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Project Number 13230.001.004

Preliminary Environmental Site Investigation

28, 30, and 66 Crestview Rise, Papakura, Auckland

Submitted to:
Harbour View Heights LP Limited
17 Bluefin Way
West Harbour
Auckland 0618

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Client	Harbour View Heights LP Limited	**Client Contact**	Russel Baikie	
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1 Introduction

ENGEO Ltd (ENGEO) was requested by Harbour View Heights LP Limited to undertake a preliminary environmental site investigation of the property at 28, 30, and 66 Crestview Rise, Papakura, Auckland (herein referred to as 'the site'). This work has been carried out in accordance with our signed agreement dated 16 August 2023. The purpose of the assessment was to support a resource consent for a change of land use from rural to high-density residential land use.

This environmental investigation has been undertaken to satisfy the requirements of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (the "NESCS"). This investigation provides information regarding the presence of land contaminants that may pose a risk to future site users and site redevelopment workers. The results of this investigation have been used to evaluate whether remediation is necessary prior to site redevelopment, and to assess the requirement for Resource Consent under the NESCS.

This investigation also addresses the requirements of regional regulations covering discharges to the environment from contaminated sites during and post-redevelopment works; namely, the Auckland Unitary Plan (AUP; Auckland Council, 2016).

This investigation was undertaken in general accordance with the Ministry for the Environment (MfE) Contaminated Land Management Guidelines (CLMG) No.1: Reporting on Contaminated Sites in New Zealand (MfE, 2021a) and CLMG No 5: Site Investigation and Analysis of Soils (MfE, 2021b). The investigation was supervised, and the report reviewed and approved by a suitably qualified and experienced contaminated land practitioner in accordance with national environmental regulations for soil contamination.

1.1 Objectives of the Assessment

The objective of the preliminary site investigation (PSI) was to gather information relating to the current and historical potentially contaminating activities at the site. The works comprised review of historical site information and review / assessment of information gathered during the site walkover undertaken on 6 September 2023.

Intrusive investigation was undertaken to:

- Assess the likelihood of contaminants being present on-site that were not identified during the desktop or site walkover.
- Verify that soil on-site is suitable for the proposed change of land use.
- High-level disposal options for soil that may be required to be removed from site during future development works.

2 Site Information

Site information is summarised in Table 1:

Table 1: Site Information

Item	Description
Legal Description	LOT 123 DP 549093, LOT 124 DP 549093, LOT 127 DP 571188
Current Land Use	The site is currently vacant. Vegetation/scrub/gorse is present throughout the site.
Proposed Land Use	Residential
Site Area	3.038 hectares
Territorial Authority	Auckland Council
Zoning (AUP)	Rural – Countryside Living Zone
Geology	The site is mapped by GNS Science as being underlain by the East Coast Bays Formation throughout the site. The East Coast Bays Formation comprises alternating sandstone and mudstone with variable volcanic content. The land directly to the west of the site is mapped as being underlain by the South Auckland Volcanic Field, comprising fine-grained and coarse-grained, porphyritic, olivine basalt, basanite and hawaiite lava flows.
Topography	The site generally slopes from northeast to southwest, with a high point of approximately 89 m in the northeast, and a low point of approximately 40 m in the southwest. A small gully with a relatively steep gradient is present in the southern portion of the site.
Hydrology	Three overland flow paths are mapped in Auckland Council GeoMaps as flowing westward in the northern portion of the site, and southward in the southern portion of the site. The receiving environment for overland flow paths on-site is the Pahurehure Inlet of the Manakau Harbour.
Hydrogeology	A groundwater assessment was not completed as part of this investigation; however, a geotechnical assessment at the site is occurring concurrently (ENGEO, 2023). Groundwater was encountered during the geotechnical investigation completed by ENGEO. The shallowest groundwater encountered was at 3.2 m below ground level, although groundwater was not encountered in most boreholes completed on-site. Based on the topography of the site, the mapped overland flow path and the nearest watercourse, shallow groundwater likely flows in a southern direction in the southern portion of the site of the site, and a western direction in the northern portion of the site.

3 Site History

ENGEO reviewed aerial photographs, property file documentation and Auckland Council's response to a contamination enquiry. Relevant information obtained during this review is summarised below.

3.1 Aerial Photographs

Aerial photographs dating from 1939 to 2023 have been reviewed (refer to Appendix 1). The aerials were sourced from Retrolens, Auckland Council GeoMaps and Nearmaps. Relevant visible features on the site and surrounding area are summarised in Table 2 below.

Table 2: Aerial Photograph Summary

Date	Description
1939	The site and surrounding area comprise agricultural land. The site itself appears to be used for grazing.
1960	A small building had been constructed directly to the northeast of the site. No significant changes to the site are observed.
1980	The surrounding area had undergone significant development, with residential developments to the west, south and north. No significant changes to the site are observed.
1988	An access road servicing a dwelling directly north of the site had been constructed. Further residential development to the north, west and south had been undertaken in the surrounding area. A large water tank was undergoing construction directly to the northeast of the site.
1996	Further residential development was completed to the south of the site. The water tank to the northeast of the site appears to have been completed. No significant changes to the site are observed.
2008	Significant development was being undertaken approximately 160 m north of the site. Further development had been completed to the south of the site. No significant changes to the site are observed.
2018	Significant earthworks were being undertaken on the site and across the land to the north of the site as a part of the Settlement Road Development. The site was being used for the storage of building supplies, and access roads had been cut throughout the site.
2019	Earthworks to the north of the site had continued, and Crestview Rise had been partially constructed. The topsoil throughout the northern portion of the site and some of the southern portion had been removed and appears to be being stored as a stockpile in the northeastern portion of the site.

Date	Description
2020	Earthworks and the construction of roadways to the north of the site had continued. A large stockpile is present in the central portion of the site. Smaller stockpiles are present in the northern portion of the site.
2022	Crestview Rise has been completed, with residential dwellings beginning to be constructed along it to the north of the site. A second large stockpile is present in the south-western corner of the site. Minor earthworks continue in the southern portion of the site, with the northern portion of the site becoming vegetated as earthworks have ceased.
2023	Earthworks have now ceased, both on-site and in the surrounding area. The site is now vegetated, with the two large stockpiles identified during earthworks remaining on-site. Further residential dwellings are being constructed to the north of the site.

3.2 Property File Review

The property file held by Auckland Council was received on 1 September 2023. A summary of the information potentially relevant to this investigation is provided in Table 3 below.

Table 3: Property File Summary

Date	Description
August 2015	Detailed Site Investigation by Geosciences Limited, summarised as follows: • Geosciences' investigation area included all stages of the Settlement Road development. • A clandestine laboratory was identified (HAIL ID A14) approximately 80 m north of the site. • Surface sampling was undertaken around the former building footprint, with no samples exceeding the adopted criteria.
May 2022	Geotechnical Completion Report by ENGEO outlines earthworks undertaken within stages 2B, 2C and 3 of the Settlement Road development. Refer section 3.4 for further details.

3.4 Auckland Council Site Contamination Enquiry

The Site Contamination Enquiry response provided by Auckland Council was received on 29 August 2023 (Appendix 2).

In preparing the response, Auckland Council reviewed records on-site and within 200 m of the site for pollution incidents, bores, contaminated site and air discharges, closed landfills and identified HAIL activities. Auckland Council's response states that there are two potential HAIL activities that may apply to the site. A summary of items is provided in Table 4 below.

Table 4: Site Contamination Enquiry Response Summary

Date	Description
2008	HAIL ID I: Reports indicate that the land north of the site has been utilised as a 'clandestine' lab in the past. All soil samples from a DSI dated 2015 returned contaminant concentrations within background criteria. This is the same HAIL activity identified during the property file review.
2022	HAIL ID G3 *(Landfill Sites)*: Geotechnical report dated 2022 indicates that all properties have been subject to fill as part of the Settlement Road development *(refer section 3.4)*.

HAIL activity G3 (Landfill sites) is further discussed in the following sections.

3.5 Previous Earthworks

ENGEO has completed multiple geotechnical investigations and observed earthworks operations across the site and the surrounding areas between 2016 and 2023. Geotechnical investigations indicate that the site generally consisted of Landslide Colluvium and East Coast Bays Formation residual soils overlying East Coast Bays Formation rock.

A summary of earthworks undertaken on the subject site is summarised below:

- Between 2017 and 2020, a gully feature in the northeast of the site was removed and backfilled with engineered fill, with underfill drains being installed running downslope. Site won material from previous stages was used as engineered fill.
- Between late 2019 and early 2020 service lines and counterfort drainage were installed in the southern and northern portions of the site.
- Undercutting of landslide colluvium took place throughout the site between December 2019 and May 2020. Areas where slip material was undercut had engineered fill placed to create the present day contours, with underfill drains placed beneath.

The material used as engineered fill was site won, native material, and ENGEO conducted periodic observation of the placement of the material. ENGEO considers there is no reason to suspect that the fill located on-site is contaminated.

4 Current Site Conditions

The site walkover and intrusive investigation works were completed on 6 September 2023 by a ENGEO environmental scientist.

Observations of conditions present at the site are summarised in Table 5. Photographs taken during the site visit are included in Appendix 3.

Table 5: Current Site Conditions

Site Conditions	Comments
Overview	The site is located to the south of Crestview Rise and Kotahitanga Street. The site is heavily sloped, with a large valley occupying the south-eastern portion of the site. The remainder of the site is vegetated with grass and gorse.
Surrounding Land Use	The site is bounded by residential properties to the north, west, and southeast. A large gully is located directly south of the site, and a public water tank is located to the northeast.
Site Building(s)	There are no buildings on-site.
Potential Sources of Contamination	No evidence of spills, staining, or plant stress were observed on-site. A strong organic odour was noted at sample location S11. The majority of the site had a layer of engineered fill or stockpiled material, which was expected based on the desktop review. None of the engineered fill encountered on-site comprised building or construction debris.
Potential for On - Or - Off - Site Migration of Contaminants	Land upgradient of the site is used for a public water tank. It is unlikely that contaminants would be associated with the public water tank. Three overland flow paths are mapped in Auckland Council GeoMaps as flowing westward in the northern portion of the site, and southward in the southern portion of the site. Underfill drains installed during recent earthworks *(refer section 3.4)* follow similar trajectories to overland flow paths on-site. The receiving environment for overland flow paths and underfill drains on-site is the Pahurehure Inlet of the Manukau Harbour. No evidence of contaminating land uses were observed during the site walkover or through the desktop review, and so migration of contaminants off site is not suspected.
Limitations	The site was overgrown with long grass and gorse occupying the majority of the site. This made access to some locations (primarily S01) difficult and limited the available view of the surface.

5 Potential HAIL Activities

If current or historical activities included on the HAIL (MfE, 2011a) are identified at a site, the NESCS may apply.

Based on the information reviewed as part of this environmental investigation and observations during the site walkover, it is not considered likely that activities from the HAIL have been historically and / or are currently present at the site.

6 Intrusive Investigation

ENGEO completed an intrusive investigation at the site on 6 September 2023. The objective of the intrusive investigation works was to:

- Assess the likelihood of contaminants being present on-site that were not identified during the desktop or site walkover.
- Verify that soil on-site is suitable for the proposed change of land use.
- High-level disposal options for soil that may be required to be removed from site during future development works.

6.1 Methodology

ENGEO was provided with a draft cut / fill plan by Envelope Engineering (Drawing; 1915-01-230-C7), which indicates that 9,960 m^3 of excess material is to be generated during earthworks, with cuts of up to 4.5 m throughout the site (Appendix 4). Sample locations were generally selected to provide coverage of areas of the site that had been subject to earthworks and are to be cut as part of future works (refer Figure 1).

Samples were proposed to be tested for a selection of heavy metals / metalloids, polycyclic aromatic hydrocarbons (PAHs) and organochlorine pesticides (OCPs).

The following was undertaken during the investigation:

- Soil samples were screened for visual and olfactory evidence of contamination.
- Samples were placed into laboratory supplied containers using a new pair of nitrile gloves for each sample. The containers were capped, labelled with a unique identifier, and placed into an insulated container and kept cool prior to transport to Hill Laboratories under a standard chain of custody.
- Prior to the collection of each sample, the equipment was decontaminated using a triple wash procedure with potable water, Decon 90 solution and deionised water.
- Soil samples were logged in general accordance with the New Zealand Geotechnical Society Inc. ‘Guidelines for the Field Classification of Soil and Rock for Engineering Purposes’ December 2005.

- Fieldwork and sampling were undertaken in general accordance with the procedures for the appropriate handling of potentially contaminated soils as described in the MfE Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils (MfE, 2021b).

6.2 Ground Conditions

Ground conditions encountered during the intrusive investigation are summarised in Table 6. Table 6 also provides a summary of analyses scheduled. Refer to attached Figure 1 for sample locations.

Table 6: Soil Descriptions

Investigation Location	Depth (m bgs)	Soil Description	Requested Analyses
S01	0.3	Fill	HM8[1], PAH
S02	0.0	Topsoil	HM8, PAH, OCP
S02	0.2	Fill	OCP
S03	0.4	Fill	HM8, OCP
S04	0.1	Topsoil	HM8, PAH
S04	0.4	Fill	HM8, PAH
S05	0.0	Topsoil	HM8, PAH, OCP
S06	0.2	Fill	HM8, PAH
S07	0.1	Topsoil	MH8, PAH, OCP
S09	1.0	Fill / Stockpile	HM8, PAH, OCP
S10	0.0	Topsoil	HM8, PAH
S10	0.2	Fill	HM8, PAH
S11	0.2	Fill (organic odour noted)	PAH, OCP
S12	0.3	Fill	HM8, PAH
S12	1.5	Native	HM8
S13	0.0	Topsoil	HM8, PAH, OCP

[1] HM8 includes arsenic, cadmium, chromium, copper, lead, nickel, zinc & mercury.

6.3 Quality Assurance and Quality Control

The quality assurance / quality control (QA / QC) procedures undertaken during the works included:

- Each soil sample was given a unique identification number.
- All samples were placed directly into a cooled container prior to transport to Eurofins laboratory under ENGEO standard chain of custody.
- Sampling equipment was decontaminated using a triple wash method (as previously stated) between each sample location.

Our review of the laboratory QA reports indicated the following:

- All QA tests undertaken by the laboratory passed within the acceptable limits.

6.4 Assessment Criteria

Analytical results were assessed to verify the findings of desktop works, and to inform soil disposal options.

Human Health Criteria

The following criteria were used to assess the risk to future site users, or to workers undertaking redevelopment activities:

- The soil contaminant standards from the Methodology for Deriving Contaminants in Soil to Protect Human Health (“the Methodology”; MfE, 2011b) for high-density residential land use have been selected;
- In accordance with Contaminated Land Management Guidelines No.2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (CLMG 2; MfE, 2011c) for contaminants not listed above.

Surrounding populations are considered to be adequately protected on the basis that risks to earthworks contractors will be managed, and that the risk to future site users is acceptable.

Environmental Criteria

In the Auckland region, potential discharges to the environment from land containing elevated levels of contaminants are managed through the AUP (AUP, 2016). Therefore, the Auckland Council permitted activity criteria referenced in this report were adopted from the AUP.

Background Criteria

To assess the results against the natural background ranges:

- Background ranges for non-volcanic soils in the Auckland region (AC, 2001).
- The laboratory limit of reporting (LOR) for other contaminants, where no natural background level of a given contaminant is available, or where the natural background limit is below the limit of reporting.

7 Results

7.1 Soil Analysis Results

The soil results summary table included in Appendix 5 compares soil contaminant concentrations in the samples tested with the adopted investigation criteria. Full analytical laboratory reports are included in Appendix 6. A summary of the results is provided below:

- Results were below the relevant human health and environmental discharge criteria.
- The concentration of nickel exceeded the regional background concentrations for non-volcanic soils in two samples (S06 at 0.2 m bgl and SP12 at 0.3 m bgl). Both samples were taken from topsoil / organic layers.
- ENGEO considers that the source of the elevated nickel may be a result of volcanically derived soil. The dominant geological unit on-site (East Coast Bays Formation) is described by GNS as having 'variable volcanic content'. The land directly west of the site is mapped as being underlain by the South Auckland Volcanic Field. S06 and S12 also both reported slightly elevated levels of zinc and chromium (compared to remaining results) which is typical of volcanically derived soils.
- No other contaminant concentrations exceeded regional background concentrations for non-volcanic soil.

8 Regulatory Context

In Auckland, soil disturbance on-site with potentially contaminated soils are covered by two contaminated land regulations:

- Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS, 2011).
- Auckland Unitary Plan (Operative in Part, 15 November 2016).

8.1 The NESCS

The intent of the NESCS is to protect the human health of the site's end users, the site redevelopment workers, and the surrounding populations.

8.1.1 Applicability

The NESCS may apply to specific activities on-site where an activity on the HAIL (MfE, 2021a) has, or is more likely than not to have occurred. The activities on-site to which the NESCS applies are listed in Table 7, which is based on the template provided in the Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health ("the Users' Guide"; MfE, 2012).

Table 7: Applicability of the NESCS

NESCS Checklist	
Is an activity described on the HAIL currently being undertaken on the piece of land to which this application applies?	No
Has an activity described on the HAIL ever been undertaken on the piece of land to which this application applies?	No
Is it more likely than not that an activity described on the HAIL is being or has been undertaken on the piece of land to which this application applies?	No
If 'Yes' to any of the above, then the NES for Assessing and Managing Contaminants in Soil to Protect Human Health may apply.	

On the basis of the above, NESCS does not apply to the site.

8.2 Regional Plan

8.2.1 Auckland Unitary Plan

The AUP (AC, 2016) sets out consent requirements for dealing with discharges to the environment from contaminated land.

None of the results of chemical analysis of samples from the site presented in Section 9.1 exceeded the relevant regional environmental discharge criteria. On this basis it is considered that soil at the site is not "land containing elevated levels of contaminants' as defined in the AUP. It is therefore considered that Section E30 of the AUP does not apply to the site and no consent relating to land contamination under the AUP is required.

9 Conclusions

The investigation has identified that:

- The site is not considered to have been used for an activity from the HAIL, and the NESCS does not apply to the proposed change of land use.
- The concentration of contaminants does not exceed the criteria for protection of human health for the current or proposed land use.
- The concentration of contaminants does not exceed environmental discharge criteria from the Auckland Unitary Plan.
- It is considered highly unlikely that there will be a risk to human health or environment if the proposed change in land use occurs.

- The presence of nickel above the natural background range for non-volcanic soils means that excess surface soil may not meet Auckland Council definition of cleanfill (assuming a non-volcanic cleanfill site). It should be noted that no contaminant concentrations exceed regional background criteria for volcanic soils.

10 Recommendations

No further intrusive investigation work is considered necessary to support the consent application.

A copy of this report should be provided to Auckland Council to support the Resource Consent application for change of land use.

The presence of nickel above the non-volcanic background range indicates that shallow soil in some areas of site must be disposed to a cleanfill that contains volcanically derived soil[2], or at a landfill that is otherwise licensed to accept the contaminants present.

A copy of this report should be provided to the receiving site prior to soil disposal. We note that based on the attached earthworks plans (Appendix 4), sample ratios may not satisfy the receiving landfill requirements. Additional sample requirements (if any) should be confirmed following discussion with the receiving landfill and is subject to the extent of earthworks at the Resource or Building Consent stage.

[2] Assumes that the cleanfill site is within the Auckland Region.

11 Limitations

i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Harbour View Heights LP Limited, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.

ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.

iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.

iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.

v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (09) 972 2205 if you require any further information.

Report prepared by

Lucas Brydon

Environmental Scientist

Report reviewed by

Jamie Rhodes, CEnvP (SC)

Associate Environmental Engineer

12 References

AC, 2001. Auckland Regional Council. (2001). Background Concentration of Inorganic Elements in Soils from the Auckland Region, Auckland Regional Council, Technical Publication No. 153.

AUP, 2016. Auckland Council. (2016). Auckland Unitary Plan Operative in part (updated 10 February 2023).

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MfE, 2011a. Ministry for the Environment. (2011). Hazardous Activities and Industries List (HAIL).

MfE, 2011b. Ministry for the Environment. (2011). Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health.

MfE, 2011c. Ministry for the Environment. (2011). Contaminated Land Management Guidelines No.2: Hierarchy and Application in New Zealand of environmental guideline values.

MfE, 2012. Ministry for the Environment. (2012). Users' Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

NESCS, 2011. The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations (2011).

FIGURES

Investigation Location Plan

Legend

- Site Boundary
- Proposed Environmental Sampling Locations

0 25 m 50 m

ENGEO

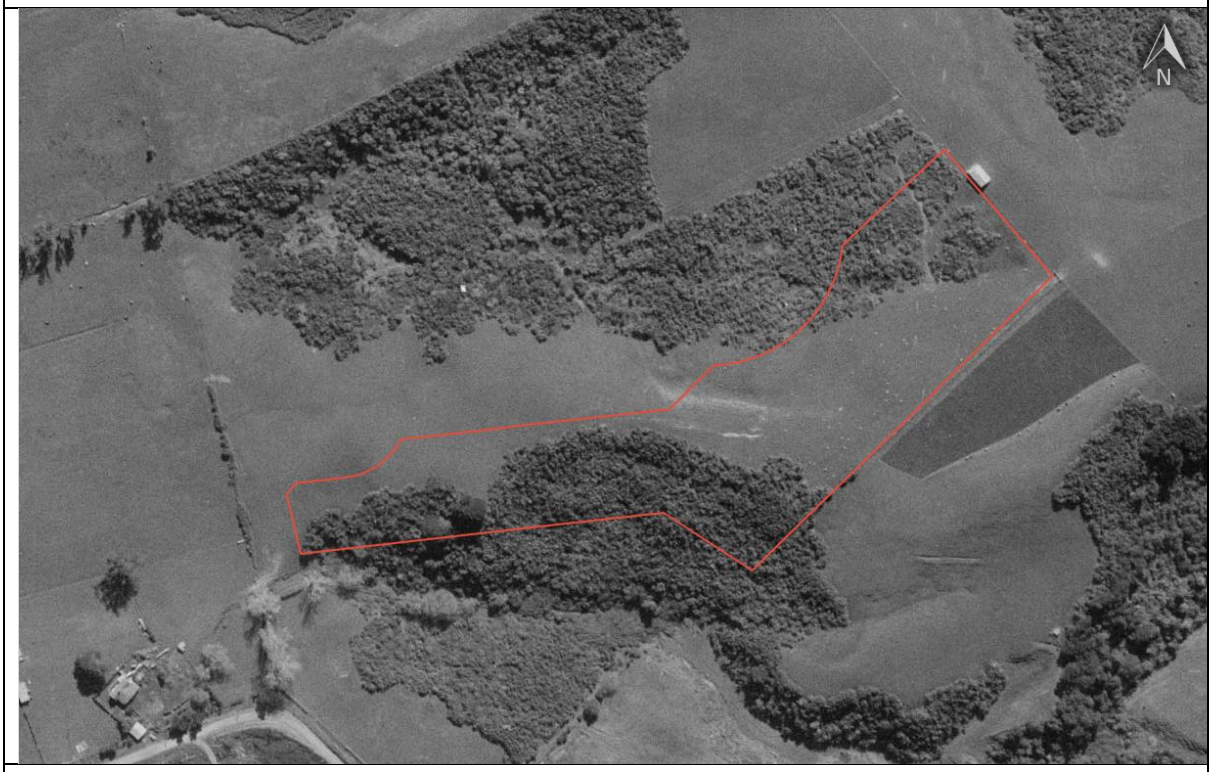
Produced by **Datanest.earth**

Title: Environmental Investigation Location Plan		
Client: Harbour View Heights LP Limited		
Project: ENVIRO - 162 - 166 Settlement Road	Drawn: LB	Figure No.: 1 Size: A4
Date: 05-09-2023	Checked: JR	
Proj No.: 13230.001.004_01	Scale: 1:2000	Version: draft

APPENDIX 1:

Aerial Photographs

1939 (Retrolens NZ)



1960 (Retrolens NZ)

1980 (Retrolens NZ)

1988 (Retrolens NZ)

1996 (Auckland Council GeoMaps)

2001 (Auckland Council GeoMaps)

2008 (Auckland Council GeoMaps)

2018 (Nearmaps)

2019 (Nearmaps)

2020 (Nearmaps)

2022 (Nearmaps)

2023 (Nearmaps)

APPENDIX 2:

Council Contamination Enquiry

29/08/2023

Engeo Limited
8 Greydene Place
Takapuna

Attention: Lucas Brydon

Dear Lucas,

Site Contamination Enquiry – *LOT 127 DP 571188 LOT 124 DP 549093 LOT 123 DP 549093*

This letter is in response to your enquiry requesting available site contamination information within Auckland Council records for the above site. Please note this report does not constitute a site investigation report; such reports are required to be prepared by a (third-party) Suitably Qualified and Experienced Practitioner.

The following details are based on information available to the Contamination, Air & Noise Team in the Resource Consent Department. The details provided may be from former regional council information, as well as property information held by the former district/city councils. For completeness the relevant property file should also be requested to obtain all historical records and reports via 09 3010101 or online at:

https://www.aucklandcouncil.govt.nz/buying-property/order-property-report/Pages/order-property-file.aspx.

1. Hazardous Activities and Industries List (HAIL) Information

This list published by the Ministry for the Environment (MfE) comprises activities and industries that are considered likely to cause land contamination as a result of hazardous substance use, storage, and/or disposal.

Council's records indicate this site has possibly been subject to the following activities that fall within the HAIL:

- HAIL Item (G3) – Landfill sites.
- HAIL Item (I) - Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment.

Geotech report dated 2022 indicated the sites (LOT 127 DP 571188, LOT 124 DP 549093 & LOT 123 DP 549093) have been subject to fill as part of the development of an urban area.

Records indicate the sites LOT 124 DP 549093 & LOT 123 DP 549093 had previously been utilised as a clandestine lab, a DSI dated 2015 all soil samples returned within normal background concentrations.

Please note:

- *If you are demolishing any building that may have asbestos containing materials (ACM) in it, you have obligations under the Health and Safety at Work (Asbestos) Regulations 2016 for the management and removal of asbestos, including the need to engage a Competent Asbestos Surveyor to confirm the presence or absence of any ACM.*
- *Paints used on external parts of properties up until the mid-1970's routinely contained lead, a poison and a persistent environmental pollutant. You are advised to ensure that soils affected by old, peeling or flaking paint are assessed in relation to the proposed use of the property, including high risk use by young children.*

2. Consents and Incidents Information (200m radius of the selected site)

The Council database was searched for records of the following activities within approximately 200 metres of the site and results are displayed in Figure 1 below:

- Pollution Incidents (including air discharges, oil or diesel spills)
- Bores
- Contaminated site and air discharges, and industrial trade process consents
- Closed Landfills
- Air quality permitted activities
- Identified HAIL activities

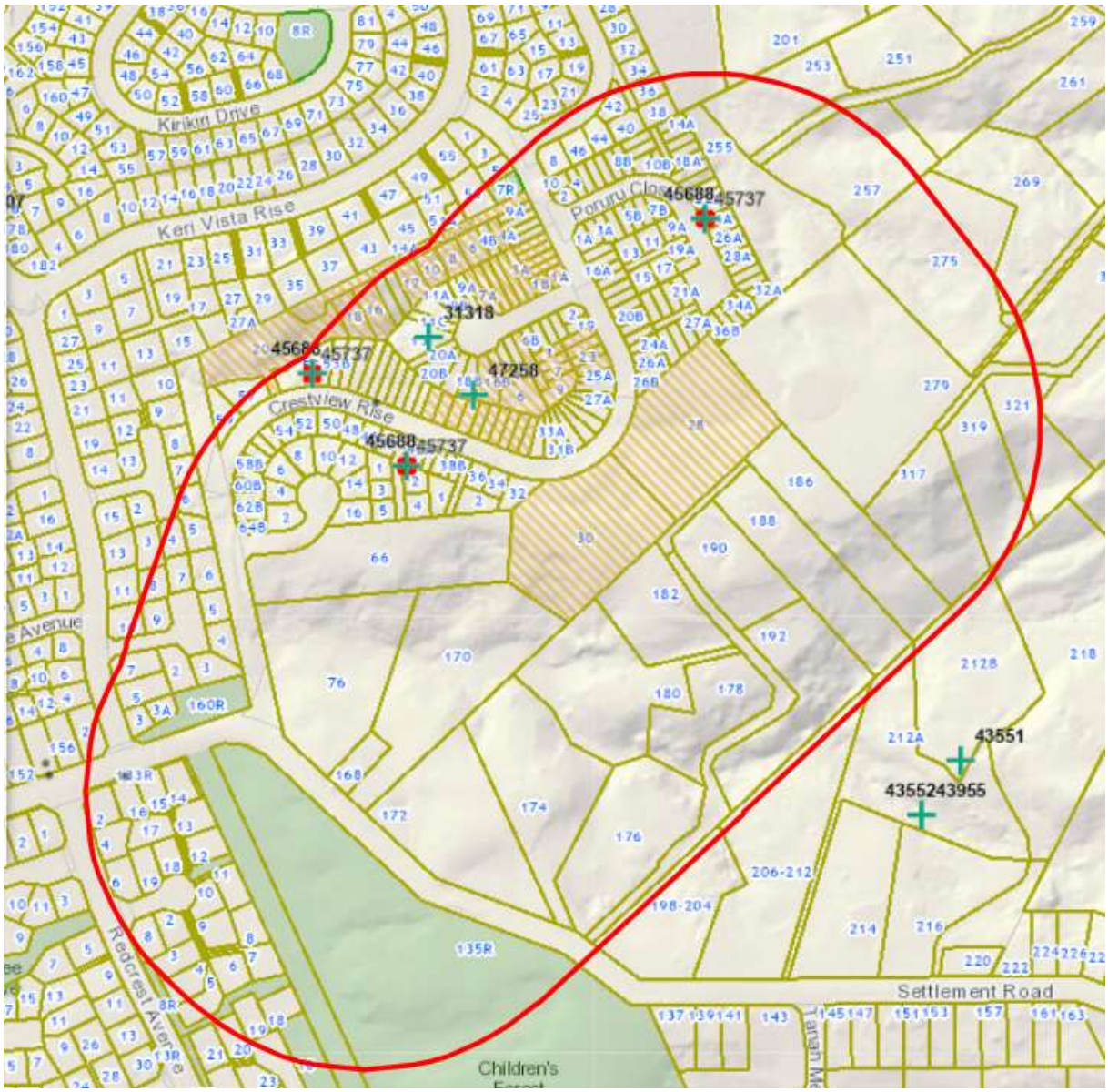


Figure 1: Selected Consents, Incidents and HAIL activities within approximately 200m of the subject site

Legend:

Relevant details of any pollution incidents and consents and HAIL activities are appended to this letter (Attachment A). Please refer to the column titled 'Property Address' on the spreadsheet to aid in identifying corresponding data on the map.

For any identified HAIL sites, please refer to the tab "HAIL activities" for more information (Column C and D include HAIL activity details where these are available).

Please note:

The HAIL activity hatching in Figure 1 only reflects whether a site has been identified as a HAIL site (both verified and non-verified) by the Council and the type of HAIL associated with the site. This does not confirm whether the site has been formally investigated or the contamination status of the property (e.g. contaminated, remediated etc.). Additionally, due to limitations within Council's records, the specific HAIL activity is not included in the data for all properties. For further information on any of these known HAIL sites, a subsequent site contamination enquiry can be lodged for the specific property (up to 5 adjacent properties can be covered in one request).

While the Auckland Council has carried out the above search using its best practical endeavours, it does not warrant its completeness or accuracy and disclaims any responsibility or liability in respect of the information. If you or any other person wishes to act or to rely on this information, or make any financial commitment based upon it, it is recommended that you seek appropriate technical and/or professional advice.

If you wish to clarify anything in this letter that relates to this site, please contact contaminatedsites@aucklandcouncil.govt.nz. Any follow up requests for information on other sites must go through the online order process.

Should you wish to request any of the files referenced above and/or listed in the attached spreadsheet for viewing, please contact the Auckland Council Call Centre on 301 0101 and note you are requesting former Auckland Regional Council records (the records department requires three working days' notice to ensure the files will be available).

Please note Auckland Council cost recovers officer's time for all site enquiries. As such an invoice for $128 for the time involved in this enquiry will follow shortly.

Yours Sincerely,

Contamination, Air and Noise Team
Specialist Unit | Resource Consents
Auckland Council

APPENDIX 3:

Site Photos

Centre of the site (S03) looking northwest.

Photo from Kotahitanga Street looking south towards the southern stockpile / cut area.

Centre of the site (S03) looking southwest.

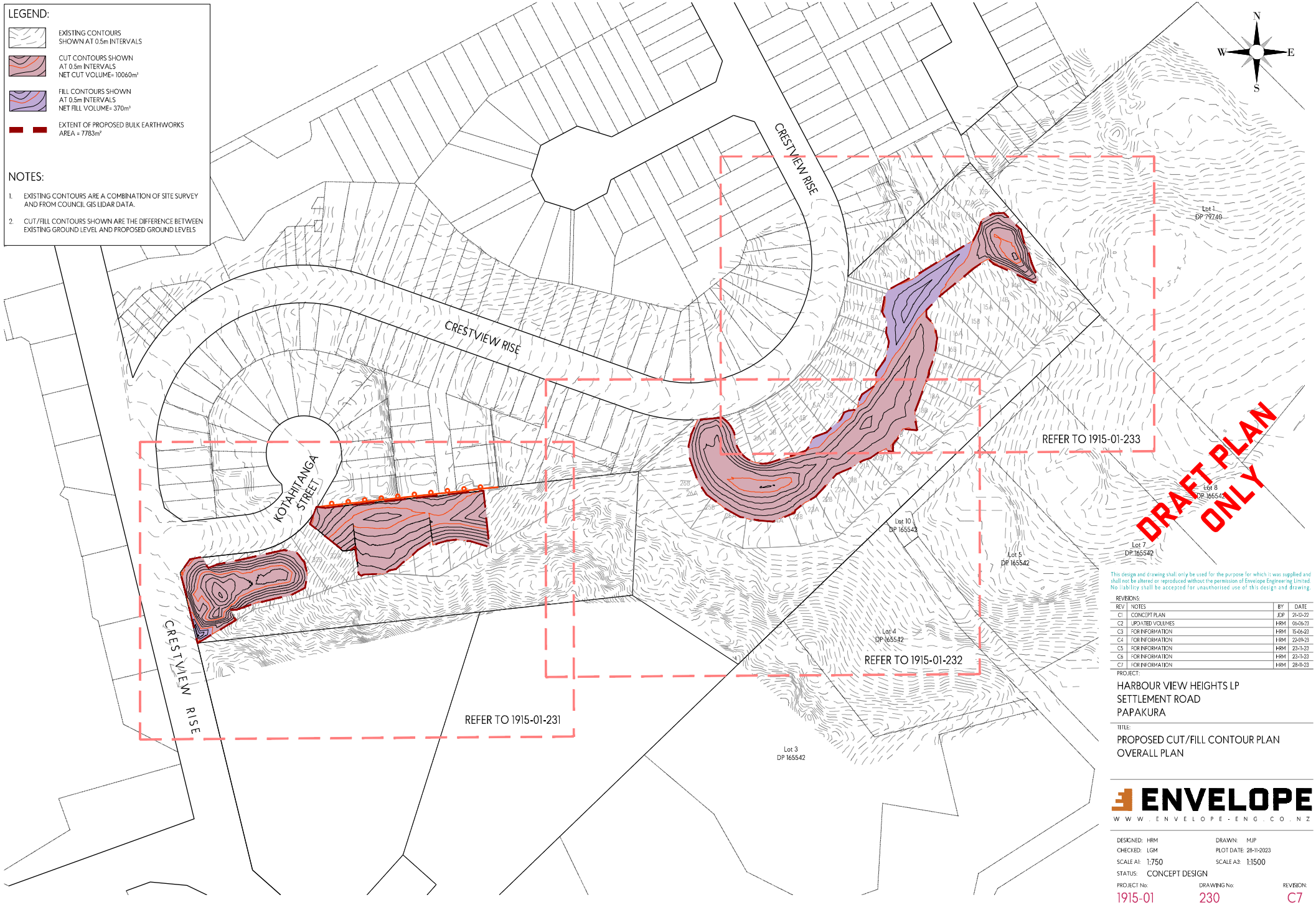
Photo from S07 looking northwest.

Photo from Kotahitanga Street, looking east towards S12.

Photo from near S13 looking northeast across the property boundary.

APPENDIX 4:

Cut-Fill Plan



REVISIONS:

REV	NOTES	BY	DATE
C1	CONCEPT PLAN	JDP	21-12-22
C2	UPDATED VOLUMES	HRM	08-06-23
C3	FOR INFORMATION	HRM	15-06-23
C4	FOR INFORMATION	HRM	22-09-23
C5	FOR INFORMATION	HRM	23-11-23
C6	FOR INFORMATION	HRM	23-11-23
C7	FOR INFORMATION	HRM	28-11-23

PROJECT:

HARBOUR VIEW HEIGHTS LP
SETTLEMENT ROAD
PAPAKURA

TITLE:

PROPOSED CUT/FILL CONTOUR PLAN
OVERALL PLAN

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED:	HRM	DRAWN:	MJP
CHECKED:	LGM	PLOT DATE:	28-11-2023
SCALE A1:	1:750	SCALE A3:	1:1500
STATUS:	CONCEPT DESIGN		

PROJECT No:	DRAWING No:	REVISION:
1915-01	230	C7

APPENDIX 5:

Results Summary

	Sample Name	S01	S02	S02	S03	S04	S04	S05	S06	S07	S09	S10	S10	S11	S12	S12	S13	Assessment Criteria:		
	Depth (m bgl)	0.3	0.0	0.2	0.4	0.1	0.4	0.0	0.2	0.1	1.0	0.0	0.2	0.2	0.3	1.5	0.0	Human Health Criteria (High-Density Residential) [1]	Environmental Criteria (Auckland Unitary Plan) [2]	Background Criteria (Auckland Soils - Non-Volcanic) [3]
	Date	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023	6/09/2023			
Heavy Metals/Metalloids	Arsenic	6.9	2.8	-	5.5	2.7	3.4	4.4	4.3	3.7	5	4.2	6.7	-	6.3	3.8	3.6	45	**100**	0.4 - 12
	Cadmium	0.12	0.09	-	0.02	0.06	0.02	0.05	0.05	0.05	0.05	0.05	0.06	-	0.01	0.06	0.11	230 *	**7.5**	< 0.1 - 0.65
	Chromium	24	11	-	34	12	36	21	42	21	30	21	35	-	46	17	14	1500 *	**400**	2 - 55
	Copper	29	3.7	-	21	5.2	6.1	14	20	8.6	23	9	21	-	23	4	5.6	> 10,000	**325**	1 - 45
	Lead	8.7	6.4	-	9.8	6.8	6.1	11	7.8	7.6	9	7.8	11	-	11	6.2	7.4	500	**250**	< 5 - 65
	Mercury	0.07	0.08	-	0.08	0.07	0.08	0.09	0.06	0.08	0.07	0.08	0.08	-	0.04	0.1	0.1	1,000	**0.75**	<0.03 - 0.45
	Nickel	30	10	-	23	6.2	6.4	9.7	59	9.7	24	8.6	33	-	36	5.4	7.1	1200 *	**105**	0.9 - 35
	Zinc	50	21	-	53	18	21	25	89	26	56	25	61	-	70	29	31	60000 *	**400**	9 - 180
Polycyclic Aromatic Hydrocarbons	All PAHs	<LOR	<LOR	-	-	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	<LOR	-	<LOR	24	**20**	< LOR
Organochlorine Pesticides	All OCPs	-	<LOR	<LOR	<LOR	-	-	<LOR	-	<LOR	<LOR	-	-	<LOR	-	-	<LOR	-	**-**	< LOR

Notes:
All results and criteria are presented in mg/kg dry weight basis, except asbestos which is reported as %w/w
Full results are included in the laboratory reports
LOR: Limit of Reporting; Results below LOR or background are shown in grey text
- : not analysed or no applicable criteria

1: Resource Management (NES:CS) Regulation 2011 - Soil contaminant standards (SCS) for High-Density Residential Land Use
2: Environmental discharge criteria selected in accordance with Section Table E30.6.1.4.2 of the AUP (Auckland Unitary Plan - Operative in Part - November, 2016). Nickel and Zinc adjusted due to non-volcanic Background Range.
3: Background Ranges of Trace Elements in Auckland Soils (non-volcanic Range). Table E30.6.1.4.2 of the AUP (Auckland Unitary Plan - Operative in Part - Updated 9 June 2023).
4. Assumes soil pH of 5.
5. Criteria for Chromium VI were conservatively selected.
6. National Environment Protection (Assessment of Site Contamination) Measure (NEPM). Residential B criteria listed.

APPENDIX 6:

Full Laboratory Results

ENGEO Ltd
8 Greydene Place
Takapuna
Auckland 0622

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Attention: **Jamie Rhodes**

Report **1023842-S**
Project name SETTLEMENT ROAD
Project ID 13230.00.004
Received Date Sep 07, 2023

Client Sample ID			**S01 0.3**	**S02 0.0**	**S02 0.2**	**S03 0.4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**K23-Se0013309**	**K23-Se0013310**	**K23-Se0013311**	**K23-Se0013312**
Date Sampled			**Sep 06, 2023**	**Sep 06, 2023**	**Sep 06, 2023**	**Sep 06, 2023**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	-	-
Anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	-	-
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	-	-
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03	-	-
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Chrysene	0.03	mg/kg	< 0.03	< 0.03	-	-
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03	-	-
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	-	-
Fluorene	0.03	mg/kg	< 0.03	< 0.03	-	-
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	-	-
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Pyrene	0.03	mg/kg	< 0.03	< 0.03	-	-
Total PAH*	0.1	mg/kg	< 0.1	< 0.1	-	-
p-Terphenyl-d14 (surr.)	1	%	78	65	-	-
2-Fluorobiphenyl (surr.)	1	%	150	136	-	-
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	6.9	2.8	-	5.5
Cadmium	0.01	mg/kg	0.12	0.09	-	0.02
Chromium	0.1	mg/kg	24	11	-	34
Copper	0.1	mg/kg	29	3.7	-	21
Lead	0.1	mg/kg	8.7	6.4	-	9.8
Mercury	0.01	mg/kg	0.07	0.08	-	0.08
Nickel	0.1	mg/kg	30	10	-	23
Zinc	5	mg/kg	50	21	-	53
Sample Properties						
% Moisture	1	%	25	21	24	22

Client Sample ID			S01 0.3	S02 0.0	S02 0.2	S03 0.4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013309	K23-Se0013310	K23-Se0013311	K23-Se0013312
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
4.4'-DDD	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
4.4'-DDE	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
4.4'-DDT	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
a-HCH	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
b-HCH	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
d-HCH	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
g-HCH (Lindane)	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Toxaphene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
trans-Chlordane	0.01	mg/kg	-	< 0.01	< 0.01	< 0.01
Dibutylchlorendate (surr.)	1	%	-	77	71	102
Tetrachloro-m-xylene (surr.)	1	%	-	62	132	75

Client Sample ID			S04 0.1	S04 0.4	S05 0.0	S06 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013313	K23-Se0013314	K23-Se0013315	K23-Se0013316
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	0.04	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	0.08	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03

Client Sample ID			S04 0.1	S04 0.4	S05 0.0	S06 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013313	K23-Se0013314	K23-Se0013315	K23-Se0013316
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Chrysene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Total PAH*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
p-Terphenyl-d14 (surr.)	1	%	78	91	61	80
2-Fluorobiphenyl (surr.)	1	%	96	124	120	115
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	2.7	3.4	4.4	4.3
Cadmium	0.01	mg/kg	0.06	0.02	0.05	0.05
Chromium	0.1	mg/kg	12	36	21	42
Copper	0.1	mg/kg	5.2	6.1	14	20
Lead	0.1	mg/kg	6.8	6.1	11	7.8
Mercury	0.01	mg/kg	0.07	0.08	0.09	0.06
Nickel	0.1	mg/kg	6.2	6.4	9.7	59
Zinc	5	mg/kg	18	21	25	89
Sample Properties						
% Moisture	1	%	27	32	25	22
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	-	-	< 0.01	-
2.4'-DDE	0.01	mg/kg	-	-	< 0.01	-
2.4'-DDT	0.01	mg/kg	-	-	< 0.01	-
4.4'-DDD	0.01	mg/kg	-	-	< 0.01	-
4.4'-DDE	0.01	mg/kg	-	-	< 0.01	-
4.4'-DDT	0.01	mg/kg	-	-	< 0.01	-
DDT + DDE + DDD (Total)*	0.01	mg/kg	-	-	< 0.01	-
a-HCH	0.01	mg/kg	-	-	< 0.01	-
Aldrin	0.01	mg/kg	-	-	< 0.01	-
b-HCH	0.01	mg/kg	-	-	< 0.01	-
Chlordanes - Total	0.01	mg/kg	-	-	< 0.01	-
cis-Chlordane	0.01	mg/kg	-	-	< 0.01	-
d-HCH	0.01	mg/kg	-	-	< 0.01	-
Dieldrin	0.01	mg/kg	-	-	< 0.01	-
Endosulfan I	0.01	mg/kg	-	-	< 0.01	-
Endosulfan II	0.01	mg/kg	-	-	< 0.01	-
Endosulfan sulphate	0.01	mg/kg	-	-	< 0.01	-
Endrin	0.01	mg/kg	-	-	< 0.01	-
Endrin aldehyde	0.01	mg/kg	-	-	< 0.01	-
Endrin ketone	0.01	mg/kg	-	-	< 0.01	-
g-HCH (Lindane)	0.01	mg/kg	-	-	< 0.01	-
Heptachlor	0.01	mg/kg	-	-	< 0.01	-
Heptachlor epoxide	0.01	mg/kg	-	-	< 0.01	-
Hexachlorobenzene	0.01	mg/kg	-	-	< 0.01	-
Methoxychlor	0.01	mg/kg	-	-	< 0.01	-
Toxaphene	0.5	mg/kg	-	-	< 0.5	-

Client Sample ID			S04 0.1	S04 0.4	S05 0.0	S06 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013313	K23-Se0013314	K23-Se0013315	K23-Se0013316
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
trans-Chlordane	0.01	mg/kg	-	-	< 0.01	-
Dibutylchlorendate (surr.)	1	%	-	-	74	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	150	-

Client Sample ID			S07 0.1	S09 1.0	S10 0.0	S10 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013317	K23-Se0013318	K23-Se0013319	K23-Se0013320
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	0.04	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	0.08	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Total PAH*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
p-Terphenyl-d14 (surr.)	1	%	65	65	64	148
2-Fluorobiphenyl (surr.)	1	%	87	118	133	132
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	3.7	5.0	4.2	6.7
Cadmium	0.01	mg/kg	0.05	0.05	0.05	0.06
Chromium	0.1	mg/kg	21	30	21	35
Copper	0.1	mg/kg	8.6	23	9.0	21
Lead	0.1	mg/kg	7.6	9.0	7.8	11
Mercury	0.01	mg/kg	0.08	0.07	0.08	0.08
Nickel	0.1	mg/kg	9.7	24	8.6	33
Zinc	5	mg/kg	26	56	25	61
Sample Properties						
% Moisture	1	%	28	25	25	24

Client Sample ID			S07 0.1	S09 1.0	S10 0.0	S10 0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013317	K23-Se0013318	K23-Se0013319	K23-Se0013320
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	-	-
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	-	-
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	-	-
4.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	-	-
4.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	-	-
4.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	-	-
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	< 0.01	-	-
a-HCH	0.01	mg/kg	< 0.01	< 0.01	-	-
Aldrin	0.01	mg/kg	< 0.01	< 0.01	-	-
b-HCH	0.01	mg/kg	< 0.01	< 0.01	-	-
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	-	-
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	-	-
d-HCH	0.01	mg/kg	< 0.01	< 0.01	-	-
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	-	-
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	-	-
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	-	-
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	-	-
Endrin	0.01	mg/kg	< 0.01	< 0.01	-	-
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	-	-
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	-	-
g-HCH (Lindane)	0.01	mg/kg	< 0.01	< 0.01	-	-
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	-	-
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	-	-
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	-	-
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	-	-
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	-	-
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	-	-
Dibutylchlorendate (surr.)	1	%	146	82	-	-
Tetrachloro-m-xylene (surr.)	1	%	149	72	-	-

Client Sample ID			S11 0.2	S12 0.3	S12 1.5	S13 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013321	K23-Se0013322	K23-Se0013323	K23-Se0013324
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Acenaphthene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Acenaphthylene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Anthracene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Benz(a)anthracene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Benzo(a)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Benzo(a)pyrene TEQ (lower bound)*	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Benzo(a)pyrene TEQ (medium bound)*	0.03	mg/kg	0.04	0.04	-	0.04
Benzo(a)pyrene TEQ (upper bound)*	0.03	mg/kg	0.08	0.08	-	0.08
Benzo(b&j)fluoranthene[N07]	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Benzo(g.h.i)perylene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Benzo(k)fluoranthene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03

Client Sample ID			S11 0.2	S12 0.3	S12 1.5	S13 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013321	K23-Se0013322	K23-Se0013323	K23-Se0013324
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Chrysene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Dibenz(a.h)anthracene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Fluoranthene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Fluorene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Indeno(1.2.3-cd)pyrene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Naphthalene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Phenanthrene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Pyrene	0.03	mg/kg	< 0.03	< 0.03	-	< 0.03
Total PAH*	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
p-Terphenyl-d14 (surr.)	1	%	75	71	-	90
2-Fluorobiphenyl (surr.)	1	%	150	138	-	90
Metals M8 (NZ MfE)						
Arsenic	0.1	mg/kg	-	6.3	3.8	3.6
Cadmium	0.01	mg/kg	-	0.01	0.06	0.11
Chromium	0.1	mg/kg	-	46	17	14
Copper	0.1	mg/kg	-	23	4.0	5.6
Lead	0.1	mg/kg	-	11	6.2	7.4
Mercury	0.01	mg/kg	-	0.04	0.10	0.10
Nickel	0.1	mg/kg	-	36	5.4	7.1
Zinc	5	mg/kg	-	70	29	31
Sample Properties						
% Moisture	1	%	28	24	30	29
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	-	-	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	-	-	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	-	-	< 0.01
4.4'-DDD	0.01	mg/kg	< 0.01	-	-	< 0.01
4.4'-DDE	0.01	mg/kg	< 0.01	-	-	< 0.01
4.4'-DDT	0.01	mg/kg	< 0.01	-	-	< 0.01
DDT + DDE + DDD (Total)*	0.01	mg/kg	< 0.01	-	-	< 0.01
a-HCH	0.01	mg/kg	< 0.01	-	-	< 0.01
Aldrin	0.01	mg/kg	< 0.01	-	-	< 0.01
b-HCH	0.01	mg/kg	< 0.01	-	-	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	-	-	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	-	-	< 0.01
d-HCH	0.01	mg/kg	< 0.01	-	-	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	-	-	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	-	-	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	-	-	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	-	-	< 0.01
Endrin	0.01	mg/kg	< 0.01	-	-	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	-	-	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	-	-	< 0.01
g-HCH (Lindane)	0.01	mg/kg	< 0.01	-	-	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	-	-	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	-	-	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	-	-	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	-	-	< 0.01
Toxaphene	0.5	mg/kg	< 0.5	-	-	< 0.5

Client Sample ID			S11 0.2	S12 0.3	S12 1.5	S13 0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			K23-Se0013321	K23-Se0013322	K23-Se0013323	K23-Se0013324
Date Sampled			Sep 06, 2023	Sep 06, 2023	Sep 06, 2023	Sep 06, 2023
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
trans-Chlordane	0.01	mg/kg	< 0.01	-	-	< 0.01
Dibutylchlorendate (surr.)	1	%	78	-	-	79
Tetrachloro-m-xylene (surr.)	1	%	65	-	-	101

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Auckland	Sep 08, 2023	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water by GC MSMS			
Metals M8 (NZ MfE)	Auckland	Sep 08, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Organochlorine Pesticides (NZ MfE)	Auckland	Sep 08, 2023	14 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water by GCMSMS			
% Moisture	Auckland	Sep 07, 2023	14 Days
- Method: LTM-GEN-7080 Moisture Content in Soil by Gravimetry			

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IANZ# 1327	IANZ# 1290	IANZ# 1402

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Site# 2370

Company Name: ENGEO Ltd - NI
Address: 8 Greydene Place
Takapuna
Auckland 0622

Project Name: SETTLEMENT ROAD
Project ID: 13230.00.004

Order No.:
Report #: 1023842
Phone: 0011 64 9 9722 205
Fax:

Received: Sep 7, 2023 9:30 AM
Due: Sep 14, 2023
Priority: 5 Day
Contact Name: Jamie Rhodes

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Auckland Laboratory - IANZ# 1327						X	X	X	X	X
Christchurch Laboratory - IANZ# 1290										
Tauranga Laboratory - IANZ# 1402										
External Laboratory										
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**					
1	S01 0.3	Sep 06, 2023		Soil	K23-Se0013309		X		X	X
2	S02 0.0	Sep 06, 2023		Soil	K23-Se0013310		X	X	X	X
3	S02 0.2	Sep 06, 2023		Soil	K23-Se0013311		X	X		
4	S03 0.4	Sep 06, 2023		Soil	K23-Se0013312		X	X	X	
5	S04 0.1	Sep 06, 2023		Soil	K23-Se0013313		X		X	X
6	S04 0.4	Sep 06, 2023		Soil	K23-Se0013314		X		X	X
7	S05 0.0	Sep 06, 2023		Soil	K23-Se0013315		X	X	X	X
8	S06 0.2	Sep 06, 2023		Soil	K23-Se0013316		X		X	X
9	S07 0.1	Sep 06, 2023		Soil	K23-Se0013317		X	X	X	X
10	S09 1.0	Sep 06, 2023		Soil	K23-Se0013318		X	X	X	X
11	S10 0.0	Sep 06, 2023		Soil	K23-Se0013319		X		X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
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NATA# 2377
Site# 2370

Company Name:	ENGEO Ltd - NI	**Order No.:**		**Received:**	Sep 7, 2023 9:30 AM
Address:	8 Greydene Place Takapuna Auckland 0622	**Report #:**	1023842	**Due:**	Sep 14, 2023
		Phone:	0011 64 9 9722 205	**Priority:**	5 Day
		Fax:		**Contact Name:**	Jamie Rhodes
Project Name:	SETTLEMENT ROAD				
Project ID:	13230.00.004				

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Auckland Laboratory - IANZ# 1327						X	X	X	X	X
Christchurch Laboratory - IANZ# 1290										
Tauranga Laboratory - IANZ# 1402										
12	S10 0.2	Sep 06, 2023		Soil	K23-Se0013320		X		X	X
13	S11 0.2	Sep 06, 2023		Soil	K23-Se0013321		X	X		X
14	S12 0.3	Sep 06, 2023		Soil	K23-Se0013322		X		X	X
15	S12 1.5	Sep 06, 2023		Soil	K23-Se0013323		X		X	
16	S13 0.0	Sep 06, 2023		Soil	K23-Se0013324		X	X	X	X
17	S01 0.0	Sep 06, 2023		Soil	K23-Se0013325	X				
18	S03 0.0	Sep 06, 2023		Soil	K23-Se0013326	X				
19	S04 0.9	Sep 06, 2023		Soil	K23-Se0013327	X				
20	S05 0.2	Sep 06, 2023		Soil	K23-Se0013328	X				
21	S06 0.0	Sep 06, 2023		Soil	K23-Se0013329	X				
22	S07 0.4	Sep 06, 2023		Soil	K23-Se0013330	X				
23	S08 0.1	Sep 06, 2023		Soil	K23-Se0013331	X				
24	S08 0.3	Sep 06, 2023		Soil	K23-Se0013332	X				
25	S08 1.3	Sep 06, 2023		Soil	K23-Se0013333	X				

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
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		Phone:	0011 64 9 9722 205	**Priority:**	5 Day
		Fax:		**Contact Name:**	Jamie Rhodes
Project Name:	SETTLEMENT ROAD				
Project ID:	13230.00.004				

Eurofins Analytical Services Manager : Katyana Gausel

Sample Detail						HOLD	Moisture Set	Organochlorine Pesticides (NZ MfE)	Metals M8 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)
Auckland Laboratory - IANZ# 1327						X	X	X	X	X
Christchurch Laboratory - IANZ# 1290										
Tauranga Laboratory - IANZ# 1402										
26	S09 0.5	Sep 06, 2023		Soil	K23-Se0013334	X				
27	S11 0.0	Sep 06, 2023		Soil	K23-Se0013335	X				
28	S11 1.0	Sep 06, 2023		Soil	K23-Se0013336	X				
Test Counts						12	16	8	14	13

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.

Units

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

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - 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.
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.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

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. 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.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	mg/kg	< 0.03			0.03	Pass	
Acenaphthylene	mg/kg	< 0.03			0.03	Pass	
Anthracene	mg/kg	< 0.03			0.03	Pass	
Benz(a)anthracene	mg/kg	< 0.03			0.03	Pass	
Benzo(a)pyrene	mg/kg	< 0.03			0.03	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.03			0.03	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.03			0.03	Pass	
Chrysene	mg/kg	< 0.03			0.03	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.03			0.03	Pass	
Fluoranthene	mg/kg	< 0.03			0.03	Pass	
Fluorene	mg/kg	< 0.03			0.03	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.03			0.03	Pass	
Naphthalene	mg/kg	< 0.1			0.1	Pass	
Phenanthrene	mg/kg	< 0.03			0.03	Pass	
Pyrene	mg/kg	< 0.03			0.03	Pass	
Method Blank							
Metals M8 (NZ MfE)							
Arsenic	mg/kg	< 0.1			0.1	Pass	
Cadmium	mg/kg	< 0.01			0.01	Pass	
Chromium	mg/kg	< 0.1			0.1	Pass	
Copper	mg/kg	< 0.1			0.1	Pass	
Lead	mg/kg	< 0.1			0.1	Pass	
Mercury	mg/kg	< 0.01			0.01	Pass	
Nickel	mg/kg	< 0.1			0.1	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Organochlorine Pesticides (NZ MfE)							
2.4'-DDD	mg/kg	< 0.01			0.01	Pass	
2.4'-DDE	mg/kg	< 0.01			0.01	Pass	
2.4'-DDT	mg/kg	< 0.01			0.01	Pass	
4.4'-DDD	mg/kg	< 0.01			0.01	Pass	
4.4'-DDE	mg/kg	< 0.01			0.01	Pass	
4.4'-DDT	mg/kg	< 0.01			0.01	Pass	
a-HCH	mg/kg	< 0.01			0.01	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
b-HCH	mg/kg	< 0.01			0.01	Pass	
Chlordanes - Total	mg/kg	-			0.01	N/A	
cis-Chlordane	mg/kg	< 0.01			0.01	Pass	
d-HCH	mg/kg	< 0.01			0.01	Pass	
Dieldrin	mg/kg	< 0.01			0.01	Pass	
Endosulfan I	mg/kg	< 0.01			0.01	Pass	
Endosulfan II	mg/kg	< 0.01			0.01	Pass	
Endosulfan sulphate	mg/kg	< 0.01			0.01	Pass	
Endrin	mg/kg	< 0.01			0.01	Pass	
Endrin aldehyde	mg/kg	< 0.01			0.01	Pass	
Endrin ketone	mg/kg	< 0.01			0.01	Pass	
g-HCH (Lindane)	mg/kg	< 0.01			0.01	Pass	
Heptachlor	mg/kg	< 0.01			0.01	Pass	
Heptachlor epoxide	mg/kg	< 0.01			0.01	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
trans-Chlordane	mg/kg	< 0.01			0.01	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	117			70-130	Pass	
Acenaphthylene	%	112			70-130	Pass	
Anthracene	%	102			70-130	Pass	
Benz(a)anthracene	%	123			70-130	Pass	
Benzo(a)pyrene	%	103			70-130	Pass	
Benzo(b&j)fluoranthene	%	84			70-130	Pass	
Benzo(g.h.i)perylene	%	99			70-130	Pass	
Benzo(k)fluoranthene	%	103			70-130	Pass	
Chrysene	%	84			70-130	Pass	
Dibenz(a.h)anthracene	%	107			70-130	Pass	
Fluoranthene	%	101			70-130	Pass	
Fluorene	%	105			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	123			70-130	Pass	
Naphthalene	%	112			70-130	Pass	
Phenanthrene	%	92			70-130	Pass	
Pyrene	%	105			70-130	Pass	
LCS - % Recovery							
Metals M8 (NZ MfE)							
Arsenic	%	85			80-120	Pass	
Cadmium	%	82			80-120	Pass	
Chromium	%	82			80-120	Pass	
Copper	%	85			80-120	Pass	
Lead	%	86			80-120	Pass	
Mercury	%	101			80-120	Pass	
Nickel	%	81			80-120	Pass	
Zinc	%	88			80-120	Pass	
LCS - % Recovery							
Organochlorine Pesticides (NZ MfE)							
2.4'-DDD	%	79			70-130	Pass	
2.4'-DDE	%	88			70-130	Pass	
2.4'-DDT	%	72			70-130	Pass	
4.4'-DDD	%	82			70-130	Pass	
4.4'-DDE	%	88			70-130	Pass	
4.4'-DDT	%	84			70-130	Pass	
a-HCH	%	92			70-130	Pass	
Aldrin	%	95			70-130	Pass	
b-HCH	%	78			70-130	Pass	
Chlordanes - Total	%	98			70-130	Pass	
cis-Chlordane	%	105			70-130	Pass	
d-HCH	%	77			70-130	Pass	
Dieldrin	%	101			70-130	Pass	
Endosulfan I	%	97			70-130	Pass	
Endosulfan II	%	86			70-130	Pass	
Endosulfan sulphate	%	82			70-130	Pass	
Endrin	%	106			70-130	Pass	
Endrin aldehyde	%	98			70-130	Pass	
Endrin ketone	%	90			70-130	Pass	
g-HCH (Lindane)	%	92			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heptachlor			%	108			70-130	Pass	
Heptachlor epoxide			%	85			70-130	Pass	
Hexachlorobenzene			%	93			70-130	Pass	
Methoxychlor			%	78			70-130	Pass	
trans-Chlordane			%	90			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthene	K23-Se0000691	NCP	%	105			70-130	Pass	
Benz(a)anthracene	K23-Se0000691	NCP	%	126			70-130	Pass	
Benzo(b&j)fluoranthene	K23-Se0000691	NCP	%	70			70-130	Pass	
Benzo(g.h.i)perylene	K23-Se0000691	NCP	%	82			70-130	Pass	
Dibenz(a.h)anthracene	K23-Se0007352	NCP	%	80			70-130	Pass	
Indeno(1.2.3-cd)pyrene	K23-Se0000691	NCP	%	73			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Cadmium	Z23-Se0020669	NCP	%	101			75-125	Pass	
Nickel	Z23-Se0020669	NCP	%	95			75-125	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Anthracene	K23-Se0013310	CP	%	105			70-130	Pass	
Chrysene	K23-Se0013310	CP	%	118			70-130	Pass	
Fluoranthene	K23-Se0013310	CP	%	85			70-130	Pass	
Fluorene	K23-Se0013310	CP	%	129			70-130	Pass	
Phenanthrene	K23-Se0013310	CP	%	102			70-130	Pass	
Pyrene	K23-Se0013310	CP	%	84			70-130	Pass	
Spike - % Recovery									
Metals M8 (NZ MfE)				Result 1					
Arsenic	K23-Se0013310	CP	%	84			75-125	Pass	
Chromium	K23-Se0013310	CP	%	85			75-125	Pass	
Copper	K23-Se0013310	CP	%	83			75-125	Pass	
Lead	K23-Se0013310	CP	%	89			75-125	Pass	
Mercury	K23-Se0013310	CP	%	99			75-125	Pass	
Zinc	K23-Se0013310	CP	%	84			75-125	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
2.4'-DDD	K23-Se0013310	CP	%	106			70-130	Pass	
2.4'-DDE	K23-Se0013310	CP	%	115			70-130	Pass	
2.4'-DDT	K23-Se0013310	CP	%	114			70-130	Pass	
4.4'-DDD	K23-Se0013310	CP	%	119			70-130	Pass	
4.4'-DDE	K23-Se0013310	CP	%	116			70-130	Pass	
4.4'-DDT	K23-Se0013310	CP	%	116			70-130	Pass	
a-HCH	K23-Se0013310	CP	%	116			70-130	Pass	
Aldrin	K23-Se0013310	CP	%	120			70-130	Pass	
b-HCH	K23-Se0013310	CP	%	103			70-130	Pass	
cis-Chlordane	K23-Se0000691	NCP	%	108			70-130	Pass	
d-HCH	K23-Se0013310	CP	%	99			70-130	Pass	
Dieldrin	K23-Se0013310	CP	%	117			70-130	Pass	
Endosulfan I	K23-Se0013310	CP	%	123			70-130	Pass	
Endrin	K23-Se0000691	NCP	%	116			70-130	Pass	
Endrin aldehyde	K23-Se0013310	CP	%	106			70-130	Pass	
Endrin ketone	K23-Se0013310	CP	%	124			70-130	Pass	
g-HCH (Lindane)	K23-Se0013310	CP	%	116			70-130	Pass	
Heptachlor epoxide	K23-Se0013310	CP	%	109			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Hexachlorobenzene	K23-Se0013310	CP	%	113			70-130	Pass	
Methoxychlor	K23-Se0000691	NCP	%	73			70-130	Pass	
trans-Chlordane	K23-Se0013310	CP	%	112			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1					
Acenaphthylene	K23-Se0013320	CP	%	121			70-130	Pass	
Anthracene	K23-Se0013320	CP	%	106			70-130	Pass	
Benzo(a)pyrene	K23-Se0013320	CP	%	111			70-130	Pass	
Benzo(k)fluoranthene	K23-Se0013320	CP	%	121			70-130	Pass	
Chrysene	K23-Se0013320	CP	%	89			70-130	Pass	
Fluorene	K23-Se0013320	CP	%	112			70-130	Pass	
Naphthalene	K23-Se0013320	CP	%	117			70-130	Pass	
Phenanthrene	K23-Se0013320	CP	%	91			70-130	Pass	
Pyrene	K23-Se0013320	CP	%	76			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides (NZ MfE)				Result 1					
2.4'-DDD	K23-Se0013320	CP	%	94			70-130	Pass	
2.4'-DDE	K23-Se0013320	CP	%	114			70-130	Pass	
2.4'-DDT	K23-Se0013320	CP	%	81			70-130	Pass	
4.4'-DDD	K23-Se0013320	CP	%	107			70-130	Pass	
4.4'-DDE	K23-Se0013320	CP	%	109			70-130	Pass	
4.4'-DDT	K23-Se0013320	CP	%	97			70-130	Pass	
a-HCH	K23-Se0013320	CP	%	114			70-130	Pass	
Aldrin	K23-Se0013320	CP	%	115			70-130	Pass	
b-HCH	K23-Se0013320	CP	%	92			70-130	Pass	
d-HCH	K23-Se0013320	CP	%	89			70-130	Pass	
Dieldrin	K23-Se0013320	CP	%	115			70-130	Pass	
Endosulfan I	K23-Se0013320	CP	%	127			70-130	Pass	
Endosulfan II	K23-Se0013320	CP	%	111			70-130	Pass	
Endosulfan sulphate	K23-Se0013320	CP	%	101			70-130	Pass	
Endrin aldehyde	K23-Se0013320	CP	%	111			70-130	Pass	
Endrin ketone	K23-Se0013320	CP	%	106			70-130	Pass	
g-HCH (Lindane)	K23-Se0013320	CP	%	114			70-130	Pass	
Heptachlor	K23-Se0013320	CP	%	130			70-130	Pass	
Heptachlor epoxide	K23-Se0013320	CP	%	101			70-130	Pass	
Hexachlorobenzene	K23-Se0013320	CP	%	112			70-130	Pass	
trans-Chlordane	K23-Se0013320	CP	%	122			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g.h.i)perylene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Chrysene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a.h)anthracene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K23-Se0013309	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Phenanthrene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K23-Se0013309	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K23-Se0013309	CP	mg/kg	6.9	7.1	2.3	30%	Pass	
Cadmium	K23-Se0013309	CP	mg/kg	0.12	0.17	35	30%	Fail	
Chromium	K23-Se0013309	CP	mg/kg	24	24	<1	30%	Pass	
Copper	K23-Se0013309	CP	mg/kg	29	32	8.2	30%	Pass	
Lead	K23-Se0013309	CP	mg/kg	8.7	9.5	8.1	30%	Pass	
Mercury	K23-Se0013309	CP	mg/kg	0.07	0.07	<1	30%	Pass	
Nickel	K23-Se0013309	CP	mg/kg	30	29	2.5	30%	Pass	
Zinc	K23-Se0013309	CP	mg/kg	50	50	1.5	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K23-Se0013309	CP	%	25	25	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
2.4'-DDD	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDE	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDT	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDD	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDE	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDT	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
a-HCH	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-HCH	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Chlordanes - Total	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
cis-Chlordane	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-HCH	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-HCH (Lindane)	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
trans-Chlordane	K23-Se0013309	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g.h.i)perylene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Chrysene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a.h)anthracene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K23-Se0013319	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K23-Se0013319	CP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	K23-Se0013319	CP	%	25	25	1.3	30%	Pass	
Duplicate									
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD			
2.4'-DDD	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDE	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
2.4'-DDT	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDD	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDE	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
4.4'-DDT	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
a-HCH	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Aldrin	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
b-HCH	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Chlordanes - Total	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
cis-Chlordane	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
d-HCH	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Dieldrin	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan I	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan II	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endosulfan sulphate	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin aldehyde	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Endrin ketone	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
g-HCH (Lindane)	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Heptachlor epoxide	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Hexachlorobenzene	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Methoxychlor	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
trans-Chlordane	K23-Se0013319	CP	mg/kg	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Metals M8 (NZ MfE)				Result 1	Result 2	RPD			
Arsenic	K23-Se0013320	CP	mg/kg	6.7	7.0	3.4	30%	Pass	
Cadmium	K23-Se0013320	CP	mg/kg	0.06	0.07	13	30%	Pass	
Chromium	K23-Se0013320	CP	mg/kg	35	40	13	30%	Pass	
Copper	K23-Se0013320	CP	mg/kg	21	24	9.4	30%	Pass	
Lead	K23-Se0013320	CP	mg/kg	11	11	1.4	30%	Pass	
Mercury	K23-Se0013320	CP	mg/kg	0.08	0.08	2.7	30%	Pass	
Nickel	K23-Se0013320	CP	mg/kg	33	36	7.7	30%	Pass	
Zinc	K23-Se0013320	CP	mg/kg	61	66	8.0	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
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:

Katyana Gausel	Analytical Services Manager
Raymond Siu	Senior Analyst-Metal
Raymond Siu	Senior Analyst-Organic

Raymond Siu
Senior Instrument Chemist (Key Technical Personnel)

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

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