RILEY CONSULTANTS

PRELIMINARY AND DETAILED SITE INVESTIGATION
CONTAMINATED LAND
RANGITIKEI LINE AND FLYGERS LINE
PALMERSTON NORTH

Engineers and Geologists

RILEY CONSULTANTS LTD
New Zealand
Email: riley@riley.co.nz
Email: rileychch@riley.co.nz
Web: www.riley.co.nz

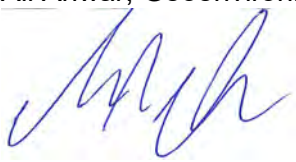
AUCKLAND
4 Fred Thomas Drive, Takapuna, Auckland 0622
PO Box 100253, North Shore, Auckland 0745
Tel: +64 9 489 7872 Fax: +64 9 489 7873

CHRISTCHURCH
22 Moorhouse Avenue, Addington, Christchurch 8011
PO Box 4355, Christchurch 8140
Tel: +64 3 379 4402 Fax: +64 3 379 4403

PRELIMINARY AND DETAILED SITE INVESTIGATION
CONTAMINATED LAND
RANGITIKEI LINE AND FLYGERS LINE, PALMERSTON NORTH

Report prepared for: Flygers Line Investment Group Limited

Report prepared by: Ali Anwar, Geoenvironmental Scientist



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Report reviewed by: Marcus Herrmann, Principal – Contaminated Land

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Approved for issue by: Rob Burden, Technical Director

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Copies to: Flygers Line Investment Group Limited 1 electronic copy

Riley Consultants Ltd 1 copy

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RILEY CONSULTANTS LTD
New Zealand
Email: riley@riley.co.nz
Email: rileychch@riley.co.nz
Web: www.riley.co.nz

AUCKLAND
4 Fred Thomas Drive, Takapuna, Auckland 0622
PO Box 100253, North Shore, Auckland 0745
Tel: +64 9 489 7872 Fax: +64 9 489 7873

CHRISTCHURCH
22 Moorhouse Avenue, Addington, Christchurch 8011
PO Box 4355, Christchurch 8140
Tel: +64 3 379 4402 Fax: +64 3 379 4403

PRELIMINARY AND DETAILED SITE INVESTIGATION CONTAMINATED LAND RANGITIKEI LINE AND FLYGERS LINE, PALMERSTON NORTH

1.0 Introduction

As requested by Ms Holly Jenkins of Kevin O'Connor & Associates Ltd (KOA) on behalf of Flygers Line Investment Group Limited, Riley Consultants Ltd (RILEY) has been engaged to provide ground contamination assessment services for two lots of land on the corner of Flygers Line and Rangitikei Line in Palmerston North. This assessment has been prepared as part of an overall submission to Palmerston North City Council (PNCC) to rezone the existing rural site as residential land.

The following report outlines the findings from a desktop assessment of available historic information relating to ground contamination and an intrusive soil sampling investigation.

This report has been reviewed by suitably qualified and experienced practitioners as required by the NES-CS[1] and as described in the NES-CS Users' Guide[2]. The report meets the general requirements of a Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI), in accordance with the Ministry for the Environment's Contaminated Land Management Guideline #1 (MfE CLMG #1)[3], the MfE CLMG #5[4] and the NES-CS.

2.0 Site Description

2.1 Site Location

The site is a rectangular property made up of two lots on the corner of Flygers Line and Rangitikei Line, legally described as Pt Sec 553 Town of Palmerston North and Lot 2 DP 389924. The site covers an area measuring 39.32ha.

2.2 Proposed Development

Development details or plans are yet to be finalised, however, at this stage it is proposed to rezone the site for residential use. As such, a ground contamination due diligence assessment is required to assess any legacy ground contamination, inform (if required) ongoing site management, provide an initial contaminated land risk assessment for construction workers during future development works, and for site end users (i.e. future residents).

3.0 Geology and Hydrogeology

From a review of the 1:250,000 Geological Map, together with our experience of the surrounding area, we infer that the site is underlain by Holocene river deposits comprising gravel, sand, silt, mud, and clay with local peat. Topographical information available online indicates that the ground surface profile on the site is relatively flat with a stream running north to south through the middle of the site.

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[1] Ministry for the Environment (2011) Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.
[2] Ministry for the Environment (2012) Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.
[3] Ministry for the Environment – Contaminated Land Management Guideline #1: Reporting on Contaminated Sites in New Zealand (revised 2011).
[4] Ministry for the Environment – Contaminated Land Management Guideline #5: Site Investigation and Analysis of Soils (revised 2011).

A recent RILEY geotechnical report for this site[5] (RILEY Ref: 170672-D) has identified that subsoil conditions typically comprise firm sandy silts from the surface through to ~4.5m below ground level (m bgl). This is underlain by 1m of soft clayey silt, whereupon very dense gravels were encountered. Machine boreholes identified the gravel layer extended from ~5.5m to 9.5m bgl, underlain by stiff clayey silt and very dense sandy gravel.

The RILEY geotechnical investigation identified the presence of groundwater at 3.5m bgl during summer (January 2019), and from 0.8m to 1.9m bgl in winter (June 2018). A groundwater level of 4m bgl was mapped in the GNS report for Palmerston North.

4.0 Preliminary Site Investigation

As part of the investigation, a PSI was undertaken to identify any potential risk of soil contamination relating to past and current activities carried out on-site. The PSI was carried out in accordance with MfE CLMG #1 and the NES-CS.

The PSI includes the following:

- A review of historic aerial photographs.
- Obtaining and reviewing PNCC property files.
- Obtaining and reviewing Horizons Regional Council (HRC) contamination reports.
- Obtaining and reviewing historic Certificates of Title.

4.1 Aerial Photograph Search

A review of available historic aerial photographs, dated 1940 to 2017 (Appendix A), is presented in Table 1:

Table 1: Review of Available Historic Aerial Photographs

Date	Description
1942	• The property appears to be a paddock with three buildings directly off Flygers Line, and a centrally located shed. • Horizontal lines appear on some parts of the property, which might be associated with crop beds. • A stream runs north to south through the middle of the site.
1949	• A building has been developed on the south-eastern corner of the property. • The centrally located shed has been removed.
1963	• The infrastructure on the south-eastern corner of the property has been extended.
1967	• One of the buildings off Flygers Line has been removed.
1979	• All the buildings off Flygers Line have now been removed.
1995	• The buildings on the south-eastern corner of the property have been removed.
2007	• The current sheds on the south-eastern corner have been developed. • Livestock appear to be grazing on the northern portion of the site. • There appears to be some pooling of water on the north-eastern quadrant of the property.
2017	• No significant changes to land use observed.

[5] *RILEY, February 2019: Geotechnical Assessment for Proposed Plan Change - Rangitikei Line and Flygers Line, Palmerston North, 170672-D.*

4.2 Palmerston North City Council Property File Search

- An application to the Manawatu District Council for a building consent was lodged on 30 September 1996, to build a calf-rearing shed on the south-eastern corner of the property. The application was approved on 16 October 1996.
- A second application to the Manawatu District Council for a building consent was lodged on 30 January 2001, to build an additional calf-rearing shed on the south-eastern corner of the property. The application was approved on 26 January 2001.

4.3 Horizons Regional Council Site Contamination Enquiry Report

The following pollution incidents were found in the HRC records:

Table 2: Pollution Incidents

Location	Date	Description
On-site	09/07/1998	Complaint about dead cow in neighbours' paddock. Cow was dead for about one week and began to smell.
Off-site	01/03/1999	Piggery smell on Benmore Avenue.
Off-site	19/05/2003	Neighbour dumping rubbish over back fence onto Mangaone Stream stop bank.
Off-site	11/04/2005	Discoloured water as a result of cattle grazing in Whiskey Creek.
Off-site	06/05/2005	Abandoned car on Flygers Line, bounded by Rangitikei Line and Gillespies Line.
On-site	15/08/2007	The owner of property on Rangitikei line burnt two truck tyres and a small amount of green waste, once asked he put fire out immediately.
Off-site	20/09/2009	Dead lamb in waterway next to walking track, 100m downstream of bridge over Mangoane stream on Rangitikei Line.
Off-site	07/01/2013	Rubbish such as; washing machine, car tyres etc. in road side drain on Flygers Line in between Rangitikei Line and Gillespies Line.
Off-site	23/04/2014	Dead deer carcass in drain on Flygers Line.
Off-site	25/06/2014	Four to seven televisions and other kinds of whiteware were dumped on Flygers Line, approximately 60m from the top of the road.

None of the pollution incidents identified above appear to pose a ground contamination risk to the site. A copy of the site contamination enquiry report is included in Appendix B.

4.4 Certificates of Title

The ownership history of Lot 2 DP 389924 (southern portion of the site) is as follows:

- The earliest ownership record dates back to 2 February 1877, when William McDouall (farmer) purchased the property. The record shows a number of mortgage transfers and leases to other farmers over the years.
- A pipeline easement certificate pursuant of Section 70 of the Petroleum Act 1937 creating a gas supply on 6 August 1968.
- Ownership of the property was transferred to Dobbin Investments Limited, then to MC2 Group Limited, and then finally to Flygers Investment Group Limited on 31 August 2007.

The ownership history of Pt Sec 553 Town of Palmerston North (northern portion of the site) is as follows:

- The earliest ownership record dates back to 7 October 1945, when William Rudd Pratt (farmer) purchased the property. The record shows a number of mortgage transfers and leases to other farmers over the years.
- Ownership of the property was transferred to Edna Daphne Pratt (widow of William Rudd Pratt) and Leonard August Morton (farmer) on 24 January 1961.
- Ownership of the property was transferred to Kairanga Knitwear Company Limited on 20 September 1972 and then transferred again to Torthorwold Farms Limited on 30 January 1973.
- Ownership transfer to Rama Ravji (retired) took place on 23 November 1987. His wife Pani Ben Ravji was then added as a tenant in common in equal shares on 10 November 1989.
- Transmission of the share of Pani Ben Ravji to Rama Ravji and Alan Desmon White as executors was carried out on 17 June 1998.
- Several other ownership transfers occurred over the year between farmers/retirees until ownership was transferred to Dobbin Investments Limited on 18 October 2004.
- Ownership was then transferred to Flygers Investment Group Limited on 31 August 2007.

The two properties appear to have continually been used as farm land to primarily rear livestock until as recently as June 2018.

4.5 Anecdotal Evidence

The former tenant was on-site on 29 June 2018. The tenant informed RILEY staff as they were leaving the site that an abattoir operated on-site and was located along the northern site boundary (buildings observed on the 1942 aerial photograph). The tenant also mentioned that the sheds may have historically been used to store minor amounts of diesel.

4.6 Hazardous Activities and Industries List Activities On-site

The desktop review indicates the potential for market gardening to have historically occurred on-site, and for isolated hydrocarbon contamination within the sheds. Potential contaminants and sources are presented below in Table 3.

Table 3: Potential Contamination Sources

Activity	Potential Contaminants	Likelihood of contamination	HAIL[6] reference
Potential market gardening.	• Heavy metals • Organochlorine pesticides (OCPs) • Acid herbicides	Likely to occur across areas subject to market gardening. The proposed development works would include ground disturbance and potential exposure of construction workers and future site end users to contaminants. This would complete a source-pathway-receptor link.	Activity A10: Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.
Potential storage of diesel within sheds.	• Heavy metals • Total petroleum hydrocarbons (TPH) • Polycyclic aromatic hydrocarbons (PAHs)	Likely to occur within footprint of the sheds. The proposed development works would include ground disturbance and potential exposure of construction workers and future site end users to contaminants. This would complete a source-pathway-receptor link.	Activity 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.
Use of fill on unknown quality beneath the former abattoir.	• Heavy metals • PAHs • Asbestos	Likely to occur within footprint of the former abattoir. The proposed development works would include ground disturbance and potential exposure of construction workers and future site end users to contaminants. This would complete a source-pathway-receptor link.	

4.7 Preliminary Site Investigation Conclusions

As up to three HAIL activities have potentially occurred on-site, a DSI is required to clarify whether contamination is present on-site, its types and levels if present, and to identify potential risks from soil contamination to construction workers and site end users. The DSI will also clarify consenting activity status under the NES-CS of any ground disturbance associated with future site development.

5.0 Detailed Site Investigation

The intrusive site investigation was undertaken on 28 to 29 June 2018 and 17 January 2019, following the PSI. A total of 13 hand auger boreholes in the field, three hand-dug test pits underneath the sheds, and nine hand auger boreholes within the footprint of the former abattoir were advanced to visually assess the encountered material and to collect samples for analysis.

The sampling locations are shown on RILEY Dwg:170672-10 (Appendix F).

5.1 Soil Sampling Procedures

Soil sampling was undertaken in general accordance with the requirements of the NES-CS and the MfE CLMG #5.

[6] *Ministry for the Environment: Hazardous Activities and Industries List, October 2011.*

Soil samples for chemical testing were collected according to the following procedure:

- Discrete soil samples were collected from varying depths from each of the boreholes.
- The soil in each borehole was logged in accordance with the New Zealand Geotechnical Society Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes.
- Freshly gloved hands were used to collect the samples, which were placed immediately into the appropriate laboratory supplied sample containers.
- Sampling equipment was wiped down and cleaned with freshwater and Decon-90 (sulphate free detergent) between each sampling location.
- Samples were couriered in chilled containers to IANZ-certified Analytica Laboratories under chain of custody documentation.

5.2 Observations

13 hand auger boreholes (HA1 to HA5; HA7 to HA14) were drilled to a maximum depth of 1m bgl between 28 and 29 June 2016. The following observations were made:

- Topsoil was encountered to a depth of 0.2m to 0.35m bgl at all test locations.
- Alluvial sediments from the Tauranga Group were encountered across all test locations from 0.2m to 1.0m bgl (target depth). These deposits generally consisted of non to moderately plastic silts with varying concentrations of clays and non-plastic silty sands with varying concentrations of clay. Organic material was not encountered in any of the boreholes.
- Groundwater was encountered at 0.9m bgl within HA1, but not encountered in the other boreholes.
- There were no visual or olfactory signs of contamination detected at any of the test locations.

Eight surface samples and one hand auger sample were collected on 17 January 2019:

- Surficial soils within the footprint of the former abattoir comprise sandy silt with fragments of concrete and metal. No odours or staining were noted (Photograph 1).
- The remainder of the site was planted with maize (Photograph 2).
- Sheds on the south-eastern corner of the site that were historically used to rear calf but were empty at the time of inspection (Photograph 3). The sheds are of a timber construction with a corrugated iron roof. Ground surface within the footprint of the sheds comprised of a mixture or sand and hay (Photograph 4).
- There were no visual or olfactory signs of contamination detected at any of the test locations.

6.0 Laboratory Testing and Acceptance Criteria

A total of 29 soil samples were collected and couriered to IANZ-accredited Analytica Laboratories for testing. The samples were analysed as follows:

Table 4: Analytical Regime

	Borehole	Sample IDs	Sample Depth (m)	Analyses
HAIL Activity A10	HA1	HA1_0m	0	Metals, OCPs and acid herbicides
		HA1_0.25m	0.25	Metals and OCPs
	HA2	HA2_0m	0	Metals and OCPs
		HA2_0.25m	0.25	Metals and OCPs
	HA3	HA3_0m	0	Metals, OCPs and acid herbicides
		HA3_0.3m	0.3	Metals and OCPs
	HA4	HA4_0m	0	Metals and OCPs
		HA4_0.25m	0.25	Metals and OCPs
	HA5	HA4_0m	0	Metals, OCPs and acid herbicides
		HA4_0.3m	0.3	Metals and OCPs
	HA7	HA7_0m	0	Metals, OCPs and acid herbicides
		HA7_0.25m	0.25	Metals and OCPs
	HA8	HA8_0m	0	Metals and OCPs
		HA8_0.25m	0.25	Metals and OCPs
	HA9	HA9_0m	0	Metals, OCPs and acid herbicides
		HA9_0.25m	0.25	Metals and OCPs
	HA10	HA10_0m	0	Metals and OCPs
		HA10_0.3m	0.3	Metals and OCPs
	HA11	HA11_0m	0	Metals and OCPs
		HA11_0.25m	0.25	Metals and OCPs
	HA12	HA9_0m	0	Metals, OCPs and acid herbicides
		HA9_0.2m	0.2	Metals and OCPs
	HA13	HA3_0m	0	Metals and OCPs
		HA3_0.3m	0.3	Metals and OCPs
	HA14	HA14_0m	0	Metals and OCPs
		HA14_0.2m	0.2	Metals and OCPs
HAIL Activity I Former Sheds	HS1	HS1	0	Metals, TPH and PAHs
	HS2	HS2	0	Metals, TPH and PAHs
	HS3	HS3	0	Metals, TPH and PAHs
HAIL Activity I Former Abattoir	AB1	AB1	0	Metals, TPH and PAHs
	AB2	AB2	0	Metals, PAHs and Asbestos
	AB4	AB4	0	Metals, PAHs and Asbestos
	AB5 0.5m	AB5 0.5m	0.5	Metals, PAHs and Asbestos
	AB8	AB8	0	Metals, PAHs and Asbestos
	AB10	AB10	0	Metals, PAHs and Asbestos
	AB12	AB12	0	Metals, PAHs and Asbestos
	ABR1	ABR1	0	Metals, PAHs and Asbestos
	ABR2	ABR2	0	Metals, PAHs and Asbestos

The results have been evaluated against the following criteria:

- Environment Canterbury's (ECan) trace elements level 2, derived from "Background concentrations of selected trace elements in Canterbury soils", prepared for ECan by Tonkin and Taylor Ltd (July 2002).
- NES-CS soil contaminant standards for outdoor worker (unpaved) and residential (10% produce) land uses.

The ECan trace elements level 2 were selected to represent on-site trace element background concentrations for the following reasons:

- No published trace element background concentrations for the Palmerston North region are available.
- The Canterbury region has historically been subject to market gardening and is, therefore, similar to the subject site's potential land use history and trace element background concentrations.
- The two areas share similar geomorphologies, i.e. alluvial deposits.

6.1 Data Quality

A quality assurance and quality control (QA/QC) programme was implemented as part of field procedures to confirm that the soil analytical data was fit for purpose, including:

- Transportation of samples with accompanying chain of custody documentation.
- Laboratory testing by an IANZ-accredited laboratory.
- Compliance with sample holding times.

Laboratory QA/QC reports are available on request.

7.0 Results

A summary of the laboratory test results is provided in Appendix C, with full laboratory transcripts included within Appendix D.

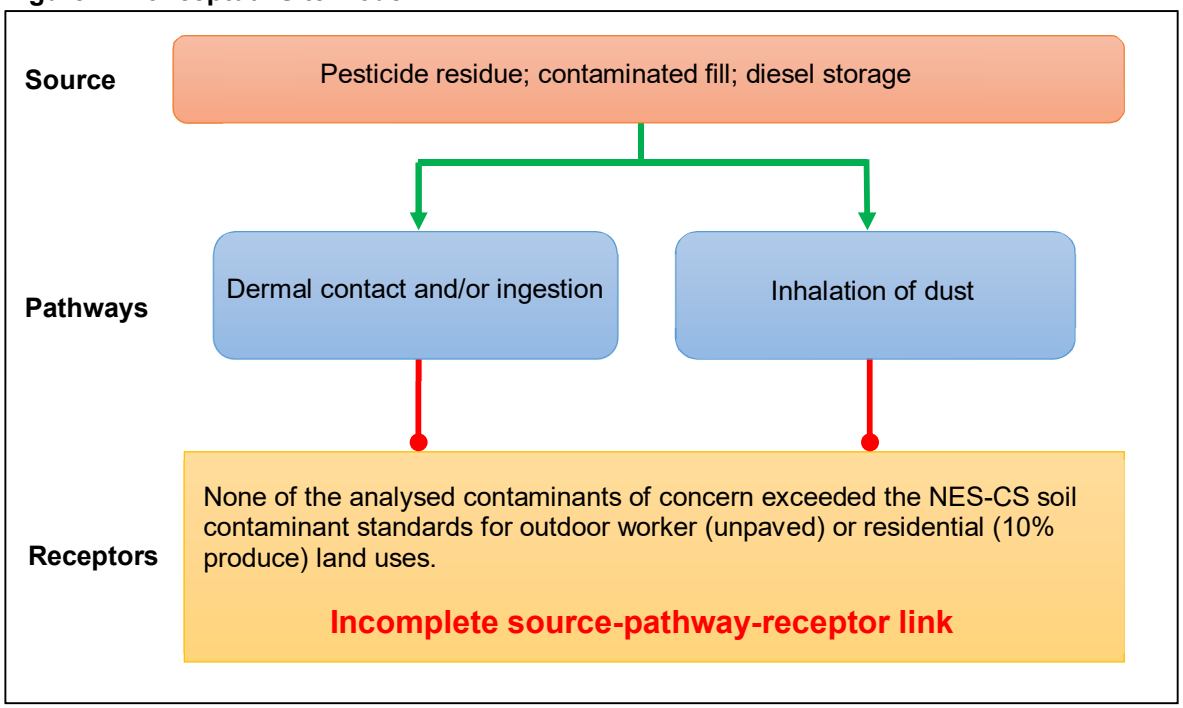
- Heavy metals:
    - Cadmium in seven out of the 13 surface samples collected from the field, exceeded the adopted background criterion.
    - Arsenic, cadmium chromium, copper, and zinc in the samples collected from the shed footprint exceeded the adopted background criteria.
    - Cadmium, chromium, copper, lead, and zinc in the samples collected from the footprint of the former abattoir exceeded the adopted background criteria.
    - None of the analysed metals exceeded the NES-CS soil contaminant standards for outdoor worker (unpaved) and residential (10% produce) land uses.
- Organochlorine pesticides:
    - None of the samples contained detectable concentrations of OCPs.
- Acid herbicides:
    - None of the samples contained detectable concentrations of acid herbicides.

- Polycyclic aromatic hydrocarbons (PAHs):
    - All of the samples analysed for PAHs contained detectable levels (0.03 to 0.67mg/kg), however, none exceeded the NES-CS soil contaminant standards for outdoor worker (unpaved) and residential (10% produce) land uses.
- Asbestos:
    - None of the analysed samples contained detectable levels of asbestos.
- Total petroleum hydrocarbons (TPH):
    - All the samples analysed for TPH contained detectable levels of light and heavy TPH fractions. However, none of the TPH values exceed relevant health-based assessment criteria within the MfE Petroleum Hydrocarbon Guidelines[7].

8.0 Conceptual Site Model

A post-investigation conceptual site model (CSM) has been developed to summarise the sources of contamination at the site, the human receptors that may be exposed to those contaminants, and the potential pathways for exposure.

Figure 1: Conceptual Site Model



9.0 Regulatory Implications

The rules relating to the control of contaminated sites and potentially contaminated sites, specific to the protection of human health, are specified in the NES-CS.

[7] *Ministry for the Environment: Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, revised 2011.*

9.1 NES-CS

The NES-CS came into effect on 1 January 2012. The NES-CS generally considers issues relating to land use and the protection of human health. The need, or otherwise, for contamination related resource consents for the proposed development has been evaluated against this regulatory requirement.

The NES-CS applies to specific activities on land where a HAIL category has, or is more likely than not to have, occurred. Activities covered under the NES-CS include soil disturbance, soil sampling, fuel systems removal, subdivision, and land use change.

9.1.1 Applicability

The following table, as provided in the NES-CS Users' Guide (April 2012), confirms the NES-CS applies to the site.

Table 5: Preliminary Site Investigation Checklist

NES-CS Requirement	Applicable to site?
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?	Yes
Is it more likely than not that an activity described on HAIL is being or has been undertaken on the piece of land to which this application applies?	Yes
If 'Yes' to any of the above, then the NES-CS may apply. **The five activities to which the NES-CS applies to are:**	
Is the activity you propose to undertake removing or replacing a fuel storage system or parts of it?	No
Is the activity you propose to undertake sampling soil?	No
Is the activity you propose to undertake disturbing soil?	Yes
Is the activity you propose to undertake subdividing land?	Yes
Is the activity you propose to undertake changing the use of the land?	Yes
Conclusion: The NES-CS applies.	

9.1.2 NES-CS Activity Status

An assessment against the relevant permitted activity rules of the NES-CS is provided in Table 6, for the activity of soil disturbance.

Table 6: NES-CS Permitted Activity Assessment for Soil Disturbance

NES-CS – Soil disturbance permitted activity conditions [Regulation 8(3)]	Assessment
a. Implementation of controls to minimise exposure of humans to mobilised contaminants.	CAN COMPLY Compliance based on the development and implementation of a suitable Site Management Plan (SMP).
b. The soil must be reinstated to an erosion free state within one month of completing the land disturbance.	INDETERMINATE No preliminary earthworks or design plans have been made available; therefore, the likelihood of compliance with this condition cannot be assessed at this time.
c. The volume of the disturbance of the piece of land must be no more than $25m^3$ per $500m^2$.	INDETERMINATE No preliminary earthworks or design plans have been made available; therefore, the likelihood of compliance with this condition cannot be assessed at this time.
d. Soil must not be taken away unless it is for laboratory testing or, for all other purposes combined, a maximum of $5m^3$ per $500m^2$ of soil may be taken away per year.	INDETERMINATE No preliminary earthworks or design plans have been made available; therefore, the likelihood of compliance with this condition cannot be assessed at this time.
e. Soil taken away must be disposed of at an appropriately licensed facility.	CAN COMPLY If required, soil will be removed from site and disposed of at an approved facility.
f. The duration of land disturbance must be no longer than two months.	INDETERMINATE No preliminary earthworks or design plans have been made available; therefore, the likelihood of compliance with this condition cannot be assessed at this time.
g. The integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.	CAN COMPLY (not applicable) There is no current indication that such a structure is required or intended to be constructed.

As indicated in Table 7, the activity status of the proposed soil disturbance for any future development of the site cannot be determined at this time, as no preliminary design or earthworks plans related to intended development of the site have been provided. Should the proposed soil disturbance and/or soil removal volumes exceed the permitted activity threshold volumes, a controlled activity consent under the NES-CS will be required.

10.0 Conclusions and Implications

The findings of the PSI and intrusive sampling investigation, as described in the previous sections, indicate:

- Surficial fill/topsoil was identified across the site. Anthropogenic materials (e.g. brick fragments, metals, and timber) were identified within the footprint of the former abattoir.
- No asbestos was detected in any of the nine soil samples taken from the abattoir footprint.

- Seven out of the 26 samples collected from the field contained cadmium at concentrations exceeding the adopted background level. All seven samples were collected from surficial soils. None of the cadmium concentrations detected exceeded the relevant heath-based NES-CS soil contaminant standards.
- All three surface samples from the shed area contained various heavy metals at concentrations exceeding the adopted background levels. Light and heavy TPH fractions were also identified in all three samples. None of the detected contaminants of concern exceeded the relevant health-based NES-CS soil contaminant standards.
- Eight out of the nine samples, collected from the footprint of the former abattoir, contained various heavy metals (primarily zinc, lead, chromium, mercury, and copper) at concentrations exceeding the adopted background levels, and all nine samples contained detectable PAHs. None of the heavy metals, nor PAH detects, exceeded the relevant health-based NES-CS soil contaminant standards.

10.1 Consenting Implications

Due to the identification of heavy metals above adopted background levels and the presence of PAHs and TPH, it is likely that future development of the site for residential purpose will require a controlled activity land use consent under the NES-CS, from PNCC. A SMP pre-works and Site Validation Report (SVR) post-works is also likely to be required under this consent.

11.0 Limitation

This report has been prepared solely for the benefit of Flygers Line Investment Group Limited as our client with respect to the brief given to us. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Riley Consultants Ltd has performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for environmental site assessment. No guarantees are either expressed or implied.

The recommendations and opinions expressed are based on data from limited test positions. The nature and continuity of subsoil conditions away from the positions are inferred, and it must be appreciated that actual conditions could vary considerably from the assumed model.

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal or planning opinions. Where opinions or judgements are to be relied on they should be independently verified with appropriate advice. There is no investigation that is thorough enough to preclude the presence of materials at the site which presently, or in the future, may be considered hazardous. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable may, in the future, become subject to different regulatory standards, which cause them to become unacceptable and require further remediation for this site to be suitable for the existing or proposed land use activities.

APPENDIX A

Historic Aerial Photographs


1942 Aerial Image


1949 Aerial Image


1963 Aerial Image


1967 Aerial Image


1979 Aerial Image
FLYGERS


1995 Aerial Image

2007 Aerial Image

N

400 m

2017 Aerial Image

Google Earth

Image © 2018 DigitalGlobe

500 m

N

APPENDIX B

Site Contamination Enquiry Report

Ali Anwar

Subject: Cnr Rangitikei & Flygers Line pollution summary

From: Samuel Fuchs <Samuel.Fuchs@horizons.govt.nz>
Sent: Friday, 20 July 2018 10:52 AM
To: Ali Anwar <aanwar@riley.co.nz>
Subject: RE: Cnr Rangitikei & Flygers Line pollution summary

Hi Ali
Please find a list below of incidents in relation to this property or in close proximity to the property boundary (100 metre buffer).

Incident No: 1969 Date of incident: 09/07/1998
Notes: Complaint about dead cow in neighbours paddock. Cow been dead for about 1 week and starting to smell.
Resolved: Yes

Incident No: 3647 Date of incident: 01/03/1999
Notes: Piggery smell on Benmore Avenue
Resolved: Yes

Incident No: 10674 Date of incident: 19/05/2003
Notes: Neighbour dumping rubbish over back fence onto Mangaone Stream stopbank.
Resolved: Yes

Incident No: 13015 Date of incident: 11/04/2005
Notes: Discoloured water as a result of cattle grazing in Whiskey Creek
Resolved: Yes

Incident No: 13080 Date of incident: 06/05/2005
Notes: Abandoned car on Flygers Line - bounded by Rangitikei Line and Gillespies Line.
Resolved: Yes

Incident No: 15356 Date of incident: 15/08/2007
Notes: The owner of property on Rangitikei line burning 2 truck tyres and a small amount of green waste - once asked he put fire out immediately.
Resolved: Yes

Incident No: 16998 Date of incident: 28/09/2009
Notes: Dead lamb in waterway next to walking track, 100m downstream of bride over Mangoane stream on Rangitikei Line
Resolved: Yes

Incident No: 18869 Date of incident: 07/01/2013
Notes: Rubbish such as washing machine, car tyres etc in road side drain on Flygers Line in between Rangitikei Line and Gillespies Line.
Resolved: Yes

Incident No: 20021 Date of incident: 23/04/2014
Notes: Dead deer carcass in drain on Flygers Line
Resolved: Yes

Incident No: 20132 Date of incident: 25/06/2014
Notes: 4-7 tvs, plus other kinds of whiteware, on flygers line, 60 metres down from start, on RHS, there are some deep drains, somewhere just after where the white rails/road barriers are.
Resolved: Yes

Kind regards,

Samuel Fuchs | Consents Monitoring Officer
Horizons Regional Council | 11-15 Victoria Avenue | Palmerston North 4410
0508 800 800 | DD: 06 952 2851 | M: 021 227 7920

APPENDIX C

Site Photographs

Appendix C: Site Photographs

Photo 1: Fragments of concrete and metal within footprint of former abattoir

Photo 2: Remainder of field planted with maize

Photo 3: Sheds were empty at time of the investigation

Photo 4: Shed surface comprised of sand and hay

APPENDIX D

Results Tables

		Criteria			Sample IDs									
		Background Concentration [1]	NES Residential (10% produce)	NES Outdoor Worker	HA1_0m	HA1_0.25m	HA2_0m	HA2_0.25m	HA3_0m	HA3_0.3m	HA4_0m	HA4_0.25m	HA5_0m	HA5_0.3m
Metals	Arsenic	12.58	20 [2]	70 [4]	3.44	3.9	3.98	5.82	5.6	5.84	4.18	4.61	5.57	4.69
	Cadmium	0.19	3 [2]	1,300 [4]	0.17	0.061	0.19	0.092	0.16	0.077	**0.55**	0.074	0.16	0.079
	Chromium	22.7	460 [2]	6,300 [4]	18.7	18.4	17.1	19.8	18.3	21.1	18.5	19.2	20.4	21.9
	Copper	20.3	10,000 [2]	10,000 [4]	10	5.91	10.4	7.67	10.1	7.52	15.5	8.29	10.4	8.6
	Lead	40.96	210 [2]	3,300 [4]	13.8	15.5	15.1	17.8	15.7	17.1	19.2	17	18.6	17.6
	Mercury	0.11	310 [2]	4,200 [4]	0.055	0.06	0.057	0.068	0.054	0.064	0.068	0.073	0.07	0.074
	Nickel	20.7	400 [3]	6,000 [3]	12.1	12	12	13.7	11.9	13.1	13.3	12.6	13.8	13.9
	Zinc	93.94	7,400 [3]	400,000 [3]	84.5	66.8	73.8	73.3	73.9	69.5	91.3	75.6	81.7	70.3
Organochlorine Pesticides [6]	Total DDT	-	70 [2]	1,000 [4]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Dieldrin	-	2.6 [2]	160 [4]	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acid Herbicides	2,4,5-Trichlorophenoxyacetic acid	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	2,4,5-Trichlorophenoxypropionic acid	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	2,4-Dichlorophenoxyacetic acid	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	(2,4-Dichlorophenoxy)butanoic acid	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Acifluorfen	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Bentazone	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Bromoxynil	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Clopyralid	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Dicamba	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Dichlorprop	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Fluazifop	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Fluroxypyr	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Haloxyfop	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	MCPA	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	MCPB	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Mecoprop	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Oryzalin	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Pentachlorophenol	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Picloram	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Quizalofop	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	2,3,4,6-Tetrachlorophenol	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
	Triclopyr	-	-	-	<0.05	-	-	-	<0.05	-	-	-	<0.05	-
Total Petroleum Hydrocarbons	C7-C9	-	120 [5]	120 [5]	-	-	-	-	-	-	-	-	-	-
	C10-C14	-	740 [5]	1,500 [5]	-	-	-	-	-	-	-	-	-	-
	C15-C36	-	-	-	-	-	-	-	-	-	-	-	-	-
	C7-C36 (Total)	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons	Benzo(a)pyrene TEQ	-	10 [2]	35 [4]	-	-	-	-	-	-	-	-	-	-
Asbestos	Qualitative Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-

	HA7_0m	HA7_0.25m	HA8_0m	HA8_0.25m	HA9_0m	HA9_0.25m	HA10_0m	HA10_0.3m	HA11_0m	HA11_0.25m	HA12_0m	HA12_0.2m	HA13_0m	HA13_0.3m	HA14_0m	HA14_0.2m
Arsenic	3.07	3.65	2.46	2.43	6.44	2.84	3.03	2.46	2.5	3.64	3.23	3.03	3.13	3.78	2.72	3.45
Cadmium	**0.23**	0.071	**0.35**	0.14	0.17	0.073	**0.22**	0.052	**0.27**	0.15	0.15	0.11	**0.27**	0.046	**0.21**	0.082
Chromium	18.4	19.9	18.8	20.8	14.6	13.7	18.6	20	19	22.2	12.3	12.5	19.8	22.4	17.7	21.3
Copper	17.4	7.81	10.9	7.19	7.76	5.3	11.6	7.05	11.6	7.63	6.03	4.28	13.5	8.06	11.8	6.9
Lead	18.1	16	15.2	15.8	10.6	9.67	17.8	14.2	19	20.1	9.49	9.4	16.5	16.8	15.7	16.4
Mercury	0.06	0.067	0.048	0.062	0.04	0.045	0.056	0.069	0.064	0.077	0.032	0.042	0.065	0.071	0.05	0.065
Nickel	11.8	12.7	11.2	13.1	8.31	8.86	11.5	11.3	11.2	12.8	6.52	6.98	13.4	12.7	11.1	11.7
Zinc	82.6	70.9	79.7	77.5	53.7	45.8	76.6	61.4	77.3	72.4	42.7	41.2	87.3	74	83	75.6
Total DDT	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2,4,5-Trichlorophenoxyacetic acid	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
2,4,5-Trichlorophenoxypropionic acid	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
2,4-Dichlorophenoxyacetic acid	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
(2,4-Dichlorophenoxy)butanoic acid	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Acifluorfen	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Bentazone	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Bromoxynil	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Clopyralid	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Dicamba	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Dichlorprop	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Fluazifop	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Fluroxypyr	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Haloxyfop	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
MCPA	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
MCPB	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Mecoprop	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Oryzalin	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Pentachlorophenol	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Picloram	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Quizalofop	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
2,3,4,6-Tetrachlorophenol	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
Triclopyr	<0.05	-	-	-	-	<0.05	-	-	-	-	-	<0.05	-	-	-	-
C7-C9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C10-C14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C15-C36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C7-C36 (Total)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene TEQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Qualitative Asbestos	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	HS1	HS2	HS3	AB1	AB2	AB4	AB5 0.5m	AB8	AB10	AB12	ABR1	ABR2
Arsenic	**15.5**	7.81	5.5	8.06	6.5	4.13	5.42	3.97	5.11	7.15	2.54	4.68
Cadmium	**0.31**	**0.25**	**0.37**	**0.59**	**0.61**	**0.53**	**0.33**	0.14	0.13	**0.22**	0.13	**0.32**
Chromium	**40.1**	20.2	14.8	**23.6**	**25.5**	15.7	18.3	14	17.3	19.4	12.3	16.8
Copper	**53**	**24.8**	**20.7**	**50.1**	**40.9**	**25.9**	14.1	13.3	10.6	13.4	12.2	**22.3**
Lead	20	20.5	20.6	**182**	**140**	**58.7**	24.3	26.4	27.1	**41.5**	**68.8**	**122**
Mercury	0.038	0.057	0.054	-	-	-	-	-	-	-	-	-
Nickel	6.49	6.96	6.46	14.1	13.9	12.4	16.3	12.3	15	15.6	7.96	11.4
Zinc	**522**	**165**	**174**	**528**	**516**	**252**	**576**	**106**	92.4	**140**	**109**	**217**
Total DDT	-	-	-	-	-	-	-	-	-	-	-	-
Dieldrin	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenoxyacetic acid	-	-	-	-	-	-	-	-	-	-	-	-
2,4,5-Trichlorophenoxypropionic acid	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenoxyacetic acid	-	-	-	-	-	-	-	-	-	-	-	-
(2,4-Dichlorophenoxy)butanoic acid	-	-	-	-	-	-	-	-	-	-	-	-
Acifluorfen	-	-	-	-	-	-	-	-	-	-	-	-
Bentazone	-	-	-	-	-	-	-	-	-	-	-	-
Bromoxynil	-	-	-	-	-	-	-	-	-	-	-	-
Clopyralid	-	-	-	-	-	-	-	-	-	-	-	-
Dicamba	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorprop	-	-	-	-	-	-	-	-	-	-	-	-
Fluazifop	-	-	-	-	-	-	-	-	-	-	-	-
Fluroxypyr	-	-	-	-	-	-	-	-	-	-	-	-
Haloxyfop	-	-	-	-	-	-	-	-	-	-	-	-
MCPA	-	-	-	-	-	-	-	-	-	-	-	-
MCPB	-	-	-	-	-	-	-	-	-	-	-	-
Mecoprop	-	-	-	-	-	-	-	-	-	-	-	-
Oryzalin	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	-	-	-	-	-	-	-	-	-	-	-	-
Picloram	-	-	-	-	-	-	-	-	-	-	-	-
Quizalofop	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	-	-	-	-	-	-	-	-	-	-	-	-
Triclopyr	-	-	-	-	-	-	-	-	-	-	-	-
C7-C9	<10	<10	<10	-	-	-	-	-	-	-	-	-
C10-C14	**16***	**24***	**223***	-	-	-	-	-	-	-	-	-
C15-C36	**2334***	**1940***	**20469***	-	-	-	-	-	-	-	-	-
C7-C36 (Total)	**2351***	**1965***	**20692***	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene TEQ	0.27	0.64	0.45	0.07	0.07	0.29	0.03	0.03	0.03	0.03	0.67	0.51
Qualitative Asbestos	-	-	-	ND	ND	ND	ND	ND	ND	-	-	-

Notes

*Published background concentrations for TPH are unavailable therefore any detectable concentrations are considered a background exceedance.

1 Environment Canterbury's trace elements level 2 derived from "Background concentrations of selected trace elements in Canterbury soils" prepared by Tonkin and Taylor Ltd (July 2002).

2 MfE, 2011. NES Users' guide soil contaminant standards for residential (10% produce) landuse.

3 National Environment Protection (Assessment of Site Contamination) Measure 1999. Schedule B1: Guideline on Investigation Levels for Soil and Groundwater.

4 MfE, 2011. NES Users' guide soil contaminant standards for commercial/industrial outdoor worker (unpaved) landuse.

5 MfE, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011).

6 Entire suite of OCPs were analysed - only reporting compounds with human health based guidelines.

APPENDIX E

Laboratory Transcripts

Analytica Laboratories Limited
Ruakura Research Centre
10 Bisley Road
Hamilton 3214, New Zealand
Ph +64 (07) 974 4740
sales@analytica.co.nz
www.analytica.co.nz

Certificate of Analysis

Riley Consultants Ltd
Level 1, 4 Fred Thomas Drive
Auckland
Attention: Ali Anwar
Phone: 0274663240
Email: aanwar@riley.co.nz

Lab Reference: 18-23220
Submitted by: Gareth Jackson
Date Received: 4/07/2018
Date Completed: 11/07/2018
Order Number:
Reference: 170672

Sampling Site: Rangitikei Line

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.

Heavy Metals in Soil

			Client Sample ID	HA1_0m 0	HA1_0.25m 0.25	HA2_0m 0	HA2_0.25m 0.25	HA3_0m 0
			Date Sampled	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-1	18-23220-2	18-23220-3	18-23220-4	18-23220-5
Arsenic	mg/kg dry wt	*0.125*		3.44	3.90	3.98	5.82	5.60
Cadmium	mg/kg dry wt	*0.005*		0.17	0.061	0.19	0.092	0.16
Chromium	mg/kg dry wt	*0.125*		18.7	18.4	17.1	19.8	18.3
Copper	mg/kg dry wt	*0.075*		10.0	5.91	10.4	7.67	10.1
Lead	mg/kg dry wt	*0.05*		13.8	15.5	15.1	17.8	15.7
Mercury	mg/kg dry wt	*0.025*		0.055	0.060	0.057	0.068	0.054
Nickel	mg/kg dry wt	*0.05*		12.1	12.0	12.0	13.7	11.9
Zinc	mg/kg dry wt	*0.05*		84.5	66.8	73.8	73.3	73.9

Heavy Metals in Soil

			Client Sample ID	HA3_0.3m 0.3	HA4_0m 0	HA4_0.25m 0.25	HA5_0m 0	HA5_0.3m 0.3
			Date Sampled	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-6	18-23220-7	18-23220-8	18-23220-9	18-23220-10
Arsenic	mg/kg dry wt	*0.125*		5.84	4.18	4.61	5.57	4.69
Cadmium	mg/kg dry wt	*0.005*		0.077	0.55	0.074	0.16	0.079
Chromium	mg/kg dry wt	*0.125*		21.1	18.5	19.2	20.4	21.9
Copper	mg/kg dry wt	*0.075*		7.52	15.5	8.29	10.4	8.60
Lead	mg/kg dry wt	*0.05*		17.1	19.2	17.0	18.6	17.6
Mercury	mg/kg dry wt	*0.025*		0.064	0.068	0.073	0.070	0.074
Nickel	mg/kg dry wt	*0.05*		13.1	13.3	12.6	13.8	13.9
Zinc	mg/kg dry wt	*0.05*		69.5	91.3	75.6	81.7	70.3

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Heavy Metals in Soil

		Client Sample ID	HA7_0m 0	HA7_0.25m 0.25	HA8_0m 0	HA8_0.25m 0.25	HA9_0m 0
		Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-11	18-23220-12	18-23220-13	18-23220-14	18-23220-15
Arsenic	mg/kg dry wt	*0.125*	3.07	3.65	2.46	2.43	6.44
Cadmium	mg/kg dry wt	*0.005*	0.23	0.071	0.35	0.14	0.17
Chromium	mg/kg dry wt	*0.125*	18.4	19.9	18.8	20.8	14.6
Copper	mg/kg dry wt	*0.075*	17.4	7.81	10.9	7.19	7.76
Lead	mg/kg dry wt	*0.05*	18.1	16.0	15.2	15.8	10.6
Mercury	mg/kg dry wt	*0.025*	0.060	0.067	0.048	0.062	0.040
Nickel	mg/kg dry wt	*0.05*	11.8	12.7	11.2	13.1	8.31
Zinc	mg/kg dry wt	*0.05*	82.6	70.9	79.7	77.5	53.7

Heavy Metals in Soil

		Client Sample ID	HA9_0.25m 0.25	HA10_0m 0	HA10_0.3m 0.3	HA11_0m 0	HA11_0.25m 0.25
		Date Sampled	26/06/2018	28/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-16	18-23220-17	18-23220-18	18-23220-19	18-23220-20
Arsenic	mg/kg dry wt	*0.125*	2.84	3.03	2.46	2.50	3.64
Cadmium	mg/kg dry wt	*0.005*	0.073	0.22	0.052	0.27	0.15
Chromium	mg/kg dry wt	*0.125*	13.7	18.6	20.0	19.0	22.2
Copper	mg/kg dry wt	*0.075*	5.30	11.6	7.05	11.6	7.63
Lead	mg/kg dry wt	*0.05*	9.67	17.8	14.2	19.0	20.1
Mercury	mg/kg dry wt	*0.025*	0.045	0.056	0.069	0.064	0.077
Nickel	mg/kg dry wt	*0.05*	8.86	11.5	11.3	11.2	12.8
Zinc	mg/kg dry wt	*0.05*	45.8	76.6	61.4	77.3	72.4

Heavy Metals in Soil

		Client Sample ID	HA12_0m 0	HA12_0.2m 0.2	HA13_0m 0	HA13_0.3m 0.3	HA14_0m 0
		Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-21	18-23220-22	18-23220-23	18-23220-24	18-23220-25
Arsenic	mg/kg dry wt	*0.125*	3.23	3.03	3.13	3.78	2.72
Cadmium	mg/kg dry wt	*0.005*	0.15	0.11	0.27	0.046	0.21
Chromium	mg/kg dry wt	*0.125*	12.3	12.5	19.8	22.4	17.7
Copper	mg/kg dry wt	*0.075*	6.03	4.28	13.5	8.06	11.8
Lead	mg/kg dry wt	*0.05*	9.49	9.40	16.5	16.8	15.7
Mercury	mg/kg dry wt	*0.025*	0.032	0.042	0.065	0.071	0.050
Nickel	mg/kg dry wt	*0.05*	6.52	6.98	13.4	12.7	11.1
Zinc	mg/kg dry wt	*0.05*	42.7	41.2	87.3	74.0	83.0

Heavy Metals in Soil

		Client Sample ID	HA14_0.2m 0.2	HS1 0	HS2 0	HS3 0
		Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-26	18-23220-27	18-23220-28	18-23220-29
Arsenic	mg/kg dry wt	*0.125*	3.45	15.5	7.81	5.50
Cadmium	mg/kg dry wt	*0.005*	0.082	0.31	0.25	0.37
Chromium	mg/kg dry wt	*0.125*	21.3	40.1	20.2	14.8
Copper	mg/kg dry wt	*0.075*	6.90	53.0	24.8	20.7
Lead	mg/kg dry wt	*0.05*	16.4	20.0	20.5	20.6
Mercury	mg/kg dry wt	*0.025*	0.065	0.038	0.057	0.054

Heavy Metals in Soil

			Client Sample ID	HA14_0.2m 0.2	HS1 0	HS2 0	HS3 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018
Nickel	mg/kg dry wt	*0.05*		11.7	6.49	6.96	6.46
Zinc	mg/kg dry wt	*0.05*		75.6	522	165	174

Organochlorine Pesticides - Soil

		Client Sample ID	HA1_0m 0	HA1_0.25m 0.25	HA2_0m 0	HA2_0.25m 0.25	HA3_0m 0
		Date Sampled	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-1	18-23220-2	18-23220-3	18-23220-4	18-23220-5
2,4'-DDD	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*	<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulphate	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*	<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*	96.9	95.8	86.8	87.2	81.7

Organochlorine Pesticides - Soil

		Client Sample ID	HA3_0.3m 0.3	HA4_0m 0	HA4_0.25m 0.25	HA5_0m 0	HA5_0.3m 0.3
		Date Sampled	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-6	18-23220-7	18-23220-8	18-23220-9	18-23220-10
2,4'-DDD	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDE	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*	<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*	<0.005	<0.005	<0.005	<0.005	<0.005

Organochlorine Pesticides - Soil

			Client Sample ID	HA3_0.3m 0.3	HA4_0m 0	HA4_0.25m 0.25	HA5_0m 0	HA5_0.3m 0.3
			Date Sampled	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018
Aldrin	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulphate	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*		82.8	92.4	89.9	89.0	88.5

Organochlorine Pesticides - Soil

			Client Sample ID	HA7_0m 0	HA7_0.25m 0.25	HA8_0m 0	HA8_0.25m 0.25	HA9_0m 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-11	18-23220-12	18-23220-13	18-23220-14	18-23220-15
2,4'-DDD	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDE	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*		<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulphate	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01

Organochlorine Pesticides - Soil

			Client Sample ID	HA7_0m 0	HA7_0.25m 0.25	HA8_0m 0	HA8_0.25m 0.25	HA9_0m 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018	29/06/2018
trans-Chlordane	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*		91.2	87.5	87.6	91.2	95.5

Organochlorine Pesticides - Soil

			Client Sample ID	HA9_0.25m 0.25	HA10_0m 0	HA10_0.3m 0.3	HA11_0m 0	HA11_0.25m 0.25
			Date Sampled	26/06/2018	28/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-16	18-23220-17	18-23220-18	18-23220-19	18-23220-20
2,4'-DDD	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDE	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*		<0.02	<0.02	<0.02	<0.02	<0.02
alpha-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulphate	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*		91.8	88.7	91.6	87.5	83.5

Organochlorine Pesticides - Soil

			Client Sample ID	HA12_0m 0	HA12_0.2m 0.2	HA13_0m 0	HA13_0.3m 0.3	HA14_0m 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-21	18-23220-22	18-23220-23	18-23220-24	18-23220-25
2,4'-DDD	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDE	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
2,4'-DDT	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDD	mg/kg dry wt	*0.003*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDE	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
4,4'-DDT	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Total DDT	mg/kg dry wt	*0.02*		<0.02	<0.02	<0.02	<0.02	<0.02

Organochlorine Pesticides - Soil

			Client Sample ID	HA12_0m 0	HA12_0.2m 0.2	HA13_0m 0	HA13_0.3m 0.3	HA14_0m 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018	29/06/2018	29/06/2018
alpha-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Aldrin	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
beta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Chlordane	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
delta-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Dieldrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endosulfan II	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endosulfan sulphate	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Endrin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Endrin ketone	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
gamma-BHC	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*		<0.005	<0.005	<0.005	<0.005	<0.005
Methoxychlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-nonachlor	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
trans-Chlordane	mg/kg dry wt	*0.01*		<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*		<0.020	<0.020	<0.020	<0.020	<0.020
TCMX (Surrogate)	%	*1*		86.4	88.7	85.4	85.3	83.2

Organochlorine Pesticides - Soil

			Client Sample ID	HA14_0.2m 0.2
			Date Sampled	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-26
2,4'-DDD	mg/kg dry wt	*0.005*		<0.005
2,4'-DDE	mg/kg dry wt	*0.005*		<0.005
2,4'-DDT	mg/kg dry wt	*0.005*		<0.005
4,4'-DDD	mg/kg dry wt	*0.003*		<0.005
4,4'-DDE	mg/kg dry wt	*0.005*		<0.005
4,4'-DDT	mg/kg dry wt	*0.005*		<0.005
Total DDT	mg/kg dry wt	*0.02*		<0.02
alpha-BHC	mg/kg dry wt	*0.005*		<0.005
Aldrin	mg/kg dry wt	*0.005*		<0.005
beta-BHC	mg/kg dry wt	*0.005*		<0.005
cis-Chlordane	mg/kg dry wt	*0.005*		<0.005
cis-Nonachlor	mg/kg dry wt	*0.01*		<0.01
delta-BHC	mg/kg dry wt	*0.005*		<0.005
Dieldrin	mg/kg dry wt	*0.05*		<0.05
Endosulfan I	mg/kg dry wt	*0.005*		<0.005
Endosulfan II	mg/kg dry wt	*0.01*		<0.01
Endosulfan sulphate	mg/kg dry wt	*0.005*		<0.005
Endrin	mg/kg dry wt	*0.05*		<0.05
Endrin aldehyde	mg/kg dry wt	*0.01*		<0.01
Endrin ketone	mg/kg dry wt	*0.005*		<0.005
gamma-BHC	mg/kg dry wt	*0.005*		<0.005
Heptachlor	mg/kg dry wt	*0.005*		<0.005
Heptachlor epoxide	mg/kg dry wt	*0.005*		<0.005
Hexachlorobenzene	mg/kg dry wt	*0.005*		<0.005
Methoxychlor	mg/kg dry wt	*0.01*		<0.01

Organochlorine Pesticides - Soil

			Client Sample ID	HA14_0.2m 0.2
			Date Sampled	29/06/2018
trans-nonachlor	mg/kg dry wt	*0.01*		<0.01
trans-Chlordane	mg/kg dry wt	*0.01*		<0.01
Chlordane (sum)	mg/kg dry wt	*0.02*		<0.020
TCMX (Surrogate)	%	*1*		86.9

Acid Herbicides in Soil

			Client Sample ID	HA1_0m 0	HA3_0m 0	HA5_0m 0	HA7_0m 0	HA9_0m 0
			Date Sampled	28/06/2018	28/06/2018	28/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-1	18-23220-5	18-23220-9	18-23220-11	18-23220-15
2,4,5-Trichlorophenoxyacetic acid	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
2,4,5-Trichlorophenoxypropionic acid	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
2,4-Dichlorophenoxyacetic acid	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
(2,4-Dichlorophenoxy)butanoic acid	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Acifluorfen	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Bentazone	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Bromoxynil	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Clopyralid	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Dicamba	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Dichlorprop	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Fluazifop	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Fluroxypyr	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Haloxyfop	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
MCPA	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
MCPB	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Mecoprop	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Oryzalin	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Pentachlorophenol	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Picloram	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Quizalofop	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
2,3,4,6-Tetrachlorophenol	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
Triclopyr	mg/kg dry wt	*0.05*		<0.05	<0.05	<0.05	<0.05	<0.05
2,4,6-Tribromophenol (Surrogate)	%	*1*		103.8	100.7	96.9	95.5	98.8

Acid Herbicides in Soil

			Client Sample ID	HA12_0m 0
			Date Sampled	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-21
2,4,5-Trichlorophenoxyacetic acid	mg/kg dry wt	*0.05*		<0.05
2,4,5-Trichlorophenoxypropionic acid	mg/kg dry wt	*0.05*		<0.05

Acid Herbicides in Soil

			Client Sample ID	HA12_0m 0
			Date Sampled	29/06/2018
2,4-Dichlorophenoxyacetic acid	mg/kg dry wt	*0.05*	<0.05
(2,4-Dichlorophenoxy)butanoic acid	mg/kg dry wt	*0.05*	<0.05
Acifluorfen	mg/kg dry wt	*0.05*	<0.05
Bentazone	mg/kg dry wt	*0.05*	<0.05
Bromoxynil	mg/kg dry wt	*0.05*	<0.05
Clopyralid	mg/kg dry wt	*0.05*	<0.05
Dicamba	mg/kg dry wt	*0.05*	<0.05
Dichlorprop	mg/kg dry wt	*0.05*	<0.05
Fluazifop	mg/kg dry wt	*0.05*	<0.05
Fluroxypyr	mg/kg dry wt	*0.05*	<0.05
Haloxyfop	mg/kg dry wt	*0.05*	<0.05
MCPA	mg/kg dry wt	*0.05*	<0.05
MCPB	mg/kg dry wt	*0.05*	<0.05
Mecoprop	mg/kg dry wt	*0.05*	<0.05
Oryzalin	mg/kg dry wt	*0.05*	<0.05
Pentachlorophenol	mg/kg dry wt	*0.05*	<0.05
Picloram	mg/kg dry wt	*0.05*	<0.05
Quizalofop	mg/kg dry wt	*0.05*	<0.05
2,3,4,6-Tetrachlorophenol	mg/kg dry wt	*0.05*	<0.05
Triclopyr	mg/kg dry wt	*0.05*	<0.05
2,4,6-Tribromophenol (Surrogate)	%	*1*	95.7

Total Petroleum Hydrocarbons - Soil

			Client Sample ID	HS1 0	HS2 0	HS3 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-27	18-23220-28	18-23220-29
C7-C9	mg/kg dry wt	*10*		<10	<10	<10
C10-C14	mg/kg dry wt	*15*		16	24	223
C15-C36	mg/kg dry wt	*25*		2,334	1,940	20,469
C7-C36 (Total)	mg/kg dry wt	*50*		2,351	1,965	20,692

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	HS1 0	HS2 0	HS3 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*		18-23220-27	18-23220-28	18-23220-29
1-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.1	<0.1	<0.1
2-Methylnaphthalene	mg/kg dry wt	*0.01*		<0.1	<0.1	<0.1
Acenaphthene	mg/kg dry wt	*0.01*		<0.1	<0.1	0.17
Acenaphthylene	mg/kg dry wt	*0.01*		<0.1	<0.1	<0.1
Anthracene	mg/kg dry wt	*0.01*		<0.1	0.11	0.44
Benz[a]anthracene	mg/kg dry wt	*0.02*		<0.2	0.38	0.35
Benzo[a]pyrene	mg/kg dry wt	*0.01*		<0.1	0.42	0.24
Benzo[b]&[j]fluoranthene	mg/kg dry wt	*0.02*		<0.2	0.38	0.32
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*		<0.2	<0.2	<0.2

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	HS1 0	HS2 0	HS3 0
			Date Sampled	29/06/2018	29/06/2018	29/06/2018
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*		<0.1	0.11	0.12
Chrysene	mg/kg dry wt	*0.01*		<0.1	0.27	0.31
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*		<0.1	<0.1	<0.1
Fluoranthene	mg/kg dry wt	*0.02*		<0.2	0.73	0.97
Fluorene	mg/kg dry wt	*0.01*		<0.1	<0.1	0.85
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*		0.13	0.30	0.19
Naphthalene	mg/kg dry wt	*0.01*		<0.1	<0.1	<0.1
Phenanthrene	mg/kg dry wt	*0.01*		<0.1	0.25	1.60
Pyrene	mg/kg dry wt	*0.02*		0.36	0.72	7.28
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.01*		0.27	0.64	0.45
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*		0.01	0.54	0.35
Anthracene-d10 (Surrogate)	%	*1*		92.1	94.9	104.6

Moisture Content

		Client Sample ID	HS1 0	HS2 0	HS3 0
		Date Sampled	29/06/2018	29/06/2018	29/06/2018
Analyte	Unit	*Reporting Limit*	18-23220-27	18-23220-28	18-23220-29
Moisture Content	%	*1*	15	8	6

Method Summary

Elements in Soil	Acid digestion followed by ICP-MS analysis. US EPA method 200.8.
OCP in Soil	Samples are extracted with hexane, pre-concetrated then analysed by GC-MSMS. In house method. (Chlordane (sum) is calculated from the main actives in technical Chlordane: Chlordane, Nonachlor and Heptachlor)
Total DDT	Sum of DDT, DDD and DDE (4,4' and 2,4 isomers)
Acid Herbicides in Soil	A portion of dried soil sample is extracted with acidified methanol and diluted with acetic acid followed by LC-MS/MS analysis.
TPH in Soil	Solvent extraction, silica cleanup, followed by GC-FID analysis. (C7-C36)
PAH in Soil	Solvent extraction, silica cleanup, followed by GC-MS analysis. **Benzo[a]pyrene TEQ (LOR)**: The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH. **Benzo[a]pyrene TEQ (Zero)**: The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation. Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to *'Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health'*. Ministry for the Enivronment. 2011.
Moisture	Moisture content is determined gravimetrically by drying at 103 °C.

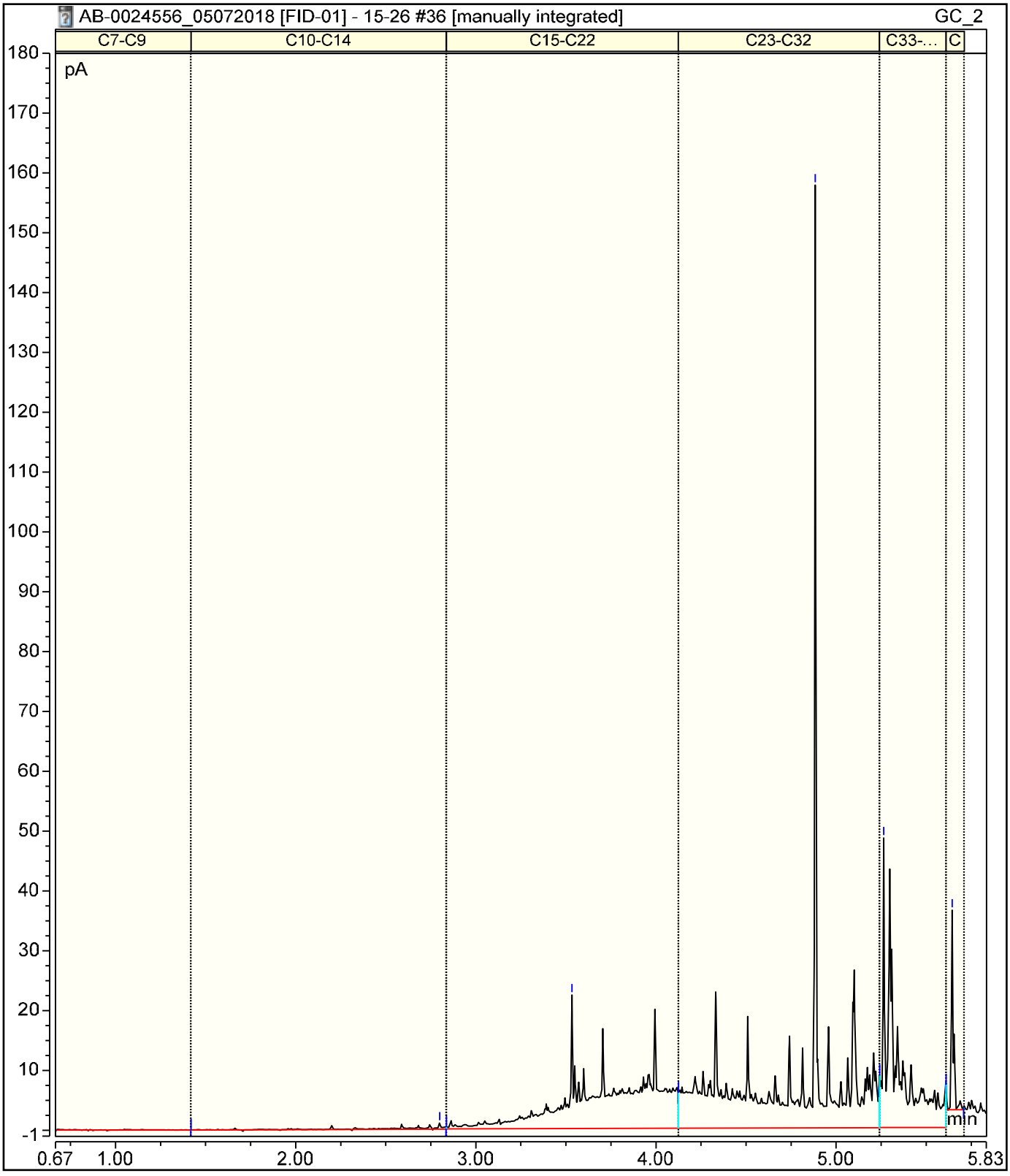
Elizabeth Fitzgerald, B.Sc.
Inorganics Team Leader

Nathan Howse, B.Sc.
Technician

Karam Wadi, B.E. (Hons)
Technologist

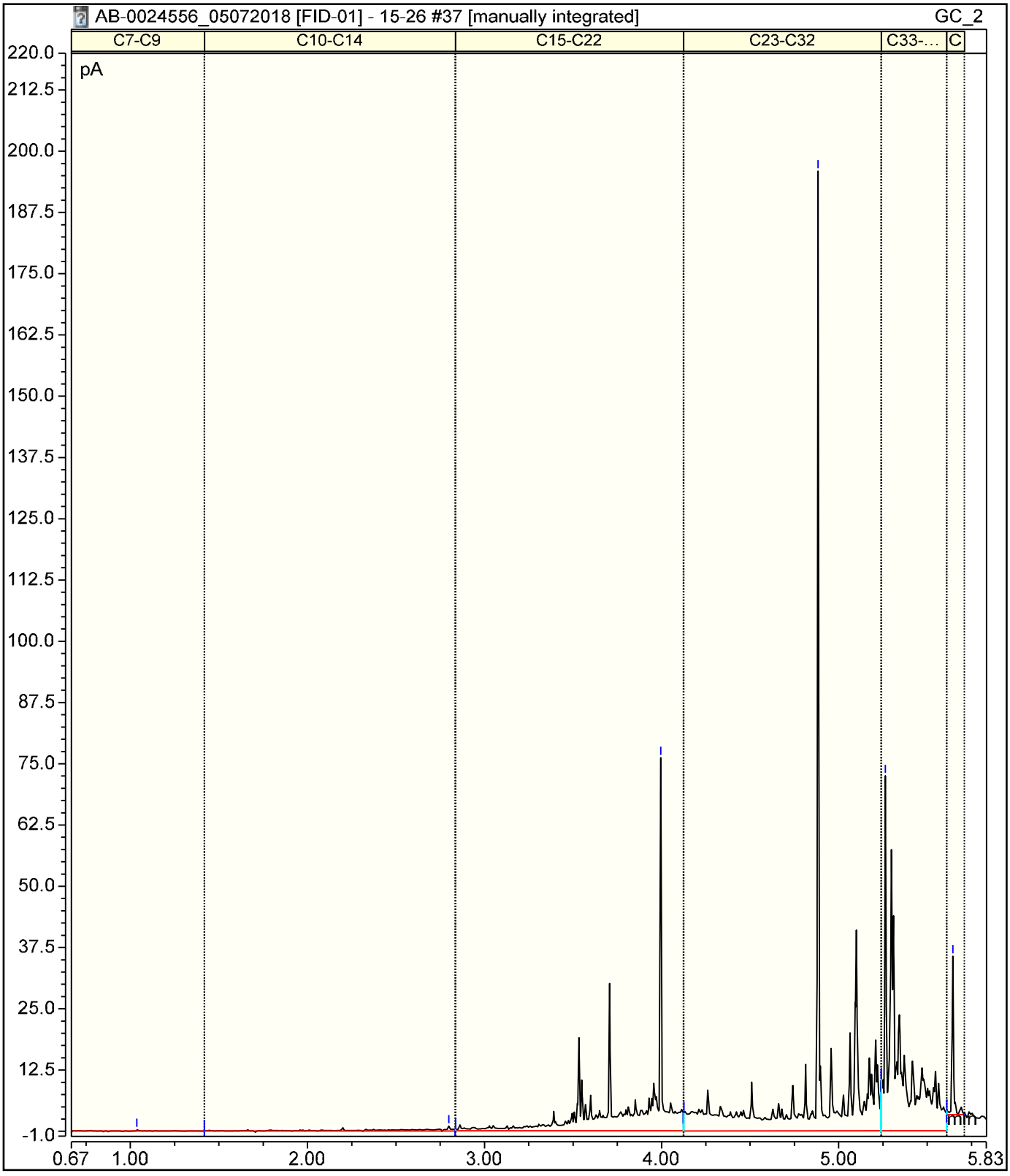
Chromatogram

18-23220-27



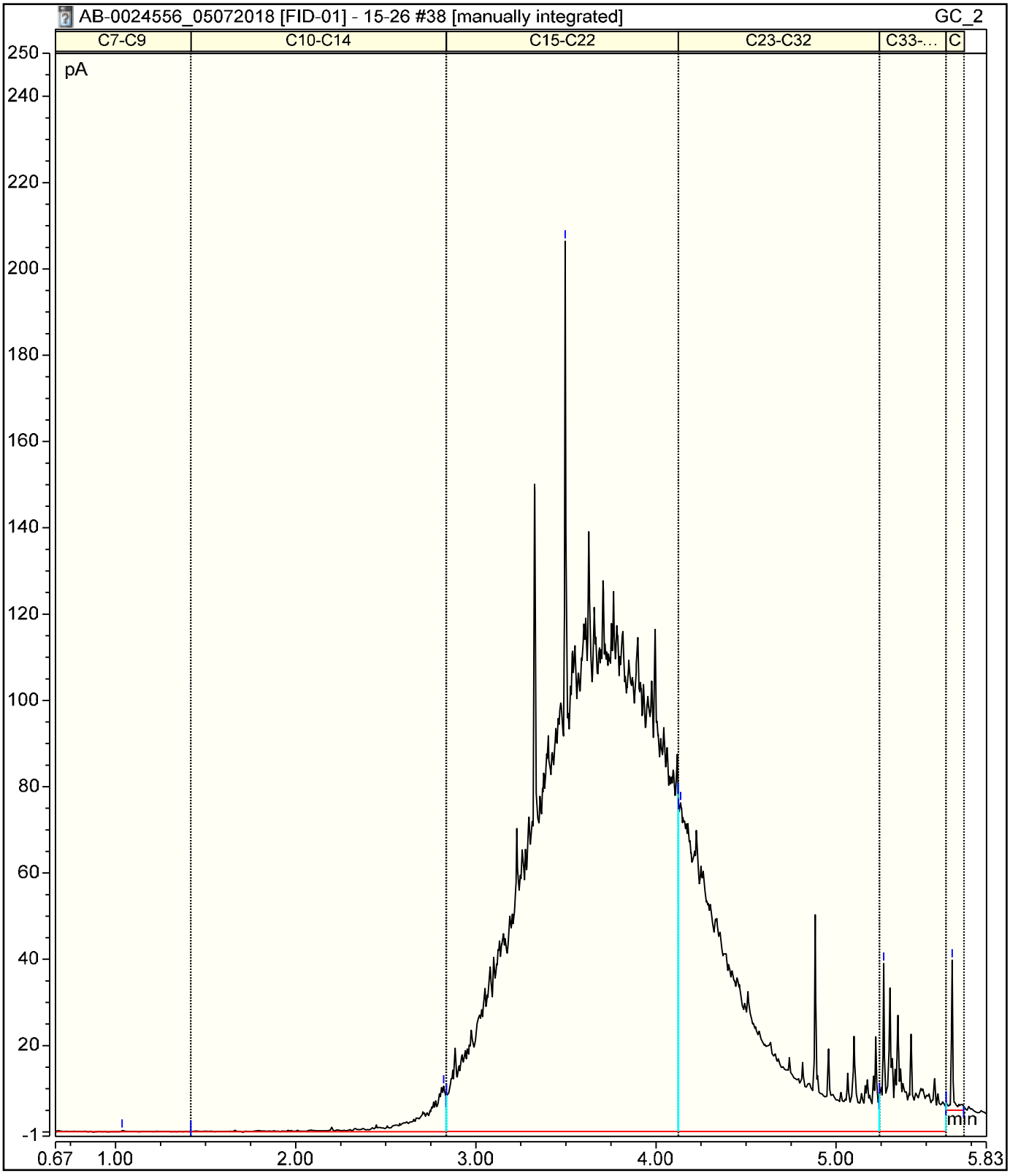
Chromatogram

18-23220-28



Chromatogram

18-23220-29



Analytica Laboratories Limited
Ruakura Research Centre
10 Bisley Road
Hamilton 3214, New Zealand
Ph +64 (07) 974 4740
sales@analytica.co.nz
www.analytica.co.nz

Certificate of Analysis

Riley Consultants Ltd
Level 1, 4 Fred Thomas Drive
Auckland
Attention: Ali Anwar
Phone: 09 489 7872
Email: aanwar@riley.co.nz

Lab Reference: 19-01327
Submitted by: Gareth Jackson
Date Received: 19/01/2019
Date Completed: 25/01/2019
Order Number:
Reference: 170672

Sampling Site: Flygers Line

Report Comments

Samples were collected by yourselves (or your agent) and analysed as received at Analytica Laboratories. Samples were in acceptable condition unless otherwise noted on this report.

Heavy Metals in Soil

			Client Sample ID	AB1 0	AB2 0	AB4 0	AB5 0.5m 0.5	AB8 0
			Date Sampled	17/01/2019	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Analyte	Unit	*Reporting Limit*		19-01327-1	19-01327-2	19-01327-4	19-01327-6	19-01327-8
Arsenic	mg/kg dry wt	*0.125*		8.06	6.50	4.13	5.42	3.97
Cadmium	mg/kg dry wt	*0.005*		0.59	0.61	0.53	0.33	0.14
Chromium	mg/kg dry wt	*0.125*		23.6	25.5	15.7	18.3	14.0
Copper	mg/kg dry wt	*0.075*		50.1	40.9	25.9	14.1	13.3
Lead	mg/kg dry wt	*0.05*		182	140	58.7	24.3	26.4
Nickel	mg/kg dry wt	*0.05*		14.1	13.9	12.4	16.3	12.3
Zinc	mg/kg dry wt	*0.05*		528	516	252	576	106

Heavy Metals in Soil

			Client Sample ID	AB10 0	AB12 0	ABR1 0	ABR2 0
			Date Sampled	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Analyte	Unit	*Reporting Limit*		19-01327-10	19-01327-12	19-01327-13	19-01327-14
Arsenic	mg/kg dry wt	*0.125*		5.11	7.15	2.54	4.68
Cadmium	mg/kg dry wt	*0.005*		0.13	0.22	0.13	0.32
Chromium	mg/kg dry wt	*0.125*		17.3	19.4	12.3	16.8
Copper	mg/kg dry wt	*0.075*		10.6	13.4	12.2	22.3
Lead	mg/kg dry wt	*0.05*		27.1	41.5	68.8	122
Nickel	mg/kg dry wt	*0.05*		15.0	15.6	7.96	11.4
Zinc	mg/kg dry wt	*0.05*		92.4	140	109	217

IANZ ACCREDITED LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation, with the exception of tests marked *, which are not accredited.

Polycyclic Aromatic Hydrocarbons - Soil

	Client Sample ID		AB1 0	AB2 0	AB4 0	AB5 0.5m 0.5	AB8 0
	Date Sampled		17/01/2019	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Analyte	Unit	*Reporting Limit*	19-01327-1	19-01327-2	19-01327-4	19-01327-6	19-01327-8
1-Methylnaphthalene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
Acenaphthene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
Anthracene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
Benz[a]anthracene	mg/kg dry wt	*0.02*	0.04	0.04	0.13	<0.02	<0.02
Benzo[a]pyrene	mg/kg dry wt	*0.01*	0.04	0.05	0.22	<0.01	<0.01
Benzo[b]&[j] fluoranthene	mg/kg dry wt	*0.02*	0.05	0.05	0.21	<0.02	<0.02
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*	<0.02	<0.02	0.06	<0.02	<0.02
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*	0.02	0.01	0.06	<0.01	<0.01
Chrysene	mg/kg dry wt	*0.01*	0.03	0.03	0.10	<0.01	<0.01
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*	<0.014	<0.012	0.01	<0.01	<0.01
Fluoranthene	mg/kg dry wt	*0.02*	0.05	0.05	0.13	<0.02	<0.02
Fluorene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*	0.02	0.02	0.12	<0.01	<0.01
Naphthalene	mg/kg dry wt	*0.01*	<0.014	<0.012	<0.01	<0.01	<0.01
Phenanthrene	mg/kg dry wt	*0.01*	0.02	0.02	0.02	<0.01	<0.01
Pyrene	mg/kg dry wt	*0.02*	0.05	0.05	0.15	<0.02	<0.02
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.01*	0.07	0.07	0.29	0.03	0.03
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*	0.06	0.06	0.29	<0.01	<0.01
Anthracene-d10 (Surrogate)	%	*1*	100.9	105.7	114.1	113.3	106.0

Polycyclic Aromatic Hydrocarbons - Soil

	Client Sample ID		AB10 0	AB12 0	ABR1 0	ABR2 0
	Date Sampled		17/01/2019	17/01/2019	17/01/2019	17/01/2019
Analyte	Unit	*Reporting Limit*	19-01327-10	19-01327-12	19-01327-13	19-01327-14
1-Methylnaphthalene	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg dry wt	*0.01*	<0.01	<0.01	0.04	0.03
Anthracene	mg/kg dry wt	*0.01*	<0.01	<0.01	0.02	0.02
Benz[a]anthracene	mg/kg dry wt	*0.02*	<0.02	<0.02	0.22	0.16
Benzo[a]pyrene	mg/kg dry wt	*0.01*	0.01	0.02	0.50	0.39
Benzo[b]&[j] fluoranthene	mg/kg dry wt	*0.02*	<0.02	<0.02	0.45	0.37
Benzo[g,h,i]perylene	mg/kg dry wt	*0.02*	<0.02	<0.02	0.21	0.15
Benzo[k]fluoranthene	mg/kg dry wt	*0.01*	<0.01	<0.01	0.16	0.11
Chrysene	mg/kg dry wt	*0.01*	<0.01	0.01	0.21	0.16
Dibenz(a,h)anthracene	mg/kg dry wt	*0.01*	<0.01	<0.01	0.04	0.02
Fluoranthene	mg/kg dry wt	*0.02*	<0.02	<0.02	0.20	0.16
Fluorene	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	mg/kg dry wt	*0.01*	<0.01	<0.01	0.39	0.29
Naphthalene	mg/kg dry wt	*0.01*	<0.01	<0.01	<0.01	<0.01
Phenanthrene	mg/kg dry wt	*0.01*	<0.01	<0.01	0.03	0.03
Pyrene	mg/kg dry wt	*0.02*	<0.02	<0.02	0.26	0.19
Benzo[a]pyrene TEQ (LOR)	mg/kg dry wt	*0.01*	0.03	0.03	0.67	0.51

Polycyclic Aromatic Hydrocarbons - Soil

			Client Sample ID	AB10 0	AB12 0	ABR1 0	ABR2 0
			Date Sampled	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Benzo[a]pyrene TEQ (Zero)	mg/kg dry wt	*0.01*		0.01	0.02	0.67	0.51
Anthracene-d10 (Surrogate)	%	*1*		104.5	104.9	107.8	109.0

Moisture Content

		Client Sample ID	AB1 0	AB2 0	AB4 0	AB5 0.5m 0.5	AB8 0
		Date Sampled	17/01/2019	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Analyte	Unit	*Reporting Limit*	19-01327-1	19-01327-2	19-01327-4	19-01327-6	19-01327-8
Moisture Content	%	*1*	35	37	24	26	5

Moisture Content

		Client Sample ID	AB10 0	AB12 0	ABR1 0	ABR2 0
		Date Sampled	17/01/2019	17/01/2019	17/01/2019	17/01/2019
Analyte	Unit	*Reporting Limit*	19-01327-10	19-01327-12	19-01327-13	19-01327-14
Moisture Content	%	*1*	5	5	13	14

Method Summary

Elements in Soil Acid digestion followed by ICP-MS analysis. (US EPA method 200.8).

PAH in Soil Solvent extraction, silica cleanup, followed by GC-MS analysis.
Benzo[a]pyrene TEQ (LOR): The most conservative TEQ estimate, where a result is reported as less than the limit of reporting (LOR) the LOR value is used to calculate the TEQ for that PAH.
Benzo[a]pyrene TEQ (Zero): The least conservative TEQ estimate, PAHs reported as less than the limit of reporting (LOR) are not included in the TEQ calculation.
Benzo[a]pyrene toxic equivalence (TEQ) is calculated according to *'Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health'*. Ministry for the Environment. 2011.

Moisture Moisture content is determined gravimetrically by drying at 103 °C.

Elizabeth Fitzgerald, B.Sc.
Inorganics Team Leader

Nathan Howse, B.Sc.
Senior Technician

Sharelle Frank, B.Sc. (Tech)
Technologist

Report Date: 24 Jan 2019

Certificate Number: P1901221401

PRECISE
CONSULTING & LABORATORY

Analytica Laboratories
Ruakura Research Centre, 10 Bisley Road, Private Bag 3123

Client Reference: 19-01327

Dear Analytica Laboratories,

Re: Asbestos Soil Identification Analysis – 19-01327

6 sample(s) received on 22 Jan 2019 by Georgina Jackson.

The results of fibre analysis were performed by Georgina Jackson of Precise Consulting and Laboratory Ltd on 24 Jan 2019.

The sample(s) were stated to be from 19-01327.

Sample analysis was performed using polarised light microscopy with dispersion staining in accordance with *AS4964-2004 Method for the qualitative identification of asbestos in soil samples.*

The results of the fibre analysis are presented in the appended table.

Should you require further information please contact Georgina Jackson.

Yours sincerely

Georgina Jackson

Georgina Jackson
PRECISE LABORATORY IDENTIFIER

Sample Analysis Results

Certificate Number: P1901221401
Report Date: 24 Jan 2019
Site Location: 19-01327

PRECISE
CONSULTING & LABORATORY

Note 1: The reporting limit for this analysis is 0.1g/kg (0.01%) by application of polarised light microscopy, dispersion staining and trace analysis techniques.

Note 2: If mineral fibres of unknown type are detected (UMF), by PLM and dispersion staining, these may or may not be asbestos fibres. To confirm the identity of this fibre, another independent analytical technique such as XRD analysis is advised.

Note 3: The samples in this report are "As Received". The laboratory does not take responsibility for the sampling procedure or accuracy of sample location description. This document may not be reproduced except in full.

Identified by:

Georgina Jackson

Approved Identifier: Georgina Jackson

Reviewed by:

Georgina Jackson

Key Technical Person: Georgina Jackson

Sample ID	Client Sample ID	Sample Location/Description/Dimensions	Analysis Results
S001	AB1	- Non-Homogeneous Soil 46.0g	No Asbestos Detected Organic Fibres
S002	AB2	- Non-Homogeneous Soil 30.0g	No Asbestos Detected Organic Fibres
S003	AB4	- Non-Homogeneous Soil 53.0g	No Asbestos Detected Organic Fibres
S004	AB5 0.5m	- Non-Homogeneous Soil 60.5g	No Asbestos Detected Organic Fibres
S005	AB8	- Non-Homogeneous Soil 92.5g	No Asbestos Detected Organic Fibres
S006	AB10	- Non-Homogeneous Soil 109.5g	No Asbestos Detected Organic Fibres

Precise Consulting & Laboratory Limited
Unit 1, 30 Greenpark Road, Penrose, Auckland 8023

P: 09 282 3886 W: www.preciseconsulting.co.nz

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

Appendix 1: Soil Analysis Raw Data

Certificate Number: P1901221401
Report Date: 24 Jan 2019
Site Location: 19-01327

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CONSULTING & LABORATORY

Sample ID	Client Sample ID	Total Sample Weight (g)	ACM Approximate Dimensions (g)*	Form	Trace Asbestos Detected**
S001	AB1	46.0	-	-	N
S002	AB2	30.0	-	-	N
S003	AB4	53.0	-	-	N
S004	AB5 0.5m	60.5	-	-	N
S005	AB8	92.5	-	-	N
S006	AB10	109.5	-	-	N

* The reporting limit for this standard is 0.1g/kg
** Trace asbestos present is indicative that freely liberated respirable fibres are present and dust control measures should be implemented or increased
*** Asbestos weights listed in this table are indicative only and are outside of IANZ accreditation and is therefore not endorsed by IANZ.

Precise Consulting & Laboratory Limited
Unit 1, 30 Greenpark Road, Penrose, Auckland 8023

P: 09 282 3886 W: www.preciseconsulting.co.nz

APPENDIX F

RILEY Dwg: 170672-10

LEGEND

- LOT BOUNDARY
- SITE BOUNDARY
- HA1 — HAND AUGER LOCATION
- S1 — SURFACE SAMPLE LOCATION

NOTES:
1. AERIAL PHOTO FROM PALMERSTON NORTH CITY COUNCIL GEO-GUIDE WEBSITE.
2. PARCELS FROM LINZ.

SCALE 1:2500

0 25 50 75 100 150 (m)

FOR INFORMATION

REV	DESCRIPTION	BY	DATE
1	FIRST ISSUE	WY	04.02.19

DESIGN: GJ | CHECKED: AA
DRAWN: GJ | CHECKED: JM
DATE DRAWN: FEB 2019

APPROVED FOR ISSUE: R BURDEN
DATE: 13/02/19

RILEY CONSULTANTS
P.O.BOX 100 253
NORTH SHORE
AUCKLAND 0745
TEL. 09-4897872
FAX. 09-4897873

TITLE

FLYGERS LINE INVESTMENT GROUP LIMITED

RANGITIKEI LINE AND FLYGERS LINE, PALMERSTON NORTH

DETAILED SITE INVESTIGATION - SITE PLAN

CADFILE: 170672-10
SCALES (A3): 1:2500
DRAWING No.: 170672-10
REV.: 1