Report on Earthworks Strategy

457-527 Cessnock Road, Gillieston Heights

304100964-002

Prepared for

Walker Gillieston Heights Pty Ltd

15 June 2023

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Stantec

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1	13/12/2022	First Issue	DS	IGP
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Appendices

1 Introduction

Cardno now Stantec Australia Pty Ltd (Stantec) have been engaged by Walker Gillieston Heights Pty Ltd to undertake a review of the contamination status of the proposed development based on available data including previous environmental assessments for the proposed residential development at 457-527 Cessnock Road, Gillieston Heights (the "Site"). It is understood that the proposed development comprises the creation of a residential subdivision, internal subdivision roads, and several open space areas.

Following initial investigation and inspection at the site, Stantec were engaged to undertake additional geotechnical investigation within Lots 457 & 463 Cessnock Road, Gillieston Heights to incorporate the lots into the overall development.

In addition to the geotechnical investigation, additional site inspection was conducted by a Principal from Stantec to record salient site features and any potential sources of contamination for inclusion in this revision of the Earthworks Strategy. The results from these investigations are included herein.

For the purpose of the review Stantec were provided with the following previous reports:

> Douglas Partners (DP) assessment of the 501-527 Cessnock Road Site referenced "Report on Preliminary Site Investigation and Detailed Site Investigation (Contamination) – Proposed Residential Subdivision, 501-527 Cessnock Road, Gillieston Heights, Project 204921.00, dated May 2022" [1]; and

> Practical Environmental Solutions (PES) assessment of the 457-463 Cessnock Road site referenced "Preliminary Site Investigation for Contamination 457-463 Cessnock Road, Gillieston Heights NSW", dated 14 February 2020 [2].

The review comprised assessment of the previous reports, and subsequent inspection to assess the site for potential sources of contamination following the reports.

Geotechnical investigation undertaken by Stantec has been reported under separate cover "Report on Geotechnical Investigation – 457-527 Cessnock Road, Gillieston Heights" referenced: 304100964-002.2, dated: 15/06/2023 [3]. The intrusive testing undertaken for the geotechnical investigation has been used to supplement the desktop review and subsequent Site inspection.

1.1 Purpose and Objectives

The purpose of the review was to provide comment on areas of identified environmental concern such that an assessment could be made on the need for further qualification, or whether a earthworks strategy could be produced for the management of any identified potential environmental concerns outlined in the DP and PES reports [1] & [2] with respect to the proposed residential development.

The DP report [1] identified that the Site has remained a rural residential and agricultural property with no evidence of major earthworks. Agricultural activity onsite consisted of dairy farming and grazing. The report [1] identified some minor localised areas of environmental concern (AEC) and the presence of uncontrolled filling.

The PES report [2] identified the Site as a residential and agricultural property with no indication of intensive agricultural practices or major earthworks. Agricultural activity on site consisted of equine and chicken breeding which was later revealed through historical imagery. The PES report [2] identified two isolated areas of environmental concern (AEC) relating to Asbestos Containing Materials (ACMs). It was noted that no filling materials at or below surface level were encountered during the limited investigation.

The report findings of the DP and PES reports are detailed in Section 0. It is considered that an earthworks strategy could be developed to address previous identified issues which can be included in the design bulk earthworks during development. As such an earthworks strategy has been proposed.

1.2 Scope

This earthworks strategy is not intended to be a detailed Sampling Analysis and Quality Plan (SAQP) or Remediation Action Plan (RAP). The intent of this document is to communicate an approach to adequately manage the identified potential environmental concerns outlined in the supplied DP [1] & PES [2] reports. The scope for the Earthworks Strategy comprised of:

> A current Site inspection.

> Review of the existing documentation and analytical data collected on Site.
> Identify the Site assessment criteria.
> Outline the approach to the management of any identified or known impacts.
> The preparation of a earthworks strategy to render the Site suitable for the proposed residential development.

1.3 Relevant Guidelines

The relevant guidelines applicable to the development of the Earthworks Strategy are as follows:

> NEPM (1999) National Environment Protection (Assessment of Site Contamination) Measure 1999 [4].
> NSW EPA (2022) Contaminated land Guidelines: Sampling Design Part 1 – Application [5].
> NSW EPA, "Waste Classification Guidelines - Part 1: Classifying Waste," NSW Environment Protection Authority, Sydney, November 2014 [6].
> NSW EPA, Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW Environment Protection Authority, 2015 [7].
> NSW EPA, "Consultants reporting on contaminated land Contaminated land guidelines, NSW Environment Protection Authority, Sydney, April 2020 [8].
> NSW, "Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3ed Edition)," Department of Environment Protection Authority NSW, 2017 [9]
> NSW EPA (2014) Excavated Natural Material Order [10].

2 Previous Investigation and Site History

2.1 Douglas Partners - Preliminary Site Investigation and Detailed Site Investigation

Douglas Partners (DP) have previously undertaken an assessment of the Site reported under cover *"Report on Preliminary Site Investigation and Detailed Site Investigation (Contamination) – Proposed Residential Subdivision, 501-527 Cessnock Road, Gillieston Heights, Project 204921.00, dated May 2022"* [1]. The report is attached in **Appendix D**.

The objective of the PSI and DSI was to identify and investigate the potential for contamination at the Site from the previous and current land uses. The scope of works comprised desktop review (Site history, published data, NSW EPA data bases, aerial photographs, tittle deeds and council searches), intrusive field investigation, logging of subsurface profile and laboratory analysis of selected soil samples for a range of analytes.

Based on the information provided, the Site history suggests that the Site has remained a residential and agricultural property with no evidence of major earthworks. Agricultural works onsite consisted of dairy farming and grazing. The aerial review indicated that structures were constructed onsite and were generally associated with residential dwellings and sheds. Evidence of the demolition of some structures and ground disturbances were noted.

The intrusive field investigation comprised the excavation of 58 test pits to depths ranging from 0.4-2.7 m below ground level (BGL). Sampling was undertaken to facilitate laboratory testing for a range of analytes.

The natural subsurface profile encountered during the field investigation comprised of silty soils with varying fractions of clay and sand, clay and sandstone. Fill was also encountered and generally comprised of soils with fragments of brick, glass, metal and plastic and were predominately located within the previous dairy farm area. No apparent records or olfactory evidence (staining, odours or free phase product) were noted to suggest the presence of contamination within the soils during the field investigation.

The report [1] concluded that the analytical results for all contaminates were below the adopted Site criteria with the exception of the following:

> Lead in sample Pit 13/0.0-0.1 at 350 mg/kg which exceeded the HIL-A of 300 mg/kg. This exceedance was within fill and building rubble within the former dairy area.

> Zinc in four samples (Pit 7/0.0-0.1, Pit 8/0.3, Pit 12/0.3, Pit 13/0.0-0.1) which exceeded the conservative EIL for urban residential and public open space. These exceedances were within fill within the former dairy area; and

> Asbestos containing materials within surface soils (i.e., fibro fragment >7 mm in size in soil) and fibro fragment at the surface at test location 301.

> Elevated E. Coli and faecal coliforms in surface samples within the vicinity of the former dairy (Pit 302) - and downslope of the adjacent hobby farm, north -western portion of the Site (Pit 305).

Based on the results of previous assessment by others and the current assessment, potential contamination sources included the use of fill within the Site, former agricultural activities, possible storage and use of chemicals and demolition of structures. The results of the investigation indicated the general absence of gross contamination across the Site.

On the basis of the above, DP [1] recommended the following:

> Hazardous building material assessment of buildings proposed to be demolished.

> Demolition of existing structures, including management of existing hazardous building materials, including asbestos. Demolition and remediation of asbestos impacts should be conducted by an appropriately licensed asbestos contractor.

> Further assessment of building footprints once demolished.

> Excavation, removal and waste classification of uncontrolled fill in the vicinity of the former dairy in the central-southern portion of the site, and any other localised areas of soil contamination; and

> Localised aeriation, liming and spelling of microbiological-impacted soils in the vicinity of the former dairy structure and in areas adjacent to upgradient agricultural activities.

DP [1] concluded that the Site is suitable for the proposed residential development following the implementation of the recommendations outlined above.

2.2 Practical Environmental Solutions (PES) - Preliminary Site Investigation

Practical Environmental Solutions (PES) have previously undertaken an assessment of the 457-463 Cessnock Road site referenced "*Preliminary Site Investigation for Contamination 457-463 Cessnock Road, Gillieston Heights NSW*", dated 14 February 2020 [2]. The report is attached in **Appendix D**.

The objective of the PSI was to identify and investigate the potential for contamination at the Site from the previous and current land uses. The scope of works comprised desktop review (Site history, published data, NSW EPA data bases, aerial photographs, tittle deeds and council searches), limited intrusive field investigation, logging of subsurface profile and laboratory analysis of selected soil samples for a range of analytes.

Based on the information provided, Site history has remained consistent with Lots 507-527 Cessnock Road, being a residential and agricultural property with no evidence of major earthworks. Agricultural activity on site consisted of equine and chicken breeding which was later revealed through historical imagery. The aerial review indicated that structures were constructed onsite and were generally associated with residential dwellings and sheds. Evidence of the demolition of some structures and ground disturbance were noted.

During the field investigation, the natural subsurface profile encountered comprised of silty topsoils with varying fractions of gravels overlying gravelly clays. It was noted that no filling materials at or below surface level were encountered during the limited investigation. No apparent records or olfactory evidence (staining, odours or free phase product) to suggest the presence of contamination within the soils during the field investigation. However, PES observed small isolated areas containing materials identified as Asbestos Containing Materials (ACMs) in two locations across the Site.

Eight (8) boreholes were excavated using hand augers with samples collected for subsequent laboratory analysis. The analytical results for all contaminates were below the adopted Site criteria. It should be noted that no confirmatory testing of the ACMs was undertaken, only visual observations. Two empty 44-gallon drums were located near the rear stables/shed in the central portion of site however, no evidence of spillage was recorded. PID sampling was conducted within this area to confirm that no volatiles were present at the time of investigation.

Based on the results of previous assessment by others and the current assessment, potential contamination sources included the use of ACM within the Site, former agricultural activities, possible storage and use of chemicals and demolition of structures. The results of the investigation indicated the general absence of gross contamination across the Site.

On the basis of the above, PES [2] recommended the following:

- Demolition of existing structures, including management of existing hazardous building materials, including asbestos. Demolition and remediation of asbestos impacts should be dealt with under an Unexpected Finds Protocol developed for the site and conducted by an appropriately licensed asbestos contractor.
- Removal of the 44-gallon drums.
- Excavation, removal and waste classification of any surplus material generated by construction activity.
- Any material being imported to the site should be classified as VENM or ENM in accordance with NSW EPA Resource Recovery Orders and Exemptions.

PES [2] concluded that the Site is suitable for the proposed residential development following the implementation of the recommendations outlined above.

2.3 Stantec – Geotechnical Investigation

Stantec have undertaken geotechnical investigations at the Site referenced *"Report on Geotechnical Investigation, 457-527 Main Road, Gillieston Heights", ref 304100964-001.2, dated June 2023* [11]. The purposed of the investigation was to obtain geotechnical information on the subsurface conditions for design and/ or commentary on preliminary acid sulfate soil & salinity assessment, earthworks procedures, founding conditions for residential structures, pavement thickness design and basin construction procedures.

The investigation comprised the excavation of forty (40) test pits and logging of subsurface conditions within the proposed allotment areas and future road alignments. The location of the test pits are shown on **Figure**

1, attached in **Appendix A.** Subsurface conditions are summarised below and detailed in the engineering logs attached in **Appendix B** with explanatory notes.

The subsurface conditions encountered across the site have been characterised and summarised as follows:

> FILL: Surficial filling comprising Silty CLAY / Clayey SILT with varying minor components of sand and gravel were encountered within several the test pits to depths in the range of 0-0.5 m BGL.

> TOPSOIL: Sandy SILT or Silty SAND of low plasticity and fine to medium grain size, dark brown in colour, with varying fractions of gravel encountered to depths in range of 0.1-0.30m below ground level (BGL).

> COLLUVIUM SOILS: Silty SAND / Sandy SILT / Silty CLAY generally pale brown to brown in colour, encountered in majority of the test locations. Colluvial materials generally ranged from moist to wet (due to inclement weather) and were predominantly loose to medium-dense (based on the results of DCP testing). It should be noted colluvial soils noted in overland flow paths were virtually saturated due to inclement weather at the time of investigation and ranged from soft to stiff (based on the results of DCP testing).

> RESIDUAL SOILS: Silty / Gravelly / Sandy CLAYs of predominantly a mottling of orange, dark red and brown colour were encountered in all test pits to depths. Residual clays were typically of medium to high plasticity and ranged from firm to hard consistency (based on DCP testing). Moisture condition was observed to range from above to below plastic limit across the site.

> EXTREMELY WEATHERED MATERIAL (EWM): Extremely weathered SANDSTONE / Pebbly SANDSTONE and or SILTSTONE countered at all test locations (excluding TP022, TP024 & TP111). Extremely weathered materials were generally consistent with very stiff to hard Silty / Gravelly / Sandy CLAY and medium dense to very dense Silty / Clayey SAND. EWM clay materials were noted to be low to medium plasticity and predominantly below the plastic limit in moisture condition. Sands were generally observed to be in a dry to moist condition.

> WEATHERED ROCK: Fine to coarse grained SANDSTONE / Pebbly SANDSTONE, CONGLOMERATE and or SILTSTONE encountered at majority of the test locations (excluding TP003, TP005, TP009, TP011, TP014-TP017, TP019-TP023, TP025, TP027, TP028, TP105-TP107 &TP109). Encountered weathered rock was generally observed to be highly weathered with inferred very low to low strength. Practical bucket refusal on generally low strength (or stronger) rock was encountered at majority of the test locations.

The natural subsurface profile is generally consistent with the regional geological expectations at the Site.

3 Site Inspection

The subject site is identified as 457-527 Cessnock Road, Gillieston Heights . The proposed development incorporates the lots summarised in Table 3-1 below.

Table 3-1 South Gillieston Heights Locality.

Lot & DP	Address
Lot 1 & 2 DP302745	457-463 Cessnock Road, Gillieston Heights
Lot 1 DP 311179	501 Cessnock Road, Gillieston Heights
Lot 1 & 2 DP601226	507-527 Cessnock Road, Gillieston Heights

The site is an irregular shaped parcel of land and is bounded by:

> Stages 10-12 of the Wallis Creek Residential Development to the north of site;
> Rural parcels of land to the west of site, separated by Main Road/Cessnock Road;
> Wallis Creek along the eastern boundary of site; and
> Rural parcels of land to the south.

Topographically the site is located within a regionally undulating terrain, characterised by a north-south trending ridgeline traversing the northern portion of the site, and adjacent low-lying alluvial flood plains to the south and east.

Slopes within the northern and central portion of site generally fall to the east towards Wallis Creek and to the west from the ridgeline typically in the order of 5-10 degrees. Slopes in the southern portion of the site fall to the south towards Testers Hollow. It is expected surface flows follow this trend with a series of farm dams and channels observed for water retention to the west of the ridgeline. Vegetation across the site at the time of fieldwork comprised large areas of open thick grazing pasture with isolated mature trees. These features have been highlighted on Figure 1 attached in Appendix A.

Observations noted during the investigation for specific lots has been summarised in Table 3-2 below.

Table 3-2 Specific lot site observations.

Lot & DP	Observations
Lot 1 & 2 DP302745	▪ Rural residential weatherboard and brick house within the central of site with evidence of animal holding areas. ▪ Verdant nature of the pasture, potentially reflecting pasture improvement of fertilizer application. This has the potential to impact trafficability as the surficial soil is more prone to waterlogging. ▪ Evidence of localised slumping around upstream edge within existing farm dam within the eastern portion of site. Southern embankment wall appeared to be constructed using localised surplus material from the impoundment area of the basin. ▪ A gully line was noted downstream of the farm dam in the eastern portion of the Site, trending south west through Lot 2 DP601226 before discharging offsite via Cessnock Road culvert crossing. ▪ Several stockpiles, with several stockpiles noted to contain foreign materials, within the north-western and central portion of site surrounding existing dwellings and sheds. ▪ Evidence of localised cut and fill within areas associated with effluent disposal, dams, pavements and structures. ▪ Retaining walls observed along northern boundary, abutting Stage 11 & 12 of the Wallis Creek residential development. ▪ In-ground concrete pool located within central portion of site, with retaining walls on eastern boundary of pool observed to be failing.
Lot 1 DP 311179	▪ Rural residential housing within the site with evidence of animal holding areas. ▪ Filling noted within driveways/access tracks typically comprised quarry gravel product. ▪ Due to presence of livestock it is anticipated the site has been used for grazing.
Lot 1 & 2 DP601226	▪ Rural residential housing within the site with evidence of animal holding areas.

Lot & DP	Observations
Lot 1 & 2 DP601226 *(continued)*	▪ Ponded water was observed localised at the base of the north-south trending gully line in the western portion of site due to inclement weather prior and during the initial field investigation. ▪ Four gully lines were noted at the Site: – A gully line was noted in close proximity to the northern site boundary, trending offsite north-east towards Wallis Creek. – A gully line was noted along the central western boundary of the site, trending south-west before discharging offsite via Cessnock Road culvert crossing. – A gully was noted in the southern portion of the Site, traversing offsite to the south-west towards Testers Hollow. – A gully line was noted within the central eastern portion of site generally trending east-west discharging flows towards Wallis Creek. ▪ Surficial softening of the topsoil material was noted through rutting across the site, with trafficability issues encountered at the time of the initial fieldwork. ▪ Rock outcropping in the southern portion of site and along the ridgeline on the eastern boundary of site where the break in grade is located. ▪ General refuse was noted in both the western and eastern gully, typically comprising scrap metal, masonry units and bricks. ▪ A farm dam with general refuse typically comprising scrap metal was noted in central-western portion of site as noted on Figure 1 in Appendix A. ▪ Demolition of existing agricultural structures within the southern portion of site with scrap timber and metal sheeting covering site surfaces. ▪ Several paddocks cordoning off sections of the central and southern portion of site were noted. Gates and fences for the paddocks were damaged due to livestock with the area likely used for livestock grazing. ▪ Vegetation comprised predominately grazing grasses, with an increased density of mature trees noted along the eastern portion of the site associated with steepening slopes along the eastern boundary of the site. ▪ The site was noted to slope along the eastern boundary toward a 3 m vertical face.

4 Earthworks Strategy

4.1 General

Based on the previous investigations, current Site inspection and existing conditions of the Site, Stantec have outlined and developed an earthworks strategy framework for the management of the previously identified issues below.

It is understood, that the dominate issues are associated with existing filling and the presence of potential hazardous materials associated within existing and former structures. It is envisaged that an earthworks strategy can address the identified issues and can be managed during the construction phase of the proposed residential development.

4.2 Earthworks and Existing Filling

The Site inspection and previous investigations indicated the presence of uncontrolled filling onsite. The filling was generally associated with building materials / fill within the vicinity of the former dairy, the construction of access tracks / driveways, leveling of building pads, dam formation and other minor typical rural surficial disturbance such as trenching works to redirect surface runoff for water retention. The locality of the dairy is presented on **Figure 1**, and the encountered filling and approximate area is detailed in **Figure 2** attached in **Appendix A**. Detailed cut and fill plans are also attached in **Appendix A**.

From a geotechnical perspective, any uncontrolled fill materials are required to be excavated, recondition, and replaced. Both geotechnical and environmental assessment of the uncontrolled fill material may need to be undertaken to identify suitability for re-use on Site. Where suitable, the fill materials shall be placed as controlled filling in general accordance with Australian Standard 3798-2007 Guidelines on earthworks for commercial and residential developments.

During this process, the fill materials will be separated, stockpiled and will be visually assessed by a suitably qualified environmental consultant to determine whether additional testing of the fill materials will be required. Additional testing will be based on observations such as material origin (i.e. site won filling) or any olfactory indications of potential contamination i.e., staining, fibro fragments and odour. If the material is proposed to be utilised onsite, it will also need to be assessed for geotechnical suitability.

Should the visual assessment identify the presence of any anthropogenic materials, it is recommended that onsite monitoring of the screening / segregation, recycling of these materials should be undertaken by an experienced environmental scientist to the extent practicable to address any aesthetic issues at the Site.

Assessment of stockpiles may be required for onsite reuse and any stockpiles for offsite disposal will need to be undertaken in accordance with NSW EPA Waste Classification Guidelines [6]. Stockpiles and other material proposed for off-site reuse must comply with an appropriate Resource Recovery Order and Resource Recovery Exemption (i.e. Excavated Natural Material Order 2014 [10]) or must comply with the definition of Virgin Excavated Natural Material (VENM) set out in Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO Act).

An isolated HIL A [4] exceedance within Pit 13 was encountered within the previous DP [1] assessment and several EIL exceedances of the NEPM [4] conservative threshold limits for Zinc were noted. It is considered that in absence of EIL calculations that the concentrations are likely attributed to degradation of galvanised sheeting or existing background concentration levels. Given the area was supporting verdant pasture, it is considered that the measured Zinc levels are not detrimental to flora and fauna.

As such, it is recommended that during the earthworks process that the isolated one location of HIL A exceedance (Pit 13) to be excavated on a 5m x 5m grid with the excavated material to be disposed offsite to a licence waste facility and assessed in accordance with the NSW EPA Waste Guidelines 2014 [6]. The excavation base is to be validated by the collection of one (1) base and four (4) side wall samples with samples analysed for 8 heavy metals. The excavation area of Pit 13 is shown on **Figure 2**, attached in **Appendix A**

4.3 Existing Structures and Former Demolition Areas

Existing structures were noted across the Site. The aerial review indicated that structures consisted of residential dwellings and sheds, predominately associated with the former diary operation. Evidence of the demolition of some structures and ground disturbance were noted. The potential of asbestos containing materials (ACM) were noted within existing structures, mainly within the dairy area. It is also noted that the existing residential properties fronting Cessnock Road are also proposed to be demolished and removed offsite along with the existing shed structures.

The following measures shall be implemented for the management of the removal of existing structures and areas of former structures:

> All existing structures and dwellings that are proposed to be demolished will require a HAZMAT survey to be undertaken prior to the demolishing and removal offsite.

> All building waste and refuse shall be disposed offsite to a licenced waste facility, legally able to accept the waste.

> Following the removal of the existing structures, a visual clearance and walkover shall be undertaken to confirm the removal of all building refuse and potential ACM and assess the underlying soils.

> It is recommended that a visual clearance and walkover shall be undertaken in areas of former structures, following the removal of any debris or fill materials.

> Sampling and analysis of the underlying soils following removal of any structure may be required based on any olfactory or visuals signs of contamination.

The DP report [1] and PES report [2] identified asbestos containing materials within surface soils (i.e., fibro fragment >7 mm in size in soil) and a fibro fragment at the surface at DP test location 301. Refer to **Figure 2,** for locality, noting PES asbestos locations are denoted as “AEC 1” & “AEC 2” within this drawing. It is recommended that the isolated area to be excavated, disposed offsite to a licenced waste facility with underlying soils to be validated. The excavation base to be validated by the collection of one (1) base and four (4) side wall samples with samples analysed for asbestos identification in soils. The works can be undertaken during the construction phase of the development.

4.4 Anthropogenic Materials

During the inspection and previous assessment, anthropogenic materials such as galvanised tin sheeting, bricks, building remnants, treated timber, steel and metal fragments, concrete and household refuse were present onsite.

Most of the anthropogenic materials were present within the dairy area of the Site and north western dwelling surroundings, with other refuse scattered across the Site. It was also noted that anthropogenic materials were present within an existing gully line located within the central portion of the Site. It is not uncommon for rural / farming practice, for materials to be placed in drainage lines to prevent erosion and scouring.

For aesthetic reasons, all foreign material) will need to be removed from the Site, including but not limited to, concrete, metal scraps, timber, building material and demolition waste and disused/abandoned equipment and machinery. It is recommended that the screening / segregation, recycling of anthropogenic materials should be undertaken to the extent practicable to address any aesthetic issues at the Site

It is considered that minor works such as the removal of isolated stockpiles and anthropogenic materials can be managed. A visual clearance and walkover shall be undertaken to confirm the removal of all anthropogenic materials and any potential ACM.

It is also noted removal of anthropogenic material would include removal of the 44-gallon drums noted in the PES report [2]. Based on inspection undertaken by Stantec, no visual or olfactory evidence of contamination was noted, and the drums can be removed offsite as general solid waste.

It recommended that any existing filling with anthropogenic inclusion should be addressed prior to bulk earthworks avoid any blending of waste with general earthworks.

4.5 Microbiological Impacts

Based on the information provided, the Site has remained a rural residential and agricultural property. Agricultural works onsite consisted of dairy farming and grazing and as such, it is expected that to some degree that micro bacteria such as E. Coli and thermotolerant coliforms will likely be present within areas of agricultural use.

The previous DP reported elevated E. Coli and faecal coliforms in surface samples within the vicinity of the former dairy (Pit 302) - and downslope of the adjacent hobby farm, north -western portion of the Site (Pit 305). Refer to the attached **Figure 1** for the nominated AEC.

While not identified as a significant concern, these areas can be dealt with during the construction utilising soil improving techniques such as localised aeriation, liming and spelling of microbiological-impacted soils.

4.6 Unexpected Finds Protocol

The Site is considered low risk of gross contamination based on the review of Site history, geotechnical works and investigation findings. As there is a low risk for contamination and areas that were inaccessible (soils beneath existing structures), an unexpected finds protocol (UFP should be implemented and managed during construction and development at the Site.

The purpose of the UFP is to evaluate any unexpected situations that could occur during the project, and to specify measures that can be implemented to manage such circumstances. The UFP refers subcontractors to inform authorities and consultants if there is unexpected find (skeletal, archaeological, asbestos etc.) after documentation and remediate if required. An Unexpected Finds Protocol is attached in **Appendix C**.

4.7 Reporting

At the completion of the earthworks, a report shall be prepared to confirm the above recommendations have been implemented which would include the following:

> A description of any remedial works undertaken.

> Clearance and documentation of the removal of the existing structures and materials disposed offsite

> A presentation of the laboratory analytical data where undertaken.

> Recommendations for further investigation and/or remediation works required at the Site (if required).

5 Conclusions and Recommendations

Stantec have prepared an earthworks strategy for the proposed residential development at 457-467 & 501 – 527 Cessnock Road, Gillieston Heights. The purpose of this earthworks strategy is to outline and development the framework for the management of any identified potential environmental concerns outlined in the DP report [1] and PES report [2] with respect to the proposed residential development.

Historically, the Site has remained a residential and agricultural property with no evidence of major earthworks. Agricultural works onsite consisted of dairy farming and grazing. The potential contamination sources included the use of fill within the Site, former agricultural activities, possible storage and use of chemicals and demolition of structures.

An isolated HIL A [4] exceedance within Pit 13 was encountered within the previous DP [1] assessment and several EIL exceedances of the NEPM [4] conservative threshold limits for Zinc were noted. It is considered that in absence of EIL calculations that the concentrations are likely attributed to degradation of galvanised sheeting or existing background concentration levels. Given the area was supporting verdant pasture, it is considered that the measured Zinc levels were not detrimental to flora and fauna.

As such, it is recommended that during the earthworks process that the isolated one location of HIL A exceedance (Pit 13) and the isolated asbestos detections (DP Pit 301 & PES AEC 1 & 2) to be excavated on a 5m x 5m grid with the excavated material to be disposed offsite to a licence waste facility and assessed in accordance with the NSW EPA Waste Guidelines 2014 [6]. The excavation base to be validated by the collection of one (1) base and four (4) side wall samples.

From a geotechnical perspective, any uncontrolled fill materials are required to be excavated, reconditioned, and re-used as filling. Further geotechnical and environmental assessment of the uncontrolled fill material may need to be undertaken to identify suitability for re-use and application on Site.

A HAZMAT survey of the existing structures is recommended with subsequent inspections and / or sampling will be required.

Based on the previous investigations undertaken by DP [1] and PES [2], Site inspections and intrusive geotechnical investigations undertaken by Stantec, no signs of gross contamination were observed at the Site. The Site, although not considered to be grossly contaminated, will require minor works and Site preparation to accommodate the proposed residential development. It is considered that it can be managed as part of this earthworks strategy during the construction phase.

Stantec considers that following the implementation of the earthworks strategy documented above and the preparation of a report confirming the strategy has been implemented, the Site can be made suitable for the proposed residential development in accordance with the *State Environmental Planning Policy (resilience and Hazards) 2021*. It is envisaged that the recommendations can be undertaken during the construction phase of the development.

5.1 Recommendations

Given the results of this assessment, Stantec recommends the following:

> The implementation of the Earthworks Strategy presented in Section 4.

> HAZMAT survey of existing structures and subsequent inspections and / or sampling.

> Assessment of existing areas of uncontrolled filling for either incorporation within the bulk earthworks or off-site disposal

> Removal of a nominal portion of soil in proximity to DP pits 13 and 301.

> Soil improving techniques to address microbiological concerns for areas in the vicinity of DP pits 302 and 305

> The implementation of an unexpected finds protocol to address any potential issues that may be uncovered during the course of the development.

> Any soil to be excavated and transported off Site for disposal require classification in accordance with the NSW EPA Waste Classification Guidelines or relevant guidelines

> Presence of any sundry items to be assessed for offsite disposal or recycled. This can be undertaken during the construction phase.

> Preparation of report detailing the recommended works undertaken.

Where these recommendations

6 Limitations

Stantec has performed investigation and consulting services for this project in general accordance with current professional and industry standards. The extent of testing was limited to discrete test locations and variations in ground conditions can occur between test locations that cannot be inferred or predicted.

A geotechnical / environmental consultant or qualified engineer shall provide inspections during construction to confirm assumed conditions in this assessment. If subsurface conditions encountered during construction differ from those given in this report, further advice shall be sought without delay.

Stantec, or any other reputable consultant, cannot provide unqualified warranties nor does it assume any liability for the site conditions not observed or accessible during the investigations. Site conditions may also change subsequent to the investigations and assessment due to ongoing use.

This report and associated documentation was undertaken for the specific purpose described in the report and shall not be relied on for other purposes. This report was prepared solely for the use by Walker Gillieston Heights Pty Ltd and any reliance assumed by other parties on this report shall be at such parties own risk.

7 References

[1] Douglas Partners, ""Report on Preliminary Site Investigation and Detailed Site Investigation (Contamination) – Proposed Residential Subdivision, 501-527 Cessnock Road, Gillieston Heights, Project 204921.00," May 2022.

[2] Practical Environmental Solutions Pty Ltd, "Preliminary Site Investigation for Contamination 457-463 Cessnock Road, Gillieston Heights NSW," February 2020.

[3] Stantec Australia Pty Ltd, "Report on Geotechnical Investigation – 457-527 Cessnock Road, Gillieston Heights," June 2023.

[4] National Environment Protection (Assessment of Site Contamination) Measure 1999, "Schedule B1 Guidelines on Investigation Levels For Soil and Groundwater," National Environment Protection Council (NEPC), Amended 16 May 2013.

[5] NSW EPA, "Contaminated land Guidelines: Sampling Design Part 1 – Application," 2022.

[6] NSW EPA, "Waste Classification Guidelines - Part 1: Classifying Waste," NSW Environment Protection Authority, Sydney, November 2014.

[7] NSW EPA, Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW Environment Protection Authority, 2015.

[8] NSW EPA, ""Consultants reporting on contaminated land guidelines"," NSW Environmental Protection Authority, 2020.

[9] NSW EPA, "Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd Edition)," Environment Protection Authority NSW, 2017.

[10] NSW EPA, "The Excavated Natural Material Order 2014," NSW Environment Protection Authority, 2014.

[11] Stantec, ""Report on Geotechnical Investigation, 501-527 Main Road, Gillieston Heights", ref 304100964-001," 16/06/2023.

APPENDIX

A

FIGURES

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Stantec

DATE PLOTTED: 14 June 2023 1:09 PM BY : JACK HANLON

NOTES:

Image underlay adapted from nearmaps aerial imagery.

LEGEND:

Development Footprint

Site Boundary

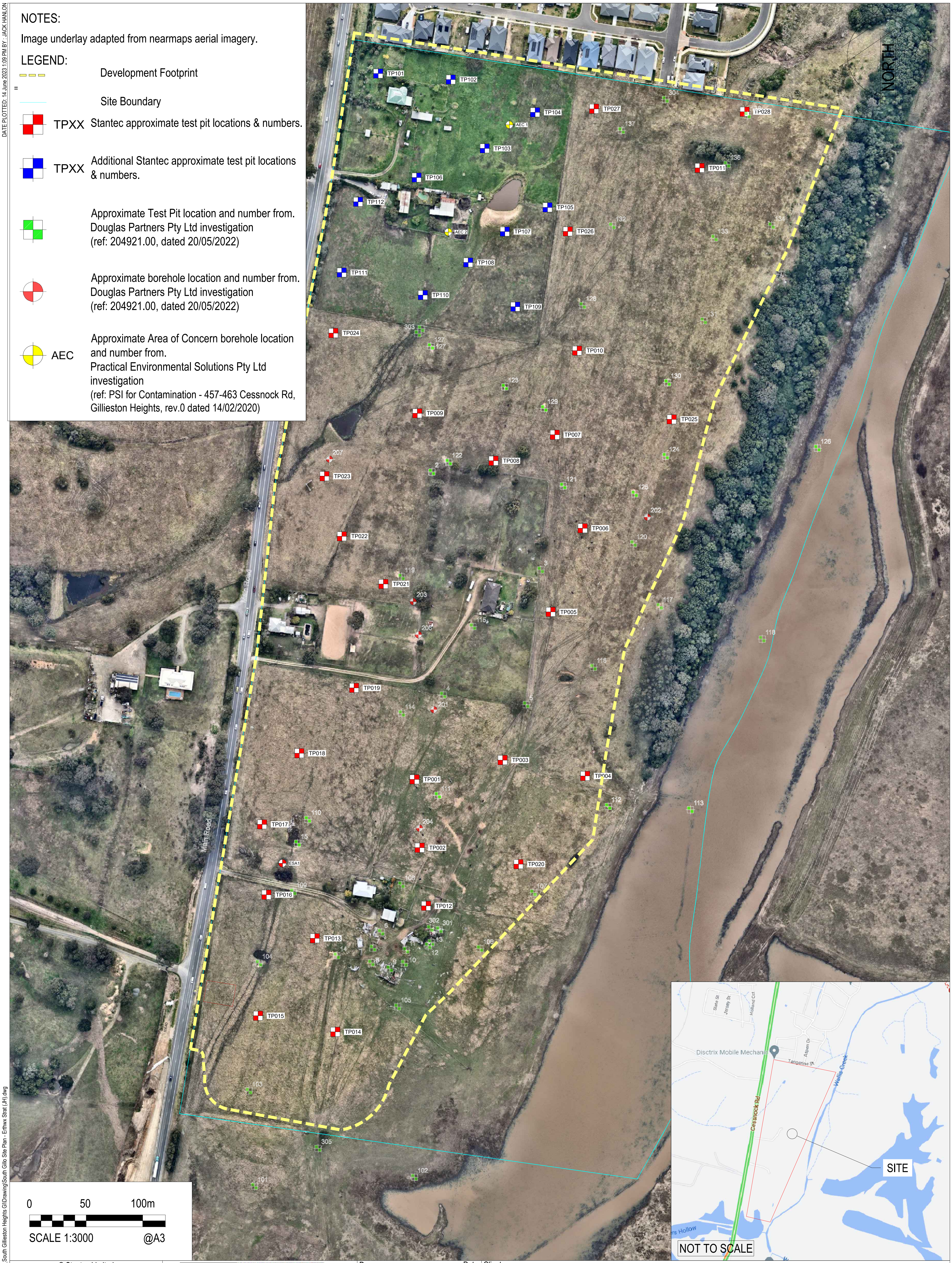
TPXX Stantec approximate test pit locations & numbers.

TPXX Additional Stantec approximate test pit locations & numbers.

Approximate Test Pit location and number from. Douglas Partners Pty Ltd investigation (ref: 204921.00, dated 20/05/2022)

Approximate borehole location and number from. Douglas Partners Pty Ltd investigation (ref: 204921.00, dated 20/05/2022)

AEC Approximate Area of Concern borehole location and number from. Practical Environmental Solutions Pty Ltd investigation (ref: PSI for Contamination - 457-463 Cessnock Rd, Gillieston Heights, rev.0 dated 14/02/2020)



0 50 100m

SCALE 1:3000 @A3

Stantec

Stantec Australia Pty Ltd | ABN 17 007 820 322
Level 2 Suite 202, 22 Honeysuckle Drive
Newcastle, NSW 2300
Tel: 02 4965 4555 Fax: 02 4965 4666
Web: www.stantec.com

Drawn JH	Date 14/06/2023
Checked KS	Date 14/06/2023
Designed	Date
Verified	Date
Approved	

Client: Walker Corporation Pty Ltd

Project: 457-463 & 501-507 CESSNOCK ROAD, GILLIESTON HEIGHTS
REMEDIATION STRATEGY

Title: SITE PLAN
TESTING LOCATIONS

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Project Number	Scale	Size
304100964	1:3000m	A3

Figure Number	Revision
F1	3

XREF's:

DATE PLOTTED: 14 June 2023 1:21 PM BY : JACK HANLON

NOTES:

Image underlay adapted from nearmaps aerial imagery.

LEGEND:

Development Footprint

Site Boundary

TPXX Stantec approximate test pit locations & numbers.

TPXX Additional Stantec approximate test pit locations & numbers.

Approximate Test Pit location and number from. Douglas Partners Pty Ltd investigation (ref: 204921.00, dated 20/05/2022)

Approximate borehole location and number from. Douglas Partners Pty Ltd investigation (ref: 204921.00, dated 20/05/2022)

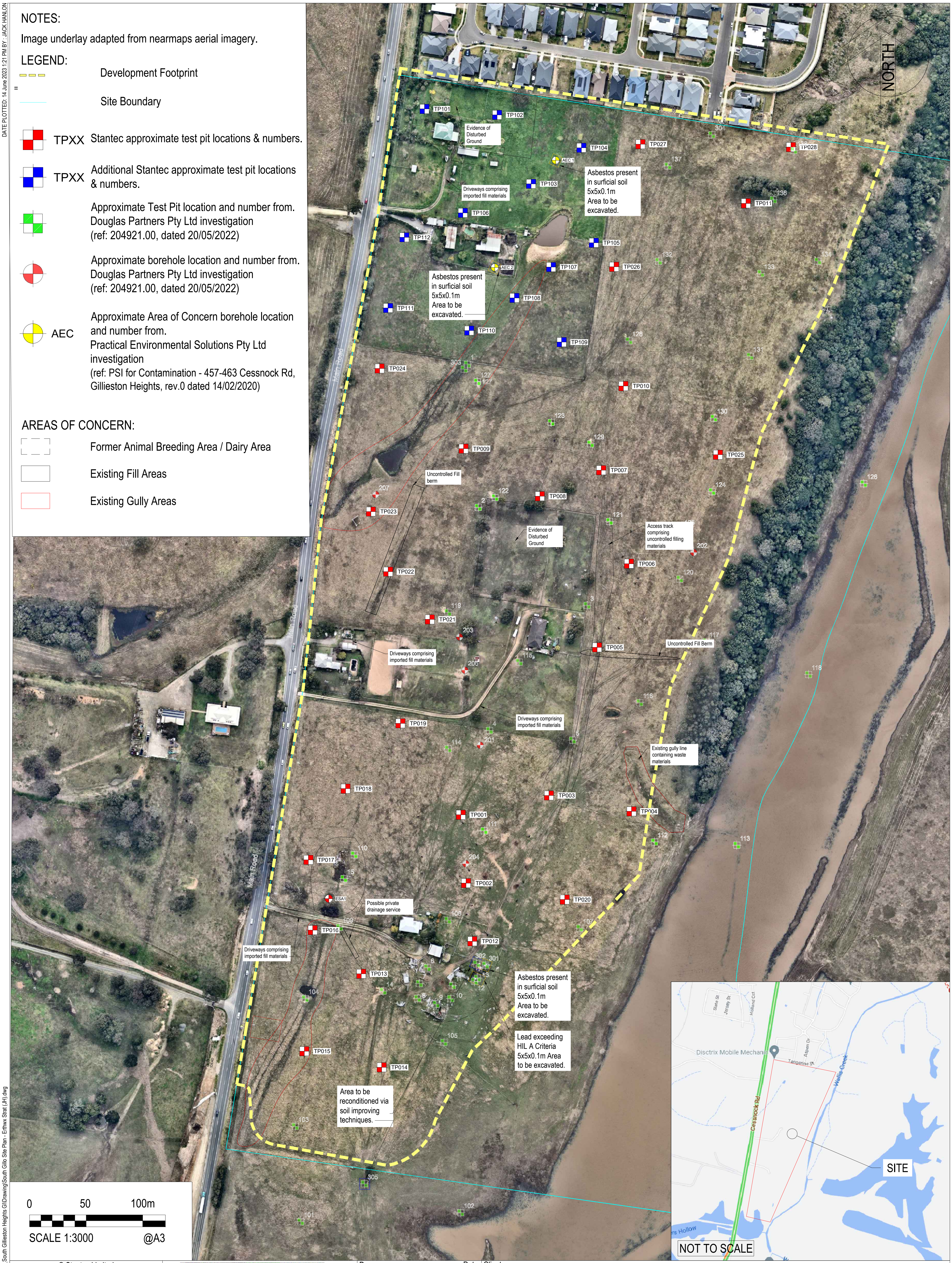
AEC Approximate Area of Concern borehole location and number from. Practical Environmental Solutions Pty Ltd investigation (ref: PSI for Contamination - 457-463 Cessnock Rd, Gillieston Heights, rev.0 dated 14/02/2020)

AREAS OF CONCERN:

Former Animal Breeding Area / Dairy Area

Existing Fill Areas

Existing Gully Areas



0 50 100m

SCALE 1:3000 @A3

Stantec
Stantec Australia Pty Ltd | ABN 17 007 820 322
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Newcastle, NSW 2300
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Web: www.stantec.com

Drawn JH	Date 14/06/2023	
Checked KS	Date 14/06/2023	
Designed	Date	
Verified	Date	
Approved		

Client: Walker Corporation Pty Ltd

Project: 457-463 & 501-507 CESSNOCK ROAD, GILLIESTON HEIGHTS GEOTECHNICAL INVESTIGATION

Title: SITE PLAN AREAS OF CONCERN WITH AREAS REQUIRING REMEDIATION

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Project Number	Scale	Size
304100964-002	1:3000m	A3

Figure Number	Revision
F3	3

XREFs:
CAD File: N:\Projects\3010\FY23 - 304100964_South Gillieston Heights GI\Drawing\South Gillo Site Plan - Enthwx Strat (JH).dwg

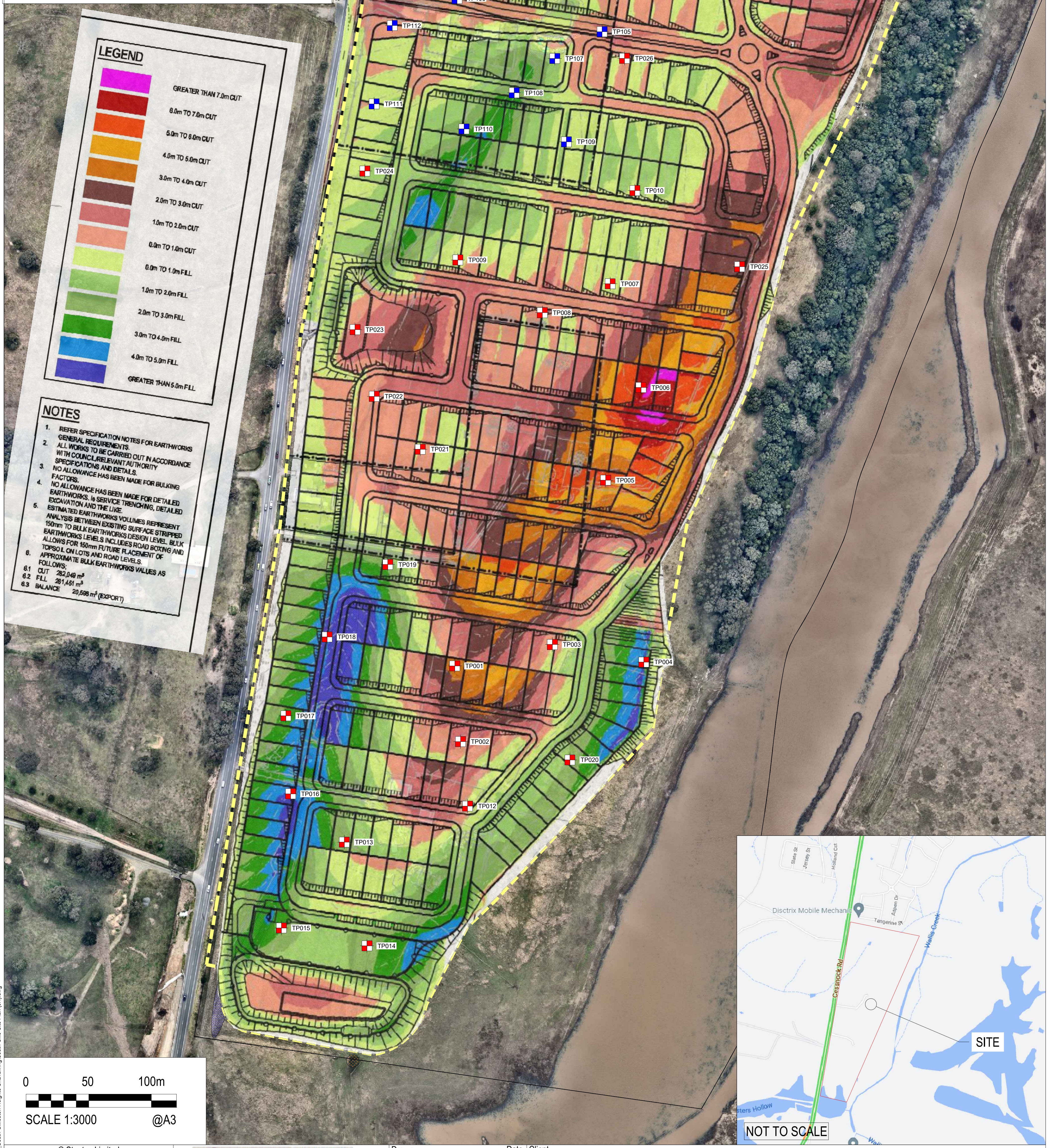
NOTES:

Image underlay adapted from nearmaps aerial imagery.
Cut Fill Plan prepared by Inspire Solutions Pty Ltd. (Ref no. 210039-DA-C04.01, dated 09/06/2023, revision 2)

LEGEND:

TPXXX — 501-527 Cessnock Road: Approximate test pit locations and numbers.

TP1 XX — 457-463 Cessnock Road: Approximate test pit locations and numbers.



0 50 100m

SCALE 1:3000 @A3

Stantec
Stantec Australia Pty Ltd | ABN 17 007 820 322
Level 2 Suite 202, 22 Honeysuckle Drive
Newcastle, NSW 2300
Tel: 02 4965 4555 Fax: 02 4965 4666
Web: www.stantec.com

Drawn JH	Date 14/06/2023	Client: Walker Gillieston Heights Pty Ltd
Checked KS	Date 14/06/2023	Project: 457-527 CESSNOCK ROAD, GILLIESTON HEIGHTS GEOTECHNICAL INVESTIGATION
Designed	Date	Status: FOR INFORMATION ONLY — NOT TO BE USED FOR CONSTRUCTION PURPOSES
Verified	Date	Project Number 304100964 / Scale 1:3000m / Size A3
Approved		Title: SITE PLAN GEOTECHNICAL TESTING LOCATIONS WITH CUT FILL PLAN
		Figure Number F3 / Revision 2

DATE PLOTTED: 14 June 2023 1:01 PM BY : JACK HANLON

XREFs:
CAD File: N:\Projects\810\FY23 - 304100964_South Gillieston Heights GI\Drawing\South Gillo Site Plan (JH).dwg

APPENDIX

B

STANTEC LOGS

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TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP001

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**

Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: | **Contractor:** Stantec Pty Ltd

Date Excavated: 5/10/22 | **Logged By:** JH | **Checked By:** KS

Excavation: Method: 600mm toothed bucket (0.00 – 1.50 m); Resistance: E (0.00 – 0.50 m), F-H (0.50 – 1.20 m), H (1.20 – 1.50 m); Stability: Stable; Water: Not Encountered

Sampling & Testing – Sample or Field Test: ES 0.05 - 0.10 m; ES 0.10 - 0.20 m; ES 0.25 - 0.35 m; ES 0.85 - 0.90 m; ES 1.00 - 1.15 m; ES 1.25 - 1.30 m

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (scale 3 6 9 12): 1, 3, 3, 4, 6, 13, /50mm

Depth (m)	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency / Relative Density	STRUCTURE & Other Observations
0.00 – 0.15m	TOPSOIL FILL: Clayey SILT, low plasticity, dark brown, trace rootlets	M (<PL)		FILL
0.15 – 0.25m	FILL: Clayey GRAVEL, fine to coarse, angular to sub angular, dark brown, trace rootlets	M		
0.25 – 0.85m	Silty CLAY, medium plasticity, dark red mottled orange and grey, trace rootlets, trace fine grained sand, trace fine angular to sub-rounded gravel As above, Orange mottled dark red	M (>PL)	St H	RESIDUAL SOIL
0.85 – 1.00m	Clayey SAND/ Sandy CLAY, pale brown mottled orange, fine to medium grained SAND, low plasticity CLAY	D / M (<PL)	D	EXTREMELY WEATHERED
1.00 – 1.20m	Clayey SAND, fine to medium grained, pale brown with fine to coarse, angular to sub-angular parent rock fragments	D	D	
1.20 – 1.50m	SANDSTONE, fine to medium grained, brown mottled orange, low strength, highly weathered			WEATHERED ROCK
1.50m	TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP002

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:
Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket
Excavation Dimensions:
Contractor: Stantec Pty Ltd
Date Excavated: 5/10/22
Logged By: JH
Checked By: KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered	ES 0.05 - 0.10 m	1	0.00–0.20m			FILL: Clayey SILT, dark brown, trace rootlets, trace plastic rope fragments	M (≈PL)		FILL
	E			ES 0.20 - 0.30 m	5	0.20–0.35m			Silty SAND, fine to medium grained, pale brown, trace fine to medium, rounded to sub-rounded gravel	M	MD	COLLUVIUM
	E / F-H			B 0.40 - 0.60 m	5, 6, 9	0.35–0.75m			Silty CLAY, medium plasticity, orange mottled dark red, trace fine to medium grained sand, trace rootlets	M (<PL)	VSt	RESIDUAL SOIL
	F-H				9, 9, 13	0.75–1.20m			Clayey SAND, fine to coarse grained, orange mottled brown, with fine to coarse, angular to sub-angular sandstone gravels, trace cobble	D	D	EXTREMELY WEATHERED
	H			ES 1.20 - 1.40 m	/25mm VR	1.20–1.40m			SANDSTONE, fine to medium grained, mottled pale grey and brown			WEATHERED ROCK
						1.40m			TERMINATED AT 1.40 m Refusal on Weathered Rock			

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- w - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP003

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:

Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket

Excavation Dimensions:
Contractor: Stantec Pty Ltd

Date Excavated: 5/10/22
Logged By: JH
Checked By: KS

Excavation: Method: 600mm toothed bucket (0.00–1.60 m); Resistance: E (0.00–0.90 m), F-H (0.90–1.60 m); Stability: Stable; Water: Not Encountered

Sampling & Testing: DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm: 1, 1, 2, 4, 5, 5, 7, 10, 10, 7, 9, /125mm VR

Depth (m)	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components, ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00–0.15m	FILL: Clayey SILT, dark brown, trace rootlets	M (≈PL)		FILL
0.15–0.30m	Silty SAND, fine to medium grained, pale brown, with fine to medium sub-rounded gravel	M	L	COLLUVIUM
0.30–1.00m	Silty CLAY, medium plasticity, mottled orange and dark red -brown, trace rootlets, trace fine grained sand	M (<PL)	St	RESIDUAL SOIL
1.00–1.60m	Sandy CLAY, low plasticity, orange brown mottled red, fine to medium grained sand As above, Orange brown mottled pale grey	M (<PL)	VSt	EXTREMELY WEATHERED
1.60m	TERMINATED AT 1.60 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP004

Job No: 304100964 — **Sheet:** 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 5/10/22	**Logged By:** JH	**Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E-F	Stable	Not Encountered	ES 0.05 - 0.10 m	1, 2	0.00–0.25m		TOPSOIL: Silty SAND, fine to medium grained, dark brown, trace organics	D		TOPSOIL
					5	0.25–0.45m		Silty SAND, fine to medium grained, pale brown, with fine to medium sub-rounded gravel	M	MD	COLLUVIUM
				B 0.50 - 0.65 m	5, 7	0.45–0.80m		Silty Sandy CLAY, medium plasticity, brown mottled orange and grey, trace organics, fine to medium grained sand, trace medium to coarse sub-rounded gravel	M (≈PL)	St - VSt	RESIDUAL SOIL
	F				14 /100mm VR	0.80–1.00m		Sandy CLAY, low plasticity, orange brown mottled red, fine to medium grained sand	M (<PL)	H	EXTREMELY WEATHERED
	F, H					1.00–1.30m		SANDSTONE, medium to coarse grained, orange mottled brown and red, highly weathered, very low strength			WEATHERED ROCK
						1.30m		TERMINATED AT 1.30 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP005

Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 5/10/22	**Logged By:** JH	**Checked By:** KS

Excavation: Method – 600mm toothed bucket (0.00–1.50 m); Stability – Stable; Water – Not Encountered

Depth (m)	Resistance	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00–0.10m	F		2	TOPSOIL: Silty SAND, fine to medium grained, dark brown, trace organics	D		TOPSOIL
0.10–0.20m	F			Sandy SILT, low plasticity, dark brown, fine grained sand, trace organics	M (<PL)	F	COLLUVIUM
0.20–0.50m	F	ES 0.20 - 0.40 m	1, 4	Sandy SILT, low plasticity, pale grey mottled pale brown	M (<PL)	St	
0.50–0.90m	F	ES 0.50 - 0.60 m	5, 4, 9 /100mm VR	Silty Sandy CLAY, medium plasticity, brown mottled red and pale grey, trace organics, fine to medium grained sand, trace medium to coarse sub-rounded gravel	M (>PL)	St / VSt	RESIDUAL SOIL
0.90–1.50m	F-H / H	ES 1.40 - 1.50 m		Silty CLAY, low plasticity, orange mottled red and pale grey, trace medium to coarse sandstone fragments, trace sandstone cobble As above, Lenses of Gravelly SAND (very low strength rock)	M (<PL)	H	EXTREMELY WEATHERED
1.50m				TERMINATED AT 1.50 m Target depth			

Depth scale: 0.5, 1.0, 1.5

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
- HP - Hand/Pocket Penetrometer
- DCP - Dynamic Cone Penetrometer
- PSP - Perth Sand Penetrometer
- MC - Moisture Content
- PBT - Plate Bearing Test
- IMP - Borehole Impression Test
- PID - Photoionisation Detector
- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP006

Job No: 304100964 — **Sheet:** 1 of 1

Position: Refer to Site Plan — **Angle from Horizontal:** 90° — **Surface Elevation:**

Machine Type: 5 tonne Excavator — **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: — **Contractor:** Stantec Pty Ltd

Date Excavated: 5/10/22 — **Logged By:** JH — **Checked By:** KS

Excavation: Method: 600mm toothed bucket (0 – 1.60 m); Stability: Stable; Water: Not Encountered

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm: 1, 2, 3, 5, 5, 7, 8, /50mm HB, 7

Resistance	Sample or Field Test	Depth	Classification / Material Description	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
F		0.00–0.15m	TOPSOIL: Sandy SILT, low plasticity, brown, trace gravel	M (<PL)		TOPSOIL
F		0.15–0.30m	Silty SAND, fine to medium grained, pale brown, with gravel	M (<PL)	L	COLLUVIUM
F / E-F / F	B 1.10 - 1.40 m	0.30–1.20m	Silty CLAY, medium to high plasticity, mottled orange and dark red -brown, trace rootlets, trace fine grained sand	M (>PL)	St / VSt	RESIDUAL SOIL
F	ES 1.20 - 1.30 m	1.20–1.45m	Silty Sandy CLAY, low plasticity, orange brown, mottled red and pale grey, fine to medium grained sand As above, Brown orange mottled pale grey	M (<PL)	H	EXTREMELY WEATHERED
F		1.45–1.60m	SANDSTONE, fine to medium grained, brown mottled pale grey and orange, very low strength, highly weathered			WEATHERED ROCK
			TERMINATED AT 1.60 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP007

Job No: 304100964 | **Sheet:** 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 5/10/22	**Logged By:** JH	**Checked By:** KS

Excavation: Method: 600mm toothed bucket (0.00 – 1.40 m); Resistance: F (0.00 – 1.30 m), H (1.30 – 1.40 m); Stability: Stable; Water: Not Encountered

Sampling & Testing — Sample or Field Test:

Sample or Field Test
ES 0.05 - 0.10 m
ES 0.65 - 0.80 m
ES 1.30 - 1.40 m

DCP TEST (AS 1289.6.3.2-1997), Blows/150 mm (scale 3 6 9 12):

Depth interval (m)	Blows/150 mm
0.00 – 0.15	2
0.15 – 0.30	2
0.30 – 0.45	2
0.45 – 0.60	4
0.60 – 0.75	5
0.75 – 0.90	9
	/25mm HB

Material Description:

Depth (m)	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.20m	TOPSOIL: Silty SAND, fine to medium grained, dark brown, trace organics, trace fine to medium, sub-rounded to rounded gravel	M		TOPSOIL
0.35m	Silty SAND, fine to medium grained, brown mottled pale brown, with fine to coarse, sub-rounded to rounded gravel	M	L	COLLUVIUM
0.70m	Silty CLAY, medium plasticity, mottled orange and dark red -brown, trace rootlets, trace fine grained sand	M (>PL)	F - St	RESIDUAL SOIL
1.00m	Silty Sandy CLAY, medium plasticity, mottled red orange and pale grey, fine to medium grained sand, trace medium to coarse rounded gravel	M (≈PL)	VSt	
1.30m	Silty Clayey SAND, medium to coarse grained, brown-orange mottled pale grey and red	D	D - VD	EXTREMELY WEATHERED
1.40m	SILTSTONE, grey mottled pale grey and purple, interbedded with SANDSTONE, fine to medium grained, brown mottled pale grey and orange, very low strength, highly weathered			WEATHERED ROCK
	TERMINATED AT 1.40 m Refusal on Weathered Rock			

Depth scale: 0.5, 1.0, 1.5

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

STANTEC 2.02.0 LIB.GLB Log CARDNO NON-CORED 304100XXX - SOUTH GILLIESTON HEIGHTS GI.GPJ <<DrawingFile>> 14/06/2023 12:48 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Stantec

TEST PIT LOG SHEET

Hole No: TP008

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights
Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 5/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	F	Stable	Not Encountered	ES 0.10 - 0.25 m	2, 1	0.00–0.20m		TOPSOIL: Silty SAND, fine to medium grained, dark brown, trace organics, trace fine to medium, sub-rounded to rounded gravel	M		TOPSOIL
	F				2	0.20–0.50m		Sandy SILT, low plasticity, dark brown, fine to medium grained sand As above, Pale grey, trace rootlets	M (<PL)	L	COLLUVIUM
	F				3, 4, 3	0.50–0.90m		Silty CLAY, medium plasticity, brown mottled grey and red, trace rootlets, trace fine to medium grained sand As above, Red mottled pale grey and orange, with sand As above, Grey mottled brown, trace sub-rounded cobble	M (>PL)	F	RESIDUAL SOIL
	F				/50mm HB	0.90–1.00m		Clayey SAND, medium to coarse grained, orange brown mottled pale grey with fine to coarse angular sandstone fragments, with lenses of silty sandy CLAY	D	D	EXTREMELY WEATHERED
	H					1.00–1.10m		SANDSTONE, medium to coarse grained, orange mottled brown, fine to medium, rounded to sub-rounded gravel clasts			WEATHERED ROCK
						1.10m		TERMINATED AT 1.10 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP009

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 5/10/22 | **Logged By:** JH | **Checked By:** KS

Depth (m)	Method	Resistance	Stability	Water	Sample or Field Test	Classification / Material Description	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 – 0.20m	600mm toothed bucket		Stable	Not Encountered		TOPSOIL: Silty SAND, fine to medium grained, dark brown, trace organics, trace fine to medium, sub-rounded to rounded gravel	M		TOPSOIL
0.20 – 0.90m					B 0.30 - 0.60 m	Silty CLAY, medium to high plasticity, brown mottled grey, trace fine to medium rounded gravel, trace fine grained sand, trace rootlets As above, High plasticity, mottled pale grey and red	M (>PL)	F	RESIDUAL SOIL
0.90 – 1.50m		F				Silty CLAY, low to medium plasticity, mottled orange brown As above, Pale grey, mottled red orange, trace coarse angular sandstone fragments	M (≈PL)	St VSt	EXTREMELY WEATHERED
1.50m						TERMINATED AT 1.50 m Target depth			

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (scale 3 6 9 12):

Interval	1	2	3	4	5	6	7	8	9	10
Blows	1	2	2	2	2	3	4	6	9	12

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP010

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 5/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Material Description (Soil type...)	Moisture Condition	Consistency Relative Density	Structure & Other Observations
600mm toothed bucket		Stable	Not Encountered		1	0.15m	FILL: Silty SAND, fine to medium grained, dark brown trace gravel, trace organics, trace glass fragments	M		FILL
					1	0.35m	Sandy SILT, low plasticity, dark brown, fine to medium grained sand, trace organics	M (<PL)	S	COLLUVIUM
	F			B 0.60 - 0.80 m	4, 4, 4, 3, 4	1.05m	Silty CLAY, medium plasticity, mottled orange and dark red -brown, trace rootlets, trace fine grained sand As above, High plasticity, trace fine to medium, sub-rounded to sub-angular gravel	M (>PL)	St	RESIDUAL SOIL
	F-H				11 /100mm HB	1.30m	Silty Sandy CLAY, low to medium plasticity, mottled pale grey orange and red, fine to medium grained sand	M (<PL)	VSt to H	EXTREMELY WEATHERED
	H					1.40m	SANDSTONE, medium to coarse grained, grey orange brown, fine to medium, rounded to sub-rounded gravel clasts			WEATHERED ROCK
							TERMINATED AT 1.40 m Refusal on Weathered Rock			

Depth scale: 0.5, 1.0, 1.5

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP011

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:
Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket
Excavation Dimensions:
Contractor: Stantec Pty Ltd
Date Excavated: 5/10/22
Logged By: JH
Checked By: KS

Excavation: Method: 600mm toothed bucket (0.00 – 1.50 m); Resistance: E; Stability: Stable; Water: Not Encountered

Depth (m)	Sample or Field Test	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 – 0.10m	ES 0.05 - 0.10 m	FILL: Silty clayey SAND, fine grained, brown orange	M		FILL
0.10 – 0.25m		Sandy SILT, low plasticity, dark brown, fine to medium grained sand, trace organics	M (<PL)	F	COLLUVIUM
0.25 – 0.60m	ES 0.45 - 0.55 m	Silty CLAY, medium plasticity, brown orange mottled red , trace rootlets, with fine grained sand	M (>PL)	F to St	RESIDUAL SOIL
0.60 – 1.25m	B 0.60 - 0.90 m	Silty Sandy CLAY, low to medium plasticity, mottled pale grey brown orange red, fine to medium grained sand, trace organics	M (<PL)	VSt (to ~0.90 m); H (below)	EXTREMELY WEATHERED
1.25 – 1.50m		Silty Clayey SAND, fine to medium grained sand, brown to orange mottled pale grey, with fine to coarse angular pebbly sandstone fragments	M	D - VD	
1.50m		TERMINATED AT 1.50 m Target depth			

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm

Depth interval (m)	Blows
0.00 – 0.15	2
0.15 – 0.30	2
0.30 – 0.45	2
0.45 – 0.60	5
0.60 – 0.75	6
0.75 – 0.90	8
0.90 – 1.05	17
1.05 – 1.20	21

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP012

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Excavation: Method – 600mm toothed bucket (0.00–1.30 m); Resistance – F, H; Stability – Stable; Water – Not Encountered

Sampling & Testing: DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (3 6 9 12): 2, 2, 5, 4, 4, 7, 8, /50mm HB

Depth (m)	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00–0.15m	FILL: Silty SAND, fine to medium grained, dark brown, with lenses of clay, trace rootlets	M		FILL
0.15–0.30m	FILL: Clayey Sandy SILT, low plasticity, brown to pale brown trace gravel, fine to coarse grained sand, trace medium sub-rounded gravel	M (<PL)		
0.30–0.45m	Sandy CLAY, medium to high plasticity, mottled orange-brown and grey, fine to medium grained sand	M (>PL)	St	RESIDUAL SOIL
0.45–0.90m	Silty CLAY, medium plasticity, orange mottled brown and red, with fine grained sand	M (≈PL)	St to VSt	
0.90–1.10m	Clayey SAND, fine to medium grained, orange mottled pale grey, with medium to coarse, angular to sub-angular gravel	D	D	EXTREMELY WEATHERED
1.10–1.30m	SANDSTONE, fine to medium grained, orange mottled pale grey, highly weathered, very low strength			WEATHERED ROCK

TERMINATED AT 1.30 m
Refusal on Weathered Rock

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

STANTEC 2.02.0 LIB.GLB Log CARDNO NON-CORED 304100XXX - SOUTH GILLIESTON HEIGHTS GI.GPJ <<DrawingFile>> 14/06/2023 12:48 10.03.00.09 Datgel AGS RTA, Photo, Monitoring Tools

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights
Job No: 304100964

Hole No: TP013

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket		Stable	Not Encountered		1, 2, 2	0.25m			FILL: Silty CLAY, low to medium plasticity, dark brown, with fine to coarse angular to sub-angular gravel, trace rootlets, trace metal fragments	M (≈PL)		FILL
					3, 3, 5	0.95m			Silty CLAY, medium to high plasticity, orange brown mottled grey, trace fine sub-rounded to angular gravel, trace rootlets	M (>PL)	St	RESIDUAL SOIL
	F				14 /25mm HB	1.10m			Sandy CLAY, low plasticity, pale orange mottled pale grey, fine to medium grained sand	M (<PL)	H	EXTREMELY WEATHERED
	H				6	1.20m			SANDSTONE, fine to medium grained, grey mottled red orange, fine to medium, rounded to sub-rounded gravel clasts			WEATHERED ROCK
									TERMINATED AT 1.20 m Refusal on Weathered Rock			

Depth scale: 0.5, 1.0, 1.5

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP014

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:

Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket

Excavation Dimensions:
Contractor: Stantec Pty Ltd

Date Excavated: 12/10/22
Logged By: JH
Checked By: KS

Excavation: Method: 600mm toothed bucket (0.00 – 1.50 m); Stability: Stable; Water: Not Encountered

Depth (m)	Resistance	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components / ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 – 0.25m	E	ES 0.05 - 0.10 m	2, 1	Fill	FILL: Clayey Sandy SILT, low plasticity, dark brown, fine to medium grained sand, trace organics, trace fine to medium, sub-rounded to angular gravel	M (<PL)		FILL
0.25 – 0.40m	E	ES 0.25 - 0.35 m	3	Fill	FILL: Clayey GRAVEL, fine to coarse, sub-rounded to sub-angular, yellow brown	M - W		
0.40 – 1.00m	E (to 0.80 m), F	ES 0.45 - 0.60 m; B 0.60 - 0.70 m; ES 0.90 - 1.00 m	4, 4, 7, 14	Clay	Silty CLAY, high plasticity, orange brown mottled grey, trace fine sub-rounded to angular gravel, trace rootlets	M (≈PL)	St to VSt; H	RESIDUAL SOIL
1.00 – 1.40m	F, F-H	B 1.00 - 1.20 m; ES 1.10 - 1.20 m	15/100mm HB	Clay	Silty CLAY, medium to high plasticity, red mottled pale grey and orange, trace fine grained sand, trace rootlets	M (<PL)	H	
1.40 – 1.50m	F-H	ES 1.40 - 1.50 m		Clay	Silty CLAY, low to medium plasticity, pale grey mottled orange	M (<PL)	H	EXTREMELY WEATHERED
1.50m					TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP015

Job No: 304100964 **Sheet:** 1 of 1

Position: Refer to Site Plan **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: **Contractor:** Stantec Pty Ltd

Date Excavated: 12/10/22 **Logged By:** JH **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket		Stable	Not Encountered		1, 2	0.30m			FILL: Sandy SILT, low plasticity, dark brown, with medium to coarse, angular to sub-angular gravel, trace rootlets	M (<PL)		FILL
					3, 5, 10	0.5 / 0.75m			Silty CLAY, medium to high plasticity, mottled dark red and grey, with fine to medium grained sand, trace rootlets	M (>PL)	St / VSt	RESIDUAL SOIL
	F / F-H				17	1.0 / 1.5 / 1.60m			Silty Sandy CLAY, medium plasticity, mottled pale grey and orange As above, With medium to coarse angular sandstone fragments	M (<PL)	H	EXTREMELY WEATHERED
									TERMINATED AT 1.60 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP016

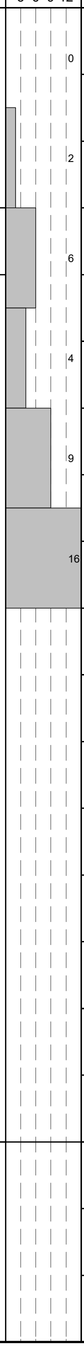
Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22	**Logged By:** JH	**Checked By:** KS

Excavation: Method — 600mm toothed bucket (0.00 – 1.70 m); Resistance — E (0.00 – ~1.20 m), F (~1.20 – 1.70 m); Stability — Stable; Water — Not Encountered

Sampling & Testing: Sample or Field Test — ES 0.30 - 0.40 m

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (scale 3 6 9 12): 0, 2, 6, 4, 9, 16



Depth (m)	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 – 0.25m	FILL: Clayey Gravelly SILT, low plasticity, dark brown, fine to coarse angular to sub angular gravel	M (<PL)		FILL 0.00 m: Ponded water on surface
0.25 – 0.45m	FILL: Clayey Silty GRAVEL, fine to medium sub-rounded to angular, pale grey, trace organics	W		0.40 m: Water Seepage
0.45 – 0.80m	Silty CLAY, medium plasticity, mottled grey, dark red and orange, with fine to coarse sub-rounded to angular gravel, with fine grained sand, trace rootlets, trace sub-rounded cobbles	M (>PL)	St to VSt	RESIDUAL SOIL
0.80 – 1.40m	Silty CLAY, medium to high plasticity, mottled dark red and grey, with fine to medium grained sand, trace rootlets	M (<PL)	H	
1.40 – 1.70m	Silty Sandy CLAY/ Sandy Clayey SILT, low plasticity, red brown mottled grey, fine to medium grained sand	M (<PL)		EXTREMELY WEATHERED
1.70m	TERMINATED AT 1.70 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP017

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**

Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: | **Contractor:** Stantec Pty Ltd

Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered		1, 3	0.00–0.35m		FILL: Clayey SILT, low plasticity, dark brown, trace organics. As above, With fine to coarse angular to sub-angular gravel, grey to brown	M (<PL)		FILL
	E / F				3, 4, 9, 15, 18, /100mm VR	0.35m–1.10m		Silty CLAY, high plasticity, brown mottled grey and pale brown, trace fine grained sand, trace organics. As above, Pale red mottled pale grey and brown orange, no organics	M (>PL)	St / VSt / H	RESIDUAL SOIL
	F-H					1.10m–1.50m		Silty CLAY, low to medium plasticity, mottled pale grey and orange brown, with medium to coarse angular to sub-angular fragments	M (<PL)	H	EXTREMELY WEATHERED
						1.50m		TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP018

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:

Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket

Excavation Dimensions:
Contractor: Stantec Pty Ltd

Date Excavated: 12/10/22
Logged By: JH
Checked By: KS

Excavation: Method: 600mm toothed bucket (0.00 – 1.50 m); Stability: Stable; Water: Not Encountered

Resistance: E (0.00 – 0.50 m); F (0.50 – 1.10 m); F-H (1.10 – 1.50 m)

Sampling & Testing – Sample or Field Test: ES 0.30 - 0.60 m; ES 0.90 - 1.00 m; ES 1.20 - 1.30 m

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (scale 3 6 9 12): 1, 3, 4, 5, 6, 10, 16, /50mm HB, 11

Depth (m)	Classification	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency / Relative Density	STRUCTURE & Other Observations
0.00 – 0.25m		FILL: Silty CLAY, low plasticity, dark brown, with fine to coarse angular to sub-angular gravel, trace cobbles	M (<PL)		FILL
0.25 – 0.85m		Silty CLAY, high plasticity, brown mottled grey and pale brown, trace fine grained sand, trace organics As above, Pale brown mottled orange	M (>PL)	St; VSt	RESIDUAL SOIL
0.85 – 1.20m		Silty Gravelly CLAY, low plasticity, pale brown mottled grey, fine to medium angular to sub-angular gravel	M (<PL)	H	EXTREMELY WEATHERED
1.20 – 1.50m		SILTSTONE, grey to dark blue, very low strength, highly weathered			WEATHERED ROCK
1.50m		TERMINATED AT 1.50 m Target depth			

METHOD

EX	Excavator bucket
R	Ripper
HA	Hand auger
PT	Push tube
SON	Sonic drilling
AH	Air hammer
PS	Percussion sampler
AS	Short spiral auger
AD/V	Solid flight auger: V-Bit
AD/T	Solid flight auger: TC-Bit
HFA	Hollow flight auger
WB	Washbore drilling
RR	Rock roller

PENETRATION

VE	Very Easy (No Resistance)
E	Easy
F	Firm
H	Hard
VH	Very Hard (Refusal)

WATER

- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS

SPT	- Standard Penetration Test
HP	- Hand/Pocket Penetrometer
DCP	- Dynamic Cone Penetrometer
PSP	- Perth Sand Penetrometer
MC	- Moisture Content
PBT	- Plate Bearing Test
IMP	- Borehole Impression Test
PID	- Photoionisation Detector
VS	- Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES

B	- Bulk disturbed sample
D	- Disturbed sample
ES	- Environmental sample
U	- Thin wall tube 'undisturbed'

MOISTURE

D	- Dry
M	- Moist
W	- Wet
PL	- Plastic limit
LL	- Liquid limit
w	- Moisture content

SOIL CONSISTENCY

VS	- Very Soft
S	- Soft
F	- Firm
St	- Stiff
VSt	- Very Stiff
H	- Hard

RELATIVE DENSITY

VL	- Very Loose
L	- Loose
MD	- Medium Dense
D	- Dense
VD	- Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP019

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:

Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket

Excavation Dimensions:
Contractor: Stantec Pty Ltd

Date Excavated: 12/10/22
Logged By: JH
Checked By: KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered		1	0.00–0.15		FILL: Silty CLAY, low plasticity, dark brown, with fine to coarse angular to sub-angular gravel, trace cobbles	M (<PL)		FILL
	E				2	0.15–0.30		Silty Clayey SAND, fine to medium grained, pale grey mottled brown, trace organics	M	L	COLLUVIUM
	E / F / F-H				4, 4, 4, 5, 6, 9, 15 (/100mm VR)	0.30–1.30		Silty CLAY, high plasticity, brown mottled grey and pale brown, trace fine grained sand, trace organics	M (>PL)	St / VSt	RESIDUAL SOIL
	H					1.30–1.50		Silty Sandy CLAY, medium plasticity, mottled pale grey orange and brown, fine to medium grained sand	M (<PL)	H	EXTREMELY WEATHERED
						1.50		TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP020

Job No: 304100964 **Sheet:** 1 of 1

Position: Refer to Site Plan **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: **Contractor:** Stantec Pty Ltd

Date Excavated: 12/10/22 **Logged By:** JH **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered		1, 2, 3	0.00 – 0.30m		FILL: Clayey SILT, low plasticity, dark brown, trace organics	M (<PL)		FILL
						0.30 – 0.45m		FILL: Silty CLAY, medium to high plasticity, brown mottled orange and grey, trace rootlets	M (>PL)		
				ES 0.50 - 0.60 m	4, 4, 6	0.45m		Silty CLAY, medium to high plasticity, orange brown mottled pale grey, with fine to medium angular to sub-angular gravel	M (>PL)	St	RESIDUAL SOIL
					6, 6, 7	– 1.40m		As above, Pale grey mottled orange and brown		VSt	
					8	1.40 – 1.50m		Silty CLAY, low plasticity, pale grey/ white, mottled orange	M (<PL)	VSt	EXTREMELY WEATHERED
					13, 13, 13, 14, 15, 15, /100mm VR	1.50m		TERMINATED AT 1.50 m Target depth			

METHOD		PENETRATION		FIELD TESTS		SAMPLES		SOIL CONSISTENCY	
EX	Excavator bucket	VE	Very Easy (No Resistance)	SPT -	Standard Penetration Test	B -	Bulk disturbed sample	VS -	Very Soft
R	Ripper	E	Easy	HP -	Hand/Pocket Penetrometer	D -	Disturbed sample	S -	Soft
HA	Hand auger	F	Firm	DCP -	Dynamic Cone Penetrometer	ES -	Environmental sample	F -	Firm
PT	Push tube	H	Hard	PSP -	Perth Sand Penetrometer	U -	Thin wall tube 'undisturbed'	St -	Stiff
SON	Sonic drilling	VH	Very Hard (Refusal)	MC -	Moisture Content	**MOISTURE**		VSt -	Very Stiff
AH	Air hammer	**WATER**		PBT -	Plate Bearing Test	D -	Dry	H -	Hard
PS	Percussion sampler		Water Level on Date shown	IMP -	Borehole Impression Test	M -	Moist	**RELATIVE DENSITY**	
AS	Short spiral auger		water inflow	PID -	Photoionisation Detector	W -	Wet	VL -	Very Loose
AD/V	Solid flight auger: V-Bit		water outflow	VS -	Vane Shear; P=Peak, R=Resdual (uncorrected kPa)	PL -	Plastic limit	L -	Loose
AD/T	Solid flight auger: TC-Bit					LL -	Liquid limit	MD -	Medium Dense
HFA	Hollow flight auger					*w* -	Moisture content	D -	Dense
WB	Washbore drilling							VD -	Very Dense
RR	Rock roller								

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP021

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**

Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: | **Contractor:** Stantec Pty Ltd

Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method: 600mm toothed bucket (0.00 – 1.50 m)
Stability: Stable
Water: Not Encountered

Depth (m)	Resistance	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 – 0.25m		FILL: Silty CLAY/ Clayey SILT, low plasticity, dark brown, trace organics	M (<PL)		FILL
0.25 – 1.20m		Silty CLAY, high plasticity, brown mottled grey and pale brown, trace fine grained sand, trace organics As above, Mottled grey and pale red, no organics	M (>PL)	St VSt to H	RESIDUAL SOIL
1.20 – 1.50m	F (to ~1.2 m); F-H (1.2 – 1.5 m)	Silty CLAY, low to medium plasticity, red mottled pale grey	M (<PL)	H	EXTREMELY WEATHERED
1.50m		TERMINATED AT 1.50 m Target depth			

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm

Depth interval (m)	Blows
0.00 – 0.15	2
0.15 – 0.30	3
0.30 – 0.45	2
0.45 – 0.60	3
0.60 – 0.75	3
0.75 – 0.90	4
0.90 – 1.05	7
1.05 – 1.20	15
1.20	VR

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd			**Hole No: TP022**
Project: Geotechnical Investigation			
Location: 457-527 Cessnock Road, Gillieston Heights	**Job No:** 304100964		**Sheet:** 1 of 1
Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**	
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket		
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd	
Date Excavated: 12/10/22	**Logged By:** JH	**Checked By:** KS	

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components / ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket (0.00–1.60 m)	F (below 1.0 m)	Stable	Not Encountered		2, 2	0.00			FILL: Clayey SILT, low plasticity, dark brown, trace organics, trace fine to medium, angular to sub-rounded gravel	M (<PL)		FILL
				ES 0.30 - 0.50 m	3	0.30m			FILL: Sandy SILT, low plasticity, pale grey, mottled pale brown, trace organics	M (<PL)		
				ES 0.60 - 0.80 m	5, 7, 9, 11	0.50m			Silty CLAY, high plasticity, grey mottled brown to light brown, trace organics, trace medium to coarse rounded gravel	M (>PL)	VSt	COLLUVIUM
				ES 1.20 - 1.40 m	17, VR	1.05m			Silty CLAY, high plasticity, mottled grey and dark red, trace fine grained sand	M (>PL)	H	RESIDUAL SOIL
						1.60m			TERMINATED AT 1.60 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights
Job No: 304100964

Hole No: TP023

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket		Stable	Not Encountered		2	0.0–0.15		FILL: Silty CLAY, low to medium plasticity, dark brown with fine to coarse angular to sub-rounded gravel, trace organics	M (<PL)		FILL
	F				3, 4	0.15m		CLAY, high plasticity, brown mottled grey and pale brown, trace fine grained sand, trace organics		St	RESIDUAL SOIL
				B 0.55 - 0.90 m	9, 8	0.5		As above, Grey mottled dark red	M (>PL)	VSt	
					13, 14, /75mm VR	1.0				H	
	F-H					1.25m		Silty Sandy CLAY, low to medium plasticity, grey mottled dark red	M (<PL)	H	EXTREMELY WEATHERED
						1.50m		TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP024
Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Depth (m)	Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 - 0.20	600mm toothed bucket	E	Stable	Not Encountered		2, 3		FILL: Clayey SILT, low plasticity, dark brown, trace organics, trace fine to coarse angular to sub-angular gravel	M (<PL)		FILL
0.20 - 0.45		E			ES 0.20 - 0.40 m	3, 5		Silty CLAY, medium to high plasticity, brown mottled grey and red, with fine to coarse angular to sub-rounded gravel, trace organics	M (>PL)	St	RESIDUAL SOIL
0.45 - 0.60		E / F				6		Silty Gravelly CLAY, medium to high plasticity, red mottled grey, fine to coarse sub-rounded to rounded gravel, trace rootlets	M (>PL)	VSt	
0.60 - 0.85		F / H				19, 13, /50mm VR		SILTSTONE, grey, dark blue mottled orange, very low strength		H	WEATHERED ROCK
0.85								TERMINATED AT 0.85 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP025

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered		2	0.00–0.20m		TOPSOIL: Clayey SILT, low plasticity, brown orange	M (>PL)		TOPSOIL
	E				3, 4	0.20–0.80m		Silty CLAY, medium to high plasticity, brown orange mottled grey, trace fine grained sand, trace rootlets	M (>PL)	St	RESIDUAL SOIL
	F				9, 9			As above, Orange mottled brown	M (>PL)	VSt	
	F				18	0.80–1.30m		Silty CLAY, low plasticity, brown orange mottled grey, with lenses of pale grey	M (<PL)	H	EXTREMELY WEATHERED
	F					1.30–1.50m		Clayey SAND, fine to medium grained, brown orange mottled grey, with fine to coarse angular to sub-angular gravel	D	VD	
						1.50m		TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP026

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method: 600mm toothed bucket (0.00–1.50 m). Stability: Stable. Water: Not Encountered.

Depth (m)	Resistance	DCP TEST (AS 1289.6.3.3-1997) Blows/150 mm	SOIL TYPE / ROCK TYPE description	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00–0.15	E	1	TOPSOIL: Clayey SILT, low plasticity, dark brown trace organics	M (<PL)		TOPSOIL
0.15–0.30	E	2	Clayey GRAVEL, fine to coarse angular to sub-rounded, pale brown mottled pale grey	M - W	L	COLLUVIUM
0.30–0.80	E / F	2, 4, 5	Silty CLAY, high plasticity, brown to orange mottled pale grey, trace fine grained sand, trace rootlets	M (>PL)	St	RESIDUAL SOIL
0.80–1.20	F / H	19, VR	Silty Sandy CLAY, low plasticity, orange brown mottled pale grey, with fine to coarse grained sand, with fine to medium, angular to sub-angular sandstone fragments	M (<PL)	H	EXTREMELY WEATHERED
1.20–1.50	H		SANDSTONE, fine to medium grained, grey mottled dark purple, very low strength, highly weathered			WEATHERED ROCK
1.50			TERMINATED AT 1.50 m Target depth			

METHOD
EX Excavator bucket; R Ripper; HA Hand auger; PT Push tube; SON Sonic drilling; AH Air hammer; PS Percussion sampler; AS Short spiral auger; AD/V Solid flight auger: V-Bit; AD/T Solid flight auger: TC-Bit; HFA Hollow flight auger; WB Washbore drilling; RR Rock roller

PENETRATION
VE Very Easy (No Resistance); E Easy; F Firm; H Hard; VH Very Hard (Refusal)

WATER
Water Level on Date shown; water inflow; water outflow

FIELD TESTS
SPT - Standard Penetration Test; HP - Hand/Pocket Penetrometer; DCP - Dynamic Cone Penetrometer; PSP - Perth Sand Penetrometer; MC - Moisture Content; PBT - Plate Bearing Test; IMP - Borehole Impression Test; PID - Photoionisation Detector; VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample; D - Disturbed sample; ES - Environmental sample; U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry; M - Moist; W - Wet; PL - Plastic limit; LL - Liquid limit; *w* - Moisture content

SOIL CONSISTENCY
VS - Very Soft; S - Soft; F - Firm; St - Stiff; VSt - Very Stiff; H - Hard

RELATIVE DENSITY
VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP027

Job No: 304100964 **Sheet:** 1 of 1

Position: Refer to Site Plan **Angle from Horizontal:** 90° **Surface Elevation:**
Machine Type: 5 tonne Excavator **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: **Contractor:** Stantec Pty Ltd
Date Excavated: 12/10/22 **Logged By:** JH **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered		1	0.15m		TOPSOIL: Clayey SILT, low plasticity, brown	M (<PL)		TOPSOIL
	E				1	0.30m		Clayey Sandy SILT, low plasticity, pale brown	M (<PL)	S	COLLUVIUM
	E				3, 5, 8, VR	1.15m		Silty CLAY, high plasticity, brown mottled grey and pale brown, trace fine grained sand, trace organics Pale brown mottled pale grey and orange	M (>PL)	St VSt to H	RESIDUAL SOIL
	F					1.60m		Silty CLAY, low to medium plasticity, pale grey mottled orange and red	M (<PL)	H	EXTREMELY WEATHERED
								TERMINATED AT 1.60 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP028

Job No: 304100964

Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**

Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: | **Contractor:** Stantec Pty Ltd

Date Excavated: 12/10/22 | **Logged By:** JH | **Checked By:** KS

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	Material Description: SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
600mm toothed bucket	E	Stable	Not Encountered	ES 0.05 - 0.10 m	3	0.00–0.15			TOPSOIL: Sandy SILT, low plasticity, brown, fine to medium grained sand	M (<PL)		TOPSOIL
	E			ES 0.20 - 0.35 m; B 0.30 - 0.45 m	4, 6, 12, /100mm VR	0.15–0.70			Silty CLAY, medium to high plasticity, brown to orange mottled grey and red, trace fine to medium grained sand, trace rootlets	M (>PL)	St; H	RESIDUAL SOIL
	F; H			ES 1.00 - 1.20 m		0.70–1.40			Clayey SAND, medium to coarse grained, brown to orange mottled pale grey, with fine to coarse angular sandstone fragments	D	VD	EXTREMELY WEATHERED
						1.40			TERMINATED AT 1.40 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP101

Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Excavation: Method	Excavation: Resistance	Excavation: Stability	Water	Sampling & Testing: Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (3 6 9 12)	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	E	Stable	Not Encountered		2, 2	0.25m			TOPSOIL: Sandy SILT: low plasticity, dark brown, with clay, trace fine rounded gravel, trace rootlets	M (<PL)		TOPSOIL
EX	E	Stable	Not Encountered		5	0.45m			Clayey SILT: low plasticity, grey, with fine to medium rounded gravel, trace rootlets	M (<PL)		COLLUVIUM
EX	E	Stable	Not Encountered		13, HB	0.5 / 0.65m			Silty CLAY: medium to high plasticity, red mottled grey and brown	M (>PL)	H	RESIDUAL SOIL
EX	F-H	Stable	Not Encountered			0.80m			Silty Sandy CLAY: medium plasticity, orange mottled pale grey	M (≈PL)	H	EXTREMELY WEATHERED
EX	H	Stable	Not Encountered			0.90m			SANDSTONE: fine to medium grained, grey, low strength, highly weathered			WEATHERED ROCK
						1.0 / 1.5			TERMINATED AT 0.90 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP102

Job No: 304100964 | **Sheet:** 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**

Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: | **Contractor:** Stantec Pty Ltd

Date Excavated: 19/4/23 | **Logged By:** JH | **Checked By:**

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	E	Stable	Not Encountered		3, 2, 5, 5, 16	0.00–0.70			FILL: Silty SAND: fine to coarse grained, dark brown, with foreign building waste inclusions	D		FILL 0.00 m: Distinct ground disturbance in the form of uneven surfaces surrounding TP 0.25 m: Bricks, ceramic tiles, timber fragments, Coal Wash Reject fragments Composition: Approx. 25% Foreign, 75% Soil.
EX	E	Stable	Not Encountered		HB (16/125m)	0.70–1.00			Silty CLAY: high plasticity, red mottled pale grey and orange	M (>PL)	St	RESIDUAL SOIL
EX	F-H, H	Stable	Not Encountered			1.00–1.25			Silty CLAY: low plasticity (friable), pale grey mottled brown, trace rootlets	M (<PL)	VSt	EXTREMELY WEATHERED
						1.25			TERMINATED AT 1.25 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP103

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:
Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket
Excavation Dimensions:
Contractor: Stantec Pty Ltd
Date Excavated: 19/4/23
Logged By: JH
Checked By:

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	Material Description: SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	E-F	Stable	Not Encountered		5	0.00–0.25m			FILL: Silty SAND: fine to coarse grained, dark brown, with fine to coarse angular gravels, trace rootlets	D		FILL
					6	0.25–0.40m			FILL: Gravelly SAND: fine to coarse grained, grey, fine to coarse angular to sub-angular gravel, trace rounded to sub-rounded cobbles, trace plastic wrap fragments	D		
					8, 5, 5	0.40–0.75m			Silty CLAY: high plasticity, red mottled pale grey and brown, trace fine grained sand	M (>PL)	St	RESIDUAL SOIL
	E-F / F / H				12, 12, VR (12/50mm)	0.75–1.20m			Sandy CLAY: low to medium plasticity, orange mottled red and brown, fine to medium grained sand	M (<PL)	VSt - H	EXTREMELY WEATHERED
						1.20m			TERMINATED AT 1.20 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP104

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan | **Angle from Horizontal:** 90° | **Surface Elevation:**
Machine Type: 5 tonne Excavator | **Excavation Method:** 600mm Toothed Bucket
Excavation Dimensions: | **Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23 | **Logged By:** JH | **Checked By:**

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		2, 2				0.25m FILL: Clayey SILT: low plasticity, dark brown-black, with fine to medium grained sand, trace rootlets, trace glass fragments	M (<PL)		FILL
	F				2				0.40m Clayey SILT: low plasticity, grey, with fine to coarse rub-rounded to sub-angular gravels	M (<PL)		COLLUVIUM
	F			B 0.50 - 0.70 m	3, 4	0.5			0.80m Silty CLAY: high plasticity, red mottled pale grey and brown, trace fine grained sand	M (>PL)	St	RESIDUAL SOIL
	F-H / H			B 1.00 - 1.30 m	5, 6, 8, 8, 10, 14; VR (14/75mm)	1.0, 1.5			1.60m Silty CLAY: low to medium plasticity (friable), pale grey mottled orange, with fine grained sand	M (<PL)	St - VSt	EXTREMELY WEATHERED
									TERMINATED AT 1.60 m Refusal on Weathered Rock			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

TEST PIT LOG SHEET

Stantec

Hole No: TP105

Client: Walker Gillieston Heights Pty Ltd		
Project: Geotechnical Investigation		
Location: 457-527 Cessnock Road, Gillieston Heights	**Job No:** 304100964	**Sheet:** 1 of 1
Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Depth (m)	Method	Resistance	Stability	Water	Sample or Field Test	Classification / Graphic Log	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 - 0.30	EX	E	Stable	Not Encountered			TOPSOIL: Silty SAND: fine to medium grained, dark brown, with fine to medium rounded gravel, trace organics	D		TOPSOIL
0.30 - 1.00	EX	E	Stable	Not Encountered	B 0.50 - 0.80 m		Silty CLAY: high plasticity, dark grey mottled orange and brown, trace fine to medium rounded gravels, trace rootlets	M (>PL)	St	Probably COLLUVIUM
1.00 - 1.60	EX	F-H	Stable	Not Encountered			Silty CLAY: high plasticity, red mottled pale grey and brown, trace fine grained sand	M (≈PL)	St - VSt	RESIDUAL SOIL
1.60 - 2.50	EX	F-H	Stable	Not Encountered			Silty CLAY: low plasticity (friable), mottled pale grey and red	M (<PL)	VSt - H	EXTREMELY WEATHERED
2.50							TERMINATED AT 2.50 m Target depth			

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm

Depth (m)	Blows
0.00 - 0.15	5
0.15 - 0.30	4
0.30 - 0.45	3
0.45 - 0.60	3
0.60 - 0.75	4
0.75 - 0.90	5
0.90 - 1.05	4
1.05 - 1.20	3
1.20 - 1.35	3
1.35 - 1.50	7
1.50 - 1.65	9
1.65 - 1.80	10
1.80 - 1.95	11
1.95 - 2.00	15

HB (15/75mm)

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP106

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Excavation: Method: EX (0.00 – 2.00 m); Stability: Stable; **Water:** Not Encountered

Resistance: F (0.00 – 0.40 m); F-H (0.40 – 0.75 m); H (0.75 – 1.10 m); F-H (1.10 – 2.00 m)

Sampling & Testing: DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm (scale 3 6 9 12): 3, 4, 3, 4, 4, 5, 6, 15, 15, VR (15/75mm)

Material Description

Depth (m)	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components / ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00 – 0.20m	TOPSOIL: Silty SAND: fine to medium grained, dark brown, with fine to medium rounded gravel, trace organics	D		TOPSOIL
0.20 – 0.35m	Sandy GRAVEL: fine to coarse rounded to sub-rounded, grey, fine to medium grained sand, trace rootlets	D		COLLUVIUM
0.35 – 1.05m	Silty CLAY: high plasticity, red mottled brown, trace fine grained sand	M (>PL)	St	RESIDUAL SOIL
	As Above, orange-brown mottled grey	M (≈PL)		
1.05 – 2.00m	Silty CLAY: low to medium plasticity, mottled pale grey and red-orange, with fine grained sand	M (<PL)	VSt - H	EXTREMELY WEATHERED
	As Above, with parent rock fragments			
2.00m	TERMINATED AT 2.00 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP107

Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Method	Resistance	Stability	Water	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	E	Stable	Not Encountered	0.00–0.60m		FILL: Sandy CLAY: low plasticity, dark brown-black, with fine to coarse angular to sub-angular gravel	M (<PL)		FILL
EX	F-H	Stable	Not Encountered	0.60–1.30m		Silty CLAY: high plasticity, dark grey mottled dark red, trace fine to coarse sub-rounded to angular gravels, trace rounded cobbles	M (>PL)	St	COLLUVIUM 1.20 m: Minor olfactory odour
EX	H	Stable	Not Encountered	1.30–2.20m		Silty CLAY: high plasticity, dark red mottled brown with orange staining, with fine to coarse sub-rounded to sub-angular gravel, trace fine grained sand	M (>PL)	VSt - H	RESIDUAL SOIL 1.50 m: Possible jarosite staining
EX	H	Stable	Not Encountered	2.20–2.30m		Silty CLAY: low plasticity (friable), mottled pale grey and red	M (<PL)	H	EXTREMELY WEATHERED
				2.30m		TERMINATED AT 2.30 m Target depth			

Sampling & Testing — DCP TEST (AS 1289.6.3.2-1997), Blows/150 mm

Depth (m)	Blows
0.00–0.15	3
0.15–0.30	4
0.30–0.45	3
0.45–0.60	2
0.60–0.75	3
0.75–0.90	3
0.90–1.05	4
1.05–1.20	11
1.20–1.35	7
1.35–1.50	15
1.50–1.65	23
1.65	VR

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Stantec

TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP108

Job No: 304100964
Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Excavation: Method EX; Resistance F-H; Stability Stable; Water Not Encountered

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm: 4, 4, 8, 9, 6, 5, 5, 6, 5, 9, 17, VR

Depth (m)	Material Description (SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components; ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure)	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
0.00–0.25m	TOPSOIL: Clayey SILT: low plasticity, dark brown, trace organics	M (<PL)		TOPSOIL 0.00 m: Within gully line
0.25–0.80m	Silty CLAY: high plasticity, grey mottled pale brown, trace fine to medium rounded gravels, trace rootlets	M (>PL)	St - VSt	COLLUVIUM
0.80–1.60m	Silty CLAY: high plasticity, mottled pale grey and orange-brown	M (>PL)	St - VSt	RESIDUAL SOIL
1.60–1.90m	Silty CLAY: low plasticity, mottled pale grey and red	M (<PL)	H	EXTREMELY WEATHERED
1.90–2.20m	SILTSTONE: pale grey and dark red, very low to low strength, highly weathered			WEATHERED ROCK
2.20m	TERMINATED AT 2.20 m Target depth			

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
VH Very Hard (Refusal)

WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Photoionisation Detector
VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP109

Job No: 304100964 | **Sheet:** 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Method	Resistance	Stability	Water	Sample or Field Test	Depth (m)	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components / ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		0.00 – 0.25m		TOPSOIL: Sandy SILT: low plasticity, brown, trace organics	M (<PL)		TOPSOIL
EX	F (to 0.45 m), F-H (0.45 – 0.75 m)	Stable	Not Encountered		0.25 – 0.75m		Silty CLAY: high plasticity, brown-grey mottled red, with fine to medium rounded gravel, trace fine grained sand, trace roolets	M (>PL)	St	COLLUVIUM
EX	H	Stable	Not Encountered		0.75 – 1.80m		Silty CLAY: high plasticity, grey mottled red, with fine to medium rounded gravel, trace fine grained sand	M (>PL)	St (to 1.2 m), VSt (1.2 – 1.8 m)	RESIDUAL SOIL
EX	F-H	Stable	Not Encountered	B 1.80 - 2.00 m	1.80 – 2.30m		Sandy CLAY: low plasticity, pale grey mottled orange-brown, fine to medium grained	M (<PL)	H	EXTREMELY WEATHERED
					2.30m		TERMINATED AT 2.30 m Target depth			

DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm

Depth (m)	Blows
0.00 – 0.15	4
0.15 – 0.30	2
0.30 – 0.45	3
0.45 – 0.60	3
0.60 – 0.75	4
0.75 – 0.90	5
0.90 – 1.05	5
1.05 – 1.20	4
1.20 – 1.35	6
1.35 – 1.50	7
1.50 – 1.65	8
1.65 – 1.80	13
1.80 – 1.95	10

VR (10/75mm)

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
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AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
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WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
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SAMPLES
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MOISTURE
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SOIL CONSISTENCY
VS - Very Soft
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RELATIVE DENSITY
VL - Very Loose
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MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP110

Sheet: 1 of 1

Position: Refer to Site Plan	**Angle from Horizontal:** 90°	**Surface Elevation:**
Machine Type: 5 tonne Excavator	**Excavation Method:** 600mm Toothed Bucket	
Excavation Dimensions:		**Contractor:** Stantec Pty Ltd
Date Excavated: 19/4/23	**Logged By:** JH	**Checked By:**

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Classification	Material Description: SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components / ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		4, 3	0.00–0.25m		TOPSOIL: Clayey SILT: low plasticity, dark brown, trace rootlets	M (<PL)		TOPSOIL
EX	F / F-H	Stable	Not Encountered		4, 3, 5, 4	0.25–1.00m		Silty CLAY: high plasticity, brown-grey mottled red, with fine to medium rounded gravel, trace fine grained sand, trace roolets	M (>PL)	St	RESIDUAL SOIL
EX	F-H / H	Stable	Not Encountered		17, 10, HB (10/25mm)	1.00–1.25m		Silty Gravelly CLAY: medium to high plasticity, red mottled grey-brown, fine to coarse rounded to sub-rounded, trace fine grained sand	M (≈PL)	VSt - H	EXTREMELY WEATHERED
EX	H	Stable	Not Encountered			1.25–1.40m		CONGLOMERATE: medium to coarse grained sand, fine to coarse rounded to sub-rounded gravels, orange-brown and red, very low strength, highly weathered			WEATHERED ROCK
						1.40m		TERMINATED AT 1.40 m Refusal on Weathered Rock			

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- water inflow
- water outflow

FIELD TESTS
- SPT - Standard Penetration Test
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SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
- ES - Environmental sample
- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
- M - Moist
- W - Wet
- PL - Plastic limit
- LL - Liquid limit
- *w* - Moisture content

SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Job No: 304100964

Hole No: TP111

Sheet: 1 of 1

Position: Refer to Site Plan
Angle from Horizontal: 90°
Surface Elevation:
Machine Type: 5 tonne Excavator
Excavation Method: 600mm Toothed Bucket
Excavation Dimensions:
Contractor: Stantec Pty Ltd
Date Excavated: 19/4/23
Logged By: JH
Checked By:

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable			3, 4	0.00–0.20m			FILL: Silty SAND: fine to medium grained, dark brown, with fine to medium rounded gravel, trace organics	D		FILL
	F (to ~0.40m), H				5, 7	0.20–0.50m			FILL: Silty Gravelly CLAY: medium plasticity, pale grey, brown red and orange, fine to coarse angular to sub-angular, with fine to medium grained sand, trace angular cobbles	M (>PL)		
	H				15	0.50–0.65m			Silty Gravelly CLAY: medium to high plasticity, pale grey mottled brown-orange, fine to coarse angular to sub-angular, with fine to medium grained sand	M (>PL)	VSt	RESIDUAL SOIL
	H		▶ (0.70 m)		VR	0.65–1.30m			SILTSTONE: pale grey and dark red, highly fractured, very low to low strength, highly weathered			WEATHERED ROCK 0.70 m: Water inflow
						1.30m			TERMINATED AT 1.30 m Refusal on Weathered Rock			

Depth scale: 0.5, 1.0, 1.5

METHOD
- EX Excavator bucket
- R Ripper
- HA Hand auger
- PT Push tube
- SON Sonic drilling
- AH Air hammer
- PS Percussion sampler
- AS Short spiral auger
- AD/V Solid flight auger: V-Bit
- AD/T Solid flight auger: TC-Bit
- HFA Hollow flight auger
- WB Washbore drilling
- RR Rock roller

PENETRATION
- VE Very Easy (No Resistance)
- E Easy
- F Firm
- H Hard
- VH Very Hard (Refusal)

WATER
- Water Level on Date shown
- ▶ water inflow
- ◀ water outflow

FIELD TESTS
- SPT - Standard Penetration Test
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- MC - Moisture Content
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- VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
- B - Bulk disturbed sample
- D - Disturbed sample
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- U - Thin wall tube 'undisturbed'

MOISTURE
- D - Dry
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- W - Wet
- PL - Plastic limit
- LL - Liquid limit
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SOIL CONSISTENCY
- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard

RELATIVE DENSITY
- VL - Very Loose
- L - Loose
- MD - Medium Dense
- D - Dense
- VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

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TEST PIT LOG SHEET

Client: Walker Gillieston Heights Pty Ltd
Project: Geotechnical Investigation
Location: 457-527 Cessnock Road, Gillieston Heights

Hole No: TP112

Job No: 304100964 **Sheet:** 1 of 1

Position: Refer to Site Plan **Angle from Horizontal:** 90° **Surface Elevation:**

Machine Type: 5 tonne Excavator **Excavation Method:** 600mm Toothed Bucket

Excavation Dimensions: **Contractor:** Stantec Pty Ltd

Date Excavated: 19/4/23 **Logged By:** JH **Checked By:**

Method	Resistance	Stability	Water	Sample or Field Test	DCP TEST (AS 1289.6.3.2-1997) Blows/150 mm	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
EX	F	Stable	Not Encountered		7, 5	0.25m			FILL: Silty Gravelly SAND: fine to medium grained, dark brown, fine to coarse rounded to angular	D		FILL
EX	F	Stable	Not Encountered		3, 5	0.50m			Silty CLAY: high plasticity, red mottled pale grey and brown, trace fine grained sand	M (>PL)	St	RESIDUAL SOIL
EX	F	Stable	Not Encountered		17, HB (17/125mm)	0.90m			Silty Gravelly CLAY: medium plasticity, brown-orange mottled grey and pale grey, fine to coarse angular to sub-angular	M (<PL)	St - VSt	EXTREMELY WEATHERED
EX	H	Stable	Not Encountered			1.10m			SILTSTONE: brown-orange mottled grey and pale grey, highly fractured, very low to low strength, highly weathered			WEATHERED ROCK
									TERMINATED AT 1.10 m Refusal on Weathered Rock			

Depth scale: 0.5, 1.0, 1.5

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION
VE Very Easy (No Resistance)
E Easy
F Firm
H Hard
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WATER
Water Level on Date shown
water inflow
water outflow

FIELD TESTS
SPT - Standard Penetration Test
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VS - Vane Shear; P=Peak, R=Resdual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

Refer to explanatory notes for details of abbreviations and basis of descriptions

STANTEC AUSTRALIA PTY LTD

Explanatory Notes

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS1726-2017 Geotechnical Site Investigations. Material descriptions are deduced from field observation or engineering examination, and may be appended or confirmed by in situ or laboratory testing. The information is dependent on the scope of investigation, the extent of sampling and testing, and the inherent variability of the conditions encountered.

Subsurface investigation may be conducted by one or a combination of the following methods.

Method		
Test Pitting: excavation/trench		
	BH	Backhoe bucket
	EX	Excavator bucket
	R	Ripper
	H	Hydraulic Hammer
	X	Existing excavation
	N	Natural exposure
Manual drilling: hand operated tools		
	HA	Hand Auger
Continuous sample drilling		
	PT	Push tube
	PS	Percussion sampling
	SON	Sonic drilling
Hammer drilling		
	AH	Air hammer
	AT	Air track
Spiral flight auger drilling		
	AS	Auger screwing
	AD/V	Continuous flight auger: V-bit
	AD/T	Continuous spiral flight auger: TC-Bit
	HFA	Continuous hollow flight auger
Rotary non-core drilling		
	WB	Washbore drilling
	RR	Rock roller
Rotary core drilling		
	PQ	85mm core (wire line core barrel)
	HQ	63.5mm core (wire line core barrel)
	NMLC	51.94mm core (conventional core barrel)
	NQ	47.6mm core (wire line core barrel)
	DT	Diatube (concrete coring)

Sampling is conducted to facilitate further assessment of selected materials encountered.

Sampling method		
Soil sampling		
	B	Bulk disturbed sample
	D	Disturbed sample
	C	Core sample
	ES	Environmental soil sample
	SPT	Standard Penetration Test sample
	U	Thin wall tube 'undisturbed' sample
Water sampling		
	WS	Environmental water sample

Field testing may be conducted as a means of assessment of the in situ conditions of materials.

Field testing		
SPT	Standard Penetration Test	
HP/PP	Hand/Pocket Penetrometer	
Dynamic Penetrometers (blows per noted increment)		
	DCP	Dynamic Cone Penetrometer
	PSP	Perth Sand Penetrometer
MC	Moisture Content	
VS	Vane Shear	
PBT	Plate Bearing Test	
IMP	Borehole Impression Test	
PID	Photo Ionization Detector	

If encountered, refusal (R), virtual refusal (VR) or hammer bouncing (HB) of penetrometers may be noted.

The quality of the rock can be assessed by the degree of natural defects/fractures and the following.

Rock quality description	
TCR	Total Core Recovery (%) (length of core recovered divided by the length of core run)
RQD	Rock Quality Designation (%) (sum of axial lengths of core greater than 100mm long divided by the length of core run)

Notes on groundwater conditions encountered may include.

Groundwater	
Not Encountered	Excavation is dry in the short term
Not Observed	Water level observation not possible
Seepage	Water seeping into hole
Inflow	Water flowing/flooding into hole

Perched groundwater may result in a misleading indication of the depth to the true water table. Groundwater levels are also likely to fluctuate with variations in climatic and site conditions.

Notes on the stability of excavations may include.

Excavation conditions	
Stable	No obvious/gross short term instability noted
Spalling	Material falling into excavation (minor/major)
Unstable	Collapse of the majority, or one or more face of the excavation

Explanatory Notes: General Soil Description

The methods of description and classification of soils used in this report are based on Australian Standard AS1726-2017 Geotechnical Site Investigations. In practice, a material is described as a soil if it can be remoulded by hand in its field condition or in water. The dominant component is shown in upper case, with secondary components in lower case. In general descriptions cover: soil type, plasticity or particle size/shape, colour, strength or density, moisture and inclusions.

In general, soil types are classified according to the dominant particle on the basis of the following particle sizes.

Soil Classification		**Particle Size (mm)**
CLAY		< 0.002
SILT		0.002 0.075
SAND	fine	0.075 to 0.21
	medium	0.21 to 0.6
	coarse	0.6 to 2.36
GRAVEL	fine	2.36 to 6.7
	medium	6.7 to 19
	coarse	19 to 63
COBBLES		63 to 200
BOULDERS		> 200

Soil types may be qualified by the presence of minor components on the basis of field examination methods and/or the soil grading.

Terminology	**In coarse grained soils**		**In fine soils**
	% fines	**% coarse**	**% coarse**
Trace	≤5	≤15	≤15
With	>5, ≤12	>15, ≤30	>15, ≤30

The strength of cohesive soils is classified by engineering assessment or field/lab testing as follows.

Strength	**Symbol**	**Undrained shear strength**
Very Soft	VS	≤12kPa
Soft	S	12kPa to ≤25kPa
Firm	F	25kPa to ≤50kPa
Stiff	St	50kPa to ≤100kPa
Very Stiff	VSt	100kPa to ≤200kPa
Hard	H	>200kPa

Cohesionless soils are classified on the basis of relative density as follows.

Relative Density	**Symbol**	**Density Index**
Very Loose	VL	<15%
Loose	L	15% to ≤35%
Medium Dense	MD	35% to ≤65%
Dense	D	65% to ≤85%
Very Dense	VD	>85%

The plasticity of cohesive soils is defined by the Liquid Limit (LL) as follows.

Plasticity	**Silt LL**	**Clay LL**
Low plasticity	≤ 35%	≤ 35%
Medium plasticity	N/A	> 35% ≤ 50%
High plasticity	> 50%	> 50%

The moisture condition of soil (*w*) is described by appearance and feel and may be described in relation to the Plastic Limit (PL), Liquid Limit (LL) or Optimum Moisture Content (OMC).

Moisture condition and description	
Dry	Cohesive soils: hard, friable, dry of plastic limit. Granular soils: cohesionless and free-running
Moist	Cool feel and darkened colour: Cohesive soils can be moulded. Granular soils tend to cohere
Wet	Cool feel and darkened colour: Cohesive soils usually weakened and free water forms when handling. Granular soils tend to cohere

The structure of the soil may be described as follows.

Zoning	**Description**
Layer	Continuous across exposure or sample
Lens	Discontinuous layer (lenticular shape)
Pocket	Irregular inclusion of different material

The structure of soil layers may include: defects such as softened zones, fissures, cracks, joints and root-holes; and coarse grained soils may be described as strongly or weakly cemented.

The soil origin may also be noted if possible to deduce.

Soil origin and description	
Fill	Anthropogenic deposits or disturbed material
Topsoil	Zone of soil affected by roots and root fibres
Peat	Significantly organic soils
Colluvial	Transported down slopes by gravity/water
Aeolian	Transported and deposited by wind
Alluvial	Deposited by rivers
Estuarine	Deposited in coastal estuaries
Lacustrine	Deposited in freshwater lakes
Marine	Deposits in marine environments
Residual soil	Soil formed by in situ weathering of rock, with no structure/fabric of parent rock evident
Extremely weathered material	Formed by in situ weathering of geological formations, with the structure/fabric of parent rock intact but with soil strength properties

The origin of the soil generally cannot be deduced solely on the appearance of the material and the inference may be supplemented by further geological evidence or other field observation. Where there is doubt, the terms 'possibly' or 'probably' may be used

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Explanatory Notes: General Rock Description

The methods of description and classification of rocks used in this report are based on Australian Standard AS1726-2017 Geotechnical Site Investigations. In practice, if a material cannot be remoulded by hand in its field condition or in water, it is described as a rock. In general, descriptions cover: rock type, grain size, structure, colour, degree of weathering, strength, minor components or inclusions, and where applicable, the defect types, shape, roughness and coating/infill.

Rock types are generally described according to the predominant grain or crystal size, and in groups for each rock type as follows.

Rock type	Groups
Sedimentary	Deposited, carbonate (porous or non), volcanic ejection
Igneous	Felsic (much quartz, pale), Intermediate, or mafic (little quartz, dark)
Metamorphic	Foliated or non-foliated
Duricrust	Cementing minerology (iron oxides or hydroxides, silica, calcium carbonate, gypsum)

Reference should be made to AS1726 for details of the rock types and methods of classification.

The classification of rock weathering is described based on definitions in AS1726 and summarised as follows.

Term and symbol		Definition
Residual Soil	RS	Soil developed on rock with the mass structure and substance of the parent rock no longer evident
Extremely weathered	XW	Weathered to such an extent that the rock has 'soil-like' properties. Mass structure and substance still evident
Distinctly weathered	DW	The strength is usually changed and may be highly discoloured. Porosity may be increased by leaching, or decreased due to deposition in pores. May be distinguished into MW (Moderately Weathered) and HW (Highly Weathered).
Slightly weathered	SW	Slightly discoloured; little or no change of strength from fresh rock
Fresh Rock	FR	The rock shows no sign of decomposition or staining

The rock material strength can be defined based on the point load index as follows.

Term and symbol		Point Load Index I_s50 (MPa)
Very Low	VL	0.03 to 0.1
Low	L	0.1 to 0.3
Medium	M	0.3 to 1.0
High	H	1.0 to 3
Very High	VH	3 to 10
Extremely High	EH	> 10

It is important to note that the rock material strength as above is distinct from the rock mass strength which can be significantly weaker due to the effect of defects.

A preliminary assessment of rock strength may be made using the field guide detailed in AS1726, and this is conducted in the absence of point load testing.

The defect spacing measured normal to defects of the same set or bedding, is described as follows.

Definition	Defect Spacing (mm)
Thinly laminated	< 6
Laminated	6 to 20
Very thinly bedded	20 to 60
Thinly bedded	60 to 200
Medium bedded	200 to 600
Thickly bedded	600 to 2000
Very thickly bedded	> 2000

Terms for describing rock and defects are as follows.

Defect Terms			
Joint	JT	Sheared zone	SZ
Bedding Parting	BP	Seam	SM
Foliation	FL	Vein	VN
Cleavage	CL	Drill Lift	DL
Crushed Seam	CS	Handling Break	HB
Fracture Zone	FZ	Drilling Break	DB

The shape and roughness of defects in the rock mass are described using the following terms.

Planarity		Roughness	
Planar	PR	Very Rough	VR
Curved	CU	Rough	RF
Undulose	UN	Smooth	S
Irregular	IR	Slickensided	SL
Stepped	ST	Polished	POL
Discontinuous	DIS		

The coating or infill associated with defects in the rock mass are described as follows.

Infill and Coating		
Clean	CN	
Stained	SN	
Carbonaceous	X	
Minerals	MU	Unidentified mineral
	MS	Secondary mineral
	KT	Chlorite
	CA	Calcite
	Fe	Iron Oxide
	Qz	Quartz
Veneer	VNR	Thin or patchy coating
Coating	CT	Infill up to 1mm

Stantec

Graphic Symbols Index

- CLAY
- Silty CLAY
- Sandy CLAY
- Gravelly CLAY
- Silty Gravelly CLAY
- Silty Sandy CLAY
- Sandy Gravelly CLAY

- SILT
- Clayey SILT
- Sandy SILT
- Gravelly SILT
- Clayey Sandy SILT
- Clayey Gravelly SILT
- Sandy Gravelly SILT

- SAND
- Clayey SAND
- Silty SAND
- Gravelly SAND
- Clayey Silty SAND
- Clayey Gravelly SAND
- Silty Gravelly SAND

- GRAVEL
- Clayey GRAVEL
- Silty GRAVEL
- Sandy GRAVEL
- Clayey Silty GRAVEL
- Clayey Sandy GRAVEL
- Silty Sandy GRAVEL

- COBBLES & BOULDERS
- PEAT, highly organic soil
- TOPSOIL
- FILL
- FILL: Asphalt or Bituminous Seal
- FILL: Ballast
- FILL: Concrete
- FILL: Roadbase

- Sedimentary rock: fine, mostly clay (CLAYSTONE)
- Sedimentary rock: fine, mostly silt (SILTSTONE)
- Sedimentary rock: fine, silt and clay (MUDSTONE, SHALE, LAMINITE)
- Sedimentary rock: medium (SANDSTONE, GREYWACKE)
- Sedimentary rock: fine to coarse, angular (BRECCIA)
- Sedimentary rock: coarse, rounded (CONGLOMERATE)
- Sedimentary rock: Organic (COAL)
- Sedimentary rock: Carbonate (LIMESTONE, DOLOMITE)
- Sedimentary rock: Volcanic (TUFF, VOLCANIC BRECCIA, AGGLOMERATE)

- Igneous rock: Felsic, fine (RHYOLITE)
- Igneous rock: Felsic, coarse (GRANITE)
- Igneous rock: Mafic, fine to medium (BASALT, DOLERITE)
- Igneous rock: Mafic, coarse (GABBRO)
- Metamorphic rock: Foliated, fine to medium (SLATE, PHYLLITE, SHIST)
- Metamorphic rock: Foliated, coarse (GNEISS)
- Metamorphic rock: Non-foliated (QUARTZITE, HORNFELS, MARBLE)

APPENDIX

C

UNEXPECTED FINDS PROTOCOL

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Stantec

Unexpected Finds Protocol

457-527 Cessnock Road, Gillieston Heights

304100964

Prepared for

Walker Gillieston Heights Pty Ltd

8 June 2023

Cardno

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Stantec

Contact Information

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Document Information

Prepared for	Walker Gillieston Heights Pty Ltd
Project Name	457-527 Cessnock Road, Gillieston Heights
File Reference	304100964-003.2
Job Reference	304100964
Date	8 June 2023
Version Number	2

Author(s):

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Geotechnical Engineer

Effective Date 8/06/2022

Approved By:

Dimce Stojanovski
Senior Scientist

Date Approved 8/06/2022

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
1	13/12/2022	First Issue to Client	KS	DS
2	8/6/2023	Incorporating additional lots	KS	DS

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Appendices

1 Introduction

This Unexpected Finds Protocol (UFP) has been developed for the proposed residential development located at 457 – 527 Cessnock Road, Gillieston Heights (the "Site") as shown in **Figure 1**, attached.

The purpose of the Unexpected Finds Protocol is to document the process for evaluating any unexpected environmental finds during the project, and to specify safety measures to be implemented to manage such circumstances and prevent any adverse environmental and human health impacts.

Based on subdivision concept design plans provided by the Client, the proposed residential development comprises the creation of a residential subdivision, internal subdivision roads and associated infrastructure.

1.1 Scope

This Unexpected Finds Protocol (UFP) is specific to the proposed residential development at 457 – 527 Cessnock Road, Gillieston Heights NSW as shown in **Figure 1**, attached. It provides guidance and procedures for dealing with any unexpected finds that may be encountered during the disturbance works carried out on Site.

1.2 References

The following documents have been reviewed in preparation of this Unexpected Finds Protocol:

> National Parks and Wildlife Act 1974 (NSW)
> Coroners Act 2009 (NSW)
> Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)
> Heritage Act 1977 (NSW)
> National Environmental Protection Measure (1999)

2 Procedure

2.1 General

The following procedure should be used to assess any unexpected finds that are encountered throughout the duration of the project. Unexpected finds may include but are not limited to heritage items, unidentified filling, odorous or stained soils, and suspected asbestos materials. All Site personnel are required to report any unexpected finds to the site manager, if observed during the course of their works.

2.2 Training and Induction of Personnel

Personnel involved in the project on site are to be inducted to the unexpected finds protocol.

Site inductions would include making workers and site personnel aware of the possibility of unexpected finds. Inductions will also include the immediate course of actions to be taken by workers if they were to find anything, including stopping work, notifying their supervisor immediately and completing the Incident Report forms. The induction should be reinforced at daily toolbox meetings.

2.3 Initial Response

If any unexpected/unidentified material is uncovered during disturbance works, the following procedure should be followed;

- Cease all works in the immediate area.
- Identify the category of the find (Contaminated Soils, Heritage, uncovering of Asbestos Materials etc).
- Delineate and restrict access to the area using fencing and /or appropriate barriers and signage.
- Ensure appropriate training and PPE is available for any persons required to enter the area.
- Document the nature of the find.
- Engage a suitably qualified consultant to assess the unexpected find.
- The consultant will assess the unexpected find and provide advice regarding the preliminary assessment with reference to Sections 4.4 – 4.8 below, which will include the following:
  - The need for further immediate management controls if required;
  - Further assessment and / or remediation works required in accordance with relevant guidelines;
  - Preparation of Remediation Action Plan (RAP) if required or provide clean up advice;
  - If required, clean up strategies of the affected area will be implemented.
  - If appointed, correspondence with a Site Auditor shall be undertaken.

Works within the affected area are not to recommence until it is deemed safe and suitable for works to continue. Written confirmation shall be undertaken by the appropriate consultant following appropriate advice and clean up procedures.

2.4 Skeletal Remains

In the event that skeletal remains are uncovered and the remains are not immediately identifiable as non-human remains, a qualified archaeologist should be engaged to determine their origin. If the skeletal remains are identifiable as human remains, the Local Police should be contacted to assess the discovery. Under no circumstances should the skeletal remains be disturbed without prior consultation with the relevant authorities which may include the coroner, police, Office of Environment & Heritage, aboriginal groups or a qualified anthropologist.

2.5 Aboriginal Heritage

In the event that any relic, artefact or material that is suspected of being Aboriginal Heritage is uncovered, works must cease immediately in the area. The Office of Environment and Heritage (OEH) should be notified, as well as the National Parks and Wildlife Service, NSW Police and local Aboriginal Stakeholders.

The Office of Environment and Heritage requires notification and an AHIP permit is required prior to the removal of any Aboriginal artefacts. An AHIP permit is issued under the National Parks and Wildlife Act and applications can be made directly to the OEH.

2.6 Archaeological Heritage

Items of archaeological heritage may be uncovered during disturbance works. Items of archaeological heritage may include Aboriginal artefacts or remains, European artefacts following settlement. European heritage may include items such as roadways (telford & corduroy timber road bases etc), kerbing, culverts, building foundations and tools. A suitably qualified archaeologist should be engaged to assess the find.

2.7 Potentially Contaminated Soils

In the event that any odorous, stained or unidentified soils are uncovered during the site works, a suitable qualified environmental consultant should be engaged to assess the material and the following procedures should apply:

> Excavation works at that part of the site where suspect soil material was encountered should cease until an inspection by an environmental consultant is carried out;

> Based on a visual inspection, the consultant will provide guidance on health and safety of remedial works, soil storage and soil disposal to allow construction works to proceed if possible;

Based on sampling and analysis the consultant will provide advice as to any additional requirements (i.e. managed on site or any offsite disposal requirements).

2.8 Asbestos Containing Materials

Contingency measures must be developed to evaluate any unexpected finds of suspected asbestos containing materials. These are to specify safety measures that can be implemented to manage and prevent any adverse environmental and human health impacts. Appropriate contingency measures in relation to asbestos impacted soils and suspected asbestos containing materials (ACM) include:

> Where suspected ACM is encountered excavation works must cease until an inspection by an environmental consultant is carried out;

> Any illegal dumping containing suspected asbestos bearing material or synthetic mineral fibres should be inspected by an environmental consultant.

Following a visual inspection; and sampling if necessary, the consultant will provide interim advice on health and safety requirements to allow construction works to proceed if possible;

Based on sampling and analysis the consultant will provide advice as to any additional requirements (i.e. management or disposal requirements).

Following an inspection and sampling for laboratory testing (where required), works can continue following the consultants written advice.

2.9 Summary

Where an area is identified as containing an isolated find, works must cease, and an inspection and sampling (where required) shall be undertaken by a suitable qualified consultant in accordance with Sections 2.4 to 2.8.

Works within the area shall only recommence following the advice of the suitable qualified personal.

An Unexpected Finds Protocol procedure form is available in **Appendix B**.

APPENDIX

A

FIGURES

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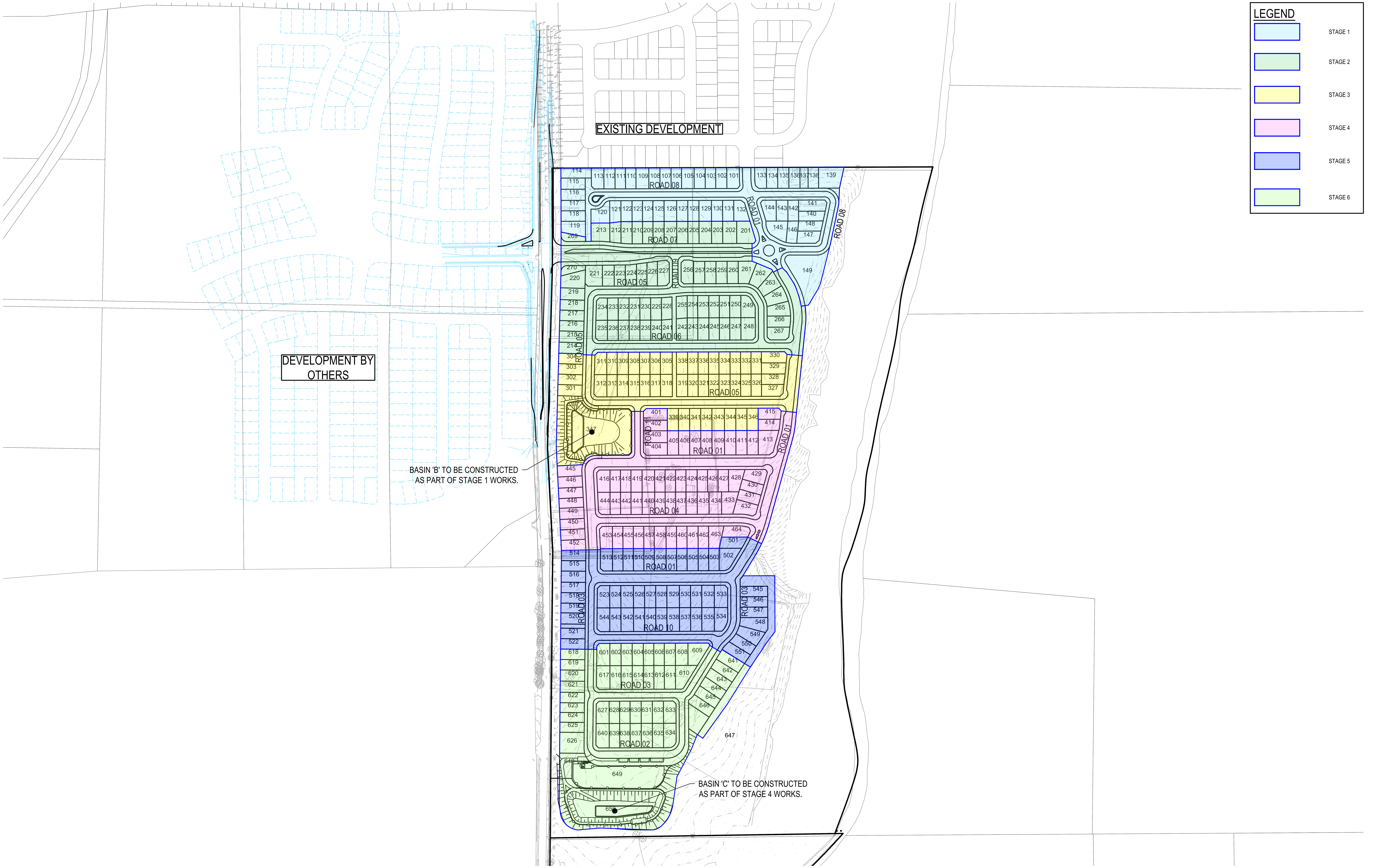

REV.	DATE	DESCRIPTION	DRN.	DES.	VERIF.	APPD.
1	09/06/2023	ISSUED FOR DEVELOPMENT APPLICATION	CB	LD		MTL

Client: walker

Scale
0 50 100 150 200 250m
SCALE 1:2500 @A1

North

enspire
Enspire Solutions Pty Ltd
Level 4, 153 Walker Street, North Sydney NSW 2060
ABN: 71 624 801 690
Phone: 02 9922 6135

Project: SOUTH GILLIESTON HEIGHTS
DEVELOPMENT APPLICATION

Title: STAGING PLAN

Scale: 1:2500
Date: 09/06/2023
Size: A1
Datum: MGA 2020

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION

Project Number/Drawing Number: 210039-DA-C01.31
Revision: 1

DATE PLOTTED: 9 June 2023 3:57 PM BY : CAITLIN BEHETS

CAD File: P:\210039 SouthGillieston\D-Civil\01-DA\Drawings\6-DACC\210039-DA-C01.31 STAGING PLAN.dwg

APPENDIX

B

UNEXPETCED FINDS PROTOCOL FORM

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Stantec

UNEXPECTED FINDS PROTOCOL

INCIDENT REPORT FORM

Location of discovery (photographs, location map etc):

Nature of find (contaminated soils, heritage, asbestos etc.):

Action Taken:

Date: Recorded By:

APPENDIX

D

DOUGLAS PARTNERS REPORT

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Stantec

Douglas Partners

Geotechnics | Environment | Groundwater

Integrated Practical Solutions

Report on
Preliminary Site Investigation and Detailed Site
Investigation (Contamination)

Proposed Residential Subdivision
501-527 Cessnock Road, Gillieston Heights

Prepared for
Walker Gillieston Heights Pty Ltd

Project 204921.00
May 2022

Document History

Document details

Project No.	204921.00	Document No.	R.001.Rev1
Document title	Report on Preliminary Site Investigation and Detailed Site Investigation Proposed Residential Subdivision		
Site address	501-527 Cessnock Road, Gillieston Heights		
Report prepared for	Walker Gillieston Heights Pty Ltd		
File name	204921.00.R.001.Rev1		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Patrick Heads	Paul Gorman	20 May 2022

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Sam Barclay, Walker Gillieston Heights Pty Ltd

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

	Signature	Date
Author	Patrick Heads	20 May 2022
Reviewer	P Gorman	20 May 2022

FS 604853

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Executive Summary

Douglas Partners Pty Ltd (DP) has conducted preliminary site investigation and detailed site investigation for a proposed residential subdivision at the subject site.

The objectives of the investigation were to identify and assess the potential contamination sources identified at the site (by DP and others) and provide an assessment of the suitability of the site for the proposed residential land use.

The scope of works included review of existing investigations, assessment of site history over the southern portion of the site, site inspection, subsurface investigation, soil sample collection, laboratory analysis and preparation of this report.

Assessment indicated that the site had generally been used for residential and agricultural purposes, including a dairy farm on the site and a poultry farm on the adjacent site to the north-west of the site. Potential contamination sources identified included agricultural use, demolition of structures, the presence of fill and possible storage of minor quantities of fuels and chemicals.

The results of the assessment suggested the general absence of gross contamination over the majority of the site. Some fill associated with demolition of structures was identified in the vicinity of the former dairy, along with the presence of some asbestos containing materials in near-surface soils associated with an existing building in the dairy.

The site is considered to be suitable for the proposed development from a contamination perspective, subject to the remediation and validation of the identified contamination, as outlined in Section 15 of this report.

Douglas Partners
Geotechnics | Environment | Groundwater

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Report on Preliminary Site Investigation and Detailed Site Investigation (Contamination)

Proposed Residential Subdivision

501-527 Cessnock Road, Gillieston Heights

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by Walker Gillieston Heights Pty Ltd to complete this preliminary site investigation and detailed site investigation for contamination (PSI and DSI) undertaken for a proposed residential subdivision for the site at 501-527 Cessnock Road, Gillieston Heights (the site). The site is shown on Drawing 1, Appendix G. and Figure 1 below.

The investigation was undertaken with reference to DP's proposal 204921.00.P.001.Rev3 dated 8 July 2021.

The objectives of the PSI and DSI are to assess the potential for contamination at the site based on past and present land uses, investigate the potential sources of contamination, provide an assessment of the suitability of the site for the proposed residential land use, and to comment on the need for further investigation and/or management with regard to the proposed development. It is understood that the report will be used to support a development application for the proposed residential development.

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

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

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

2. Proposed Development

The proposed development comprises a residential subdivision with associated infrastructure (roads, drainage, etc). The development includes a riparian zone associated with Wallis Creek, and several open space areas.

Bulk earthworks is proposed as part of the development, including up to 7 m of cut in the central portion of the site, and some fill, including localised fill of up to 5 m thickness in the vicinity of existing drainage lines. The preliminary cut fill plan (Walker Corporation, drawing 210039-SK004) is provided in Appendix G. The preliminary subdivision plan (PCB, reference 118763, 26 August 2016) is also provided in Appendix G.

3. Scope of Works

The scope of work for the assessment comprised the following:

- Preparation of a PSI for part 527 Cessnock Road (Lot 3 DP 71130), comprising the following:
  - Review of available published information on the site, including geological, topographical, acid sulfate soil and soil landscape maps;
  - Brief data review of previous investigations conducted at the site and nearby sites;
  - Brief site history review to assess the potential for contamination at the site comprising a review of historical aerial photograph records, search of registered groundwater bores in the area, a SafeWork NSW hazardous chemicals storage records for the lot, a historic title deed search and NSW EPA and Council searches;
  - Brief site inspection by an environmental engineer to identify areas of potential contamination and assess current site condition;
  - Preparation of a preliminary Conceptual Site Model (CSM);
  - Preparation of a PSI report for part 527 Cessnock Road presenting the findings of the PSI and recommendations for subsurface investigation, remediation etc (if required) to support the rezoning.
- Preparation of a DSI for the site defined above and on Drawing 1, Appendix G, comprising the following:
  - Preparation of safety and quality plan;
  - Dial before you dig search;
  - Review of PSI reports completed by others for the site;
  - Brief walkover by senior environmental engineer to assess current site condition and mark test locations;
  - Preparation/review of conceptual site model;
  - Electromagnetic check of test locations for buried services;
  - Excavation of test pits to depth of up to 2.5 m or prior refusal/collapse, or 0.5 m into natural soils;
  - Logging of the subsurface profile, including visual and olfactory assessment of potential contamination;
  - Collection of soil samples from the test pits at regular depth intervals for identification and testing purposes, with reference to contamination sampling protocols;
  - Screening of soil samples for the presence of volatile organic compounds using a PID;
  - Analysis of selected soil samples for TRH, BTEX, PAH, PCB, OCP, OPP and Metals (10), including QA/QC samples;
  - Analysis of selected soil samples for microbiological contaminants (E.Coli, faecal coliforms, salmonella);
  - Analysis of selected soil samples for asbestos identification (500 ml bulk soil sample);
  - Preparation of a report comprising the results of the DSI for the site, including the results of field testing, contaminant observations, comments on the contamination status of the site and the requirements for further investigation, remediation and validation (if any).

4. Site Information

Site Address	501-527 Cessnock Road, Gillieston Heights
Legal Description	Lot 1 DP 601226 Lot 2 DP 601226 Lot 1 DP 311179 Lot 3 DP 71130
Area	50 ha approx.
Zoning	Maitland Local Environmental Plan 2011 RU2 – Rural Landscape E2 – Environmental Conservation
Local Council Area	Maitland City Council
Current Use	Rural Residential
Surrounding Uses	North – Rural residential properties and further a large residential development East – River (Wallis Creek)/rural residential properties/agricultural and grazing properties South –River (Testers Hollow)/Residential properties West – Main road (Cessnock Road) directly bordering, furthered by creek (Testers Hollow)

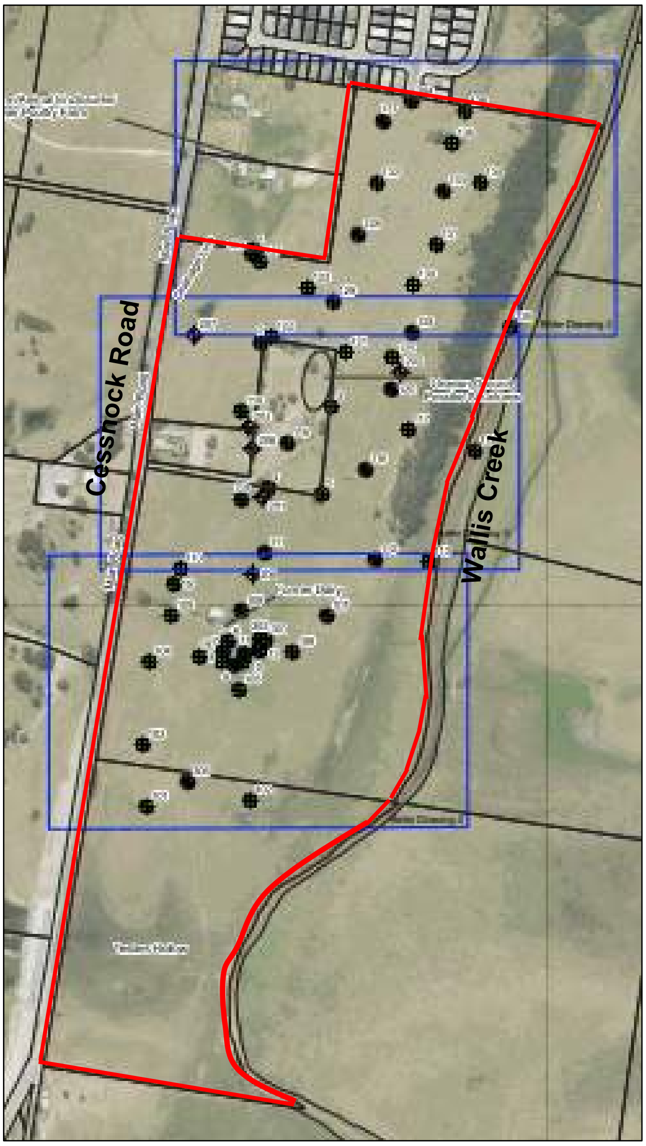


Figure 1: Approximate site extent (in red)

Environmental Setting

Regional Topography	Gillieston Heights generally comprises gently undulating topography, elevated between approximately RL 10 – 40 m (AHD), surrounded by the low lying areas of Wallis Creek to the east, swap creek to the west and Testers Hollow to the south of the suburb. The area largely consists of rural residential development grazing land.
Site Topography	The site generally falls to the south, with elevations of approximately RL 46 in the north-eastern portion of the site, falling to approximately RL 4 in the south-eastern and southern portions of the site.
Soil Landscape	Bolwarra Heights: the majority of the site is within the Bolwarra Heights soil landscape.

	The landscape generally comprises rolling low hills on Permian sediments in the centre-west of the sheet in the East Maitland Hills region. Slopes are 5-20%, elevation to 100m, local relief to 80m.Soil comprises moderately deep (<150cm), well-drained Yellow Podzolic Soils (Dy2.21, Dy2.31), Red Podzolic Soils (Dr2.31, Dr3.21) and Brown Podzolic Soils (Db1.21, Db1.11) with some moderately deep (<100cm), well-drained Lithosols (Um1.41, Um1.42) on crests, moderately deep (<140cm), imperfectly drained yellow Soloths (Dy2.41, Dy3.41) on lower slopes. Limitations include moderate foundation hazard, water erosion hazard, high run-on (localised), seasonal waterlogging (localised), localised steep slopes with mass movement hazard. The far eastern and southern portion of the site is underlain by the Wallis Creek soil type. The landscape comprises narrow (<500m) to moderately broad (1000m), level to gently undulating floodplains on Quaternary alluvium. Local relief is up to 2m, slopes are 0-3%, elevation to 20m. soils generally comprise deep (>200cm), well to imperfectly drained Alluvial Soils (Um1.23) and Siliceous Sands (Uc1.23) on floodplains with some deep (>200cm), imperfectly to poorly drained Alluvial Soils. Limitations of the soil landscape include flooding, permanently high watertables, high run-on, high stream bank erosion hazard, ground water pollution hazard, non-cohesive soils of low fertility.
Geology	Published mapping indicates that the majority of the site is underlain by various formations of the Maitland Group (Branxton Formation, Muree Sandstone and Mulbring Siltstone generally comprising conglomerate, sandstone and siltstone respectively). The far eastern and southern portions of the site are underlain by Quaternary Alluvial backswamp deposits, generally comprising Organic-rich mud, peat, silt and clay. A reproduction of the published geology map
Acid Sulfate Soils	Published acid sulfate soils risk mapping indicates high probability of ASS within 1 m of the ground surface within the southern eastern corner and southern portions of the site. the remainder of the site is outside an area of mapped acid sulfate soils
Surface Water	Wallis Creek to the east and Testers Hollow to the south are considered to be the nearest sensitive surface water receptors. These water bodies form the eastern and southern site boundaries respectively.
Groundwater	The nearest registered borehole was GW051647 located approximately 370 m east of the site, on the eastern side of Wallis Creek. The bore registered for stock purposes. There was no groundwater information available for the registered borehole, however subsurface information indicated the presence of clay and sand layers to 6.1 m underlain by sandstone to termination at 12 m. Groundwater flow direction is anticipated to flow with the surface topography and flow to the south and east.

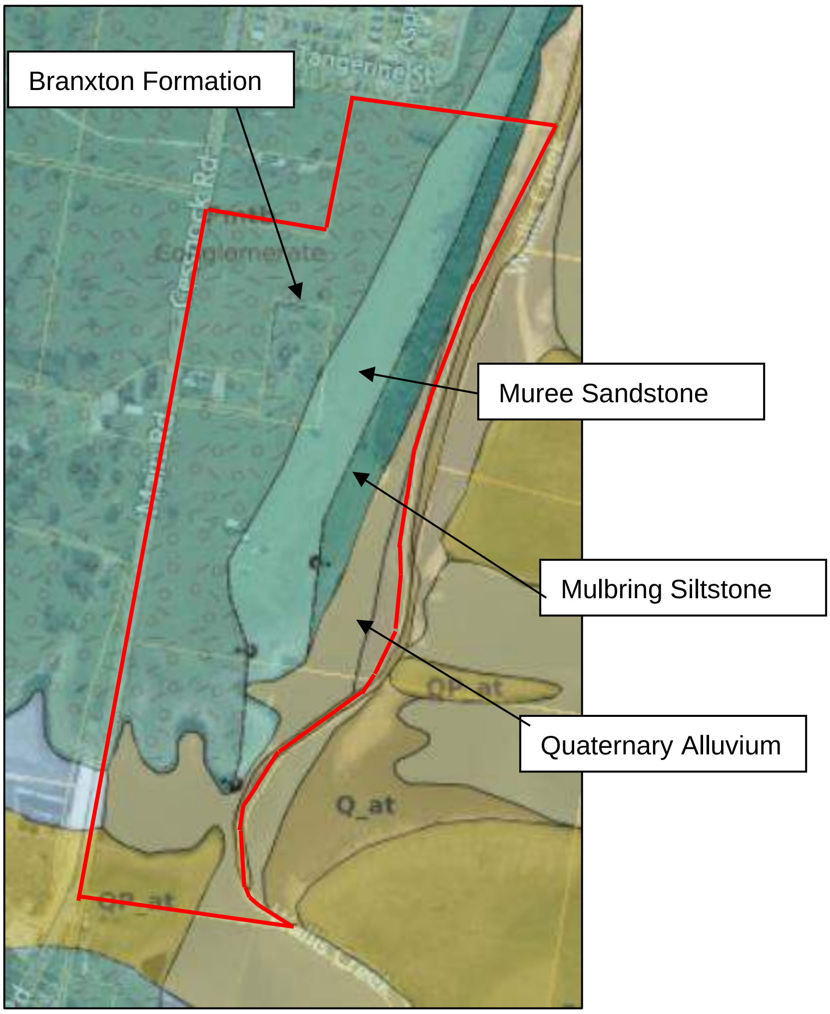


Figure 2: Geology map (approximate site boundary in red)

5. Background

5.1 Introduction

Several reports have been prepared for the site and surrounds with regards to contamination assessment. A brief review of the following reports (as supplied by the client) has been conducted:

- Environmental Resources Management Australia Pty Ltd (ERM, 2017);
- Practical Environmental Solutions Pty Ltd (PES, 2020);
- Qualtest Laboratory (NSW) Pty Ltd (Qualtest, 2020).

A summary of the reports is presented below.

5.2 Environmental Resources Management Australia Pty Ltd (ERM, 2017)

A Preliminary Site Investigation (ERM PSI) at a property located at 527 Cessnock Road, Gillieston Heights, New South Wales (Lot 2, DP 601226), as shown on Figure 3 below, was conducted by Environmental Resources Management Australia Pty Ltd (ERM) in 2017. The objectives of the ERM PSI were to collect site information to:

- Identify potential sources of contamination and determine potential contaminants of concern;
- Identify areas of potential contamination;
- Identify potential human and ecological receptors;
- Identify potentially affected media.

The scope of works included:

- Desktop searches and review (historical aerial photos, groundwater bore search, regulator database searches, published maps etc.)
- Site inspection (interview with site personnel, site walkover);
- Preparation of a PSI report.

ERM identified relevant potential contaminating activities to be limited, and generally associated with on-site dwelling construction materials (lead based paints and asbestos), the historical storage and use minor quantities of fuel and other chemicals, and uncertainty surrounding the use of various construction waste and household materials in the infilling of a former dam.

The reported findings of the assessment found that although a limited number of potentially contaminating activities had been identified, there was a low potential that these activities have resulted in areas of contamination or unacceptable impact to soil or groundwater conditions beneath the site. As a result, complete source–pathway–receptor linkages were considered unlikely under the current or the proposed future land use scenario, and site conditions precluding the redevelopment of the site for residential use had not been identified.

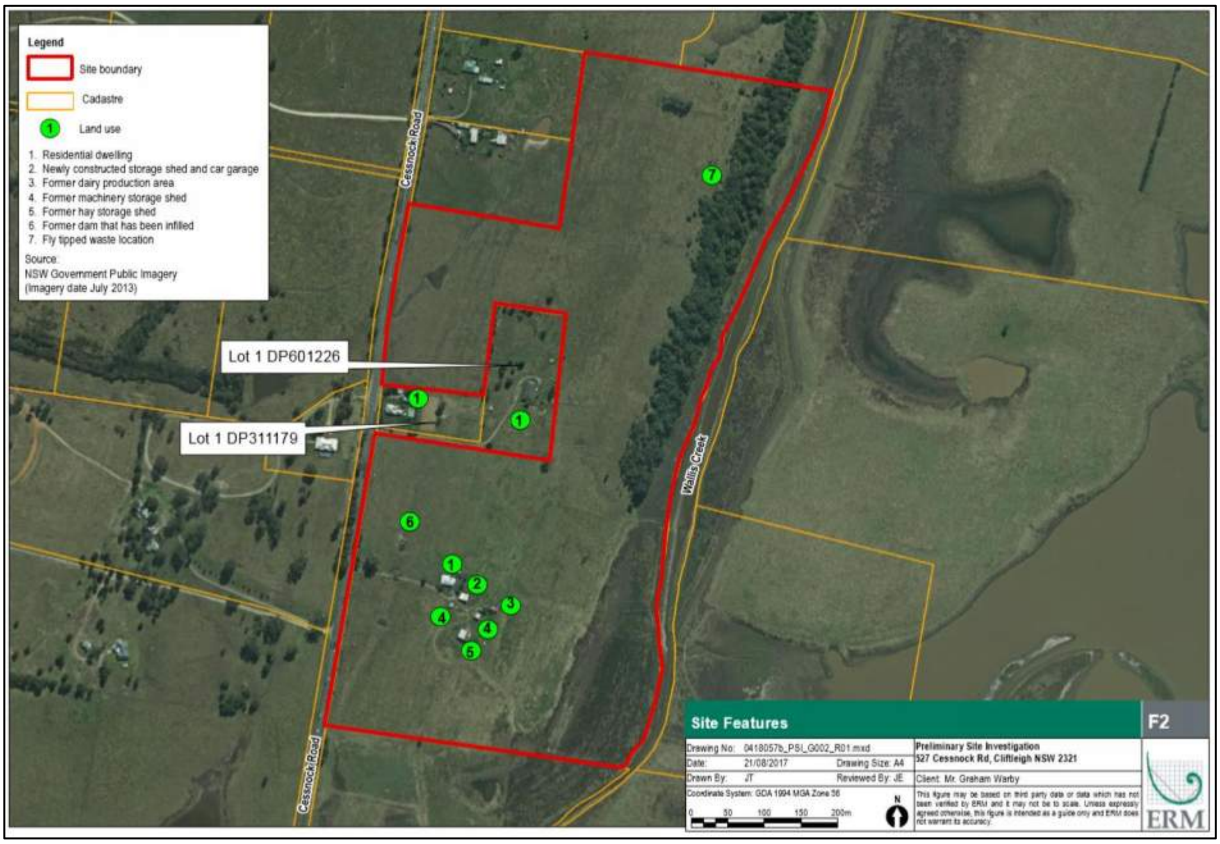


Figure 3: Site location (Lot 2 DP 601226) identified by Environmental Resources Management Australia Pty Ltd (2017)

5.3 Practical Environmental Solutions Pty Ltd (PES, 2020)

A Preliminary Site Investigation (PES PSI) at a property located at 457-463 Cessnock Road (adjoining Lots 1 & 2, DP 302745, respectively) Gillieston Heights, New South Wales, as shown on Figure 4 below, was conducted by Practical Environmental Solutions Pty Ltd (PES) in February 2020. The investigation was undertaken to develop an understanding of the current and historical activities that either have been or are being conducted on the land and its surrounds. This included assessing areas of environmental concern (AECs) and *potential contaminants of concern (PCOCs) and reporting on the potential for contamination on the site, if any, to impact on the planned, future residential use of the land. At the time the proposed development of the area was a manufactured home estate.

It is noted that PES (2020) was prepared for lots not part of the current assessment. The subject lots of the PES report do, however, share boundaries and drainage features with the subject site

The scope of works in PES (2020) included:

- Review of documents provided by the current landowner and/or previous owners;
- Assessment of site geology, hydrogeology and topography;
- Review of site history through Maitland City Council records, NSW DECC records, SafeWork NSW, Historical Title Information (past and present), historical aerial photographs and EPA records;

- A site inspection to identify potential areas of environmental concern (AEC) or possible environmental contaminants;
- Drilling of boreholes using hand tools in areas targeted to potential areas of environmental concern, and collection and analysis of soil samples;
- Preparation of a Preliminary Site Investigation report which discusses the findings of the assessment; in reference to the NEPC (2013) guidelines.

Based on historical data, former site use included agricultural use, with chicken sheds covering Lot 1 of the site (subsequently removed by 1993 approx.). Subsequent land use included residential/agricultural with associated outbuildings, including sheds and horse stables.

Possible fill materials of an unknown origin were also observed within the site.

A series of targeted bore holes was conducted across both allotments, with analysis of eight soil samples and one QA/QC sample for the site. PES compared the results of analysis to the NEPC (2013) Health Investigation / Screening Level 'A' criteria. Following analysis of the samples, no exceedances of the adopted criteria were identified. However, PES identified areas of environmental concern due to the presence of two small pockets of bonded asbestos fragments, identified in the area of a now demolished shed footprint on Lot 1. The Asbestos Containing Materials appear to be limited to the immediate surface layer and are a result of poor demolition practices. PES did not identify any other AECs, including no evidence of contamination such as staining or odours, or agricultural uses such as cattle tick dips or petroleum storage tanks (above or below ground).

PES concluded that based on the site history, site walkover and results of the limited sampling, the site was suitable for the proposed redevelopment as a manufactured housing estate following the removal of the identified bonded asbestos 'pockets' and issuing of an Asbestos Clearance Certificate.

Figure 4: Site locations (Lot 1 & 2, DP 302745) identified in PES (2020)

5.4 Qualtest Laboratory (NSW) Pty Ltd (Qualtest, 2020)

A Preliminary Contamination Assessment (PCA) was undertaken at properties located at 457, 463, 501, and 507 Cessnock Road (adjoining Lots 1 & 2 DP 302745, Lot 1 DP 311179, and Lot 1 DP 601226 respectively) Gillieston Heights, New South Wales. The investigation was conducted by Qualtest Laboratory (NSW) Pty Ltd in April 2020 to provide an assessment of the likelihood for contamination to be present on the site from past uses and activities, in support of the development application for proposed rezoning of the sites.

The scope of works included:

- Desktop study and site history review (historical titles, historical aerial photos, regulatory records, council records, discussions with site personnel);
- Site walkover; and,
- Data assessment and preparation of a PCA Report.

The Qualtest investigation area included two lots outside the current subject site (i.e. the lots also assessed in PES (2020)), plus the two residential lots in the central portion of the current subject site. The areas assessed in the Qualtest report are shown in Figures 5, 6 and 7 below.

The desk study and site history review suggested the site (approx. 8 ha) has been used for rural and agricultural purposes including dairy farming and hobby farming for the past 20 years. Lots 1 and 2 DP 302745 and Lot 1 DP311179 were occupied, with residences and sheds located on the properties, since at the least the 1950s. Lot 1 DP601226 had been occupied, with a residence, since the 1980s, and is expected to have been previously used as a dairy farm. The eastern portion of Lot 1 DP 302745 appeared to have been used as a commercial poultry farm from at least the 1950s to the 1970s. Site observations confirmed the then current presence of domestic stock (horses, pigs, chickens and geese) typical with hobby farming.

Five AEC were identified as part of the conceptual site model based on the site history and site observations. The AECs related to former commercial poultry farm and potential burial pits on Lot 1 DP 302745; weathering of hazardous materials in former and current buildings on each Lot; septic tanks and associated soak-aways and trenches on each Lot; storage of waste materials and farm materials; and fill of unknown quality and origin on each Lot.

Based on the site history and observations during the site walkover, it was recommended that additional assessment, comprising intrusive investigations (e.g. test pitting, sampling of surface soils, fill stockpiles, and surface water and sediment sampling) in the AECs identified is carried out. Given the age of the buildings on site it was also recommended that a hazardous materials survey be carried out by a suitably qualified consultant, prior to demolition of the structures due to the possible presence of asbestos containing materials (if they are proposed to be demolished).

Client:	MAITLAND CITY COUNCIL C/O PCB PTY LTD	Drawing No:	FIGURE 1
Project:	PRELIMINARY CONTAMINATION ASSESSMENT	Project No:	NEW17P-0155A-AA
Location:	457, 463, 501 & 507 CESSNOCK ROAD, GILLIESTON HEIGHTS NSW	Scale:	N.T.S.
Title:	SITE LOCATION PLAN	Date:	20 APRIL 2020

Figure 5: Site locations (Lot 1 & 2 DP 302745, Lot 1 DP 311179, and Lot 1 DP 601226) identified by Qualtest Laboratory (NSW) Pty Ltd (2020)

Figure 6: Locations of former structures on site (Lot 1 & 2 DP 302745) identified by Qualtest Laboratory (NSW) Pty Ltd (2020)

Figure 7: Locations of former structures on site (Lot 1 DP 311179 and Lot 1 DP 601226) identified by Qualtest Laboratory (NSW) Pty Ltd (2020)

6. Site History – Lot 3 DP 71130

6.1 Introduction

Subsequent to review of existing reported site history as presented in Section 6, additional site history information has been collated for Lot 3, DP 71130, located in the southern portion of the subject site.

The review of site history for the lot included the following:

- Review of historical aerial photographs;
- Historical title deed search;
- Review of planning and regulatory records;

A summary of site history information is presented in the following sections.

6.2 Historical Aerial Photography

Several historical aerial photographs were obtained from public databases. Extracts of the aerial photographs are included in Appendix C. A summary of key features observed for the lot and surrounding land is presented in Table 1.

Table 1: Summary of Historical Aerial Photographs

Year	Lot	Surrounding Land Use
1944	Open space, with the lot partially inundated by Wallis Creek. No trees or other obvious vegetation on the site.	Property to the southwest of site appears to have been used for agricultural purposes. Property to the north of site appears to have been residential, with several smaller shed structures possible farm. Site bordered by a main road directly west, and Wallis Creek to the east.
1961	No significant changes to site.	No significant changes to surrounding areas.
1984	No significant changes to site. Less inundation, indicating variable water levels across the site with time	Development of long structures (chicken sheds?) southwest of site (western side of main road). Some possible residential/agricultural development in the lot to the south
2006	Fenced grassed paddocks within the lot – agricultural use. Small body of water located in north-eastern corner. Minimal trees – only located on borders of lot.	Developed residential lots to the south. Construction being completed on road to the west. Chicken sheds? In previous aerial have been cleared.

Year	Lot	Surrounding Land Use
2010	Dry grass fields. No water.	Pastures all very dry with little colour. Testers Hollow and surrounding creeks mostly dry.
2012-2015	Minor inundation. Lot consists of approx. 20-30% water.	Development/construction of turning lane at southwest corner of lot. Large scale construction of residential areas began north (upstream?) of the site.
2016	Extremely flooded. Lot consists of >80% floodwater. Loss of separated fields.	Site flood continuous with surrounding floodwaters spanning approximately 6 km north-south and 1 km east-west.
2017-2020	No significant changes to site. Lightly inundated.	Major construction began directly west of main road. Greener pastures.

6.3 Title Deeds

A historical title deeds search was used to obtain ownership and occupancy information including company names and the occupations of individuals. The title information can assist in the identification of previous land uses by the company names or the site owners and can, therefore, assist in establishing whether there were potentially contaminating activities occurring at the site. The results of the title deed search are provided in Appendix D. A summary of the title deeds and possible land uses (with reference to the aerial photographs and other historical searches) is presented in Table 2.

Table 2: Historical Title Deeds, Lot 3 DP 71130

Date of Acquisition and Term Held	Registered Proprietor(s) & Occupations	Inferred Land Use
27.04.1920 (1920 to 1929)	William Johnson (Retired Licensed Victualler)	Unknown Rural
11.11.1929 (1929 to 1939)	William James Johnson (Retired Fireman) Joseph Johnson (Engineer) Reginald Heath Stakes (Civil Engineer)	Unknown Rural
30.03.1939 (1939 to 1954)	Charles William Osland (Contractor)	Unknown Rural
18.05.1954 (1954 to 2019)	Victor Claud Warby (Dairy farmer)	Agricultural / Dairy Farm
16.12.2019 (2019 to date)	Graeme Dennis Victor Warby Gloria Valmai Hesketh Victor Francis William Warby	Agricultural

6.4 Public Registers and Planning Records

EPA Notices available under Section 58 of the Contaminated Lands Management Act (CLM Act) Database searched 10/01/22	There were no records of notices for the site or adjacent sites.
Sites notified to EPA under Section 60 of the CLM Act Database searched 10/01/22	The site and adjacent sites were not listed as a notified contaminated site.
Licences listed under Section 308 of the Protection of the Environment Operations Act 1997 (POEO Act) Database searched 10/01/22	There were no records issued to the site or adjacent sites.
Council Records	No relevant records

6.5 On Line Search

An on-line search for the site indicated the general absence of information regarding the subject site (Lot 3).

News articles for the surrounding areas included reports of acid mine drainage in Testers Hollow as a result of abandoned coal mines in the vicinity.

6.6 Site History Integrity Assessment

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

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

6.7 Summary of Site History – Lot 3 DP 71130

The site history information for Lot 3 DP 71130 suggests that the site has remained as an agricultural property with no evidence of major earthworks, building or demolition activities. Historical aerial photographs suggest that the site is regularly inundated with surface water, as a result of the sites proximity to both Wallis Creek and Testers Hollow. The lot is bordered by Cessnock Rd to the West, and open fields / residential areas surrounding the North, East and South borders. The land was likely used as grazing land as part of adjacent dairy farm operations. Major construction works of residential estates have been completed within 1.5 km (and upslope) of the lot. It is noted that Lot 3 is within a local topographical low point and is regularly inundated with surface water, suggesting that historically, runoff from nearby agricultural land uses and drainage, including acid mine drainage from an abandoned coal mine to the west, may have been deposited on the site.

6.8 Summary of Site History – Current Site

Based on the results of previous assessments (ERM (2017), PES (2020) and Qualtest (2020)), the site history information for the subject site suggests that the site has remained as a residential and agricultural property with no evidence of major earthworks.

Agricultural activities on the site have included a dairy farm and grazing, with poultry farming on adjacent sites to the west and north-west of the subject site.

Review of historical aerial photographs indicate that some structures have been constructed on the site, generally associated with resident dwellings, sheds and agricultural activities (e.g. farm sheds). Evidence of some demolition and possible ground disturbance is present in the central-southern portion of the site (i.e. in the vicinity of the former dairy).

7. Site Walkover

7.1 Observations

A site walkover was undertaken by a senior environmental engineer on 24 January 2022. The general site topography was consistent with that described in Section 5. The site layout appeared to have remained relatively unchanged from recent historical aerial photographs. The following key site features pertinent to the current investigation were observed:

- The majority of the site surface generally comprised grassed paddocks, including a ridge in the northern portion of the site (Figure 8), with the remainder of the site generally falling to the south and east towards Testers Hollow and Wallis Creek respectively. Figure 9 shows the elevated paddocks in the central portion of the site, with Figure 10 illustrating the low-lying areas of the southern portion of the site;
- Residential and hobby farm properties in the lots immediately north-west of the subject site (Figure 11). It was noted that surface water drainage from these lots flow onto the subject site (Figure 12). Several structures, enclosures and a dam were observed within the adjacent sites;
- Two residential structures with associated sheds and animal holding areas were present in the central portion of the site;
- Some evidence of soil disturbance and possible former structures were observed within the central portion of the site within the animal paddocks, particularly in Lot 1 DP601226 (Figures 13 and 14);
- A residential structure and associated agricultural shed structures were observed in the central-southern portion of the site, within Lot 2 DP 601226 (Figures 15 and 16);
- Evidence of demolition of structures was also observed in the central southern portion of the site, with some exposed building materials, concrete slabs and uneven ground observed (Figures 17 and 18);
- A former dairy structure was also observed in the central-southern portion of the site (Figures 19 to 21). The dairy structure was largely timber and metal, however, there was a portion of the structure made with cement sheeting (possible asbestos containing materials);
- Some evidence of possible fuel/oil storage was also observed in the former dairy farm area and surrounds (Figures 22 and 23);
- Storage of cement pipes (possible asbestos containing materials) in the central-southern portion of the site (Figure 24); and
- Infilled drainage channel/dam in the central-southern portion of the site. The dumped material included metal sheeting and timber (Figure 25).

Figure 8: Grassed paddock and ridge in the northern portion of the site, looking south

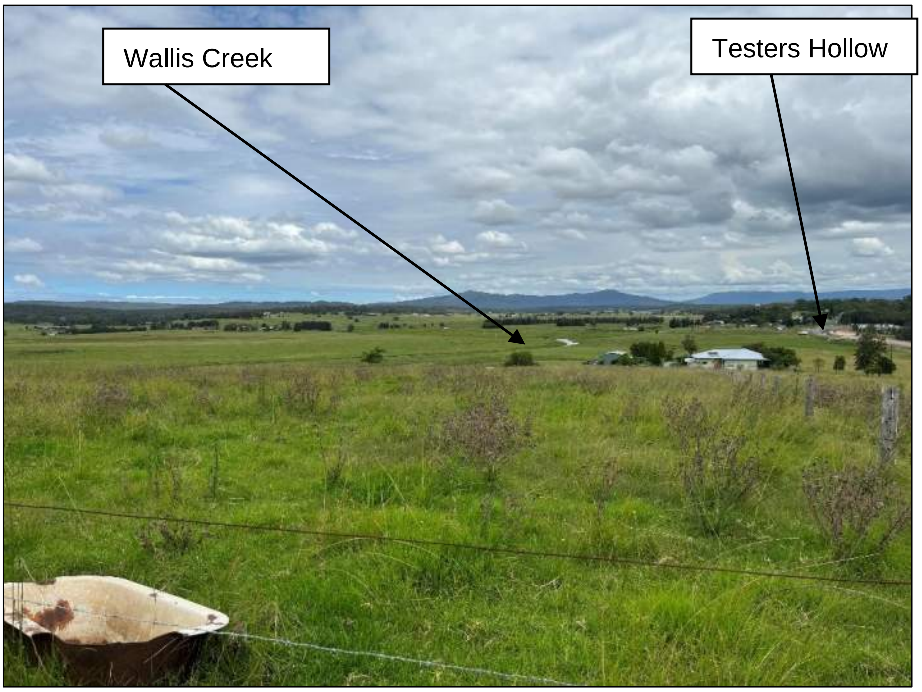


Figure 9: Grassed paddocks in the central portion of the site, looking south-south-west towards Wallis Creek and Testers Hollow

Figure 10: Grassed paddock and dam in the southern portion of the site, looking south

Figure 11: Residential and hobby farm structures and paddocks immediately north-west of the subject site, looking south-west

Figure 12: Drainage line flowing from the adjacent site to the north-west onto the subject site, looking north-east

Figure 13: Possible ground disturbance within Lot 1 DP 601226. Arrows show locations of raised/disturbed ground

Figure 14: Possible ground disturbance within Lot 1 DP 601226.

Figure 15: Residential dwelling, metal clad and framed shed structure and evidence of former animal holding area, central-southern portion of the site, looking north

Figure 16: Residential dwelling, metal clad and framed shed structure and evidence of former animal holding area, central-southern portion of the site, looking north-east

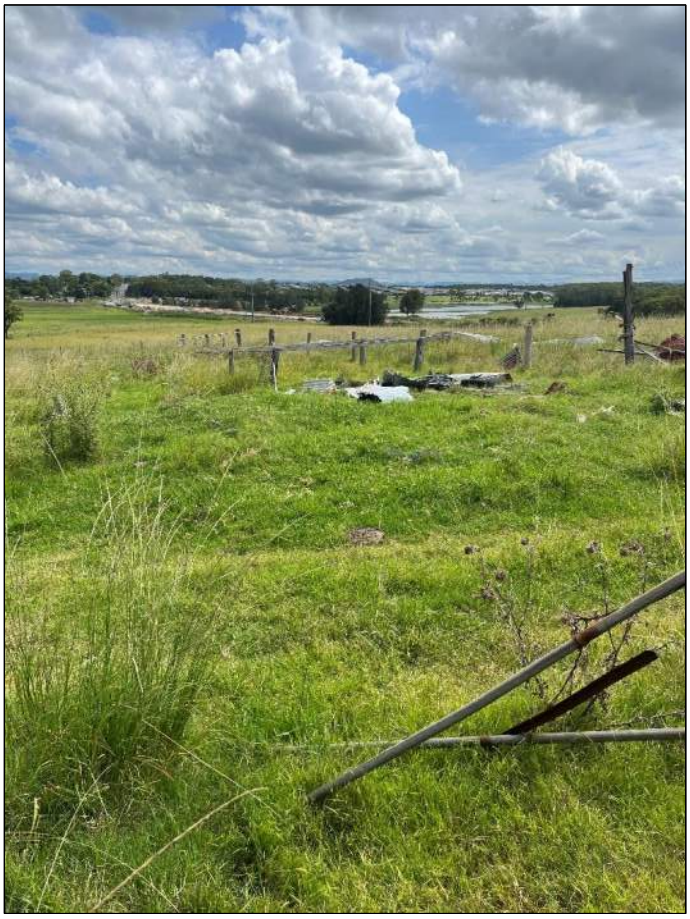


Figure 17: Building materials and uneven ground in the central-southern portion of the site, looking south-west

Figure 18: Building materials, remnant structure and uneven ground in the central-southern portion of the site, looking south-east

Figure 19: Former dairy structure, of timber and metal construction, in the central-southern portion of the site, looking north

Figure 20: Former dairy structure, of timber and metal construction, in the central-southern portion of the site, looking south

Figure 21: Cement sheeting/cladding on the walls of a portion of the former dairy, with some broken sheeting on the exposed soil (in red circle) in the central-southern portion of the site.

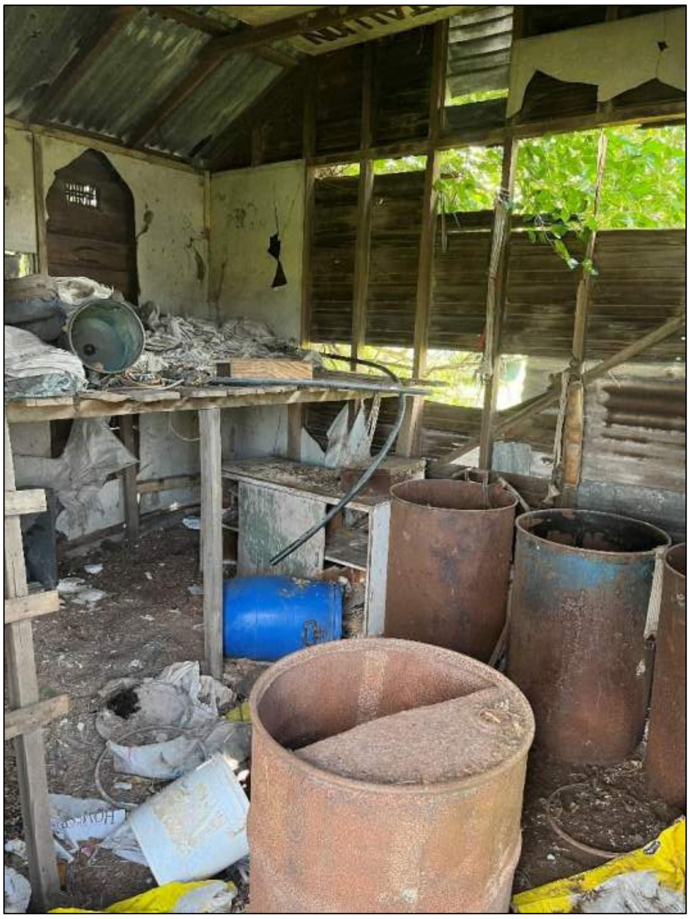


Figure 22: Oil/fuel barrels within the former dairy structure in the central-southern portion of the site

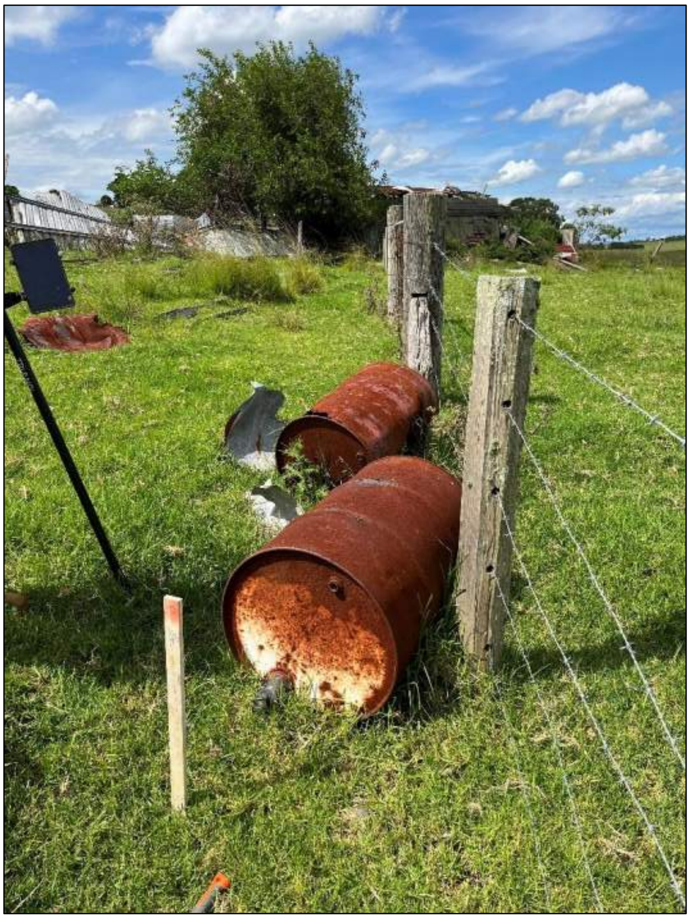


Figure 23: Oil/fuel barrels in the central-southern portion of the site

Figure 24: Cement pipes (possible asbestos containing materials) in the central-southern portion of the site (i.e. former dairy area)

Figure 25: Infilled dam (red circle) in the central-southern portion of the site, looking north

8. Preliminary Conceptual Site Model

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

Potential Sources

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

- S1: Fill: Associated with levelling, demolition of former buildings on the site and potential burying of waste;
  - COPC include metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), phenols and asbestos;
- S2: Storage and use of minor quantities of chemicals associated with agricultural and residential land use;
  - COPC include TRH, BTEX, PAH, metals and pesticides;
- S3: Agricultural activities on the site and adjacent sites such as dairy and poultry farming;
  - COPC include microbiological contaminants (e.g. faecal coliforms, E. Coli);
- S4: Current and former buildings, including demolition of structures;
  - COPC include asbestos, synthetic mineral fibres (SMF), lead and PCB.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users (residential and agricultural);
- R2: Construction and maintenance workers;
- R3: End users (residential land use, general public); and
- R4: Adjacent site users (residential land use).

The following potential environmental receptors have been identified:

- R5: Surface water (Wallis Creek, Testers Hollow);
- R6: Groundwater; and
- R7: Terrestrial ecosystems.

Potential Pathways

The following potential pathways in relation to human receptors have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;

The following potential pathways in relation to the environmental receptors have been identified:

- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Inhalation, ingestion and absorption.

Summary of Potentially Complete Exposure Pathways

A ‘source–pathway–receptor’ approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S4) and receptors (R1 to R7) are provided in below Table 3.

Table 3: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill, Metals, TRH, BTEX, PAH, OCP and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents). R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	An intrusive investigation is recommended to assess the presence or otherwise of the identified contamination sources and/or contaminants of concern .
S2: Storage/use of minor quantities of chemicals/fuels - OCP, OPP, metals, TRH, BTEX, PAH	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents) R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S3: Agricultural activities on the site and adjacent sites such as dairy and poultry farming	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents). R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S4: Current and former buildings, including demolition of structures: ACM asbestos, (SMF), lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P6: Inhalation, ingestion and absorption	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents).	

9. Sampling and Analysis Quality Plan

9.1 Data Quality Objectives

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

9.2 Soil Sampling Rationale

Based on the CSM and data quality objectives (DQO) the following sampling rationale was adopted.

A combined systematic and judgemental sampling strategy was adopted for the assessment to determine test pit locations which was adapted based on areas of access. The systematic assessment was conducted to assess general site conditions. Judgemental; sampling locations were based on site history information, site observations and the subsequent CSM with the rationale provided below

Test pit locations are shown on Drawings 1 to 4, in Appendix G.

Pits 1 to 5	Pit 1: drainage line downslope of adjacent hobby farm and animal enclosures (and former poultry sheds) in the north-western portion of the site Pit 2: Downslope of residence/hobby farm in the central-northern portion of the site Pit 3: Downslope of residence/hobby farm in the central-northern portion of the site, and adjacent to possible soil disturbance Pit 4: Downslope of residence/hobby farm in the central-northern portion of the site Pit 5: Downslope of residence/hobby farm in the central-northern portion of the site
Pits 6 to 15, Pits 301 and 302	Within and in the vicinity of the former dairy in the central-southern portion of the site, including areas of demolished buildings and building rubble. Pits 10, 12 and 13 were located downgradient of fuel/oil drums within the former dairy area
Pits 101 to 138	General site coverage
Pit 303	drainage line downslope of adjacent hobby farm and animal enclosures (and former poultry sheds) in the north-western portion of the site – collected for microbiological analysis
Pit 304	Located adjacent to the northern site boundary (i.e. background microbiological sample)
Pit 305	Within low-lying flood prone area in the southern portion of the site (microbiological sample)

Soil samples from machine excavated test pits and boreholes were collected from each borehole / test pit at depths of approximately 0.1 m, 0.5 m, 1.0 m and every 0.5 m thereafter, and changes in lithology or signs of contamination.

Soil samples from hand excavated test pits (i.e. pits 1 to 5, Pits 301 to 305) were collected from near-surface soils.

In terms of the sampling rationale, the following is noted:

- No sampling was undertaken in Lot 1 DP 311179 as the site was used to house horses at the time of the assessment ;
- Minimal sampling was undertaken in Lot 1 DP 601226 (i.e. in the area of uneven ground and possible former structures) as access to the site for subsurface investigation was not granted by the owner;

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

9.3 Analytical Rationale

Samples were selected for analysis on the basis of the identified sources and contaminants of concern as per in the conceptual site model, including:

- Upper soil profile across the general site area to assess for pesticide, chemical and fuel use as part of former rural activities (i.e. TRH, BTEX, PAH, metals, pesticides):
- The presence of fill (former dairy area and residential areas, general suite of analytes including trH, BTEX, PAH, PCB, OCP, OPP, metals);
- The presence of building materials at the surface or in fill (former dairy area, analysis for asbestos);
- The presence of oil/fuel storage containers (former dairy area, analysis for TRH, BTEX and PAH);
- Observed possible asbestos containing materials on structures and at the surface (former dairy shed, analysis for asbestos in materials and asbestos in soil);
- Former and current agricultural activities upslope of the site, including hobby farms and animal enclosures (microbiological contaminants, pesticides).

10. Site Assessment Criteria

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

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential land use scenario. The derivation of the SAC is included in Appendix F and the adopted SAC are listed on the summary analytical results tables in Appendix E.

11. Results

11.1 Field Work Results

The test pit logs for this assessment are included in Appendix B The logs recorded the following general sub-surface profile:

- Fill: Generally comprising silty soils with fragments of brick, glass, metal and plastic, generally within the area of the former dairy. Fill was observed in Pits 5 to 8, Pits 10 to 13 and Pit 15, Pit 108 and Pit 122 to depths of between 0.1 m and 1.0 m bgl;
- Sandy silt/clayey silt/silty clay/silt: generally comprising grey brown silty soils with varying fractions of clay and sand;
- Clay: Clay in all test locations. Encountered in all machine-excavated locations, generally below silty upper soils. Clays in the eastern portion of the site (i.e. adjacent to the eastern boundary) were likely alluvial clays, with residual clays generally encountered in the central-southern, central, western and northern portions of the site;
- Sandstone: encountered in the majority of pits within the central, central-southern, western and northern portions of the site. Sandstone encountered to the depth of investigation in test pits was generally extremely weathered.

Table 4: Summary of Field Investigations

Location(1)	Surface Level (AHD)	Depth to Base of Fill (m)	Depth to Top of Extremely Weathered Material (m)	Depth to Top of Rock (m)	Test Pit Refusal Depth(1) (m)	Depth to Groundwater (m)
1	31.415					
2	33.716					
3	39.29					
4	33.364					
5	26.694	0.1				
6	16.818	0.8		1.5		
7	15.485	0.1				
8	14.808	0.45				
10	12.536	0.4				
11	13.928	0.55		1.3		
12	12.687	0.4		1.5		
13		0.5		1.3		
14				1.2		

Location[1]	Surface Level (AHD)	Depth to Base of Fill (m)	Depth to Top of Extremely Weathered Material (m)	Depth to Top of Rock (m)	Test Pit Refusal Depth[1] (m)	Depth to Groundwater (m)
15		1.0				
101	5.56		2.0	2.0	2.3	
102	2.72					2.4
103	8.33		1.0	1.3	1.5	
104	10.07		2.1	2.3	2.6	
105	10.46		1.6	1.7	1.9	
106	9.63		2.1	2.3		
107	9.96		1.0	1.1		
108	19.51	0.4		1.8	2.3	
109	13.94		1.3	1.6	2.3	
110	17.51			1.2	1.7	
111	23.94		1.0	1.2	1.5	
112	8.92		0.8	1.0	1.7	
113	1.56					2.0^
114	31.10		1.2	1.4	1.8	
116	28.09			1.4	2.3	
117	26.63			1.3	2.2	
118	1.56					2.4^
119	33.41					
120	38.83			1.2	1.8	
121	40.66			1.4		
122	34.31	0.4				
123	36.32		0.9			
124	42.69		0.8			
125	42.69		0.5			
126	1.75					2.5
127	32.64					
128	40.65		1.3			

Location(1)	Surface Level (AHD)	Depth to Base of Fill (m)	Depth to Top of Extremely Weathered Material (m)	Depth to Top of Rock (m)	Test Pit Refusal Depth(1) (m)	Depth to Groundwater (m)
129	38.93		1.2			
130	45.12		0.7			
131	46.35		0.6			
132	42.47					
133	46.14		0.8			
134	44.75		0.6	0.7	0.8	
135	1.94					2.2^
136	40.86		1.1	1.8	1.8	
137	43.61		1.2			
138	32.25		0.6	0.9	1.1	
301						
302						
303						
304						
305						

Notes to Table 4:

Shaded values are from current investigation

NE – Not Encountered

^ groundwater encountered as seepage at the measured depth

(1) Pits 1 to 5 and 301 to 305 excavated using hand tools; Pits 6-15 and Pits 101 to 138 excavated using 5 t excavator

There were no other apparent records of visual or olfactory evidence (e.g. staining, odours, free phase product) to suggest the presence of contamination within the soils observed in the investigation.

The PID screening indicated that the sub-surface conditions were generally absent of VOC with all recorded values of less than 1 ppm.

Free groundwater was observed during excavation of test pits at Pit 102 (2.4 m depth) and Pit 126 (2.5 m depth). Seepage was observed in Pits 113, 118 and 125 at depths of 2.0 m, 2.4 m and 2.2 m respectively. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

11.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix E:

- Table E1: Summary of Laboratory Results for Land Use - Metals;
- Table E2: Summary of Laboratory Results for Land Use – TRH, BTEX, PAH;
- Table E3: Summary of Laboratory Results for Land Use – OCP, OPP, PCB, Asbestos;
- Table E4: Summary of Laboratory Results for Land Use - Microbiological;
- Table E5: Summary of Laboratory Results for Waste Classification – Metals, TRH, BTEX;
- Table E6: Summary of Laboratory Results for Waste Classification – PAH, OCP, OPP, PCB, Asbestos;

The laboratory certificate(s) of analysis are presented in Appendix E. The chain of custody and sample receipt information are provided in Appendix F.

12. Discussion

12.1 Soils

The analytical results for all contaminants tested in all samples were below the SAC with the exception of:

- Lead in sample Pit 13/0.0-0.1 at 350 mg/kg which exceeded the HIL-A of 300 mg/kg. This exceedance is within fill and building rubble within the former dairy area;
- Zinc in four samples (Pit 7/0.0-0.1, Pit 8/0.3, Pit 12/0.3, Pit 13/0.0-0.1) which exceeded the conservative EIL for urban residential and public open space. These exceedances were within fill within the former dairy area; and
- Asbestos containing materials within surface soils (i.e. fibro fragment >7 mm in size in soil) and fibro fragment at the surface at test location 301.

Preliminary microbiological testing in soil indicated the following:

- Detected faecal coliforms (Pit 304, 3300 MPN/100g) in the surface soil sample in the northern portion of the site (i.e. on the northern site boundary, upgradient of site activities and downgradient of the adjacent residential subdivision);
- Elevated faecal coliforms and E.Coli in surface samples in the vicinity of the former dairy (Pit 302, >180000 MPN/100 g) and downslope of the adjacent hobby farm /animal enclosures/former poultry sheds in the north-western portion of the site (Pit 303, 35000 MPN/100 g); and
- Detected faecal coliforms in the low-lying southern portion of the site (Pit 305), at similar levels to the background sample (i.e. Pit 305, 3100 MPN/100 g).

12.2 Waste Classification

All soil samples tested were within 'General Solid Waste' criteria (CT1) based on total concentrations with the exception of the following samples:

- Samples from near-surface fill in Pits 8, 12 and 13 exceeded 'General Solid Waste (CT1) criteria for lead; and
- Samples from near surface fill in Pit 8 exceeded 'General Solid Waste (CT1) criteria for benzo(a)pyrene;
- Asbestos containing materials within surface soils (i.e. fibro fragment >7 mm in size in soil) and fibro fragment at the surface at test location 301.

12.3 Data Quality Assurance and Quality Control

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

13. Revised Conceptual Site Model

The data collected for this DSI has generally confirmed that certain potential contaminant sources outlined in the CSM outlined in Section 9 pose a potentially complete pathway to the identified receptor(s) whilst others do not. No other sources of contamination have been identified as a result of the testing results. This is summarised in **Table 5**.

Table 5: Updated Summary of Potentially Complete Exposure Pathways (Proposed Land Use)

Source	Transport Pathway	Receptor	Remediation Action Required
S1: Fill, Metals, TRH, BTEX, PAH, OCP and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents).	Localised minor exceedances in upper fill, generally associated with building material and fill in the vicinity of the former dairy. Removal of the impacted fill and surrounds will be required for geotechnical suitability.

Source	Transport Pathway	Receptor	Remediation Action Required
	P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S2: Storage/use of minor quantities of chemicals/fuels - OCP, OPP, metals, TRH, BTEX, PAH	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies P5: Leaching of contaminants and vertical migration into groundwater P6: Inhalation, ingestion and absorption	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents) R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	Testing of soil indicates that contaminants associated with adjacent land uses do not appear to be significantly impacting the site. Testing in the downgradient of, oil/fuel storage at the site indicated the general absence of impacts in soil. No remediation action required.
S3: Agricultural activities on the site and adjacent sites such as dairy and poultry farming	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P3: Surface water run-off P4: Lateral migration of groundwater providing base flow to water bodies	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents).	Testing of soil indicates that microbiological contaminants associated with former and adjacent land uses have impacted the site in the vicinity of former dairy activities and in drainage lines downgradient of adjacent agricultural activities. Localised remediation of impacted soils is recommended, including aerations, liming and spelling of soils

Source	Transport Pathway	Receptor	Remediation Action Required
	P5: Leaching of contaminants and vertical migration into groundwater	R5: Surface water R6: Groundwater R7: Terrestrial ecosystems	
S4: Current and former buildings, including demolition of structures: ACM asbestos, (SMF), lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and / or vapours P6: Inhalation, ingestion and absorption	R1: Current users (residents) R2: Construction and maintenance workers R3: End users (residents) R4: Adjacent site users residents).	Controls should be in place in for the management of the hazardous waste contamination during demolition (i.e. removal of ACM from the former dairy building, relevant to R2, and potentially other buildings). Localised minor exceedances of lead in upper fill, and the presence of asbestos in the vicinity of the former dairy structure. Removal of the impacted fill and surrounds will be required. Further investigation of existing building footprints post demolition, and in data gaps identified in Section 9.2. Remediation options for the impacts associated with hazardous building materials include removal and disposal to an appropriately licensed landfill or on-site management of impacts (e.g. beneath structures, pavements or soil capping).

14. Conclusions and Recommendations

The objective of the PSI and DSI was to identify and investigate the potential for contamination at the site from the previous and current land uses. Based on the results of previous assessment by others and the current assessment, potential contamination sources included the use of fill within the site, former agricultural activities, possible storage and use of chemicals and demolition of structures.

The results of the investigation indicated the general absence of gross contamination across the site.

Localised impacts were observed in the vicinity of the former dairy farm in the central-southern portion of the site, associated with the following:

- Demolition and burial of former structures within the area;
- Former dairy activities (i.e. microbiological contamination);
- The presence of asbestos-containing materials on the dairy structure, impacting underlying soils.

Microbiological impacts were also observed within the site, immediately downgradient of adjacent agricultural activities.

There are potential impacts in close proximity to and beneath existing structures, which cannot currently be fully accessed for sampling.

On the basis of the above, the following remediation is recommended for the site:

- Hazardous building material assessment of buildings proposed to be demolished;
- Demolition of existing structures, including management of existing hazardous building materials, including asbestos. Demolition and remediation of asbestos impacts should be conducted by an appropriately licensed asbestos contractor;
- Further assessment of building footprints, once demolished;
- Delineation and remediation of contaminated soils identified in Section 12.1;
- Assessment of data gaps identified in Section 9.2;
- Excavation, removal and waste classification of uncontrolled fill in the vicinity of the former dairy in the central-southern portion of the site, and any other localised areas of soil contamination determined through the previous steps outlined above; and
- Localised aeriation, liming and spelling of microbiological-impacted soils in the vicinity of the former dairy structure and in areas adjacent to upgradient agricultural activities.

Remediation of the identified impacts should be conducted with reference to a site-specific Remediation Action Plan, outlining the procedures, methodologies and responsibilities for remediation and validation at the site.

Based on the results of the DSI it is considered that the site is suitable for the proposed residential development subject to implementation of the recommendations above.

15. References

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

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

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

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

16. Limitations

Douglas Partners (DP) has prepared this report for this project at 501-527 Cessnock Road Gillieston Heights with reference to DP's proposal dated 8 July 2021 and acceptance received from Walker Gillieston Heights dated 26 November 2021. The work was carried out under Walker Consultancy Deed dated 26 November 2021. This report is provided for the exclusive use of Walker Gillieston Heights Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

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

Asbestos has been detected by observation and by laboratory analysis, on the surface of the site and in near-surface soil at selected test locations sampled and analysed. Building demolition materials, such as sheetmetal, timber and, brick were, however, located in below-ground fill and at the surface, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

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

Douglas Partners Pty Ltd

Appendix A

About this Report

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix B

Test Pit Logs – Pits 1 to 15, 101 to 138
Borehole Logs – Bores 201 to 207

TEST PIT LOG

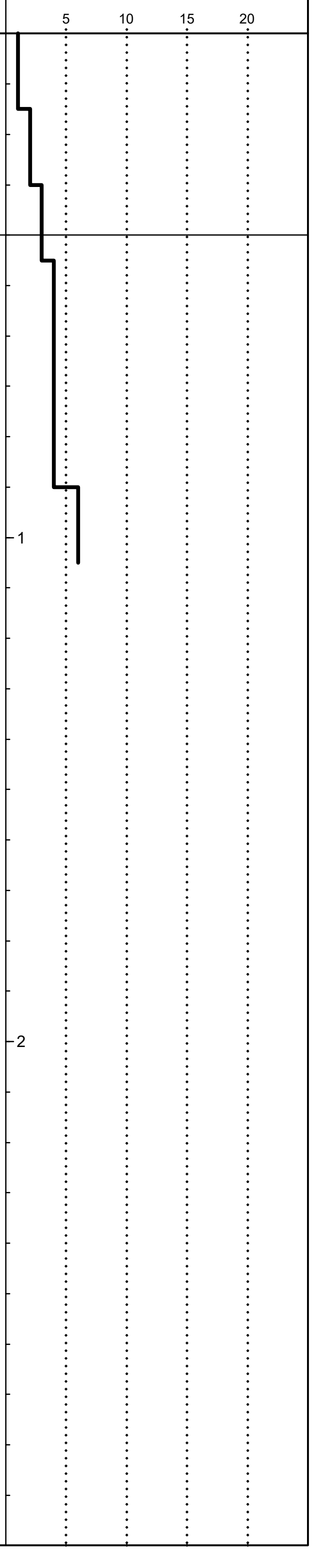
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 31.42 AHD
EASTING: 362038.8
NORTHING: 6372774.378

PIT No: 1
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		Sandy SILT (ML) : Low plasticity, dark brown, trace rootlets, W<PL		D	0.0 – 0.1	E	PID<1	
		From 0.2m, trace fine to medium grained subangular to subrounded gravels		D	0.3	E	PID<1	
31	0.4	Pit discontinued at 0.4m, limit of investigation						
	1							
30								
	2							
29								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Spade
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

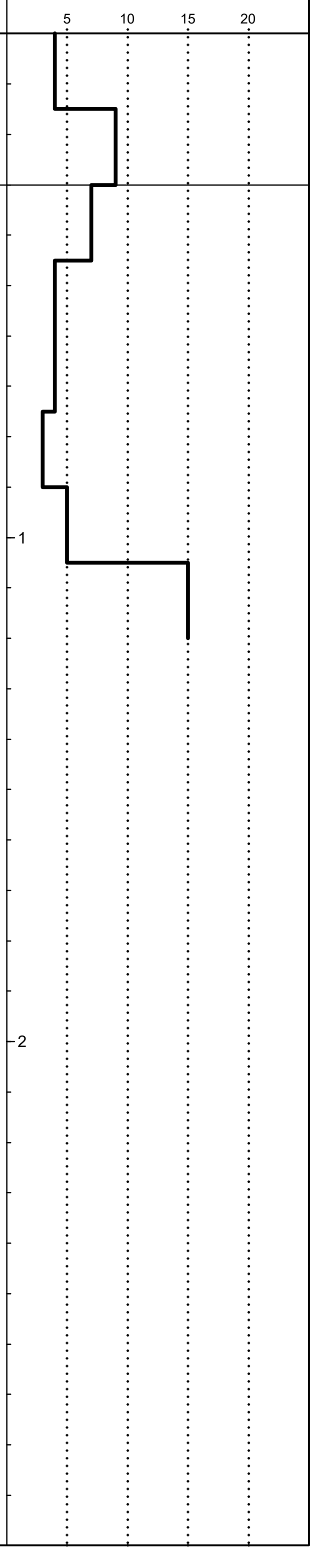
SURFACE LEVEL: 33.72 AHD
EASTING: 362048.7
NORTHING: 6372647.524

PIT No: 2
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		Sandy SILT (ML) : Low plasticity, brown, trace rootlets, W<PL		D	0.0	E	PID<1	
					0.1			
		From 0.2m, trace charcoal						
	0.3	Pit discontinued at 0.3m, limit of investigation		D	0.3	E	PID<1	

RL scale: 33, 32, 31. Depth scale: 1, 2.

Dynamic Penetrometer Test (blows per 150mm)



RIG: Spade
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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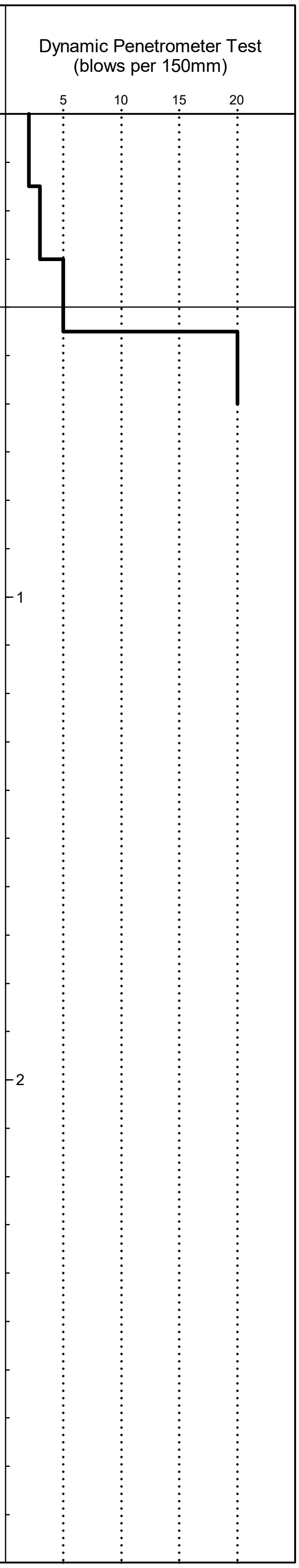
TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 39.29 AHD
EASTING: 362145.3
NORTHING: 6372560.917

PIT No: 3
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
		Sandy SILT (ML) : Low plasticity brown, trace fine to medium grained subangular to subrounded gravel, rootlets, W<PL		D	0.0–0.1	E	PID<1	
39	0.25	Clayey SAND (SP) : Fine to medium grained, poorly graded pale brown, trace fine to medium subangular to subrounded gravel, rootlets, moist		D	0.3	E	PID<1	
	0.4	Pit discontinued at 0.4m, limit of investigation						



RIG: Spade
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

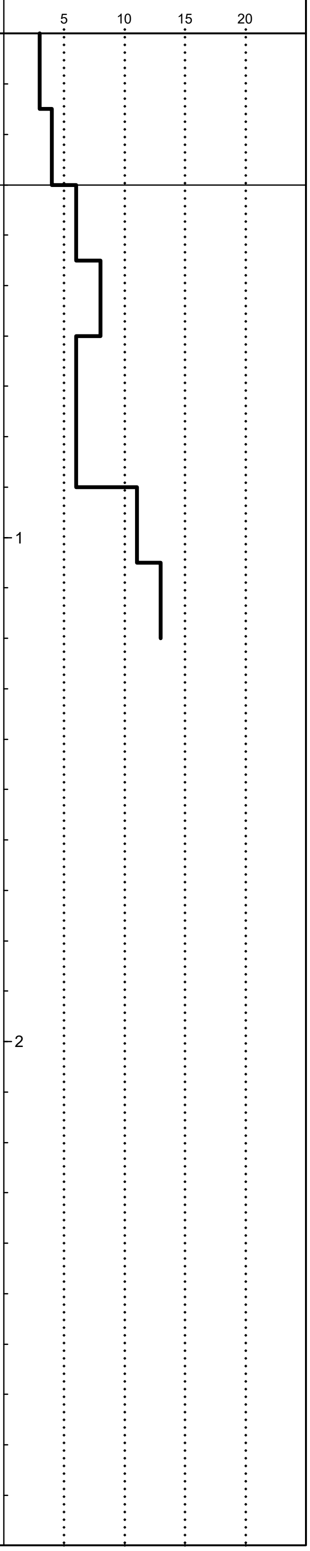
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 33.36 AHD
EASTING: 362059
NORTHING: 6372449.895

PIT No: 4
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		Sandy SILT (ML) : Low plasticity, brown, trace rootlets, W<PL		D	0.0 0.01	E	PID<1	
	0.2	Sandy CLAY (CL) : Low plasticity, pale brown mottled orange, trace fine grained subangular to subrounded gravels, W<PL		D	0.3	E	PID<1	
33	0.3	Pit discontinued at 0.3m, limit of investigation						
	1							
32								
	2							
31								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Spade
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

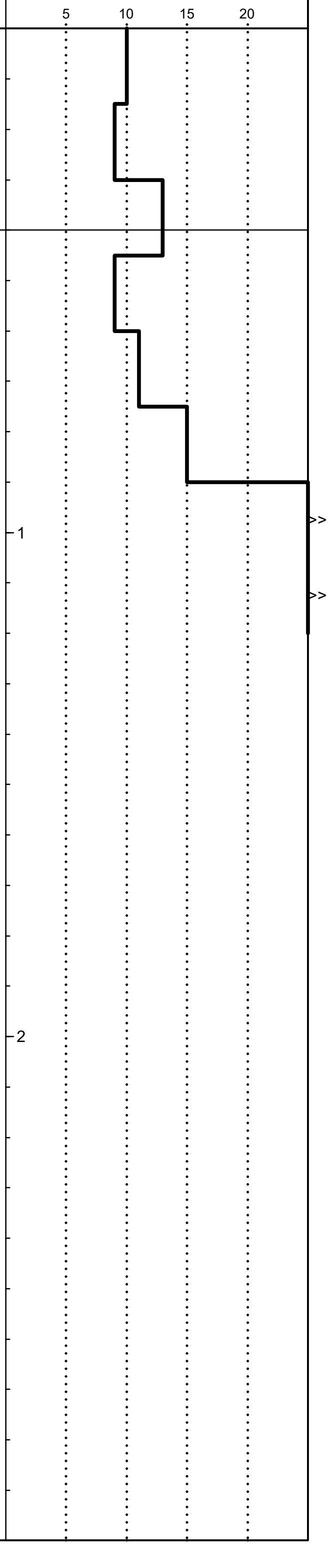
TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd	**SURFACE LEVEL:** 26.70 AHD	**PIT No:** 5
PROJECT: Proposed Residential Subdivision	**EASTING:** 362132.6	**PROJECT No:** 204921.00
LOCATION: 527 Cessnock Road, Gillieston Heights	**NORTHING:** 6372441.496	**DATE:** 8/2/2022
		SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
		FILL / Silty SAND (SP) : Fine to medium grained, poorly graded, brown, trace fine to medium grained subrounded gravels (natural imported), wood, moist		D	0.0 – 0.1	E	PID<1	
	0.1	Sandy CLAY (CL) : Low plasticity, pale brown, trace fine grained subrounded gravels, rootlets, W<PL		D	0.3	E	PID<1	
	0.4	Pit discontinued at 0.4m, limit of investigation						

RL scale: 26, 25, 24. Depth scale: 1, 2.

Dynamic Penetrometer Test (blows per 150mm)



RIG: Spade **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 16.82 AHD
EASTING: 362004.5
NORTHING: 6372239.61

PIT No: 6
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
		FILL : Grey brown clayey silt fill, trace plastic rope, brick fragments, moist		D	0.0 – 0.1				
	0.35	Sandy SILT : Brown fine to medium grained sandy silt, moist		D	0.4				
	0.5	FILL : Grey to grey brown clayey silt and intermixed fine to coarse grained sand and fine gravel fill (possible ash), moist		D	0.6				
16	0.8	Silty CLAY : Dark brown mottled orange silty clay, M<WP		U_{50}	0.85 – 1.3				
15	1.5	SANDSTONE : Pale brown, mottled orange, very low strength, extremely weathered							
	2.0	Pit discontinued at 2.0m, limit of investigation							

RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

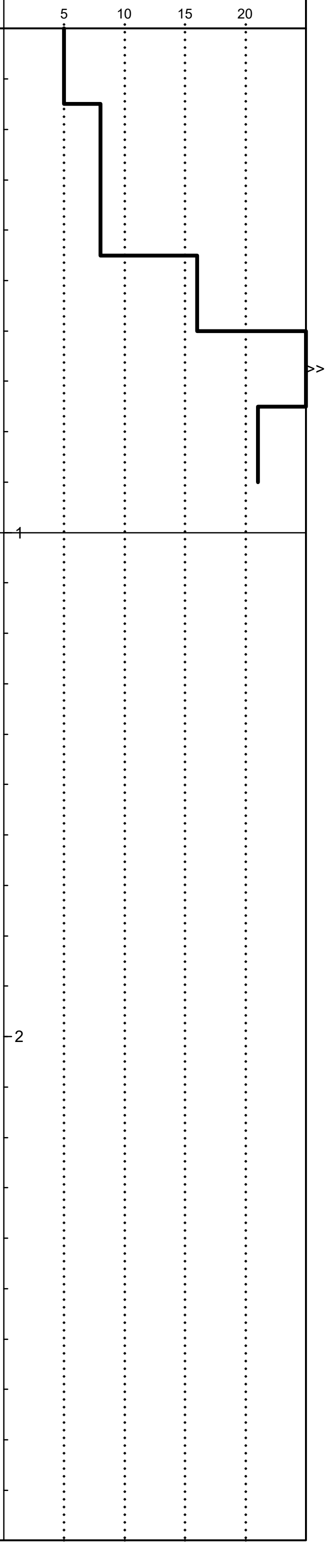
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 15.49 AHD
EASTING: 361997.3
NORTHING: 6372225.614

PIT No: 7
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
		FILL / Clayey SILT (ML) : Low plasticity grey/brown, trace timber, metal wire, plastic bag, plastic pipe with abundant rootlets, W<PL		D	0.1	E	PID<1	
	0.1	Clayey SILT (ML) : Low plasticity, grey brown, W<PL						
15	0.4	CLAY (CH) : High plasticity, red/brown mottled orange, W≤PL		D	0.5	E	pp = 350 PID<1	
					0.9		pp >400	
	1.0	Pit discontinued at 1.0m, limit of investigation						
14								
	2							
13								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 14.81 AHD
EASTING: 361995.8
NORTHING: 6372212.383

PIT No: 8
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		FILL / Clayey SILT : Low plasticity, pale brown, trace subangular to subrounded gravels, W<PL		D	0.0 0.01		PID<1		
	0.1	FILL / CLAY : Low plasticity, orange/brown, trace subangular to subrounded gravels, glass bottles, plastic, rootlets, abundant sheet metal, W<PL		D	0.3		PID<1		
	0.45	Silty CLAY : Low plasticity, brown, trce rootlets, W<PL		D	0.5		pp = 300 PID<1		
14	0.75	CLAY : High plasticity, red/brown mottled orange, W≤PL							
	1 1.0	Pit discontinued at 1.0m, limit of investigation		D	1.0		pp = 300 PID<1		1
13	2								2
12									

RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 12.54 AHD
EASTING: 362025.1
NORTHING: 6372212.138

PIT No: 10
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
	FILL / Clayey SILT : Low plasticity, pale brown, with rootlets, W<PL		D	0.0 0.05		PID<1	
0.3	FILL / Silty SAND : Fine to medium grained, brown, trace subangular to subrounded, fine to coarse grained gravels, coal reject, moist						
0.4	CLAY : High plasticity, red/brown mottled orange, trace rootlets, W≤PL		D	0.4		PID<1	
			D	0.6		pp >400 PID<1	
0.8	Pit discontinued at 0.8m, limit of investigation						

RL scale: 12, 11, 10. Depth scale: 1, 2.

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

RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 13.93 AHD
EASTING: 362026.6
NORTHING: 6372223.775

PIT No: 11
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
	FILL / Clayey SILT : Low plasticity, brown, trace rootlets, subangular to subrounded gravels, coal reject, W<PL	D	0.0 – 0.1	PID<1
0.15	FILL / Silty CLAY : Low plasticity, brown, trace glass, metal piping, plastic, hose, rootlets, subangular to subrounded gravels, W<PL	D	0.3	PID<1
0.55	Silty SAND : Fine to medium grain, pale brown, moist	D	0.6	PID<1
		D	0.8	pp = 200 PID<1
1.2	CLAY : High plasticity, red/brown mottled orange, trace rootlets, W≤PL			
1.3	SANDSTONE : Grey with orange mottling, very low strength, extremely weathered			
1.5	Pit discontinued at 1.5m, limit of investigation			

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

RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

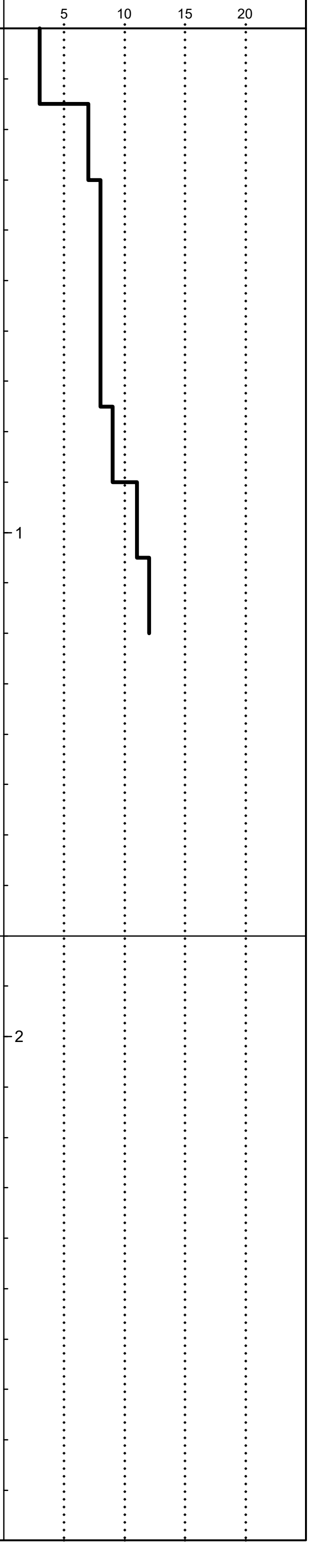
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 12.69 AHD
EASTING: 362046.2
NORTHING: 6372227.717

PIT No: 12
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water
0.05	FILL / Clayey SILT : Low plasticity, brown, trace rootlets and coal reject, W<PL	D	0.0 – 0.05		PID<1	
0.4	FILL / Sandy SILT : Low plasticity, pale brown, trace rootlets, coal reject, metal, plastic bags, brick, W<PL	D	0.3		PID<1	
1.5	CLAY : High plasticity, red/brown mottled orange, trace rootlets, W≤PL	D	0.5		PID<1	
		U	0.5 – 0.9	50		
		D	1.0		pp = 250 PID<1	
		B	1.2		2 buckets	
1.8	SANDSTONE : Grey with orange mottling, very low strength, extremely weathered					
	Pit discontinued at 1.8m, limit of investigation					

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: --
EASTING: 362048.8
NORTHING: 6372230.429

PIT No: 13
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
	0.01	FILL / Clayey SILT : Low plasticity, pale brown, trace plastic fragments, electric fence wire, bail twine, rootlets, timber, W<PL		D	0.0 0.1		PID<1 D3		
		FILL / Sandy SILT : Low plasticity, brown, trace subangular to subrounded gravels, fine to coarse grained, brick, W<PL		D	0.3		PID<1		
	0.5	CLAY : High plasticity, red/brown mottled orange, trace rootlets, W≤PL		D	0.6		pp = 350 PID<1		
	1.3	SANDSTONE : Grey with orange mottling, very low strength, extremely weathered							
	1.6	Pit discontinued at 1.6m, limit of investigation							

RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

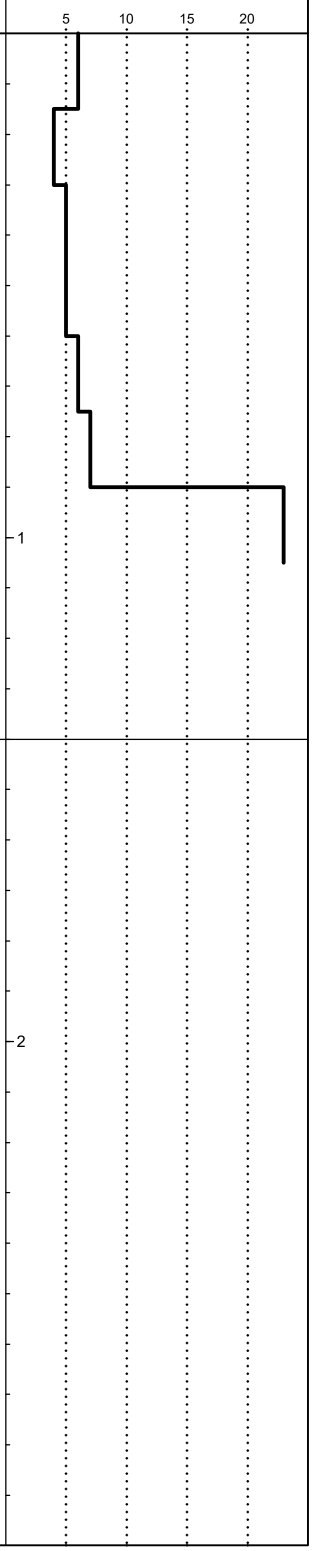
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: --
EASTING: 361965.2
NORTHING: 6372218.763

PIT No: 14
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
		SANDY SILT - Low plasticity, dark brown with rootlets, W<PL		D	0.0 0.1		PID<1 D2	
	0.13	CLAY - High plasticity, red / brown mottled orange, trace rootlets, W <PL		D	0.5		pp = 200 PID<1	
	1.2	SANDSTONE- Grey mottled orange, very low strength, extremely weathered						
	1.4	Pit discontinued at 1.4m, limit of investigation						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: --
EASTING: 361930.3
NORTHING: 6372318.352

PIT No: 15
PROJECT No: 204921.00
DATE: 25/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		FILL / SANDY SILT - Low plasticity, dark brown, trace rootlets, W<PL		D	0.0 0.05		PID<1		
	0.1	FILL / CLAYEY SILT - Low plasticity, dark brown, trace subangular to subrounded gravels, fine to coarse grained, W<PL		D	0.5		PID<1		
1	1.0	CLAY - High plasticity, red / grey, mottled W <PL		D	1.0		pp = 200 PID<1		1
	1.8	Pit discontinued at 1.8m, limit of investigation							
2									2

RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

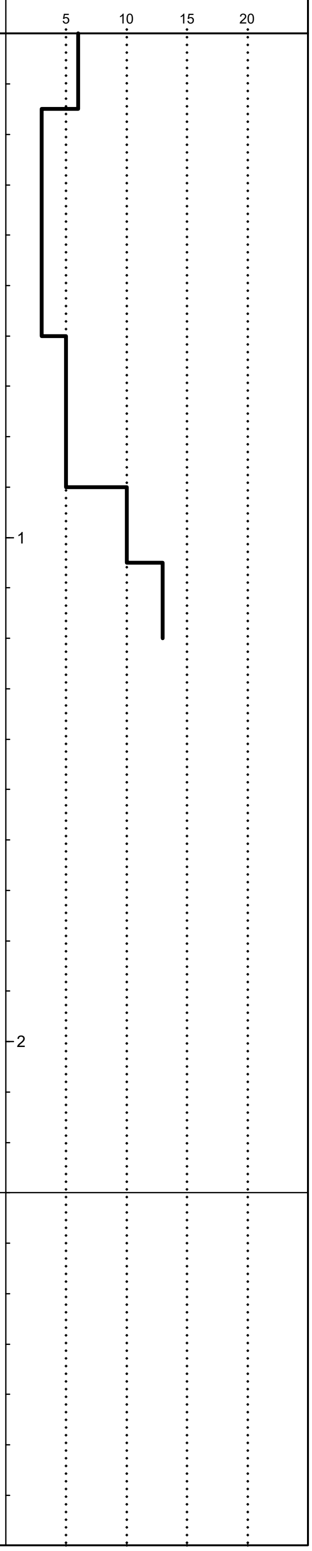
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 5.56 AHD
EASTING: 361892.6
NORTHING: 6372014.337

PIT No: 101
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		SILT (ML) - Low plasticity, brown trace rootlets, fine rounded gravels (natural), W<PL		D, E	0.05			
	0.35	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL, hard		D, E	0.5		pp >400 PID<1	
5				U_{50}	0.5–0.72			
	1			D	1.0		pp >400	
4				D	1.5		pp >400	
		From 1.7m, grading to very stiff rock						
		From 1.9m, very stiff			1.9		pp = 300-400	
	2.0	SANDSTONE - Fine to medium grained, grey brown, extremely weathered		D	2.1			
	2.3	Pit discontinued at 2.3m, machine refusal on rock						
3								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

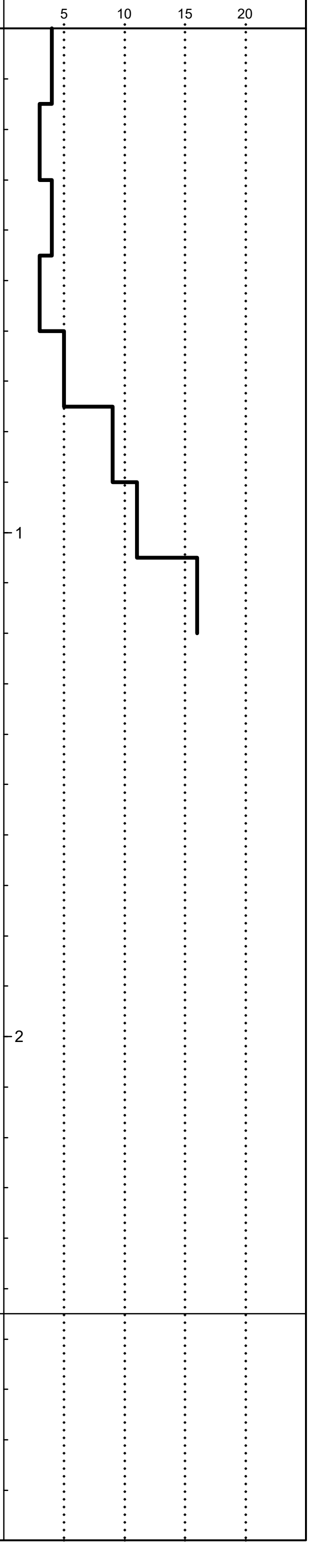
SURFACE LEVEL: 2.72 AHD
EASTING: 362034.3
NORTHING: 6372022.592

PIT No: 102
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
	SILT (ML) - Low plasticity, brown trace rootlets, fine rounded gravels (natural), W<PL	D, E	0.05			
0.15	SILTY CLAY (CH) - High plasticity,dark brown, trace rootlets, W>PL		0.15			
		B				
		D, E	0.5		pp = 150-200	
0.65	CLAY (CH) - High plasticity, pale grey mottled orange brown, trace rootlets, fine to medium grained sand		0.65			
1	From 1.0m, with fine to medium grained sand	D	1.0		pp = 200-250	
		D	1.5		pp = 200-250	
2		D	2.0		pp = 100-200	
2.2	SANDSTONE - Fine to medium grained, pale grey mottled orange - brown, extremely weathered					
		D	2.5			27-01-22
2.55	Pit discontinued at 2.55m, limit of investigation					

RL: 2, 1, 0

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: Free groundwater observed at 2.4m

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

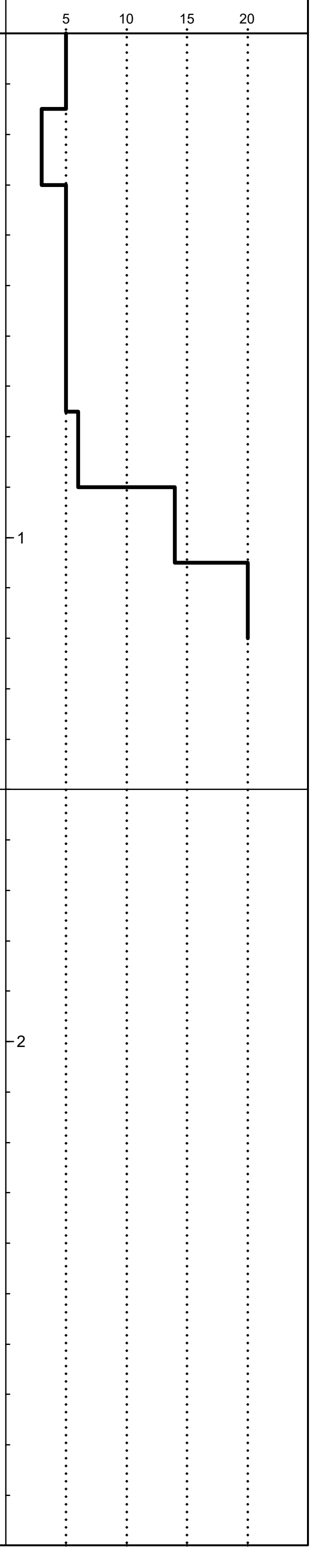
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 8.33 AHD
EASTING: 361887.6
NORTHING: 6372098.719

PIT No: 103
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		SANDY SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05			
8	0.2	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL, with fine to medium grained sand		D, E	0.5		pp >400	
				B				
	1			D	1.0		pp = 200-300	
		From 1.1m, grading to rock			1.2		pp = 100-200	
7	1.3	SANDSTONE - Fine to medium grained, brown - orange, mottled grey, extremely weathered						
	1.5	Pit discontinued at 1.5m, machine refusal on rock						
6	2							

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

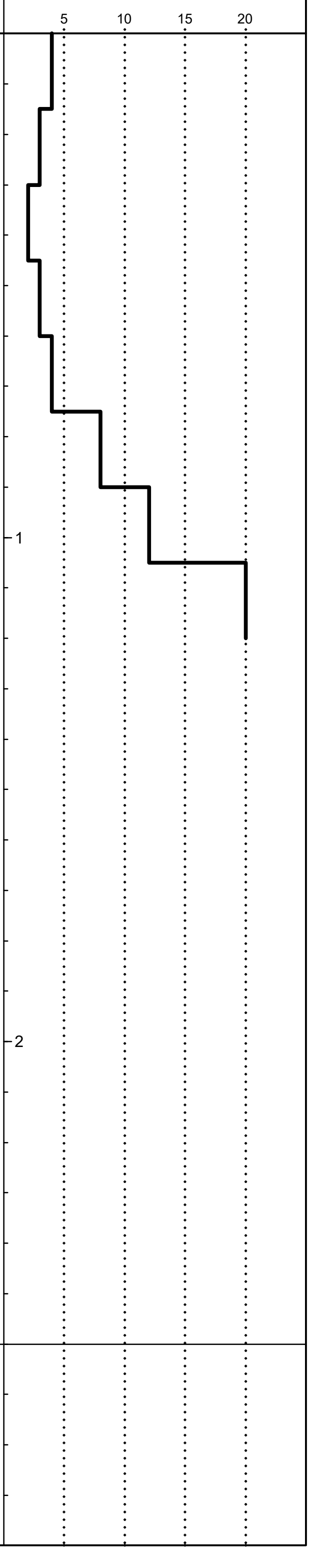
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 10.07 AHD
EASTING: 361896.3
NORTHING: 6372211.993

PIT No: 104
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
10		SANDY SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05			
	0.3	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL, with fine to medium grained sand		D, E	0.5		pp = 150-200	
9	1			D, E	1.0		pp = 100-150	
				D, E	1.5		pp = 80-100	
8	2			D	2.0		pp = 50	
		From 2.1m, with fine to medium grained sand, grading to rock						
	2.3	SANDSTONE - Fine to medium grey mottled brown, extremely weathered		D	2.5			
	2.6	Pit discontinued at 2.6m, machine refusal on rock						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

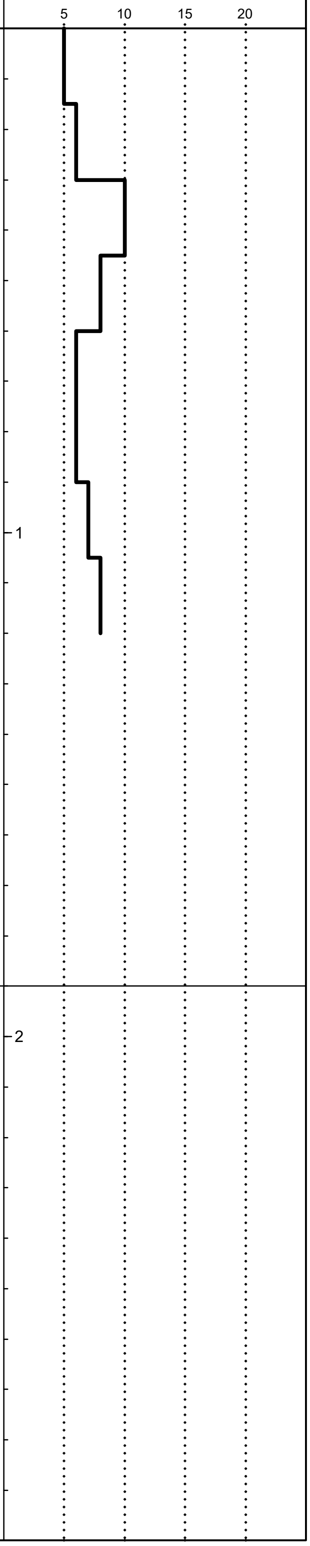
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 10.46 AHD
EASTING: 362019.2
NORTHING: 6372173.471

PIT No: 105
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water
0.0	SANDY SILT (ML) - Low plasticity, brown, trace rootlets, W<PL	D, E	0.05			
0.35	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL, with fine to medium grained sand		0.4			
		D, E U_{50}	0.5		pp >400 PID<1	
			0.62			
		D	1.0		pp >400 PID<1	
		B				
		D	1.5		pp >400 PID<1	
	From 1.6m, grading to rock					
1.7	SANDSTONE - Fine to medium grained sand, orange - brown mottled grey, extremely weathered, with sandstone cobbles	D	1.8			
1.9	Pit discontinued at 1.9m, machine refusal on rock					

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

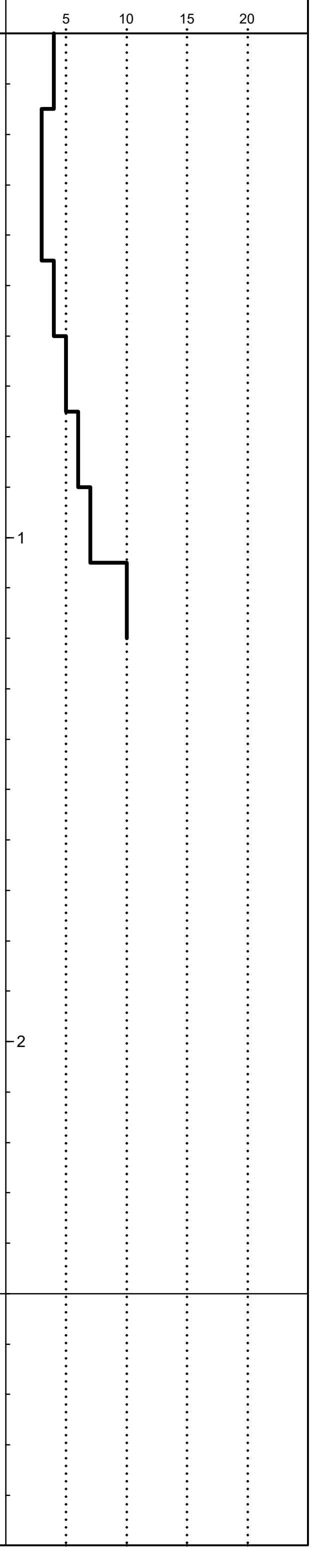
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 9.63 AHD
EASTING: 362092.1
NORTHING: 6372225.293

PIT No: 106
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments
	SILT (ML) - Low plasticity, brown, trace rootlets, fine rounded gravels (natural), W<PL	D, E	0.05		
0.3	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL, with fine to medium grained sand	D, E	0.5		pp >400 PID<1
		D, E U	1.0	50	pp >400 PID<1
	From 1.5m, brown - orange	D	1.5		pp >400
		D	2.0		pp >400
	From 2.1m, trace fine to medium grained sand, grading to rock				
2.3	SANDSTONE - Fine to medium grained, grey-brown, extremely weathered	D	2.4		
2.5	Pit discontinued at 2.5m, limit of investigation				

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

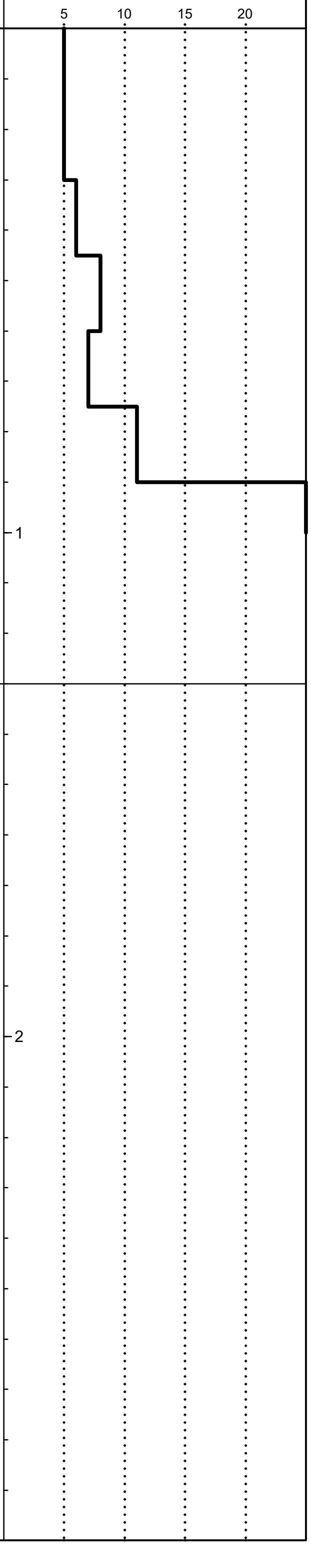
TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 9.96 AHD
EASTING: 362139.4
NORTHING: 6372274.821

PIT No: 107
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		SILT (ML) - Low plasticity brown, trace rootlets, W<PL		D, E	0.05		PID<1		
	0.2	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL, hard		D, E	0.5		pp >400 PID<1		
9	1	From 1.0m, trace fine to medium grained sand, grading to rock		D	1.0		pp >400 PID<1		1
	1.1	SANDSTONE - Fine to medium grained, pale brown / grey, extremely weathered		D	1.2		PID<1		
	1.3	Pit discontinued at 1.3m, limit of investigation							
8	2								2
7									



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

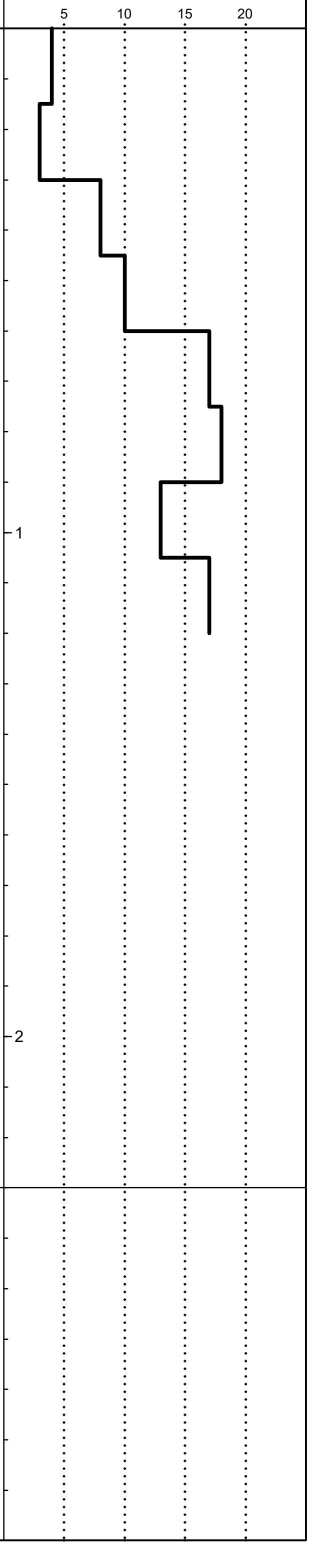
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 19.51 AHD
EASTING: 362022.4
NORTHING: 6372281.7

PIT No: 108
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments
0.0 – 0.4	FILL / SANDY SILT (ML) - Low plasticity brown, trace rootlets, fine to medium subangular to subrounded (CNR), brick, ceramic, W<PL	D, E	0.05		
0.4 – 1.8	CLAY (CH) - High plasticity, orange brown mottled red / grey, trace rootlets, W<PL	D, E	0.5		pp = 250-300
		D	1.0		pp >400
		D	1.5		pp >400
1.8 – 2.3	SANDSTONE - Fine to medium grained, brown grey, extremely weathered	D	2.0		
2.3	Pit discontinued at 2.3m, machine refusal on rock				

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

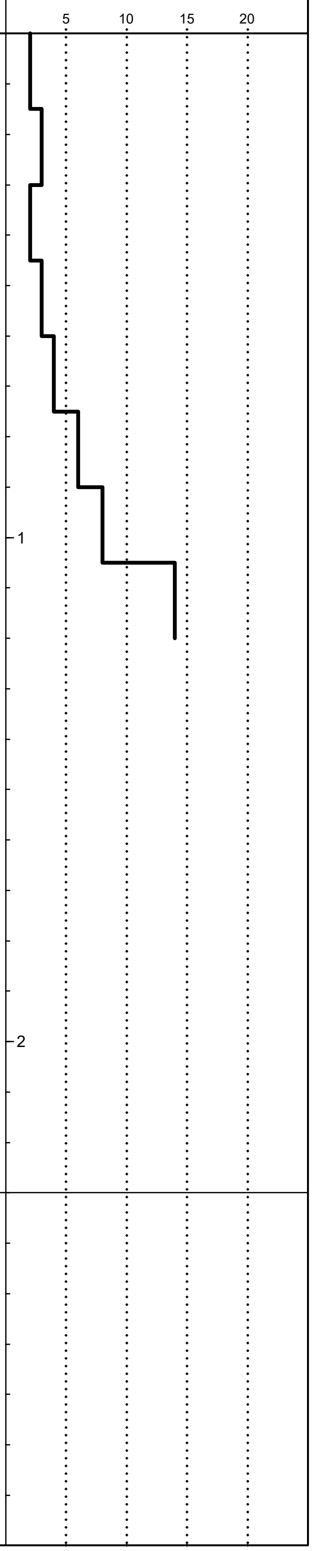
SURFACE LEVEL: 13.94 AHD
EASTING: 361926.6
NORTHING: 6372275.28

PIT No: 109
PROJECT No: 204921.00
DATE: 27/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
0.0	SANDY SILT (ML) - Low plasticity, brown, trace rootlets, W<PL	D, E	0.05			
0.35	CLAY (CH) - High plasticity, orange - brown, mottled red / grey, trace rootlets, W<PL	D, E	0.5		pp = 300	
		D	1.0		pp = 200-300	
	From 1.3m, with fine to medium grained sand, grading to rock	D	1.5		pp = 300-350	
1.6	SANDSTONE - Fine to medium grained, pale brown, mottled grey, extremely weathered	D	2.0			
2.3	Pit discontinued at 2.3m, machine refusal on rock					

RL scale: 13, 12, 11

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

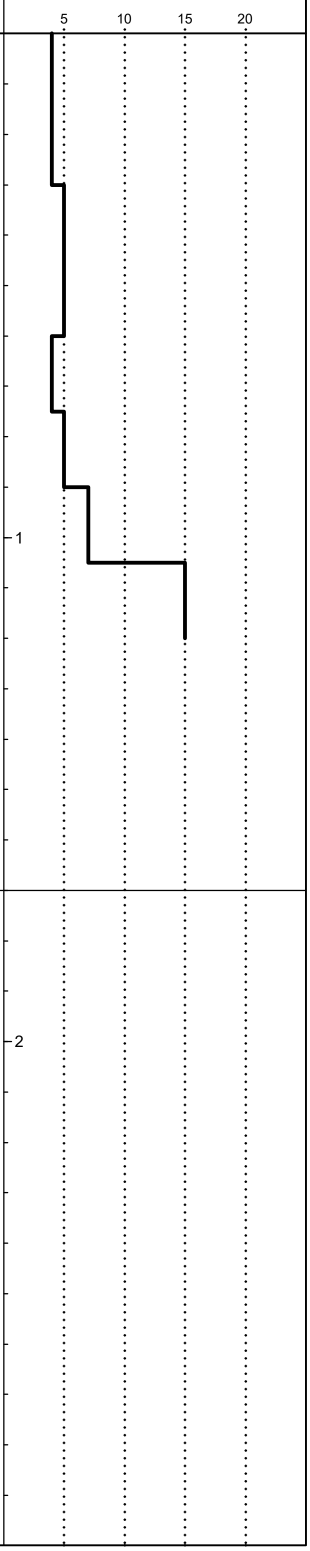
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 17.51 AHD
EASTING: 361939.4
NORTHING: 6372339.484

PIT No: 110
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
		SANDY GRAVELLY SILT (ML) - Low plasticity, brown, with fine to coarse subangular to subrounded gravels (CNR), trace rootlets, cobbles W<PL (possible filling)	D, E	0.05			
	0.4	CLAY (CH) - High plasticity, orange -brown mottled red / grey, trace rootlets, W<PL, hard, very stiff		0.4			
17				0.51		pp = 350-400	
			U_{50}				
			B	0.79			
	1		D	1.0		pp = 350-400	
	1.2	SANDSTONE - Fine to medium grained, pale brown with grey, extremely weathered		1.2			
16			D	1.5			
	1.7	Pit discontinued at 1.7m, machine refusal on rock					
	2						
15							

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

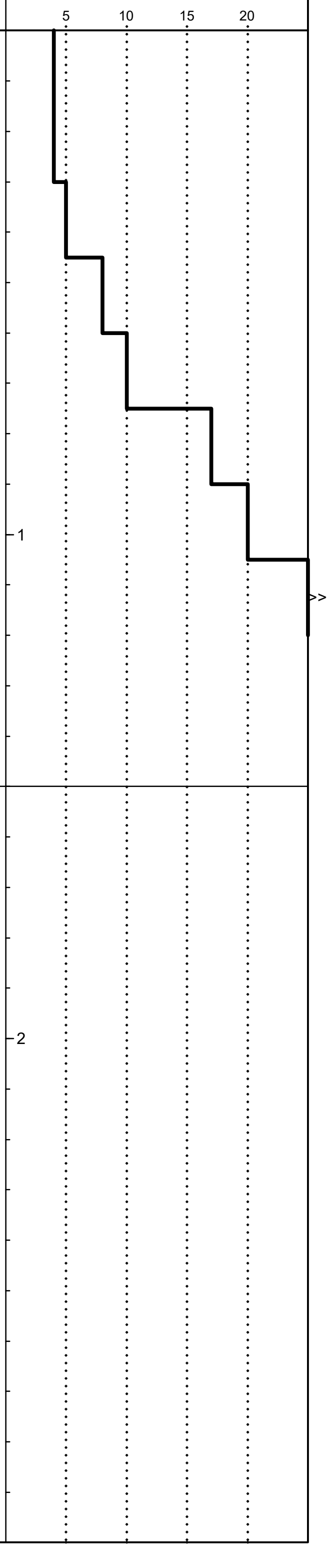
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 23.94 AHD
EASTING: 362054.5
NORTHING: 6372361.038

PIT No: 111
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05			
	0.25	CLAY (CH) - High plasticity, orange-brown, mottled red/grey, trace rootlets, W<PL, hard		D, E	0.5		pp >400	
23	1	From 1.0m, grading to rock		D	1.0		pp >400	
	1.2	SANDSTONE - Fine to medium grained, pale brown / grey, extremely weathered, trace fine rounded gravel		D	1.3			
	1.5	Pit discontinued at 1.5m, machine refusal on rock						
22	2							
21								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

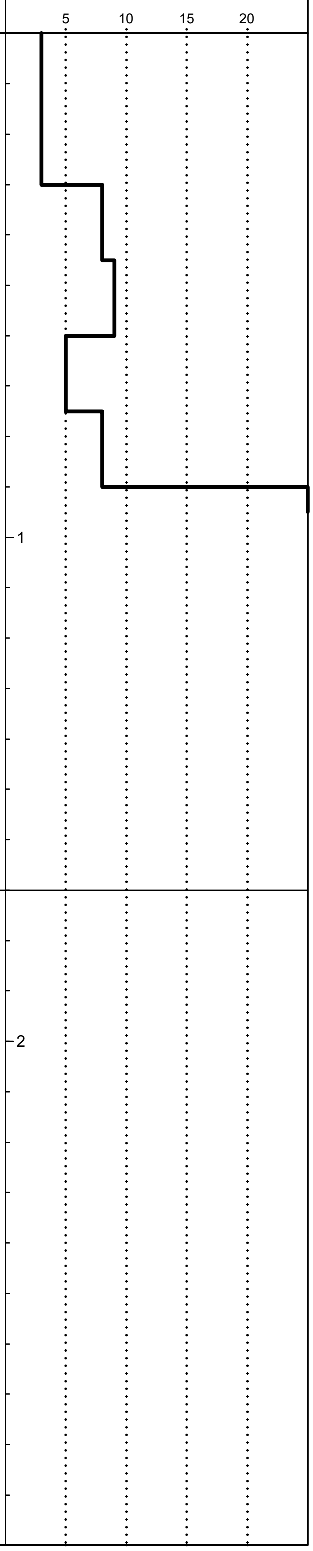
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 8.92 AHD
EASTING: 362205.4
NORTHING: 6372351.407

PIT No: 112
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Results & Comments
0.0	SILT (ML) - Low plasticity, brown, trace rootlets, W<PL	D, E	0.05	
0.3	CLAY (CH) - High plasticity, orange-brown, mottled red/grey, trace rootlets, W<PL, hard	D, E	0.5	pp >400
	From 0.8m, trace fine to medium sandstone gravels	D	0.9	pp >400
1.0	SANDSTONE - Fine to medium grained, intermixed pale grey / brown, extremely weathered	D	1.5	
1.7	Pit discontinued at 1.7m, machine refusal on rock			

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

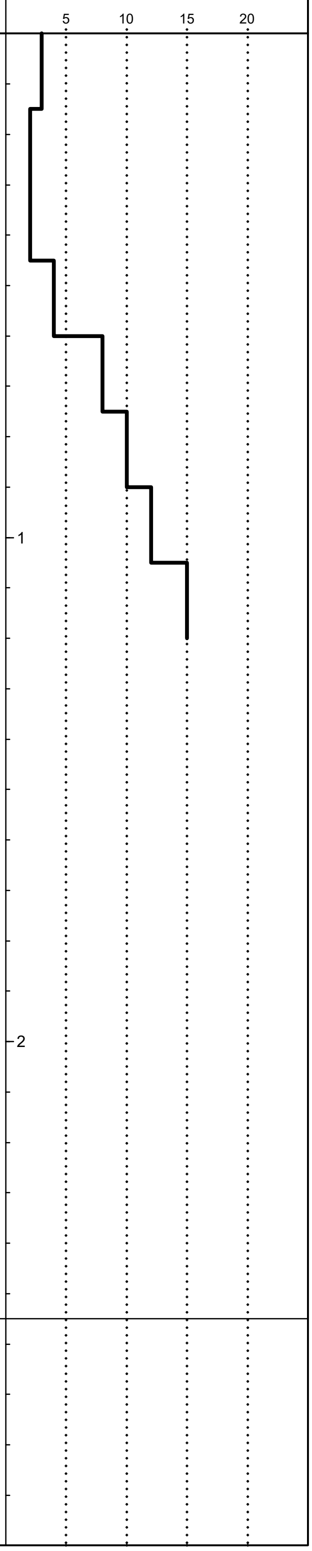
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 1.56 AHD
EASTING: 362278.3
NORTHING: 6372348.656

PIT No: 113
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		CLAY (CH) - High plasticity, grey mottled brown, trace rootlets, W>PL		D, E	0.05			
				D, E	0.5		pp = 350-400	
1								
	1			D	1.0		pp >400	
				U_{50}				
				B				
					1.3			
				D	1.5		pp = 150-200	
0								
	2			D	2.0		pp = 150-200	▷
				D	2.5		pp = 100-150	
-1	2.55	Pit discontinued at 2.55m, limit of investigation						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: Seepage at 2.0m

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

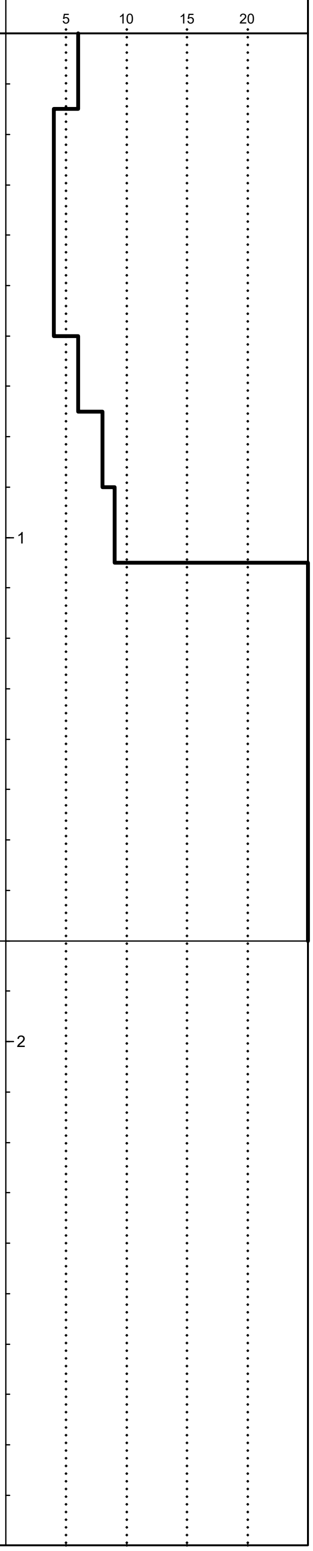
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 31.1 AHD
EASTING: 362022.4
NORTHING: 6372433.497

PIT No: 114
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
31		SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05		PID<1	
	0.15	CLAY (CH) - High plasticity, orange-brown, mottled red/grey, trace rootlets, W<PL, hard		D, E	0.5		pp = 300-400 PID<1	
	1			D	1.0		pp = 350-400	
30		From 1.2m, grading to rock		B				
	1.4	SANDSTONE - Fine to medium grained, pale brown mottled grey, extremely weathered			1.4			
				D	1.5		PID<1	
	1.8	Pit discontinued at 1.8m, machine refusal on rock						
	2							
29								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

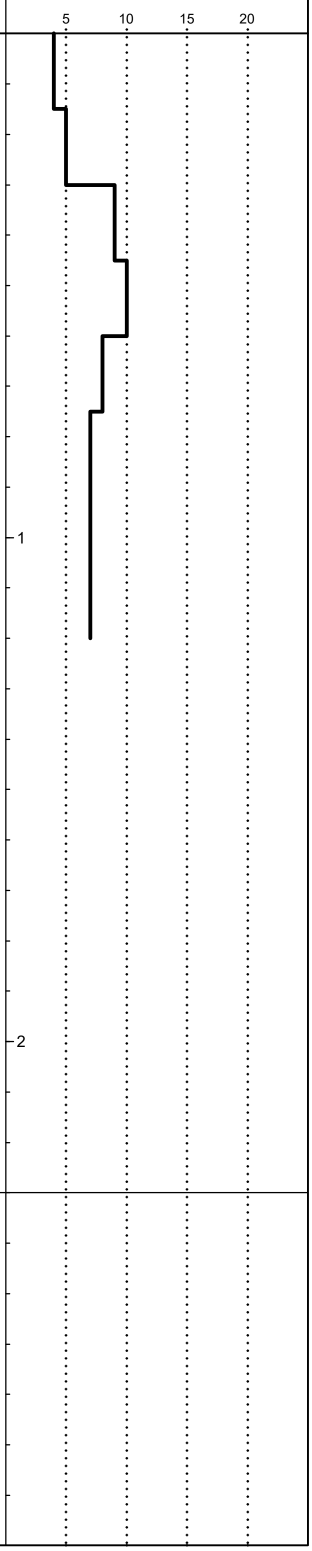
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 28.09 AHD
EASTING: 362192.1
NORTHING: 6372474.77

PIT No: 116
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
28		SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05		PID<1	
	0.3	CLAY (CH) - High plasticity, orange-brown, mottled red/grey, trace rootlets, W<PL, hard, trace fine rounded gravel (natural)			0.45			
				D, E	0.5		pp >400	
				U_{50}				
					0.69			
27	1			D	1.0		pp >400	
	1.4	SANDSTONE - Fine to medium grained, pale brown - grey, extremely weathered		D	1.5			
26	2							
	2.3	Pit discontinued at 2.3m, machine refusal on rock						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

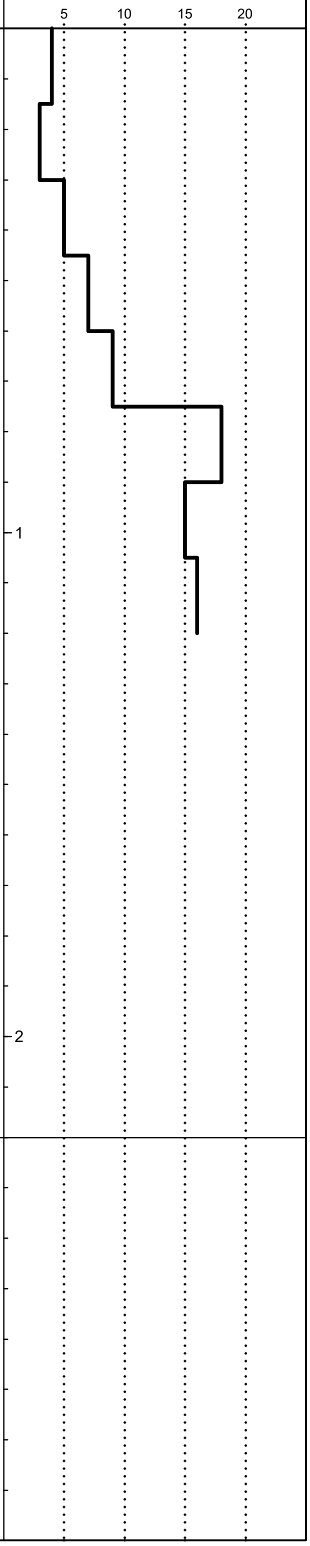
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 26.63 AHD
EASTING: 362250.8
NORTHING: 6372528.885

PIT No: 117
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05			
	0.35	CLAY (CI) - Medium plasticity, orange-brown mottled red, trace rootlets, fine rounded gravels (natural), W<PL, very stiff to hard		D, E	0.5		pp >400	
26								
	1			D	1.0		pp = 300	
	1.3	SANDSTONE - Fine to medium grained, pale brown-grey, extremely weathered		D	1.5			
25								
	2			D	2.0			
	2.2	Pit discontinued at 2.2m, machine refusal on rock						
24								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

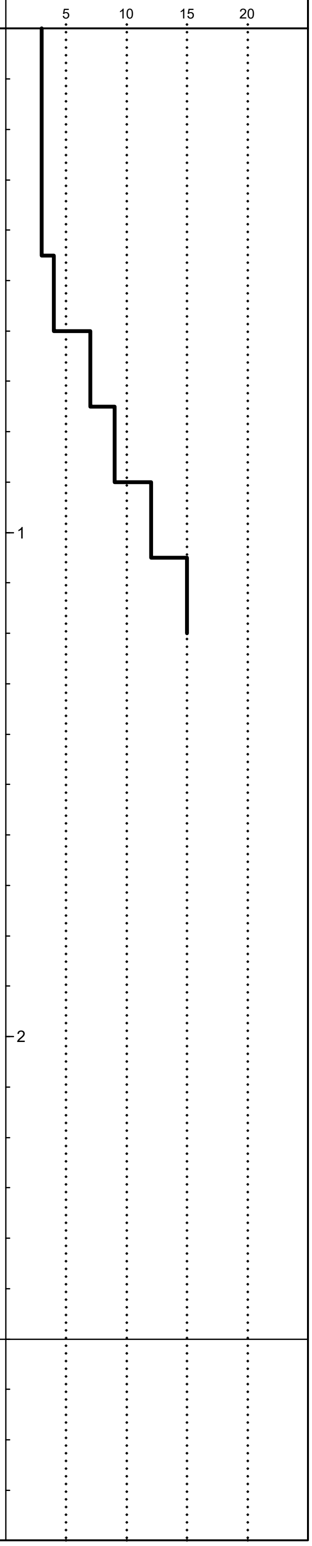
TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 1.56 AHD
EASTING: 362341.6
NORTHING: 6372499.993

PIT No: 118
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		CLAY (CH) - High plasticity, grey mottled brown, trace rootlets, W>PL		D, E	0.05				
					0.2		pp >400		
1				D, E	0.5		pp = 300-400		
	1			D	1.0		pp = 150-200		
0				D	1.5		pp = 150		
	2			D	2.0		pp = 150		
-1				D	2.5		pp = 100-150		
	2.6	Pit discontinued at 2.6m, limit of investigation							



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: Seepage at 2.4m

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

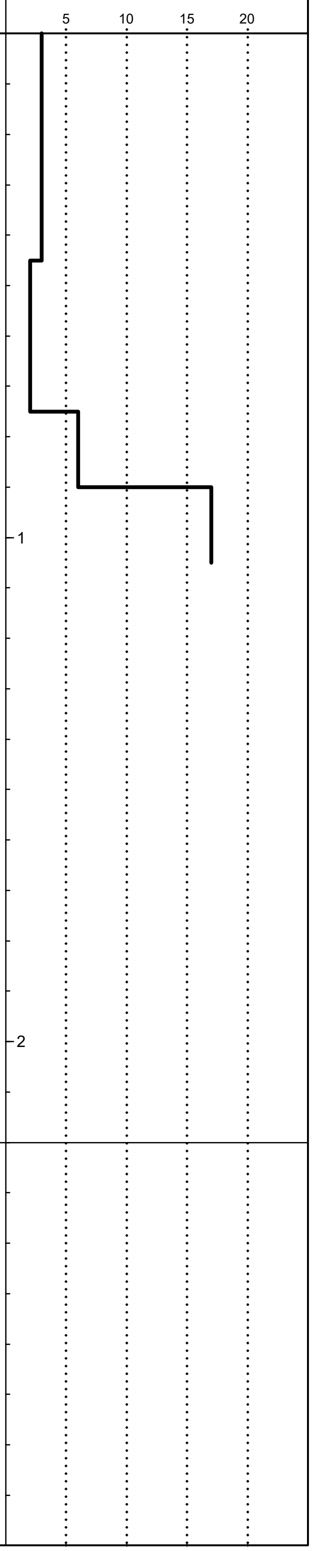
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 33.41 AHD
EASTING: 362022
NORTHING: 6372554.488

PIT No: 119
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments
0.0	Sandy SILT (ML) : Low plasticity brown, trace rootlets, W<PL	D	0.0–0.1	E	PID<1
0.15	Silty CLAY (CL) : Low plasticity brown, trace rootlets, fine to medium grained subangular to subrounded gravel, trace charcoal, W<PL	D	0.3	E	PID<1
		D	0.5	E	PID<1
0.8	CLAY (CH) : High plasticity pale brown/grey, mottled orange, trace rootlets	D	1.0	E	PID<1
		B	0.8–1.9		
	From 1.5m, mottled red, trace fine to medium grained subangular to subrounded gravel, W>PL				
1.9	CLAY (CH) : High plasticity , grey mottled red/orange, trace rootlets, W<PL				
2.2	Pit discontinued at 2.2m, limit of investigation				

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Gilmour **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

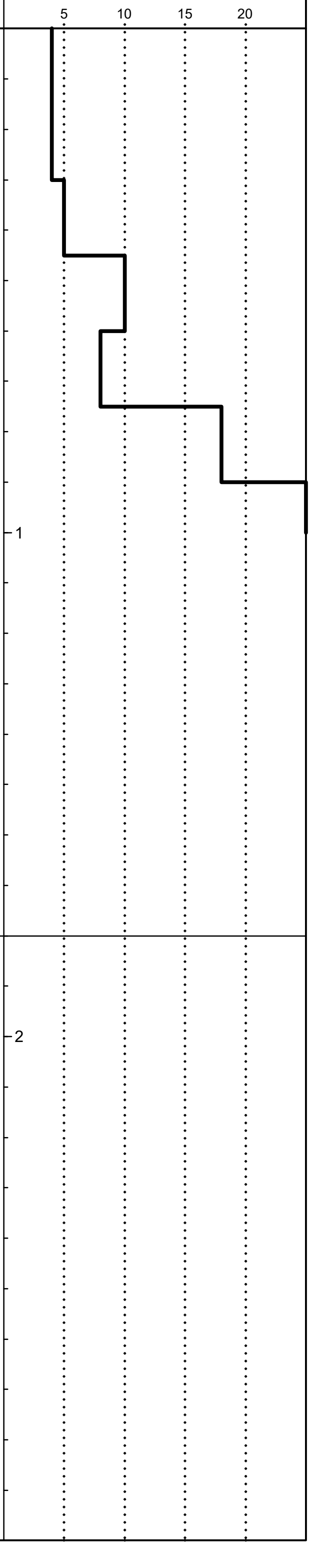
TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: --
EASTING: 362227.4
NORTHING: 6372584.376

PIT No: 120
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
		SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D, E	0.05		PID<1		
	0.3	CLAY (CI) - Medium plasticity, orange-brown mottled red, trace rootlets, fine rounded gravels (natural), W<PL, very stiff		D, E	0.5		pp = 300-400 PID<1		
	1			D	1.0		pp = 300-400 PID<1		
	1.2	SANDSTONE - Fine to medium grained, pale brown-grey, extremely weathered		D	1.5		PID<1		
	1.8	Pit discontinued at 1.8m, machine refusal on rock							
	2								



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 40.65 AHD
EASTING: 362165
NORTHING: 6372635.335

PIT No: 121
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		Silty SAND (SP) : Fine to medium grained dark brown, trace subangular to subrounded gravels (crushed natural rock), moist		D	0.0–0.1	E	PID<1		
				D	0.3	E	PID<1		
	0.4	CLAY (CL) : Low plasticity, red/orange, mottled grey, W<PL		D	0.5	E	PID<1		
40									
	1								1
	1.4	SANDSTONE : Fine to medium grained, light brown, very low strength, extremely weathered							
39									
	2 2.0	Pit discontinued at 2.0m, limit of investigation							2
38									

RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

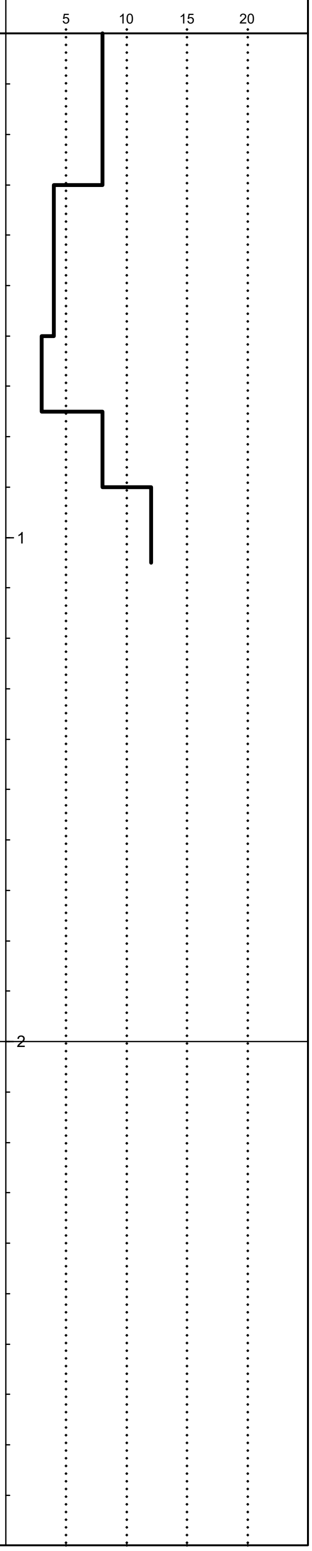
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 34.30 AHD
EASTING: 362063.6
NORTHING: 6372656.295

PIT No: 122
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
	0.0	Sandy SILT (ML) : Low plasticity, brown, trace fine grained subangular to subrounded gravels, rootlets, W<PL		D	0.0 – 0.1	E	PID<1	
34	0.2	FILL / Gravelly SAND (SA) : Fine to medium grained, poorly graded, fine to coarse grained gravels (natural), grey, moist		D	0.3	E	PID<1	
	0.4	CLAY (CH) : High plasticity, brown mottled red/orange, trace fine to coarse grained subangular to subrounded graves, rootlets, W≤PL		D	0.5	E	PID<1	
	1			D	1.0	E	PID<1	
33								
	1.6	CLAY (CH) : High plasticity, grey mottled red/orange, trace rootlets, W<PL						
	2 / 2.0	Pit discontinued at 2.0m, limit of investigation						
32								

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

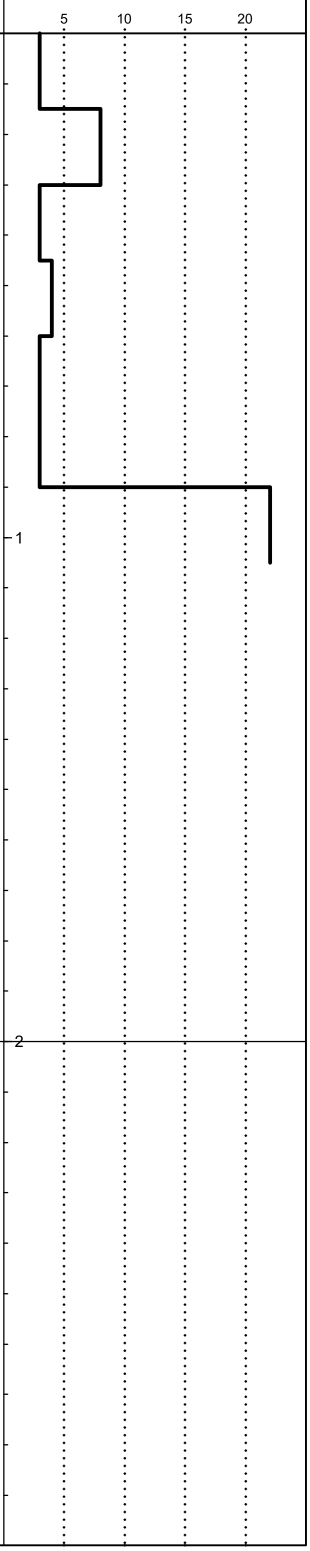
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 36.32 AHD
EASTING: 362113.2
NORTHING: 6372722.943

PIT No: 123
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
	Sandy SILT (ML) : Low plasticity, dark brown, trace fine grained subrounded gravel, rootlets, W<PL	D	0.0–0.1	E	PID<1	
0.2	Sandy CLAY (CH) : High plasticity, grey mottled orange, trace rootlets, W>PL	D	0.3	E	PID<1	
0.4	CLAY (CH) : High plasticity, grey mottled orange/ref, trace fine grained subangular to subrounded gravels, W<PL	D	0.5	E	PID<1	
		B	0.4–0.9			
0.9	SAND / SANDSTONE : Fine to medium grained, pale brown, extremely weathered	D	1.0	E	PID<1	
2.0	Pit discontinued at 2.0m, limit of investigation					

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

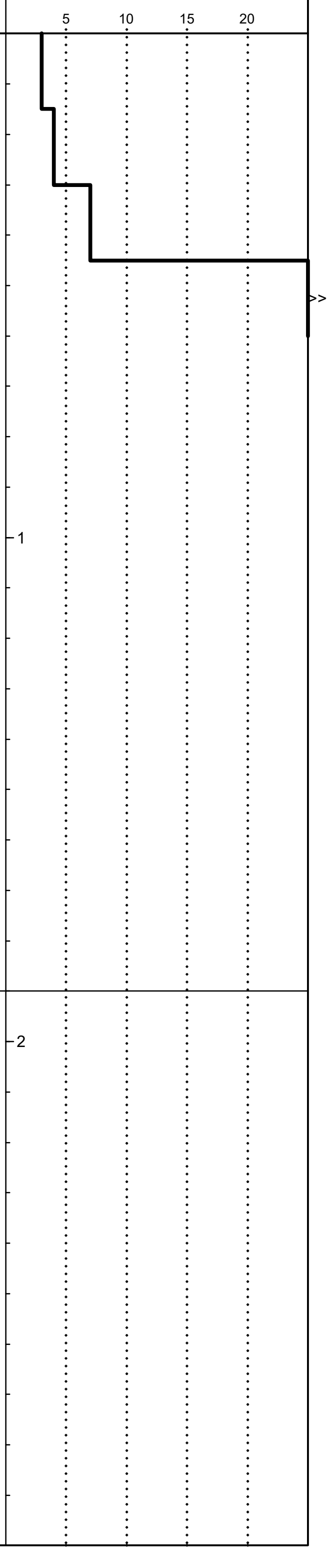
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 42.70 AHD
EASTING: 362255.8
NORTHING: 6372661.959

PIT No: 124
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
		Sandy SILT (ML) : Low plasticity, dark brown, trace rootlets, W<PL		D	0.0 – 0.1	E	PID<1	
	0.1	Silty CLAY (CL) : Low plasticity, brown, trace carbonaceous lenses, W<PL		D	0.3	E	PID<1	
	0.35	CLAY (CL) : Low plasticity, red, trace fine to medium grained subangular to subrounded gravels, W<PL		D	0.5	E	PID<1	
42				U_{50}	0.5 – 0.75			
	0.8	SAND / SANDSTONE : Fine to medium grained, pale brown, extremely weathered		D	1.0	E	PID<1	
41	1							
	1.9	Pit discontinued at 1.9m, limit of investigation						
40	2							

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

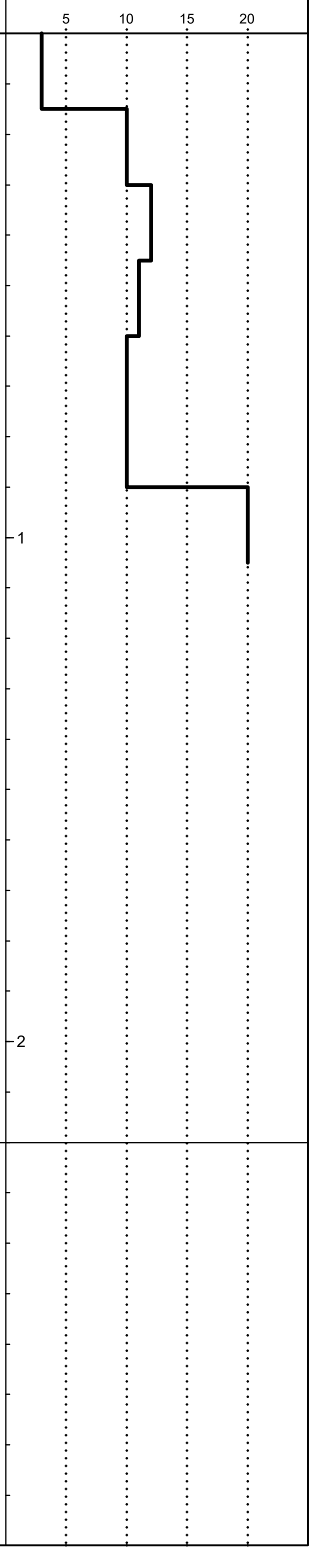
SURFACE LEVEL: 42.69 AHD
EASTING: 362228.4
NORTHING: 6372628.513

PIT No: 125
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments
0.0	Sandy SILT (ML) : Low plasticity, dark brown, trace rootlets, W<PL	D	0.0 – 0.1		PID<1
0.15	CLAY (CL) : Low plasticity, dark brown, trace fine to medium grained subangular to subrounded gravels, W<PL				
0.3	CLAY (CL) : Low plasticity, brown/red, trace subangular to subrounded fine to medium grained gravels, W<PL	D	0.3		PID<1
		B	0.4 – 0.5		
0.5	SAND / SANDSTONE : Fine to medium grained pale brown, extremely weathered	D	0.5		PID<1
		B	0.8 – 1.0		
2.2	Pit discontinued at 2.2m, limit of investigation				

RL: 42, 41, 40

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

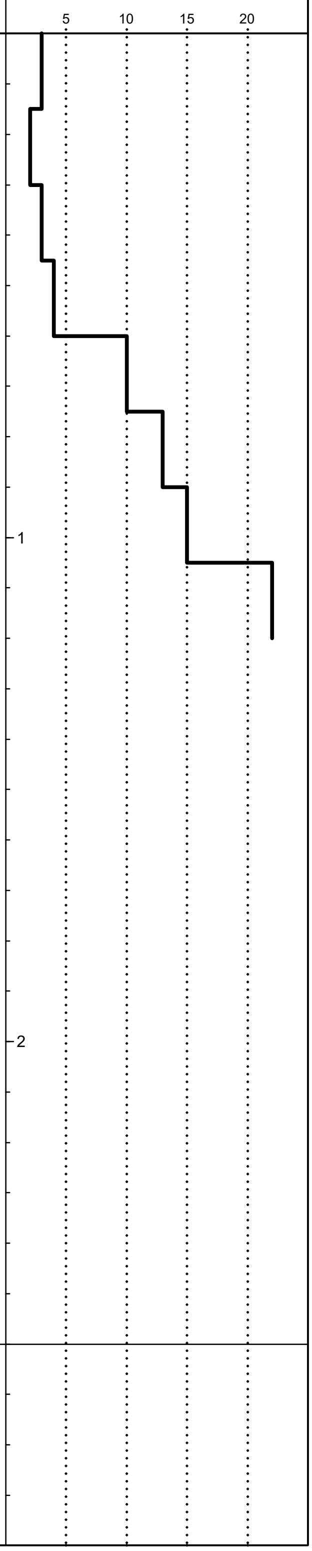
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: --
EASTING: 362390.2
NORTHING: 6372669.217

PIT No: 126
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
		CLAY (CH) - High plasticity, grey mottled brown, trace rootlets, W>PL		D, E	0.05			
					0.2		pp >400	
				D, E	0.5		pp = 300-400	
				B				
	1			D	1.0		pp = 150-200	
				D	1.5		pp = 100-150	
	1.9	SILTY CLAY (CH) - High plasticity, grey mottled brown, trace rootlets, W>WP						
	2			D	2.0		pp = 50-60	
				D	2.5		pp = 50-60	28-01-22
	2.6	Pit discontinued at 2.6m, limit of investigation						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Kramer **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: Free groundwater observed at 2.5m

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

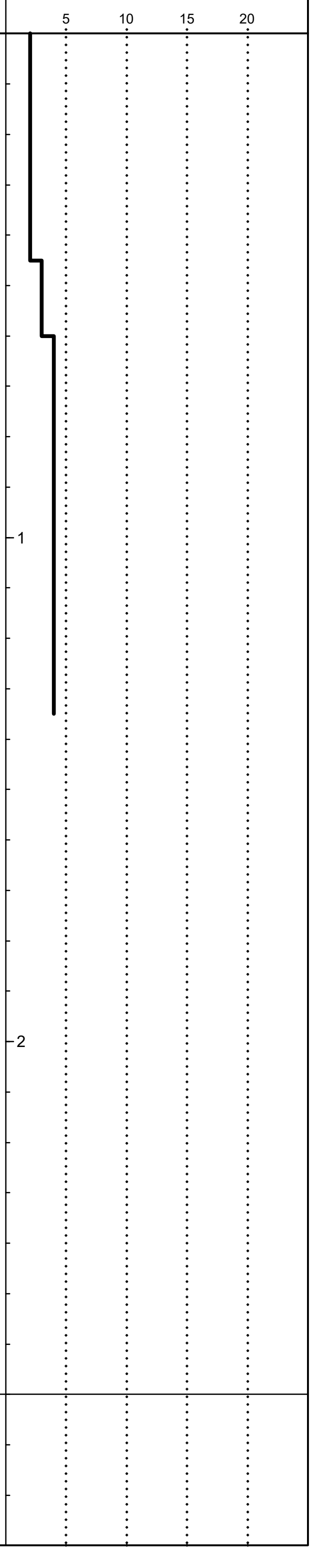
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 32.64 AHD
EASTING: 362047.6
NORTHING: 6372758.737

PIT No: 127
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments	Water
		Sandy SILT (ML) : Low plasticity dark brown, trace rootlets, fine grained subangular to subrounded gravels, W<PL	D	0.01	E	PID<1	
	0.25	CLAY (CH) : High plasticity, dark brown mottled pale brown, trace rootlets, fine to medium grained subangular to subrounded gravels, W<PL	D	0.3	E	PID<1	
32	0.6	CLAY (CH) : High plasticity, dark brown mottled red/orange, trace rootlets, fine to coarse grained subangular to subrounded W>PL		0.6			
	1		D	1.0	E	PID<1	
			B		E		
31	1.7	CLAY (CH) : High plasticity, grey/red, trace rootlets, fine to medium grained subangular to subrounded, W<PL		1.7			
	2		D	2.0	E	PID<1	
	2.4	CLAY (CH) : High plasticity, grey mottled red, trace rootlets, fine to medium grained subangular to subrounded W<PL					
30	2.7	Pit discontinued at 2.7m, limit of investigation					

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Gilmour
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 40.65 AHD
EASTING: 362182
NORTHING: 6372795.326

PIT No: 128
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
		SANDY SILT (ML) - Low plasticity, dark brown, trace, fine to medium grained subangular to subrounded gravels, rootlets, W<PL	D	0.0–0.1	E	PID<1	
	0.1	SANDY CLAY (CL) - Low plasticity, grey-brown, trace fine to medium grained subangular to subrouded gravels, W<PL	D	0.3	E	PID<1	
	0.4	CLAY (CH) - High plasticity, orange mottled red-grey, trace fine to medium grained subangular to subrounded gravels, trace rootlets, W<PL	D	0.4–0.5	E	PID<1	
40			B				
	1		D	1.0–1.3	E	PID<1	
39	1.3	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered					
	2						
38	2.4	Pit discontinued at 2.4m, limit of investigation					

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: Yanmar 8t Excavator 600mm bucket with teeth **LOGGED:** Helbig **SURVEY DATUM:** MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 38.93 AHD
EASTING: 362148
NORTHING: 6372704.037

PIT No: 129
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments
0.0–0.1	SANDY SILT (ML) - Low plasticity, dark brown, trace fine to medium grained subangular / subrounded gravels, W<PL	D	0.0–0.1	E	PID<1
0.1–0.35	SANDY CLAY (CL) - Low plasticity, brown, mottled dark grey-orange, trace fine to medium subangular to subrounded gravels, rootlets, W<PL	D	0.3–0.35	E	PID<1
0.35–1.2	CLAY (CH) - High plasticity, red mottled grey-orange, trace subrounded fine grained gravels, rootlets, W<PL	D	0.5	E	PID<1
	From 0.6m, orange mottled red-grey, trace fine to medium grained sand	B			
		D	1.0	E	PID<1
1.2–2.2	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered		1.2		
2.2	Pit discontinued at 2.2m, limit of investigation				

RL: 38, 37, 36

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

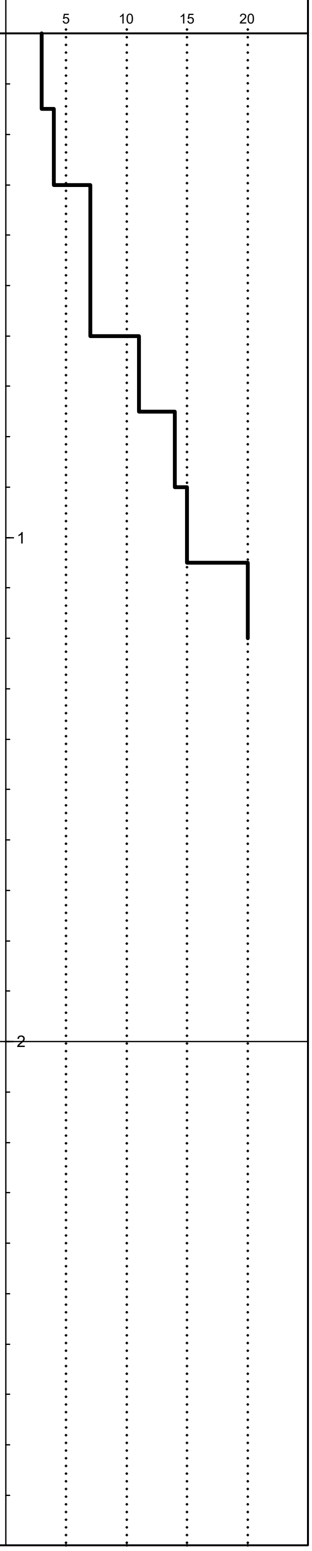
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 45.12 AHD
EASTING: 362257.3
NORTHING: 6372727.062

PIT No: 130
PROJECT No: 204921.00
DATE: 7/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
45		SANDY SILT (ML) - Low plasticity, dark brown, trace rootlets, W<PL	D	0.1	E	PID<1	
	0.15	SILT (ML) - Low plasticity, dark brown, W<PL	D	0.3	E	PID<1	
	0.4	CLAY (CL) - Low plasticty, brown-orange, W<PL	D	0.5	E	PID<1	
			B	0.8			
44	0.7	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered					
43	2.0	Pit discontinued at 2.0m, limit of investigation					

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

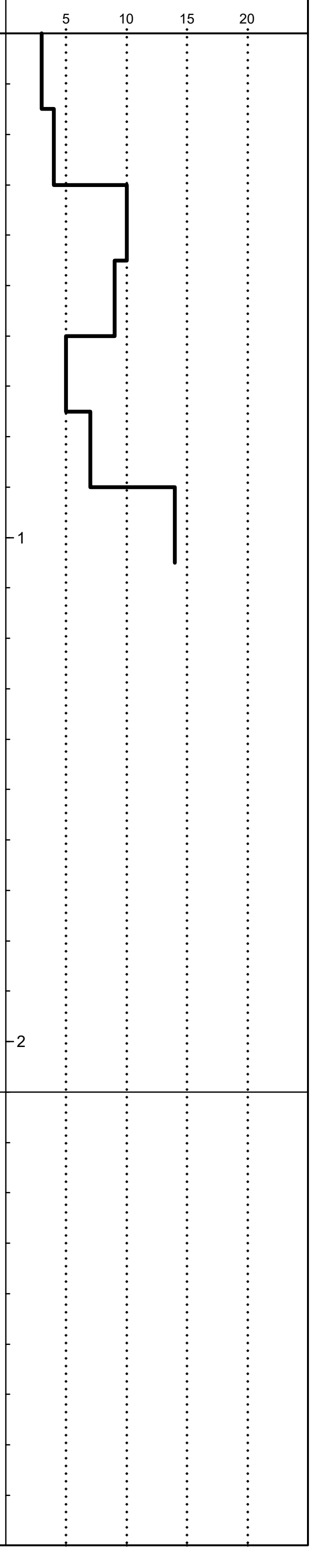
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 46.35 AHD
EASTING: 362289.3
NORTHING: 6372781.891

PIT No: 131
PROJECT No: 204921.00
DATE: 7/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water
		SANDY SILT (ML) - Low plasticity, brown, trace fine to medium grained subangular to subrounded gravels, rootlets, W<PL		D	0.0–0.1	E	PID<1	
46	0.25	CLAY (CL) - Low plasticity, red-orange mottled brown, trace rootlets, W<PL		D	0.3	E	PID<1	
				D	0.5	E	PID<1	
				B	0.5–0.6			
45	0.6	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered						
44	2.1	Pit discontinued at 2.1m, limit of investigation						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

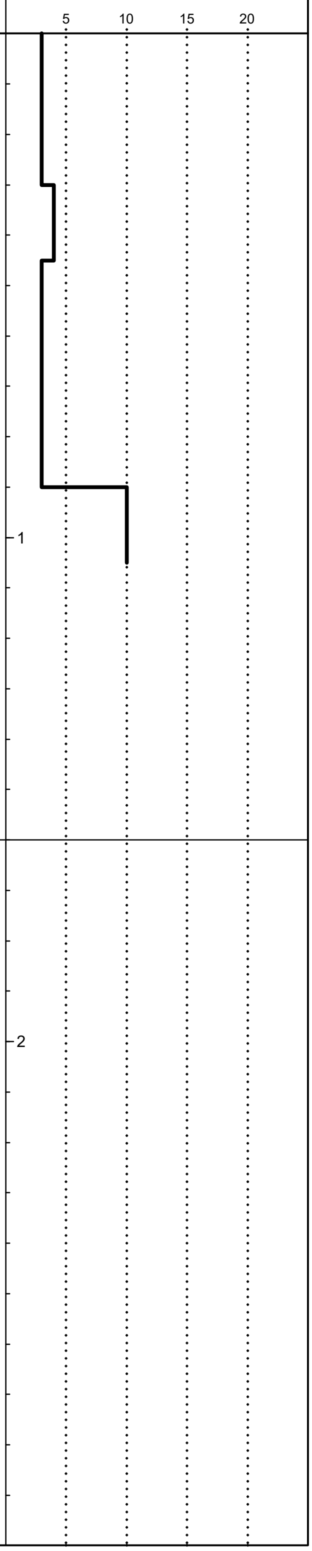
SURFACE LEVEL: 42.47 AHD
EASTING: 362208
NORTHING: 6372865.873

PIT No: 132
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments
0.0	SANDY SILT (ML) - Low plasticity, brown, trace fine to medium grained subrounded gravel, rootlets, W<PL	D	0.0 – 0.1	E	PID<1
0.1	SANDY CLAY (CL) - Low plasticity, brown, trace fine to coarse grained subrounded gravel, rootlets, W<PL				
0.3	CLAY (CH) - High plasticity, red mottled pale brown, trace rootlets, W<PL	D	0.3	E	PID<1
		D	0.5	E	PID<1
0.8	CLAY (CH) - High plasticity, grey mottled orange, trace fine to medium grained sand, W<PL	D	1.0	E	PID<1
1.6	Pit discontinued at 1.6m, limit of investigation				

RL scale: 42, 41, 40

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

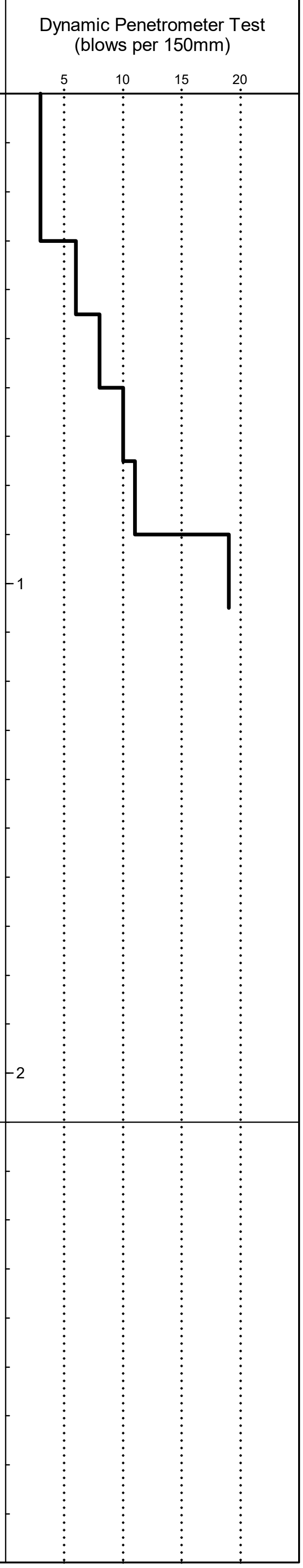
TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 46.14 AHD
EASTING: 362298.7
NORTHING: 6372855.269

PIT No: 133
PROJECT No: 204921.00
DATE: 8/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
46	0.0	SANDY SILT (ML) - Low plasticity, dark brown, trace fine grained subangular to subrounded gravels, W<PL	D	0.0 0.01	E	PID<1	
			D	0.3	E	PID<1	
	0.4	CLAY (CL) - Low plasticity, brown-red, trace fine grained subangular to subrounded gravels, rootlets, W<PL		0.4			
			D	0.5	E	PID<1	
			B				
	0.8	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered		0.8			
45	1		D	1.0	E	PID<1	
44	2.1	Pit discontinued at 2.1m, limit of investigation					



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 44.75 AHD
EASTING: 362349.2
NORTHING: 6372866.331

PIT No: 134
PROJECT No: 204921.00
DATE: 7/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments
0.0	SANDY SILT (ML) - Low plasticity, brown, trace fine to medium grained subangular to subrounded gravels, rootlets, W<PL	D	0.0–0.1	E	PID<1
		D	0.3	E	PID<1
0.4	CLAY (CL) - Low plasticity, orange mottled red, trace fine to medium grained subangular to subrounded gravel, rootlets, W<PL	B, D	0.4–0.6 (0.5)	E	PID<1
0.6	SAND / SANDSTONE - Fine to medium grained pale brown, low strength				
0.7	SANDSTONE - Fine to medium grained, white to pale brown, moderately weathered				
0.8	Pit discontinued at 0.8m, refusal				

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RL: 44, 43, 42

RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

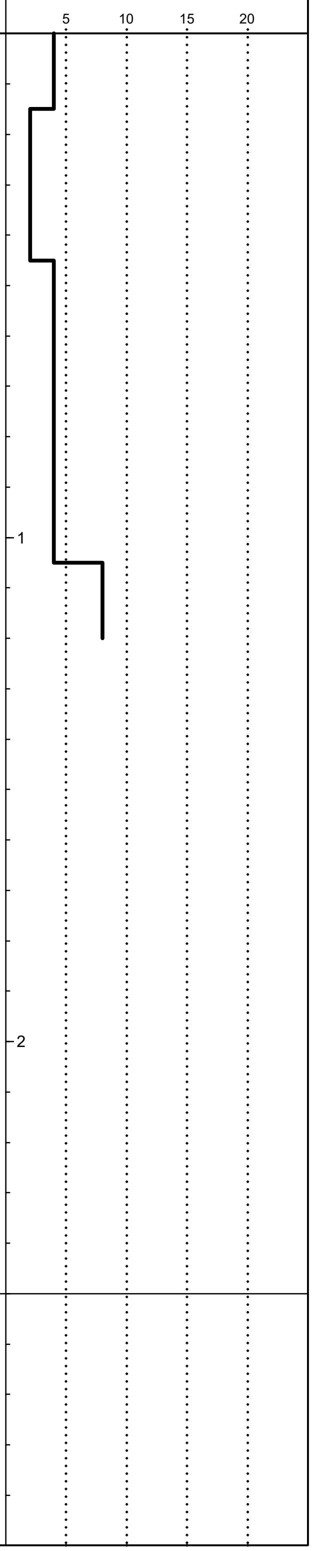
SURFACE LEVEL: 1.94 AHD
EASTING: 362475.3
NORTHING: 6372871

PIT No: 135
PROJECT No: 204921.00
DATE: 28/1/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Type	Depth	Sample	Results & Comments	Water
	CLAY (CH) - High plasticity, grey mottled brown, trace rootlets, W>PL	D, E	0.05		PID<1	
			0.2		pp >400	
		D, E	0.5		pp = 300 PID<1	
		U_{50}				
			0.94			
1		D	1.0		pp = 250-280	
		D	1.5		pp = 150-160	
2		D	2.0		pp = 100	
2.2	SILTY CLAY (CH) - High plasticity, grey mottled brown, trace rootlets, W>WP	D	2.3		pp = 90	▷ (2.2)
2.5	Pit discontinued at 2.5m, limit of investigation					

RL: 1, 0, -1

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Kramer
SURVEY DATUM: MGA94

WATER OBSERVATIONS: Seepage at 2.2m

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

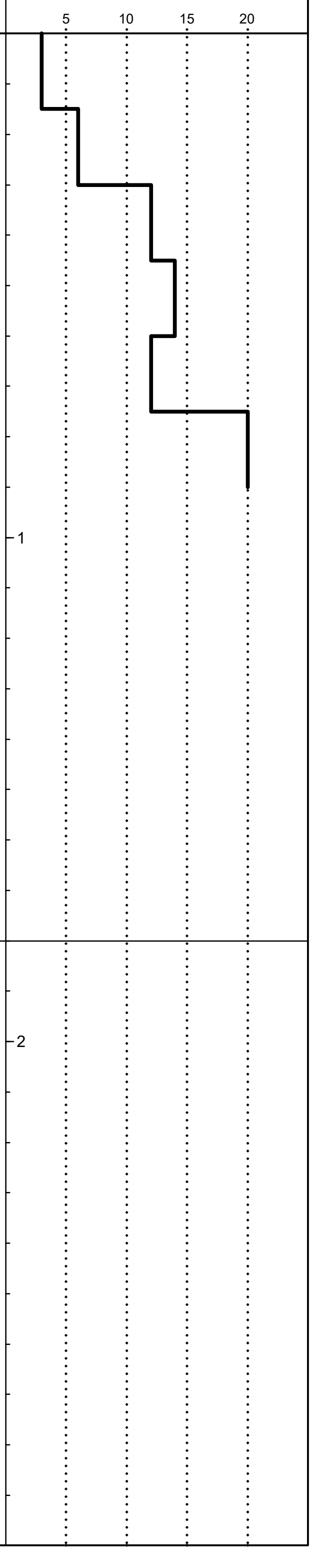
SURFACE LEVEL: 40.85 AHD
EASTING: 362309.6
NORTHING: 6372920.569

PIT No: 136
PROJECT No: 204921.00
DATE: 7/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Sampling Type	Sampling Depth	Sample	Results & Comments
0.0	SANDY SILT (ML) - Low plasticity, brown, trace fine grained subangular to subrounded gravels, rootlets, W<PL	D	0.0–0.1	E	PID<1
		D	0.3	E	PID<1
0.4	CLAY (CL) - Low plasticity, brown-orange mottled red, trace rootlets, wood (natural), W<PL	D	0.5	E	PID<1
		B	0.8–1.0		
1.1	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered	D	1.2	E	PID<1
1.8	Pit discontinued at 1.8m, refusal				

RL: 40, 39, 38

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 43.61 AHD
EASTING: 362216.2
NORTHING: 6372950.377

PIT No: 137
PROJECT No: 204921.00
DATE: 7/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
		SANDY SILT (ML) - Low plasticity, brown, trace rootlets, W<PL		D	0.0 – 0.1	E	PID<1		
				D	0.3	E	PID<1		
	0.4	CLAY (CH) - High plasticity, pale brown mottled orange, trace rootlets, W>PL		D	0.5	E	PID<1		
43				B	0.5 – 0.8				
	1								
	1.2	SAND / SANDSTONE - Fine to medium grained pale brown, extremely weathered		D	1.5	E	PID<1		
42									
	2								
	2.1	Pit discontinued at 2.1m, limit of investigation							
41									

RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

TEST PIT LOG

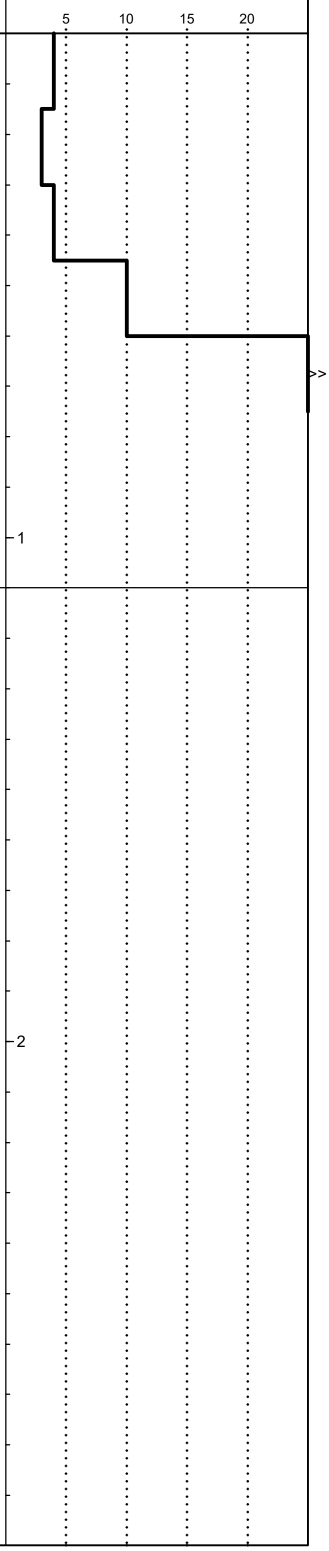
CLIENT: Walker Gillieston Heights Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

SURFACE LEVEL: 32.25 AHD
EASTING: 362327.7
NORTHING: 6372964.25

PIT No: 138
PROJECT No: 204921.00
DATE: 7/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water
32		SANDY SILT (ML) - Low plasticity, dark brown, trace fine grained subangular to subrounded gravel, rootlets, W<PL		D	0.0–0.1	E	PID<1	
	0.3	CLAY (CH) - High plasticity, orange mottled red, trace rootlets, W ≪PL		D	0.3–0.4	E	PID<1	
				D	0.5	E	PID<1	
				U_{50}	0.5–0.75			
	0.6	SAND / SANDSTONE - Fine to medium grained pale brown, low strength						
	0.9 / 1	SANDSTONE - Fine to medium grained, white to pale brown, moderately weathered						
31 / 30	1.1 / 2	Pit discontinued at 1.1m, refusal on rock						

Dynamic Penetrometer Test (blows per 150mm)



RIG: Yanmar 8t Excavator 600mm bucket with teeth
LOGGED: Helbig
SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Walker Corporation Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

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

BORE No: 201
PROJECT No: 204921.00
DATE: 9/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling Type	Test Results & Comments
0.1	TOPSOIL / SANDY SILT (ML) - Low plasticity, brown, sand fine to medium grained, trace fine grained subangular to subrounded gravel, W<PL			
	SILTY CLAY (CH) - High plasticity clay, red-brown, trace fine to medium grained sand		S	pp >600 6,10,10 N = 20
2.1	SANDY CLAY (CL) - Brown, low plasticiity clay, sand medium to coarse with silt, extremely weathered rock		S	25/90,-,- refusal
			S	25/120,-,- refusal
5.5	SANDSTONE - Brown, fine grained with quartz clasts and pebbles, irregular bedding	5.52m: P, sh, pl, ro 5.67m: P, sh, pl, ro 5.72m: P, sh, pl, sm, 15mm 5.82m: J, 10°, pl, ro, cly inf (20mm) 6.24m: J, 5°, pl, ro, cly inf, fe 6.27m: P, sh, pl, sm 6.31m: P, sh, pl, ro 6.37m: P, sh, pl, ro 6.45m: DB 6.53m: J, 15°, ir, ro 6.66m: P, sh, pl, ro	S	25/40,-,- refusal
7.0	Bore discontinued at 7.0m, limit of investigation			

RIG: Truck-mounted drilling rig **DRILLER:** Campbell **LOGGED:** Keogh / Helbig **CASING:** HQ to 0.7m
TYPE OF BORING: Solid flight auger to 5.55m, NMLC coring to 7.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Walker Corporation Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

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

BORE No: 202
PROJECT No: 204921.00
DATE: 9/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Discontinuities	Type	Core Rec. %	RQD %	Test Results & Comments
0.1	TOPSOIL - Silty sand, dark brown					
0.4	CLAY (CH) - High plasticity clay, orange-brown, M<PL, very stiff, residual					
2.5	SANDY CLAY (CL) - Low plasticity, pale brown, sand medium to coarse with silt, W<PL		S			14,18,18 N = 36
5.7	SANDSTONE - Pale brown, fine to medium grained, quartz clasts	2.55m: fg 2.72m: P, sh, pl, ro 2.76m: P, sh, pl, ro 2.86m: P, sh, pl, ro 2.91m: P, sh, pl, ro 2.94m: P, sh, pl, ro 2.96m to 3.11m, soil 3.17m: P, sh, pl, sm 3.4m: P, sh, pl, ro 3.48m: J, 10°, pl, ro 3.6m: P, sh, pl, ro 3.65m: HB 3.72m: J, 15°, pl, ro 3.75m: cs, sh, pl, ro, inf (40) 3.86m: P, sh, pl, ro 4.35m: P, sh, pl, ro 4.6m: P, sh, pl, ro (cly inf (2) 4.73m: P, sh, pl, ro 4.84m: P, sh, pl, ro, inf 5m: P, sh, pl, ro, cly inf 5.17m: P, sh, pl, ro, cly inf (3) 5.34m: J, 10°, ir, ro, cly infil (3) 5.5m: J, 15°, ir, cly infil	C C	100 100	44 81	
	Bore discontinued at 5.7m, limit of investigation					

Column headings: RL; Depth (m); Description of Strata; Degree of Weathering (EW, HW, MW, SW, FS, FR); Graphic Log; Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High); Water; Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00); Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault); Sampling & In Situ Testing.

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9

RIG: Truck-mounted drilling rig **DRILLER:** Campbell **LOGGED:** Keogh / Helbig **CASING:** HQ to 0.7m
TYPE OF BORING: Solid flight auger to 2.5m, NMLC coring 2.5m to 5.7m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Walker Corporation Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

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

BORE No: 203
PROJECT No: 204921.00
DATE: 9/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	TOPSOIL / SANDY SILT (ML) - Low plasticity, brown, trace fine to medium subangular to subrounded gravel, W<PL										
		CLAY (CH) - High plasticity, orange mottled grey-red, W<PL										
	1.0	CLAY (CH) - High plasticity, grey mottled red-orange, W<PL							S			pp = 500600 4,6,10 N = 16
	2.6	SANDY CLAY (CL) - Low plasticity, pale brown, sand fine to medium grained, extremely weathered rock, W<PL							S			15,25/90,- refusal
									S			25/60,-,- refusal
	5.0	Bore discontinued at 5.0m, limit of investigation										

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9

RIG: Truck-mounted drilling rig **DRILLER:** Campbell **LOGGED:** Keogh / Helbig **CASING:** HQ to 0.7m
TYPE OF BORING: Solid flight auger to 5.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Walker Corporation Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

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

BORE No: 204
PROJECT No: 204921.00
DATE: 9/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01 0.05 0.10 0.50 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	TOPSOIL / SANDY SILT - Dark brown, trace subangular to subrounded gravel										
		SILTY CLAY (CH) - High plasticity, orange-brown, W<PL										
	1								S			pp = 300 8,8,10 N = 18
	2.5	SANDY CLAY (CL) - Low plasticity, pale brown, sand medium to coarse with silt, extremely weathered rock							S			25/135,-,- refusal
	4								S			25/50,-,- refusal
	5.0	Bore discontinued at 5.0m, limit of investigation										

RIG: Truck-mounted drilling rig **DRILLER:** Campbell **LOGGED:** Keogh / Helbig **CASING:** HQ to 0.7m
TYPE OF BORING: Solid flight auger to 5.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Walker Corporation Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

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

BORE No: 206
PROJECT No: 204921.00
DATE: 10/2/2022
SHEET 1 OF 1

Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
0.2	FILL / SANDY SILT (ML) - Low plasticity, brown, trace plastic, fine to coarse grained subangular to subrounded gravel, wood, W<PL					
1.0	SILTY CLAY (CL) - Low plasticity, pale brown with fine to medium grained poorly graded sand, W<PL		S			25/100,-,- refusal
2.8	SANDY CLAY (CL) - Low plasticity, pale brown with medium to coarse grained sand, extremely weathered rock, W<PL					
7.0	SANDSTONE - Pale brown, fine to medium grained, pebbles from 4.2m, quartz clasts, irregular bedding	2.86m: P, sh, pl, ro 2.91m: P, sh, pl, ro 3.08m: P, sh, ir, ro, cly inf (3) 3.14m: P, 20°, cu, ro 3.48m: P, sh, un, ro 3.76m: P, sh, ir, ro, cly inf	C	100	54	
		3.88m: P, sh, ir, ro, cly inf 4m: P, sh, pl, ro 4.1m: P, sh, ir, ro 4.14m: P, 10°, pl, ro 4.42m: P, sh, pl, ro 4.62m: P, sh, pl, ro 4.82m: P, sh, ir, ro 4.83m: P, sh, pl, ro, cly inf	C	100	86	
	From 4.95m to 5.4m, grey	5.52m: P, sh, ir, ro, cly inf 5.76m: P, sh, ir, ro 6.13m: P, 10°, un, ro 6.25m: P, sv, un, ro 6.69m: P, sh, pl, ro 6.87m: P, sh, pl, ro	C	100	91	
	Bore discontinued at 7.0m, limit of investigation					

RIG: Truck-mounted drilling rig **DRILLER:** Campbell **LOGGED:** Keogh / Helbig **CASING:** HQ to 0.7m
TYPE OF BORING: Solid flight auger to 2.8m, NMLC coring to 7.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Walker Corporation Pty Ltd
PROJECT: Proposed Residential Subdivision
LOCATION: 527 Cessnock Road, Gillieston Heights

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

BORE No: 207
PROJECT No: 204921.00
DATE: 10/2/2022
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Degree of Weathering (EW HW MW SW FS FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01 0.05 0.10 0.50 1.00)	Discontinuities (B - Bedding J - Joint S - Shear F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.2	SANDY SILT (ML) - Low plasticity, dark brown, trace medium to coarse grained subrounded gravels, W<PL										
		CLAY (CH) - High plasticity, brown-red, W>PL										
	1								S			pp = 100 1,2,3 N = 5
	2	From 2.0m, colour red - grey mottled orange							S			pp = 250 4,6,9 N = 15
	3											
	4											
	5.0	Bore discontinued at 5.0m, limit of investigation										
	6											
	7											
	8											
	9											

RIG: Truck-mounted drilling rig **DRILLER:** Campbell **LOGGED:** Keogh / Helbig **CASING:** HQ to 0.7m
TYPE OF BORING: Solid flight auger to 5.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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Appendix C

Historical Aerial Photographs (Optional)

Appendix C
Historical Aerial Photos
527 Cessnock Road, Gillieston Heights

Figure C1: 1944 aerial photo, Lot 3 DP 71130

Figure C2: 1961 aerial photo, Lot 3 DP 71130

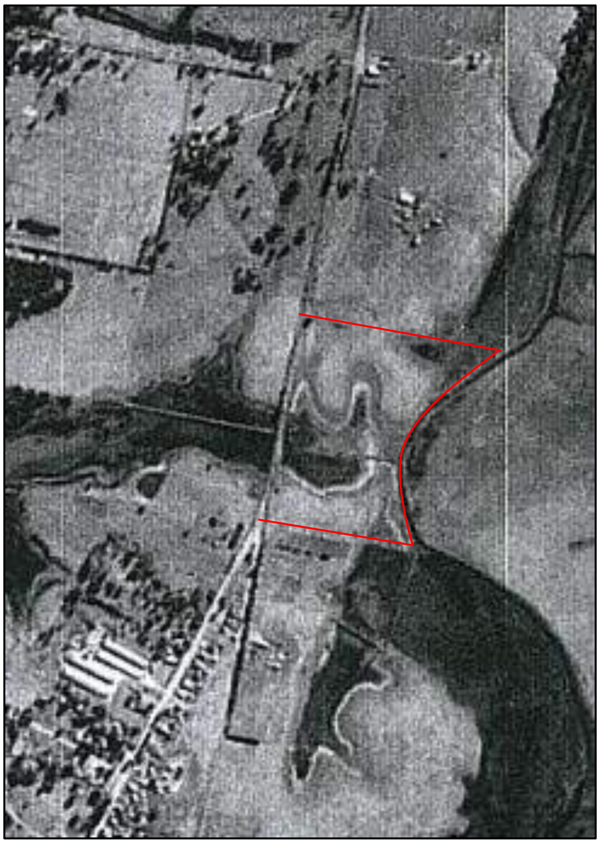


Figure C3: 1984 aerial photo, Lot 3 DP 71130

Figure C4: 2006 aerial photo, Lot 3 DP 71130

Figure C5: 2006 aerial photo, Lot 3 DP 71130

Figure C6: 2015 aerial photo, Lot 3 DP 71130

Figure C7: 2020 aerial photo, Lot 3 DP 71130

Douglas Partners Pty Ltd

Appendix D

NSW EPA Records
Historical Titles Search

Appendix D
Council and NSW EPA searches
527 Cessnock Road, Gillieston Heights

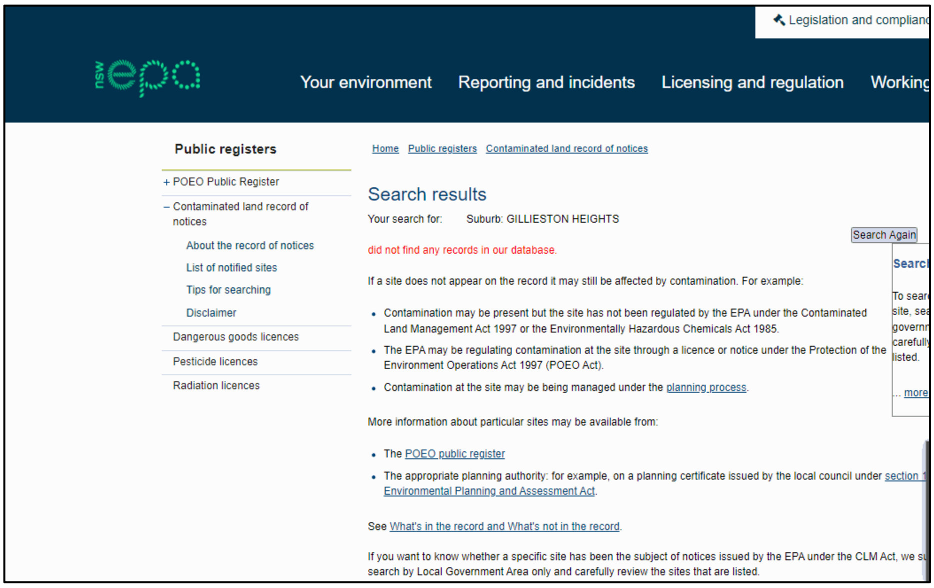


Figure D1: EPA Notices available under Section 58 of the Contaminated Lands Management Act

GERRINGONG	Gerringong Cooperative	18 Belinda STREET	Other Petroleum	Regulation under CLM Act not required	-34.74518835	150.8181054
GILGANDRA	United (Former Mobil) Service Station	13 Castlereagh STREET	Service Station	Regulation under CLM Act not required	-31.71715641	148.6581574
GILGANDRA	Former Mobil Depot	2 Federation STREET	Other Petroleum	Regulation under CLM Act not required	-31.70937362	148.6522102
GILGANDRA	Former Mobil Depot	20 Federation STREET	Other Petroleum	Regulation under CLM Act not required	-31.70771744	148.6514198
GILGANDRA	Caltex Service Station Gilgandra	6425 Newell HIGHWAY	Service Station	Regulation under CLM Act not required	-31.72545524	148.65281
GILLENBAH	Caltex (Former Mobil) Narrandera Service Station	16321 - 16335 Newell HIGHWAY	Service Station	Regulation under CLM Act not required	-34.76124219	146.5398604
GIRRAWEEN	Industrial Galvanizers Girraween	20-22 Amax AVENUE	Metal Industry	Regulation being finalised	-33.80500693	150.9396743
GIRRAWEEN	Caltex Pendle Hill Service Station Girraween	602 Great Western HIGHWAY	Service Station	Regulation under CLM Act not required	-33.80827518	150.942151

Figure D2: Sites notified to EPA under Section 60 of the CLM Act

Douglas Partners Pty Ltd

Cadastral Records Enquiry Report : Lot 3 DP 71130

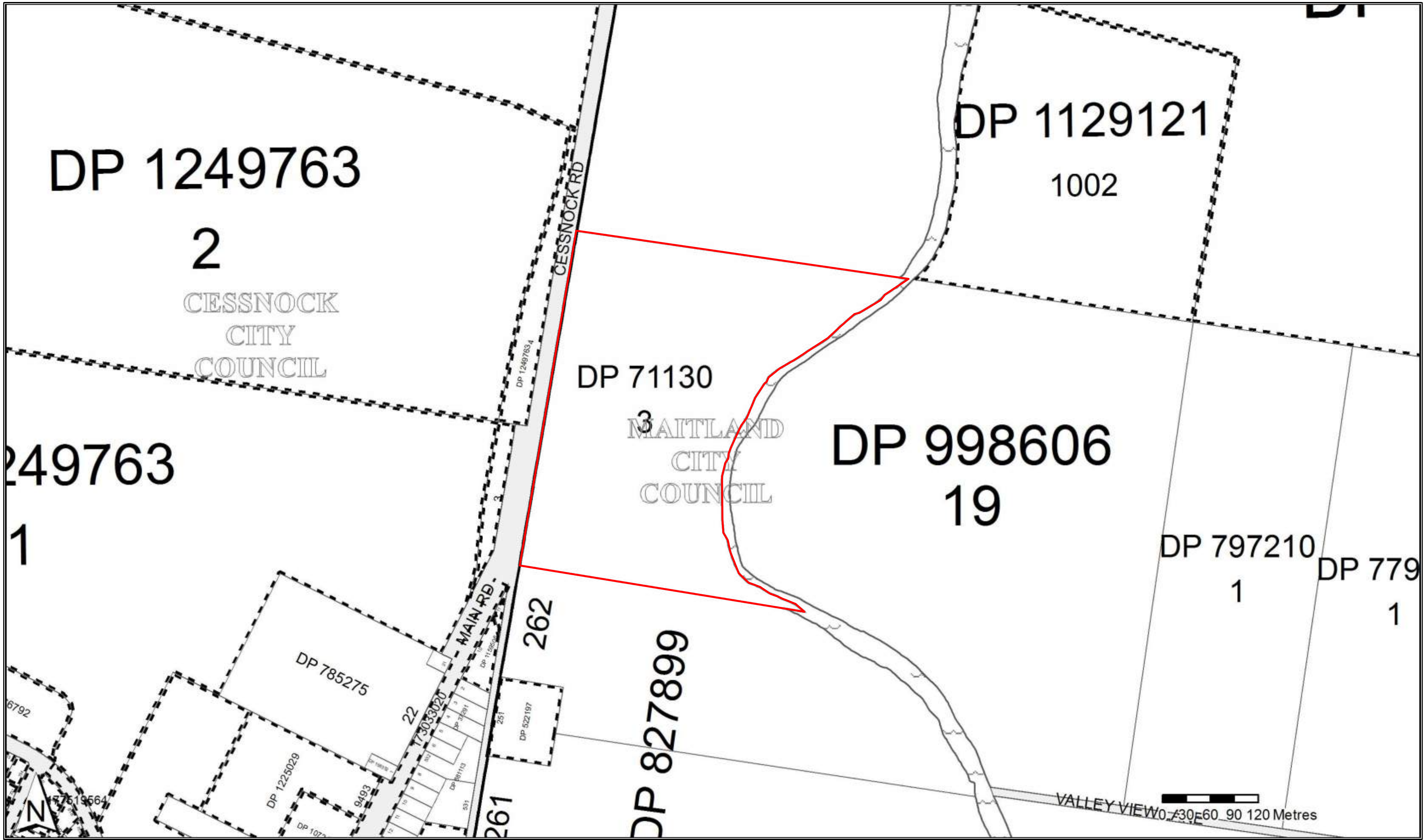
Ref : 527 Cessnock Road Gillieston Heights

Locality : GILLIESTON HEIGHTS

Parish : MAITLAND

LGA : MAITLAND

County : NORTHUMBERLAND



This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

Municipality of West Maitland
R.P.A. 21130

FP 71130
Ⓔ DP 71130
6

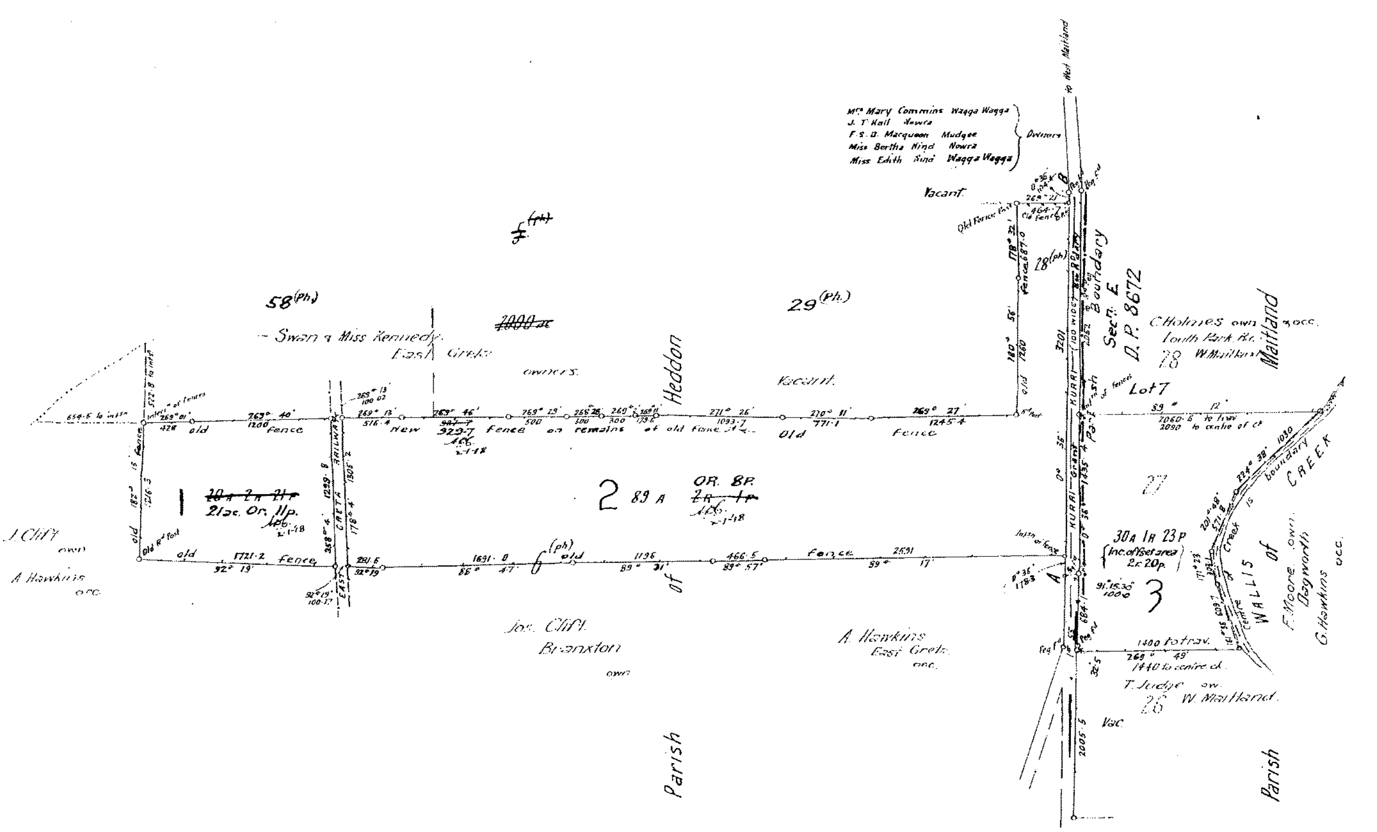
PLAN

of part of Samuel Clift's 640ac G^t Por 6^(ph) and Por 28^(ph) Lot 27 of the Dagworth Estate

Parishes of Heddon & Maitland

County of Northumberland

Scale 10 chains to an inch



I Alexander Donald Craig of Sydney Licensed Surveyor specially licensed under the Real Property Act do hereby solemnly and sincerely declare that the boundaries and measurements shown in this plan are correct for the purposes of the said Act and that the survey of the land to which the plan relates has been made under my immediate supervision, and I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act 1900

A D Craig

Licensed Surveyor

Subscribed and declared before me at Sydney this 28^th day of June AD 1917

J. Mackintosh J.P.

Datum line of Azimuth A.B.
Date of Survey May 1917.

DP 71130

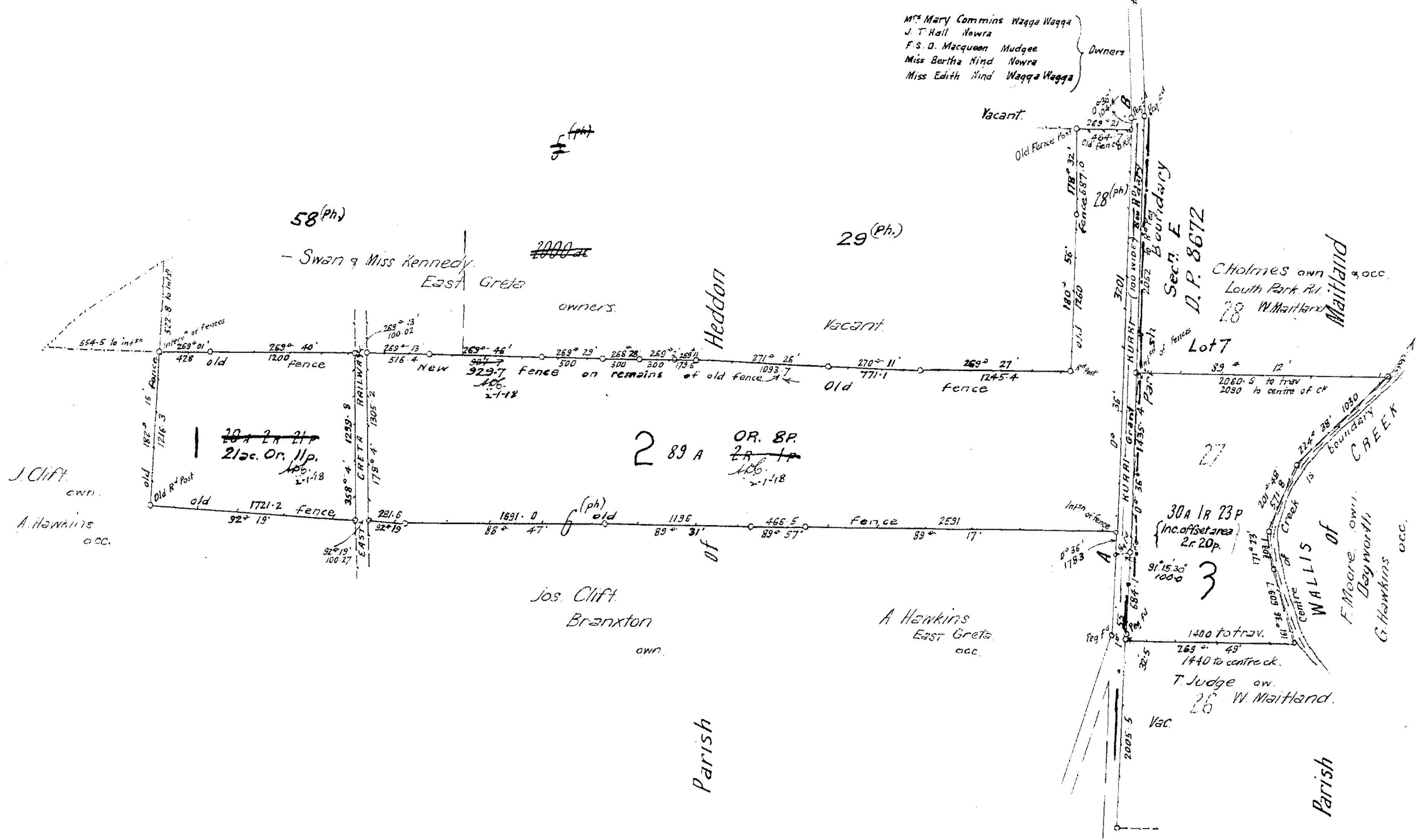
CONVERSION TABLE ADDED IN REGISTRAR GENERAL'S DEPARTMENT

LINKS	METRES
19	3.822
32.5	6.538
36	7.242
100	20.117
100.02	20.121
100.27	20.171
104.4	21.002
178.3	35.868
179.6	36.130
281.6	56.649
300	60.350
303.1	60.974
428	86.100
464.7	93.483
466.5	93.845
500	100.584
516.4	103.883
522.8	105.171
571.8	115.028
609.7	122.652
654.5	131.664
684.1	137.619
687	138.202
771.1	155.121
907.7	182.600
929.7	187.026
1030	207.203
1093.7	220.017
1196	240.597
1200	241.402
1216.3	244.681
1245.4	250.535
1260	253.472
1299.8	261.478
1305.2	262.564
1400	281.635
1435	288.676
1435.4	288.757
1691	340.175
1721.2	346.250
2005.5	403.442
2060.6	414.527
2090	420.441
2591	521.226
3201	643.939
25691	5168.207

AC RD P	SQ M
• • 8	202.3
• 2 1	2049
• 2 20	2529

AC RD P	HA
20 2 21	8.349
21 • 11	8.526
30 1 23	12.3
89 • 8	36.04
640 • •	259

D.P. 71130 (E)



Mrs Mary Commins Wagga Wagga
J. T. Hall Nowra
F. S. D. Macqueen Mudgee
Miss Bertha Hind Nowra
Miss Edith Hind Wagga Wagga
Owners
to West Maitland
Vacant
Old Fence Post
58(Ph)
Swan & Miss Kennedy
East Greta
owners
29(Ph.)
28(Ph)
Heddon
Vacant
Old Fence
New fence on remains of old fence
old fence
1
21ac. 0r. 11p.
2
89 A 0R. 8P.
EAST GRETA RAILWAY
J. Clift own
A. Hawkins occ.
Old Rd Post
6(ph)
Jos. Clift
Branxton
own
A Hawkins
East Greta
occ.
Parish of Heddon
KURRI KURRI Grant
(100 WIDE)
Parish Boundary
Secn. E
D.P. 8672
C. Holmes own & occ.
Louth Park Rd.
W. Maitland
28
Lot 7
27
2060.5 to trav
2090 to centre of ck
30A 1R 23P
(Inc. offset area 2r. 20p.)
3
Boundary is centre of Creek
WALLIS CREEK
F. Moore own
Baguorth
G. Hawkins occ.
1400 to trav.
1440 to centre ck.
T. Judge ow.
26
W. Maitland
Vac
Parish of Maitland

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

17/1/2022 2:26PM

FOLIO: 3/71130

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 5040 FOL 80

Recorded	Number	Type of Instrument	C.T. Issue
24/11/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
30/4/1990		AMENDMENT: PARISH-COUNTY	
1/5/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
14/5/1990	Y932590	DISCHARGE OF MORTGAGE	EDITION 1
16/12/2019	AP763514	TRANSMISSION APPLICATION (DEVISEE,BENEFICIARY,NEXT OF KIN)	EDITION 2
30/3/2021	AQ916413	CAVEAT	

*** END OF SEARCH ***

527 Cessnock Road Gillieston Heights PRINTED ON 17/1/2022

Received: 17/01/2022 14:25:23

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 3/71130

SEARCH DATE	TIME	EDITION NO	DATE
17/1/2022	2:25 PM	2	16/12/2019

LAND

LOT 3 IN DEPOSITED PLAN 71130
LOCAL GOVERNMENT AREA MAITLAND
PARISH OF MAITLAND COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP71130

FIRST SCHEDULE

GRAEME DENNIS VICTOR WARBY
IN 1/3 SHARE
GLORIA VALMAI HESKETH
IN 1/3 SHARE
VICTOR FRANCIS WILLIAM WARBY
IN 1/3 SHARE
AS TENANTS IN COMMON (AD AP763514)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 C775518 LAND EXCLUDES MINERALS AND SUBSTRATA AND IS SUBJECT TO RIGHTS TO MINE
* 3 AQ916413 CAVEAT BY WALKER GILLIESTON HEIGHTS PTY LIMITED

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

527 Cessnock Road Gillieston Heights PRINTED ON 17/1/2022

Received: 17/01/2022 14:24:28

Appendix E

Summary of Laboratory Results
Laboratory Reports

Appendix E
Summary of Laboratory Results
Proposed Residential Subdivision
527 Cessnock Road, Gillieston Heights

E1.0 Introduction

The results of laboratory testing for the above project is presented in the following tables:

- Table E1: Summary of Laboratory Results for Land Use - Metals;
- Table E2: Summary of Laboratory Results for Land Use – TRH, BTEX, PAH;
- Table E3: Summary of Laboratory Results for Land Use – OCP, OPP, PCB, Asbestos;
- Table E4: Summary of Laboratory Results for Land Use - Microbiological;
- Table E5: Summary of Laboratory Results for Waste Classification – Metals, TRH, BTEX;
- Table E6: Summary of Laboratory Results for Waste Classification – PAH, OCP, OPP, PCB, Asbestos.

Table E1: Summary of Laboratory Results for Residential Land Use – Metals

				Metals							
				Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc
			PQL	4	0.4	1	1	1	0.1	1	1
Sample ID	Depth	Fill/Natural	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	0 - 0.1 m	Natural	08 Feb 2022	6	<0.4	8	5	24	<0.1	5	48
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
2	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	5	2	26	<0.1	2	12
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
3	0.3 m	Natural	08 Feb 2022	<4	<0.4	4	1	5	<0.1	2	9
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
4	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	4	4	10	<0.1	4	38
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
5	0 - 0.1 m	Fill	08 Feb 2022	<4	<0.4	4	16	17	<0.1	2	20
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
6	0 - 0.1 m	Fill	25 Jan 2022	<4	<0.4	6	9	60	<0.1	5	130
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
6	0.4 m	Fill	25 Jan 2022	<4	0.4	3	28	16	<0.1	4	51
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
7	0 - 0.1 m	Fill	25 Jan 2022	<4	0.6	9	16	89	<0.1	8	490
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
8	0.3 m	Fill	25 Jan 2022	11	<0.4	17	8	110	<0.1	9	330
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
10	0.4 m	Fill	25 Jan 2022	<4	<0.4	3	<1	4	<0.1	1	19
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
11	0.3 m	Fill	25 Jan 2022	<4	<0.4	7	21	87	<0.1	6	190
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
12	0.3 m	Fill	25 Jan 2022	5	0.5	10	27	130	<0.1	9	800
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
13	0 - 0.1 m	Fill	25 Jan 2022	4	2	9	51	350	<0.1	9	1400
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
15	0.5 m	Fill	25 Jan 2022	4	<0.4	9	7	17	<0.1	4	130
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
101	0 - 0.05 m	Natural	25 Jan 2022	<4	<0.4	10	7	11	<0.1	8	22
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
102	0.05 m	Natural	25 Jan 2022	<4	<0.4	25	19	12	<0.1	29	45
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
103	0.05 m	Natural	25 Jan 2022	<4	<0.4	7	2	8	<0.1	3	6
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
104	0.5 m	Natural	25 Jan 2022	9	<0.4	12	4	41	0.2	4	9
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
105	0.05 m	Natural	25 Jan 2022	<4	<0.4	6	3	9	<0.1	3	27
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
106	0.05 m	Natural	25 Jan 2022	<4	<0.4	8	7	14	<0.1	5	35
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
107	0.05 m	Natural	25 Jan 2022	<4	<0.4	5	2	8	<0.1	3	13
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
108	0.05 m	Fill	25 Jan 2022	<4	<0.4	6	3	26	<0.1	3	52
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
109	0.5 m	Natural	25 Jan 2022	7	<0.4	19	5	12	<0.1	5	20
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
110	0.05 m	Natural	25 Jan 2022	10	<0.4	7	<1	6	<0.1	1	6
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
111	0.05 m	Natural	25 Jan 2022	<4	<0.4	5	3	10	<0.1	3	20
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
112	0.05 m	Natural	25 Jan 2022	<4	<0.4	5	3	7	<0.1	5	10
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
114	0.05 m	Natural	25 Jan 2022	4	<0.4	7	5	13	<0.1	6	31
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
116	0.05 m	Natural	25 Jan 2022	5	<0.4	8	6	14	<0.1	12	25
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
118	0.05 m	Natural	25 Jan 2022	5	<0.4	25	24	17	<0.1	28	72
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
119	0.3 m	Natural	08 Feb 2022	5	<0.4	15	1	9	<0.1	4	13
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
120	0.05 m	Natural	25 Jan 2022	4	<0.4	6	4	12	<0.1	5	21
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
121	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	6	2	7	<0.1	2	12
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
122	0.3 m	Fill	08 Feb 2022	4	<0.4	5	<1	8	<0.1	1	4
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
123	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	5	<1	9	<0.1	2	11
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
124	0.5 m	Natural	08 Feb 2022	6	<0.4	12	5	13	<0.1	13	38
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
125	0.3 m	Natural	08 Feb 2022	8	<0.4	16	7	13	<0.1	14	31
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
127	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	6	6	8	<0.1	3	8
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
128	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	6	1	9	<0.1	2	9
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
129	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	6	2	10	<0.1	2	12
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
130	0.3 m	Natural	08 Feb 2022	<4	<0.4	5	2	8	<0.1	3	11
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
D1LAH	0.3 m	Natural	08 Feb 2022	6	<0.4	12	5	13	<0.1	8	26
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
131	0.5 m	Natural	08 Feb 2022	8	<0.4	17	3	14	<0.1	10	28
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
132	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	6	<1	7	<0.1	2	6
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
133	0.3 m	Natural	08 Feb 2022	5	<0.4	10	4	11	<0.1	6	17
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
134	0.3 m	Natural	08 Feb 2022	<4	<0.4	4	<1	4	<0.1	2	5
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
D2LAH	0.3 m	Natural	08 Feb 2022	<4	<0.4	4	<1	3	<0.1	2	6
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
135	0.05 m	Natural	25 Jan 2022	4	<0.4	26	25	16	<0.1	31	80
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
136	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	6	3	11	<0.1	3	25
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
137	0.3 m	Natural	08 Feb 2022	<4	<0.4	3	2	6	<0.1	2	7
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
D3LAH	0.3 m	Natural	08 Feb 2022	<4	<0.4	4	1	4	<0.1	2	6
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
138	0 - 0.1 m	Natural	08 Feb 2022	<4	<0.4	8	2	9	<0.1	6	16
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
301/0-0.05	0 m	Natural	21 Mar 2022	-	-	-	-	-	-	-	-
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190
301/A	0 m	Natural	21 Mar 2022	-	-	-	-	-	-	-	-
				100 / 100	20 / -	100 / 410	6000 / 65	300 / 1100	40 / -	400 / 35	7400 / 190

Lab result		
HIL/HSL value	EIL/ESL value	EIL/ESL value

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

Blue = DC exceedance HSL 0-<1 Exceedance

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

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

Notes:

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

Site Assessment Criteria (SAC):

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

SAC based on gen	SAC based on generic land use thresholds for Residential A with garden/accessible soil	
HIL A	HIL A	Residential / Low - High Density (NEPC, 2013)
HSL A/B	HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL A	DC HSL A	Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Table E2: Summary of Laboratory Results – TRH, BTEX, PAH

				TRH						BTEX				PAH			
				TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
			PQL	25	50	25	50	100	100	0.2	0.5	1	1	0.1	0.05	0.5	0.05
Sample ID	Depth	Fill/Natural	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.2**	<0.5	**1.8**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
2	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	**0.1**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
3	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
4	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.05**	<0.5	**0.3**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
5	0 - 0.1 m	Fill	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
6	0 - 0.1 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.1**	<0.5	**1.2**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
6	0.4 m	Fill	25 Jan 2022	<25	<50	<25	<50	**160**	<100	<0.2	<0.5	<1	<1	**0.1**	**0.3**	<0.5	**3.6**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
7	0 - 0.1 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.1**	<0.5	**1.1**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
8	0.3 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.81**	**1.2**	**9.4**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
10	0.4 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
11	0.3 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.5**	**0.6**	**5.4**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
12	0.3 m	Fill	25 Jan 2022	<25	<50	<25	<50	**120**	<100	<0.2	<0.5	<1	<1	<0.1	**0.2**	<0.5	**1.7**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
13	0 - 0.1 m	Fill	25 Jan 2022	<25	<50	<25	<50	**180**	<100	<0.2	<0.5	<1	<1	<0.1	**0.54**	**0.7**	**4.5**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
15	0.5 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.3**	<0.5	**3.3**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
101	0 - 0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	**0.1**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
102	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
103	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.07**	<0.5	**0.3**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
104	0.5 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
105	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
106	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
107	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
108	0.05 m	Fill	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
109	0.5 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
110	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
111	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
112	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
114	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	**0.1**	<0.5	**0.77**
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
116	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
118	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
119	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
120	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
121	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
122	0.3 m	Fill	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
123	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
124	0.5 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
125	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
127	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
128	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
129	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
130	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
D1LAH	0 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
131	0.5 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
132	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
133	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
134	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
D2LAH	0 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
135	0.05 m	Natural	25 Jan 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
136	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	**140**	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
137	0.3 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
D3LAH	0 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
138	0 - 0.1 m	Natural	08 Feb 2022	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
301/0-0.05	0 m	Natural	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -
301/A	0 m	Natural	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				- -	- 120	50 180	280 -	- 1300	- 5600	0.7 65	480 105	NL 125	110 45	5 170	- 0.7	3 -	300 -

Lab result	
HIL/HSL value	EIL/ESL value

Notes:

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

b Reported naphthalene laboratory result obtained from BTEXN suite

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

Blue = DC exceedance   HSL 0-<1 Exceedance

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

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

Site Assessment Criteria (SAC):

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

SAC based on generic land use thresholds for Residential A with garden/accessible soil

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

Table E3: Summary of Laboratory Results – OCP, OPP, PCB, Asbestos

					OCP											OPP	PCB								Asbestos
				Total PAHs	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Arochlor 1016	Total PCB	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Asbestos Comment
			PQL	0.05	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
Sample ID	Depth	Fill/Natural	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
1	0 - 0.1 m	Natural	08 Feb 2022	**1.8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
2	0 - 0.1 m	Natural	08 Feb 2022	**0.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
3	0.3 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
4	0 - 0.1 m	Natural	08 Feb 2022	**0.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
5	0 - 0.1 m	Fill	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
6	0 - 0.1 m	Fill	25 Jan 2022	**1.2**	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
6	0.4 m	Fill	25 Jan 2022	**3.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
7	0 - 0.1 m	Fill	25 Jan 2022	**1.1**	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
8	0.3 m	Fill	25 Jan 2022	**9.4**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
10	0.4 m	Fill	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
11	0.3 m	Fill	25 Jan 2022	**5.4**	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
12	0.3 m	Fill	25 Jan 2022	**1.7**	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
13	0 - 0.1 m	Fill	25 Jan 2022	**4.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
15	0.5 m	Fill	25 Jan 2022	**3.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
101	0 - 0.05 m	Natural	25 Jan 2022	**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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
102	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
103	0.05 m	Natural	25 Jan 2022	**0.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
104	0.5 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
105	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
106	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
107	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
108	0.05 m	Fill	25 Jan 2022	<0.05	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
109	0.5 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
110	0.05 m	Natural	25 Jan 2022	<0.05	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
111	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
112	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
114	0.05 m	Natural	25 Jan 2022	**0.77**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
116	0.05 m	Natural	25 Jan 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
118	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
119	0.3 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
120	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
121	0 - 0.1 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
122	0.3 m	Fill	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
123	0 - 0.1 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
124	0.5 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
125	0.3 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
127	0 - 0.1 m	Natural	08 Feb 2022	<0.05	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
128	0 - 0.1 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
129	0 - 0.1 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
130	0.3 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
D1LAH	0 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
131	0.5 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
132	0 - 0.1 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
133	0.3 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
134	0.3 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
D2LAH	0 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
135	0.05 m	Natural	25 Jan 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
136	0 - 0.1 m	Natural	08 Feb 2022	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
137	0.3 m	Natural	08 Feb 2022	<0.05	<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	NAD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
D3LAH	0 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
138	0 - 0.1 m	Natural	08 Feb 2022	<0.05	<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	NT
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
301/0-0.05	0 m	Natural	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	AD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -
301/A	0 m	Natural	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	AD
				300 -	- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	- -	1 -	- -	- -	- -	- -	- -	- -	- -

Lab result	
HIL/HSL value	EIL/ESL value

Notes:

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

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

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

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

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

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

Site Assessment Criteria (SAC):

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

SAC based on generic land use thresholds for Residential A with garden/accessible soil

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

Table E4: Summary of Laboratory Results – Faecal Coliforms and E. Coli in Soil

		Microbial Testing in Soil	
		Faecal Coliforms in Soil	E. Coli in Soil
	PQL	<200	<200
Sample ID	Sample Date	MPN/100g	MPN/100g
302	23/03/2022	**>180,000**	**>180,000**
303	23/03/2022	35,000	**35,000**
304	23/03/2022	3,300	200
305	23/03/2022	3100	<200
SW EPA Biosolids Guideline		100000	10000

Notes:
Results in Bold exceed Stabilisation Grade A Microbiological Standards for Biosolids from NSW EPA Environmental Guidelines: Use and Disposal of Biosolids Guidelines

Table E5: Summary of Laboratory Results for Wate Classification – Metals, TRH, BTEX

			Metals								TRH					BTEX					
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	100	100	50	0.2	0.5	1	2	1	3
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
1	0 - 0.1 m	08/02/2022	**6**	<0.4	**8**	**5**	**24**	<0.1	**5**	**48**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
2	0 - 0.1 m	08/02/2022	<4	<0.4	**5**	**2**	**26**	<0.1	**2**	**12**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
3	0.3 m	08/02/2022	<4	<0.4	**4**	**1**	**5**	<0.1	**2**	**9**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
4	0 - 0.1 m	08/02/2022	<4	<0.4	**4**	**4**	**10**	<0.1	**4**	**38**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
5	0 - 0.1 m	08/02/2022	<4	<0.4	**4**	**16**	**17**	<0.1	**2**	**20**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
6	0 - 0.1 m	25/01/2022	<4	<0.4	**6**	**9**	**60**	<0.1	**5**	**130**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
6	0.4 m	25/01/2022	<4	**0.4**	**3**	**28**	**16**	<0.1	**4**	**51**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
7	0 - 0.1 m	25/01/2022	<4	**0.6**	**9**	**16**	**89**	<0.1	**8**	**490**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
8	0.3 m	25/01/2022	**11**	<0.4	**17**	**8**	**110**	<0.1	**9**	**330**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
10	0.4 m	25/01/2022	<4	<0.4	**3**	<1	**4**	<0.1	**1**	**19**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
11	0.3 m	25/01/2022	<4	<0.4	**7**	**21**	**87**	<0.1	**6**	**190**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
12	0.3 m	25/01/2022	**5**	**0.5**	**10**	**27**	**130**	<0.1	**9**	**800**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
13	0 - 0.1 m	25/01/2022	**4**	**2**	**9**	**51**	**350**	<0.1	**9**	**1400**	<25	<50	<100	**140**	**140**	<0.2	<0.5	<1	<2	<1	<3
15	0.5 m	25/01/2022	**4**	<0.4	**9**	**7**	**17**	<0.1	**4**	**130**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
101	0 - 0.05 m	25/01/2022	<4	<0.4	**10**	**7**	**11**	<0.1	**8**	**22**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
102	0.05 m	25/01/2022	<4	<0.4	**25**	**19**	**12**	<0.1	**29**	**45**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
103	0.05 m	25/01/2022	<4	<0.4	**7**	**2**	**8**	<0.1	**3**	**6**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
104	0.5 m	25/01/2022	**9**	<0.4	**12**	**4**	**41**	**0.2**	**4**	**9**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
105	0.05 m	25/01/2022	<4	<0.4	**6**	**3**	**9**	<0.1	**3**	**27**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
106	0.05 m	25/01/2022	<4	<0.4	**8**	**7**	**14**	<0.1	**5**	**35**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
107	0.05 m	25/01/2022	<4	<0.4	**5**	**2**	**8**	<0.1	**3**	**13**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
108	0.05 m	25/01/2022	<4	<0.4	**6**	**3**	**26**	<0.1	**3**	**52**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
109	0.5 m	25/01/2022	**7**	<0.4	**19**	**5**	**12**	<0.1	**5**	**20**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
110	0.05 m	25/01/2022	**10**	<0.4	**7**	<1	**6**	<0.1	**1**	**6**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
111	0.05 m	25/01/2022	<4	<0.4	**5**	**3**	**10**	<0.1	**3**	**20**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
112	0.05 m	25/01/2022	<4	<0.4	**5**	**3**	**7**	<0.1	**5**	**10**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
114	0.05 m	25/01/2022	**4**	<0.4	**7**	**5**	**13**	<0.1	**6**	**31**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
116	0.05 m	25/01/2022	**5**	<0.4	**8**	**6**	**14**	<0.1	**12**	**25**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
118	0.05 m	25/01/2022	**5**	<0.4	**25**	**24**	**17**	<0.1	**28**	**72**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
119	0.3 m	08/02/2022	**5**	<0.4	**15**	**1**	**9**	<0.1	**4**	**13**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
120	0.05 m	25/01/2022	**4**	<0.4	**6**	**4**	**12**	<0.1	**5**	**21**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
121	0 - 0.1 m	08/02/2022	<4	<0.4	**6**	**2**	**7**	<0.1	**2**	**12**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
122	0.3 m	08/02/2022	**4**	<0.4	**5**	<1	**8**	<0.1	**1**	**4**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
123	0 - 0.1 m	08/02/2022	<4	<0.4	**5**	<1	**9**	<0.1	**2**	**11**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
124	0.5 m	08/02/2022	**6**	<0.4	**12**	**5**	**13**	<0.1	**13**	**38**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
125	0.3 m	08/02/2022	**8**	<0.4	**16**	**7**	**13**	<0.1	**14**	**31**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
127	0 - 0.1 m	08/02/2022	<4	<0.4	**6**	**6**	**8**	<0.1	**3**	**8**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
128	0 - 0.1 m	08/02/2022	<4	<0.4	**6**	**1**	**9**	<0.1	**2**	**9**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
129	0 - 0.1 m	08/02/2022	<4	<0.4	**6**	**2**	**10**	<0.1	**2**	**12**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
130	0.3 m	08/02/2022	<4	<0.4	**5**	**2**	**8**	<0.1	**3**	**11**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
D1LAH	0 m	08/02/2022	**6**	<0.4	**12**	**5**	**13**	<0.1	**8**	**26**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
131	0.5 m	08/02/2022	**8**	<0.4	**17**	**3**	**14**	<0.1	**10**	**28**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
132	0 - 0.1 m	08/02/2022	<4	<0.4	**6**	<1	**7**	<0.1	**2**	**6**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
133	0.3 m	08/02/2022	**5**	<0.4	**10**	**4**	**11**	<0.1	**6**	**17**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
134	0.3 m	08/02/2022	<4	<0.4	**4**	<1	**4**	<0.1	**2**	**5**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
D2LAH	0 m	08/02/2022	<4	<0.4	**4**	<1	**3**	<0.1	**2**	**6**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
135	0.05 m	25/01/2022	**4**	<0.4	**26**	**25**	**16**	<0.1	**31**	**80**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3
136	0 - 0.1 m	08/02/2022	<4	<0.4	**6**	**3**	**11**	<0.1	**3**	**25**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
137	0.3 m	08/02/2022	<4	<0.4	**3**	**2**	**6**	<0.1	**2**	**7**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
D3LAH	0 m	08/02/2022	<4	<0.4	**4**	**1**	**4**	<0.1	**2**	**6**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
138	0 - 0.1 m	08/02/2022	<4	<0.4	**8**	**2**	**9**	<0.1	**6**	**16**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
301/0-0.05	0 m	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
301/A	0 m	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Summary Statistics																					
Min			4	0.4	3	1	3	0.1	1	4	25	50	100	100	50	0.2	0.5	1	2	1	1
Max			11	2	26	51	350	0.2	31	1400	25	50	100	140	140	0.2	0.5	1	2	1	3
Mean			5	0.4	9	7	27	0.1	6	87	25	50	100	101	52	0.2	0.5	1	2	1	2
Waste Classification Criteria [f]																					
CT1			100	20	100	NC	100	4	40	NC	650	NC	NC	NC	10000	10	288	600	NC	NC	1000
SCC1			500	100	1900	NC	1500	50	1050	NC	650	NC	NC	NC	10000	18	518	1080	NC	NC	1800
TCLP1			N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A
CT2			400	80	400	NC	400	16	160	NC	2600	NC	NC	NC	40000	40	1152	2400	NC	NC	4000
SCC2			2000	400	7600	NC	6000	200	4200	NC	2600	NC	NC	NC	40000	72	2073	4320	NC	NC	7200
TCLP2			N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A

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

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

Notes:

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

Table E6: Summary of Laboratory Results for Wate Classification – PAH, OCP, OPP, PCB, Asbestos

			PAH		OCP		OPP	PCB								Asbestos					
			Benzo(a)pyrene (BaP)	Total PAHs	Total Endosulfan	Total Analysed OCP	Total Analysed OPP	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	ACM >7mm Estimation	FA and AF Estimation	Total Asbestos#1	Asbestos ID in materials
		PQL	0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				<0.001	<0.1	0
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	g	%(w/w)	g/kg	-
1	0 - 0.1 m	08/02/2022	**0.2**	**1.8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	0 - 0.1 m	08/02/2022	<0.05	**0.1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	0.3 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
4	0 - 0.1 m	08/02/2022	**0.05**	**0.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	0 - 0.1 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
6	0 - 0.1 m	25/01/2022	**0.1**	**1.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
6	0.4 m	25/01/2022	**0.3**	**3.6**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	0 - 0.1 m	25/01/2022	**0.1**	**1.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
8	0.3 m	25/01/2022	**0.81**	**9.4**	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
10	0.4 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	0.3 m	25/01/2022	**0.5**	**5.4**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
12	0.3 m	25/01/2022	**0.2**	**1.7**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
13	0 - 0.1 m	25/01/2022	**0.54**	**4.5**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	0.5 m	25/01/2022	**0.3**	**3.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	0 - 0.05 m	25/01/2022	<0.05	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
102	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
103	0.05 m	25/01/2022	**0.07**	**0.3**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104	0.5 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
105	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
106	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
107	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
108	0.05 m	25/01/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
109	0.5 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
110	0.05 m	25/01/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
111	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
112	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
114	0.05 m	25/01/2022	**0.1**	**0.77**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
116	0.05 m	25/01/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
118	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
119	0.3 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
120	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
121	0 - 0.1 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
122	0.3 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
123	0 - 0.1 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
124	0.5 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125	0.3 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
127	0 - 0.1 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
128	0 - 0.1 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
129	0 - 0.1 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
130	0.3 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
D1LAH	0 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
131	0.5 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132	0 - 0.1 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
133	0.3 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
134	0.3 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
D2LAH	0 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
135	0.05 m	25/01/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
136	0 - 0.1 m	08/02/2022	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	-	-
137	0.3 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	-	-
D3LAH	0 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
138	0 - 0.1 m	08/02/2022	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-
301/0-0.05	0 m	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	AD	NAD	4.7373	<0.001	8.487	-
301/A	0 m	21 Mar 2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	AD
Summary Statistics																					
Min			0.05	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-
Max			0.81	9.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-
Mean			0.1	0.72	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-
Waste Classification Criteria [f]																					
CT1			0.8	200	60	<50	4	NC	NC	NC	NC	NC	NC	NC	<50	NC	NC	NC	NC	NC	NC
SCC1			10	200	108	<50	7.5	NC	NC	NC	NC	NC	NC	NC	<50	NC	NC	NC	NC	NC	NC
TCLP1			N/A	N/A	N/A	N/A	N/A	NC	NC	NC	NC	NC	NC	NC	N/A	NC	NC	NC	NC	NC	NC
CT2			3.2	800	240	<50	16	NC	NC	NC	NC	NC	NC	NC	<50	NC	NC	NC	NC	NC	NC
SCC2			23	800	432	<50	30	NC	NC	NC	NC	NC	NC	NC	<50	NC	NC	NC	NC	NC	NC
TCLP2			N/A	N/A	N/A	N/A	N/A	NC	NC	NC	NC	NC	NC	NC	N/A	NC	NC	NC	NC	NC	NC

Notes:

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

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CERTIFICATE OF ANALYSIS 288062

Client Details	
Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details	
Your Reference	**204921.00, Gillieston Heights**
Number of Samples	26 Soil
Date samples received	04/02/2022
Date completed instructions received	08/02/2022

Analysis Details

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

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

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

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

Report Details	
Date results requested by	15/02/2022
Date of Issue	15/02/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Ridwan Wijaya
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		288062-1	288062-2	288062-3	288062-4	288062-5
Your Reference	UNITS	6	6	7	8	10
Depth		0.0-0.1	0.4	0.0-0.1	0.3	0.4
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	80	97	83	89	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		288062-6	288062-7	288062-8	288062-9	288062-10
Your Reference	UNITS	11	12	13	15	101
Depth		0.3	0.3	0.0-0.1	0.5	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	93	87	98	87	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		288062-11	288062-12	288062-13	288062-14	288062-15
Your Reference	UNITS	102	103	104	105	106
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	91	117	86	95	95

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		288062-16	288062-17	288062-18	288062-19	288062-20
Your Reference	UNITS	107	108	109	110	111
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	104	93	96	83	97

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		288062-21	288062-22	288062-23	288062-24	288062-25
Your Reference	UNITS	112	114	116	118	120
Depth		0.05	0.05	0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	93	92	87	99	92

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		288062-26
Your Reference	UNITS	135
Depth		0.05
Date Sampled		25/01/2022
Type of sample		Soil
Date extracted	-	09/02/2022
Date analysed	-	09/02/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	80

svTRH (C10-C40) in Soil						
Our Reference		288062-1	288062-2	288062-3	288062-4	288062-5
Your Reference	UNITS	6	6	7	8	10
Depth		0.0-0.1	0.4	0.0-0.1	0.3	0.4
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	160	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	160	<50	<50	<50
Surrogate o-Terphenyl	%	78	80	90	76	74

svTRH (C10-C40) in Soil						
Our Reference		288062-6	288062-7	288062-8	288062-9	288062-10
Your Reference	UNITS	11	12	13	15	101
Depth		0.3	0.3	0.0-0.1	0.5	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	140	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	140	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	120	180	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	120	180	<50	<50
Surrogate o-Terphenyl	%	78	81	85	76	72

svTRH (C10-C40) in Soil						
Our Reference		288062-11	288062-12	288062-13	288062-14	288062-15
Your Reference	UNITS	102	103	104	105	106
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	75	73	73	71	80

svTRH (C10-C40) in Soil						
Our Reference		288062-16	288062-17	288062-18	288062-19	288062-20
Your Reference	UNITS	107	108	109	110	111
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	73	84	78	78	79

svTRH (C10-C40) in Soil						
Our Reference		288062-21	288062-22	288062-23	288062-24	288062-25
Your Reference	UNITS	112	114	116	118	120
Depth		0.05	0.05	0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	78	78	79	89	76

svTRH (C10-C40) in Soil		
Our Reference		288062-26
Your Reference	UNITS	135
Depth		0.05
Date Sampled		25/01/2022
Type of sample		Soil
Date extracted	-	09/02/2022
Date analysed	-	10/02/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	85

PAHs in Soil						
Our Reference		288062-1	288062-2	288062-3	288062-4	288062-5
Your Reference	UNITS	6	6	7	8	10
Depth		0.0-0.1	0.4	0.0-0.1	0.3	0.4
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	11/02/2022	11/02/2022	11/02/2022	11/02/2022
Naphthalene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.4	0.1	1.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Fluoranthene	mg/kg	0.3	0.5	0.3	1.7	<0.1
Pyrene	mg/kg	0.2	0.6	0.3	1.6	<0.1
Benzo(a)anthracene	mg/kg	0.1	0.3	0.1	0.6	<0.1
Chrysene	mg/kg	0.1	0.3	0.1	0.7	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2	0.6	<0.2	1	<0.2
Benzo(a)pyrene	mg/kg	0.1	0.3	0.1	0.81	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	<0.1	0.5	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	0.3	0.1	0.7	<0.1
Total +ve PAH's	mg/kg	1.2	3.6	1.1	9.4	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	1.2	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	0.5	<0.5	1.2	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	0.6	<0.5	1.2	<0.5
Surrogate p-Terphenyl-d14	%	80	97	80	95	94

PAHs in Soil						
Our Reference		288062-6	288062-7	288062-8	288062-9	288062-10
Your Reference	UNITS	11	12	13	15	101
Depth		0.3	0.3	0.0-0.1	0.5	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	11/02/2022	11/02/2022	11/02/2022	11/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.6	0.1	0.2	0.4	<0.1
Anthracene	mg/kg	0.2	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	1	0.3	0.6	0.7	0.1
Pyrene	mg/kg	1	0.3	0.7	0.6	<0.1
Benzo(a)anthracene	mg/kg	0.6	0.2	0.4	0.2	<0.1
Chrysene	mg/kg	0.4	0.1	0.4	0.2	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.7	0.3	0.8	0.4	<0.2
Benzo(a)pyrene	mg/kg	0.5	0.2	0.54	0.3	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2	<0.1	0.3	0.2	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.3	0.1	0.4	0.2	<0.1
Total +ve PAH's	mg/kg	5.4	1.7	4.5	3.3	0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.6	<0.5	0.7	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.7	<0.5	0.8	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.7	<0.5	0.8	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	82	88	100	103	84

PAHs in Soil						
Our Reference		288062-11	288062-12	288062-13	288062-14	288062-15
Your Reference	UNITS	102	103	104	105	106
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	11/02/2022	11/02/2022	11/02/2022	11/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.07	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.3	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	96	95	93	93

PAHs in Soil						
Our Reference		288062-16	288062-17	288062-18	288062-19	288062-20
Your Reference	UNITS	107	108	109	110	111
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	11/02/2022	11/02/2022	10/02/2022	11/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	83	102	93	100

PAHs in Soil						
Our Reference		288062-21	288062-22	288062-23	288062-24	288062-25
Your Reference	UNITS	112	114	116	118	120
Depth		0.05	0.05	0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	11/02/2022	10/02/2022	11/02/2022	11/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.1	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.77	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	99	99	94	104	99

PAHs in Soil			
Our Reference		288062-26	288062-27
Your Reference	UNITS	135	6 - [TRIPLICATE]
Depth		0.05	0.0-0.1
Date Sampled		25/01/2022	25/01/2022
Type of sample		Soil	Soil
Date extracted	-	09/02/2022	11/02/2022
Date analysed	-	11/02/2022	11/02/2022
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.2
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.4
Pyrene	mg/kg	<0.1	0.4
Benzo(a)anthracene	mg/kg	<0.1	0.2
Chrysene	mg/kg	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.3
Benzo(a)pyrene	mg/kg	<0.05	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2
Total +ve PAH's	mg/kg	<0.05	1.8
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	106	100

Organochlorine Pesticides in soil						
Our Reference		288062-1	288062-3	288062-6	288062-7	288062-10
Your Reference	UNITS	6	7	11	12	101
Depth		0.0-0.1	0.0-0.1	0.3	0.3	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	11/02/2022	11/02/2022	11/02/2022	11/02/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	78	74	74	85	81

Organochlorine Pesticides in soil				
Our Reference		288062-17	288062-19	288062-23
Your Reference	UNITS	108	110	116
Depth		0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	10/02/2022	10/02/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	74	88	86

Organophosphorus Pesticides in Soil						
Our Reference		288062-1	288062-3	288062-6	288062-7	288062-10
Your Reference	UNITS	6	7	11	12	101
Depth		0.0-0.1	0.0-0.1	0.3	0.3	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	11/02/2022	11/02/2022	11/02/2022	11/02/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	78	74	74	85	81

Organophosphorus Pesticides in Soil				
Our Reference		288062-17	288062-19	288062-23
Your Reference	UNITS	108	110	116
Depth		0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	10/02/2022	10/02/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	74	88	86

PCBs in Soil						
Our Reference		288062-1	288062-3	288062-6	288062-7	288062-10
Your Reference	UNITS	6	7	11	12	101
Depth		0.0-0.1	0.0-0.1	0.3	0.3	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	11/02/2022	11/02/2022	11/02/2022	11/02/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	78	74	74	85	81

PCBs in Soil				
Our Reference		288062-17	288062-19	288062-23
Your Reference	UNITS	108	110	116
Depth		0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	11/02/2022	10/02/2022	10/02/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	74	88	86

Acid Extractable metals in soil						
Our Reference		288062-1	288062-2	288062-3	288062-4	288062-5
Your Reference	UNITS	6	6	7	8	10
Depth		0.0-0.1	0.4	0.0-0.1	0.3	0.4
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Arsenic	mg/kg	<4	<4	<4	11	<4
Cadmium	mg/kg	<0.4	0.4	0.6	<0.4	<0.4
Chromium	mg/kg	6	3	9	17	3
Copper	mg/kg	9	28	16	8	<1
Lead	mg/kg	60	16	89	110	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	4	8	9	1
Zinc	mg/kg	130	51	490	330	19

Acid Extractable metals in soil						
Our Reference		288062-6	288062-7	288062-8	288062-9	288062-10
Your Reference	UNITS	11	12	13	15	101
Depth		0.3	0.3	0.0-0.1	0.5	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Arsenic	mg/kg	<4	5	4	4	<4
Cadmium	mg/kg	<0.4	0.5	2	<0.4	<0.4
Chromium	mg/kg	7	10	9	9	10
Copper	mg/kg	21	27	51	7	7
Lead	mg/kg	87	130	350	17	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	9	9	4	8
Zinc	mg/kg	190	800	1,400	130	22

Acid Extractable metals in soil						
Our Reference		288062-11	288062-12	288062-13	288062-14	288062-15
Your Reference	UNITS	102	103	104	105	106
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Arsenic	mg/kg	<4	<4	9	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	25	7	12	6	8
Copper	mg/kg	19	2	4	3	7
Lead	mg/kg	12	8	41	9	14
Mercury	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	29	3	4	3	5
Zinc	mg/kg	45	6	9	27	35

Acid Extractable metals in soil						
Our Reference		288062-16	288062-17	288062-18	288062-19	288062-20
Your Reference	UNITS	107	108	109	110	111
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Arsenic	mg/kg	<4	<4	7	10	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	6	19	7	5
Copper	mg/kg	2	3	5	<1	3
Lead	mg/kg	8	26	12	6	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	5	1	3
Zinc	mg/kg	13	52	20	6	20

Acid Extractable metals in soil						
Our Reference		288062-21	288062-22	288062-23	288062-24	288062-25
Your Reference	UNITS	112	114	116	118	120
Depth		0.05	0.05	0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Arsenic	mg/kg	<4	4	5	5	4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	7	8	25	6
Copper	mg/kg	3	5	6	24	4
Lead	mg/kg	7	13	14	17	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	6	12	28	5
Zinc	mg/kg	10	31	25	72	21

Acid Extractable metals in soil		
Our Reference		288062-26
Your Reference	UNITS	135
Depth		0.05
Date Sampled		25/01/2022
Type of sample		Soil
Date prepared	-	09/02/2022
Date analysed	-	09/02/2022
Arsenic	mg/kg	4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	26
Copper	mg/kg	25
Lead	mg/kg	16
Mercury	mg/kg	<0.1
Nickel	mg/kg	31
Zinc	mg/kg	80

Moisture						
Our Reference		288062-1	288062-2	288062-3	288062-4	288062-5
Your Reference	UNITS	6	6	7	8	10
Depth		0.0-0.1	0.4	0.0-0.1	0.3	0.4
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
Moisture	%	22	17	28	15	6.7

Moisture						
Our Reference		288062-6	288062-7	288062-8	288062-9	288062-10
Your Reference	UNITS	11	12	13	15	101
Depth		0.3	0.3	0.0-0.1	0.5	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
Moisture	%	18	24	34	36	9.4

Moisture						
Our Reference		288062-11	288062-12	288062-13	288062-14	288062-15
Your Reference	UNITS	102	103	104	105	106
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
Moisture	%	16	15	34	13	15

Moisture						
Our Reference		288062-16	288062-17	288062-18	288062-19	288062-20
Your Reference	UNITS	107	108	109	110	111
Depth		0.05	0.05	0.5	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
Moisture	%	11	8.1	21	4.5	11

Moisture						
Our Reference		288062-21	288062-22	288062-23	288062-24	288062-25
Your Reference	UNITS	112	114	116	118	120
Depth		0.05	0.05	0.05	0.05	0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	09/02/2022	09/02/2022	09/02/2022	09/02/2022	09/02/2022
Date analysed	-	10/02/2022	10/02/2022	10/02/2022	10/02/2022	10/02/2022
Moisture	%	13	13	19	17	12

Moisture		
Our Reference		288062-26
Your Reference	UNITS	135
Depth		0.05
Date Sampled		25/01/2022
Type of sample		Soil
Date prepared	-	09/02/2022
Date analysed	-	10/02/2022
Moisture	%	20

Asbestos ID - soils		
Our Reference		288062-1
Your Reference	UNITS	6
Depth		0.0-0.1
Date Sampled		25/01/2022
Type of sample		Soil
Date analysed	-	15/02/2022
Sample mass tested	g	Approx. 25g
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Asbestos comments	-	NO
Trace Analysis	-	No asbestos detected

Asbestos ID - soils NEPM						
Our Reference		288062-3	288062-4	288062-6	288062-7	288062-10
Your Reference	UNITS	7	8	11	12	101
Depth		0.0-0.1	0.3	0.3	0.3	0.0-0.05
Date Sampled		25/01/2022	25/01/2022	25/01/2022	25/01/2022	25/01/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	15/02/2022	15/02/2022	15/02/2022	15/02/2022	15/02/2022
Sample mass tested	g	303.54	469.64	383.35	434.95	297.48
Sample Description	-	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM			
Our Reference		288062-17	288062-19
Your Reference	UNITS	108	110
Depth		0.05	0.05
Date Sampled		25/01/2022	25/01/2022
Type of sample		Soil	Soil
Date analysed	-	15/02/2022	15/02/2022
Sample mass tested	g	743.18	277.25
Sample Description	-	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–
FA and AF Estimation*	g	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. ‘EQ PQL’values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. ‘EQ zero’values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. ‘EQ half PQL’values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	288062-3
Date extracted	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	79	79
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	79	79
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	94	92
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	74	75
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	78	70
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	74	80
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	78	84
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	112	1	80	98	20	83	87

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-22
Date extracted	-			[NT]	11	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			[NT]	11	09/02/2022	09/02/2022		09/02/2022	09/02/2022
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	88	94
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	88	94
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	105	117
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	83	95
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	76	78
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	89	91
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	93	95
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	91	77	17	93	110

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	09/02/2022	09/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	09/02/2022	09/02/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	21	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	21	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	21	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	21	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	21	93	86	8	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	288062-3
Date extracted	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			10/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	123	80
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	127	91
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	127	101
TRH $>C_{10}$ -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	123	80
TRH $>C_{16}$ -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	127	91
TRH $>C_{34}$ -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	127	101
Surrogate o-Terphenyl	%		Org-020	79	1	78	79	1	120	90

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-22
Date extracted	-			[NT]	11	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			[NT]	11	09/02/2022	09/02/2022		10/02/2022	10/02/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	78	72
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	89	84
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	109	93
TRH $>C_{10}$ -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	78	72
TRH $>C_{16}$ -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	89	84
TRH $>C_{34}$ -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	109	93
Surrogate o-Terphenyl	%		Org-020	[NT]	11	75	78	4	74	78

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	09/02/2022	09/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	10/02/2022	10/02/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	21	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
TRH $>C_{10}$ -C_{16}	mg/kg	50	Org-020	[NT]	21	<50	<50	0	[NT]	[NT]
TRH $>C_{16}$ -C_{34}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
TRH $>C_{34}$ -C_{40}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	21	78	75	4	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	288062-3
Date extracted	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			10/02/2022	1	10/02/2022	10/02/2022		10/02/2022	11/02/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	92
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	95
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	95
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.3	100	112	122
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.7	80	108	123
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.6	100	111	117
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.3	100	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.2	67	77	65
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.2	0.5	86	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.1	0.3	100	112	112
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.2	67	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.3	100	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	96	1	80	88	10	97	92

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-22
Date extracted	-			[NT]	11	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			[NT]	11	11/02/2022	11/02/2022		10/02/2022	10/02/2022
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	99	99
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	91	97
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	101	99
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	126	99
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	114	92
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	115	94
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	68	71
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	98	104
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	99	100	1	93	95

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	09/02/2022	09/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	11/02/2022	11/02/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	21	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	21	99	99	0	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-3
Date extracted	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	11/02/2022
Date analysed	-			10/02/2022	1	10/02/2022	10/02/2022		10/02/2022	11/02/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	86
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	96
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	93
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	101
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	106
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	98
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	104
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	78	127
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	100
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	80
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	82	1	78	82	5	86	84

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-3
Date extracted	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			10/02/2022	1	10/02/2022	10/02/2022		10/02/2022	11/02/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	117
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	99
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	79	91
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	110
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	116	102
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	80	89
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	100
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	82	1	78	82	5	86	84

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-3
Date extracted	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			10/02/2022	1	10/02/2022	10/02/2022		10/02/2022	11/02/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	118	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	82	1	78	82	5	86	84

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	288062-3
Date prepared	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			09/02/2022	1	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	101	92
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	94	79
Chromium	mg/kg	1	Metals-020	<1	1	6	7	15	96	87
Copper	mg/kg	1	Metals-020	<1	1	9	10	11	97	94
Lead	mg/kg	1	Metals-020	<1	1	60	60	0	100	79
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	107	98
Nickel	mg/kg	1	Metals-020	<1	1	5	5	0	99	87
Zinc	mg/kg	1	Metals-020	<1	1	130	140	7	105	#

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	288062-22
Date prepared	-			[NT]	11	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Date analysed	-			[NT]	11	09/02/2022	09/02/2022		09/02/2022	09/02/2022
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	101	78
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	94	70
Chromium	mg/kg	1	Metals-020	[NT]	11	25	22	13	95	76
Copper	mg/kg	1	Metals-020	[NT]	11	19	18	5	95	81
Lead	mg/kg	1	Metals-020	[NT]	11	12	11	9	100	75
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	117	109
Nickel	mg/kg	1	Metals-020	[NT]	11	29	27	7	98	76
Zinc	mg/kg	1	Metals-020	[NT]	11	45	40	12	103	73

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	21	09/02/2022	09/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	09/02/2022	09/02/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	21	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	21	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	21	5	7	33	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	21	3	3	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	21	7	10	35	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	21	5	6	18	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	21	10	13	26	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

8 metals in soil - # Percent recovery is not applicable due to the high concentration of the element in the sample. However an acceptable recovery was obtained for the LCS.

PAHs in Soil: The laboratory RPD acceptance criteria has been exceeded for 288062-1. Therefore a triplicate result has been issued as laboratory sample number 288062-27.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Sample 288062-1 was sub-sampled from a jar provided by the client.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, samples 288062-3, 6, 7, 10, 19 are below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

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CERTIFICATE OF ANALYSIS 289028

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**204921.00, Gillieston Heights**
Number of Samples	25 Soil
Date samples received	17/02/2022
Date completed instructions received	17/02/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	28/02/2022
Date of Issue	24/02/2022

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

Results Approved By
Dragana Tomas, Senior Chemist
Jeremy Faircloth, Operations Manager, Sydney
Loren Bardwell, Development Chemist
Steven Luong, Organics Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289028-1	289028-2	289028-3	289028-4	289028-5
Your Reference	UNITS	1	2	3	4	5
Depth		0.0-0.1	0.0-0.1	0.3	0.0-0.1	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	68	70	78	90	83

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289028-6	289028-7	289028-8	289028-9	289028-10
Your Reference	UNITS	119	121	122	123	124
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.5
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	77	94	87	77	83

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289028-11	289028-12	289028-13	289028-14	289028-15
Your Reference	UNITS	125	127	128	129	130
Depth		0.3	0.0-0.1	0.0-0.1	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	22/02/2022	22/02/2022	22/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	81	81	75	74	80

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289028-16	289028-17	289028-18	289028-19	289028-20
Your Reference	UNITS	131	132	133	134	136
Depth		0.5	0.0-0.1	0.3	0.3	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	22/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	81	81	84	79

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289028-21	289028-22	289028-23	289028-24	289028-25
Your Reference	UNITS	137	138	D1LAH	D2LAH	D3LAH
Depth		0.3	0.0-0.1	-	-	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	92	92	81	85

svTRH (C10-C40) in Soil						
Our Reference		289028-1	289028-2	289028-3	289028-4	289028-5
Your Reference	UNITS	1	2	3	4	5
Depth		0.0-0.1	0.0-0.1	0.3	0.0-0.1	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	84	80	77	80	75

svTRH (C10-C40) in Soil						
Our Reference		289028-6	289028-7	289028-8	289028-9	289028-10
Your Reference	UNITS	119	121	122	123	124
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.5
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	81	77	79	79	89

svTRH (C10-C40) in Soil						
Our Reference		289028-11	289028-12	289028-13	289028-14	289028-15
Your Reference	UNITS	125	127	128	129	130
Depth		0.3	0.0-0.1	0.0-0.1	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	80	78	79	78	82

svTRH (C10-C40) in Soil						
Our Reference		289028-16	289028-17	289028-18	289028-19	289028-20
Your Reference	UNITS	131	132	133	134	136
Depth		0.5	0.0-0.1	0.3	0.3	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	140
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	140
Surrogate o-Terphenyl	%	80	81	81	82	85

svTRH (C10-C40) in Soil						
Our Reference		289028-21	289028-22	289028-23	289028-24	289028-25
Your Reference	UNITS	137	138	D1LAH	D2LAH	D3LAH
Depth		0.3	0.0-0.1	-	-	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	72	83	83	80	81

PAHs in Soil						
Our Reference		289028-1	289028-2	289028-3	289028-4	289028-5
Your Reference	UNITS	1	2	3	4	5
Depth		0.0-0.1	0.0-0.1	0.3	0.0-0.1	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.4	0.1	<0.1	0.1	<0.1
Pyrene	mg/kg	0.4	<0.1	<0.1	0.1	<0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.2	<0.05	<0.05	0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	1.8	0.1	<0.05	0.3	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	94	102	94	99	95

PAHs in Soil						
Our Reference		289028-6	289028-7	289028-8	289028-9	289028-10
Your Reference	UNITS	119	121	122	123	124
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.5
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	104	93	110	96	93

PAHs in Soil						
Our Reference		289028-11	289028-12	289028-13	289028-14	289028-15
Your Reference	UNITS	125	127	128	129	130
Depth		0.3	0.0-0.1	0.0-0.1	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	22/02/2022	22/02/2022	22/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	110	94	101	93	90

PAHs in Soil						
Our Reference		289028-16	289028-17	289028-18	289028-19	289028-20
Your Reference	UNITS	131	132	133	134	136
Depth		0.5	0.0-0.1	0.3	0.3	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	93	86	87	97	88

PAHs in Soil						
Our Reference		289028-21	289028-22	289028-23	289028-24	289028-25
Your Reference	UNITS	137	138	D1LAH	D2LAH	D3LAH
Depth		0.3	0.0-0.1	-	-	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	85	89	93	79	86

Organochlorine Pesticides in soil						
Our Reference		289028-6	289028-9	289028-11	289028-12	289028-15
Your Reference	UNITS	119	123	125	127	130
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	22/02/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	104	103	93	91

Organochlorine Pesticides in soil						
Our Reference		289028-17	289028-19	289028-21	289028-22	289028-23
Your Reference	UNITS	132	134	137	138	D1LAH
Depth		0.0-0.1	0.3	0.3	0.0-0.1	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	83	86	79

Organochlorine Pesticides in soil			
Our Reference		289028-24	289028-25
Your Reference	UNITS	D2LAH	D3LAH
Depth		-	-
Date Sampled		08/02/2022	08/02/2022
Type of sample		Soil	Soil
Date extracted	-	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022
alpha-BHC	mg/kg	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	86	79

Organophosphorus Pesticides in Soil						
Our Reference		289028-6	289028-9	289028-11	289028-12	289028-15
Your Reference	UNITS	119	123	125	127	130
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	22/02/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	104	103	93	91

Organophosphorus Pesticides in Soil						
Our Reference		289028-17	289028-19	289028-21	289028-22	289028-23
Your Reference	UNITS	132	134	137	138	D1LAH
Depth		0.0-0.1	0.3	0.3	0.0-0.1	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	83	86	79

Organophosphorus Pesticides in Soil			
Our Reference		289028-24	289028-25
Your Reference	UNITS	D2LAH	D3LAH
Depth		-	-
Date Sampled		08/02/2022	08/02/2022
Type of sample		Soil	Soil
Date extracted	-	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	86	79

PCBs in Soil						
Our Reference		289028-6	289028-9	289028-11	289028-12	289028-15
Your Reference	UNITS	119	123	125	127	130
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	22/02/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	104	103	93	91

PCBs in Soil						
Our Reference		289028-17	289028-19	289028-21	289028-22	289028-23
Your Reference	UNITS	132	134	137	138	D1LAH
Depth		0.0-0.1	0.3	0.3	0.0-0.1	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	83	86	79

PCBs in Soil			
Our Reference		289028-24	289028-25
Your Reference	UNITS	D2LAH	D3LAH
Depth		-	-
Date Sampled		08/02/2022	08/02/2022
Type of sample		Soil	Soil
Date extracted	-	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	86	79

Acid Extractable metals in soil						
Our Reference		289028-1	289028-2	289028-3	289028-4	289028-5
Your Reference	UNITS	1	2	3	4	5
Depth		0.0-0.1	0.0-0.1	0.3	0.0-0.1	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	6	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	8	5	4	4	4
Copper	mg/kg	5	2	1	4	16
Lead	mg/kg	24	26	5	10	17
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	2	2	4	2
Zinc	mg/kg	48	12	9	38	20

Acid Extractable metals in soil						
Our Reference		289028-6	289028-7	289028-8	289028-9	289028-10
Your Reference	UNITS	119	121	122	123	124
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.5
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	5	<4	4	<4	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	6	5	5	12
Copper	mg/kg	1	2	<1	<1	5
Lead	mg/kg	9	7	8	9	13
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	2	1	2	13
Zinc	mg/kg	13	12	4	11	38

Acid Extractable metals in soil						
Our Reference		289028-11	289028-12	289028-13	289028-14	289028-15
Your Reference	UNITS	125	127	128	129	130
Depth		0.3	0.0-0.1	0.0-0.1	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	8	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	6	6	6	5
Copper	mg/kg	7	6	1	2	2
Lead	mg/kg	13	8	9	10	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	14	3	2	2	3
Zinc	mg/kg	31	8	9	12	11

Acid Extractable metals in soil						
Our Reference		289028-16	289028-17	289028-18	289028-19	289028-20
Your Reference	UNITS	131	132	133	134	136
Depth		0.5	0.0-0.1	0.3	0.3	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	8	<4	5	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	6	10	4	6
Copper	mg/kg	3	<1	4	<1	3
Lead	mg/kg	14	7	11	4	11
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	2	6	2	3
Zinc	mg/kg	28	6	17	5	25

Acid Extractable metals in soil						
Our Reference		289028-21	289028-22	289028-23	289028-24	289028-25
Your Reference	UNITS	137	138	D1LAH	D2LAH	D3LAH
Depth		0.3	0.0-0.1	-	-	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	<4	<4	6	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	8	12	4	4
Copper	mg/kg	2	2	5	<1	1
Lead	mg/kg	6	9	13	3	4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	6	8	2	2
Zinc	mg/kg	7	16	26	6	6

Moisture						
Our Reference		289028-1	289028-2	289028-3	289028-4	289028-5
Your Reference	UNITS	1	2	3	4	5
Depth		0.0-0.1	0.0-0.1	0.3	0.0-0.1	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	25	16	9.1	19	9.2

Moisture						
Our Reference		289028-6	289028-7	289028-8	289028-9	289028-10
Your Reference	UNITS	119	121	122	123	124
Depth		0.3	0.0-0.1	0.3	0.0-0.1	0.5
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	21	16	11	13	14

Moisture						
Our Reference		289028-11	289028-12	289028-13	289028-14	289028-15
Your Reference	UNITS	125	127	128	129	130
Depth		0.3	0.0-0.1	0.0-0.1	0.0-0.1	0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	18	15	11	16	10

Moisture						
Our Reference		289028-16	289028-17	289028-18	289028-19	289028-20
Your Reference	UNITS	131	132	133	134	136
Depth		0.5	0.0-0.1	0.3	0.3	0.0-0.1
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	16	13	16	10	16

Moisture						
Our Reference		289028-21	289028-22	289028-23	289028-24	289028-25
Your Reference	UNITS	137	138	D1LAH	D2LAH	D3LAH
Depth		0.3	0.0-0.1	-	-	-
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/02/2022	21/02/2022	21/02/2022	21/02/2022	21/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	13	14	15	9.7	11

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

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

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date extracted	-			21/02/2022	1	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			21/02/2022	1	21/02/2022	21/02/2022		21/02/2022	21/02/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	89	101
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	89	101
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	87	101
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	87	100
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	87	98
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	93	104
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	92	102
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	88	1	68	67	1	85	93

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date extracted	-			[NT]	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			[NT]	11	21/02/2022	21/02/2022		23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	85	92
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	85	92
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	86	96
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	94	99
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	81	91
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	81	86
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	81	87
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	81	96	17	80	88

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	21/02/2022	21/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	23/02/2022	23/02/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	21	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	21	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	21	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	21	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	21	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	21	89	85	5	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date extracted	-			21/02/2022	1	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			23/02/2022	1	23/02/2022	23/02/2022		23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	79	90
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	67	80
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	91	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	79	90
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	67	80
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	91	#
Surrogate o-Terphenyl	%		Org-020	75	1	84	81	4	108	111

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date extracted	-			[NT]	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			[NT]	11	23/02/2022	23/02/2022		23/02/2022	23/02/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	83	82
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	70	74
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	91	95
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	83	82
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	70	74
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	91	95
Surrogate o-Terphenyl	%		Org-020	[NT]	11	80	82	2	88	97

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	21/02/2022	21/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	23/02/2022	23/02/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	21	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	21	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	21	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	21	72	71	1	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date extracted	-			21/02/2022	1	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			21/02/2022	1	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	101
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	123
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	124
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	102	116
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.3	29	102	119
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.4	0.3	29	105	113
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	79	79
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.3	0.2	40	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.2	0.1	67	124	130
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	92	1	94	103	9	85	94

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date extracted	-			[NT]	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			[NT]	11	21/02/2022	21/02/2022		22/02/2022	22/02/2022
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	107	103
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	95	103
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	93	95
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	106	94
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	114	104
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	113	105
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	77	71
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	112	110
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	110	112	2	99	89

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	21/02/2022	21/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	22/02/2022	22/02/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	21	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	21	85	96	12	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date extracted	-			21/02/2022	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			21/02/2022	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	100	124
HCB	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	106	128
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	99	111
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	107	120
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	104	126
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	101	119
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	104	120
Endrin	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	92	113
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	96	116
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	108	130
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	95	11	103	102	1	89	99

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date extracted	-			[NT]	21	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			[NT]	21	22/02/2022	22/02/2022		22/02/2022	22/02/2022
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	98	96
HCB	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	103	99
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	109	97
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	116	111
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	112	104
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	115	109
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	122	108
Endrin	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	100	111
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	116	108
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	112	94
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	21	83	82	1	84	80

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date extracted	-			21/02/2022	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			21/02/2022	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	114	128
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	104	118
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	91	111
Malathion	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	120	115
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	112	122
Parathion	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	89	107
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	102	131
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	95	11	103	102	1	89	99

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date extracted	-			[NT]	21	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			[NT]	21	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	97	103
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	114	108
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	63	69
Malathion	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	108	110
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	120	108
Parathion	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	72	70
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	90	90
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	21	83	82	1	84	80

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date extracted	-			21/02/2022	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			21/02/2022	11	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	105	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	95	11	103	102	1	89	99

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date extracted	-			[NT]	21	21/02/2022	21/02/2022		21/02/2022	21/02/2022
Date analysed	-			[NT]	21	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	120	100
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	21	83	82	1	84	80

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	289028-6
Date prepared	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Date analysed	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Arsenic	mg/kg	4	Metals-020	<4	1	6	<4	40	102	94
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	103	85
Chromium	mg/kg	1	Metals-020	<1	1	8	8	0	105	90
Copper	mg/kg	1	Metals-020	<1	1	5	5	0	104	100
Lead	mg/kg	1	Metals-020	<1	1	24	32	29	104	86
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	100	125
Nickel	mg/kg	1	Metals-020	<1	1	5	5	0	104	89
Zinc	mg/kg	1	Metals-020	<1	1	48	48	0	103	85

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	289028-22
Date prepared	-			[NT]	11	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Date analysed	-			[NT]	11	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Arsenic	mg/kg	4	Metals-020	[NT]	11	8	8	0	96	94
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	97	87
Chromium	mg/kg	1	Metals-020	[NT]	11	16	19	17	97	91
Copper	mg/kg	1	Metals-020	[NT]	11	7	7	0	98	97
Lead	mg/kg	1	Metals-020	[NT]	11	13	14	7	97	89
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	118	123
Nickel	mg/kg	1	Metals-020	[NT]	11	14	15	7	97	92
Zinc	mg/kg	1	Metals-020	[NT]	11	31	30	3	97	87

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	21	22/02/2022	22/02/2022		[NT]	[NT]
Date analysed	-			[NT]	21	22/02/2022	22/02/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	21	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	21	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	21	3	4	29	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	21	2	2	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	21	6	5	18	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	21	2	2	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	21	7	7	0	[NT]	[NT]

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

PAHs in Soil: The laboratory RPD acceptance criteria has been exceeded for 288062-1. Therefore a triplicate result has been issued as laboratory sample number 288062-27.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Sample 288062-1 was sub-sampled from a jar provided by the client.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, samples 288062-3, 6, 7, 10, 19 are below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

TRH Soil C10-C40 NEPM - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample 289028-6ms have caused interference.

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customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 289446

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**204921.00, Gillieston Heights**
Number of Samples	5 Soil
Date samples received	22/02/2022
Date completed instructions received	22/02/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	01/03/2022
Date of Issue	01/03/2022

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

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

Results Approved By
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

Asbestos ID - soils NEPM						
Our Reference		289446-1	289446-2	289446-3	289446-4	289446-5
Your Reference	UNITS	3/0.3	5/0-0.1	127/0-0.1	136/0-0.1	137/0.3
Date Sampled		08/02/2022	08/02/2022	08/02/2022	08/02/2022	08/02/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022	01/03/2022
Sample mass tested	g	659.31	658.19	638.83	526.27	470.31
Sample Description	-	Beige fine-grained soil & rocks	Beige fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

Result Definitions

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

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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CERTIFICATE OF ANALYSIS 291536

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**204921.00 Gillieston Heights**
Number of Samples	5 Soil, 1 Material
Date samples received	22/03/2022
Date completed instructions received	22/03/2022

Analysis Details

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

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

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

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

Report Details

Date results requested by	01/04/2022
Date of Issue	31/03/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Wonnie Condos
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Greta Petzold, Senior Report Coordinator
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

Micro testing in soil					
Our Reference		291536-3	291536-4	291536-5	291536-6
Your Reference	UNITS	302	303	304	305
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		21/03/2022	21/03/2022	21/03/2022	21/03/2022
Date of testing	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Faecal Coliforms in soil	MPN/100g	>180,000	35,000	3,300	3,100
E Coli in soil	MPN/100g	>180,000	35,000	200	<200

Asbestos ID - soils NEPM - ASB-001		
Our Reference		291536-1
Your Reference	UNITS	301/0-0.05
Type of sample		Soil
Date Sampled		21/03/2022
Date analysed	-	28/03/2022
Sample mass tested	g	558.19
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos[#1]	g/kg	8.4870
Asbestos ID in soil <0.1g/kg*	-	See Above
ACM >7mm Estimation*	g	4.7373
FA and AF Estimation*	g	–
ACM >7mm Estimation*	%(w/w)	0.8487
FA and AF Estimation*#2	%(w/w)	<0.001

Asbestos ID - materials		
Our Reference		291536-2
Your Reference	UNITS	301/A
Type of sample		Material
Date Sampled		21/03/2022
Date analysed	-	24/03/2022
Mass / Dimension of Sample	-	90x70x5mm
Sample Description	-	Beige fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected
Trace Analysis	-	[NT]

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Ext-008	Subcontracted to Sonic Food & Water Testing. NATA Accreditation No. 4034.

Result Definitions

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

Quality Control Definitions

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

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

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

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

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

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

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Factual description of asbestos identified in the soil samples: NEPM
Sample 291536-1; Chrysotile, Amosite and Crocidolite asbestos identified in 31.5823g of fibre cement material >7mm

Microbiology analysed by Sonic Food & Water Testing. Report No. W2206862
The time between collection and the commencement of testing should not exceed 24 hours. Samples tested outside this time may have their results compromised

Appendix F

Data Quality Report
Site Assessment Criteria
Fieldwork Methodology
Chain of Custody (Field and Despatch)
Sample Receipt

Appendix F
Data Quality Report
527 Cessnock Road, Gillieston Heights

F1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	5% of primary samples; <30% RPD	PC
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As laboratory certificate	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

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

The RPD results were all within the acceptable range, with the exception of those indicated in bold in Table F1. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL;

- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

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

F2.0 Data Quality Indicators

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

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

Table 2: Data Quality Indicators

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

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

F3.0 Conclusion

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

F4.0 References

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

Douglas Partners Pty Ltd

Table F1: Relative Percentage Difference Results – Intra-laboratory Replicates

			Metals								TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene b	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
D1LAH	0 m	08 Feb 2022	6	<0.4	12	5	13	<0.1	8	26	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
130	0.3 m	08 Feb 2022	<4	<0.4	5	2	8	<0.1	3	11	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
		Difference	2	0	7	3	5	0	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	**40%**	0%	**82%**	**86%**	**48%**	0%	**91%**	**81%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
D2LAH	0 m	08 Feb 2022	<4	<0.4	4	<1	3	<0.1	2	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
134	0.3 m	08 Feb 2022	<4	<0.4	4	<1	4	<0.1	2	5	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
		Difference	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	0%	0%	29%	0%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
D3LAH	0 m	08 Feb 2022	<4	<0.4	4	1	4	<0.1	2	6	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
137	0.3 m	08 Feb 2022	<4	<0.4	3	2	6	<0.1	2	7	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.1	<0.05	<0.5	<0.05
		Difference	0	0	1	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	29%	**67%**	**40%**	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table F1: Relative Percentage Difference Results – Intra-laboratory Replicates (continued)

			OCP											OPP	PCB									Asbestos
			DDD	DDT+DDE+DDD c	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Arochlor 1016	Total PCB	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Asbestos Comment
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
D1LAH	0 m	08 Feb 2022	<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	NT
130	0.3 m	08 Feb 2022	<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	NT
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
D2LAH	0 m	08 Feb 2022	<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	NT
134	0.3 m	08 Feb 2022	<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	NT
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-
D3LAH	0 m	08 Feb 2022	<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	NT
137	0.3 m	08 Feb 2022	<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	NT
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-

Appendix F
Site Assessment Criteria
527 Cessnock Road, Gillieston Heights

F1.0 Introduction

F1.1 Guidelines

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

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013);
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011); and
- NSW EPA *Use and Disposal of Biosolids Products* (NSW EPA, 1997).

F1.2 General

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

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

- Land use: residential;
    - o Corresponding to land use category 'A', residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry)), also includes children's day care centres, preschools and primary schools.
- Soil type: clay.

F2.0 Soils

F2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-A
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	6000
Lead	300
Manganese	3800
Mercury (inorganic)	40
Nickel	400
Zinc	7400
PAH	
B(a)P TEQ	3
Total PAH	300
OCP	
DDT+DDE+DDD	240
Aldrin and dieldrin	6
Chlordane	50
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxychlor	300
OPP	
Chlorpyrifos	160
PCB	
PCB	1

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B	HSL-A&B	HSL-A&B
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	0.7	1	2	3
Toluene	480	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	110	310	NL	NL
Naphthalene	5	NL	NL	NL
TRH F1	50	90	150	290
TRH F2	280	NL	NL	NL

Notes to Table 2: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

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

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-A	DC HSL-IMW
Benzene	100	1100
Toluene	14 000	120 000
Ethylbenzene	4500	85 000
Xylenes	12 000	130 000
Naphthalene	1400	29 000
TRH F1	4400	82 000
TRH F2	3300	62 000
TRH F3	4500	85 000
TRH F4	6300	120 000

Notes to Table 3: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

IMW intrusive maintenance worker

F2.2 Asbestos in Soil

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

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

The HSL are in Table 4.

Table 4: Health Screening Levels for Asbestos

Form of Asbestos	HSL-A
ACM	0.01%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes to Table 4: Surface soils defined as top 10 cm.
* Based on site observations at the sampling points and the analytical results of surface samples.

F2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 6, with inputs into their derivation shown in Table 5.

Table 5: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	"Aged" (>2 years) / "new" (<2 years)	
pH	4.0	Conservative assumption of clay pH
CEC	5 $cmol_c$/kg	Conservative assumption of clay CEC
Clay content	%	Conservative assumption of clay content
Traffic volumes	high	Residential subdivision, adjacent to main road
State / Territory	NSW	

Table 6: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	65
Nickel	35
Chromium III	410
Lead	1100
Zinc	190
PAH	
Naphthalene	170
OCP	
DDT	180

Notes to Table 6: EIL-A-B-C urban residential and public open space

F2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 7.

Table 7: Ecological Screening Levels (mg/kg)

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

Notes to Table 7: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
EIL-A-B-C urban residential and public open space

F2.5 Management Limits

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

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

The adopted management limits are in Table 8.

Table 8: Management Limits (mg/kg)

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

Notes to Table 8: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene
ML-A-B-C residential, parkland and public open space

F2.6 Microbiological Criteria

In the absence of land use criteria for microbiological contaminants, Stabilisation Grade A criteria for microbiological contamination in biosolids have been adopted from NSW EPA Environmental Guidelines: Use and Disposal of Biosolids Products (NSW EPA, 1997). The guidelines are summarised in Table 9 below.

Table 9: Stabilisation Grade A Microbiological Standards (MPN/100 g)

Contaminant	Standard
E.Coli	<10000
Faecal Coliforms	<100000

Notes to Table 9: MPN – most probable number

F2.7 Waste Classification

The contaminant concentration criteria in the NSW EPA Waste Classification Guidelines: Part 1 – Classifying Waste (NSW EPA , 2014) are considered to be appropriate for the assessment of soils for disposal to an appropriately licensed landfill. The adopted criteria are presented in Tables B5 and B6, Appendix E.

F3.0 References

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

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

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

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Appendix F
Field Work Methodology
527 Cessnock Road, Gillieston Heights

F1.0 Guidelines

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

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

F2.0 Soil Sampling

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

- Collect soil samples directly from the excavator bucket at the nominated sample depth;
- Collect near surface samples using hand tools;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for PID screening;
- Collect ~500 ml samples for FA and AF analysis;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

F2.1 Field Testing

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

PID Field Test

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;

- Allow the headspace in the PID zip-lock bag samples to equilibrate; and
- Screen using the PID.

F3.0 References

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

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CHAIN OF CUSTODY FIELD SHEET

Project No: 204921	**Client Project Name:** Proposed Residential Subdivision		
Client: Walker Corporation	**Location:** 527 Cessnock Road Gillieston Heights		
Project Manager: PH	**DP Lab Received**	By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
Pit 6	0-0.1		S	G/P		LAH	25/1/22	915		✓			
	0.4									✓			
	0.6												
Pit 7	0.0-0.1	D1								✓			
	0.5												
Pit 8	0-0.01												
	0.3									✓			
	0.5												
	1.0												
Pit 14	0-0.1	D2											
	0.5												
Pit 11	0-0.1												
	0.3									✓			
	0.6												
	0.8												

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab B Provide name of Lab 2 C Provide name of Lab 3

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Bulks + U50 stored in bay

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Client: Walker Corporation	**Location:** 527 Cessnock Road Gillieston Heights		
Project Manager: PH	**DP Lab Received**	By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 [A]	Lab 2 [B]	Lab 3 [C]	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date	Date	Date	
Pit 10	0-0.05		S	G/P		LAH	25/1/22						
	0.4									✓			
	0.6									✓			
Pit 13	0-0.1	D3											
	0.3												
	0.6												
Pit 12	0-0.05									✓			
	0.3												
	~~0.6~~												
	0.5												
	1.0												
Pit 15	0-0.05									✓			
	0.5												
	1.0												

* **Default storage:** glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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Client: Walker Corporation	**Location:** 527 Cessnock Road Gillieston Heights		
Project Manager: PH	**DP Lab Received**	By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 A	Lab 2 B	Lab 3 C	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date	Date	Date	
101/0.05	0.05		S	G, P		JRK	27/1/22	11:00	Fridge /	✓			
101/0.5	0.5								Bay 111				
102/0.05	0.05									✓			
102/0.5	0.5												
103/0.05	0.05									✓			
103/0.5	0.5												
104/0.05	0.05												
104/0.5	0.5									✓			
105/0.05	0.05									✓			
105/0.5	0.5												
106/0.05	0.05									✓			
106/0.5	0.5												
108/0.05	0.05	D1/JRK								✓			
108/0.5	0.5												
109/0.05	0.05									✓			
109/0.5	0.5							15:30					
107/0.05	0.05									✓			

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab B Provide name of Lab 2 C Provide name of Lab 3

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Project No: 204921	**Client Project Name:**	Proposed Residential Subdivision	
Client: Walker Corporation	**Location:**	527 Cessnock Road Gillieston Heights	
Project Manager: PH		**DP Lab Received** By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling			Storage Locn *	Lab 1 A	Lab 2 B	Lab 3 C	
						By	Date	Time		Date	Date	Date	
107/0.5	0.5		S	G,P		JRK	28/1/22	8:00	Fridge / Bay 111	✓			
110/0.05	0.05	D2/JRK											
110/0.5	0.5									✓			
111/0.05	0.05												
111/0.5	0.5									✓			
112/0.05	0.05												
112/0.5	0.5												
113/0.05	0.05												
113/0.5	0.5									✓			
114/0.05	0.05												
114/0.5	0.5									✓			
116/0.05	0.05												
116/0.5	0.5												
117/0.05	0.05												
117/0.5	0.5									✓			
118/0.05	0.05												
118/0.5	0.5							15:30					

* **Default storage:** glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab B Provide name of Lab 2 C Provide name of Lab 3

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Client: Walker Corporation	Location: 527 Cessnock Road Gillieston Heights		
Project Manager: PH		DP Lab Received By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 [A]	Lab 2 [B]	Lab 3 [C]	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date	Date	Date	
120/0.05	0.05		S	G, P		JRK	28/1/22	8:00	Fridge/	✓			
120/0.5	0.5								Bay 111				
126/0.05	0.05												
126/0.5	0.5												
135/0.05	0.05												
135/0.5	0.5							15:30					

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab   B Provide name of Lab 2   C Provide name of Lab 3

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Client: Walker Corporation	Location: 527 Cessnock Road Gillieston Heights		
Project Manager: PH		DP Lab Received	By: Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling			Storage Locn *	Lab 1 [A]	Lab 2 [B]	Lab 3 [C]	
						By	Date	Time		Date	Date	Date	
121	0-0.1		S	G P		LAH	7/2/22			✓			
	0.3												
	0.5												
124	0-0.1									✓			
	0.3												
	0.5												
	1.0												
	0.5-0.75	U50							Bag 112				
125	0-0.1									✓			
	0.3												
	0.5												
	0.4-0.5	Bulk							Bag 112				
	0.8/1.0	Bulk							Bag 112				
130	0-0.1									✓ + DILAH			
	0.3	DILAH											
	0.5												
	0.5-0.8	Bulk							Bag 112				

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab

B Provide name of Lab 2

C Provide name of Lab 3

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Project No: 204921	Client Project Name: Proposed Residential Subdivision		
Client: Walker Corporation	Location: 527 Cessnock Road Gillieston Heights		
Project Manager: PH	DP Lab Received	By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling			Storage Locn *	Lab 1 [A]	Lab 2 [B]	Lab 3 [C]	
						By	Date	Time		Date	Date	Date	
131	0-0.		S	G P		LAH	7/2/22			✓			
	0.3												
	0.5								Bag 1/2				
	0.5-0.6	Bulk											
133	0-0.1									✓			
	0.3												
	0.5												
	1.0								Bag 1/2				
	0.4-0.6	Bulk											
134	0-0.1									✓+D2LAH			
	0.3	D2LAH											
	0.5								Bag 1/2				
	0.4-0.6	Bulk											

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab

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Client: Walker Corporation	Location: 527 Cessnock Road Gillieston Heights		
Project Manager: PH		DP Lab Received By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field: Sample ID	Depth (m)	Duplicate Sample	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	ASS Samples	Sampling: By	Sampling: Date	Sampling: Time	DP Lab: Storage Locn *	For Despatch to: Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	Notes
136	0-0.1		S	GP		LAH	7/2/22			✓			
	0.3												
	0.5												
	1.2												
	0.8-1.0	Bulk							Bay 112				
137	0-0.1									✓+D3LAH			
	0.3	D3LAH											
	0.5												
	1.5												
	0.5-0.8	Bulk							Bay 112	✓			
138	0-0.1												
	0.3												
	0.5												
	0.4-0.75	U50							Bay 112				

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab

B Provide name of Lab 2

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CHAIN OF CUSTODY FIELD SHEET

Project No: 204921	**Client Project Name:** Proposed Residential Subdivision		
Client: Walker Corporation	**Location:** 527 Cessnock Road Gillieston Heights		
Project Manager: PH		**DP Lab Received** By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
122	0-0.1		S	G P		LAHTEB	8/12/22		Bay 12	✓			
	0.3												
	0.5												
	1.0												
119	0-0.1									✓			
	0.3												
	0.5												
	1.0												
	0.8-1.9	Bulk								✓			
132	0-0.1												
	0.3	DSALAH											
	0.5, 1.0												
5	0-0.1, 0.3												
1	0-0.1, 0.3												
2	0-0.1, 0.3												
3	0-0.1, 0.3												
4	0-0.1, 0.3												

* **Default storage:** glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab

B Provide name of Lab 2

C Provide name of Lab 3

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CHAIN OF CUSTODY FIELD SHEET

Project No: 204921	Client Project Name: Proposed Residential Subdivision		
Client: Walker Corporation	Location: 527 Cessnock Road Gillieston Heights		
Project Manager: PH		DP Lab Received By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Depth (m)	Duplicate Sample	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	ASS Samples	Sampling By	Sampling Date	Sampling Time	DP Lab Storage Locn *	Lab 1 A Date	Lab 2 B Date	Lab 3 C Date	Notes
~~130~~ 128	0-0.1		S	G P		LAH/TLW	8/2/22		Bay 11C	✓			
	0.3, 0.5												
	1.0												
	0.4-1.3	Bulk								✓			
129	0-0.1												
	0.3	D4LAH											
	0.5												
	1.0												
	0.55-1.2	Bulk								✓			
123	0-0.1												
	0.3, 0.5												
	1.6												
	0.4-0.9	Bulk								✓			
127	0-0.1, 0.3												
	1.0, 2.0												
	0.5-1.7	Bulk											

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 Envirolab
B Provide name of Lab 2
C Provide name of Lab 3

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Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY FIELD SHEET

Project No: 204921	Client Project Name: Proposed Residential Subdivision		
Client: Walker Corporation	Location: 527 Cessnock Road Gillieston Heights		
Project Manager: PH	DP Lab Received	By:	Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
301	0–0.05		S	P	—	LAH	2/3/21	7:30		✓			
	0.15									✓			
302	0–0.05									✓			
303	0–0.05									✓			
304	0–0.05									✓			
305	0–0.05		✓	✓		✓	✓	✓		✓			
301/A	—		✓	✓		✓	✓	✓					

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204921.00	**Suburb:**	Gillieston Heights	**To:**	Envirolab
Project Name:	Gillieston Heights	**Order Number**			12 Ashley Street Chatswood
Project Manager:	PH	**Sampler:**	LAH/JRK	**Attn:**	Simon Song
Emails:				**Phone:**	02 91006200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 288062
Date Received: 4/2/22
Time Received: 1040
Received By: JD
Temp: Cool/Ambient 9°C
Cooling: Ice/Icepack
Security: Intact

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml			Notes/preservation
6/0.0-0.1	1	25/01/22	S	G/P	✓	✓	✓	✓		✓			combo 6a (500 ml asb)
6/0.4	2				✓		✓	✓					combo 3
7/0.0-0.1	3				✓	✓	✓	✓		✓			combo 6a (500 ml asb)
8/0.3	4				✓		✓	✓		✓			combo 3a (500 ml asb)
10/0.4	5				✓		✓	✓					combo 3
11/0.3	6				✓	✓	✓	✓		✓			combo 6a (500 ml asb)
12/0.3	7				✓	✓	✓	✓		✓			combo 6a (500 ml asb)
13/0.0-0.1	8				✓		✓	✓					combo 3
15/0.5	9				✓		✓	✓					combo 3
101/0.0-0.05	10				✓	✓	✓	✓		✓			combo 6
102/0.05	11				✓		✓	✓					combo 3
103/0.05	12				✓		✓	✓					combo 3
104/0.5	13				✓		✓	✓					combo 3
105/0.05	14				✓		✓	✓					combo 3
106/0.05	15				✓		✓	✓					combo 3
PQL (S) mg/kg													ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit
Metals to Analyse: 8HM unless specified here:
Lab Report/Reference No: 288062
Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**
Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**
Signed: **Received by:** Jason Ding ELS SYD **Date & Time:** 4/2/22 1040
9°C

Douglas Partners Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204921.00	**Suburb:**	Gillieston Heights	**To:**	Envirolab
Project Name:	Gillieston Heights	**Order Number**			12 Ashley Street Chatswood
Project Manager:	PH	**Sampler:**	LAH/JRK	**Attn:**	Simon Song
Emails:				**Phone:**	02 91006200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	
Prior Storage:	☐ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservation
107/0.05	16				✓		✓	✓						combo 3
108/0.05	17				✓	✓	✓	✓		✓				combo 6a (500 ml asb)
109/0.5	18				✓		✓	✓						combo 3
110/0.05	19				✓	✓	✓	✓		✓				combo 6a (500 ml asb)
111/0.05	20				✓		✓	✓						combo 3
112/0.05	21				✓		✓	✓						combo 3
~~113/1.0~~					✓		✓	✓						combo 3
114/0.05	22				✓		✓	✓						combo 3
116/0.05	23				✓	✓	✓	✓						combo 6
118/0.05	24				✓		✓	✓						combo 3
120/0.05	25				✓		✓	✓						combo 3
~~126/1.0~~					✓		✓	✓						combo 3
135/0.05	26				✓		✓	✓						combo 3
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

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

Lab Report/Reference No: 288062

Metals to Analyse: 8HM unless specified here:

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

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

Signed: **Received by:** [illegible] Day ELS Stn **Date & Time:** 4/2/22 1040

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204921.00	**Suburb:**	Gillieston Heights	**To:**	Envirolab
Project Name:	Gillieston Heights	**Order Number**			12 Ashley Street Chatswood
Project Manager:	PH	**Sampler:**	LAH/TLG	**Attn:**	Simon Song
Emails:	patrick.heads@douglaspartners.com.au			**Phone:**	02 91006200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	
Prior Storage:	☐ Esky ☒ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☒ No ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200
Job No: 289028
Date Received: 17/2/22
Time Received: 1110
Received By: AB
Temp: Cool/Ambient
Cooling: Ice/Icepack 12°
Security: Intact/Broken/None

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservation
1/0.0-0.1	1	08/02/22	S	G/P	✓		✓	✓						combo 3
2/0-0.1	2				✓		✓	✓						combo 3
3/0.3	3				✓		✓	✓		✓				combo 3a (500 ml asb)
4/0-0.1	4				✓		✓	✓						combo 3
5/0-0.1	5				✓		✓	✓		✓				combo 3a (500 ml asb)
119/0.3	6				✓	✓	✓	✓						combo 6
121/0-0.1	7				✓		✓	✓						combo 3
122/0.3	8				✓		✓	✓						combo 3
123/0-0.1	9				✓	✓	✓	✓						combo 6
124/0.5	10				✓		✓	✓						combo 3
125/0.3	11				✓	✓	✓	✓						combo 6
127/0-0.1	12				✓	✓	✓	✓		✓				combo 6a (500 ml asb)
128/0-0.1	13				✓		✓	✓						combo 3
129/0-0.1	14				✓		✓	✓						combo 3
130/0.3	15				✓	✓	✓	✓						combo 6
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: 25 **Relinquished by:** LAH **Transported to laboratory by:**

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

Signed: **Received by:** A·BM, ELS MD **Date & Time:** 17/2/22 1110

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204921.00	**Suburb:**	Gillieston Heights	**To:**	Envirolab
Project Name:	Gillieston Heights	**Order Number**			12 Ashley Street Chatswood
Project Manager:	PH	**Sampler:**	LAH/TLG	**Attn:**	Simon Song
Emails:	patrick.heads@douglaspartners.com.au			**Phone:**	02 91006200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type S - soil W - water	Container Type G - glass P - plastic	Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservation
131/0.5	16				✓		✓	✓						combo 3
132/0-0.1	17				✓	✓	✓	✓						combo 6
133/0.3	18				✓		✓	✓						combo 3
134/0.3	19				✓	✓	✓	✓						combo 6
136/0-0.1	20				✓		✓	✓		✓				combo 3a (500 ml asb)
137/0.3	21				✓	✓	✓	✓		✓				combo 6a (500 ml asb)
138/0-0.1	22				✓	✓	✓	✓						combo 6
D1LAH	23				✓	✓	✓	✓						combo 6
D2LAH	24				✓	✓	✓	✓						combo 6
D3LAH	25				✓	✓	✓	✓		✓				combo 6a (500 ml asb)
PQL (S) mg/kg											**ANZECC PQLs req'd for all water analytes ☐**			

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

Lab Report/Reference No: 289028

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: 25 **Relinquished by:** LAH **Transported to laboratory by:**

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

Signed: **Received by:** A·Bu, ELS SYD **Date & Time:** 12/2/22 1110

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No: 204921.00	**Suburb:** Gillieston Heights	**To:**	Envirolab
Project Name: Gillieston Heights	**Order Number**		12 Ashley Street Chatswood
Project Manager: PH	**Sampler:** LAH/TLG	**Attn:**	Simon Song
Emails:		**Phone:**	02 91006200
Date Required: Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒		**Email:**	

Prior Storage: ☐ Esky ☐ Fridge ☐ Shelved Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type S - soil W - water	Container Type G - glass P - plastic	Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservation
3/0.3	1	08/02/22	S	P						✓				
5/0-0.1	2	08/02/22	S	P						✓				
127/0-0.1	3	08/02/22	S	P						✓				
136/0-0.1	4	08/02/22	S	P						✓				
137/0.3	5	08/02/22	S	P						✓				
~~DSLAH~~		08/02/22	S	P						✓				Exclude, not taken
[signature]														
PQL (S) mg/kg														

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 189446
Date Received: 22-2-22
Time Received: 1045
Received by: TJHAW
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

ANZECC PQLs req'd for all water analytes ☐

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

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: 5 **Relinquished by:** [signature] **Transported to laboratory by:**

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

Signed: [signature] **Received by:** TJHAW @ ELS Sydney **Date & Time:** 2-2-22 1045

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	204921.00	**Suburb:**	Gillieston Heights	**To:**	Envirolab
Project Name:	Gillieston Heights	**Order Number**			12 Ashley Street Chatswood
Project Manager:	PH	**Sampler:**	LAH	**Attn:**	Simon Song
Emails:	patrick.heads@douglaspartners.com.au			**Phone:**	02 91006200
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ssong@envirolab.com.au

Prior Storage: X Esky ☐ Fridge ☐ Shelved   Do samples contain 'potential' HBM? Yes X No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos ID 500 ml	Asbestos ID Material	Faecal Coliforms and E. Coli		Notes/preservation
301/0-0.05	1	21/3/22	S	P						✓				
301/A	2		material								✓			
302	3		S									✓		
303	4		S									✓		
304	5		S									✓		
305	6		S									✓		Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
														Job No: 291586
														Date Received: 22/03/22
														Time Received: 1130
														Received By: CR
														Temp: Cool/Ambient 15°C
														Cooling: Ice/Icepack
														Security: Intact/Broken/None
PQL (S) mg/kg														

ANZECC PQLs req'd for all water analytes ☐

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

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291536

Total number of samples in container: 6 **Relinquished by:** LAH **Transported to laboratory by:** TNT overnight - 21/3/22

Send Results to: Douglas Partners Pty Ltd **Address** Emails Above **Phone:** 0+249609600 **Fax:**

Signed: **Received by:** ELS Sydney Closeman **Date & Time:** 22/03/22 1130

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details	
Your reference	204921.00, Gillieston Heights
Envirolab Reference	289028
Date Sample Received	17/02/2022
Date Instructions Received	17/02/2022
Date Results Expected to be Reported	28/02/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	25 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12
Cooling Method	Ice
Sampling Date Provided	YES

Comments

No NEPM bags received - for Asbestos 500 ml analysis
NEPM bags to be received - 22/2/2022

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM
1-0.0-0.1	✓	✓	✓				✓	
2-0.0-0.1	✓	✓	✓				✓	
3-0.3	✓	✓	✓				✓	✓
4-0.0-0.1	✓	✓	✓				✓	
5-0.0-0.1	✓	✓	✓				✓	✓
119-0.3	✓	✓	✓	✓	✓	✓	✓	
121-0.0-0.1	✓	✓	✓				✓	
122-0.3	✓	✓	✓				✓	
123-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	
124-0.5	✓	✓	✓				✓	
125-0.3	✓	✓	✓	✓	✓	✓	✓	
127-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓
128-0.0-0.1	✓	✓	✓				✓	
129-0.0-0.1	✓	✓	✓				✓	
130-0.3	✓	✓	✓	✓	✓	✓	✓	
131-0.5	✓	✓	✓				✓	
132-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	
133-0.3	✓	✓	✓				✓	
134-0.3	✓	✓	✓	✓	✓	✓	✓	
136-0.0-0.1	✓	✓	✓				✓	✓
137-0.3	✓	✓	✓	✓	✓	✓	✓	✓
138-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	
D1LAH	✓	✓	✓	✓	✓	✓	✓	
D2LAH	✓	✓	✓	✓	✓	✓	✓	
D3LAH	✓	✓	✓	✓	✓	✓	✓	✓

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details	
Your reference	204921.00, Gillieston Heights
Envirolab Reference	289446
Date Sample Received	22/02/2022
Date Instructions Received	22/02/2022
Date Results Expected to be Reported	01/03/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	25
Cooling Method	None
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

Sample ID	Asbestos ID - soils NEPM
3/0.3	✓
5/0-0.1	✓
127/0-0.1	✓
136/0-0.1	✓
137/0.3	✓

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

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

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details	
Your reference	204921.00 Gillieston Heights
Envirolab Reference	291536
Date Sample Received	22/03/2022
Date Instructions Received	22/03/2022
Date Results Expected to be Reported	29/03/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	5 Soil, 1 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	15
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Nil

Please direct any queries to:

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

Analysis Underway, details on the following page:

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

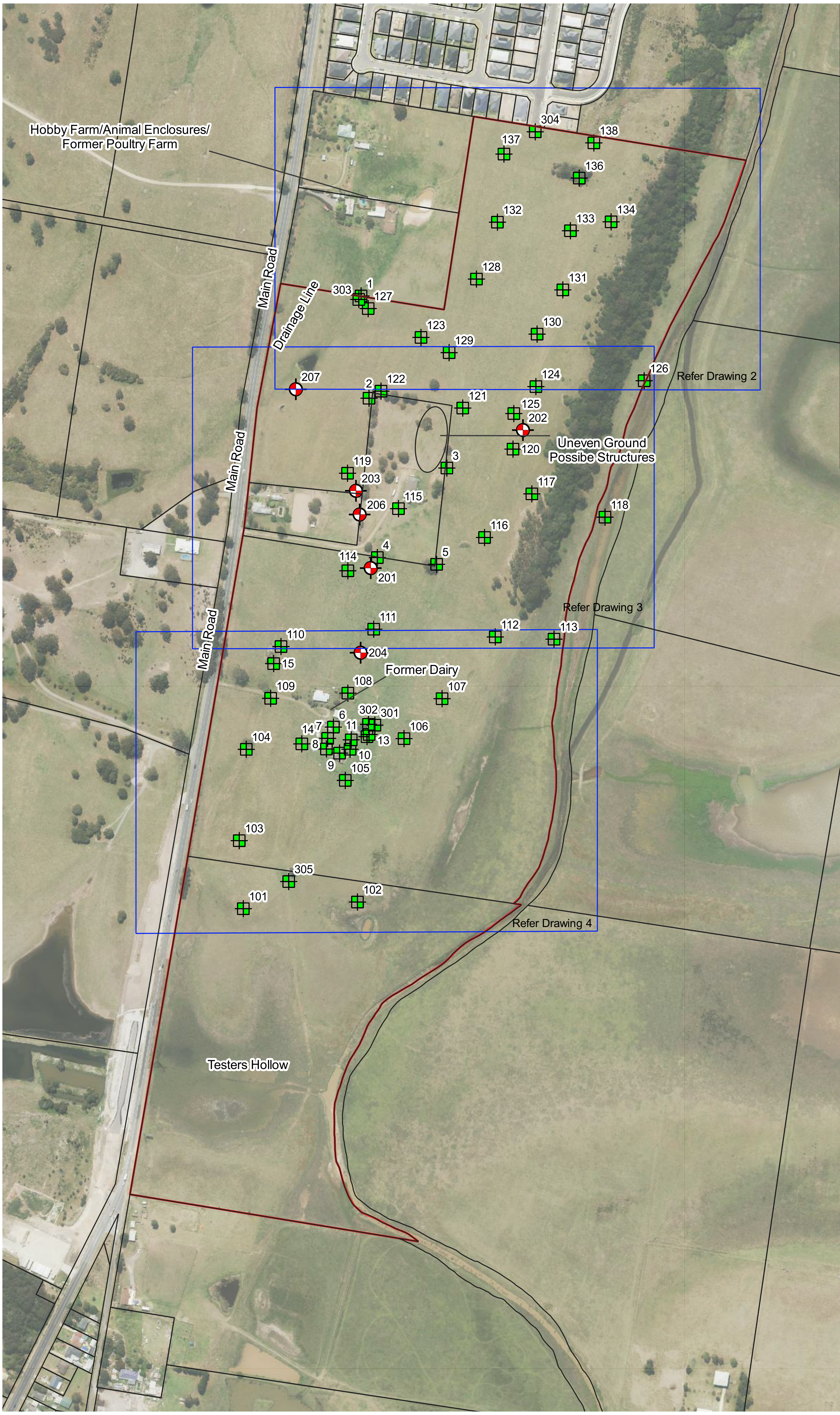
Sample ID	Micro testing in soil	Asbestos ID - soils NEPM - ASB-001	Asbestos ID - materials
301/0-0.05		✓	
301/A			✓
302	✓		
303	✓		
304	✓		
305	✓		

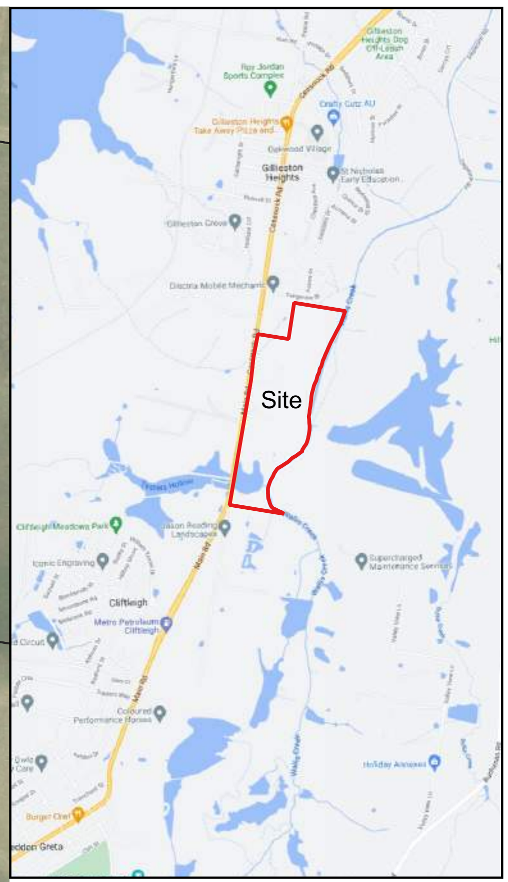
The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

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

Appendix G

Drawings 1 to 4 – Test Location Plan
Preliminary Subdivision Plan (PCB, reference 118763, 26 August 2016)





Site Location

Drawing adapted from Metromap Image dated 9.10.2021

Douglas Partners
Geotechnics | Environment | Groundwater

TITLE: Test Location Plan - Key Plan
Proposed Residential Subdivision
527 Cessnock Road, Gillieston Heights

N

OFFICE: Newcastle
DRAWN BY: PLH
DATE: 11.May.2022

CLIENT: Walker Corporation Pty Ltd	PROJECT No: 204921.00	DRAWING No: 1	REVISION: 0	SCALE: 1:5,000 (A3 Sheet)

Drawing adapted from Metromap Image dated 9.10.2021.
Test location are approximate only and were located using Hand-Held GPS.

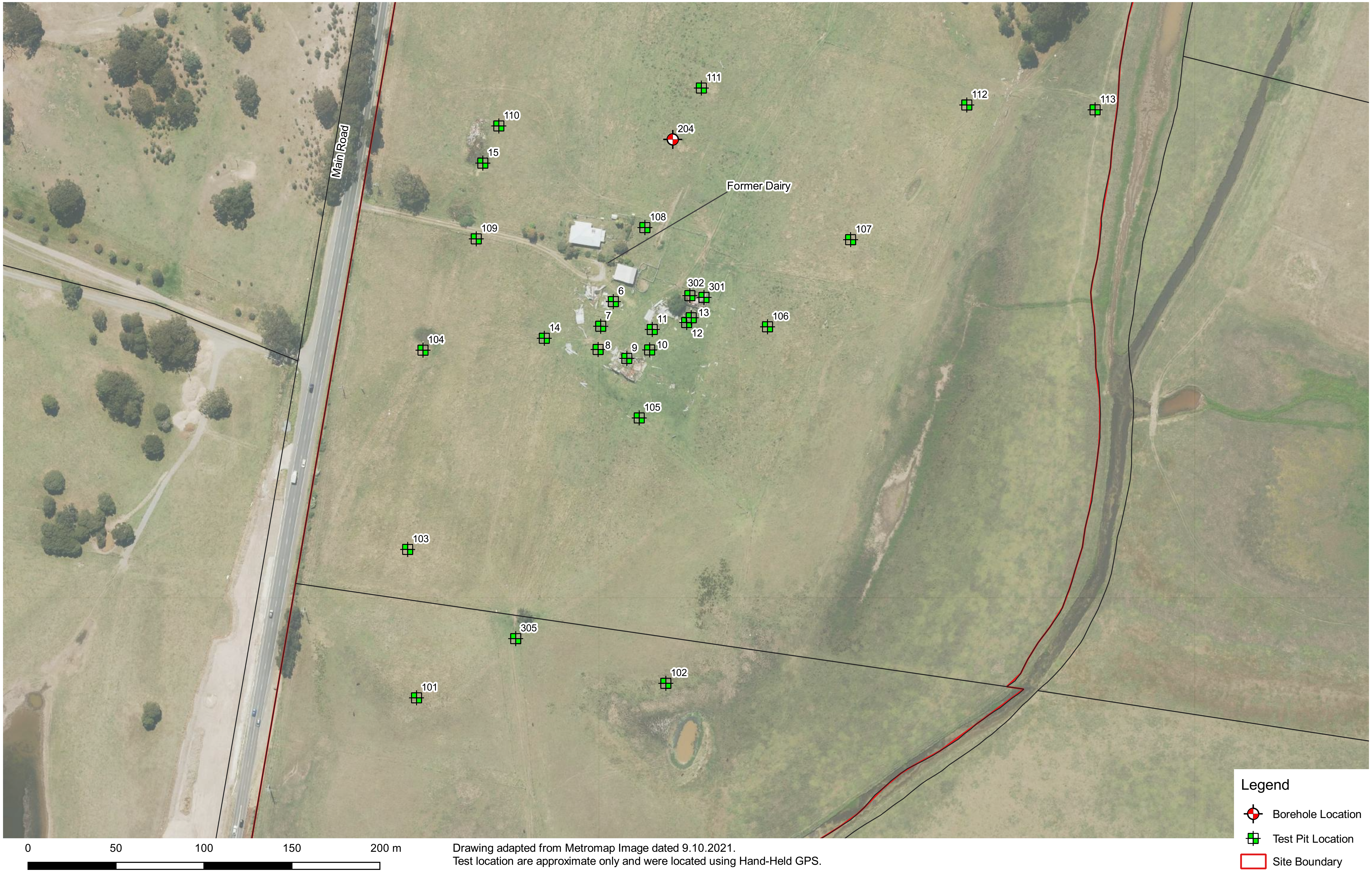
Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Walker Corporation Pty Ltd		TITLE: **Test Location Plan**
OFFICE: Newcastle	DRAWN BY: PLH	**Proposed Residential Subdivision**
SCALE: 1:2,000 @ A3	DATE: 11.May.2022	**527 Cessnock Road, Gillieston Heights**

PROJECT No:	204921.00
DRAWING No:	2
REVISION:	0

Drawing adapted from Metromap Image dated 9.10.2021.
Test location are approximate only and were located using Hand-Held GPS.

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Walker Corporation Pty Ltd	TITLE: **Test Location Plan**	PROJECT No: 204921.00
	OFFICE: Newcastle — DRAWN BY: PLH	**Proposed Residential Subdivision**	DRAWING No: 3
	SCALE: 1:2,000 @ A3 — DATE: 11.May.2022	**527 Cessnock Road, Gillieston Heights**	REVISION: 0



Drawing adapted from Metromap Image dated 9.10.2021.
Test location are approximate only and were located using Hand-Held GPS.

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Walker Corporation Pty Ltd		TITLE:	**Test Location Plan**
OFFICE: Newcastle	DRAWN BY: PLH		**Proposed Residential Subdivision**
SCALE: 1:2,000 @ A3	DATE: 11.May.2022		**527 Cessnock Road, Gillieston Heights**

PROJECT No:	204921.00
DRAWING No:	4
REVISION:	0

PRELIMINARY ONLY
FOR DISCUSSION PURPOSES

237 LOTS

LAYOUT A DESKTOP EXERCISE ONLY
NO SURVEY OR PRELIMINARY ENGINEERING
DESIGN UNDERTAKEN

CONTOURS - FROM LIDAR INFORMATION

FLOOD LEVEL RL 10.2m (ADOPTED)
(CURRENT FLOOD LEVEL 9.73m AHD
- MCC UNDER REVIEW)

INSTRUCTION NUMBER: 07/49
FILE ID: 118763
SURVEYED: N/A
DESIGNED: MAC
DRAWN: MAC
CHECKED: BDK
DATUM: AHD
CONTOUR INTERVAL: 1.0m

NO.	DESCRIPTION	DRAWN	DATE
F	----	----	----
E	----	----	----
D	----	----	----
C	----	----	----
B	----	----	----
A	INITIAL ISSUE	MAC	26/08/16

pcb
PULVER COOPER & BLACKLEY
SURVEYORS TOWN PLANNERS
CIVIL ENGINEERS PROJECT MANAGERS

P.O. Box 729
NEWCASTLE 2300
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98 LAWES STREET
EAST MAITLAND 2323
Ph (02) 4934 3026
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PLAN:
PLAN OF PROPOSED SUBDIVISION
OF LOTS 1 & 2 DP 601226
No's 507 & 527 CESSNOCK ROAD
GILLIESTON HEIGHTS
LGA: MAITLAND

CLIENT:
WALKER CORPORATION
LEVEL 21 GOVERNOR
MACQUARIE TOWER
SYDNEY

40 20 0 40 80 120
Horizontal Scale 1:2000 (A1)
1:4000 (A3)

NO. OF SHEETS
3

SHEET No.
1

Plot Date: 29/08/2016 Cad File: 07_49_Warby – Subdivision Plan (ID 118668)

APPENDIX

E

PRACTICAL ENVIRONMENTAL SOLUTIONS REPORT

Cardno

now

Stantec

Preliminary Site Investigation for Contamination

457-463 Cessnock Road,
GILLIESTON HEIGHTS NSW

Prepared for:

ROTER SAND UNIT TRUST

14 FEBRUARY 2020

Prepared by:

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DISTRIBUTION

DOCUMENT STATUS & REVIEW

Revision	Prepared By	Reviewed By	Date Issued
0	**David McQueeney** **Environmental Scientist** B.EnvScMgt. Practical Environmental Solutions Pty Ltd	**Anthony Milligan | Managing Director** BConMgt (Building), Eng Surv., Occupational Hygiene (BOHS) **SafeWork NSW Asbestos Assessor Licence No. 000161** Practical Environmental Solutions Pty Ltd.	14 February 2020

DISTRIBUTION OF COPIES

Revision	Electronic	Paper	Issued To	Date Issued
0	1	0	**Mr. Lee Bateman** DEVELOPMENT MANAGER Roter Sand Unit Trust. 81 Mustang Drive RUTHERFORD NSW 2320	14 February 2020
0	1	0	**Practical Environmental Solutions Pty Ltd (PES)** Project File	14 February 2020

1 EXECUTIVE SUMMARY

Practical Environmental Solutions (PES) has been commissioned by Mr. Lee Bateman on behalf of Roter Sand Unit Trust (the client) to complete a *Preliminary Site Investigation* (PSI) on two (2) adjoining parcels of land in Gillieston Heights NSW.

The adjoining sites are, respectively, described as Lot 1 & 2 DP 302745 standing at 457 (Lot 1) & 463 (Lot 2) Cessnock Road, Gillieston Heights NSW respectively. The site is located within the Maitland City Council (MCC) LGA.

The site covers an approximate area of 4.95 hectares (Ha) and is graphically represented in Drawing 1, Appendix A. Attached in Appendix B are site identification photographs.

With access to architectural design plans, PES understands that a manufactured housing estate (MHE) development is proposed for the site.

Consequently, this investigation seeks to develop an understanding of the current and historical activities that either have been or are being conducted on the land and its surrounds. This will include assessing Areas of Environmental Concern (AECs) and Potential Contaminants of Concern (PCOCs) and report on the potential for contamination on the site, if any, to impact on the planned, future residential use of the land. Additionally, the investigation will establish the need for further assessment or remediation, if considered necessary.

On Wednesday 29 January 2020, an environmental scientist from PES undertook the field assessment phase of our investigation. The scope of work included a site history investigation, a site 'walkover' and the production of a series of targeted bore holes across both allotments.

Following a review of historical site aerial imagery, PES identified six (6) long sheds (all now demolished) standing on Lot 1. After interviewing the owner of Lot 2, it was confirmed to us that these sheds constituted the built infrastructure of a commercial chicken farm. As a result of this new information, PES returned to site on Monday 03 February 2020 to conduct a more targeted assessment of the areas determined to be the footprint, generally, of the now demolished sheds.

In total, eight (8) soil samples + 1 QA/QC sample were retrieve for analysis from eight (8) discrete locations across the site for the identified PCoCs.

PES compared the results of analysis to the NEPC (2013) Health Investigation / Screening Level 'A' criteria. Following analysis of the samples, no exceedances of the adopted criteria were identified.

Also. PES identified AECs for the hazard, asbestos. These included two (2) small pockets of bonded asbestos fragments in the area of a now demolished shed footprint on Lot 1 (identified in Appendix A, Drawing 3).

PES did not identify any other AECs, including no evidence of contamination such as staining or odours, or agricultural uses such as cattle tick dips or petroleum storage tanks (above or below ground).

The current land use of both sites is equine breeding, with a review of the site history and aerial photographs showing the past history of Lot 1 as a chicken breeding facility with no other indication of intensive agriculture, such as orchards, market gardening or cropping conducted on the land in the past for both Lot 1 and Lot 2.

PES concludes that based on the site history, site walkover and results of the limited sampling, the site is suitable for the proposed redevelopment as a manufactured housing estate following the completion of the below recommendations.

Following the removal of the identified bonded asbestos 'pockets' and issue of an Asbestos Clearance Certificate for this operation, PES recommends an *Unexpected Finds Protocol* be developed to account for any undiscovered ACMs that might be encountered on the site during future construction activities. Also, a hazardous materials audit (HSA) be conducted on the built infrastructure of both properties prior to their demolition.

LIST OF ABBREVIATIONS

ACM - Asbestos Containing Material

AEC - Area of Environmental Concern

AHD - Australian Height Datum

ANZECC - Australian and New Zealand Environment and Conservation Council

B(a)P TEQ - Total equivalents of Benzo(a)Pyrene (carcinogenic compounds)

BGL - Below Ground Level

BH – Borehole

BTEX - Benzene, Toluene, Ethylbenzene and Xylenes

COC - Chemical of Concern

DQI - Data Quality Indicators

DQO - Data Quality Objectives

ENM - Excavated Natural Material

ESA - Environmental Site Assessment

HIL - NEPM Schedule B1 Health Investigation Level, 2013.

LOR - Limit of Reporting

µg/L - micrograms per litre

mg/kg - milligrams per kilogram

mg/L - milligrams per litre

NATA - National Association of Testing Authorities

NEHF - National Environmental Health Forum

NEPM - National Environment Protection Measure

NSW DECCW - NSW Department of Environment, Climate Change and Water (currently NSW OEH)

NSW OEH - NSW Office of Environment and Heritage

NSW EPA - Environment Protection Authority of New South Wales (part of NSW OEH)

PAH - Polycyclic Aromatic Hydrocarbon

PCB - Polychlorinated biphenyls

PID - Photoionization Detection

RAPE – Reclaimed Asphalt Pavement Exemption

TCLP – Toxicity Characteristic Leachate Procedure

TP – Bore hole

VENM – Virgin Excavated Natural Material

PRACTICAL ENVIRONMENTAL SOLUTIONS

TABLE OF CONTENTS

2 INTRODUCTION

This report presents the findings of a Preliminary Site Investigation for adjoining parcels of land in Gillieston Heights, a suburb of the City of Maitland in the Hunter Region of the State of New South Wales. These allotments are described as Lot 1 & 2 DP 302745 standing at 457 (Lot 1) & 463 (Lot 2) Cessnock Road, respectively.

The field investigation phase of the investigation was conducted on Wednesday 29 January and Monday 03 February 2020, to identify past and present contaminating activities, if any, report on site condition(s) and provide a preliminary assessment of site contamination. We understand that a manufactured housing estate is planned for the land.

The assessment has been developed in reference to guidelines made or approved by the NSW Environment Protection Authority (EPA), *National Environmental Protection (Assessment of Site Contamination) Measure* (NEPM) 2013 Schedule B1 (NEPC 2013) and consistent with EPA (1998) planning guidelines relevant to NSW State Environmental Planning Policy 55 – Remediation of Land (SEPP 55).

2.1 Goals and Objectives

The goals and objectives of this environmental contamination assessment are:

- Identify potential, past and present forms of contamination;
- Identify potential types of contamination;
- Evaluate the site for the potential of various types of contamination;
- Determine the appropriateness of the site for the proposed land use (equivalent to residential land development with soil access) through soil analysis;
- Provide results and conclusions of the potential contamination at the site; and
- Calculate the need for further assessment, management or remediation.

PRACTICAL ENVIRONMENTAL SOLUTIONS

2.2 Scope of Works

This assessment comprised the following scope of works:

- Review of documents provided by the current landowner and/or previous owners (if available);
- Assessment of site geology, hydrogeology and topography;
- Review of site history through Maitland City Council records, NSW DECC records, SafeWork NSW, Historical Title Information (past and present), historical aerial photographs and EPA records;
- A thorough site inspection to identify potential areas of environmental concern (AEC) or possible environmental contaminants;
- From deemed AECs, produce below-ground test pits with retrieval of representative samples of soils for analysis;
- Preparation of a *Preliminary Site Investigation* report which discusses the findings of the assessment; in reference to the NEPC (2013) guidelines.

3 SITE IDENTIFICATION & DESCRIPTION

The combined investigation area (site) is identified as Lot 1 & 2 DP 302745 standing at 457 (Lot 1) & 463 (Lot 2) Cessnock Road, Gillieston Heights, a of suburb of City of Maitland in the Hunter Region of the State of New South Wales and is shown in **Drawing 1, Appendix A.**

The overall site covers an approximate area of 4.95 Ha.

Both adjoining sites currently house residential dwellings with associated outbuildings, including sheds and horse stables. They would be described as lifestyle blocks or hobby farms.

4 PUBLISHED DATA AND SITE HISTORY SUMMARY

Information provided in this section of the report is predominately sourced from Enviro Screen Report (Land & Insight Resources 2019 – LIR - 01094). A copy of the report is attached in Appendix H.

4.1 Regional Geology

The 1:100,000 scale Newcastle Geological Map indicates the site geology as Permian – conglomerate, sandstone and siltstone.

4.2 Hydrogeology

The regional groundwater flow regime is inferred to be to the south-west of the site into dams on neighbouring properties, leading into an ephemeral creek on the other side of Cessnock Road (~ 400m from site boundary).

Two (2) registered bores are located within a 2 km radius of the site and are summarised in the table below:

Table 1: Register Groundwater Bore Search Summary.

Well Number	Intended Purpose	Completion Date	Depth of Bore (m)	Standing Water Level (m)	Proximity to Site (m)
GW21010164	Unknown	Unsure	Unsure	unknown	267m SE
GW051647	Stock water supply	01-Sept-80	12	unknown	717m NE

4.3 Acid Sulphate Soils

Further review of the *Acid Sulfate Soils Risk Maps* indicates that the site is classified as Class 5 land for potential occurrence of ASS. Class 5 indicates that development consent is required for works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the water table is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

Based on review data Acid Sulfate Soils are unlikely to be encountered onsite.

4.4 Topography

The site is sloping to the north and lies, variously, between 34 - 44m Australian Height Datum (AHD).

4.5 Extent of Site History Review

The brief review of site history comprised the following:

- City Council Historical Record Search;
- Summary of Owners;
- Review of Historical Aerial Photographs; and
- Searches with NSW Environmental Protection Authority (EPA) for Contaminated Land Notices.

Details are presented in the following sections.

4.6 Maitland City Council (MCC) Section 10.7 Planning Certificate

Following a review of the site's Planning Certificate pursuant to Section 10.7 of the *Environmental Planning and Assessment Act* 1979 indicates that there are no matters under Section 59 (2) of the *Contaminated Land Management Act 1997* to be disclosed. With no other issues with respect to site contamination identified.

PRACTICAL ENVIRONMENTAL SOLUTIONS

4.7 Historical Title Search

Table 2 is a summary of the past owners report (Info Track 2020) concerning Address: - 457 to 463 Cessnock Road, Gillieston Heights, Description: - Lots 1 & 2 D.P. 302745

Attached in Appendix F is a copy of the Historical Title information.

Table 2: Past Owners Summary - As regards Lot 1 D.P. 302745.

Date of Acquisition and term held	**Registered Proprietor(s) & Occupations where available**	**Reference to Title at Acquisition and sale**
01.12.1921 (1921 to 1940)	John Henry Rix (Miner) Eliza Ann Rix (Married Woman)	Vol 3257 Fol 75
25.09.1940 (1940 to 1982)	Frank Baden Hallam (Engine Driver)	Vol 3257 Fol 75
30.04.1982 (1982 to 1988)	Constance Ford (Transmission Application not investigated)	Vol 3257 Fol 75
30.11.1988 (1988 to 2002)	Mark Jongerden Maxine Gay Jongerden	Vol 3257 Fol 75 Now 1/302745
23.09.2002 (2002 to 2004)	Jeffrey Mark Brown	1/302745
27.07.2004 (2004 to 2006)	Margaret Helen Sewell Trevor Andrew Maltman	1/302745
03.10.2006 (2006 to date)	# Margaret Helen Sewell	1/302745

Denotes current registered proprietor

Easements and Leases: - NIL

Table 2: Past Owners Summary (Continued) - As regards Lot 2 D.P. 302745.

Date of Acquisition and term held	Registered Proprietor(s) & Occupations where available	Reference to Title at Acquisition and sale
18.09.1924 (1924 to 1945)	William Turner Rix (miner)	Vol 3640 Fol 89
24.03.1945 (1945 to 1972)	Ernest Laing (Gas Works Employee)	Vol 3640 Fol 89
07.03.1972 (1972 to 1981)	Mabel Parsons Reynolds (Married Woman) (Section 93 Application not investigated)	Vol 3640 Fol 89
22.07.1981 (1981 to 1992)	Raymond Charles Reynolds	Vol 3640 Fol 89 Now 2/302745
22.12.1992 (1992 to 1992)	Raymond Reynolds (Linesman)	2/302745
22.12.1992 (1992 to date)	# Raymond Reynolds (Linesman) # Vicki Sheryl Reynolds	2/302745

Denotes current registered proprietor

Easements and Leases: - NIL

4.8 SafeWork NSW Dangerous Goods Search

A search of Dangerous Goods licenses was not undertaken.

After visiting the site. PES contends that there is no evidence to suggest that the land would have any records pertaining to it in the records held by SafeWork NSW for the site.

4.9 Review of Historical Aerial Photographs

PES reviewed aerial photographs of the site from 1958, 1966, 1971, 1975, 1987, 1993, 2004, 2010, 2014, 2016 and 2019.

Copies of the historical imagery is attached in Appendix H. A precis of key observations is detailed in Table 3: (over page).

PRACTICAL ENVIRONMENTAL SOLUTIONS

Table 3: Historical Aerial Imagery Review

Year	Onsite	Offsite
1958	Lot 1: Long sheds (approximately 6) are visible across the site. The residential dwelling appears in the same location as the current dwelling. Lot 2: A single building and a small shed are visible on the site, on the footprint of the current building. Dam is visible in same position of the current dam. Both sites are cleared of vegetation.	No built infrastructure appears within the surrounding 500m of the site. To the north the early township of Gillieston Heights is visible. Cessnock Road runs along the front (western elevation) of the sites (s), although does not appear to be sealed. A driveway (present currently) runs away from the site on the opposite side of the road – to the west.
1966	Limited changes have occurred on site.	Minor development of Gillieston Heights to the north and a house constructed ~300m to the south.
1971	Lot 1: Three of the long sheds appear to have been removed / demolished. No other changes identified. Lot 2: No apparent changes identified.	The land to the west of the site has had vegetation cleared and some contour banks installed. No other changes identified.
1975	Lot 1: No observable changes identified on site. Lot 2: No observable changes identified on site.	Two chicken sheds or similar have been conducted over 500m to the north west of the site. Limited notable changes.
1987	Lot 1: Only two of the long sheds remain. Some beehives appear at the rear (east) elevation of the site. Lot 2: Since 1975 a pool, current shed, including stables and yards surrounding the sheds have been constructed on the site.	Another residential dwelling has been constructed to the south of the site (~300 m). Another two chicken sheds have been constructed nest to the existing two shed to the north west of the site.
1993	Lot 1: All long sheds removed. All remaining built infrastructure is the dwelling and shed near house (still standing). Lot 2: No observable changes identified on site.	No notable changes.
2004	Lot 1: Construction of a small horse shelter in the front paddock. The dam appears to have its volume increased (dam wall larger and lengthened dam footprint). A contour bank or similar has been constructed up gradient of the dam. Lot 2: A new car garage / shed to the front of the house has been constructed, the dam wall has increased in height from the widening of the dam.	No notable changes.

2010	Lot 1: No notable changes. Lot 2: No notable changes.	No notable changes.
2014	Lot 1: Construction of small 'granny flat' to rear of dwelling. No other changes notable. Lot 2: No notable changes.	Demolition of old chicken sheds to the north west of the site. Residential development of the land surrounding the sheds, including runoff dam / retention basin (north-west of site).
2016	Lot 1: No notable changes. Lot 2: No notable changes.	Continued residential development to the north of the site (suburb of Gillieston Heights).
2019	Lot 1: No notable changes. Lot 2: No notable changes.	Continued residential development to the north of the site (suburb of Gillieston Heights), with development now to the boundary of Lot 1.

4.10 NSW EPA Records – Contaminated Site Notified to the EPA or Records of Notice

A review and search of the EPA public register indicated the site has no statutory notices issued under the provision of the *Protection of the Environment Operations Act* 1997 (POEO Act). Under the CLM Act 1997 the site and surrounds (within 1000m) have not been notified to the EPA.

A search of the Public Register revealed no licenced activities within a one (1) km radius of the site. No other potentially contaminated sites were identified within a one (1) km radius from the site.

4.11 Interview with Owners

Aerial imagery showed a cluster of structures on Lot 1. Consequently, and knowing he was available, PES conducted an interview with the current owner of Lot 2 to discuss past uses of the allotment (Lot 1) adjoining his property. We know from records that the property had been in the owner's family since 1972. The owner of Lot 2 confirmed the sheds previously standing on Lot 1 were used for chicken breeding and egg production.

4.12 Site History Summary

Based on a review of historical data, public searches and site investigations, the site history can be summarised as follows:

- The site prior to its current land use was agricultural, with what appears to be chicken sheds covering the Lot 1 of the site.
- Lot 2 appears to not have had any intensive agricultural uses.
- All chicken sheds were removed by 1993 on Lot 1.
- Both sites appear to have only been used recently as hobby farms; including adjustment and breeding of horses.

5 CONCEPTUAL SITE MODEL

The NEPC (2013) details that a conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. Presented below in Table 4 is the preliminary CSM developed for the site.

Table 4: Conceptual Site Model

Potential Contaminant Sources
Pesticide, petroleum and heavy metals associated with past use as a chicken breeding operation (Lot 1), imported fill (not identified), ACMs remaining in residual soils from past poor demolition practices, potential contaminated soils to footprints of demolished building pads, improper disposal of old oils and petroleum products, emissions from passing traffic or from industrial practices, flaking paint from old buildings.
Pathways
Earthworks, service trenches, cracks in hardstand, stormwater runoff, rainwater infiltration / leaching, top down migration through soil, dust mobilisation.
Receptors
Workers involved in the potential remediation / restoration or development of the site (onsite), future site users (onsite), current site users, surface water runoff (offsite) into adjacent drainage channels and creek lines, nearby local residents and surrounding properties (offsite).

6 POTENTIAL CONTAMINANTS

Based on the available site history information and observations made during the site inspection the principal sources of potential contamination are considered to be:

- Possible fill materials of an unknown origin that may contain a range of contaminants including heavy metals, total recoverable hydrocarbons (TPHs), Benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), Organophosphorus (OPPs), and Asbestos.

The potential for contamination from the above sources is considered to be medium for Lot 1 and low for Lot 2. Determination for this classification was reached as a result of the site history for Lot 1 revealing the land to have been used, primarily, as a chicken breeding facility.

Based on the potential risk presented by the past site uses PES proceeded to assess the material for chemical contamination.

7 FIELD WORK

7.1 Sampling Rationale

For this investigation PES stipulated a targeted (judgemental) sampling procedure targeting the locations of former shed, and any other potential AECs identified, to address the potential sources of contamination described above.

Sampling frequency and locations were considered in reference to the NSW EPA *Contaminated Sites Sampling Design Guidelines* (1995) and AS4482.1:2005 *Guide to the sampling and investigation of potentially contaminated soil*.

Using a hand auger, PES produced eighteen (18) below ground bore holes, generally, over the site including eight (8) across the targeted area of site (identified in Appendix A, Drawing 2).

Accordingly, a total of eight (8) soil samples were selected for analysis based on the contention that they were representative of surface and below ground conditions across the site and such that likely contamination, if any, would be detected. The samples consisted of material from the natural soils across the site. Selection criteria included:

- Material type and depth;
- Visual or olfactory evidence of possible contamination (i.e. odour or staining);
- Proximity to a known or potential source of contamination.

During our investigation, PES observed small 'pockets' of materials that were identified (based on our considerable professional experience) as being asbestos containing. Consequently, PES did not take any confirmatory samples testing for the presence or not of asbestos. This material shall be regarded henceforth as asbestos-containing material (ACM) and treated accordingly.

7.2 Methods

Fieldwork for this investigation was carried out on Wednesday 29 January 2020 and later, on Monday 03 February 2020 and comprised the following:

- Production below ground of eight (8) bore holes to depths of up to 300mm b.g.l over the site using a combination of spade & hand auger to assess subsurface conditions and collect samples for contamination analysis.

The bore hole locations were set out by an environmental scientist from PES. The approximate locations of the hole are shown on **Drawing 3, Appendix A**.

Soil profiles were recorded; including observations and the material types.

As no visible fill was present, sampling was targeted to surface soils only, therefore complete soil profile descriptions are not required to be produced**.**

All sampling data was recorded on PES chain of custody sheets, and the general sampling procedure comprised:

- The use of high nitrile disposable gloves for each sampling event;
- Transfer of samples into laboratory-prepared glass jars, and capping immediately;
- Transfer of samples into snap-lock plastic backs for screening of volatile organic compounds (VOCs) using a calibrated photoionisation detector (PID) – a calibration certificate is provided in Appendix G.
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of sample jars and replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory;
- Use of chain of custody (C-O-C) documentation ensuring the sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory.

The process of obtaining samples and their transportation, storage and delivery to laboratories for analysis was documented on a PES standard chain-of-custody form. Copies of completed forms are contained in **Appendix E.**

8 DATA QUALITY OBJECTIVES (DQOS)

It is accepted practice that the nature and quality of the data produced in an investigation will be determined by the Data Quality Objectives (DQOs). The DQO process is detailed in the United States Environmental Protection Agency (US EPA) Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QAIG-4: EPA/240/B-06/001), February 2006.

The seven-step DQO process developed by the US EPA, shown in Table 5 below, is recommended by NEPC (2013) when site contamination data is being relied upon to make risk-based decisions as part of a detailed site investigation. They are designed to clarify the study objectives, define the appropriate data types and specify tolerable levels of potential errors.

8.1 The 7 Steps in Defining DQOs

Table 5: Seven Step DQO Process

Step	Data Quality Objective Step
1	**State the problem** – The first step in the DQO process is to define the problem that has initiated the investigation and to identify the resources available to resolve the problem
2	**Identify the goal of the study** – Identify the objectives or decisions that need to be made about the contamination problem and the new environmental data required to make them.
3	**Identify information inputs** – Identify data and information needed to answer study questions.
4	**Define the boundaries of the study** – Define the spatial and temporal boundaries of the environmental media that the data must represent.
5	**Develop the analytical approach** – Define the parameter of interest, specifying the action levels, and integrating information in Steps 1 – 4 into a single statement that gives a logical basis for choosing between alternative actions. This includes decision making based on the outcome of hypothesis testing and estimation through appropriate statistical means.
6	**Specify performance or acceptance criteria** – Specify the decision rule and decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data. Criteria must be specific to both existing and new data.
7	**Develop the plan for obtaining data** – Identify a resource effective sampling and analysis plan for generating data that is expected to satisfy the DQOs.

For the purpose of establishing the overall project goals, stakeholder and applicable environmental context, the first four (4) steps of the DQO process have been adapted to communicate the framework under which particular questions of study are addressed through individual DQOs. This is referred to as systematic planning and is defined as an integral part of the process by US EPA (2006).

8.1 Step 1: State the problem

Historical land use activities on the site present potential contamination risk that could impact the suitability of the site's proposed use. The aim of this assessment is to investigate the site, including conducting limited below ground intrusive sampling to establish whether contamination is present or not.

Subsequently, the Client has requested a contaminated land assessment be conducted in line with SEPP 55 and guidance endorsed by NSW state and local Government regulators to appropriately investigate environmental media of concern and make justifiable conclusions on site suitability.

8.2 Step 2: Identify the decision / goal of the study

The ultimate goal of the study is to determine if the site is suitable for its proposed use as a manufactured housing estate, identify options for remediation if required to render the site suitable for the proposed use, or determine particular land uses that the site is suitable for in its current state.

8.3 Step 3: Identify the information inputs

Information inputs relevant to the study questions include:

- Site history and environmental setting;
- CSM refined through the findings of intrusive sampling;
- Soil analytical data for investigations completed previously on the site.

These factors have contributed to the identification of the Potential Contaminants of Concern (PCoC) described in Table 6 below:

Table 6: Description of PCoC

PCoC	Description and relationship
OPPs / OCPs	Organochlorine pesticides (OCPs) and organophosphorus pesticides (OPPs). Pest controls and wastes.
Heavy Metals	Elements that are naturally occurring and environmentally persistent. Often found in chemicals, paints, pest control, timber treatment products, wastes, and as a product of industrial processes (smelting etc.). The typical analytical suite includes arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc. Additional PES included Manganese, Beryllium, Boron and Selenium for samples GH06 – GH08 as these were in areas near the demolished shed.
TRHs, BTEXN and PAHs	Total recoverable hydrocarbons (TRHs) F1 (C_6 - C_{10}), F2 (>C_{10} – C_{16}), F3 (>C_{16} – C_{34}), and F4 (>C_{34} – C_{40}); benzene, toluene, ethylbenzene, meta-para & ortho- xylenes, naphthalene (BTEXN); polycyclic aromatic hydrocarbons (PAHs). Typical contaminants associated with fuels, oils and lubricants. PAHs may also be present in combusted material (ash or char) and coal products.
Asbestos	A mineral associated with general building products such as cladding and lining materials, insulations, piping, gaskets and brake pads. Totally banned in building products in 1989, and fully banned after 31 December 2003.

8.4 Step 4: Define the boundaries of the study

Vertical - The environmental media of concern will be sites soils, and groundwater if encountered sampled at varying depths with the purpose of assessing the vertical extent of potential contamination. Sampling depths will vary spatially however, soil sampling will focus on the shallow subsurface (up to 0.30m b.g.l.).

The spatial (lateral) boundaries of the site are identified in Appendix A, Drawing 1.

Constraints within the study boundary – the following issues present limitations upon sampling strategy for the site:

- Location of belowground services.

The boundaries of the study area are subject to some alteration with each location presented as indicative. Any changes will consider the rationale of the location of the sampling location and endeavour to obtain the same information for the CSM from the alternate location.

8.5 Step 5: Develop the analytical approach

The decision rules for this investigation are as follows:

1. If a review of the data obtained from this investigation indicate a degree of uncertainty on contamination delineation and distribution, then the proposed remedial strategies will be refined to provide remediation and/or management of those uncertainties and limitations with respect to the proposed redevelopment.
2. If it is determined that additional information is required to further reduce the uncertainties associated with the distribution and characteristics of soil and fill requiring remediation and/or management, with respect to the proposed redevelopment, then appropriate recommendations for further technical assessment or investigation will be provided.

8.6 Step 6: Specify performance or acceptance criteria

The acceptable limits on decision errors to be applied in the investigation and the manner of addressing possible decision errors have been developed based on the Data Quality Indicators (DQIs) of precision, accuracy, representativeness, comparability and completeness (PARCC) and are presented in Table 8 (sub-section 9.1 below).

The tolerable limits on decision errors are as follows:

- Probability that 95% of data will satisfy the DQOs, therefore a limit on the decision error will be 5% that a conclusive statement may be incorrect.

In applying statistical analysis of a data set: The performance / acceptance criteria for each study question varies.

- No individual sample result should have a concentration that exceeds 250% of Site assessment criteria (SAC);
- A normal distribution will only be used if the coefficient of variance is not greater than 1.2; and
- The standard deviation of a sample population should not exceed 50% of the SAC.

The potential for significant decision errors are to be minimised by completing a robust Quality Assurance/Quality Control (QA/QC) program and by completing an investigation that has an appropriate sampling and analytical density for the purposes of the investigation and that the representative sampling is undertaken.

8.7 Step 7: Develop the plan for obtaining data

The historical use of part of the Site for commercial breeding and raising of chickens presents the potential for contamination to be present on the Site (Lot 1). Given the history of the Site the general contamination history the PCOCs include, but may not be limited to, heavy metals, PAHs, TRH, BTEXN, organochlorine pesticides (OCPs), organophosphorus pesticide (OPPs), and asbestos. Many of these chemicals may be mobile within the unconsolidated fill materials and able to migrate vertically and laterally to local waterways. The overall design of the investigation on the Site requires considerations of these factors.

PES will work closely with the analytical laboratories and sampling equipment suppliers to ensure that appropriate procedures and processes are developed and implemented prior to and during the field work, to ensure that sample handling, and transport to and processing by the analytical laboratories is appropriate

9 FIELD QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

9.1 Internal Intra-Laboratory Duplicate Assessment

In order to assess field quality assurance / quality control (QA/QC) procedures, one (1) duplicate field sample (QA01) was collected and analysed with primary sample GH01 for metals, TRH, BTEXN, PAHs, and OPPs/OCPs. The results of the field duplicate sampling are presented in Table 7 (below). The results of the field duplicate sampling indicated that Relative Percentage Differences (RPD's) were unable to be calculated for TRH and BTEXN as results were below the laboratory limit of reporting.

Table 7: Validation Field Duplicate Assessment

	GH01	QA01	RPD %	LOR mg/kg	10 X LOR
Arsenic	3	4.9	48.1	2	20
Cadmium	0.4	0.7	54.5	5	5
Chromium	11	17	42.9	5	50
Copper	20	35	54.5	5	50
Mercury	< 0.1	< 0.1	<0.1	0.1	1
Lead	130	220	51.4	5	50
Nickel	23	36	44.1	5	50
Zinc	370	590	45.8	5	50
PAHs					
Fluoranthene	0.7	0.9	25.0	0.5	5
Pyrene	0.7	0.8	13.3	0.5	5
Sum of reported PAH	1.4	1.7	19.4	0.5	5
OCPs					
Dieldrin	0.27	0.34	*23.0*	0.05	0.5

The results in the field duplicate analysis indicate the duplicates were acceptable when compared to the appropriate criteria (see below).

The overall precision of laboratory split samples and laboratory duplicates is generally assessed by their Relative Percentage Difference ('RPD'). The RPD of duplicated analyses were calculated and compared to the following criteria for acceptability. The acceptance criteria are listed in AS4482.1 (2005). PES has utilised the duplicate results produced by the laboratory internal Quality Control Review.

RPDs were calculated between the primary sample concentration and its corresponding intra-laboratory duplicate. As stipulated by the NEPM, the RPD acceptance criteria is 30% however it is noted that higher variations can be expected for organic analysis, samples with low analyte concentrations or non-homogenous samples (NEPC 2013). As such, the primary laboratory RPD acceptance criteria were used and are as follows:

1. Results <10 times the LOR: No Limit;
2. Results between 10-20 times the LOR: RPD must lie between 0-50%; and
3. Results >20 times the LOR: RPD must lie between 0-30%

The laboratory produced one intra-laboratory duplicate sample during analysis. Given that the purpose of the sampling works was to provide preliminary indications as to the presence/absence of contamination, this was deemed appropriate. Of the valid RPDs (where concentrations were above the laboratory LOR), none of them were reported outside of the acceptable limits defined above. Analytical results for intra-laboratory duplicate sample and RPDs are included in Appendix C. See Table 6 (over page) for the quality control procedures adopted by PES.

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Table 8: Quality Control Procedures

Quality control sample	Frequency	Results [1]
Precision		
Field duplicates	≥ 5%	≤ 30 - 50% [2]
Inter-laboratory duplicates	≥ 5%	≤ 30 - 50% [2]
Laboratory duplicates	≥ 10%	Lab specified [3]
Accuracy		
Surrogate spikes	Organics by GC	70 – 130% [4]
Matrix spikes (MSs)	≥ 1/media type	70 - 130% [5]
Laboratory control samples (LCSs)	≥ 1/lab batch	70 - 130% [6]
Certified reference material (CRM)	LCS for metals	Lab specified [7]
Representativeness		
Rinsate samples	≥ 1/field batch	< LOR
Trip blanks	≥ 1/field batch (volatiles)	< LOR
Trip spikes	≥ 1/field batch (volatiles)	70 - 130%, ≤ 30 - 50% [8]
Laboratory blanks	≥ 1/lab batch	< LOR

Table notes:

1. Where results are laboratory specified, the laboratory analytical reports should be consulted for specific information.

2. Relative percentage differences (RPDs) for field duplicates from AS 4482.1-2005.

3. RPDs for laboratory duplicates specified by the laboratory. Based on the magnitude of the results compared to the level of reporting (LOR), e.g. laboratory result < 10 x laboratory limit of reporting (LOR) = no limit, 10 – 20 x LOR = 0-50%, > 20 x LOR = 0-20%.

4. Surrogate recoveries specified by laboratory based on global acceptance criteria or dynamic recovery limits based on statistical evaluation of actual laboratory data.

5. MS recoveries specified by laboratory based on global acceptance criteria.

6. LCS recoveries specified by laboratory based on global acceptance criteria or dynamic recovery limits based on statistical evaluation of actual laboratory data.

7. CRM recoveries specified by laboratory based on global acceptance criteria.

8. Trip spike results are specified as either recoveries or RPDs.

9.2 Data evaluation

The data evaluation is discussed in *sub-section* 12.4.

10 ASSESSMENT CRITERIA

10.1 Reference Guidelines

This preliminary site investigation was undertaken in reference with the following guidelines:

- AS4482.1:2005 Guide to the sampling and investigation of potentially contaminated soil
- National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended 2013, National Environment Protection Council (NEPC 2013)
- Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995 (EPA 1995)
- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, NSW EPA, 1997 (EPA 1997)
- Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition, NSW EPA, 2006 (DEC 2006)
- Contaminated Sites: Guidelines on Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW DECC, June 2009 (DECC 2009).

10.2 Soil Assessment Criteria

As the affected site is to be developed for use that includes a tertiary educational facility (nearest land use setting is secondary schools), the contaminants for soil sampling were assessed against the following criteria:

- Health based Investigation and Screening Levels for *residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools and primary schools*, in this instance equivalent to Health Investigation Level 'A' (HIL 'A') (NEPC 2013).
- Health Screening Levels 'A & B' (HSLs – equivalent to HIL 'A' criteria) for vapour intrusion, at various depths (NEPC 2013):
- Vapour Intrusion – Soil HSL 'A & B' – Clay 0m - <1m;
- Management limits for hydrocarbons for residential, parkland and public open space, Fine soil texture (NEPC 2013); and
- Site Specific Ecological Investigation / Screening Levels (EILs / ESLs) for Urban residential and public open space use (URPOS), aged soils (NEPC 2013)

11 LABORATORY TESTING

11.1 Analytical Programme

Laboratory testing was undertaken by MGT - Eurofins, a National Association of Testing Authorities, Australia (NATA) registered laboratory and Australian Safer Environment and Technology (NATA) registered laboratory. Analytical methods used are shown on the laboratory sheets in **Appendix D.**

A total of eight (8) soil samples were selected to provide a detailed assessment of the below ground conditions. The samples were selected to target identified potential sources of contamination arising from the sites historical usage and surrounding site uses.

The selected samples were analysed for the following potential contaminants:

- Total Recoverable Hydrocarbons (TRH);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Organochlorine Pesticides (OCPs);
- Organophosphorus Pesticides (OPPs);
- Benzene, Toluene, Ethyl Benzene, Xylene & Naphthalene (BTEXN); and
- Metals: Arsenic (As); Cadmium (Cd); Chromium (Cr); Copper (Cu); Lead (Pb); Mercury (Hg); Nickel (Ni); Zinc (Zn), Manganese (Mn), Beryllium (Be), Boron (B) and Selenium (Se); and
- Asbestos.

12 ASSESSMENT OF RESULTS AND FIELD INVESTIGATION

12.1 Subsurface Conditions

The subsurface conditions are presented in detail in **Table 9** and in the laboratory results in **Appendix D.** These should be read in conjunction with the general notes preceding them. These explain definitions of the classification methods and descriptive terms.

A summary of the subsurface conditions encountered in the bore holes are presented below in **Table 9**:

Table 9 –Soil Profile Summary

FROM (m)	TO (m)	DESCRIPTION
0.00	0.1	Natural – brown silty topsoils, minor gravels.
0.1	0.5	Natural – gravelly clays.

12.2 Observations

PES observed no apparent imported fill on the site, only the natural soil profile comprising a brown silty clay with minor gravel material into a dense yellow gravelly clay.

An area near the car shed / garage on Lot 1 contained a cut / fill area, from the shed to level a small section of the land.

The site is undulating with a ridge from which the land is sloping either side to the west and east with a shared dam in the gully to the east of the built infrastructure. The dam wall has been excavated from the footprint of the dam.

Visual and olfactory signs of gross contamination (i.e. staining and odour) were not observed across the site or within any of the bore holes produced. No visual or olfactory evidence of oil or grease staining was observed, or evidence of above or underground storage tanks (USTs).

PES identified two (2) empty 44-gallon, or 205 litre, drums near the rear stables / shed of Lot 2 although there was no evidence of spillage surrounding the drums. PID sampling surrounding the drums confirmed no volatiles were present.

Our investigations reveal there to be no immediate (within 500m) surrounding site uses that have, or would have had, the potential to cause contamination on the site.

PES did not encounter groundwater in any bore holes produced.

12.3 Soil Analytical Results

The analysis of the eight (8) + one (1) QA / QC soil samples from the site are detailed in Tables 11 - 13 **Appendix C – Soil Analysis Results.** These results are tabulated for comparison against the adopted Tier 1 investigation levels stipulated in the ASC NEPM (2013) Guidelines.

Presented below is a summary of the soil analytical results:

Heavy Metals

There were no exceedances of the adopted Soil Health Investigation Levels ‘A’.

Polycyclic Aromatic Hydrocarbons (PAH)

There were no exceedances of the adopted Soil Health Investigation Levels ‘A’. All results were below the PQL.

Organophosphorus Pesticides & Organochlorine Pesticides

There were no exceedances of the adopted Soil Health Investigation Levels ‘A’. All results were below the PQL.

Benzene, Toluene, Ethylbenzene & Xylene

There were no exceedances of the adopted Soil Health Screening Levels ‘A & B’. All results were below the PQL.

Total Recoverable Hydrocarbons

There were no exceedances of the adopted Soil Health Screening Levels ‘A & B’. All results were below the PQL.

Asbestos

Two pockets of bonded asbestos were identified.

VOC Measurements (PID)

PID screening was undertaken on all collected soil samples; the maximum VOC concentration was 1.1 ppm which is considered negligible.

12.4 95% Upper Confidence Limit Calculations

The 95% Upper Confidence Limits (UCLs) of the average concentrations for the soil results were calculated using ProUCL for soil analytical results exceeding the adopted investigation levels in reference to the procedures discussed in NEPC (2013) Schedule B2 Section 13 and NSW EPA (1995) Sampling Design Guidelines.

The criteria stipulate the results should meet the following criteria:

- The standard deviation of the results should be less than 50% of the relevant investigation or screening level, and
- No single value should exceed 250% of the relevant investigation or screening level.

As all results were below the adopted criteria, PES did not conduct a 95% UCL calculation for these results.

13 DISCUSSION

The historical use of Lot 1 for agricultural uses (chicken 'farm' / breeding) is identified as the main source of potential contamination on the site. The main recent site uses have been for hobby farming, including horse breeding.

No fill materials nor indications of hydrocarbons including staining or olfactory odours were identified. Two (2) small pockets of bonded ACMs were encountered on Lot 1, but not observed in any other bore holes across the adjoining sites. PES suspects the ACMs encountered were as a result of poor demolition practices and are, consequently, limited to the immediate surface layer. They appear to have been buried sometime in the past and, most likely, when previously existing built infrastructure was demolished. Two (2) empty 44-gallon drums were identified on Lot 2 near the rear sheds / stables.

PES did not identify any other potentially contaminating activities across the site.

The results of analysis did not identify any exceedances of the adopted criteria (HILs 'A', HSLs 'A & B' and EIL/ESL URPOS). Although the sampling focussed on potential AECs and were not sufficient in number to detect a hotspot, PES contends these results are representative of site conditions and characterise the land with respect to contamination.

Based on the analytical testing conducted and historical analysis the Site does not indicate gross contamination above the adopted Tier 1 investigation or screening levels stipulated in NEPC (2013).

14 CONCLUSIONS AND RECOMMENDATIONS

The site observations, historical information and below-ground observations support the contention that the land on which our Client proposes to develop a manufactured housing estate has only ever been used, historically, for agricultural purposes. We've learned that Lot 1 previously housed a commercial chicken farm.

This historical use has a medium potential for contamination. Site soils did not display physical indicators of gross contamination during the site investigation, with the exception of a small find of bonded ACMs in an area of Lot 1.

Following sampling from targeted site soils PES compared the sampling results to the NEPC (2013) - HIL 'A' & HSL 'A & B' and EIL / ESL URPOS criteria for Metals, TRH, BTEXN, PAHs, OCPs/OPPs and Asbestos. With the results analysed, no exceedances of the above-mentioned criteria were observed.

PES concludes that based on the site history, site walkover and soil analysis results of the targeted area of site; the site presents a low human health and environmental risk and is suitable for the proposed redevelopment as a manufactured housing estate provided the following recommendations are complied with.

PES recommends the following:

- Removal of the drums, and isolated and ACM pockets confirmed by the issue of an *Asbestos Clearance Certificate* (ACC) for the operation. This activity may be completed at the same time as the pre-demolition removal of asbestos from the current, built infrastructure.
- Any ACMs encountered during construction activities shall be dealt with under an *Unexpected Finds Protocol* developed for the site arising from the fact that an encounter with ACM is now <u>not</u> an unforeseen occurrence.
- Any material generated by construction activity that is surplus to requirement and destined for offsite disposal shall be appropriately classified in accordance with the NSW EPA (2014) *Waste Classification Guidelines*, including NSW EPA approved resource recovery orders and exemptions.

- Any material being imported to the site should be classified as *VENM* or *ENM* in accordance with NSW EPA Resource Recovery Orders and Exemptions.

15 LIMITATIONS OF THIS REPORT

PES have performed investigation and consulting services for this project with reference to current professional and industry standards for assessment of site contamination.

Whilst every effort has been made to ensure a representative programme of field and laboratory sampling and testing, conditions different to those identified during these tasks may exist. Therefore, PES cannot provide unqualified warranties, nor does PES assume any liability for site conditions not observed or accessible during the time of the investigation.

Despite all reasonable care and diligence, the ground conditions encountered, and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change over time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and/or spillages of contaminating substances. These changes may occur subsequent to PES's investigations and assessment.

This report and associated documentation and the information herein have been prepared solely for the use of Roter Sand Unit Trust. The report and the information contained herein may be further relied on by Maitland City Council solely for the purpose of approving the development application/construction certificate for the residential development proposed for this site. Any reliance assumed by other parties on this report shall be at such party's own risk. Any ensuing liability resulting from use of the report by other parties cannot be transferred to PES.

16 REFERENCES

- National Environment Protection Council (NEPC), (2013). National Environment Protection (Assessment of Site Contamination) Measure 1999, NEPM, Canberra. Schedule B2:
- Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995 (EPA 1995)
- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, NSW EPA, 1997 (EPA 1997)
- Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition, NSW EPA, 2006 (DEC 2006)
- Contaminated Sites: Guidelines on Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW DECC, June 2009 (DECC 2009).
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- NSW EPA (2018) Contaminated Land Record http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx accessed 26/04/18. NSW EPA (2016)
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- NSW EPA Protection of the Environment Operation Act Public Register http://www.epa.nsw.gov.au/prpoeoapp/ accessed 26/04/18.
- Ochd. J., Jones D. C, Uren R. E. & Hughes K. S. (compilers) 2015. Gosford- Lake Macquarie Special 1:100000 Geological Sheet 9131 & part sheet 9231. Geological Survey of New South Wales, Maitland.

APPENDIX A

SITE MAP, BOREHOLE & SAMPLE LOCATIONS, & AECs

PROJECT TITLE: PSI			DRAWING TITLE: Site Identification		PRACTICAL ENVIRONMENTAL SOLUTIONS
CLIENT:					
DATE: 24/01/2020	SCALE: NTS	DESIGNED: D McQueeney	DRAWING NUMBER: 1	JN: 20.2732	N
PRACTICAL ENVIRONMENTAL SOLUTIONS			SOURCE: ESRI (2020)		

LEGEND

Bore Hole & Sampling locations.

Inspection Bore Hole Locations

PROJECT TITLE: PSI			**DRAWING TITLE:** Sampling Locations	
CLIENT: Roter Sand Unit Trust				
DATE: 24/01/2020	**SCALE:** NTS	**DESIGNED**:D McQueeney	**DRAWING NUMBER**: 2	**JN**: 20.2732
PRACTICAL ENVIRONMENTAL SOLUTIONS			**SOURCE**: SIX Maps (NSW Government 2019)	

N

PRACTICAL ENVIRONMENTAL SOLUTIONS

LEGEND

AECs

PROJECT TITLE: PSI			**DRAWING TITLE:** AECs	
CLIENT: Roter Sand Unit Trust				
DATE: 24/01/2020	**SCALE:** NTS	**DESIGNED:** D McQueeney	**DRAWING NUMBER**: 3	**JN**: 20.2732
PRACTICAL ENVIRONMENTAL SOLUTIONS			**SOURCE**: SIX Maps (NSW Government 2019)	

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APPENDIX B

SITE PHOTOGRAPHS

Representative Site Photographs: (Lot 2)

Photograph 1: Front Elevation of Dwelling.

Photograph 2: Example Test Pit

Photograph 3: Rear Dwelling Elevation

Photograph 4: Rear Stables

Photograph 5: 44 Gallon (205 lt.) Drums

Photograph 6: Dam Wall

Site Photographs (Lot 2)

Photograph 7: Site Identification

Photograph 8: Cut / Fill Area

Photograph 9: Sewage Transpiration Bed

Photograph 10: Paddock

Photograph 11: Dam wall (North Elevation)

Photograph 12: ACM 'Find'

APPENDIX C

SOIL ANALYSIS RESULTS

Sample Identification	PQL	Guideline		GH01	GH02	GH03	GH04	GH05	QA01	GH06	GH07	GH08
Sample Depth (m)		HIL 'A' A	EIL URPOS B	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date				29/1/20	29/1/20	29/1/20	29/1/20	29/1/20	29/1/20	3/2/20	3/2/20	3/2/20
Polycyclic Aromatic Hydrocarbons (PAH)												
Acenaphthene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a) pyrene			0.7	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b)&(j)fluoranthene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene				0.7	< 0.5	< 0.5	< 0.5	< 0.5	0.9	< 0.5	< 0.5	< 0.5
Fluorene				< 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				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene			170	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene				0.7	< 0.5	< 0.5	< 0.5	< 0.5	0.8	< 0.5	< 0.5	< 0.5
Carcinogenic PAH (B(a)P equivalent)	0	3		0	0	0	0	0	0	0	0	0
Sum of reported PAH	0	300		1.4	< 0.5	< 0.5	< 0.5	< 0.5	1.7	< 0.5	< 0.5	< 0.5
Metals												
Arsenic		100	100	3	2.4	3.5	5.7	6.3	4.9	4.2	2	3.5
Beryllium		60		n/a	n/a	n/a	n/a	n/a	n/a	< 2	< 2	< 2
Boron		4500		n/a	n/a	n/a	n/a	n/a	n/a	< 10	< 10	< 10
Cadmium		20		0.4	< 0.4	< 0.4	< 0.4	< 0.4	0.7	< 0.4	< 0.4	< 0.4
Chromium		100	190	11	7.6	8	14	12	17	7.5	7	15
Cobalt		100		n/a	n/a	n/a	n/a	n/a	n/a	< 5	< 5	< 5
Copper		6000		20	8.3	< 5	7.2	6	35	< 5	7.1	16
Mercury		40		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Manganese		3800		n/a	n/a	n/a	n/a	n/a	n/a	49	110	190
Lead		300	1100	130	17	18	17	7	220	19	14	22
Nickel		400	30	23	< 5	< 5	5.9	9.2	36	< 5	< 5	7.7
Selenium		200		n/a	n/a	n/a	n/a	n/a	n/a	< 2	< 2	< 2
Zinc		7400		370	200	44	46	42	590	310	310	880

Table 10: PAH and Metals Analysis (see table notes below)

Sample Identification	PQL	Guideline		GH01	GH02	GH03	GH04	GH05	QA01	GH06	GH07	GH08
Sample Depth (m)		HIL 'A' [A]	EIL URPOS [B]	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date				29/1/20	29/1/20	29/1/20	29/1/20	29/1/20	29/1/20	3/2/20	3/2/20	3/2/20
Organochlorine Pesticides (OCP)												
Chlordane		50		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
DDD				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDE				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
DDT			180	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
alpha-BHC				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin				0.27	< 0.05	< 0.05	< 0.05	< 0.05	0.34	< 0.05	< 0.05	< 0.05
Endosulfan 1				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan 2				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulfate				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin Aldehyde				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor		6		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide				< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
HCB		10		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor		300		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene		20		< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
DDT+DDD+DDE	0	240		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin + Dieldrin	0	6		0.27	< 0.05	< 0.05	< 0.05	< 0.05	0.34	< 0.05	< 0.05	< 0.05
Endosulfan	0	270		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Organophosphorous Pesticides (OPP)												
Dichlorvos				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos (Phosdrin)				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton (total)				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Phorate				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos		160		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Parathion				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Stirofos				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Prothiofos				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Azinophos methyl				< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos				< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Table 11: OCPs and OPPs Analysis (see table notes below)

All results are in units of mg/kg, except for asbestos.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

[A] NEPM 1999 (amended April 2013) Health Investigation Levels (HIL) 'A' (Residential), 'B' (Minimal Soil Access Residential), 'C' (Parks/Open space), 'D' (Commercial/Industrial)

[B] NEPM 1999 (amended April 2013) Ecological Investigation Levels (EIL) AES (Area of Ecological Significance), URPOS (Urban Residential and Public Open Space), C&I (Commercial and Industrial)

HIL for Chromium are for Chromium VI

EIL for Chromium are the added contaminant limit for aged (>2years) Chromium III in soils of 1% clay, the most conservative of the criteria. The background level has been assumed to be zero for the Tier 1 asses

EIL for Nickel are the added contaminant limit for aged (>2years) Nickel in soils of 5% clay, the most conservative of the criteria. The background level has been assumed to be zero for the Tier 1 assessment.

EIL for Lead are the added contaminant limit for aged (>2years) Lead. The background level has been assumed to be zero for the Tier 1 assessment.

EIL for Arsenic are for aged (>2years) Arsenic

EIL for DDT and Naphthalene are for fresh (<2years) DDT and Naphthalene

PCB analysis includes non-Dioxin like and Dixin-like compounds compared to a guideline of non-Dioxin like PCB

Results show n in **BOLD** are in excess of the primary acceptance criteria

Results show n in shading are >250%of the primary acceptance criteria

Results show n in <u>underline</u> are in excess of primary EIL

Where summation required (PAH, OCP, PCB) calculation includes components reported as non detected as 1/2 PQL.

Sample Identification	PQL	Guideline A										GH01	GH02	GH03	GH04	GH05	QA01	GH06	GH07	GH08
Sample Depth (m) B		HSL 'A' HSL 'B'							ESL URPOS			0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date		SILT 1-<2m	SILT 2-<4m	SILT >4m	CLAY 0-<1m	CLAY 1-<2m	CLAY 2-<4m	CLAY >4m	Coarse	Fine		29/1/20	29/1/20	29/1/20	29/1/20	29/1/20	29/1/20	3/2/20	3/2/20	3/2/20
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)																				
Benzene	<0.1	0.7	1	2	0.7	1	2	3	50	65		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	<0.1	NL	NL	NL	480	NL	NL	NL	85	85		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	<0.1	NL	NL	NL	NL	NL	NL	NL	70	125		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
meta- and para-Xylene	<0.2											< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
ortho-Xylene	<0.1											< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Xylenes	0	210	NL	NL	110	310	NL	NL	105	45		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Polycyclic Aromatic Hydrocarbons (PAH)																				
Naphthalene	<0.5	NL	NL	NL	5	NL	NL	NL	170	170		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total Recoverable Hydrocarbons (TRH)																				
TRH C_6-C_{10}	<20											< 20	< 20	< 20	< 20	< 20	< 100	< 20	< 20	< 20
TRH >C_{10}-C_{16}	<50								120	120		< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
TRH >C_{16}-C_{34}	<100								300	1300		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
TRH >C_{34}-C_{40}	<100								2800	5600		< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100	< 100
F1	<20	65	100	190	50	90	150	290	180	180		< 20	< 20	< 20	< 20	< 20	< 100	< 20	< 20	< 20
F2	<50	NL	NL	NL	280	NL	NL	NL				< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50

Table 12: BTEXN and TRH Analysis Results (see table notes below)

All results are in units of mg/kg.
Blank Cell indicates no criterion available
PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory
F1 PQL deemed equal TRH C_6-C_{10}.
F2/F2$_{sg}$ PQL deemed equal TRH/TRH$_{sg}$ >C_{10}-C_{16}. $_{sg}$ = silica gel clean up
A NEPM 1999 (amended April 2013) Vapour Based Health Screening Levels (HSL) 'A' (Residential), 'B' (Minimal Soil Access Residential), 'C' (Parks/Open space), 'D' (Commercial/Industrial)
A NEPM 1999 (amended April 2013) Ecological Screening Levels (ESL) AES (Area of Ecological Significance), URPOS (Urban Residential and Public Open Space), C&I (Commercial and Industrial)
A NEPM 1999 (amended April 2013) Management Limits (ML) Sensitive Sites (Residential, open space), Non-Sensitive Sites (Commercial and Industrial)
A CRC Care Technical Report 10, September 2011 Direct Contact (DC) Health Screening Levels 'A' (Residential), 'B' (Minimal Soil Access Residential), 'C' (Parks/Open space), 'D' (Commercial/Industrial)
B Start of sample over a 0.1m interval
C Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where tw o strata equally represented, most conservative criterion used
NL designates 'Not Limiting' indicating that the pore w ater concentration required to constitute a vapour risk is higher than the solubility capacity for that compound based on a petroleum mixture. Vapour is therefore not a risk for this compound.
Presented ESL for naphthalene is an Ecological Investigation Level
Results for TRH have been compared to TPH guidelines.
ESL for TRH/TRH$_{sg}$ >C_{16}-C_{34} and >C_{34}-C_{40} are low reliability
F1 = TRH C_6-C_{10} minus BTEX
F2/F2$_{sg}$ = TRH/TRH$_{sg}$ >C_{10}-C_{16} minus naphthalene
Results show n in **BOLD** are in excess of the vapour based HSL
Results show n in shading are >250% of the vapour based HSL
Results show n in underline are in excess of the ESL
Results show n in *italics* are in excess of the management limit
Results show n in patterned cells are in excess of the direct contact HSL
Where summation required (Xylene, F1, F2/F2$_{sg}$) calculation includes components reported as non detected as 1/2 PQL.

PRACTICAL ENVIRONMENTAL SOLUTIONS

APPENDIX D

SOIL LABORTORY RESULTS AND QUALITY ASSURANCE/QUALITY CONTROL

eurofins | Environment Testing

Certificate of Analysis

Practical Environmental Solutions P/L
11 Ulick St
Mereweather
NSW 2291

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **David McQueeney**

Report	**699511-S**
Project name	GILLIESTON HEIGHTS
Project ID	20.2732
Received Date	Jan 30, 2020

Client Sample ID			GH01	GH02	GH03	GH04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Ja31926	M20-Ja31927	M20-Ja31928	M20-Ja31929
Date Sampled			Jan 29, 2020	Jan 29, 2020	Jan 29, 2020	Jan 29, 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	%	60	58	96	141
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

Client Sample ID			GH01	GH02	GH03	GH04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Ja31926	M20-Ja31927	M20-Ja31928	M20-Ja31929
Date Sampled			Jan 29, 2020	Jan 29, 2020	Jan 29, 2020	Jan 29, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
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	< 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	0.7	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	1.4	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	122	130	84	88
p-Terphenyl-d14 (surr.)	1	%	128	133	110	123
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	0.27	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	0.27	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	0.27	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	90	86	134	147
Tetrachloro-m-xylene (surr.)	1	%	109	103	80	83
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID			GH01	GH02	GH03	GH04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M20-Ja31926	M20-Ja31927	M20-Ja31928	M20-Ja31929
Date Sampled			Jan 29, 2020	Jan 29, 2020	Jan 29, 2020	Jan 29, 2020
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	86	88	127	138
Heavy Metals						
Arsenic	2	mg/kg	3.0	2.4	3.5	5.7
Cadmium	0.4	mg/kg	0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	11	7.6	8.0	14
Copper	5	mg/kg	20	8.3	< 5	7.2
Lead	5	mg/kg	130	17	18	17
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	23	< 5	< 5	5.9
Zinc	5	mg/kg	370	200	44	46
% Moisture	1	%	14	20	5.6	7.5

Client Sample ID			GH05	QA01
Sample Matrix			Soil	Soil
Eurofins Sample No.			M20-Ja31930	M20-Ja31931
Date Sampled			Jan 29, 2020	Jan 29, 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	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50

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Client Sample ID			GH05	QA01
Sample Matrix			Soil	Soil
Eurofins Sample No.			M20-Ja31930	M20-Ja31931
Date Sampled			Jan 29, 2020	Jan 29, 2020
Test/Reference	LOR	Unit		
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	%	101	86
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	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	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	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5
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	< 0.5	0.9
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	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	0.8
Total PAH*	0.5	mg/kg	< 0.5	1.7
2-Fluorobiphenyl (surr.)	1	%	91	82
p-Terphenyl-d14 (surr.)	1	%	124	110
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	0.34

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Client Sample ID			GH05	QA01
Sample Matrix			Soil	Soil
Eurofins Sample No.			M20-Ja31930	M20-Ja31931
Date Sampled			Jan 29, 2020	Jan 29, 2020
Test/Reference	LOR	Unit		
Organochlorine Pesticides				
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	0.34
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	0.34
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	145	131
Tetrachloro-m-xylene (surr.)	1	%	85	80
Organophosphorus Pesticides				
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2

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Environment Testing

Client Sample ID			GH05	QA01
Sample Matrix			Soil	Soil
Eurofins Sample No.			M20-Ja31930	M20-Ja31931
Date Sampled			Jan 29, 2020	Jan 29, 2020
Test/Reference	LOR	Unit		
Organophosphorus Pesticides				
Terbufos	0.2	mg/kg	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	130	129
Heavy Metals				
Arsenic	2	mg/kg	6.3	4.9
Cadmium	0.4	mg/kg	< 0.4	0.7
Chromium	5	mg/kg	12	17
Copper	5	mg/kg	6.0	35
Lead	5	mg/kg	7.0	220
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	9.2	36
Zinc	5	mg/kg	42	590
% Moisture	1	%	8.1	14

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
Eurofins | mgt Suite B10			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jan 31, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8081)			
Metals M8	Melbourne	Jan 31, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Melbourne	Jan 31, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

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IANZ # 1290

Company Name:	Practical Environmental Solutions P/L	**Order No.:**		**Received:**	Jan 30, 2020 3:50 PM
Address:	11 Ulick St Mereweather NSW 2291	**Report #:**	699511	**Due:**	Feb 6, 2020
		Phone:	0401 507 517	**Priority:**	5 Day
		Fax:		**Contact Name:**	David McQueeney
Project Name:	GILLIESTON HEIGHTS				
Project ID:	20.2732				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Moisture Set	Eurofins | mgt Suite B10
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	GH01	Jan 29, 2020		Soil	M20-Ja31926	X	X
2	GH02	Jan 29, 2020		Soil	M20-Ja31927	X	X
3	GH03	Jan 29, 2020		Soil	M20-Ja31928	X	X
4	GH04	Jan 29, 2020		Soil	M20-Ja31929	X	X
5	GH05	Jan 29, 2020		Soil	M20-Ja31930	X	X
6	QA01	Jan 29, 2020		Soil	M20-Ja31931	X	X
Test Counts						6	6

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							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
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	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	118			70-130	Pass	
TRH C10-C14	%	97			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	96			70-130	Pass	
Toluene	%	115			70-130	Pass	
Ethylbenzene	%	113			70-130	Pass	
m&p-Xylenes	%	112			70-130	Pass	
Xylenes - Total	%	113			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	113			70-130	Pass	
TRH C6-C10	%	108			70-130	Pass	
TRH >C10-C16	%	92			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	106			70-130	Pass	
Acenaphthylene	%	107			70-130	Pass	
Anthracene	%	101			70-130	Pass	
Benz(a)anthracene	%	84			70-130	Pass	
Benzo(a)pyrene	%	108			70-130	Pass	
Benzo(b&j)fluoranthene	%	110			70-130	Pass	
Benzo(g.h.i)perylene	%	107			70-130	Pass	
Benzo(k)fluoranthene	%	106			70-130	Pass	
Chrysene	%	88			70-130	Pass	
Dibenz(a.h)anthracene	%	103			70-130	Pass	
Fluoranthene	%	101			70-130	Pass	
Fluorene	%	108			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	104			70-130	Pass	
Naphthalene	%	80			70-130	Pass	
Phenanthrene	%	97			70-130	Pass	
Pyrene	%	97			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	82			70-130	Pass	
4.4'-DDD	%	116			70-130	Pass	
4.4'-DDE	%	87			70-130	Pass	
4.4'-DDT	%	105			70-130	Pass	
a-BHC	%	110			70-130	Pass	
Aldrin	%	100			70-130	Pass	
b-BHC	%	107			70-130	Pass	
d-BHC	%	97			70-130	Pass	
Dieldrin	%	108			70-130	Pass	
Endosulfan I	%	92			70-130	Pass	
Endosulfan II	%	116			70-130	Pass	
Endosulfan sulphate	%	95			70-130	Pass	
Endrin	%	99			70-130	Pass	
Endrin aldehyde	%	80			70-130	Pass	
Endrin ketone	%	106			70-130	Pass	
g-BHC (Lindane)	%	87			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heptachlor	%	101			70-130	Pass	
Heptachlor epoxide	%	82			70-130	Pass	
Hexachlorobenzene	%	82			70-130	Pass	
Methoxychlor	%	78			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	71			70-130	Pass	
Dimethoate	%	78			70-130	Pass	
Ethion	%	81			70-130	Pass	
Fenitrothion	%	75			70-130	Pass	
Methyl parathion	%	78			70-130	Pass	
Mevinphos	%	81			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	94			80-120	Pass	
Cadmium	%	104			80-120	Pass	
Chromium	%	93			80-120	Pass	
Copper	%	94			80-120	Pass	
Lead	%	87			80-120	Pass	
Mercury	%	100			75-125	Pass	
Nickel	%	92			80-120	Pass	
Zinc	%	92			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Ja30329	NCP	%	106			70-130	Pass	
Acenaphthylene	S20-Ja30329	NCP	%	109			70-130	Pass	
Anthracene	S20-Ja30329	NCP	%	107			70-130	Pass	
Benz(a)anthracene	S20-Ja30329	NCP	%	117			70-130	Pass	
Benzo(a)pyrene	S20-Ja30329	NCP	%	109			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Ja30329	NCP	%	104			70-130	Pass	
Benzo(g.h.i)perylene	S20-Ja30329	NCP	%	70			70-130	Pass	
Benzo(k)fluoranthene	S20-Ja30329	NCP	%	93			70-130	Pass	
Chrysene	S20-Ja30329	NCP	%	93			70-130	Pass	
Dibenz(a.h)anthracene	S20-Ja30329	NCP	%	83			70-130	Pass	
Fluoranthene	S20-Ja30329	NCP	%	110			70-130	Pass	
Fluorene	S20-Ja30329	NCP	%	112			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Ja30329	NCP	%	88			70-130	Pass	
Naphthalene	S20-Ja30329	NCP	%	102			70-130	Pass	
Phenanthrene	S20-Ja30329	NCP	%	101			70-130	Pass	
Pyrene	S20-Ja30329	NCP	%	105			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M20-Ja30076	NCP	%	101			70-130	Pass	
4.4'-DDD	M20-Ja30076	NCP	%	119			70-130	Pass	
4.4'-DDE	M20-Ja30076	NCP	%	113			70-130	Pass	
a-BHC	M20-Ja30076	NCP	%	118			70-130	Pass	
Aldrin	M20-Ja30076	NCP	%	114			70-130	Pass	
b-BHC	M20-Ja30076	NCP	%	83			70-130	Pass	
d-BHC	M20-Ja30076	NCP	%	98			70-130	Pass	
Dieldrin	M20-Ja30076	NCP	%	106			70-130	Pass	
Endosulfan I	M20-Ja30076	NCP	%	129			70-130	Pass	
Endosulfan II	M20-Ja30076	NCP	%	102			70-130	Pass	
Endosulfan sulphate	M20-Ja30076	NCP	%	72			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin	M20-Ja30076	NCP	%	80			70-130	Pass	
Endrin aldehyde	M20-Ja30076	NCP	%	89			70-130	Pass	
Endrin ketone	M20-Ja30076	NCP	%	85			70-130	Pass	
g-BHC (Lindane)	M20-Ja30076	NCP	%	114			70-130	Pass	
Heptachlor	M20-Ja30076	NCP	%	77			70-130	Pass	
Heptachlor epoxide	M20-Ja30076	NCP	%	111			70-130	Pass	
Hexachlorobenzene	M20-Ja30076	NCP	%	116			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Ja28390	NCP	%	106			75-125	Pass	
Cadmium	S20-Ja28390	NCP	%	101			75-125	Pass	
Chromium	S20-Ja28390	NCP	%	110			75-125	Pass	
Copper	S20-Ja28390	NCP	%	106			75-125	Pass	
Lead	S20-Ja28390	NCP	%	100			75-125	Pass	
Mercury	S20-Ja28390	NCP	%	108			70-130	Pass	
Nickel	S20-Ja28390	NCP	%	103			75-125	Pass	
Zinc	S20-Ja28390	NCP	%	105			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDT	M20-Ja28863	NCP	%	78			70-130	Pass	
Methoxychlor	M20-Ja28863	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	M20-Ja20710	NCP	%	102			70-130	Pass	
Dimethoate	M20-Ja20710	NCP	%	93			70-130	Pass	
Ethion	M20-Ja20710	NCP	%	83			70-130	Pass	
Fenitrothion	M20-Ja20710	NCP	%	89			70-130	Pass	
Methyl parathion	M20-Ja20710	NCP	%	86			70-130	Pass	
Mevinphos	M20-Ja20710	NCP	%	71			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	M20-Ja31929	CP	%	87			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M20-Ja31929	CP	%	78			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M20-Ja31930	CP	%	75			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M20-Ja31930	CP	%	72			70-130	Pass	
Toluene	M20-Ja31930	CP	%	78			70-130	Pass	
Ethylbenzene	M20-Ja31930	CP	%	82			70-130	Pass	
m&p-Xylenes	M20-Ja31930	CP	%	86			70-130	Pass	
o-Xylene	M20-Ja31930	CP	%	85			70-130	Pass	
Xylenes - Total	M20-Ja31930	CP	%	85			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M20-Ja31930	CP	%	83			70-130	Pass	
TRH C6-C10	M20-Ja31930	CP	%	72			70-130	Pass	

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Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Ja27226	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S20-Ja27226	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S20-Ja27226	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S20-Ja27226	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
EPN	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S20-Ja27226	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S20-Ja27226	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S20-Ja27226	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Ja28390	NCP	mg/kg	17	18	1.0	30%	Pass	
Cadmium	S20-Ja28390	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Ja28390	NCP	mg/kg	9.1	9.2	1.0	30%	Pass	
Copper	S20-Ja28390	NCP	mg/kg	37	37	1.0	30%	Pass	
Lead	S20-Ja28390	NCP	mg/kg	24	24	1.0	30%	Pass	
Mercury	S20-Ja28390	NCP	mg/kg	0.1	0.1	<1	30%	Pass	
Nickel	S20-Ja28390	NCP	mg/kg	10	11	2.0	30%	Pass	
Zinc	S20-Ja28390	NCP	mg/kg	45	47	3.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M20-Ja31928	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M20-Ja31928	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M20-Ja31928	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M20-Ja31928	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M20-Ja31928	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M20-Ja31928	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M20-Ja31928	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M20-Ja31928	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M20-Ja31928	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	M20-Ja31928	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M20-Ja31928	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M20-Ja31928	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M20-Ja31928	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M20-Ja31928	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M20-Ja31928	CP	mg/kg	< 100	< 100	<1	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
% Moisture	M20-Ja31931	CP	%	14	14	<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

Authorised By

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (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.

Practical Environmental Solutions P/L
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Mereweather
NSW 2291

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **David McQueeney**

Report	**699958-S**
Project name	GILLIESTON HEGIHTS
Project ID	20.2732
Received Date	Feb 04, 2020

Client Sample ID			**GH06**	**GH07**	**GH08**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N20-Fe02453**	**N20-Fe02454**	**N20-Fe02455**
Date Sampled			**Feb 03, 2020**	**Feb 03, 2020**	**Feb 03, 2020**
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	< 50
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	119	120	67
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5

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Environment Testing

Client Sample ID			GH06	GH07	GH08
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			N20-Fe02453	N20-Fe02454	N20-Fe02455
Date Sampled			Feb 03, 2020	Feb 03, 2020	Feb 03, 2020
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	71	83	53
p-Terphenyl-d14 (surr.)	1	%	112	114	87
Organochlorine Pesticides					
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Toxaphene	1	mg/kg	< 1	< 1	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	131	142	105
Tetrachloro-m-xylene (surr.)	1	%	98	98	55
Organophosphorus Pesticides					
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2

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Environment Testing

Client Sample ID			GH06	GH07	GH08
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			N20-Fe02453	N20-Fe02454	N20-Fe02455
Date Sampled			Feb 03, 2020	Feb 03, 2020	Feb 03, 2020
Test/Reference	LOR	Unit			
Organophosphorus Pesticides					
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	110	110	125
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	< 100
Heavy Metals					
Arsenic	2	mg/kg	4.2	2.0	3.5
Beryllium	2	mg/kg	< 2	< 2	< 2
Boron	10	mg/kg	< 10	< 10	< 10
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	7.5	7.0	15
Cobalt	5	mg/kg	< 5	< 5	< 5
Copper	5	mg/kg	< 5	7.1	16
Lead	5	mg/kg	19	14	22
Manganese	5	mg/kg	49	110	190
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	7.7
Selenium	2	mg/kg	< 2	< 2	< 2
Zinc	5	mg/kg	310	310	880
% Moisture	1	%	7.2	7.6	17

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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
Eurofins | mgt Suite B10			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Feb 05, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Melbourne	Feb 05, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 05, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Melbourne	Feb 05, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Melbourne	Feb 05, 2020	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water (USEPA 8270)			
Organophosphorus Pesticides	Melbourne	Feb 05, 2020	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS (USEPA 8081)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Feb 05, 2020	
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Melbourne	Feb 05, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Melbourne	Feb 05, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Melbourne	Feb 04, 2020	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name:	Practical Environmental Solutions P/L	**Order No.:**		**Received:**	Feb 4, 2020 9:50 AM
Address:	11 Ulick St Mereweather NSW 2291	**Report #:**	699958	**Due:**	Feb 11, 2020
		Phone:	0401 507 517	**Priority:**	5 Day
		Fax:		**Contact Name:**	David McQueeney
Project Name:	GILLIESTON HEGIHTS				
Project ID:	20.2732				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Beryllium	Boron	Cobalt	Manganese	Selenium	Moisture Set	Eurofins | mgt Suite B10
Melbourne Laboratory - NATA Site # 1254 & 14271						X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217												
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	GH06	Feb 03, 2020		Soil	N20-Fe02453	X	X	X	X	X	X	X
2	GH07	Feb 03, 2020		Soil	N20-Fe02454	X	X	X	X	X	X	X
3	GH08	Feb 03, 2020		Soil	N20-Fe02455	X	X	X	X	X	X	X
Test Counts						3	3	3	3	3	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	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
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							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Beryllium	mg/kg	< 2			2	Pass	
Boron	mg/kg	< 10			10	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium	mg/kg	< 5			5	Pass	
Cobalt	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Selenium	mg/kg	< 2			2	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	115			70-130	Pass	
TRH C10-C14	%	87			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	115			70-130	Pass	
Toluene	%	106			70-130	Pass	
Ethylbenzene	%	101			70-130	Pass	
m&p-Xylenes	%	103			70-130	Pass	
Xylenes - Total	%	103			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	112			70-130	Pass	
TRH C6-C10	%	109			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	107			70-130	Pass	
Acenaphthylene	%	104			70-130	Pass	
Anthracene	%	125			70-130	Pass	
Benz(a)anthracene	%	93			70-130	Pass	
Benzo(a)pyrene	%	78			70-130	Pass	
Benzo(b&j)fluoranthene	%	83			70-130	Pass	
Benzo(g.h.i)perylene	%	92			70-130	Pass	
Benzo(k)fluoranthene	%	104			70-130	Pass	
Chrysene	%	94			70-130	Pass	
Dibenz(a.h)anthracene	%	75			70-130	Pass	
Fluoranthene	%	117			70-130	Pass	
Fluorene	%	104			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	74			70-130	Pass	
Naphthalene	%	101			70-130	Pass	
Phenanthrene	%	110			70-130	Pass	
Pyrene	%	105			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	101			70-130	Pass	
4.4'-DDD	%	88			70-130	Pass	
4.4'-DDE	%	111			70-130	Pass	
4.4'-DDT	%	76			70-130	Pass	
a-BHC	%	127			70-130	Pass	
Aldrin	%	97			70-130	Pass	
b-BHC	%	115			70-130	Pass	
d-BHC	%	118			70-130	Pass	
Dieldrin	%	83			70-130	Pass	
Endosulfan I	%	102			70-130	Pass	

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Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan II			%	118			70-130	Pass	
Endosulfan sulphate			%	106			70-130	Pass	
Endrin			%	111			70-130	Pass	
Endrin aldehyde			%	93			70-130	Pass	
Endrin ketone			%	107			70-130	Pass	
g-BHC (Lindane)			%	92			70-130	Pass	
Heptachlor			%	109			70-130	Pass	
Heptachlor epoxide			%	102			70-130	Pass	
Hexachlorobenzene			%	98			70-130	Pass	
Methoxychlor			%	76			70-130	Pass	
LCS - % Recovery									
Organophosphorus Pesticides									
Diazinon			%	107			70-130	Pass	
Dimethoate			%	92			70-130	Pass	
Ethion			%	103			70-130	Pass	
Fenitrothion			%	112			70-130	Pass	
Methyl parathion			%	110			70-130	Pass	
Mevinphos			%	92			70-130	Pass	
LCS - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions									
TRH >C10-C16			%	80			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	97			80-120	Pass	
Beryllium			%	102			80-120	Pass	
Boron			%	101			80-120	Pass	
Cadmium			%	96			80-120	Pass	
Chromium			%	98			80-120	Pass	
Cobalt			%	104			80-120	Pass	
Copper			%	103			80-120	Pass	
Lead			%	102			80-120	Pass	
Manganese			%	97			80-120	Pass	
Mercury			%	106			75-125	Pass	
Nickel			%	96			80-120	Pass	
Selenium			%	95			80-120	Pass	
Zinc			%	96			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M20-Fe04870	NCP	%	107			70-130	Pass	
TRH C10-C14	M20-Fe07044	NCP	%	98			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M20-Fe04870	NCP	%	110			70-130	Pass	
Toluene	M20-Fe04870	NCP	%	104			70-130	Pass	
Ethylbenzene	M20-Fe04870	NCP	%	101			70-130	Pass	
m&p-Xylenes	M20-Fe04870	NCP	%	102			70-130	Pass	
o-Xylene	M20-Fe04870	NCP	%	105			70-130	Pass	
Xylenes - Total	M20-Fe04870	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M20-Fe04870	NCP	%	99			70-130	Pass	
TRH C6-C10	M20-Fe04870	NCP	%	103			70-130	Pass	
Spike - % Recovery									

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Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Organochlorine Pesticides				Result 1					
Chlordanes - Total	M20-Fe06513	NCP	%	106			70-130	Pass	
4.4'-DDD	M20-Fe06513	NCP	%	104			70-130	Pass	
4.4'-DDE	M20-Fe06513	NCP	%	118			70-130	Pass	
4.4'-DDT	M20-Fe06513	NCP	%	87			70-130	Pass	
a-BHC	M20-Fe06513	NCP	%	128			70-130	Pass	
Aldrin	M20-Fe06513	NCP	%	104			70-130	Pass	
b-BHC	M20-Fe06513	NCP	%	111			70-130	Pass	
d-BHC	M20-Fe06513	NCP	%	120			70-130	Pass	
Dieldrin	M20-Fe06513	NCP	%	99			70-130	Pass	
Endosulfan I	M20-Fe06513	NCP	%	117			70-130	Pass	
Endosulfan II	M20-Fe06513	NCP	%	80			70-130	Pass	
Endosulfan sulphate	M20-Fe06513	NCP	%	83			70-130	Pass	
Endrin	M20-Fe06513	NCP	%	92			70-130	Pass	
Endrin aldehyde	M20-Fe06513	NCP	%	85			70-130	Pass	
Endrin ketone	M20-Fe06513	NCP	%	86			70-130	Pass	
g-BHC (Lindane)	M20-Fe06513	NCP	%	98			70-130	Pass	
Heptachlor	M20-Fe06513	NCP	%	119			70-130	Pass	
Heptachlor epoxide	M20-Fe06513	NCP	%	113			70-130	Pass	
Hexachlorobenzene	M20-Fe06513	NCP	%	97			70-130	Pass	
Methoxychlor	M20-Fe06513	NCP	%	91			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	M20-Fe07044	NCP	%	93			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M20-Fe04517	NCP	%	73			75-125	Fail	Q08
Beryllium	M20-Fe04517	NCP	%	68			75-125	Fail	Q08
Boron	M20-Fe04517	NCP	%	76			75-125	Pass	
Cadmium	M20-Fe04517	NCP	%	96			75-125	Pass	
Chromium	M20-Fe04517	NCP	%	78			75-125	Pass	
Cobalt	M20-Fe04517	NCP	%	74			75-125	Fail	Q08
Copper	M20-Fe04517	NCP	%	82			75-125	Pass	
Lead	M20-Fe04517	NCP	%	75			75-125	Pass	
Manganese	M20-Fe04517	NCP	%	378			75-125	Fail	Q08
Mercury	M20-Fe04517	NCP	%	102			70-130	Pass	
Nickel	M20-Fe04517	NCP	%	74			75-125	Fail	Q08
Selenium	M20-Fe04517	NCP	%	66			75-125	Fail	Q08
Zinc	M20-Fe04517	NCP	%	94			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M20-Fe07053	NCP	%	91			70-130	Pass	
Acenaphthylene	M20-Fe07053	NCP	%	93			70-130	Pass	
Anthracene	M20-Fe07053	NCP	%	72			70-130	Pass	
Benz(a)anthracene	M20-Fe07053	NCP	%	79			70-130	Pass	
Benzo(a)pyrene	M20-Fe07053	NCP	%	90			70-130	Pass	
Benzo(b&j)fluoranthene	M20-Fe07053	NCP	%	84			70-130	Pass	
Benzo(g.h.i)perylene	M20-Fe07053	NCP	%	78			70-130	Pass	
Benzo(k)fluoranthene	M20-Fe07053	NCP	%	105			70-130	Pass	
Chrysene	M20-Fe07053	NCP	%	93			70-130	Pass	
Dibenz(a.h)anthracene	M20-Fe07053	NCP	%	84			70-130	Pass	
Fluoranthene	M20-Fe07053	NCP	%	78			70-130	Pass	
Fluorene	M20-Fe07053	NCP	%	60			70-130	Fail	Q08
Indeno(1.2.3-cd)pyrene	M20-Fe07053	NCP	%	81			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Naphthalene	M20-Fe07053	NCP	%	91			70-130	Pass	
Phenanthrene	M20-Fe07053	NCP	%	101			70-130	Pass	
Pyrene	M20-Fe07053	NCP	%	80			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	B20-Fe02582	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M20-Fe03643	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M20-Fe03643	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M20-Fe03643	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	B20-Fe02582	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	B20-Fe02582	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	B20-Fe02582	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	B20-Fe02582	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	B20-Fe02582	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	B20-Fe02582	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	B20-Fe02582	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	B20-Fe02582	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M20-Fe06512	NCP	mg/kg	0.9	0.9	6.0	30%	Pass	
Benzo(a)pyrene	M20-Fe06512	NCP	mg/kg	1.0	1.1	4.0	30%	Pass	
Benzo(b&j)fluoranthene	M20-Fe06512	NCP	mg/kg	0.9	1.0	5.0	30%	Pass	
Benzo(g.h.i)perylene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M20-Fe06512	NCP	mg/kg	0.9	1.1	20	30%	Pass	
Chrysene	M20-Fe06512	NCP	mg/kg	0.9	0.9	3.0	30%	Pass	
Dibenz(a.h)anthracene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M20-Fe06512	NCP	mg/kg	1.7	1.8	7.0	30%	Pass	
Fluorene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M20-Fe06512	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M20-Fe06512	NCP	mg/kg	1.4	1.5	4.0	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M20-Fe06512	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Endrin	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	M20-Fe06512	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	M20-Fe06512	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	M20-Fe06512	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	M20-Fe06512	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	M20-Fe06512	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	M20-Fe03643	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	M20-Fe04517	NCP	mg/kg	3.5	4.4	22	30%	Pass	
Beryllium	M20-Fe04517	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Boron	M20-Fe04517	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Cadmium	M20-Fe04517	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M20-Fe04517	NCP	mg/kg	33	42	24	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cobalt	M20-Fe04517	NCP	mg/kg	14	17	23	30%	Pass	
Copper	M20-Fe04517	NCP	mg/kg	26	34	25	30%	Pass	
Lead	M20-Fe04517	NCP	mg/kg	6.5	7.9	19	30%	Pass	
Manganese	M20-Fe04517	NCP	mg/kg	440	560	22	30%	Pass	
Mercury	M20-Fe04517	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M20-Fe04517	NCP	mg/kg	26	33	26	30%	Pass	
Selenium	M20-Fe04517	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Zinc	M20-Fe04517	NCP	mg/kg	82	100	20	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Fe01869	NCP	%	15	14	9.0	30%	Pass	

eurofins | Environment Testing

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
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

Authorised By

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (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.

APPENDIX E

CHAIN OF CUSTODY (FIELD & DESPATCH)

CHAIN OF CUSTODY RECORD

Eurofins | mgt ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F 16 Mars Road Lane Cove West NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1 21 Smallwood Place Murarrie QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVic@eurofins.com

Company	PES
Address	1/2 Frost Drive, Mayfield West
Contact Name	Dave McQueeney
Phone №	0413212601
Special Directions	
Purchase Order	
Quote ID №	

Project №	20.2732	Project Manager	Dave McQueeney
Project Name	Gillieston Heights	EDD Format	

Sampler(s)	John Fow
Handed over by	John Fowler
Email for Invoice	Dave McQueeney
Email for Results	Dave McQueeney

Analyses: Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

Containers: 500mL Plastic, 250mL Plastic, 125mL Plastic, 200mL Amber Glass, 40mL VOA vial, 500mL PFAS Bottle, Jar (Glass or HDPE), Other (Asbestos AS4964, WA Guidelines)

Required Turnaround Time (TAT)
Default will be 5 days if not ticked.
♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day ♦ ☐ 1 day ♦
☐ 2 days ♦ ☐ 3
☑ 5 days (Standard)
☐ Other(

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B10	Jar (Glass or HDPE)	Sample Comments / Dangerous Goods Hazard Warning
1	GH01	29/01/20	S	X	1	
2	GH02		S	X	1	
3	GH03		S	X	1	
4	GH04		S	X	1	
5	GH05		S	X	1	
6	QA01		S	X	1	
7						
8						
9						
10						
	Total Counts					

Date/Time: 30/1/20 3:50PM
Chilled: Yes / No
Temp: 9.
Correction:
Final Temp:

Method of Shipment	☐ Courier (#)	☑ Hand Delivered	☐ Postal	Name: John Fow	Signature	Date 30/01/2020	Time 1550
Eurofins | mgt Laboratory Use Only	Received By: SOE	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature: AW	Date: 30/1/20	Time: 3:50PM	Temperature
	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time	Report №

699511

CHAIN OF CUSTODY RECORD

Eurofins | mgt ABN 50 005 085 521

☐ Sydney Laboratory
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1 21 Smallwood Place Murarrie QLD 4172

☐ Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleVic@eurofins.com

Company	PES	Project No	20. 2732	Project Manager	Dave McQueeney
Address	1/2 Frost Drive, Mayfield West	Project Name	Gilleston Heights	EDD Format	
Contact Name	Dave McQueeney			Sampler(s)	Julian Fowler
Phone No	0413212601			Handed over by	Julian Fowler
Special Directions				Email for Invoice	Dave McQueeney
Purchase Order				Email for Results	Dave McQueeney
Quote ID No					

Analyses: Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

No	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B10 + Be, B, Co, Mn, Se	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)
	GH06	3/02/20	S	X							1	
	GH07	↓	S	X							1	
	GH08		S	X							1	
				Total Counts								

Containers: Change container type & size if necessary

Required Turnaround Time (TAT): Default will be 5 days if not ticked

*Surcharge will apply
- ☐ Overnight (reporting by 9am)*
- ☐ Same day * ☐ 1 day *
- ☐ 2 days * ☐ 3
- ☑ 5 days (Standard)
- ☐ Other(

Sample Comments / Dangerous Goods Hazard Warning

Date/Time: 4/2 950am
Chilled: Yes / No
Temp: 9.2
4.4
10.0
Correction: +0.6.
Final Temp:

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name: Julian Fowler	Signature	Date	Time
Eurofins | mgt Laboratory Use Only	Received By: RALUBA	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date 4/2	Time 4/02/20 950am
	Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	Date	Time

Time: 0945
Temperature: 10.12
Report No: 699958

APPENDIX F

HISTORICAL TITLE INFORMATION

Cadastral Records Enquiry Report : Lot 1 DP 302745

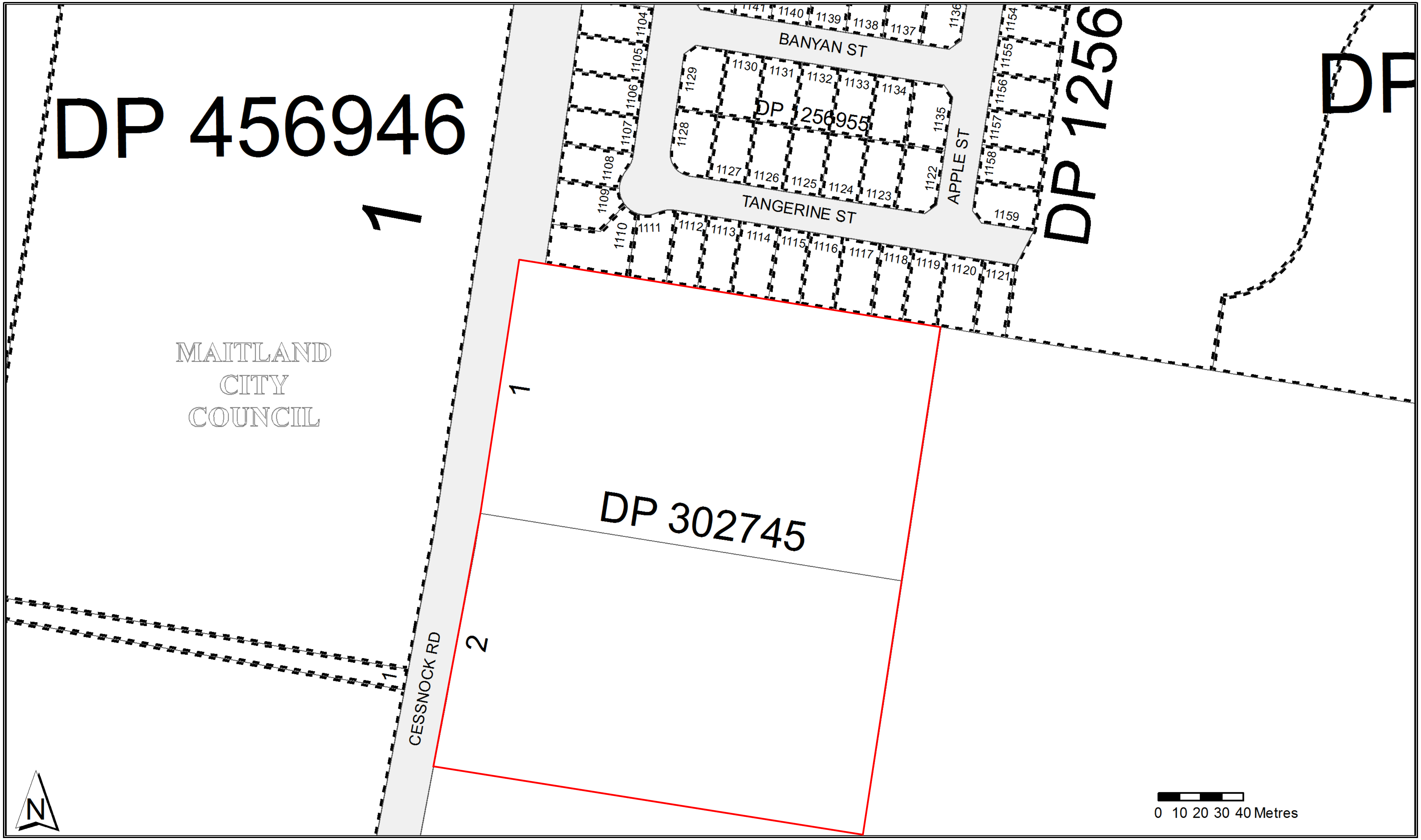
Ref : GILLIESTON heights 457 cessnock

Locality : GILLIESTON HEIGHTS

Parish : MAITLAND

LGA : MAITLAND

County : NORTHUMBERLAND



Report Generated 10:03:58 PM, 22 January, 2020

This information is provided as a searching aid only.Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For ALL ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps

Historical Title

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/1/2020 10:04PM

FOLIO: 1/302745

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3257 FOL 75

Recorded	Number	Type of Instrument	C.T. Issue
18/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
18/6/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
4/7/2000	6919804	MORTGAGE	EDITION 1
23/9/2002	8976078	DISCHARGE OF MORTGAGE	
23/9/2002	8976079	TRANSFER	
23/9/2002	8976080	MORTGAGE	EDITION 2
8/10/2002	9015723	DISCHARGE OF MORTGAGE	EDITION 3
20/10/2003	AA83015	CAVEAT	
8/12/2003	AA127703	APPLICATION FOR PREPARATION OF LAPSING NOTICE	
27/7/2004	AA833312	TRANSFER	EDITION 4
3/10/2006	AC637864	TRANSFER	EDITION 5

*** END OF SEARCH ***

Form: 01T
Licence: 10V/0096/96
Edition: 0011

TRANSFER

New South Wales
Real Property Act 1900

8976079K

PRIVACY NOTE: this information is legally required and will be

STAMP DUTY

Office of State Revenue use only

OFFICE OF STATE REVENUE (N.S.W. TREASURY)
CLIENT No. 1403011 STAMP No. 75
STAMP DUTY $2.00 SIGNATURE
TRANSACTION No. 022002 DATE 22.7.02
ASSESSMENT DETAILS:

(A) **TORRENS TITLE** If appropriate, specify the part transferred
Folio Identifier 1/302745

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
208X	St George Bank Limited DX 11139 KOGARAH Phone: (02) 9236 9580 Reference (optional): REFERENCE 211.2645355	T TW (Sheriff)

(C) **TRANSFEROR**

MARK JONGERDEN and MAXINE GAY JONGERDEN

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 310,000.00 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple.

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable): 1. .... 2. .... 3. ....

(H) **TRANSFEREE**

JEFFREY MARK BROWN

(I) **TENANCY:**

DATE 16 / 08 / 2002
dd mm yyyy

(J) I certify that the transferor, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this transfer in my presence.

Signature of witness:

Name of witness: EARL HULIN

Address of witness: 417 High Street, Maitland

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferor:

I certify that the transferee, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this transfer in my presence.

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the transferee.

Signature of transferee:

If signed on the transferee's behalf by a solicitor or licensed conveyancer, insert the signatory's full name and capacity below:
CRAIG STUART MUNTER, SOLICITOR

All handwriting must be in block capitals.

Page 1 of ____
number additional pages sequentially

A set of notes on this form (01T-2) is available from Land and Property Information NSW.

Form: 01T
Release: 2.1
www.lpi.nsw.gov.au

TRANSFER

New South Wales
Real Property Act 1900

AA833312G

PRIVACY NOTE: this information is legally required and will beco

STAMP DUTY Office of State Revenue use only

Office of State Revenue NSW Treasury
Client No: 1406780 581
VENDOR DUTY ENDORSED
2054805
Trans No: NOT LIABLE

Office of State Revenue NSW Treasury YEAR 2000 - 2005 N11 ALTERATION NOTED

NEW SOUTH WALES DUTY
20-07-2004 0002074690-001
SECTION 18(2)
DUTY $ ***************2.00

(A) **TORRENS TITLE** Identifier ~~11/302745~~ 1/302745

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
30P	L. J. KANE & CO. LTO BOX 30P Reference: WH·SEWELL	T TW (Sheriff)

(C) **TRANSFEROR** JEFFREY MARK BROWN

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 510,000.00 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple

(F) **SHARE TRANSFERRED**

(G) Encumbrances (if applicable):

(H) **TRANSFEREE** MARGARET HELEN SEWELL as to one three-quarter share and TREVOR ANDREW MALTMAN as to one one-quarter share as

(I) **TENANCY:** tenants in common.

(J) **DATE**

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness: Wanderson

Name of witness: WILLIAM NEIL ANDERSON
Address of witness: 2 ST. ANDREWS STREET MAITLAND

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferor: Brown

Certified for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature:

Signatory's name: WAYNE JOHN HODGINS
Signatory's capacity: Solicitor

All handwriting must be in block capitals.

Page 1 of 1
number additional pages sequentially

Land and Property Information NSW.

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/302745

SEARCH DATE	TIME	EDITION NO	DATE
22/1/2020	10:04 PM	5	3/10/2006

LAND

LOT 1 IN DEPOSITED PLAN 302745
LOCAL GOVERNMENT AREA MAITLAND
PARISH OF MAITLAND COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP302745

FIRST SCHEDULE

MARGARET HELEN SEWELL (T AC637864)

SECOND SCHEDULE (2 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 A757345 LAND EXCLUDES MINERALS AND IS SUBJECT TO RIGHTS TO MINE

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

GILLIESTON heights 457 cessnock PRINTED ON 22/1/2020

Received: 22/01/2020 22:04:13

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE
22/1/2020 10:04PM

FOLIO: 2/302745

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 3640 FOL 89

Recorded	Number	Type of Instrument	C.T. Issue
16/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
29/6/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
22/12/1992	E996452	TRANSMISSION APPLICATION	
22/12/1992	E996453	TRANSFER	EDITION 1
31/10/1997	3542373	MORTGAGE	EDITION 2
11/7/2001	7762288	MORTGAGE	EDITION 3
23/5/2002	8624837	DISCHARGE OF MORTGAGE	EDITION 4
20/1/2004	AA343818	DISCHARGE OF MORTGAGE	
20/1/2004	AA343819	MORTGAGE	EDITION 5
21/3/2004	AA501351	DEPARTMENTAL DEALING	
28/11/2008	AE353846	DISCHARGE OF MORTGAGE	
28/11/2008	AE353847	MORTGAGE	EDITION 6
14/1/2009	AE438561	DEPARTMENTAL DEALING	EDITION 7
24/11/2011	AG640265	DISCHARGE OF MORTGAGE	
24/11/2011	AG640266	MORTGAGE	EDITION 8
2/9/2018	AN678864	DEPARTMENTAL DEALING	EDITION 9 CORD ISSUED
3/10/2019	AP575151	CAVEAT	

*** END OF SEARCH ***

GILLIESTON heights 457 cessnock PRINTED ON 22/1/2020

 OFFICE USE ONLY

RP3

STAMP DUTY [redacted]

E 996452 B

DUTY $ 10-00

80026247

TRANSMISSION APPLICATION

TA | of | R /
$

SECTION 93, REAL PROPERTY ACT, 1900

(See Instructions for Completion on back of form)

DESCRIPTION OF LAND Note (a)

LAND of which deceased is registered proprietor

Torrens Title reference	If Part Only, Delete Whole and Give Details	Location
CERTIFICATE OF TITLE Volume: 3640 Folio 89 Now 2\302745	WHOLE	Parish of Maitland County of Northumberland

REGISTERED DEALING Note (b)

LEASE, MORTGAGE, OR CHARGE of which deceased is registered proprietor

~~Type of Dealing~~	Registered Number	Torrens Title Reference	Location

DECEASED REGISTERED PROPRIETOR Note (c)

RAYMOND CHARLES REYNOLDS

Note (d) (the abovenamed DECEASED) is registered as proprietor of the land above described ~~abovementioned registered dealing~~ The APPLICANT

APPLICANT Note (e)

RAYMOND REYNOLDS Main Road, Gillieston Heights, Linesman

OFFICE USE ONLY

H151

ENTITLEMENT Note (f) and (j)

being entitled as Devisee of the will/~~estate~~ of the abovenamed deceased

Probate No 114004/92 ~~Letters of Administration No.~~ of whose will was ~~of whose estate were~~ granted on 28th September, 1992

to RAYMOND REYNOLDS

Note (d) hereby applies to be registered as proprietor of the estate or interest of the said deceased in the land above described ~~abovementioned registered dealing~~

DATE 7th December, 1992

I hereby certify this application to be correct for the purposes of the Real Property Act, 1900.

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

Signature of Witness

EXECUTION Note (g)

ROBERT HENRY FAULKNER

Name of Witness (BLOCK LETTERS)

11 BOURKE STREET, MAITLAND,

Address and Occupation of Witness

SOLICITOR.

R Reynolds

Signature of Applicant

TO BE COMPLETED BY LODGING PARTY Notes (g) and (h)

LODGED BY G. KENYON & SONS
LAW STATIONERS
CASTLEREAGH ST. SYDNEY 2000
DX 456 SYDNEY Phone 267-8644
32K

Ref:

Delivery Box Number 32 Reynolds

CT	PROBATE No. AND/OR OTHER	LOCATION OF DOCUMENTS DATE OF DEATH
	114004/92	Herewith.
	9/7/92	In L.T.O. with
	sighted & returned	Produced by

OFFICE USE ONLY

Checked	Passed
Signed	Extra Fee

REGISTERED - -19

Secondary Directions

Delivery Directions

96

RP 3
1987

I/We	RAYMOND REYNOLDS
executor of the will of / administrator of the estate of	RAYMOND CHARLES REYNOLDS
consent to this application	
Signature of Witness	
Name of Witness (BLOCK LETTERS)	ROBERT HENRY FAULKNER
Address and Occupation of Witness	11 BOURKE STREET, MAITLAND SOLICITOR.
Signature of Executor/Administrator	R Reynolds

CONSENT OF EXECUTOR OR ADMINISTRATOR
Note (j)

INSTRUCTIONS FOR COMPLETION

Before lodgment at the Land Titles Office this application—

(i) Should be marked "Registration not Opposed" by the Commissioner of Stamp Duties if the deceased registered proprietor died before 31st December, 1982; and
(ii) Where applicable, stamp duty should be paid and the application appropriately stamped.

Typewriting and handwriting should be clear, legible and in permanent dense black or dark blue non-copying ink.

Alterations are not to be made by erasure; the words rejected are to be ruled through and initialled by the parties to the dealing in the left hand margin.

If the space provided is insufficient, additional sheets of the same size and quality of paper and having the same margins as this form should be used. Each additional sheet must be identified as an annexure and signed by the applicant and the attesting witness.

Rule up all blanks.

The following instructions relate to the side notes on the form.

(a) Description of land. (If application is only in respect of a registered dealing, rule through this panel.)

(i) TORRENS TITLE REFERENCE. Insert the current reference to the Folio of the Register for the land the subject of the application. e.g. 12/701924 or Vol. 12364 Fol. 176.
(ii) PART/WHOLE. If part only of the land in the Folio of the Register is the subject of the application, delete the word "WHOLE" and insert the lot and plan number, portion, &c.
(iii) LOCATION. Insert the locality shown on the Folio of the Register, e.g. at Chullora. If the locality is not shown, insert the Parish and County, e.g. Ph. Lismore Co. Rous.

(b) Registered dealing. (If application is only in respect of a Certificate of Title, rule through this panel.)

Show the registered number of the lease, mortgage, or charge, the title reference affected thereby, and the location of the land involved, e.g. Lease—W123456—Vol. 12634 Fol. 124—at Camperdown.

(c) Show the full name of the deceased registered proprietor.

(d) Strike out "land above described" or "abovementioned registered dealing", whichever does not apply.

(e) Show the full name, address and description of the applicant. If devisees or beneficiaries apply, indicate whether they hold as joint tenants or tenants in common, and, if as tenants in common, state the shares in which they hold.

(f) Insert executor, administrator, trustee, devisee or beneficiary as appropriate. If letters of administration have been granted, e.g., "cum testamento annexo" or "de bonis non", the entitlement may be abbreviated, e.g. administrator c.t.a., administrator d.b.n., &c. Applicants should not claim as executor *and* devisee or executor *and* trustee.

(g) Execution.

GENERALLY (i) Should there be insufficient space for the execution of this dealing, use an annexure sheet.

(ii) The certificate of correctness under the Real Property Act, 1900, must be signed by all the applicants, each applicant to execute the dealing in the presence of an adult witness, not being a party to the application, to whom he/she is personally known. Any person falsely or negligently certifying is liable to the penalties provided by section 117 of the Real Property Act, 1900.

ATTORNEY (iii) If the application is executed by an attorney for the applicant pursuant to a registered power of attorney, the form of attestation must set out the full name of the attorney, and the form of execution must indicate the source of his/her authority, e.g. "AB by his/her attorney (or receiver or delegate, as the case may be), XY pursuant to power of attorney registered Book No ".

AUTHORITY (iv) If the application is executed pursuant to an authority (other than specified in (iii)), the form of execution must indicate the statutory, judicial or other authority pursuant to which the application has been executed.

CORPORATION (v) If the application is executed by a corporation under seal, the form of execution should include a statement that the seal has been properly affixed, e.g. in accordance with the Articles of Association of the corporation. Each person attesting the affixing of the seal must state his/her position (e.g., director, secretary) in the corporation.

(h) Insert the name, postal address, Document Exchange reference, telephone number and delivery box number of the lodging party.

(i) The lodging party is to complete the LOCATION OF DOCUMENTS panel. Place a tick in the appropriate box to indicate the whereabouts of the Certificate of Title or duplicate registered dealing. List, in an abbreviated form, other documents lodged, e.g. stat. dec. for statutory declaration, pbte for probate, L/A for letters of administration.

(j) Consent of the executor or administrator is required only where the applicant claims otherwise than as executor, administrator, or trustee.

OFFICE USE ONLY

FIRST SCHEDULE DIRECTIONS

(A) FOLIO IDENTIFIER	(B) DIRECTION	(C) NAME

SECOND SCHEDULE AND OTHER DIRECTIONS

(D) FOLIO IDENTIFIER (OR REGD. DEALING & FOLIO IDENTIFIER)	(E) DIRECTION	(F) NOTFN TYPE	(G) DEALING NUMBER	(H) DETAILS

AUSDOC Commercial & Law Stationers P/L, 1989

Title Search

NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 2/302745

SEARCH DATE	TIME	EDITION NO	DATE
22/1/2020	10:03 PM	9	2/9/2018

NO CERTIFICATE OF TITLE HAS ISSUED FOR THE CURRENT EDITION OF THIS FOLIO.
CONTROL OF THE RIGHT TO DEAL IS HELD BY COMMONWEALTH BANK OF AUSTRALIA.

LAND

LOT 2 IN DEPOSITED PLAN 302745
AT EAST GRETA
LOCAL GOVERNMENT AREA MAITLAND
PARISH OF MAITLAND COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP302745

FIRST SCHEDULE

RAYMOND REYNOLDS
VICKI SHERYL REYNOLDS
AS JOINT TENANTS (T E996453)

SECOND SCHEDULE (4 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 B122225 LAND EXCLUDES MINERALS AND IS SUBJECT TO RIGHTS TO MINE
3 AG640266 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA
* 4 AP575151 CAVEAT BY ROTER SAND PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

GILLIESTON heights 457 cessnock PRINTED ON 22/1/2020

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register. InfoTrack an approved NSW Information Broker hereby certifies that the information contained in this document has been provided electronically by the Registrar General in accordance with Section 96B(2) of the Real Property Act 1900.

APPENDIX G

PID CALIBRATION CERTIFICATE

CALIBRATION CERTIFICATE

ION

Date of Calibration: - 12th June 2019

Calibrated by: - T.Payne

Customer: - Air-Met Scientific Pty Ltd

Description: - Tiger

Manufacturer: - ION Science Ltd

Type Number: - N/A

Serial Number: - T-115093

Certificate Number: - 247279

Signed: -

Service Due date: - June 2020

This instrument has been factory calibrated to fully documented procedures in accordance with our ISO 9001:2008 Quality Management System.
Measurement standards are derived from volumetric and time sources which have been calibrated at an accredited laboratory traceable to National or International standards. The following list indicates the serial numbers of equipment used during the calibration procedure.

BAR02	C9559 / A12446[1]				

[1] Gas mixtures prepared using equipment traceable to N.P.L. standards against Suppliers Certificate No.

The instrument has been calibrated at a temperature of 19.1°C ± 0.25°C and a barometric pressure of 1006.4 mbar ± 2 mbar.

ION Science hereby certify that on the day of calibration the instrument was working according to the manufacturer's original sales specification as checked by the calibration procedure, unless otherwise stated.
Copies of this certificate may only be reproduced in full.
Calibrations are valid as certified only on date of Calibration. For correct instrument operation please see the User Manual.

RESULTS ON DESPATCH

Applied Concentration	Instrument Indication
100.3 ppm Isobutylene	101.2 ppm Isobutylene

The estimated applied gas uncertainty is ± 2.0%

Comments: -

PD-FM-086-07

Unrivalled Gas Detection.

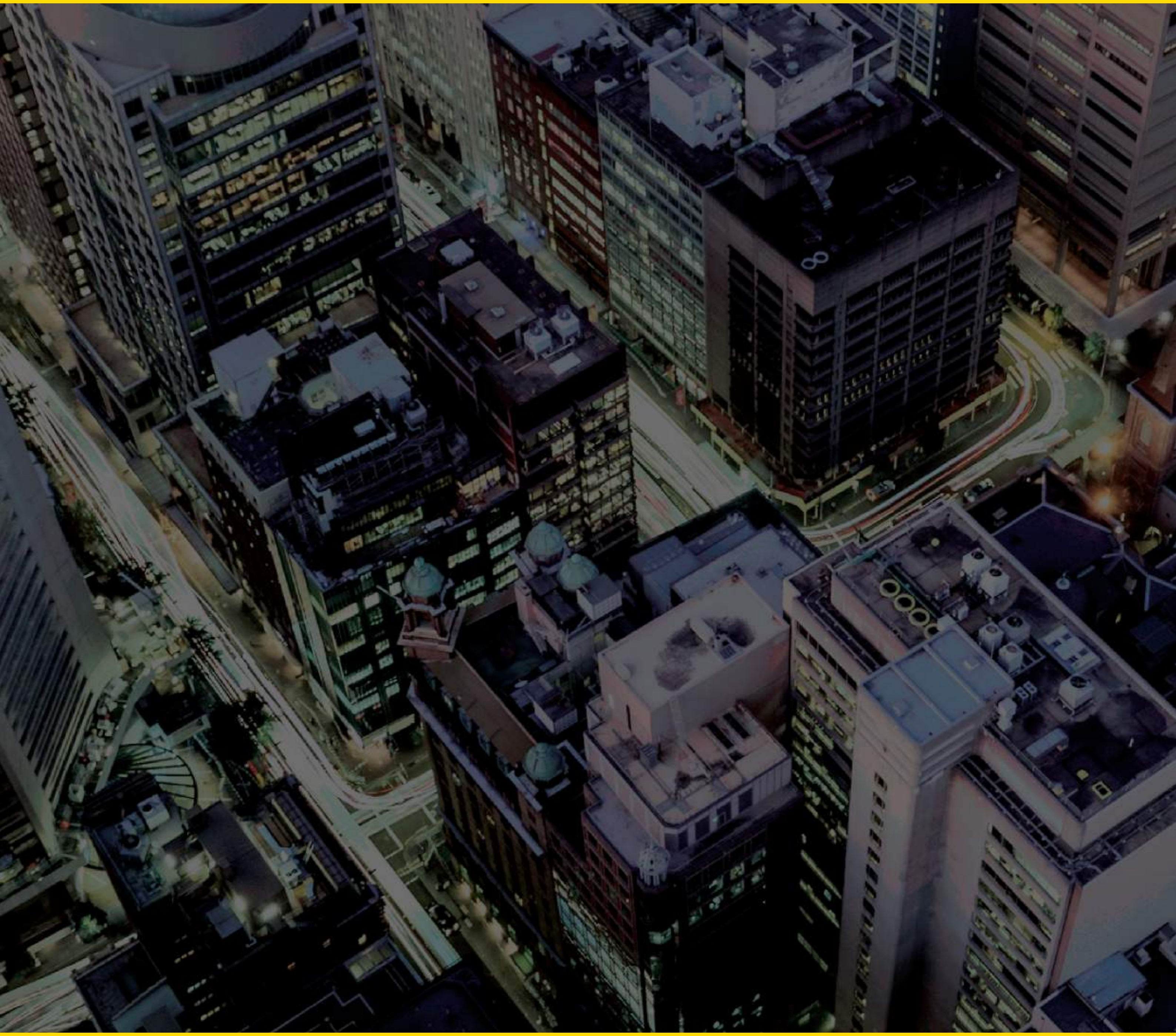
ION Science Ltd, The Hive, Butts Lane, Fowlmere, Cambs, SG8 7SL, UK
T +44 (0)1763 208503 E info@ionscience.com W ionscience.com

APPENDIX H

LAND INSIGHT & RESOURCES ENVIRO SCREEN REPORT, REPORT MAPS & HISTORICAL IMAGERY

Fast, Accurate and Comprehensive Environmental and Development Risk Information

LAND INSIGHT & RESOURCES



ENVIRO-SCREEN

Property Details

457-463 Cessnock Road, Gillieston Heights NSW

Search Date: 23 January 2019

Understanding your Report

Your Report has been produced by Land Insight and Resources (LI Resources).

Your Report is based on information available from public databases and sources at the date of reporting. The information gathered relates to land that is within a 200 to 2000 m radius (buffer zone) from the boundaries of the Property. A smaller or larger radius may be applied for certain records (as listed under records and as shown in report maps).

While every effort is made to ensure the details in your Report are correct, LI Resources cannot guarantee the accuracy or completeness of the information or data provided.

The report provided by LI Resources includes data listed on page 3 (table of contents). All sources of data and definitions are provided on the report maps and as listed in the Product Guide (Attached). For a full list of references, metadata, publications or additional information not provided in this report, please contact LI Resources at info@liresources.com.au.

The report does not include title searches; dangerous good searches or; property certificates (unless requested); or information derived from a physical inspection, such as hazardous building materials, areas of infilling or dumping/spilling of potentially contaminated materials. It is important to note that these documents and an inspection can contain information relevant to contamination that may not be identified by this Report.

This Report, and your use of it, is regulated by LI Resources Terms and Conditions (See LIR Product Guide).

Land Insight and Resources

ABN 70 167 080 837

phone: + 61 2 9979 1720

e-mail: info@liresources.com.au

https://liresources.com.au/

INDEX

Section 1 - Property Setting

1.1 SITE LOCATION MAP AND SENSITIVE RECEPTORS

Map 1 (200m Buffer)

Sensitive receptor	Category	Distance (m)*	Direction
Not identified	-	-	-

*Distance from the sensitive receptor point feature to the site boundary centroid.

1.2 PLANNING CONTROLS

Map 2 (onsite)

Zoning

Zoning	RU2	Rural Landscape

Environmental Planning Instruments

Type	Local Environmental Plan	Classification
Not identified	-	-

1.3 SOIL AND LAND USE INFORMATION

Map 3a/3b (onsite)

Soil Landscape

Soil Landscape	ERbh	BOLWARRA HEIGHTS	**Soil Group**	EROSIONAL
Description	**Landscape**— Undulating low hills to rolling low hills on Permian sediments in the central east of the Hunter Region. Slopes 5 - 20%, local relief <80 m, elevation <100 m. Extensively cleared tall open-forest. **Soils**— Moderately deep (50 - <100 cm), moderately permeable, moderately well-drained Brown Kurosols and Chromosols (Brown Podzolic Soils and Non-calcic Brown Soils); deep (100 - <150 cm), moderately permeable poorly drained Brown Dermosols (Structured Loams and Earthy Loams); very deep (150 – 500 cm), moderately permeable well-drained Brown and Yellow Kurosols (Yellow Podzolic Soils); deep (100 - <150 cm), slowly permeable moderately well-drained to imperfectly drained Brown and Yellow Kurosols (Yellow Podzolic Soils and Soloths); moderately deep to deep (50 - <150 cm), poorly drained Natric Brown Kurosols (Soloths); and shallow (25 - <50 cm), well-drained Leptic Tenosols (Lithosols) occur. **Qualities and limitations**— localised shallow soils, widespread complex soils, localised poor moisture availability, localised steep slopes, localised rock outcrop hazard, localised mass movement hazard, widespread foundation hazard, localised woody weeds, localised discharge zone, localised salinity hazard, localised gully erosion hazard, localised sheet erosion hazard, localised poor drainage, localised seasonal waterlogging.			

Salinity Hazard

Hydrologic Soil Group	C - Slow rate	Soils having slow infiltration rates when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.
Salinity Hazard	-	Not identified

Acid Sulfate Soil

ASS Risk Maps *(Table 1.3.1)*	On the Property?		Within Record Search Buffer?	
Class	Class 5		Class 5	
Atlas of Australian Acid Sulfate Soil *(Table 1.3.2)*	Bn(p4)	ASS in inland lakes, waterways, wetlands and riparian zones	**Probability of Occurrence**	Low Probability of occurrence

Table 1.3.1. Classification scheme in the ASS Planning Maps

Class of Land as shown on ASS Planning Maps	
1	Acid sulfate soils in a class 1 area are likely to be found on and below the natural ground surface.
2	Acid sulfate soils in a class 2 area are likely to be found below the natural ground surface.
3	Acid sulfate soils in a class 3 area are likely to be found beyond 1 metre below the natural ground surface.
4	Acid sulfate soils in a class 4 area are likely to be found beyond 2 metres below the natural ground surface.
5	Acid sulfate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1,2,3 or 4 land.

For each class of land, the maps identify the type of works likely to present an environmental risk if undertaken in the particular class of land. If these types of works are proposed, further investigation is required to determine if ASS are actually present and whether they are present in such concentrations as to pose a risk to the environment.

Table 1.3.2. Atlas of Australian Acid Sulfate Soils[1] (ASRIS) (CSIRO/NatCASS)

Code	Distinguishing soil/sediment properties, vegetation, landforms, or other characteristics
	Probability of Occurrence of ASS[1]
A	**High Probability of occurrence -** (>70% chance of occurrence in mapping unit)
B	**Low Probability of occurrence** - (6-70% chance of occurrence in mapping unit)
C	**Extremely low probability of occurrence** - (1-5% chance of occurrence in mapping unit)
D	**No probability of occurrence** - (<1% chance of occurrence in mapping unit)
x	**Disturbed ASS[1] terrain -** (ASS[1] material present below urban development).
u	**Unclassified** - (Insufficient information to classify map unit)
	Zones
a	Potential acid sulfate soil material and/or Monosulfidic Black Ooze (MBO).
b, c	Potential acid sulfate soil generally within upper 1 m.
c, d, e	ASS[1] generally within upper 1 m.
f	ASS[1] generally below 1 m from the surface
g	ASS[1], generally below 3 m from the surface.
h	ASS[1] generally within 1 m of the surface.
i, j	ASS[1] generally below 1 m of the surface.
k	ASS[1] material and/or Monosulfidic Black Ooze (MBO).
l, m, n, o, p, q	ASS[1] generally within upper 1 m in wet / riparian areas.
	Subscripts to codes
(a)	Actual acid sulfate soil (AASS) = sulfuric material.
(p)	Potential acid sulfate soil (PASS) = sulfidic material.
(q)	Monosulfidic Black Ooze (MBO) is organic ooze enriched by iron monosulfides.
	Confidence levels
(1)	All necessary analytical and morphological data are available
(2)	Analytical data are incomplete but are sufficient to classify the soil with a reasonable degree of confidence
(3)	No necessary analytical data are available, but confidence is fair, based on a knowledge of similar soils in similar environments
(4)	No necessary analytical data are available, and classifier has little knowledge or experience with ASS, hence classification is provisional

[1]Acid Sulfate Soils (ASS) are all those soils in which sulfuric acid may be produced, is being produced, or has been produced in amounts that have a lasting effect on main soil characteristics (Pons 1973). Acid sulfate soil (ASS) may include PASS or AASS + PASS. Potential acid sulfate soil (PASS) = sulfidic material. Actual acid sulfate soil (AASS) = sulfuric material.

1.4 GEOLOGY AND TOPOGRAPHY

Map 4 (onsite)

Geology

Map Sheet	Symbol	Formation	Group	Era	Period	Description
Newcastle 1:100 000 Geological Map	Pmb	Branxton Formation	Maitland Group	Palaeozoic	Permian	Conglomerate, sandstone, siltstone

Topography

Topography	34-44mAHD

Section 2 - Hydrogeology

2.1 HYDROGEOLOGY AND GROUNDWATER BORES

Map 5a (500m - 2000m Buffer)

	On the Property?	Within Record Search Buffer?
Aquifer Type	Fractured or fissured, extensive aquifers of low to moderate productivity	Fractured or fissured, extensive aquifers of low to moderate productivity Porous, extensive highly productive aquifers
Drinking Water Catchments	Not identified	Not identified
Protected Riparian Corridor	Not identified	Wallis Creek / Buttai Creek/ Swamp Creek
UPSS Environmentally sensitive zone	Northern NSW area 2 UPSS	Northern NSW area 2 UPSS
Wetlands	Not identified	Testers Hollow / Wentworth Swamps
Groundwater Bores	Not identified	Yes, see 2.1.1 and 2.1.2

[1] - Groundwater bore buffer size will change depending on the number of GW bores found within buffer; if there are less than 7 bores within buffer, buffer will increase to max 2km until bores are found.

Table 2.1.1. Groundwater Bore Details

Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity	Yield (L/s)	Distance (m)	Direction
21010164	Unknown	-	-	-	-	-	-	267	South-east
GW051647	Water supply for livestock	01-Sep-80	12	12				717	North-east

Table 2.1.2. Groundwater Bore Driller Lithology Details

Groundwater Bore ID	From Depth (m)	To Depth (m)	Lithology	Description	Distance (m)	Direction
GW051647	0	0.15	TPSL	Topsoil	717	North-east
GW051647	0.15	3	CLAY	Clay	717	North-east
GW051647	3	3.81	SAND	Sand yellow	717	North-east
GW051647	3.81	4.57	SAND	Sand white	717	North-east
GW051647	4.57	6.1	CLAY	Clay sand	717	North-east
GW051647	6.1	12	SDSN	Sandstone hard	717	North-east

2.2 HYDROGEOLOGY AND OTHER BOREHOLES

Map 5b (500m Buffer)

	On the Property?	Within Record Search Buffer?
Groundwater Vulnerability	Not identified	Not identified
Groundwater Exclusion Zones[1,2]	Not identified	Not identified
Hydrogeologic Unit	Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)	Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability) Surficial Sediment Aquifer (porous media - unconsolidated)
Other known borehole investigations (500m buffer)	Not identified	Not identified

[1] - Botany Groundwater Management Zones (BGMZ): Zone 1 – the use of groundwater remains banned; Zones 2 to 4 – domestic groundwater use is banned, especially for drinking water, watering gardens, washing windows and cars, bathing, or to fill swimming pools.

[2] - Williamtown Groundwater Management Zones (WGMZ): Primary Management Zone – this area has significantly higher levels of PFAS detected and therefore, the strongest advice applies. Secondary Management Zone – this area has some detected levels of PFAS; Broader Management Zone – the topography and hydrology of the area means PFAS detections could occur now and into the future.

Groundwater Dependent Ecosystems

Site	On the Property?	Within Record Search Buffer?
Ecosystems that rely on the Surface expression of Groundwater	Not identified	Not identified
Ecosystems that rely on Subsurface presence of Groundwater	Not identified	Not identified

Table 2.2.1. Other known borehole investigations (Coal Seam Gas (CSG), Petroleum Wells and Other Boreholes) (500m buffer)

Borehole ID	Purpose	Project	Client/License	Date Drilled	Depth (m)	Distance (m)	Direction
Not identified	-	-	-	-	-	-	-

Section 3 – Environmental Registers, Licences and Incidents

3.1 CONTAMINATED LAND PUBLIC REGISTER

Map 6 (1000m Buffer)

Contaminated Land Record of Notices

Site Name[2]	Site ID	Address[1]	Notices	Distance (m)	Direction
Not identified	-	-	-	-	-

1. Some addresses do not contain specific street numbers. Records identified as being in the surrounding area have been added for information.
2. Former NSW EPA sites. These sites have been removed from the Record of Notices and/or the Sites Notified lists and are kept here for information purposes only.

Sites Notified as Contaminated to the EPA

Site Name[2]	Address[1]	Activity that caused Contamination	EPA Site Management Class[3]	Distance (m)	Direction
Not identified	-	-	-	-	-

1. Some addresses do not contain specific street numbers. Records identified as being in the surrounding area have been added for information.
2. Former NSW EPA sites. These sites have been removed from the Record of Notices and/or the Sites Notified lists and are kept here for information purposes only.
3. The EPA maintains a record of sites that have been notified to the EPA by owners or occupiers as contaminated land. The sites notified to the EPA and recorded on the register are at various stages of the assessment and/or remediation process. Table 5 outlines the possible management status that can be attributed to a registered contaminated site.

Table 3.3.1. EPA Site Management Class Explanation

EPA Site Management Class	
Under Assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Contamination currently regulated under the CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record.
Contamination currently regulated under the POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).

EPA Site Management Class	
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record.

3.2 POTENTIALLY CONTAMINATED AREAS

Map 6 (1000m Buffer)

Defence Sites

Site name	RCIP*	Description	Status*	Distance (m)	Direction
Not identified	-		-	-	-

*RCIP (Regional Contamination Investigation Program)

Former Gasworks Sites

Site	Location	Distance (m)	Direction
Not identified	-	-	-

PFAS Sites

Site name	Description	Source	Distance (m) *	Direction
Not identified	-	-	-	-

*2km search

3.3 LICENSING UNDER THE POEO ACT

Map 7 (500m Buffer)

Licences

EPL Number	Licence holder	Location Name	Premise Address[1]	Fee Based Activity	Distance (m)	Direction
Not identified	-		-	-	-	

[1]. Some sites do not contain specific addresses. Records identified as being in the surrounding area have been added for information.

Surrendered Licences still Regulated by EPA

Licence Nº	Licence holder	Location Name	Premise Address[1]	Fee Based Activity	Status	Distance (m)	Direction
12439	STATE OF NEW SOUTH WALES (Department of Primary Industries - Lands)	Waterways within the Hunter Valley Flood Mitigation Scheme, MAITLAND, NSW 2320	MAITLAND, NSW 2320	Other activities	Surrendered	Not mapped	-

[1]. Some sites do not contain specific addresses. Records identified as being in the surrounding area have been added for information.

Clean Up and Penalty Notices

Penalty Nº	Licence holder	Location Name	Premise Address[1]	Fee Based Activity	Status	Distance (m)	Direction
Not identified	-		-	-	-	-	-

[1]. Some sites do not contain specific addresses. Records identified as being in the surrounding area have been added for information.

3.4 NATIONAL POLLUTANT INVENTORY (NPI)

Map 7 (500m Buffer)

Facility name	Address	Primary ANZSIC Class	Latest report	Distance (m)	Direction
Not identified	-		-	-	-

3.5 PUBLIC REGISTER OF PROPERTIES AFFECTED BY LOOSE-FILL ASBESTOS INSULATION

Map 7 (onsite)

Address	Match Found
Not identified	-

Section 4 – Other Potentially Contaminating Activities

4.1 FORMER POTENTIALLY CONTAMINATED LAND

Map 8a (500m Buffer)

Contaminated Legacy Areas

Site Name	Description	Status	Distance (m)	Direction
Not identified	-	-	-	-

Note: This section includes known contaminated areas such as James Hardies Asbestos waste legacy areas, Pasminco Smelter and Uranium processing site.

Derelict Mines and Quarries

Site name	Method	Description	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Historical Landfills

Site name	Description	Status*	Distance (m)	Direction
Not identified	-		-	-

Unexploded Ordnance (UXO) Areas

Site name	Category	Description	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

4.2 POTENTIALLY CONTAMINATING ACTIVITIES

Map 8b (500m Buffer)

Aviation Fuel Depots/Terminals

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Cattle Dip Sites

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Mines and Quarries

Deposit Name	Method	Description	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Dry Cleaners

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Liquid Fuel Depots/Terminals

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Fire and Rescue Sites

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Power Stations

Site name	Owner	Primary Fuel Type	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Service Stations

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Substation / Switching Stations

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Telephone Exchanges

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Waste Management Facilities

Site name	Owner	Class	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Wastewater Treatment Facilities

Site name	Operator	Class	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

***Status:**
Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.
Current: business that are operational on the day this report was issued.
Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 2 years will be reported in the historical business section in this report.

4.3 CURRENT COMMERCIAL AND TRADE DATA

Map 8c (200m Buffer)

Current Commercial and Trade Data

Site name [1]	Category	Location	Status [2]	Distance (m)	Direction
Not identified	-		-	-	-

[1] Data includes categories associated with potentially contaminating activities. All negligible risk data is not reported.

[2] Status: Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.
Current: business that are operational on the day this report was issued.
Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 2 years will be reported in the historical business section in this report.

Tanks (AST/UST)

ID	Tank type	Description	Status	Distance (m)	Direction
Not identified	-		-	-	-

Note: This is not an exhaustive list of all existing tanks.

4.4 HISTORICAL COMMERCIAL AND TRADE DATA

(not mapped)

1932 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1940 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1950 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1965 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1970 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1971 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1974 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1980 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1981 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1990 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1991 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

2005 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

Note: Directories for the years 1932, 1940, 1950, 1965, 1970, 1980 and 1990 cover the Sydney CBD and greater Sydney area only. Directories for 1971, 1981 and 1991 cover regional NSW, but may also contain data for the Sydney area.

Historical data positional accuracy and georeferencing results explanation

Positional accuracy	Georeferenced	Description
Address	Located to the address level	*When street address and names fully match.*
Street	Located to the street centroid	*When street names match but no exact address was found. Location is approximate.*
Place	Located to the structure, building or complex	*When building, residential complex or structure name match but no exact address was found. Location is approximate.*
Suburb	Located to the suburb area	*When suburb name match but no exact address was found. Location is approximate.*
Not georeferenced	Not found	*When it was not georeferenced, and address could not be found.*

Land Insight and Resources use a number of different address georeferencing methods and characterised them according to the following criteria: completeness (match rates) and positional accuracy. When address do not contain specific street numbers or a match is not found, records identified as being in the surrounding areas are included for reference.

Section 5 - Other Environmental Constraints

5.1 FEDERAL, STATE AND LOCAL HERITAGE

Map 9 (200m Buffer)

Local Environment Plan (LEP) Heritage

Site ID	Site Name	Significance	Type	Distance (m)*	Direction
Not identified	-	-	-	-	-

National Heritage List (NHL)

Site ID	Site Name	Class	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

Register of the National Estate (RNE)

Site ID	Site Name	Class	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

Non-Aboriginal heritage item (Local)

Site ID	Site Name	Class	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

Non-Aboriginal heritage item (SHR)*

Site ID	Site Name	Listing nº	Plan nº	Distance (m)	Direction
Not identified	-	-	-	-	-

*State Heritage Register

Commonwealth Heritage List (CHL)

Site ID	Site Name	Class	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

World Heritage Area (WHA)

Site ID	Site Name	IUCN	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

5.2 NATURAL HAZARDS

Map 10 (500m Buffer)

Bush Fire Prone Land (BLP)

Category	On the Property?	Within Record Search Buffer?
Vegetation Buffer	Not identified	Yes
Vegetation Category 1	Not identified	Yes
Vegetation Category 3	Not identified	Yes

Fire History

Category	On the Property?	Within Record Search Buffer?
Not identified	-	-

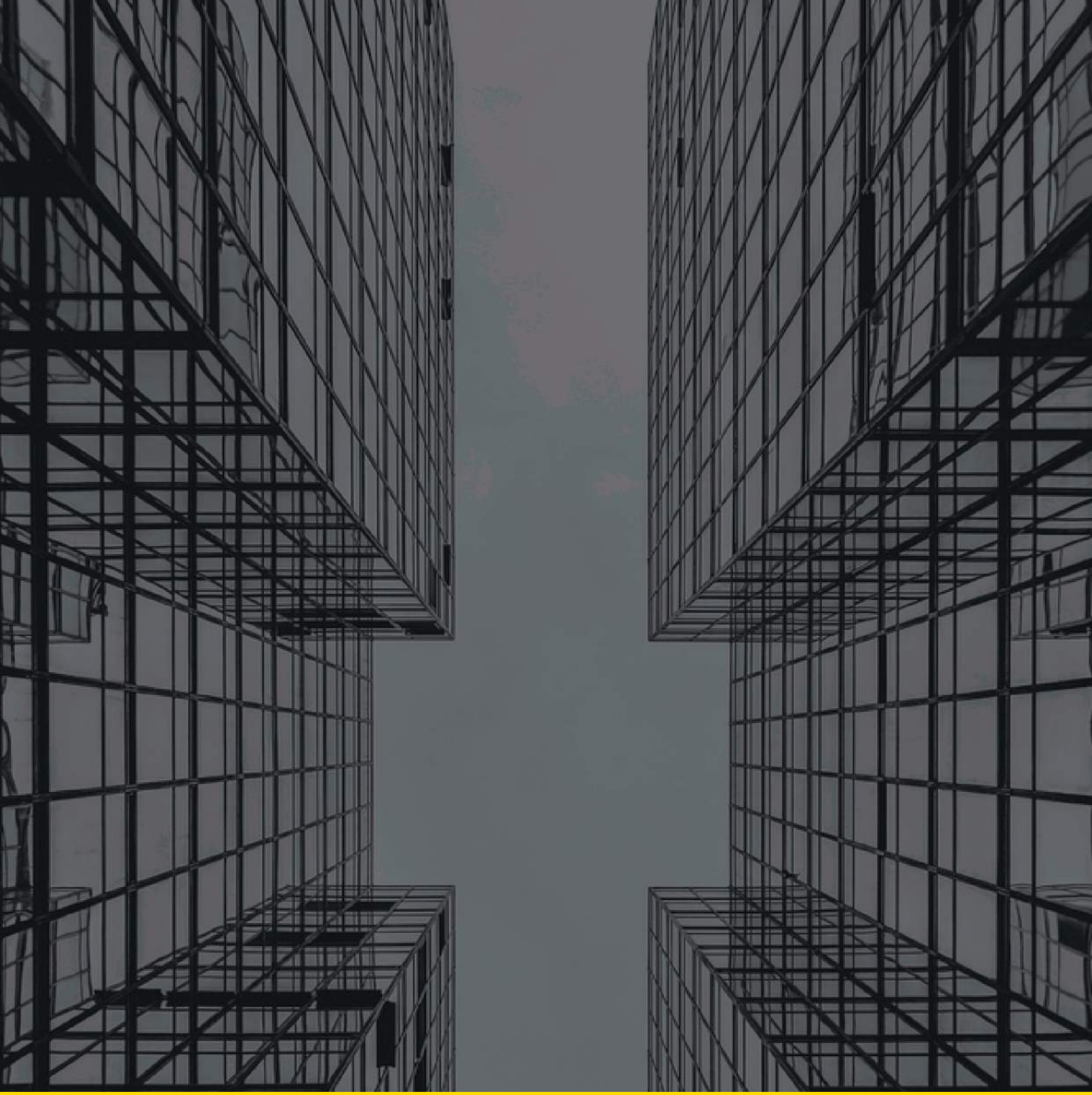
Flood Hazard

Category	On the Property?	Within Record Search Buffer?
Maitland Local Environmental Plan 2011	Not identified	Yes

5.3 COASTAL MANAGEMENT (STATE ENVIRONMENTAL PLANNING POLICY)

Map 10 (500m Buffer)

Type	On the Property?	Within Record Search Buffer?
Coastal Wetlands Proximity Area	Not identified	Not identified
Coastal Wetlands	Not identified	Not identified
Coastal Environment Area Map	Yes	Yes
Coastal Use Area Map	Not identified	Yes



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W www.liresources.com.au

ATTACHMENT A

Report Maps

Subject area
Cadastral boundary

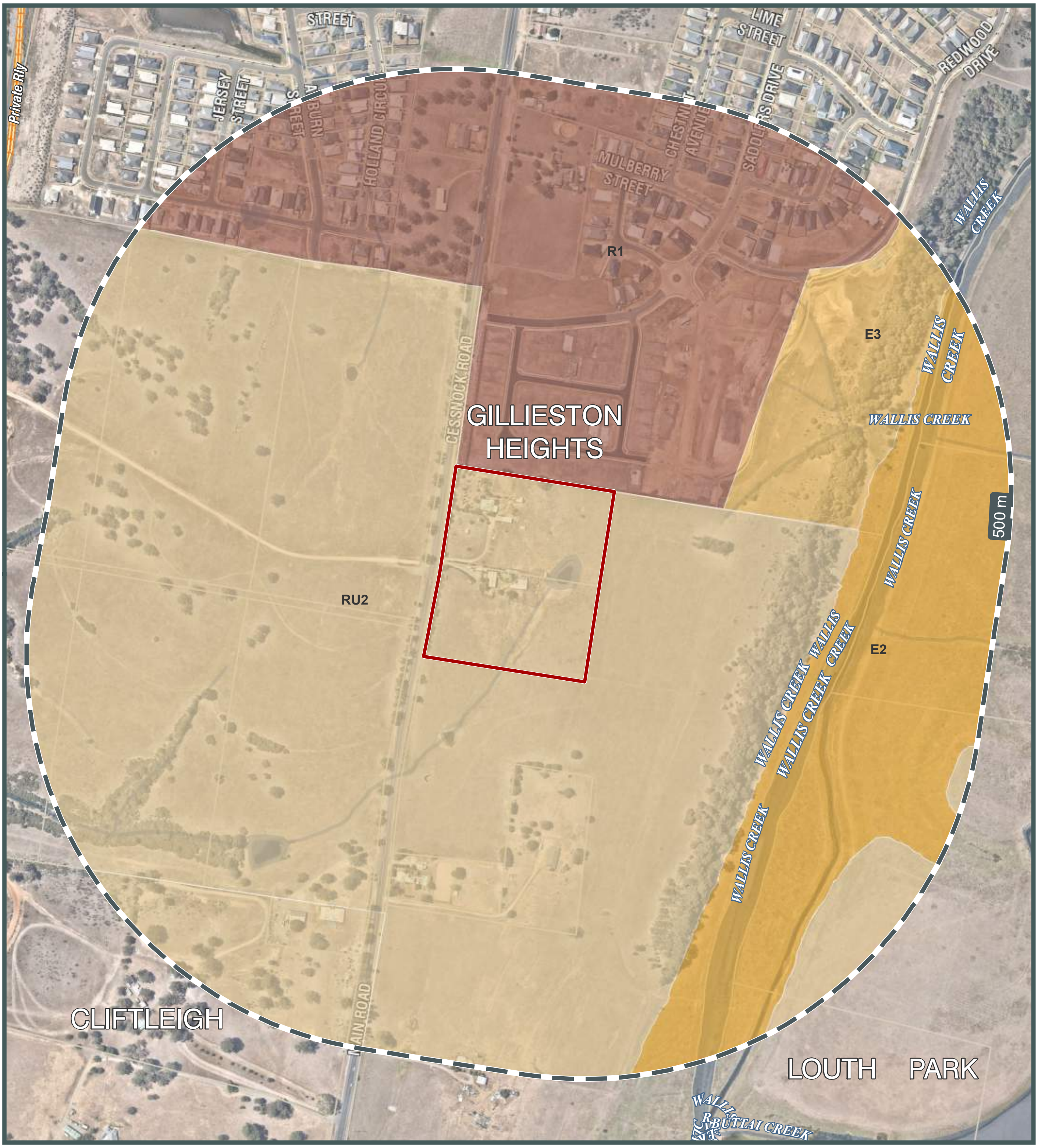
Transmission Line
Stormwater channel
Sewer Main
Water Main
Pipeline

0 100 200 300 400m

SUBJECT AREA AND SENSITIVE RECEPTORS

LAND INSIGHT & RESOURCES

MAP 1 **Enviro-Screen**



Subject area

Land Zoning

- E2, Environmental Conservation
- E3, Environmental Management
- R1, General Residential
- RU2, Rural Landscape

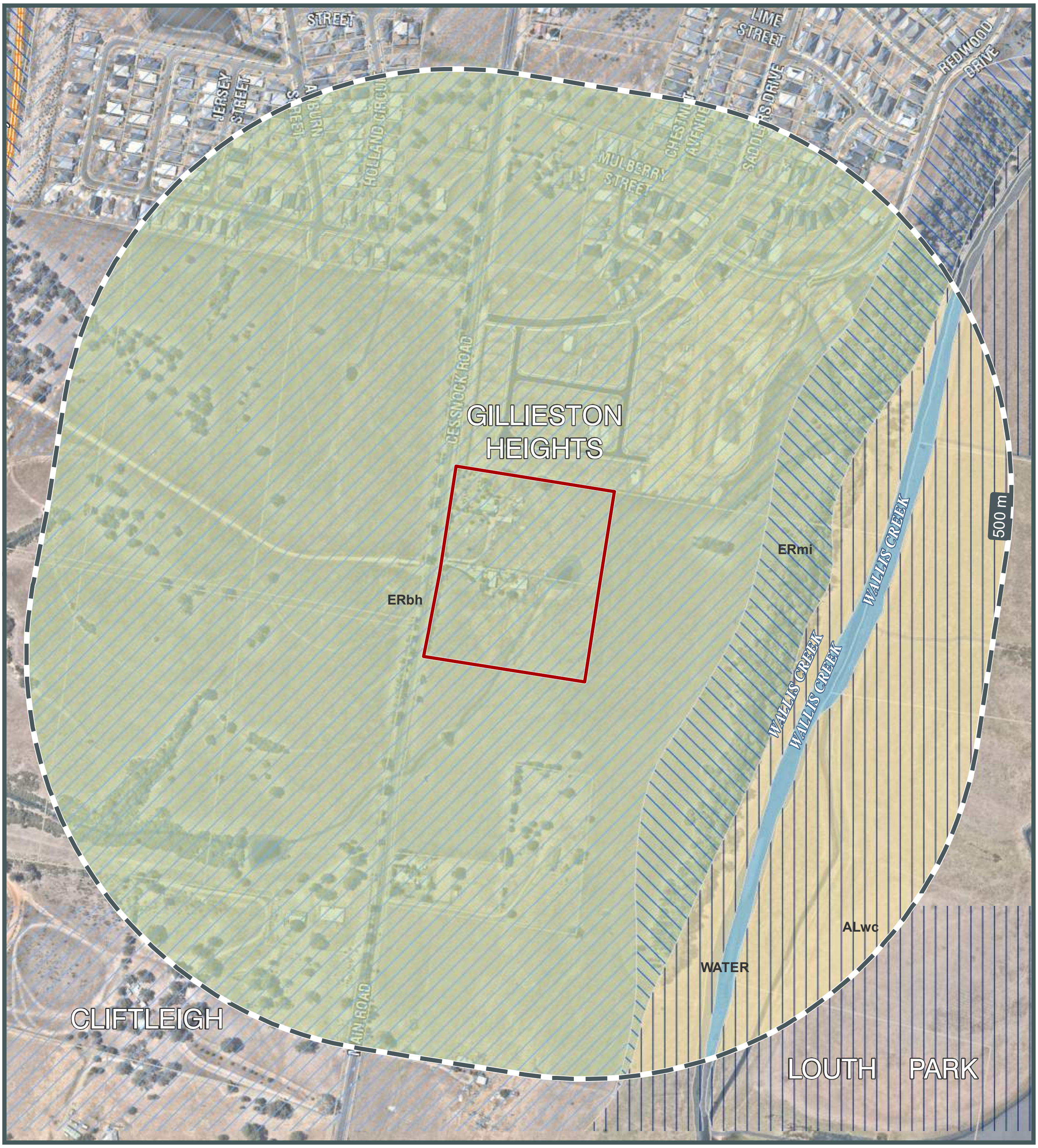
0 200 400 600 800m

PLANNING CONTROLS

LAND INSIGHT & RESOURCES

MAP 2

Enviro-Screen



Subject area

Hydrologic soil group

- A high
- B moderate
- C slow rate

Soils Landscape

- ALwc | ALLUVIAL
- ERbh | EROSIONAL
- ERmi | EROSIONAL
- WATER | WATER

0 200 400 600 800m

SOIL LANDSCAPES AND SALINITY

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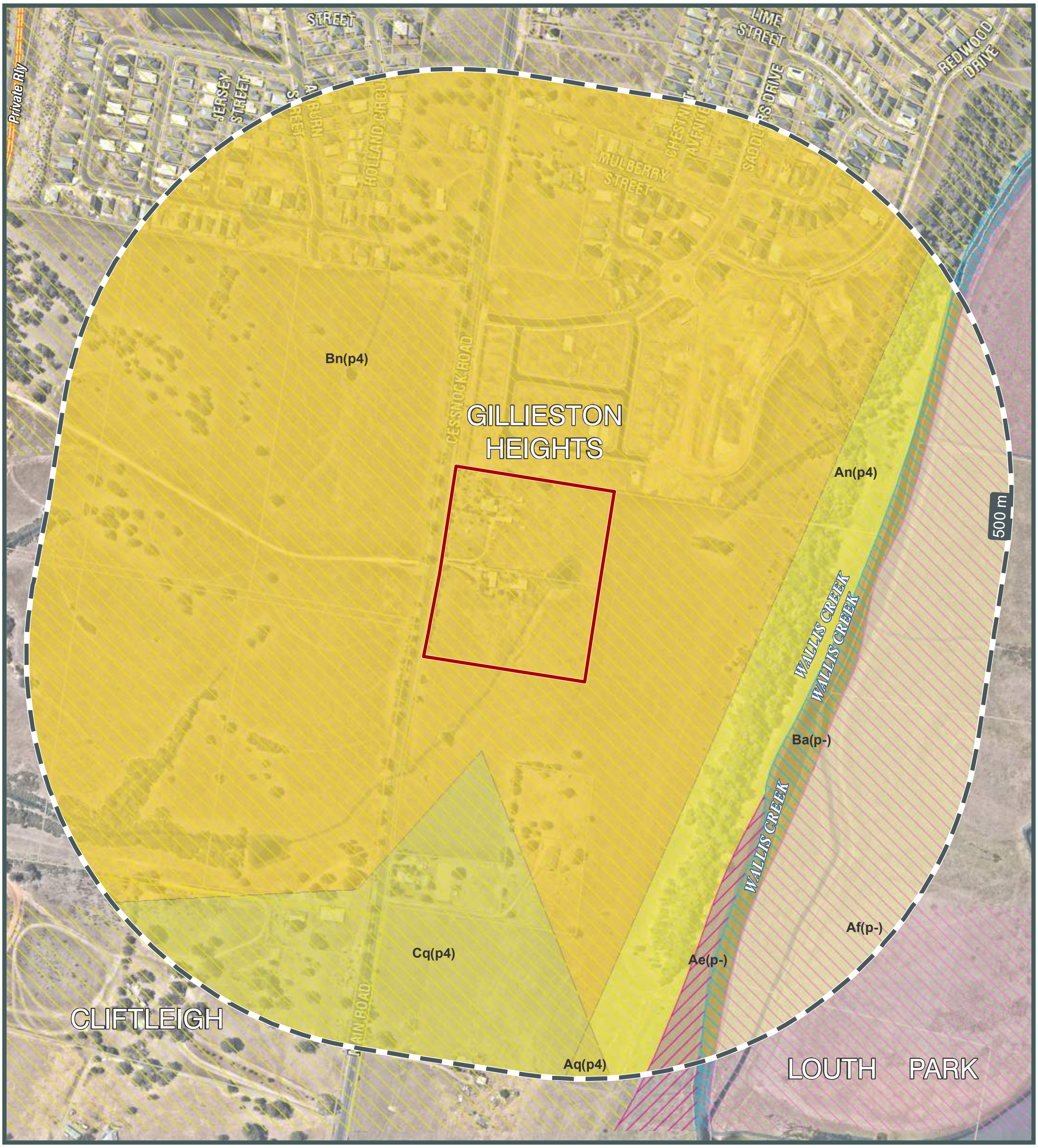
MAP 3a

Enviro-Screen



Subject area

Acid Sulfate Soil Risk
- Class 1
- Class 2
- Class 3
- Class 5

ASRIS Atlas of Australian Sulfate Soils
- Ae(p-) | ASS in floodplains
- Af(p-) | ASS in floodplains
- An(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Aq(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Ba(p-) | ASS in subtidal marine environments
- Bn(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Cq(p4) | ASS in inland lakes, waterways, wetlands and riparian zones

0 200 400 600 800m

ACID SULFATE SOILS

LAND INSIGHT & RESOURCES

MAP 3b

Enviro-Screen

Subject area

Topographic contour (m)

1:100 000 Geological Map

Pg | Coal seams, siltstone, sandstone, conglomerate

Pmb | Conglomerate, sandstone, siltstone

Pmm |

Pms | Fine to coarse-grained sandstone, conglomerate, minor clay

Qa | Gravel, sand, silt

w | Water

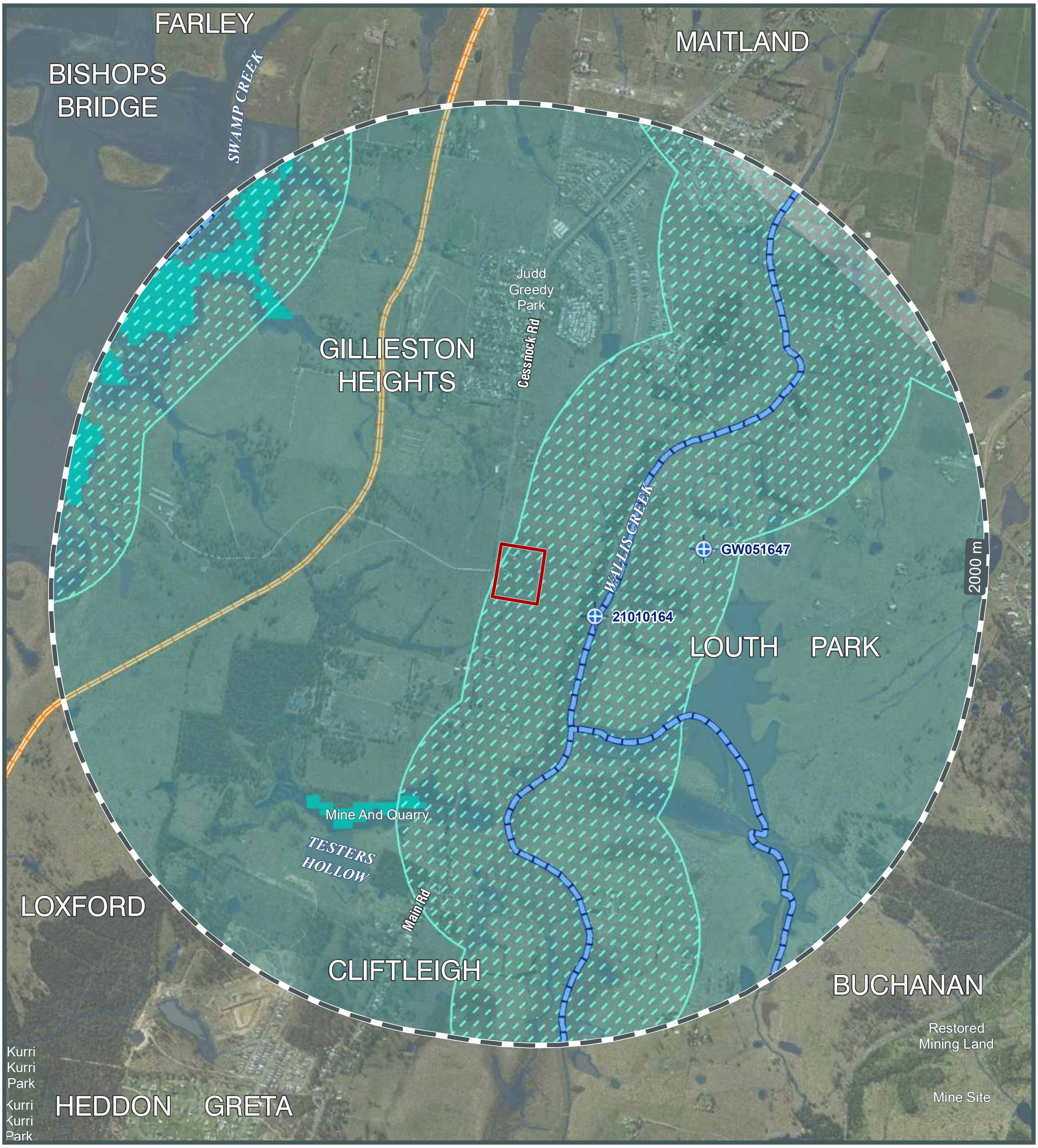
0 200 400 600 800m

GEOLOGY AND TOPOGRAPHY

LAND INSIGHT & RESOURCES

MAP 4

Enviro-Screen



Subject area

Groundwater bores

Protected riparian corridor

Wetlands

Drinking Water Catchments

UPSS Environmentally Sensitive Zone

Aquifer Type

Fractured or fissured, extensive aquifers of low to moderate productivity

Porous, extensive highly productive aquifers

0 200 400 600 800 1,000 1,200m

HYDROGEOLOGY AND GROUNDWATER BORES

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MAP 5a **Enviro-Screen**

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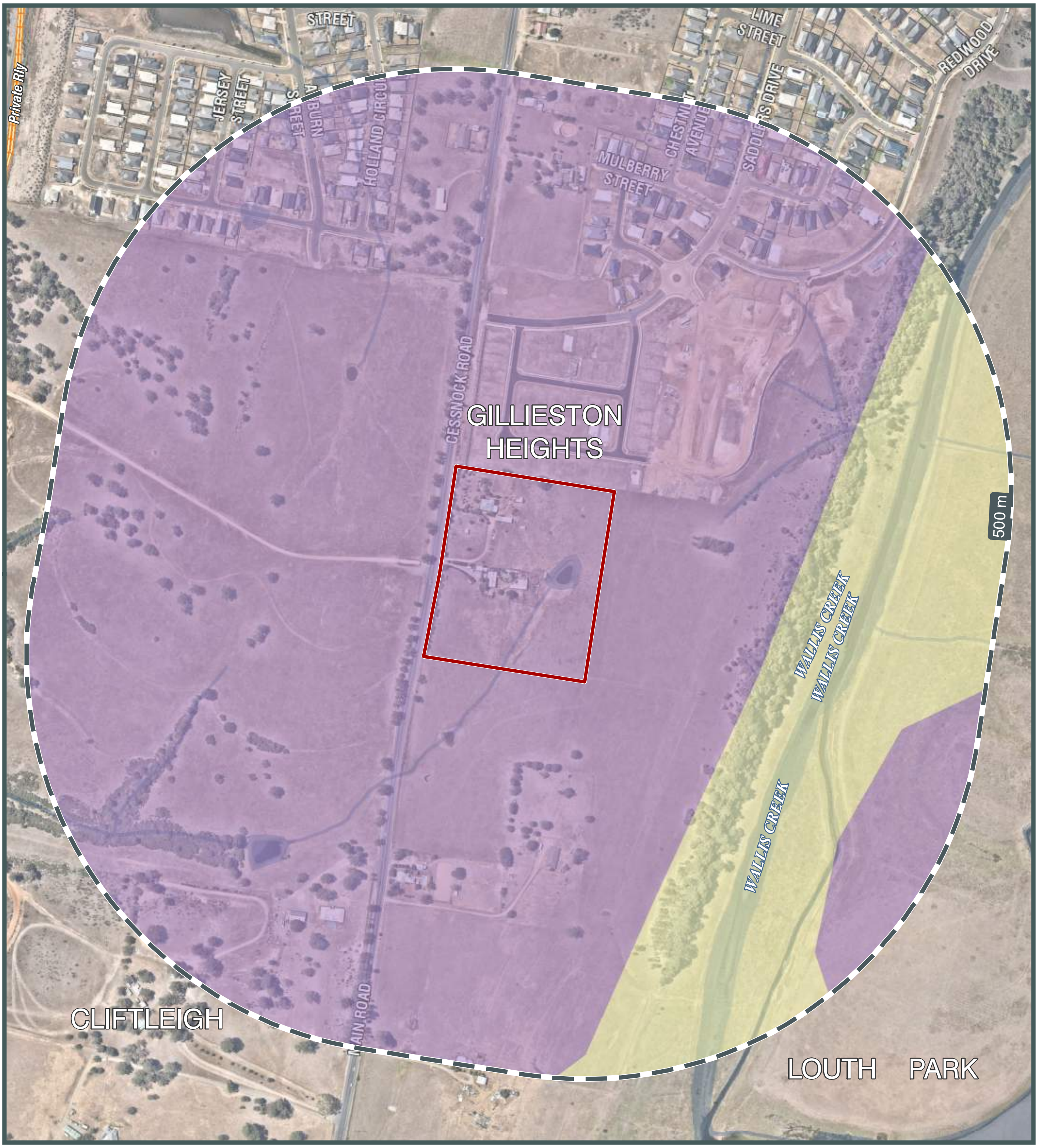

Subject area

Hydrogeologic Unit

Surficial Sediment Aquifer (porous media - unconsolidated)

Palaeozoic and Pre-Cambrian Fractured Rock Aquifers (low permeability)

0 200 400 600 800m

HYDROGEOLOGY AND OTHER BOREHOLES

LAND INSIGHT & RESOURCES

MAP 5b

Enviro-Screen

Subject area

Contaminated Land Register (EPA)

Current - Sites notified as contaminated
Former - Sites notified as contaminated
Contaminated Land Record of Notices

Potentially Contaminated Areas

Defence Sites
Former Gasworks Sites
PFAS Sites

0 250 500 750 1,000 1,250 1,500m

CONTAMINATED LAND REGISTER AND POTENTIALLY CONTAMINATED AREAS

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MAP 6

Enviro-Screen

Subject area

Licensing Under The POEO Act

POEO Licences
Surrendered Licences still Regulated by EPA
Clean Up and Penalty Notices

NPI Facilities

0 200 400 600 800m

ENVIRONMENTAL REGISTER & LICENCES AND NPI FACILITIES

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MAP 8

Enviro-Screen

Subject area

Contaminated Legacy Areas
- Contaminated Legacy Areas
- Derelict Mines and Quarries
- Historical (Legacy) Landfills

Unexploded Ordnance (UXO) Areas
- Defence Controlled Area
- UXO Area: Substantial Occurence
- UXO Area: Slight Occurence
- UXO Area: Other

0 200 400 600 800m

FORMER POTENTIALLY CONTAMINATED LAND

LAND INSIGHT & RESOURCES

MAP 8a **Enviro-Screen**

Subject area

Aviation fuel depots	Fire Rescue sites	Power stations	Telephone exchanges
Cattle dip	Liquid fuel depots / terminals	Service stations	Waste management facilities
Dry cleaners	Mine/quarry	Substation locations	Wastewater Treatment Facility

Current: business that are operational on the day this report was issued.
Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 2 years will be reported in the historical business section in this report.

0 200 400 600 800m

POTENTIALLY CONTAMINATING ACTIVITIES

LAND INSIGHT & RESOURCES

MAP 8b

Enviro-Screen

Subject area

Commercial & Trade Directory

Other potentially contaminating activities

Former potentially contaminating activities

Tanks

Aboveground Storage Tank - Current

Aboveground Storage Tank - Former

Underground Storage Tank - Current

Underground Storage Tank - Forrmer

Unknown

*This is not an exhaustive list of all tanks.

0 100 200 300 400m

CURRENT COMMERCIAL AND TRADE DATA

LAND INSIGHT & RESOURCES

MAP 8c

Enviro-Screen

Subject area

Federal, State and Local Heritage

- Heritage conservation Area (LEP)
- Register of the National Estate (RNE)
- National Heritage List (NHL)
- Non-Aboriginal heritage item (Local)
- Non-Aboriginal heritage item (SHR)
- Commonwealth Heritage List (CHL)
- World Heritage Area (WHA)

0 100 200 300m

HERITAGE

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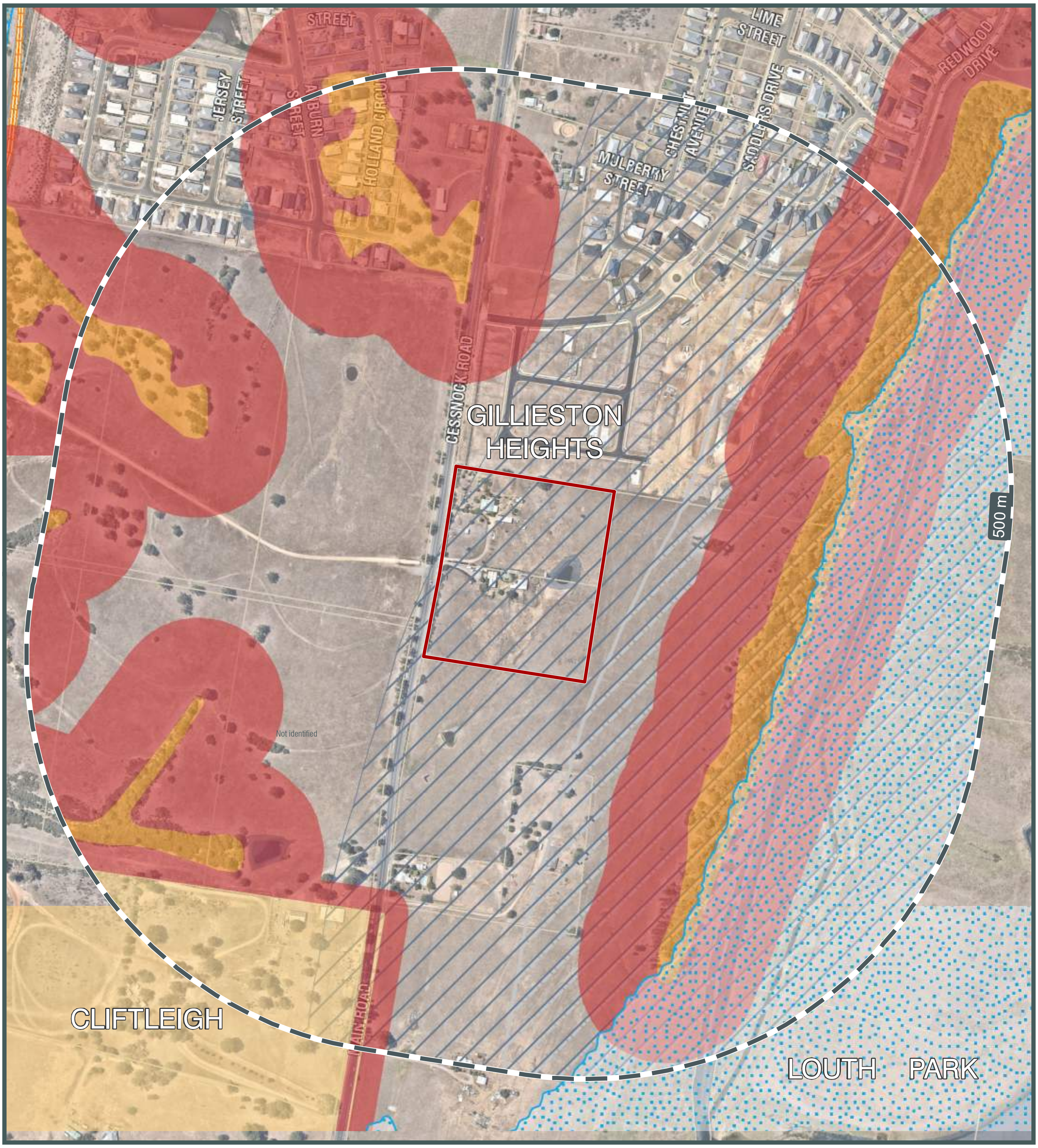
MAP 9

Enviro-Screen



Subject area

Bush Fire Prone Land
- Vegetation Buffer
- Vegetation Category 1
- Vegetation Category 3
- Fire History

Flood Hazard
- Flood Prone Land (EPI)

SEPP Coastal Management
- Proximity Area for Coastal Wetlands
- Proximity Area for Littoral Rainforests
- Littoral Rainforests
- Coastal Wetlands
- Coastal Environment Area Map
- Coastal Use Area Map

0 200 400 600 800m

NATURAL HAZARDS

LAND INSIGHT & RESOURCES

MAP 10

Enviro-Screen

ATTACHMENT B

Historical Imagery

LIR-01094 Aerial Photograph 1958 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1958

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MAP 11

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LIR-01094 Aerial Photograph 1966 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1966

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MAP 12

LIR-01094 Aerial Photograph 1971 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1971

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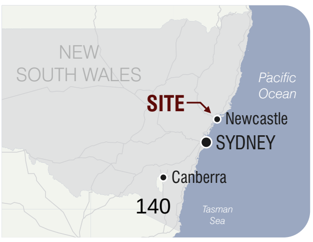

MAP 13

LIR-01094 Aerial Photograph 1975 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1975

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MAP 14

LIR-01094 Aerial Photograph 1987 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1987

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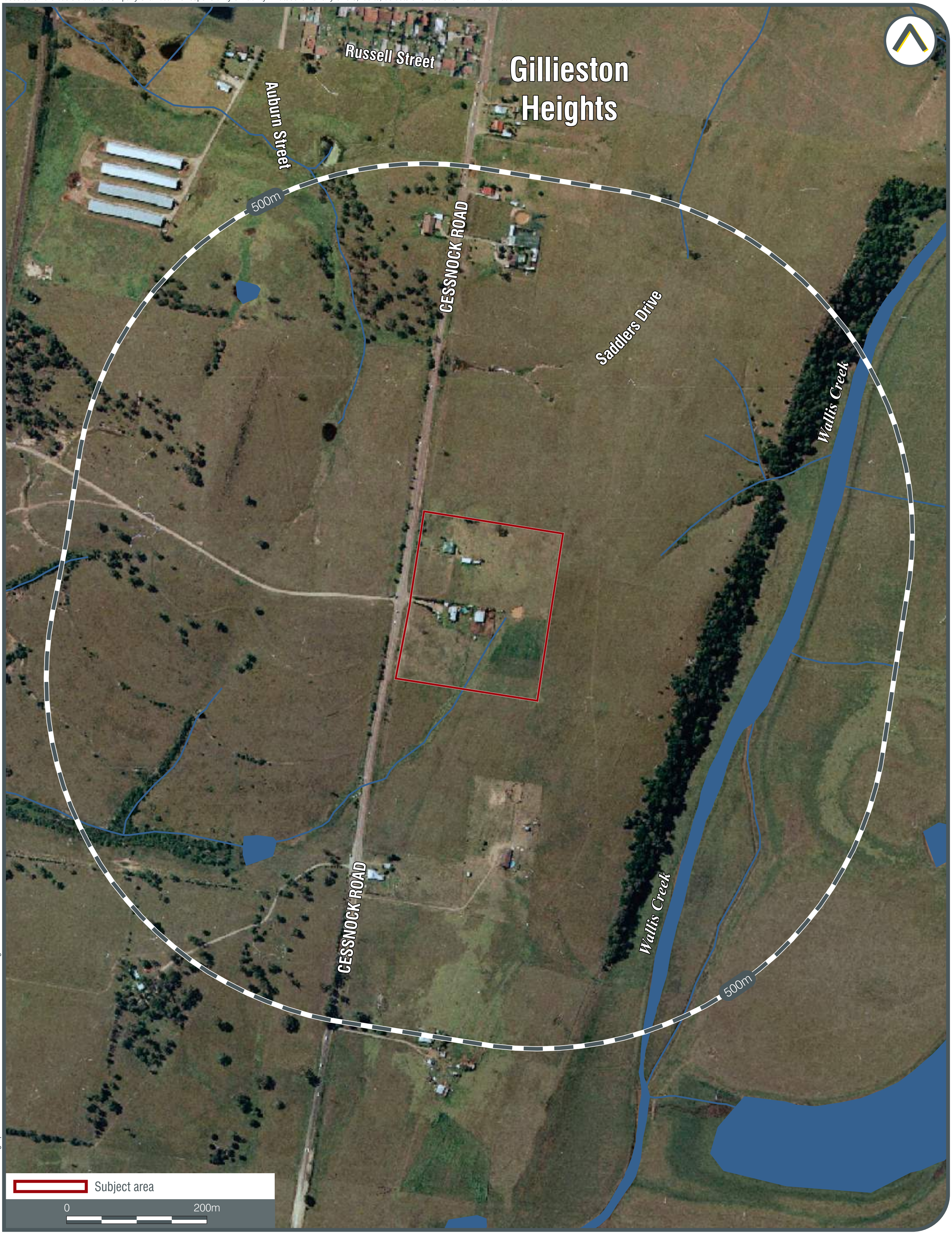
MAP 15



LIR-01094 Aerial Photograph 1993 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 1993

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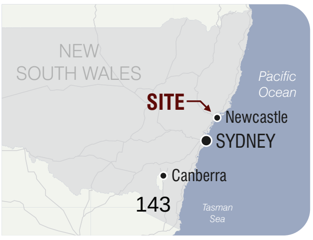

MAP 16

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LIR-01094 Aerial Photograph 1987 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 2004

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MAP 17

LIR-01094 Aerial Photograph 2014 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 2010

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MAP 18

LIR-01094 Aerial Photograph 2014 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 2014

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MAP 19

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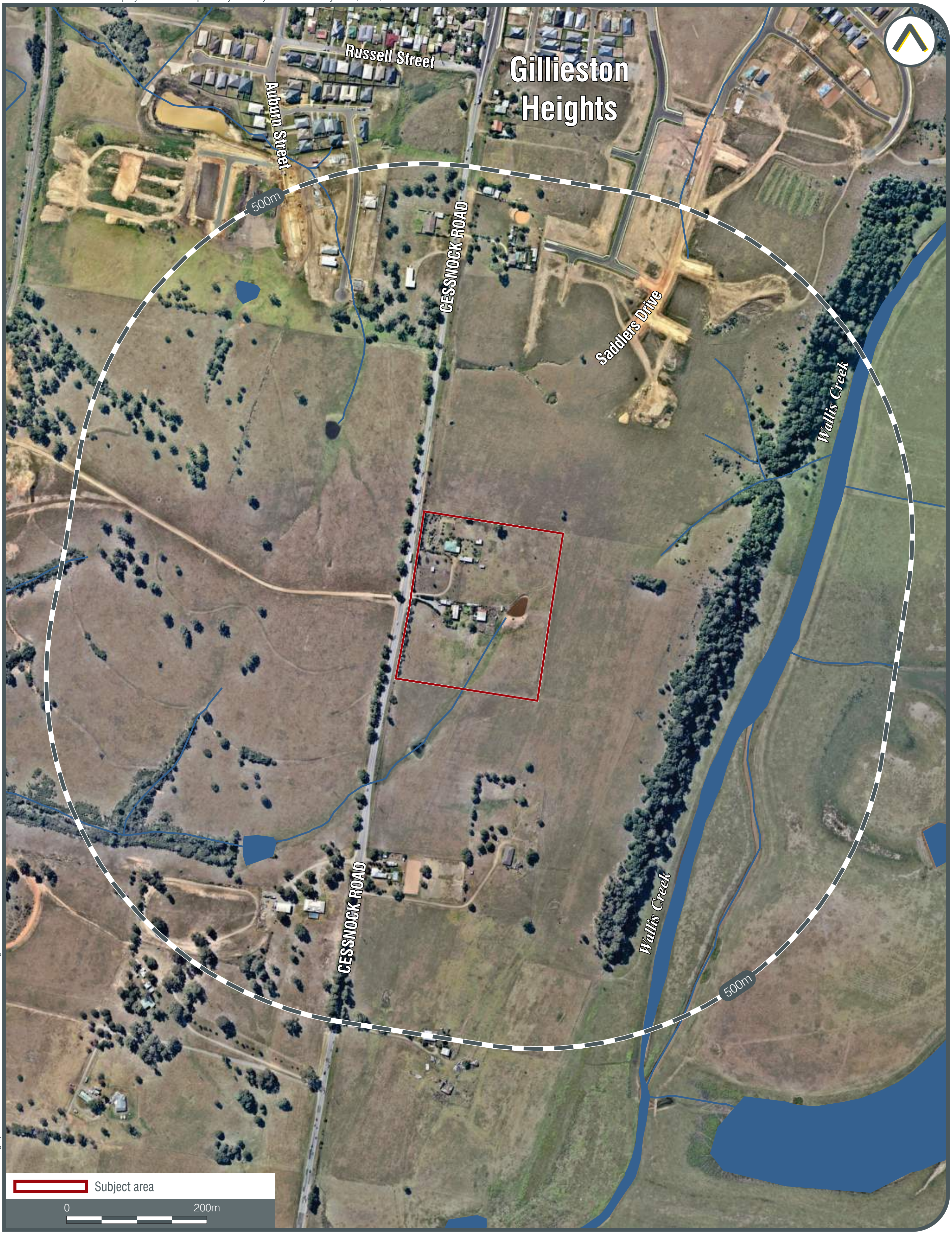

LIR-01094 Aerial Photograph 2016 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 2016

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MAP 26

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LIR-01094 Aerial Photograph 2019 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

HISTORIC AERIAL PHOTOGRAPH - 2019

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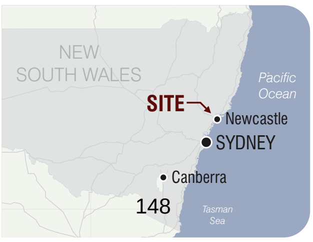
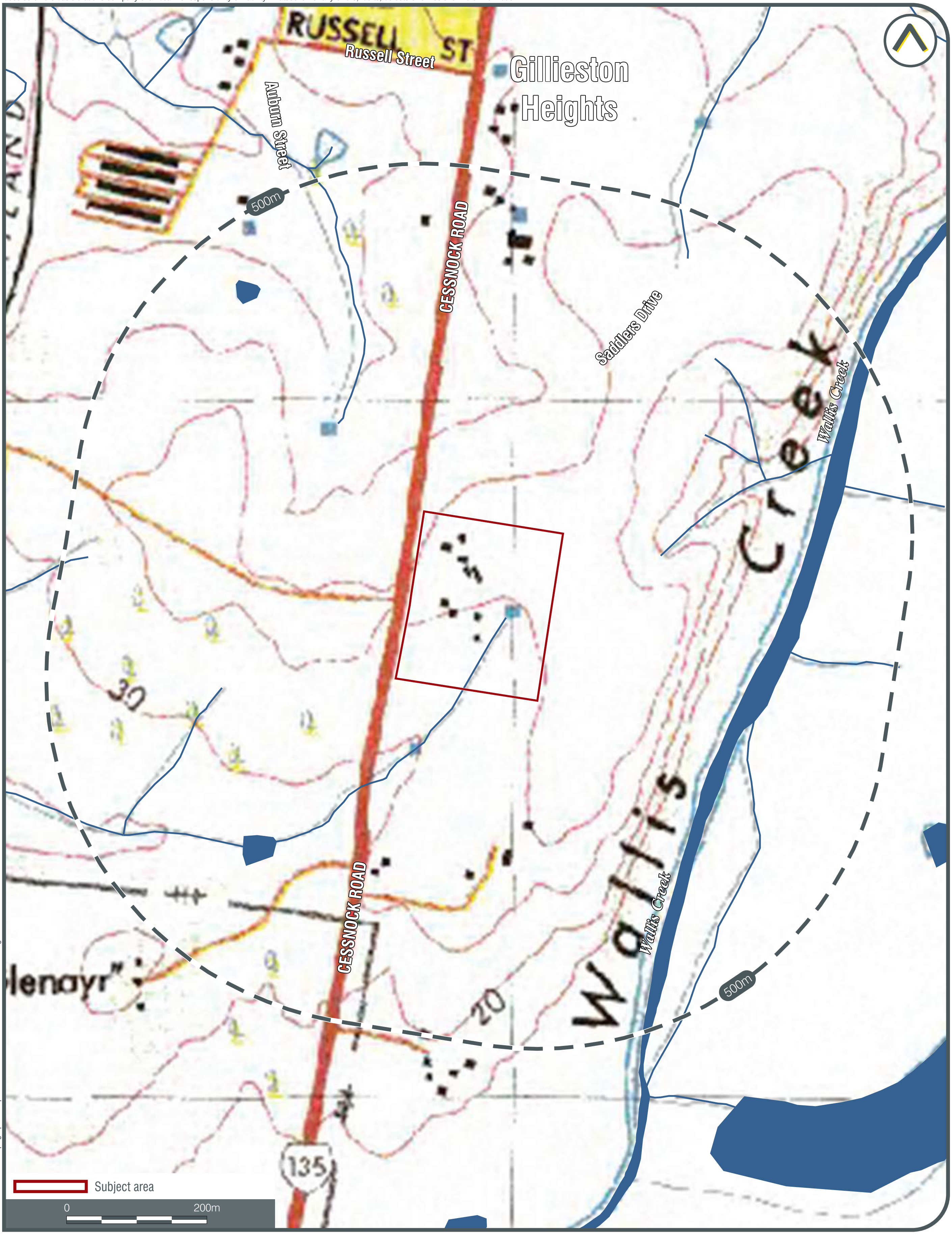
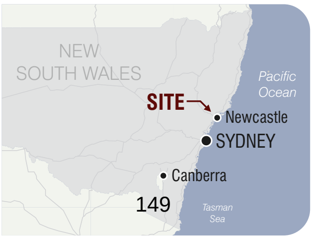


MAP 21



LIR-01094 Pre-1991 Topographic Map 23 01 2020. Data source: Please refer to 'Digital Data Sources' in the Product Guide

1969-1991 TOPOGRAPHIC MAP SERIES (BERESFIELD 9232-3N)



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MAP 22