$		**Target Risk (TR)**	**Pathway Specific HILs (mg/kg)**				**Derived Soil HIL (to 1 or 2 s.f.)** (mg/kg)
										Soil Ingestion (eqns 4 and 5)	**Dermal** (eqns 7 and 8)	**Dust** (eqns 10 and 11)		
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	4.0E+02	8.3E+02	2.1E+07		**270**

Based on aged soil impact
(MfE 2011)

Derivation of risk-based criteria:
Construction Workers

Summary of Exposure Parameters		Abbreviation	units	Parameter	References/Notes
Soil and Dust Ingestion Rate	- Adults	IR_{SA}	mg/day	330	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Construction Workers (USEPA, 2002)
Surface Area of Skin	- Adults	SA_A	cm^2/day	6800	Based on 34% total skin area of 20000 cm^2 exposed (Friebel & Nadebaum, 2011)
Soil-to-Skin Adherence Factor		AF	mg/cm^2/day	0.9	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / enHealth (2012)
Time Spent Outdoors		ETo	hours	8	Based on an 8 hour work day
Lung Retention Factor		RF	-	0.375	Schedule B7, Table 5
Particulate Emission Factor		PEFo	(m^3/kg)	4.4E+08	Intrusive maintenance workers (Friebel & Nadebaum, 2011) / Subsurface maintenance (USEPA, 2002)
Body weight	- Adults	BW_C	kg	78	enHealth (2012) based on average adult body weight (over 18yo male and female)
Exposure Frequency		EF	days/year	80	Based on 4 month construction period
Exposure Duration	- Adults	ED_C	years	1	Based on 4 month construction period
Averaging Time (carcinogenic)		AT_{NT}	days	25550	Based on lifetime of 70 years, multiplied by 24 hours for the assessment of inhalation exposures

Non-Threshold Effects - Lifetime Exposures [adult]

Compound	Toxicity Reference Value Oral (TRV_O) $(mg/kg/day)^{-1}$	GI Absorption (GAF) (unitless)	Non-Threshold Slope Factor Dermal (SFd) $(mg/kg/day)^{-1}$	Oral Bioavailability BA_O (%)	Dermal Absorption Factor (DAF) (unitless)		Toxicity Reference Value Inhalation (TRV_I) $(mg/m^3)^{-1}$		Target Risk (TR)	Pathway Specific HILs (mg/kg) Soil Ingestion (eqns 4 and 5)	Dermal (eqns 7 and 8)	Dust (eqns 10 and 11)		Derived Soil HIL (to 1 or 2 s.f.) (mg/kg)
benzo(a)pyrene	0.5	1	0.5	100%	0.026		1.43E-01		1E-05	1.5E+03	3.1E+03	7.9E+07		**1000**
					Based on aged soil impact (MfE 2011)									

Appendix F – Soil Logs

Environmental Log - Borehole

Hole ID.	**BH01**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**22 Jun 2020**
date completed:	**22 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: ***GHT HOLDINGS PTY LTD***

principal: ***PERCEPTION PLANNING PTY LTD***

project: ***DETAILED SITE INVESTIGATION***

location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371416; N: 6378342 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information						material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
								CONCRETE.			**CONCRETE**
		E	0				GP	**FILL: Sandy GRAVEL**: fine to coarse grained, black, fine to coarse grained slag skulls.	M		**FILL**
							CH	**Silty CLAY**: high plasticity, black, traces of fine to coarse grained gravels, no odour.	>Wp		**RESIDUAL SOIL**
					0.5						
		E	0								
					1.0						
					1.5						
		E	0				CH	**Sandy CLAY**: high plasticity, white/ pale grey, traces shale/ siltstone.			
					2.0			Borehole BH01 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH02**		
sheet:	1 of 1		
project no.	***754-NTLEN271167***		
client:	***GHT HOLDINGS PTY LTD***	date started:	***22 Jun 2020***
principal:	***PERCEPTION PLANNING PTY LTD***	date completed:	***22 Jun 2020***
project:	***DETAILED SITE INVESTIGATION***	logged by:	***SR***
location:	***107-117 SWAN STREET, MORPETH, NSW***	checked by:	***HL***

position: E: 371782; N: 6377931 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information						material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SW	**FILL: SAND**: fine to coarse grained, brown, traces of brick fragments, root affected.	D to M		**FILL**
					0.3		CH	**Silty CLAY**: high plasticity, dark brown/ black, traces of fine to coarse grained gravels.	>Wp		**RESIDUAL SOIL**
	▶ (water inflow)				0.5						
		E	0		0.8						
					1.0						
					1.5						
					1.6		CH	**Sandy CLAY**: high plasticity, white/ pale brown, traces of shale fragments.	<Wp		
		E	0		1.8						
					2.0			Borehole BH02 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Environmental Log - Borehole

Hole ID.	**BH03**
sheet:	1 of 1
project no.	**754-NTLEN271167**
client:	**GHT HOLDINGS PTY LTD**
principal:	**PERCEPTION PLANNING PTY LTD**
project:	**DETAILED SITE INVESTIGATION**
location:	**107-117 SWAN STREET, MORPETH, NSW**
date started:	**22 Jun 2020**
date completed:	**22 Jun 2020**
logged by:	**SR**
checked by:	**HL**

position: E: 371626; N: 6378244 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		CH	**Silty CLAY**: high plasticity, dark brown/ black, traces fine grained gravels.	>Wp		**RESIDUAL SOIL**
		E	0		0.8						
					1.1		CH	**Sandy CLAY**: high plasticity, white/ pale grey.	<Wp		
		E	0		1.8						
					2.0			Borehole BH03 terminated at 2.00 m Target depth			

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

		Hole ID.	**BH04**
		sheet:	1 of 1
		project no.	**754-NTLEN271167**
client:	**GHT HOLDINGS PTY LTD**	date started:	**22 Jun 2020**
principal:	**PERCEPTION PLANNING PTY LTD**	date completed:	**22 Jun 2020**
project:	**DETAILED SITE INVESTIGATION**	logged by:	**SR**
location:	**107-117 SWAN STREET, MORPETH, NSW**	checked by:	**HL**

position: E: 371508; N: 6378246 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SP	**FILL: Gravelly SAND**: fine to medium grained, angular, brown, traces glass fragments, fine to medium slag skulls.	M		**FILL**
							CH	**Silty CLAY**: high plasticity, dark brown/ black.	~Wp - >Wp		**RESIDUAL SOIL**
					0.5						
		E	0								
					1.0						
							CH	**Sandy CLAY**: high plasticity, white/ pale brown, trace riverstones, fine to coarse grained sand.	<Wp		
					1.5						
		E	0								
					2.0			Borehole BH04 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH05**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**22 Jun 2020**
date completed:	**22 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: **GHT HOLDINGS PTY LTD**

principal: **PERCEPTION PLANNING PTY LTD**

project: **DETAILED SITE INVESTIGATION**

location: **107-117 SWAN STREET, MORPETH, NSW**

position: E: 371472; N: 6378217 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information						material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SW	**FILL: SAND**: fine to coarse grained, rounded to angular, brown, fine to coarse grained gravels.	D to M		**FILL**
					0.2		CH	**Silty CLAY**: high plasticity, black.	>Wp		**RESIDUAL SOIL**
		E	0		0.8						
					1.5		CH	**Sandy CLAY**: high plasticity, white/ pale grey, traces of rounded riverstones, tree roots @ 1.6m bgs.			
		E	0		1.8						
					2.0			Borehole BH05 terminated at 2.00 m Target depth			

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Environmental Log - Borehole

Hole ID.	**BH06**
sheet:	1 of 1
project no.	***754-NTLEN271167***
date started:	***22 Jun 2020***
date completed:	***22 Jun 2020***
logged by:	***SR***
checked by:	***HL***

client: ***GHT HOLDINGS PTY LTD***
principal: ***PERCEPTION PLANNING PTY LTD***
project: ***DETAILED SITE INVESTIGATION***
location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371569; N: 6378249 (MGA94 Zone 56) — surface elevation: Not Specified — angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted — drilling fluid: — hole diameter : 350 mm

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SW-SC	**FILL: Gravelly CLAYEY SAND**: fine to coarse grained, brown/ black, sandstone fragments, root affected.	M		**FILL**
					0.4		CH	**Silty CLAY**: high plasticity, black.	>Wp		**RESIDUAL SOIL**
		E	0		0.8						
		E	0		1.8						
					2.0			Borehole BH06 terminated at 2.00 m Target depth			

Depth scale: 0.5, 1.0, 1.5, 2.0, 2.5

method		support		samples & field tests		consistency / relative density	
AD	auger drilling*	M	mud	ALT	air lift test	VS	very soft
AS	auger screwing*	C	casing	B	bulk disturbed sample	S	soft
HA	hand auger	N	nill	D	disturbed sample	F	firm
MR	mud rotary			E	environmental sample	St	stiff
W	washbore			SS	split spoon sample	VSt	very stiff
				U##	undisturbed sample ##mm diameter	H	hard
				WS	water sample	Fb	friable
*	bit shown by suffix			HB	hammer bouncing	VL	very loose
e.g.	AD/T			N	standard penetration test (SPT)	L	loose
B	blank bit			N*	SPT - sample recovered	MD	medium dense
T	TC bit			Nc	SPT with solid cone	D	dense
V	V bit			PID	photoionization detector	VD	very dense
				R	refusal		

water
10-Oct-12 water level on date shown
water inflow
water outflow

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

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Environmental Log - Borehole

Hole ID.	**BH07**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: **GHT HOLDINGS PTY LTD**
principal: **PERCEPTION PLANNING PTY LTD**
project: **DETAILED SITE INVESTIGATION**
location: **107-117 SWAN STREET, MORPETH, NSW**

position: E: 371664; N: 6378143 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SC	**FILL: CLAYEY SAND**: fine to coarse grained, sub-rounded to sub-angular, brown/ mottled orange, traces gravels, some gravelly sand, traces of brick fragments.	M		**FILL**
		E	0		0.5		CH	**Silty CLAY**: high plasticity, black, traces gravels.	>Wp		**RESIDUAL SOIL**
		E	0		1.6		CH	**Sandy CLAY**: high plasticity, pale grey/ white.			
					2.0			Borehole BH07 terminated at 2.00 m Target depth			

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore
* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH08**
sheet:	1 of 1
project no.	**754-NTLEN271167**
client:	**GHT HOLDINGS PTY LTD**
principal:	**PERCEPTION PLANNING PTY LTD**
project:	**DETAILED SITE INVESTIGATION**
location:	**107-117 SWAN STREET, MORPETH, NSW**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

position: E: 371435; N: 6378346 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SW	**FILL: Gravelly SAND**: fine to coarse grained, brown.	M		**FILL**
	▶ (water inflow, ~0.5 m)				0.4		CH	**Silty CLAY**: high plasticity, black.	>Wp		**RESIDUAL SOIL**
		E	0		0.8						
					1.4		CH	**Sandy CLAY**: high plasticity, white/ pale grey.			
		E	0		1.8		CL-CH	**Gravelly CLAY**: fine to coarse grained, medium to high plasticity, white/ brown/ mottled orange.			
					2.2			Borehole BH08 terminated at 2.20 m Target depth			

Depth scale: 0.5, 1.0, 1.5, 2.0, 2.5

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	***BH09***
sheet:	1 of 1
project no.	***754-NTLEN271167***
date started:	***23 Jun 2020***
date completed:	***23 Jun 2020***
logged by:	***SR***
checked by:	***HL***

client: ***GHT HOLDINGS PTY LTD***
principal: ***PERCEPTION PLANNING PTY LTD***
project: ***DETAILED SITE INVESTIGATION***
location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371714; N: 6378163 (MGA94 Zone 56) — surface elevation: Not Specified — angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted — drilling fluid: — hole diameter : 350 mm

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SW	**FILL: Gravelly SAND**: fine to coarse grained, angular, brown/ dark brown, fragment of tile, slight oil odour.	M		**FILL**
					0.35		CH	**Silty CLAY**: high plasticity, black, oil odour.	>Wp		**RESIDUAL SOIL**
		E	0		0.5						
					1.2		CH	**Sandy CLAY**: fine to coarse grained, angular, high plasticity, white, fine to coarse grained fragments of shale.	<Wp		
		E	0		1.8						
					2.0			Borehole BH09 terminated at 2.00 m Target depth			

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH10**
sheet:	1 of 1
project no.	**754-NTLEN271167**
client:	**GHT HOLDINGS PTY LTD**
principal:	**PERCEPTION PLANNING PTY LTD**
project:	**DETAILED SITE INVESTIGATION**
location:	**107-117 SWAN STREET, MORPETH, NSW**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

position: E: 371578; N: 6378270 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SC	**FILL: CLAYEY SAND**: fine to coarse grained, brown, root affected.	M		**TOPSOIL**
					0.3		CH	**Silty CLAY**: high plasticity, black, tree roots @0.5m bgs.	>Wp		**RESIDUAL SOIL**
					0.5						
		E	0		0.8						
					1.0						
					1.4		CI-CH	**Gravelly Sandy CLAY**: fine to coarse grained, medium to high plasticity, mottled orange/ brown, fine to coarse grained gravel.	<Wp		
					1.5						
					1.6		CH	**Gravelly Sandy CLAY**: fine to coarse grained, high plasticity, white.			
		E	0		1.8						
					2.0			Borehole BH10 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH11**
sheet:	1 of 1
project no.	**754-NTLEN271167**

client:	***GHT HOLDINGS PTY LTD***	date started:	***23 Jun 2020***
principal:	***PERCEPTION PLANNING PTY LTD***	date completed:	***23 Jun 2020***
project:	***DETAILED SITE INVESTIGATION***	logged by:	***SR***
location:	***107-117 SWAN STREET, MORPETH, NSW***	checked by:	***HL***

position: E: 371459; N: 6378278 (MGA94 Zone 56) surface elevation: Not Specified angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted drilling fluid: hole diameter : 350 mm

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SC	**FILL: CLAYEY SAND**: fine to coarse grained, brown/ dark brown, orange gravels, brick fragments.	M		**FILL**
					0.5		CH	**Silty CLAY**: high plasticity, black, traces of rootlets.	>Wp		**RESIDUAL SOIL**
		E	0								
					1.0						
					1.5						
		E	0								
					2.0			Borehole BH11 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

coffey
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Environmental Log - Borehole

Hole ID.	**BH12**
sheet:	1 of 1
project no.	***754-NTLEN271167***
client:	***GHT HOLDINGS PTY LTD***
principal:	***PERCEPTION PLANNING PTY LTD***
project:	***DETAILED SITE INVESTIGATION***
location:	***107-117 SWAN STREET, MORPETH, NSW***
date started:	***23 Jun 2020***
date completed:	***23 Jun 2020***
logged by:	***SR***
checked by:	***HL***

position: E: 371458; N: 6378351 (MGA94 Zone 56) surface elevation: Not Specified angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted drilling fluid: hole diameter : 350 mm

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description: **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SW	**FILL: Gravelly SAND**: fine to coarse grained, grey/ brown, trace slag skulls.	D		**FILL**
					0.3		CH	**Sandy CLAY**: fine to coarse grained, high plasticity, dark brown/ black.	>Wp		**RESIDUAL SOIL**
					0.5						
		E	0								
					1.0						
					1.5						
							CH	**Gravelly Sandy CLAY**: fine to coarse grained, high plasticity, brown/ mottled orange, traces gravels.			
		E	0								
					2.0			Borehole BH12 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH13**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: ***GHT HOLDINGS PTY LTD***

principal: ***PERCEPTION PLANNING PTY LTD***

project: ***DETAILED SITE INVESTIGATION***

location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371425; N: 6378352 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0				GW	**FILL: ASPHALT (10MM)**.	D		**ASPHALT**
		E	0					**FILL: Sandy GRAVEL**: fine to coarse grained, rounded to sub-angular, grey, brick fragments, old service line in borhole..			**FILL**
					0.5			Borehole BH13 terminated at 0.40 m Refusal			
					1.0						
					1.5						
					2.0						
					2.5						

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- MR mud rotary
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nill

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- ALT air lift test
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- WS water sample
- HB hammer bouncing
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- PID photoionization detector
- R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density
- VS very soft
- S soft
- F firm
- St stiff
- VSt very stiff
- H hard
- Fb friable
- VL very loose
- L loose
- MD medium dense
- D dense
- VD very dense

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Environmental Log - Borehole

Hole ID.	***BH14***
sheet:	1 of 1
project no.	***754-NTLEN271167***
date started:	***23 Jun 2020***
date completed:	***23 Jun 2020***
logged by:	***SR***
checked by:	***HL***

client: ***GHT HOLDINGS PTY LTD***
principal: ***PERCEPTION PLANNING PTY LTD***
project: ***DETAILED SITE INVESTIGATION***
location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371483; N: 6378322 (MGA94 Zone 56) surface elevation: Not Specified angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted drilling fluid: hole diameter : 350 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0.7				GP	**FILL: ASPHALT (10MM)**.	M		**FILL**
		E	105.6					**FILL: Sandy GRAVEL**: fine to coarse grained, rounded to sub-rounded, pale brown, black stained soils, strong hydrocarbon odour.			
					0.5		CH	**FILL: Silty CLAY**: fine to coarse grained, high plasticity, dark brown/ black, slight hydrocarbon odour, fine grained pale brown sand.	>Wp		
		E	1.5								
					1.0		SP	**FILL: SAND**: fine to coarse grained, brown, strong hydrocarbon odour.	M		
	water inflow	E	170		1.5		CH	**CLAY**: high plasticity, brown, green staining, strong hydrocarbon odour.	>Wp		**RESIDUAL SOIL**
		E	10.5					becoming a slight hydrocarbon odour			
					2.0						
								Borehole BH14 terminated at 2.10 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

		Hole ID.	**BH15**
		sheet:	1 of 1
		project no.	**754-NTLEN271167**
client:	**GHT HOLDINGS PTY LTD**	date started:	**23 Jun 2020**
principal:	**PERCEPTION PLANNING PTY LTD**	date completed:	**23 Jun 2020**
project:	**DETAILED SITE INVESTIGATION**	logged by:	**SR**
location:	**107-117 SWAN STREET, MORPETH, NSW**	checked by:	**HL**

position: E: 371527; N: 6378230 (MGA94 Zone 56) surface elevation: Not Specified angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted drilling fluid: hole diameter : 350 mm

drilling information						material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0.8					**FILL: ASPHALT (50MM)**.	M		**ASPHALT**
							GP	**FILL: Sandy GRAVEL**: fine to coarse grained, rounded to sub-rounded, orange/ brown, rounded rock fragments.			**FILL**
					0.5		CH	**Silty CLAY**: high plasticity, black/ dark brown.	>Wp		**RESIDUAL SOIL**
		E	0		1.0						
					1.5						
		E	0		2.0						
					2.5			Borehole BH15 terminated at 2.20 m Target depth			

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH16**
sheet:	1 of 1
project no.	***754-NTLEN271167***
date started:	***23 Jun 2020***
date completed:	***23 Jun 2020***
logged by:	***SR***
checked by:	***HL***

client: ***GHT HOLDINGS PTY LTD***
principal: ***PERCEPTION PLANNING PTY LTD***
project: ***DETAILED SITE INVESTIGATION***
location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371425; N: 6378372 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter :

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0		SC	**FILL: CLAYEY SAND**: fine to coarse grained, brown/ dark brown/ orange brown, traces metals.	M		**FILL**
					0.4		CH	**CLAY**: high plasticity.	>Wp		
					0.5						
	▶ (0.8)	E	0		0.8			hit old water pipe in side of borehole @ 0.8m bgs			
					1.0						
					1.5						
		E	0		1.8		CI-CH	**Gravelly Sandy CLAY**: fine to coarse grained, platy, medium to high plasticity, mottled orange/ brown, fragments of shale.			**RESIDUAL SOIL**
					2.0						
					2.3			Borehole BH16 terminated at 2.30 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH17**
sheet:	1 of 1
project no.	**754-NTLEN271167**

client:	***GHT HOLDINGS PTY LTD***	date started:	***23 Jun 2020***
principal:	***PERCEPTION PLANNING PTY LTD***	date completed:	***23 Jun 2020***
project:	***DETAILED SITE INVESTIGATION***	logged by:	***SR***
location:	***107-117 SWAN STREET, MORPETH, NSW***	checked by:	***HL***

position: E: 371432; N: 6378375 (MGA94 Zone 56) surface elevation: Not Specified angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted drilling fluid: hole diameter : 350 mm

drilling information						material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
	23-06-20	E	0				GP	**FILL: GRAVEL**: fine to coarse grained, sub-angular to angular, grey, slight hyrdocarbon odour.	D		**FILL**
		E	0						W		
					0.5			Borehole BH17 terminated at 0.40 m Collapse			
					1.0						
					1.5						
					2.0						
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

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Environmental Log - Borehole

Hole ID.	**BH17A**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: ***GHT HOLDINGS PTY LTD***

principal: ***PERCEPTION PLANNING PTY LTD***

project: ***DETAILED SITE INVESTIGATION***

location: ***107-117 SWAN STREET, MORPETH, NSW***

position: E: 371424; N: 6378372 (MGA94 Zone 56) | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Excavator mounted | drilling fluid: | hole diameter : 350 mm

drilling information						material substance					
method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
	23-06-20		0				GP	**FILL: GRAVEL**: fine to coarse grained, sub-angular to angular, grey, slight hydrocarbon odour.	D W		**FILL**
					0.5			Borehole BH17A terminated at 0.40 m Collapse			
					1.0						
					1.5						
					2.0						
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

coffey
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Environmental Log - Borehole

Hole ID.	**BH17B**
sheet:	1 of 1
project no.	**754-NTLEN271167**

client:	***GHT HOLDINGS PTY LTD***	date started:	***23 Jun 2020***
principal:	***PERCEPTION PLANNING PTY LTD***	date completed:	***23 Jun 2020***
project:	***DETAILED SITE INVESTIGATION***	logged by:	***SR***
location:	***107-117 SWAN STREET, MORPETH, NSW***	checked by:	***HL***

position: E: 371428; N: 6378371 (MGA94 Zone 56) surface elevation: Not Specified angle from horizontal: 90°
equipment type: 4-6t Excavator, Excavator mounted drilling fluid: hole diameter : 350 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0					**FILL: ASPHALT (50MM).**	M		**FILL**
							GP	**FILL: Sandy GRAVEL**: fine to coarse grained, rounded to sub-angular, orange/brown.			
					0.5		CH	**Silty CLAY**: high plasticity, black, slight hydrocarbon odour @0.8m bgs.	>Wp		**RESIDUAL SOIL**
		E	35.7		1.0						
					1.5				<Wp		
		E	1702				CI-CH	**Gravelly Sandy CLAY**: medium to high plasticity, pale brown/ mottled orange, very strong hydrocarbon odour.			
					2.0		CI-CH	**Sandy CLAY**: medium to high plasticity, white, shale fragments, very strong hydrocarbon odour.			
		E	370								
								Borehole BH17B terminated at 2.30 m Target depth			
					2.5						

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method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Environmental Log - Borehole

Hole ID.	**BH18**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: ***GHT HOLDINGS PTY LTD***

principal: ***PERCEPTION PLANNING PTY LTD***

project: ***DETAILED SITE INVESTIGATION***

location: ***107-117 SWAN STREET, MORPETH, NSW***

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: 4-6t Excavator, Bob Cat mounted | drilling fluid: | hole diameter : 350 mm

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description (SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	structure and additional observations
								FILL: CONCRETE.	M		**CONCRETE**
		E	0				SP	**FILL: Gravelly SAND**: fine to coarse grained, black, brick fragments.			**FILL**
					0.5		CH	**Silty CLAY**: high plasticity, black.	>Wp		**RESIDUAL SOIL**
		E	0		1.0						
							CH	**Sandy CLAY**: fine to coarse grained, high plasticity, orange brown/ brown, fine to coarse grained sands.			
							CH	**Sandy CLAY**: high plasticity, white.			
					1.5						
		E	0								
					2.0			Borehole BH18 terminated at 2.00 m Target depth			
					2.5						

CDF_0_9_07_LIBRARY.GLB rev:AU Log COF BOREHOLE: ENVIRONMENTAL 754-NTLEN271167.GPJ <<DrawingFile>> 31-08-2020 15:25

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- MR mud rotary
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nill

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

samples & field tests
- ALT air lift test
- B bulk disturbed sample
- D disturbed sample
- E environmental sample
- SS split spoon sample
- U## undisturbed sample ##mm diameter
- WS water sample
- HB hammer bouncing
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- PID photoionization detector
- R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

consistency / relative density
- VS very soft
- S soft
- F firm
- St stiff
- VSt very stiff
- H hard
- Fb friable
- VL very loose
- L loose
- MD medium dense
- D dense
- VD very dense

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Environmental Log - Borehole

Hole ID.	**BH19**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**23 Jun 2020**
date completed:	**23 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: ***GHT HOLDINGS PTY LTD***
principal: ***PERCEPTION PLANNING PTY LTD***
project: ***DETAILED SITE INVESTIGATION***
location: ***107-117 SWAN STREET, MORPETH, NSW***

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°
equipment type: 4-6t Excavator, Bob Cat mounted | drilling fluid: | hole diameter : 350 mm

drilling information / **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description **SOIL NAME**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
								FILL: ASPHALT (100MM).	D		**ASPHALT**
		E	0				GP	**FILL: Gravelly SAND**: fine to coarse grained, rounded to sub-angular, black, trace brick fragments.	M		**FILL**
					0.5		CH	**Silty CLAY**: high plasticity, black.	>Wp		**RESIDUAL SOIL**
		E	0		1.0						
							CH	**Sandy CLAY**: fine to coarse grained, high plasticity, orange brown/ brown, fine to coarse sands.			
							CH	**Sandy CLAY**: high plasticity, white.			
					1.5						
		E	0								
					2.0			Borehole BH19 terminated at 2.00 m Target depth			
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

coffey
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Environmental Log - Borehole

Hole ID.	**BH20**
sheet:	1 of 1
project no.	**754-NTLEN271167**
date started:	**24 Jun 2020**
date completed:	**24 Jun 2020**
logged by:	**SR**
checked by:	**HL**

client: **GHT HOLDINGS PTY LTD**

principal: **PERCEPTION PLANNING PTY LTD**

project: **DETAILED SITE INVESTIGATION**

location: **107-117 SWAN STREET, MORPETH, NSW**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: Hand Auger | drilling fluid: | hole diameter : 100 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0				SC	**FILL: CLAYEY SAND**: fine to coarse grained, brown, buidling debris on soil surface.	M		**FILL**
					0.5		CH	**Silty CLAY**: high plasticity, brown/ black.	~Wp - <Wp		**RESIDUAL SOIL**
		E	0		1.0				>Wp		
					1.5			Borehole BH20 terminated at 1.20 m Collapse			
					2.0						
					2.5						

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

Environmental Log - Borehole

Hole ID.	**BH21**
sheet:	1 of 1
project no.	**754-NTLEN271167**
client:	**GHT HOLDINGS PTY LTD**
principal:	**PERCEPTION PLANNING PTY LTD**
project:	**DETAILED SITE INVESTIGATION**
location:	**107-117 SWAN STREET, MORPETH, NSW**
date started:	**24 Jun 2020**
date completed:	**24 Jun 2020**
logged by:	**SR**
checked by:	**HL**

position: Not Specified | surface elevation: Not Specified | angle from horizontal: 90°

equipment type: Hand Auger | drilling fluid: | hole diameter : 100 mm

drilling information | **material substance**

method & support	water	samples & field tests	photoionization detector (ppmv)	RL (m)	depth (m)	graphic log	soil group symbol	material description — SOIL NAME: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	structure and additional observations
		E	0		0.0–0.3		GP	**FILL: Gravelly SAND**: fine to coarse grained, sub-rounded to angular, brown, building debris on soil surface.	M		**FILL**
		E	0		0.3–1.5		CH	**Silty CLAY**: high plasticity, brown/ black.	~Wp - <Wp (to 0.8); >Wp		**RESIDUAL SOIL**
		E	0								
					1.5			Borehole BH21 terminated at 1.50 m Collapse			

Depth scale: 0.5, 1.0, 1.5, 2.0, 2.5

method
AD auger drilling*
AS auger screwing*
HA hand auger
MR mud rotary
W washbore
* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nill

water
10-Oct-12 water level on date shown
water inflow
water outflow

samples & field tests
ALT air lift test
B bulk disturbed sample
D disturbed sample
E environmental sample
SS split spoon sample
U## undisturbed sample ##mm diameter
WS water sample
HB hammer bouncing
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
PID photoionization detector
R refusal

soil group symbol & soil description
based on AS 1726:2017

moisture condition
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

consistency / relative density
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

APPENDIX H – BORE LOGS

JOB : 107-117 Swan St., Morpeth NSW	TEST Bore No. A	
Surface elevation: Gravel	TEST PIT LOCATION: Site of Former USTs – front of shop and at street frontage	
Date:26/07/18 Logged By: S.Smith	Drill Type: solid flyght mechanical auger Checked By : G. Nordholf	

SOIL DESCRIPTION	DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
Gravel, minor grass (25mm thick)	0.00 0.40		GW	No odour, no staining	**A 0.3**
Clean Fill in position of former UST Sandy clay & river gravel	2.00		SM	No odour, no staining	
Light Brown Clay			MH	No odour, no staining	**A 2.1**
Shale/ironstone weather rock – End of hole TCB refusal.	2.6		Sh	No odour, no staining No groundwater PID <5ppm	

SHEET NO. 1 OF 9

TEST PIT LOG : PE A

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

Surface elevation	grass	TEST PIT LOCATION: edge of concrete slab at street frontage			
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf			
JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. B			
SOIL DESCRIPTION	DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
Road Base, grass , minor topsoil	0.00 0.30		GW	No odour, no staining	
Sandy PEAT, Silty sand			SM	Hydrocarbon odour, no staining PID 80ppm	**B 0.7** **BD (Field duplicate)**
	2.5		SH	No odour, no staining	
Shale/ironstone weather rock – End of hole TCB refusal.				No odour, no staining No groundwater	
SHEET NO. 2 OF 9		**TEST PIT LOG : PE B**			

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. C				
Surface elevation: concrete		TEST PIT LOCATION: concrete slab at street frontage				
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf				
SOIL DESCRIPTION	DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS	
concrete	0.00 0.20			No odour, no staining		
Sandy PEAT, Silty sand			SM	No odour, no staining PID <5 ppm	**C 0.9**	
Shale/ironstone weather rock – End of hole TCB refusal.	2.70		SH	No odour, no staining No groundwater		

SHEET NO. 3 OF 9

TEST PIT LOG : PE C

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. D				
Surface elevation	grass	TEST PIT LOCATION: Behind concrete slab, grass area.				
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf				
SOIL DESCRIPTION		DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
Road Base, grass, road base and minor topsoil		0.00 0.30		GW	No odour, no staining	
Silty sandy clay		1.50		CL	Slight Hydrocarbon odour, no staining PID <5 ppm	**D 0.7**
End of hole					No groundwater	
SHEET NO. 4 OF 9		**TEST PIT LOG : PE D**				

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. E	
Surface elevation	grass	TEST PIT LOCATION: East of the driveway at street frontage	
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf	

SOIL DESCRIPTION	DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
Bedding sand, grass	0.00 0.10		GW	No odour, no staining	
Road base	0.60		SM	No odour, no staining	**E 0.6**
Silty sand, minor peat	0.90		SH	No odour, no staining	
Dark Grey silty clay	1.80			No odour, no staining	
Brown Clay with residual shale	2.5				
Minor gravel– End of hole	2.7			No groundwater	**E 2.7**
SHEET NO 5 OF 9				**TEST PIT LOG PE E**	

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW	TEST Bore No. F				
Surface elevation grass	TEST PIT LOCATION: Adjacent to back fence.				
Date:26/07/18 Logged By: S.Smith	Drill Type: solid flyght mechanical auger Checked By : G. Nordholf				
SOIL DESCRIPTION	DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
Grass & topsoil	0.00 0.30		GW	No odour, no staining	**F 0.3**
Sandy clay with minor peat	0.80		SM	No odour, no staining	
Sandy clay with minor peat	1.30		SH	No odour, no staining	
Light brown clay with minor gravel	2.00			No odour, no staining	**F 2.0**
Weathered shale with minor ironstone	2.5				
End of hole **SHEET NO 6 OF 9**				No groundwater **TEST PIT LOG PE F**	

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. G				
Surface elevation	grass	TEST PIT LOCATION: Western edge of concrete behind sheds/workshop				
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf				
SOIL DESCRIPTION		DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
Bedding sand, grass		0.00 0.20		GW	No odour, no staining	
Silty clay				CL	No odour, no staining	
End of hole		0.60				**G 0.6**
SHEET NO 7 OF 9					**TEST PIT LOG PE G**	

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. H				
Surface elevation	Grass	TEST PIT LOCATION: Yard behind house				
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf				
SOIL DESCRIPTION		DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
grass topsoil		0.00 0.7		GW	No odour, no staining No odour, no staining PID <5 ppm	H 0.7
Silty sandy clay		1.5		CL;	No odour, no staining No groundwater	

SHEET NO. 8 OF 9

TEST PIT LOG : PE H

PACIFIC ENVIRONMENTAL AUSTRALIA TEST BORE LOG

JOB : 107-117 Swan St., Morpeth NSW		TEST Bore No. I				
Surface elevation	concrete	TEST PIT LOCATION: Inside workshop concrete slab				
Date:26/07/18 Logged By: S.Smith		Drill Type: solid flyght mechanical auger Checked By : G. Nordholf				
SOIL DESCRIPTION		DEPTH (M)	GRAPHIC LOG	UNIFIED CLASSIFICATION SYMBOL	FIELD MONITORING	SAMPLE INTERVALS
concrete		0.00 0.20			No odour, no staining	
Silty Sandy clay				CL	No odour, no staining PID <5 ppm	**I 0.4**
Shale/ironstone weather rock – End of hole TCB refusal.		2.50		SH	No odour, no staining No groundwater	
SHEET NO. 9 OF 9		**TEST PIT LOG : PE I**				

Appendix G – Site Photographs

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Selected Site Photographs – 107 – 117 Swan Street, Morpeth

Photograph 1:
View south along eastern boundary of site

Photograph 2:
Gap in silt barriers on eastern boundary of site

Photograph 3:
Looking north east at stockpile area, covered in black plastic, stockpile on building footing

Photograph 4:
Construction material stockpiled on southern boundary of site, looking west

Photograph 5:

Silt barriers on the northern side of the stockpile

Photograph 6:

Closeup of stockpile showing mulch bunding around base and black plastic covering

Photograph 7:

Silt barriers on the eastern side of the stockpile, looking south

Photograph 8:

Sediment basin on northern border of site, looking south

 **Photograph 9:** **Showing silt barrier at northern end of sediment basin**	 **Photograph 10:** **Looking at source area of stockpiled material, looking west**
 **Photograph 11:** **Showing fragment of ACM at southern base of stockpile**	 **Photograph 12:** **Looking north at sediment basin and cut area**

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Photograph 13:
Looking at building in western portion of site

Photograph 14:
Showing fuel drum and construction materials within the shed area

Photograph 15:
Showing ACM panels within the building on site

Photograph 16:
Showing empty fuel drum within the covered shed area

 **Photograph 17:** **Showing rear of 2-storey building, looking north**	 **Photograph 18:** **Showing soil, vegetation and general waste stockpile on southern border of site**
 **Photograph 19:** **Showing brick and concrete building footing**	 **Photograph 20:** **Showing western boundary of the site, showing no silt barriers**

Photograph 21:

Showing stockpile SP1 looking east

Photograph 22:

Showing soil profile of BH01, sandy clays

Photograph 23:

Showing residual white sandy clay with traces of extremely weathered rock (BH09)

Photograph 24:

Showing residual clays and sandy clays observed in BH13

 **Photograph 25:** Showing material from BH14 with green staining on clay layer (1.4 – 2.1mbgs)	 **Photograph 26:** Showing ACM within the remaining structure on northern boundary of the site. ACM seen within brick footings.
 **Photograph 27:** Showing borehole location BH18 within the existing shed	 **Photograph 28:** Showing resdiual white sandy clay at location BH07

Appendix H – Calibration Certificates

Calibration Certificate

AirMet Scientific P/L
Level 3, 18-26 Dickson Avenue
Artarmon
NSW 2064, Australia
Tel: 02 8425 8300
Fax: 02 8425 8399

This document certifies that the instrument detailed has been calibrated to the parameters

Certificate Print Date: 9-Jun-2020
Call ID / Order No: 244058
Calibration Date: 05-Jun-2020
Job No / Pack No: S2440580001
Next Calibration Due: 2-Dec-2020

Customer: Coffey Environments Pty Ltd-ID 203374
Serial No: 595-001069
Description: MINIRAE

Calibration Summary

Frequency: 180 Days
Temp: 22°C
Humidity: 45%
As Found: In Tolerance
Certificate: S2440580001
Result: Pass

Desc	As Found Actual	As Found Result	As Left (Cal Status) Actual	As Left (Cal Status) Result
PID ISOBUTYLENE ppm	98.9	Pass	100.0	Pass

Standard Used

Equip ID	Description	Valid Until	Cert
SY320	Zero Grade Air 20.9%VOL O2, N2 Balance	31-03-2025	400291067
SY299	Isobutylene 100ppm	19-07-2024	

Completed By: Jason Cheng

Signed:

coffey
A TETRA TECH COMPANY

FIELD EQUIPMENT CALIBRATION DETAILS

Job/Site Details:

Project Name: MORPETH DSI	Project Number: NTHEN 271167
Fieldwork Date(s): 22.6	Work Completed By: SR
Type of Work (eg. ESA, GME, etc): Boreholes	

NB When completing service calibration details, refer to the calibration certificate which accompanies the equipment.

Photoionisation Detector (PID):

Equipment Description: Mini rae lite	Equipment ID: 595-001069	
Calibration Frequency Required by Manufacturer: 6 month	Last Service Date: 05/6/2020	Calibrated by : Ashtead
Challenge Gas Standard: Isobutylene 100.0ppm	Gas Batch #:	Gas Expiry date:
Field Challenge Details:		

1) Date/Time: 22/6 100.0	4) Date/Time:	7) Date/Time:	10) Date/Time:
2) Date/Time: 23/6 100.0	5) Date/Time:	8) Date/Time:	11) Date/Time:
3) Date/Time: 24/6 100.0	6) Date/Time:	9) Date/Time:	12) Date/Time:

Lower Explosive Level Meter (LEL):

Equipment Description:	Equipment ID:	
Calibration Frequency Required by Manufacturer:	Last Service Date:	Calibrated by :
Challenge Gas Standard:	Gas Batch #:	Gas Expiry date:
Field Challenge Details:	☐ Tick if recorded elsewhere on Hot Work Permit (No.____________)	

1) Date/Time:	4) Date/Time:	7) Date/Time:	10) Date/Time:
2) Date/Time:	5) Date/Time:	8) Date/Time:	11) Date/Time:
3) Date/Time:	6) Date/Time:	9) Date/Time:	12) Date/Time:

Water Quality Meter:

Equipment Description:	Equipment ID:	
Calibration Frequency Required by Manufacturer:	Last Service Date:	Calibrated by :
Calibration Standards:		
Field Calibration Record		

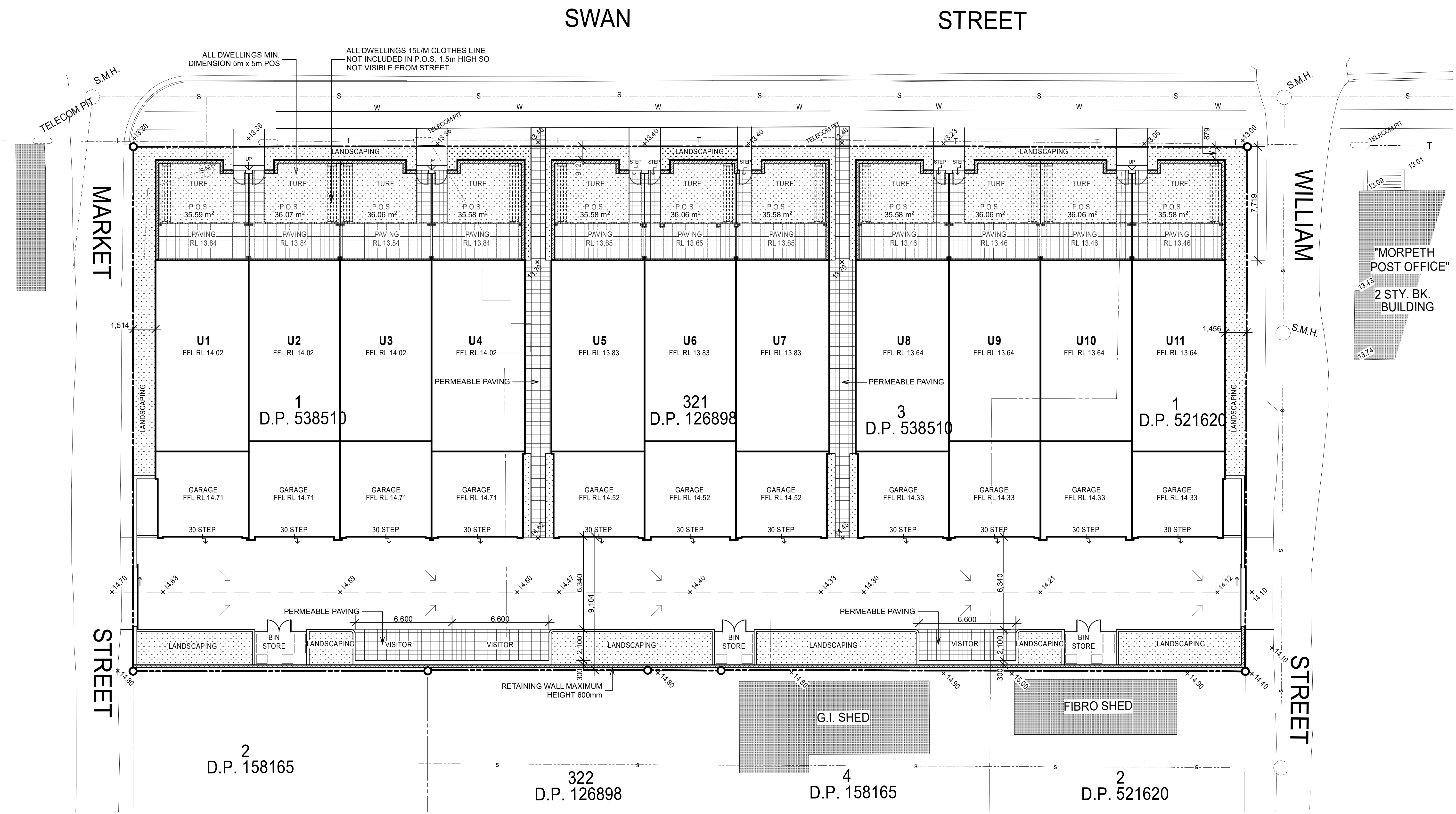
Date Calibrated	DO Probe	Conductivity	pH 4.0	pH 6.88	Temperature

Interface Probe (IP) :

Equipment Description:	Equipment ID:	
Calibration Frequency Required by Manufacturer:	Last Service Date:	Calibrated by :
Field Challenge Details:		

1) Date/Time:	4) Date/Time:	7) Date/Time:	10) Date/Time:
2) Date/Time:	5) Date/Time:	8) Date/Time:	11) Date/Time:
3) Date/Time:	6) Date/Time:	9) Date/Time:	12) Date/Time:

Appendix I – Development Plans



A	28/05/21 - HEIGHT REDUCED
ISSUE	DETAILS

SORENSEN DESIGN & PLANNING

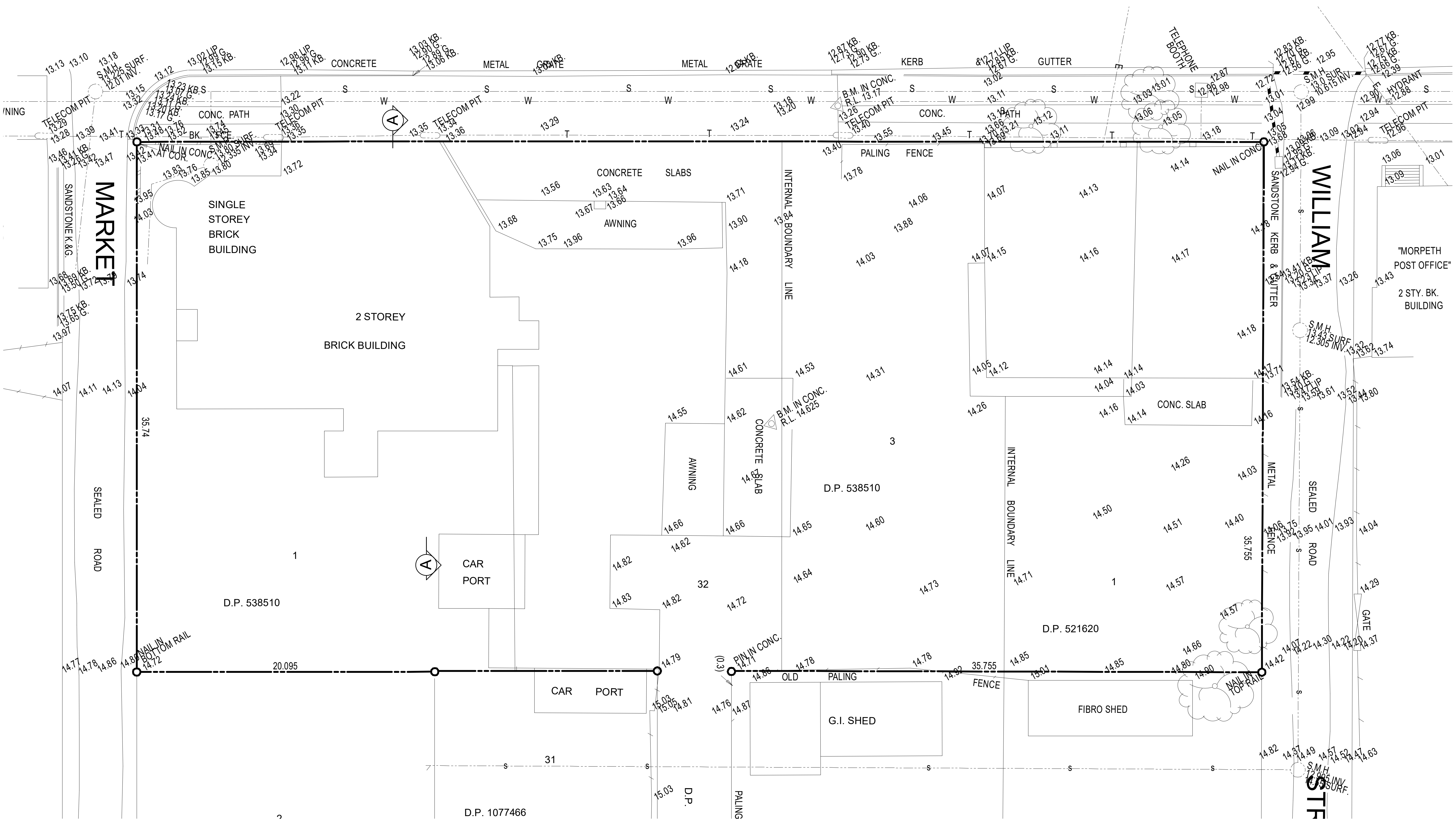
PORT STEPHENS OFFICE
Ph: (02) 4984 9955
Suite 4/ 10 Yacaaba Street
Nelson Bay NSW 2315

NEWCASTLE OFFICE
Ph: (02) 4961 5544

SINGLETON OFFICE
Ph: (02) 4961 5544

CONTACT DETAILS
General Enquiries:
reception@sorensendesign.com.au
www.sorensendesign.com.au

PROJECT:	107-117 SWAN STREET MORPETH
CLIENT:	UNICOMB
TITLE:	SITE PLAN
FILE:	2003016
DATE:	7/05/2021
SHEET:	1 OF 16



ISSUE	DETAILS
A	28/05/21 - HEIGHT REDUCED

SORENSEN DESIGN & PLANNING

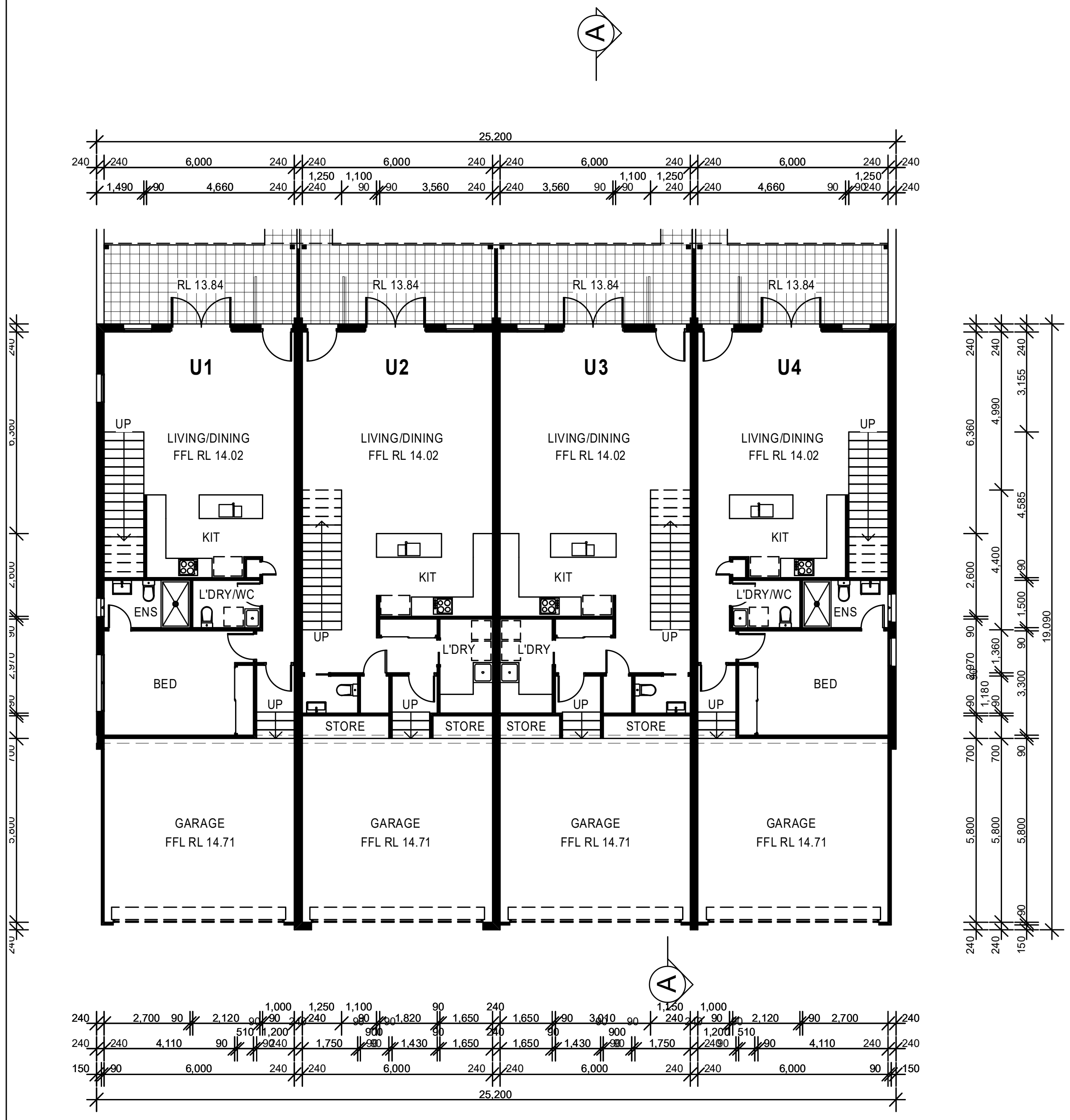
PORT STEPHENS OFFICE
Ph: (02) 4984 9955
Suite 4/ 10 Yacaaba Street
Nelson Bay NSW 2315

NEWCASTLE OFFICE
Ph: (02) 4961 5544

SINGLETON OFFICE
Ph: (02) 4961 5544

CONTACT DETAILS
General Enquiries:
reception@sorensendesign.com.au
www.sorensendesign.com.au

PROJECT	107-117 SWAN STREET MORPETH
CLIENT	UNICOMB
TITLE	SURVEY
FILE	2003016
DATE	7/05/2021
SHEET	2 OF 16



GROUND FLOOR / SITE PLAN

1:200

SITE ANALYSIS AREAS

SITE AREA	$2712.4m^2$
BUILDING FOOTPRINT	$1309.1m^2$
HARDSTAND	$562.0m^2$
PERMEABLE PAVING	$116.2m^2$
LANDSCAPED AREA	$331.1m^2$
PRIVATE OPEN SPACE	$394.0m^2$
SITE COVERAGE	69%

HIA GreenSmart PROFESSIONAL — MEMBER OF BUILDING DESIGNERS AUSTRALIA NSW — WINNER 2010 HIA Hunter Residential Building Designer of the Year — WINNER 2011 HIA Hunter Residential Building Designer of the Year

ISSUE	DETAILS
A	28/05/21 - HEIGHT REDUCED

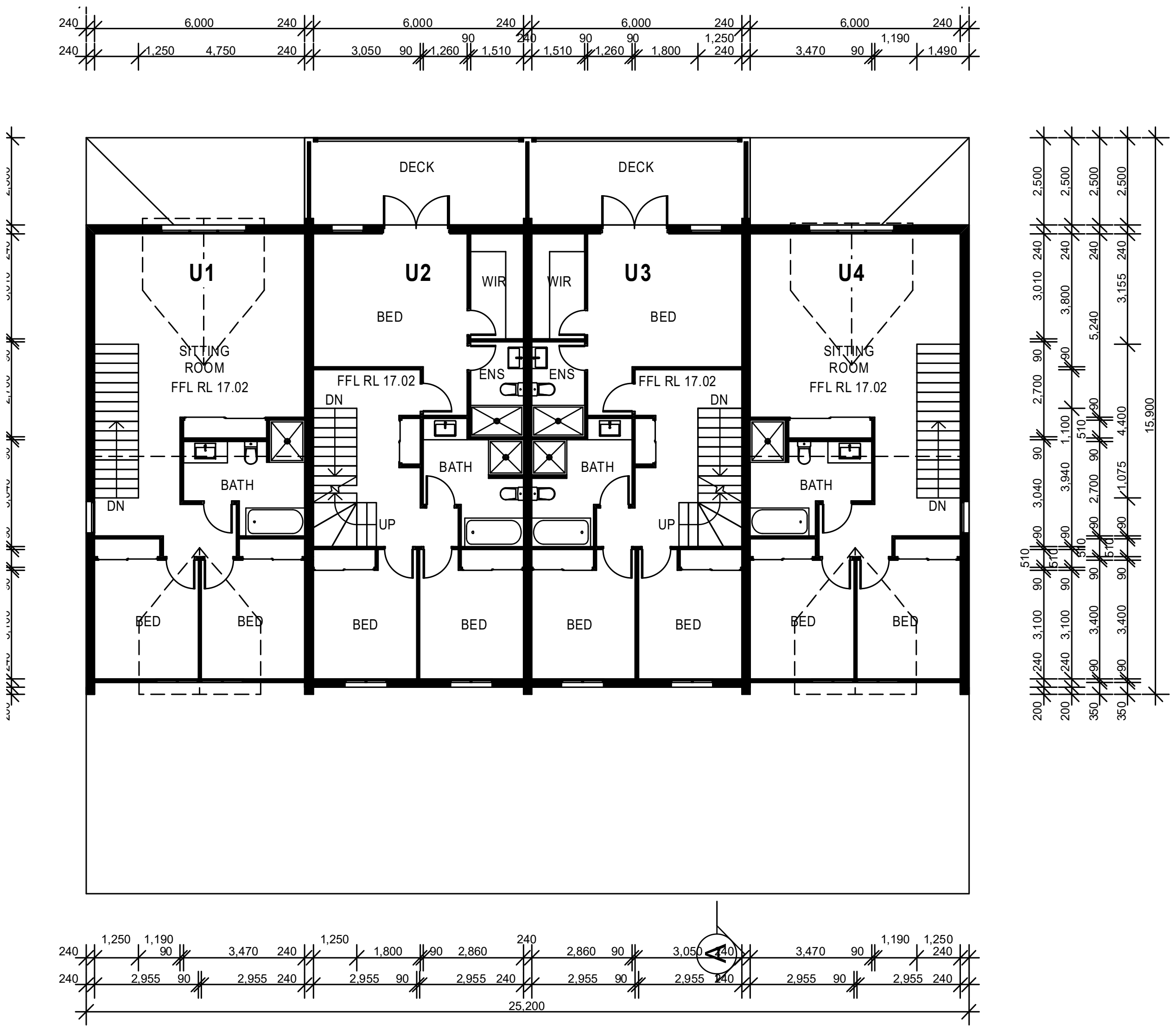
SORENSEN DESIGN & PLANNING

PORT STEPHENS OFFICE
Ph: (02) 4984 9955
Suite 4/ 10 Yacaaba Street
Nelson Bay NSW 2315

NEWCASTLE OFFICE
Ph: (02) 4961 5544
SINGLETON OFFICE
Ph: (02) 4961 5544

CONTACT DETAILS
General Enquiries:
reception@sorensendesign.com.au
www.sorensendesign.com.au

PROJECT:	107-117 SWAN STREET MORPETH
CLIENT:	UNICOMB
TITLE:	GROUND FLOOR PLAN
FILE:	2003016 DATE: 7/05/2021 SHEET: 3 OF 16



FIRST FLOOR PLAN

1:200

ISSUE	DETAILS
A	28/05/21 - HEIGHT REDUCED

SORENSEN DESIGN & PLANNING

PORT STEPHENS OFFICE
Ph: (02) 4984 9955
Suite 4/ 10 Yacaaba Street
Nelson Bay NSW 2315

NEWCASTLE OFFICE
Ph: (02) 4961 5544

SINGLETON OFFICE
Ph: (02) 4961 5544

CONTACT DETAILS
General Enquiries:
reception@sorensendesign.com.au
www.sorensendesign.com.au

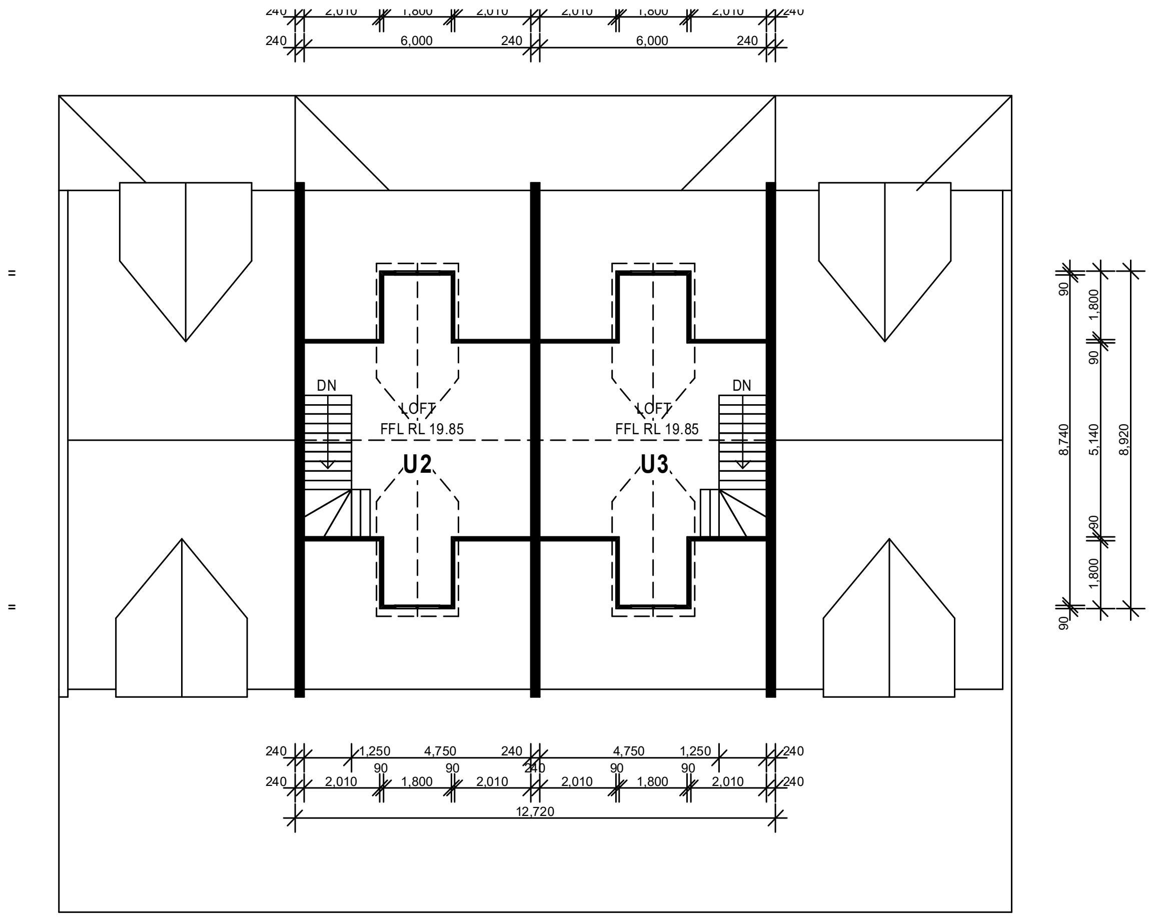
PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

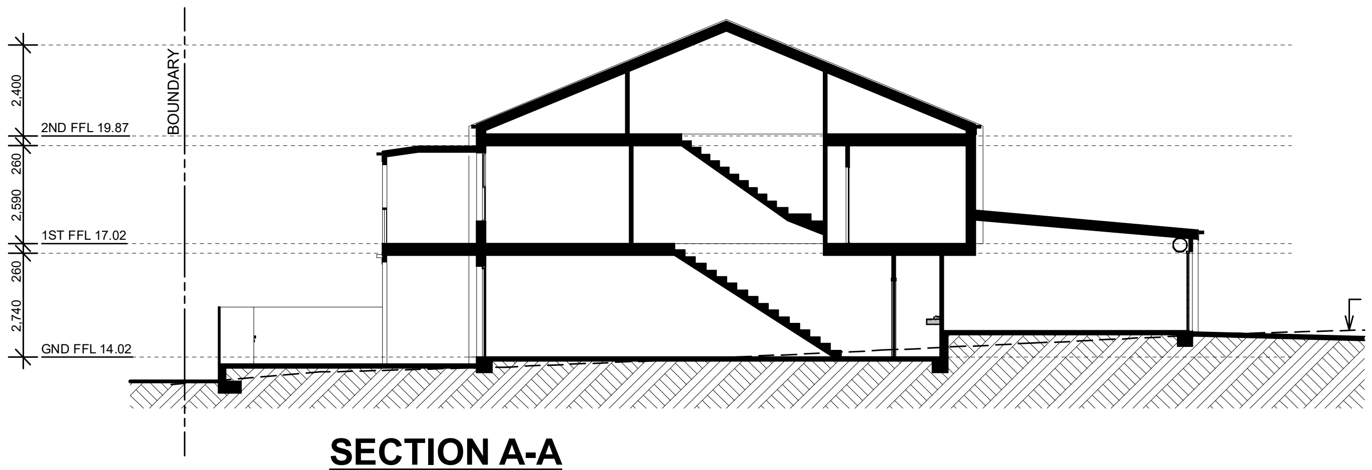
TITLE: FIRST FLOOR PLAN

FILE: 2003016 DATE: 7/05/2021 SHEET: 4 OF 16

A3



SECOND FLOOR PLAN
1:200



SECTION A-A
1:200

ISSUE	DETAILS
A	28/05/21 - HEIGHT REDUCED

SORENSEN
DESIGN & PLANNING

PORT STEPHENS OFFICE
Ph: (02) 4984 9955
Suite 4/ 10 Yacaaba Street
Nelson Bay NSW 2315

NEWCASTLE OFFICE
Ph: (02) 4961 5544

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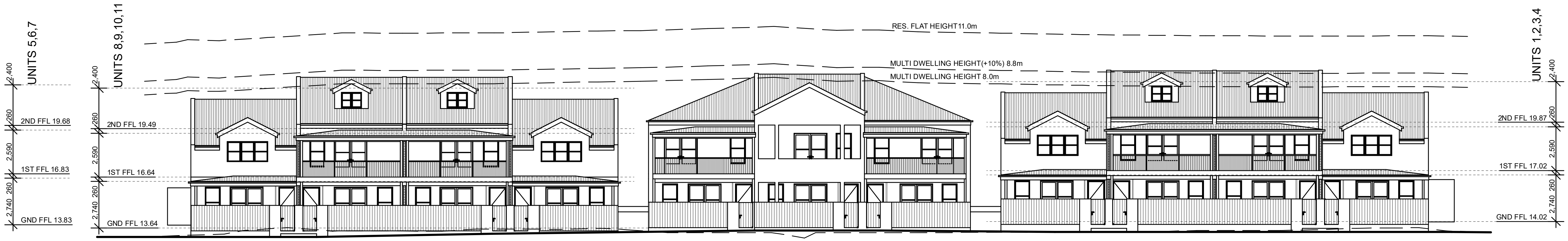
PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

TITLE: SECOND FLOOR PLAN & SECTION

FILE: 2003016 DATE: 7/05/2021 SHEET: 5 OF 16

A3



NORTH ELEVATION

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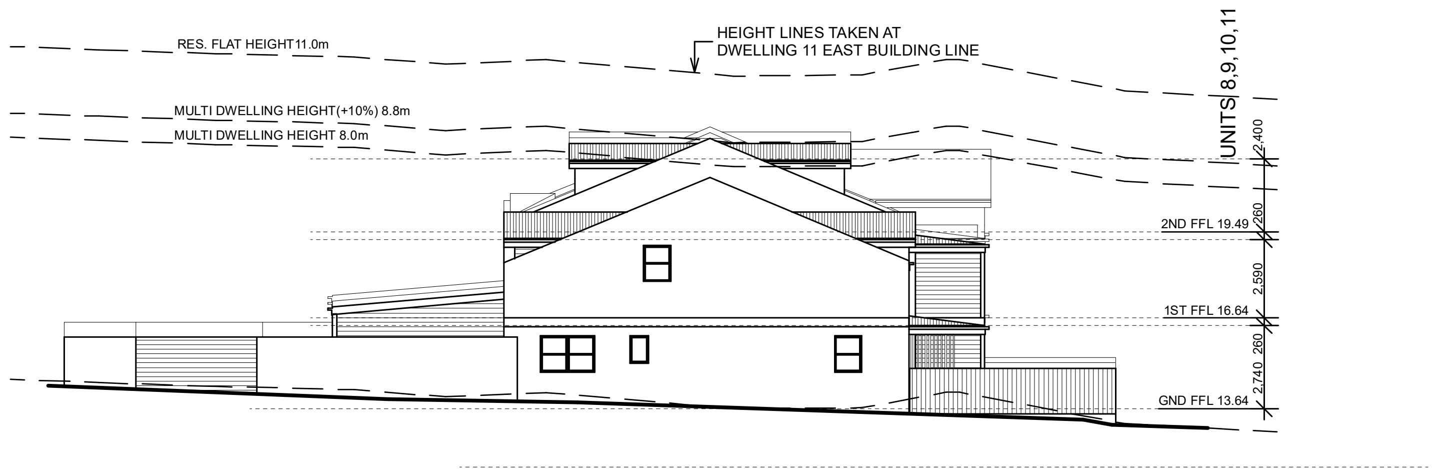

EAST ELEVATION

1:250

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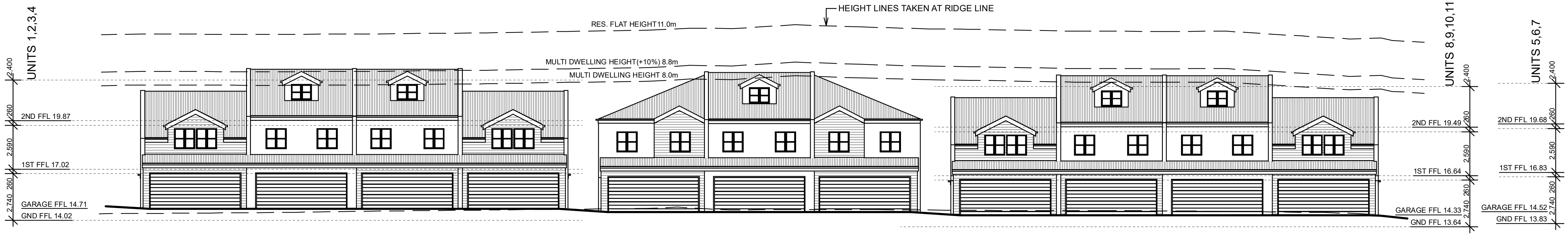
PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

TITLE: ELEVATIONS

FILE: 2003016 DATE: 7/05/2021 SHEET: 6 OF 16

A3



SOUTH ELEVATION

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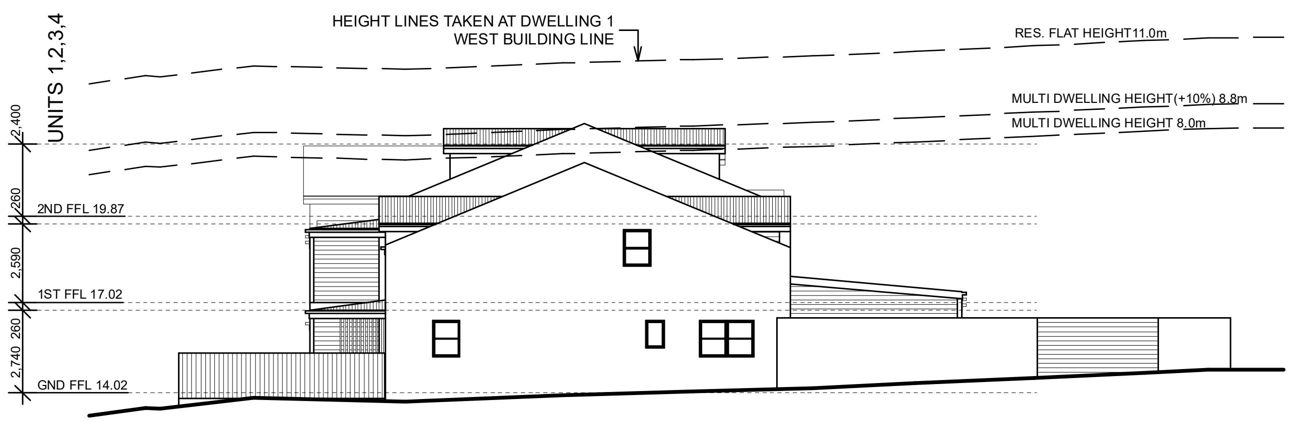

WEST ELEVATION

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PROJECT: 107-117 SWAN STREET MORPETH
CLIENT: UNICOMB
TITLE: ELEVATIONS
FILE: 2003016 DATE: 7/05/2021 SHEET: 7 OF 16

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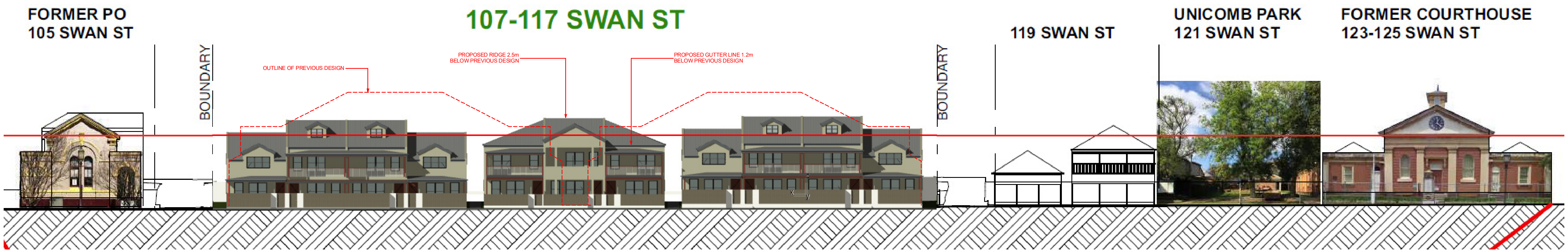

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PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

TITLE: STREETSCAPE

FILE: 2003016 DATE: 7/05/2021 SHEET: 8 OF 16

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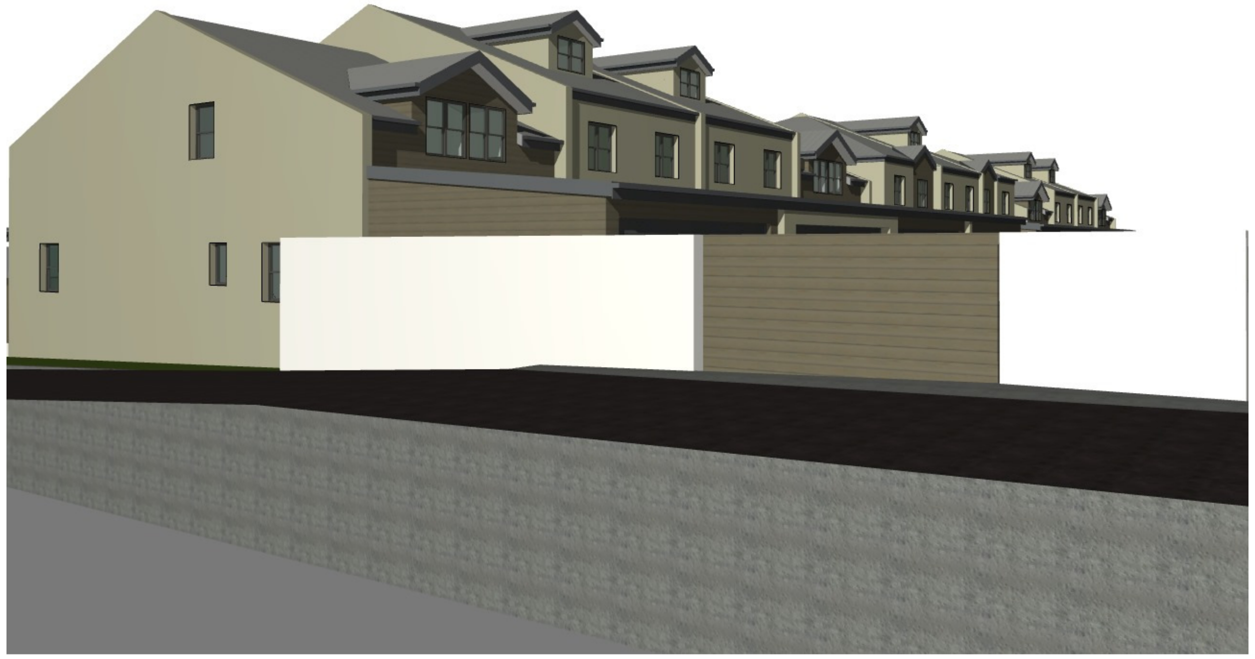
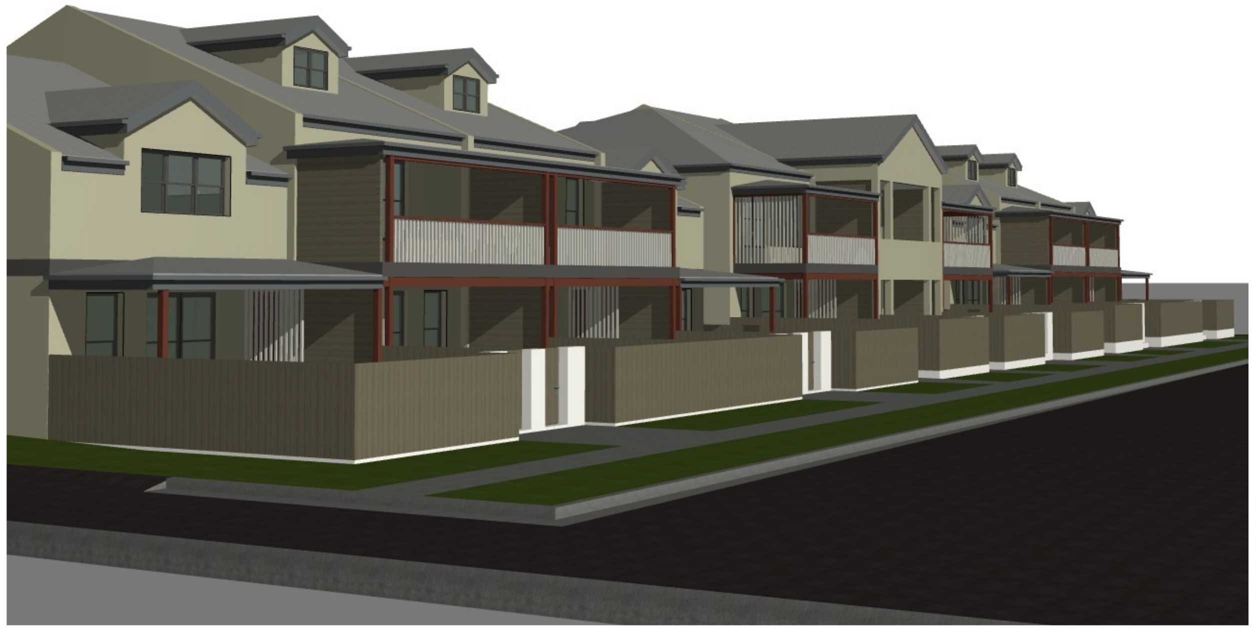
VIEW FROM NORTH WEST

VIEW FROM NORTH



VIEW FROM SOUTH EAST



VIEW FROM NORTH EAST

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PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

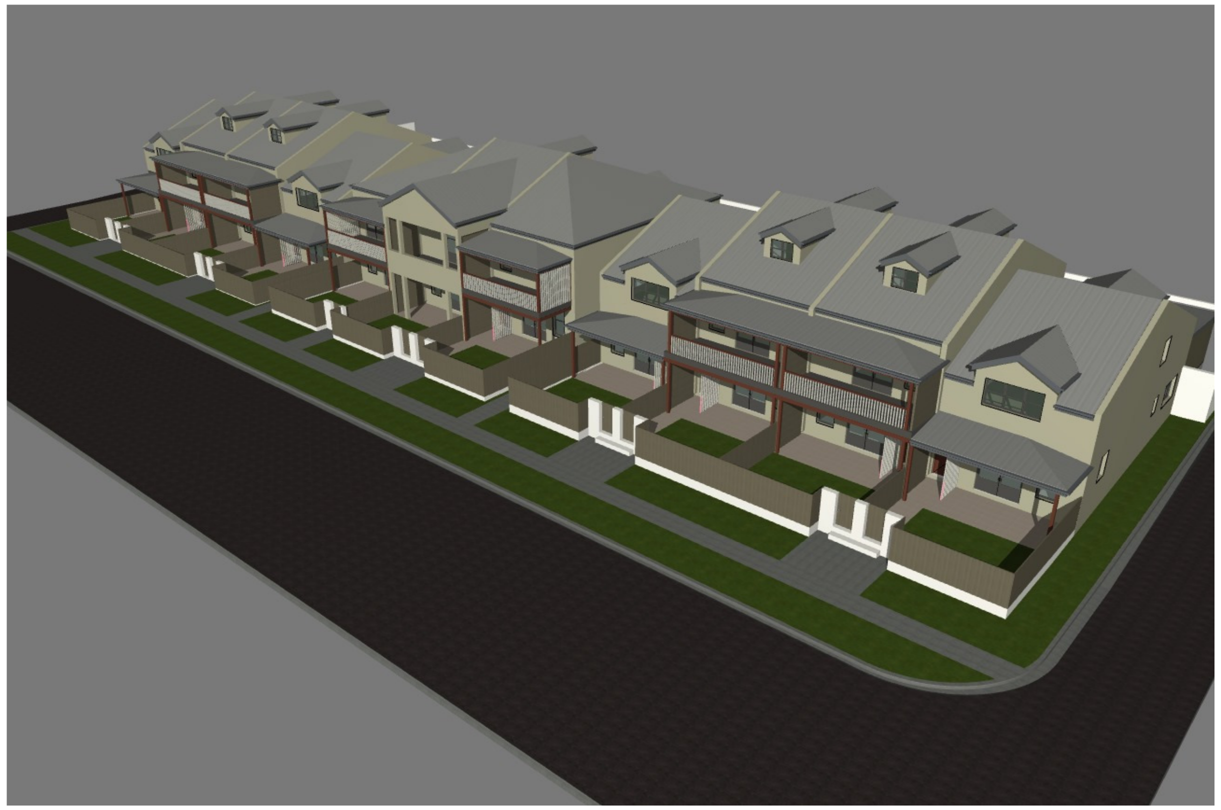
TITLE: 3D VIEWS

FILE: 2003016 DATE: 7/05/2021 SHEET: 9 OF 16

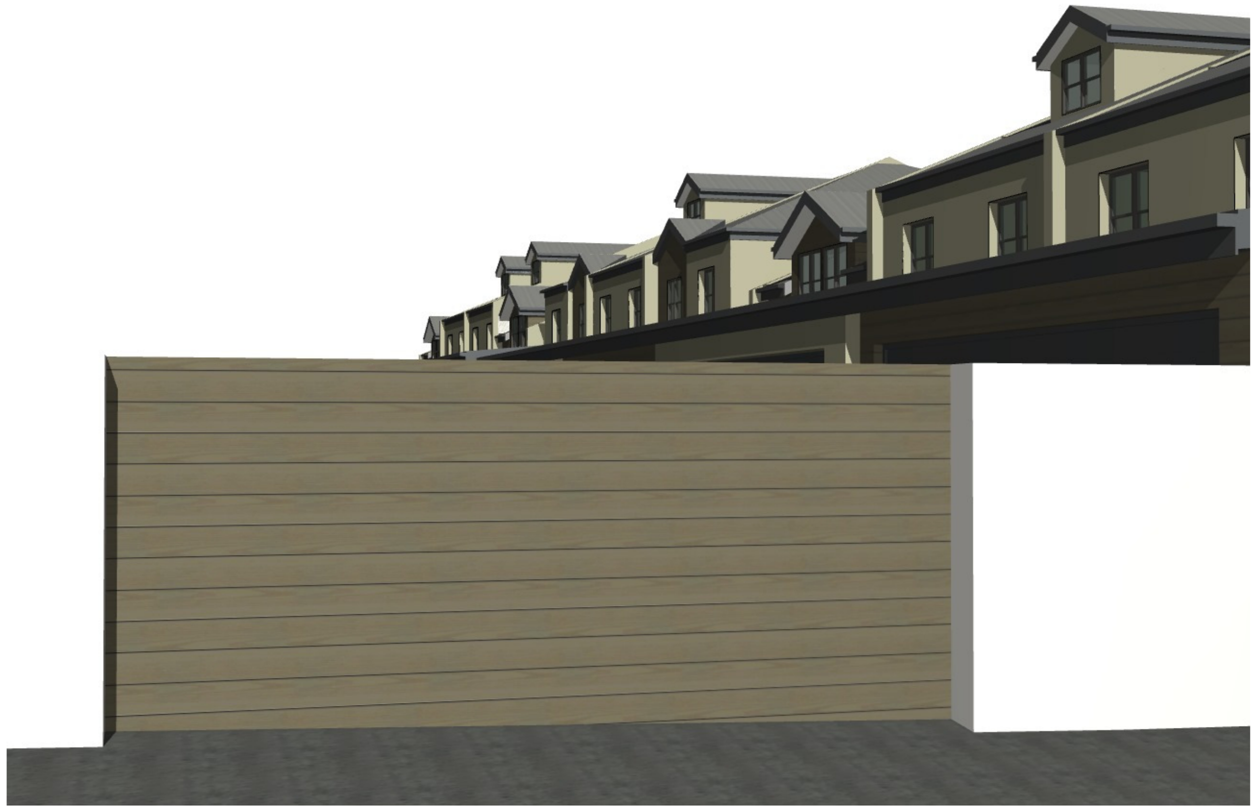
A3

SOUTH ELEVATION

NORTH ELEVATION



AERIAL VIEW



DRIVEWAY

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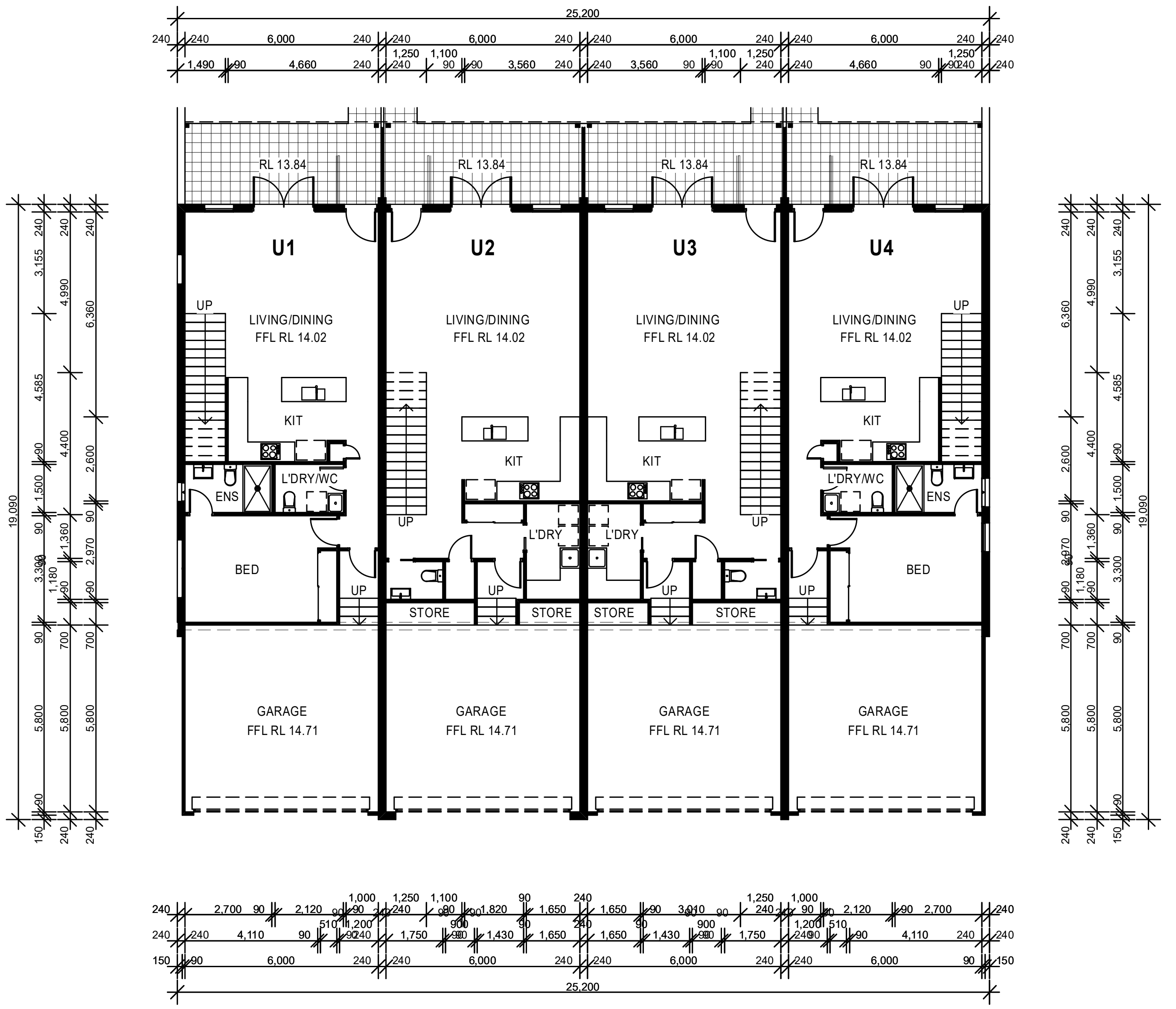
PROJECT: 107-117 SWAN STREET MORPETH

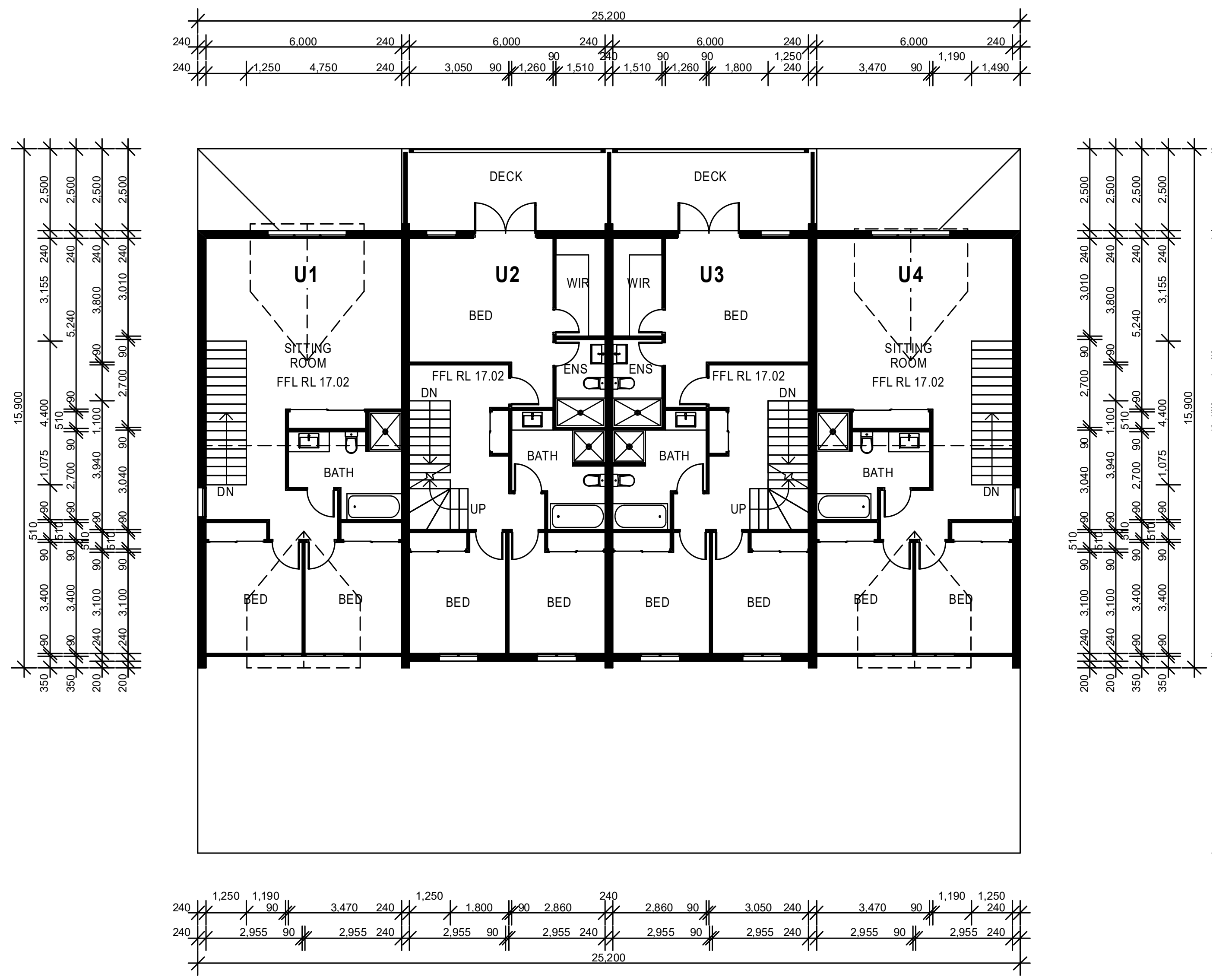
CLIENT: UNICOMB

TITLE: 3D VIEWS

FILE: 2003016 DATE: 7/05/2021 SHEET: 10 OF 16



GROUND FLOOR PLAN
1:200



FIRST FLOOR PLAN
1:200

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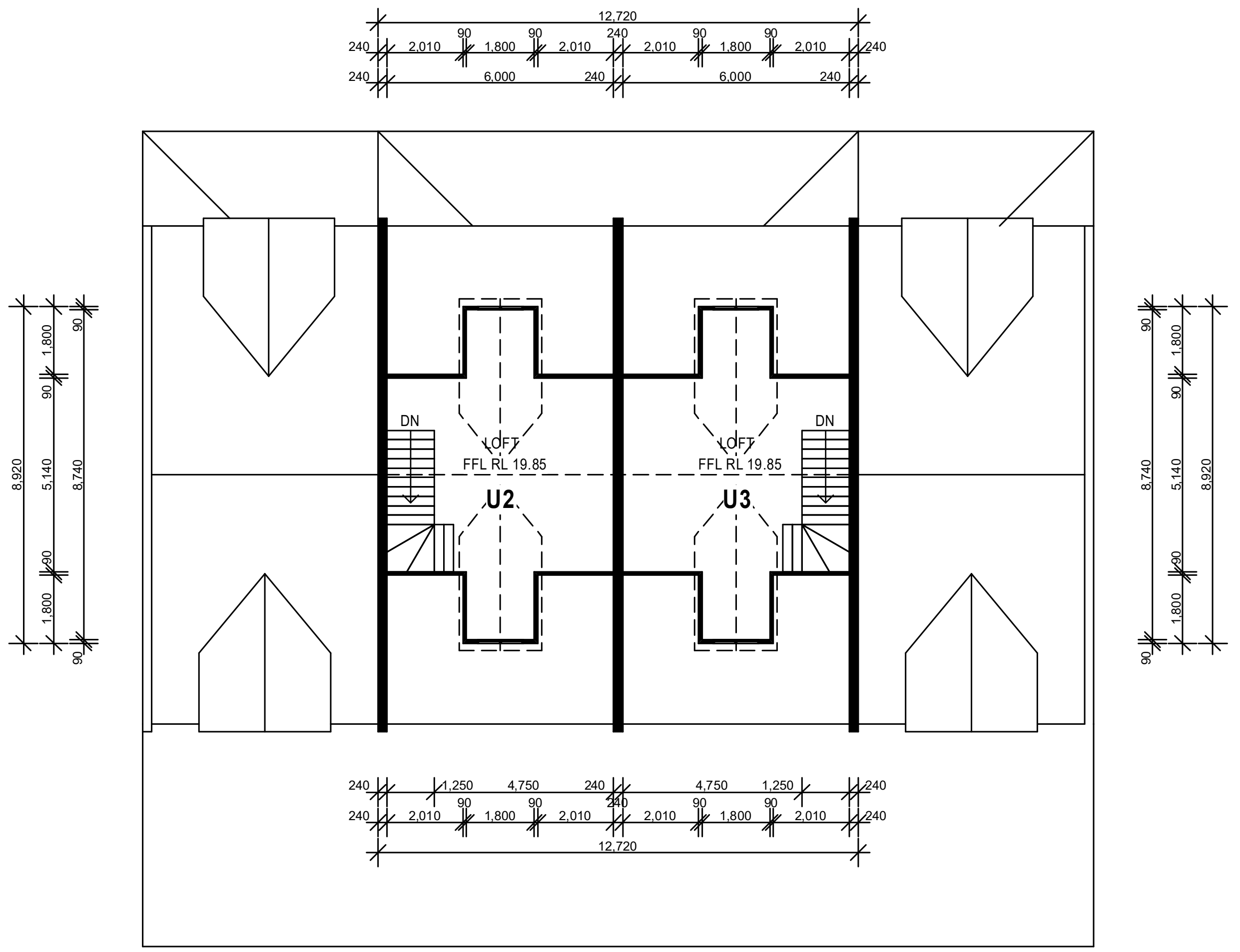
PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

TITLE: SETOUT PLANS U1,U2,U3,U4

FILE: 2003016 DATE: 7/05/2021 SHEET: 11 OF 16

A3



SECOND FLOOR PLAN

1:200

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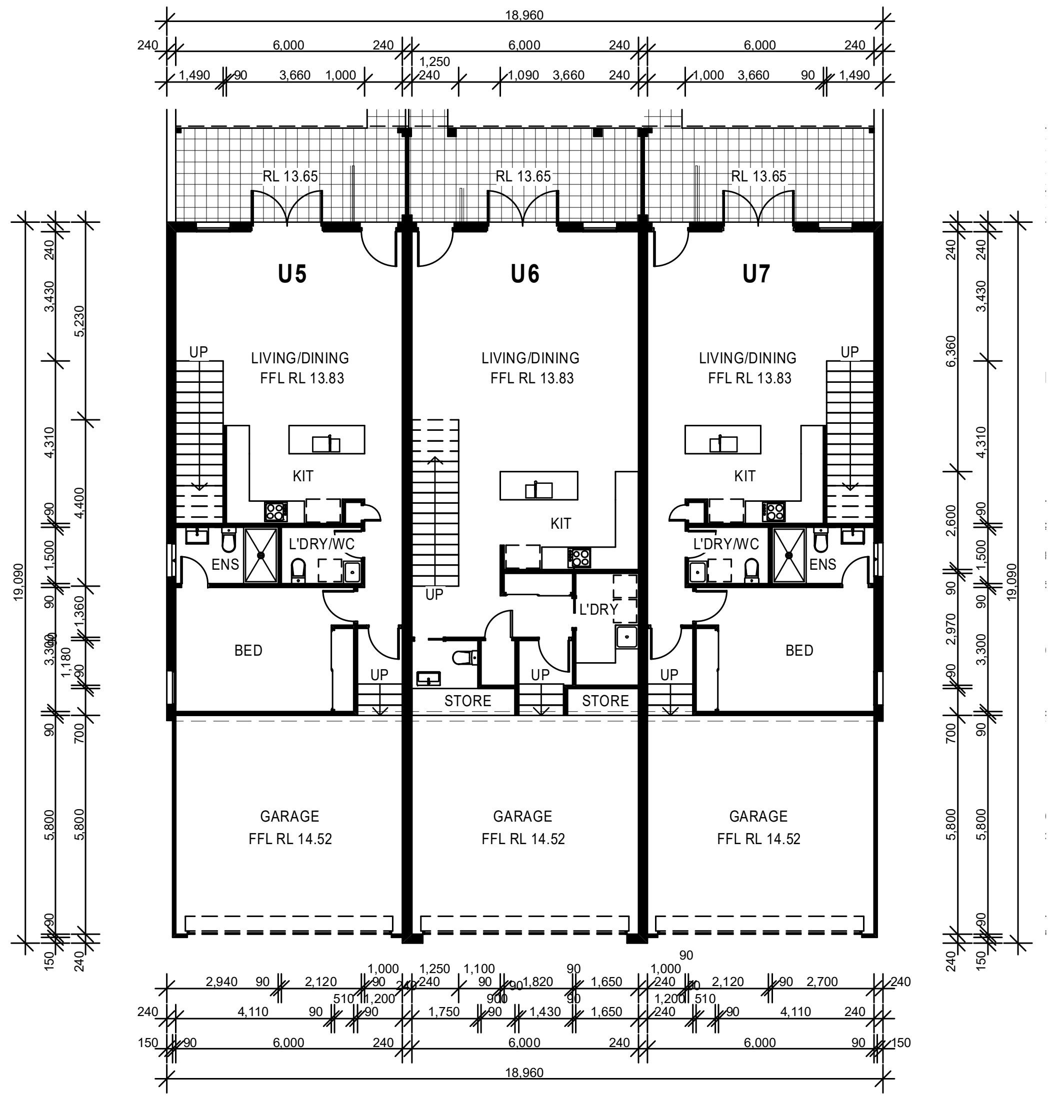
PROJECT: 107-117 SWAN STREET MORPETH

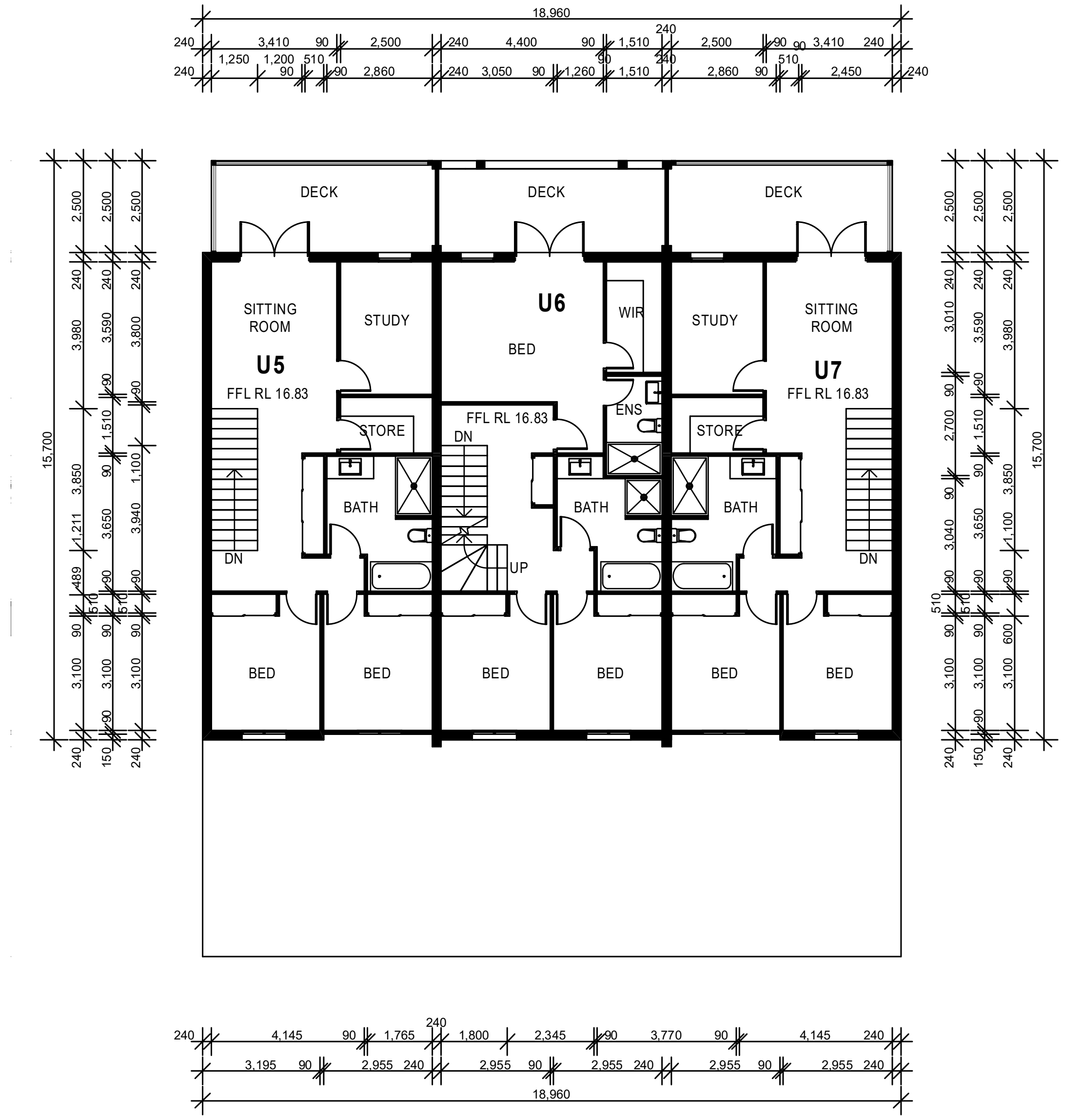
CLIENT: UNICOMB

TITLE: SETOUT PLANS U1,U2,U3,U4

FILE: 2003016 DATE: 7/05/2021 SHEET: 12 OF 16



GROUND FLOOR PLAN
1:200



FIRST FLOOR PLAN
1:200

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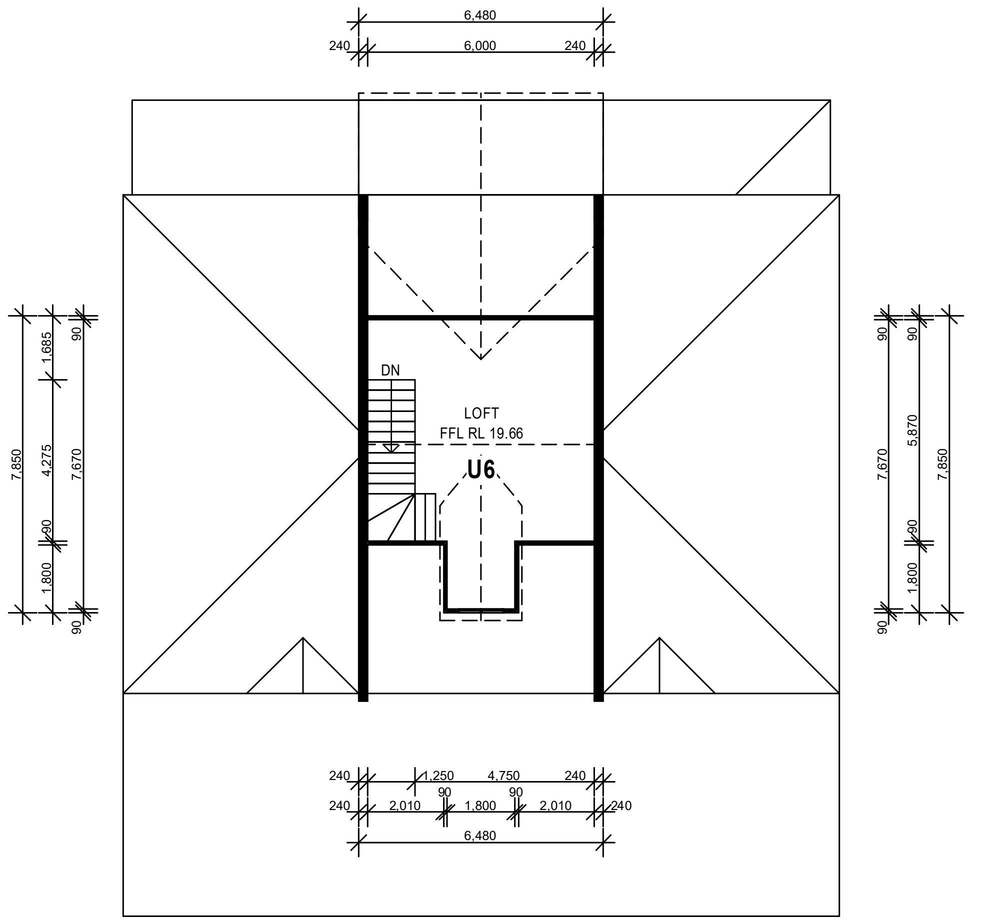
PROJECT:	107-117 SWAN STREET MORPETH
CLIENT:	UNICOMB
TITLE:	SETOUT PLANS U4,U5,U6
FILE:	2003016 DATE: 7/05/2021 SHEET: 13 OF 16



SECOND FLOOR PLAN

1:200

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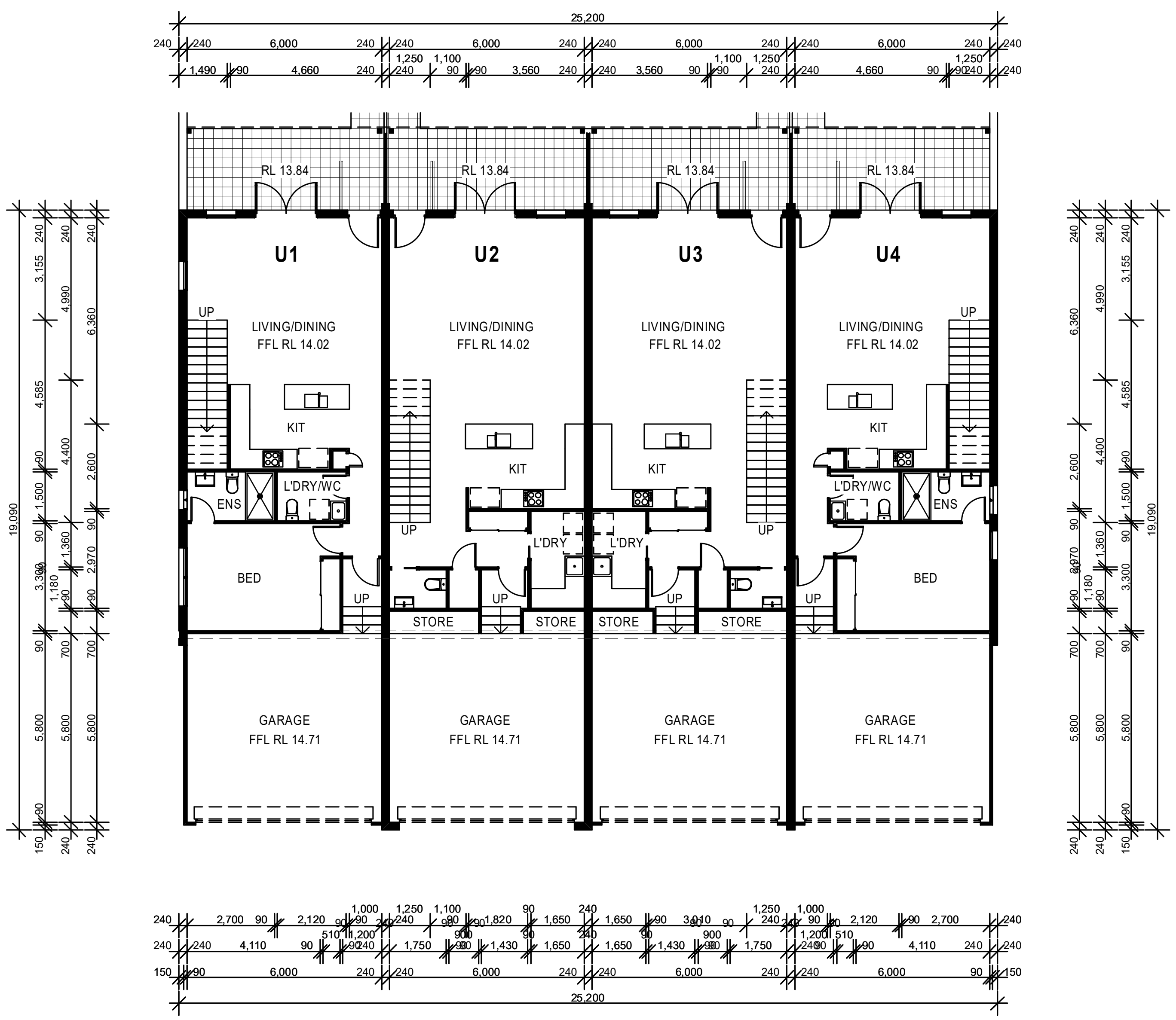
CLIENT: UNICOMB

TITLE: SETOUT PLANS U4,U5,U6

FILE: 2003016 DATE: 7/05/2021 SHEET: 14 OF 16

A3



GROUND FLOOR PLAN

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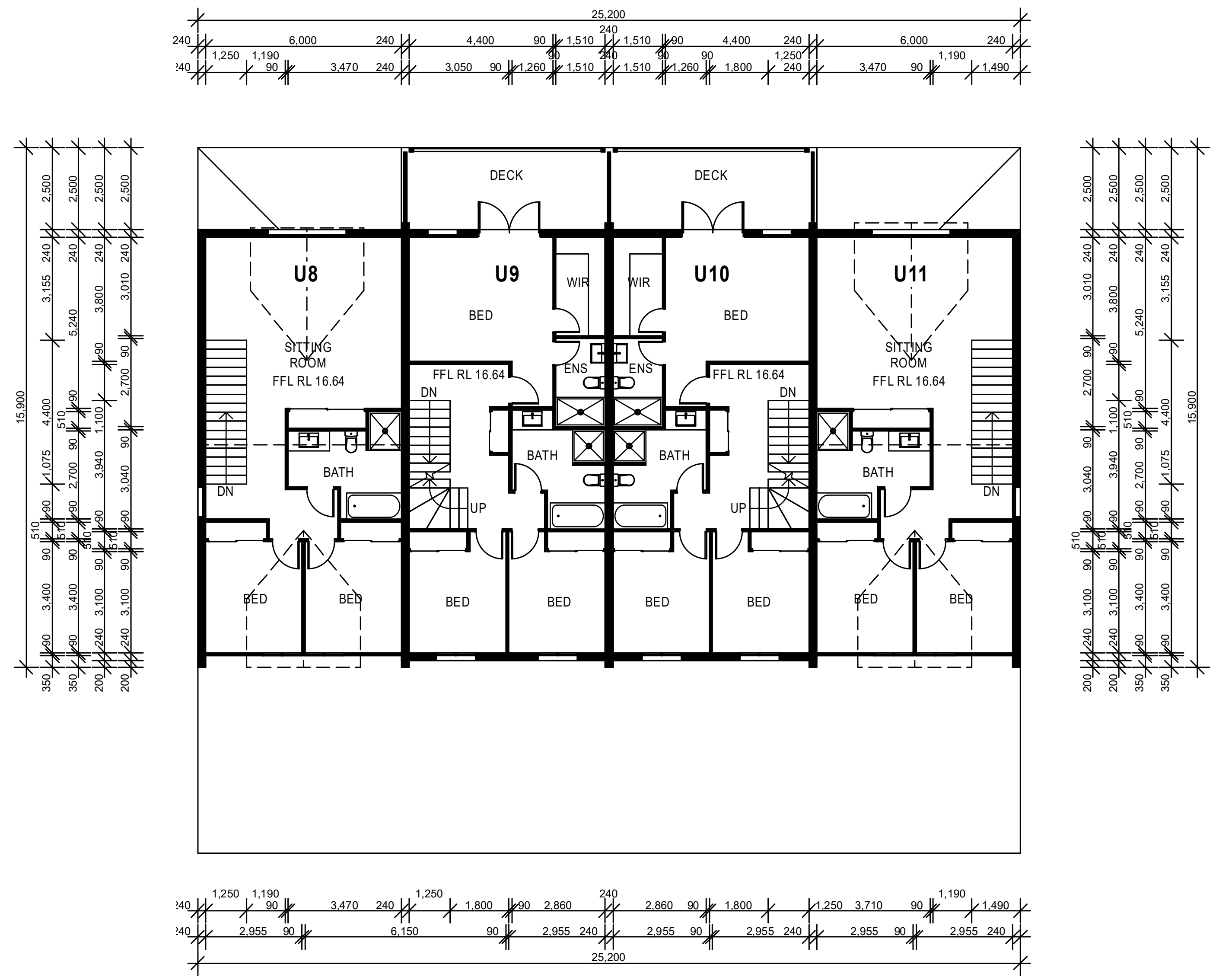

FIRST FLOOR PLAN

1:200

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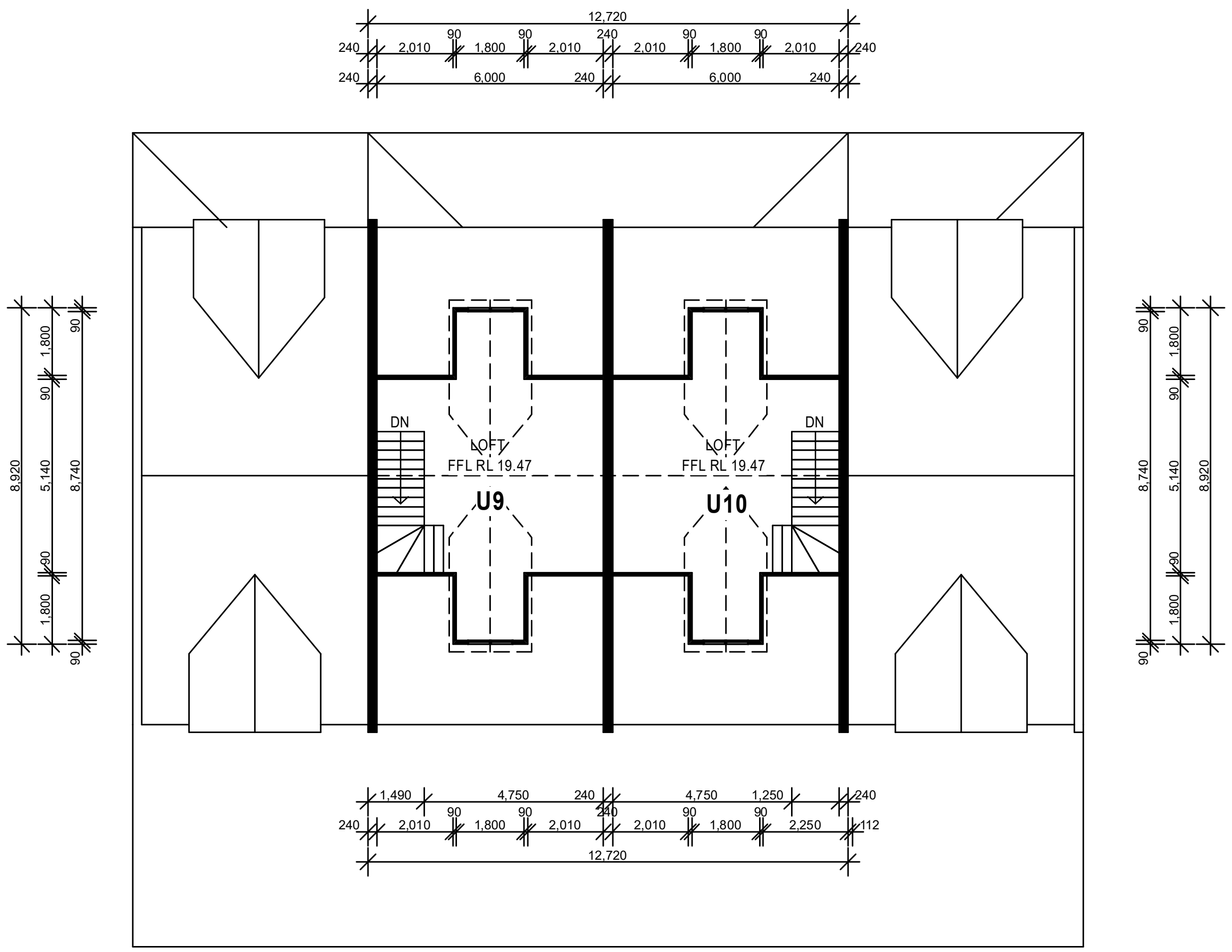
PROJECT: 107-117 SWAN STREET MORPETH

CLIENT: UNICOMB

TITLE: SETOUT PLANS U8,U9,U10,U11

FILE: 2003016 DATE: 7/05/2021 SHEET: 15 OF 16

A3



SECOND FLOOR PLAN

1:200

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CLIENT: UNICOMB

TITLE: SETOUT PLANS U8,U9,U10,U11

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