

DETAILED SITE INVESTIGATION (DSI)

301 BUCKLAND ROAD, PUKEKOHE



Reference Number: REP-1258A/DSI/JAN19

PREPARED FOR: FRANKLINS PLUMBERS & BUILDERS SUPPLIES LTD, c/- SCOTT WILKINSON PLANNING

15 JANUARY 2019



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Statement

This site investigation has been prepared in accordance with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. It has been managed by a suitably qualified and experienced practitioner (SQEP); and reported on in accordance with the current edition of the Ministry for the Environment's *Contaminated Land Management guidelines No.1 – Reporting on Contaminated Sites in New Zealand*.

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Thank you for the opportunity to carry out this investigation. Should you have any queries regarding this report please do not hesitate to contact us on 09 475 0222.

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EXECUTIVE SUMMARY

The property at 301 Buckland Road, Pukekohe, is legally described as Pt Lot 1 DP 3363 and is approximately 4.36 Ha in size. The property has been secured for development by Franklins Plumbing and Builders Supplies Ltd, during which it is proposed to construct a commercial showroom, offices, storeroom, and warehouse. The proposed development includes significant cut-to-fill earthworks to create a three-tiered split level surface for construction of the proposed buildings. The proposal therefore involves a change in landuse from agricultural to commercial / industrial, alongside soil disturbance development activities.

Geosciences Ltd (GSL) conducted a Preliminary Site Investigation (PSI) during November 2018, during which a number of activities on the Ministry for the Environment's (MfE) Hazardous Activities and Industries List (HAIL) were identified as being more likely than not to currently or historically have occurred on the site. Items identified included persistent pesticide use associated with horticultural activities, both on the property and via migration from neighbouring fields (Items A.10 and H respectively), the presence of unverified fill material and buried rubble (Item I), and potential lead contamination from the use of lead-based paint on a dwelling located on site (Item I).

Consequently, GSL designed a conceptual site model of potential contamination, with a judgemental sampling regime used to target areas of potential contamination. Fourteen discrete soil samples and two composite soil samples were collected and analysed for the contaminants of concern related to the HAIL activities identified above. Six discrete soil samples were analysed for arsenic, copper, lead, and organochlorine pesticides (OCPs) associated with horticultural persistent pesticide use, seven discrete soil samples were analysed for a suite of heavy metals and polycyclic aromatic hydrocarbons (PAHs) associated with unverified fill material, and one composite sample was analysed for lead from lead-based paints.

Eight of the sixteen analysed samples returned concentrations below the expected naturally occurring background ranges for inorganic elements in volcanic soils in the Auckland region. Six samples returned concentrations in excess of the expected naturally occurring background ranges while two samples exceeded the Auckland Unitary Plan (Operative in Part) (AUP(OP)) permitted activity soil acceptance criteria; one of which also exceeded the National Environmental Standard (NES) *for Assessing and Managing Contaminants in Soil to Protect Human Health* (2011) Soil Contaminant Standards (SCS) for the commercial / industrial outdoor worker (unpaved) landuse.

Based on these findings, the development activities will be subject to Regulation 10 of the NES as a Restricted Discretionary Activity, requiring a Remediation Action Plan (RAP) to address the identified arsenic hotspot, and production of a site validation report following the material's removal. The development activities will also require a RAP under Regulation E30.6.2 of the AUP(OP) as a Controlled Activity to address the arsenic and lead hotspots identified. This RAP will include the site management practices necessary to ensure that the risk to human health and the environment through the mobilisation of contaminants during development earthworks is minimised.

1 INTRODUCTION

Geosciences Ltd (GSL) has prepared the following report for Scott Wilkinson Planning on behalf of Franklins Plumbers & Builders Supplies Ltd in accordance with the GSL proposal, Ref: *Pro-1634/Nov18*, dated 20 November 2018.

This report has been prepared in accordance with the Ministry for the Environment (MfE) Contaminated Land Management Guidelines (CLMG): No. 1 - "*Guidelines for Reporting on Contaminated Sites in New Zealand*", and No. 5 – "*Site Investigation and Analysis of Soils*" (References 1 and 2).

2 PROPERTY DETAILS

Location:	301 Buckland Road, Pukekohe
Legal Description:	Pt Lot 1 DP 3363
Size:	4.36 Ha
Zoning:	Future Urban Zone

3 PROPOSED CHANGE IN LANDUSE, SUBDIVISION AND DEVELOPMENT

It is proposed to develop the site through the construction of a commercial showroom, offices, storerooms, and warehouse for Franklin Plumbers and Builders Supplies Ltd. The proposed development will include significant cut-to-fill earthworks to create a three-tiered split level surface for construction of the proposed buildings. The resulting configuration will include approximately 25,492 m² impermeable surfaces (including buildings), and approximately 17,745 m² permeable landscaped surfaces.

To achieve this, approximately 31,785 m³ of cut, and 42,086 m³ of fill work is proposed, with approximately 10,300 m³ of engineered cleanfill material required to be imported to create the platform below the main warehouse and pipe storage building. Where cut material is deemed unsuitable for use in construction, it will be removed from site for disposal at an appropriate facility. A copy of the proposed earthworks plan is attached in Appendix A.

The proposal therefore involves a change in landuse from agricultural to commercial / industrial, alongside soil disturbance development activities.

4 STANDARDS AND REGULATIONS

As a result of the proposed change in landuse and development outlined above, it will be necessary to address the requirements of the following applicable standards and regulations for the site.

4.1 NATIONAL ENVIRONMENTAL STANDARD (NES)

The *National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health* (NES) (Reference 3), which came into effect on 1 January 2012, ensures that land

affected by contaminants in soil is appropriately identified and assessed when soil disturbance and/or land development activities take place and, if necessary, remediated or the contaminants contained to make the land safe for human use.

Under the NES, land is considered to be actually or potentially contaminated if an activity or industry on the MfE Hazardous Activities and Industries List (HAIL) has been, is, or is more likely than not to have been, undertaken on the land. Consequently, a subdivision or development on HAIL land requires a detailed site investigation (DSI) of the piece of land to determine if there is a risk to human health as a result of the former activities.

The NES defines five standard landuse scenarios for which soil contaminant standards have been derived. The most sensitive landuse scenario which is applicable to the proposed change in landuse, subdivision and development at this site is defined by the NES as: *Commercial / industrial outdoor worker (unpaved)*.

4.2 AUCKLAND UNITARY PLAN (OPERATIVE IN PART) (AUP(OP))

Section 30(1)(f) of the RMA provides the Auckland Council with a statutory duty to investigate land for the purposes of identifying and monitoring contaminated land and for the control of discharges of contaminants into or onto land or water and discharges of water into water.

The Auckland Unitary Plan (Operative in Part) (AUP(OP)), which was formally notified on 30 September 2013, is a combined regional policy statement, regional coastal plan, regional plan and district plan. Auckland Council notified an operative in part version of the plan on 15 November 2016 (Reference 4).

Chapter E.30 of the AUP(OP) deals specifically with contaminated land and maintains that Council is required to manage both the use of land containing elevated levels of contaminants and the discharge of contaminants from land containing elevated levels of contaminants. As no appeals have been lodged on Chapter E.30, the provisions of that section can be considered operative under Section 87 of the Resource Management Act 1991. For all purposes of this investigation, the relevant provisions of the AUP(OP) relating to soil contamination have legal jurisdiction and those provision have been considered where they may have an impact on the proposed development

5 DSI OBJECTIVES

The objectives of this investigation were to assess:

- the soil quality and associated risk to human health and the environment as a result of potential contamination in soil on the site as a result of former HAIL activities identified during the Preliminary Site Investigation (PSI) conducted by Geosciences Ltd (GSL), Ref: *Rep-1258/PSI/Nov18*;
- the resulting status of the activity under the NES;
- what, if any, contaminated land rules of the AUP(OP) apply to the proposed subdivision and development; and
- any further work that may be required under the NES, or the AUP(OP) as a result of the soil quality on site.

6 SCOPE OF WORKS

To achieve the objectives of the DSI, GSL has undertaken the following:

- A site visit for the purpose of collecting soil samples;
- the collection of fourteen discrete soil samples and two composite soil samples from the site;
- laboratory analysis of six discrete soil samples and one composite sample for arsenic, copper, lead, and organochlorine pesticides (OCPs), the contaminants of concern relating to potential horticultural use of persistent pesticides;
- laboratory analysis of eight discrete soil samples for a suite of heavy metals and polycyclic aromatic hydrocarbons (PAHs), the contaminants of concern relating to potential fill material;
- the analysis of one composite sample for lead, the contaminant of concern related to the historic use of lead based paint on buildings prior to the 1980s; and
- the preparation of a report in accordance with Contaminated Land Management Guideline No. 1 – Reporting on contaminated Sites in New Zealand (Ministry for the Environment, 2011) that summarises the results of the intrusive investigation and the need, if any, for any further work.

7 FORMER INVESTIGATIONS

GSL conducted a preliminary site investigation of the site in November 2018, the findings of which are summarised in the GSL report, *Rep-1258/PSI/Nov18*, as mentioned above. An excerpt of the Executive Summary and the figure delineating identified HAIL areas of that report is attached in Appendix B.

An historical investigation and site visit at that time revealed that the site is more likely than not the location of a number of current and historical HAIL activities. Activities identified included potential horticulture on an eastern portion of the property (HAIL Item A.10), migration of soil from the neighbouring horticultural fields along an overland flowpath on the western portion of the site (HAIL Item H), a number of locations of stockpiled unverified fill material (mostly a mix of soil and rubble) and buried rubble in the location of a former building (HAIL Item I), and the potential release of lead into soil from lead paint on the dwelling constructed prior to the 1940s (HAIL Item I).

8 CONCEPTUAL MODEL FOR POTENTIAL CONTAMINATION

Based on the findings of the preliminary site investigation GSL developed a conceptual model for potential contamination on site. The PSI identified a number of discrete areas affected by HAIL items across the property including:

- Potential horticultural activity, including potential migration of horticultural soil from the adjacent property across a visually distinct flow path;
- potential use of lead based paints on old structures on site; and

- non-engineered / unverified fill on site as identified by geotechnical investigation.

The bulk storage and use of persistent pesticides related to historical horticultural activities are included on the MfE HAIL under Item A.10, while the migration of potentially contaminated soil from adjacent land is encompassed by Item H of the HAIL it is noted that the potential migration of soil is a plume of sediment from adjacent horticultural land, therefore GSL considers the same contaminants of concern, being; arsenic, copper, lead, and organochlorine pesticides (OCPs).

With regards to the sediment plume noted in the PSI, the migration of soil from the adjacent property has the potential to impact the surface soil in a discrete area of the site, identified in Figure 2. The migration of soil would be expected to result in a reasonably uniform distribution of contaminants in the uppermost soil horizon. Potential horticultural activity was identified in one portion of the site during the 1960s. The primary source of potential contamination as a result of horticultural activity is through the direct sprayed application of persistent pesticides to crops, there are no structures noted which could have been the location of the bulk storage of persistent pesticides of agrichemicals. Such an application of persistent pesticides is likely to produce a uniform distribution of contaminants through the uppermost soil horizon and is unlikely to produce hotspots of contamination.

Due to the age of the dwelling on site the potential exists for lead based paints to have been used on the buildings exterior. Lead based paints have the potential to impact soil surrounding the building at times when the paint is in deteriorated condition, or at times where routine maintenance is undertaken through scraping or sanding painted surfaces with insufficient ground protection. The soil can be impacted when paint flakes or dust infiltrate the uppermost soil around the structure, and can result in a well constrained hotspot surrounding the structure. Concentrations of lead can be high in close proximity to the structure and generally attenuate rapidly with distance from the source, generally reducing to background concentrations within 3 m from the structure.

Unverified filling activities can present a wide range of potential contaminants of concern depending on the source site. The handling, stockpiling, and emplacement of unverified fill generally results in a non-uniform distribution of contaminants throughout the fill horizon / stockpile. As the source site for the fill material is not known a wide range of potential contaminants are considered, GSL identified heavy metals and polycyclic aromatic hydrocarbons as the primary contaminants of concern in order to suitably classify the identified fill material.

9 SOIL SAMPLING AND ANALYSIS

Based on the conceptual model outlined above, GSL developed a judgemental sampling regime targeting the identified HAIL areas. Six discrete soil samples were collected on the western portion of the property from the identified plume of soil that had migrated onto the site from the neighbouring horticultural fields. A composite soil sample, comprising four sub-samples, was collected from the area of potential horticulture on the eastern portion of the property.

A second composite soil sample, also comprising four sub-samples, was collected from around the house curtilage. These samples were collected using a stainless steel foot corer to a depth of 0-150 mm, with the entire contents of the core placed directly into a plastic zipper bag and thoroughly homogenized.

Four discrete soil samples were collected from the identified stockpiles of unverified fill material, while three discrete soil samples were collected from the area of buried rubble where a building had been removed. An eighth discrete soil sample was collected from an area of emplaced sandy fill material, most likely used for training horses. The eight discrete soil samples were collected using a stainless steel hand auger to a depth of approximately 150 mm below relative surface level, with sample placed directly into laboratory supplied glass jars.

Sampling equipment was decontaminated between each sample in accordance with GSL’s internal quality control procedures. A brief sample description was recorded in the field at the time of sample collection. The date, sample identification number, location, and initials of sampler were noted on each sample container.

The sampling protocol followed was in accordance with the ‘Contaminated Land Management Guidelines (CLMG) No. 5 – Site Investigation and Analysis of Soils’. The soil sampling rationale that was followed is described below while the soil sample locations are shown in Figure 2, and site photographs are attached in Appendix C.

TABLE 1: SAMPLING RATIONALE

SOIL SAMPLE No.	LOCATION	INDICATED LABORATORY ANALYSIS
SS1 – SS6	Plume of horticultural soil migrated from neighbouring fields	Arsenic, Copper, Lead, OCPs
SS7 – SS14	Emplaced / stockpiled fill material	Heavy metals, PAHs
Comp1	Potential former horticulture	Arsenic, Copper, Lead, OCPs
Comp2	Dwelling curtilage	Lead

10 LABORATORY ANALYSIS AND QUALITY CONTROL

Sample containers were placed in a box with a chain of custody form (COC) indicating the analysis to be performed. Soil samples were dispatched to Eurofins Mgt laboratories in Melbourne, Australia, for analysis of the contaminants of concern listed above.

Eurofins Mgt laboratories are accredited by the National Association of Testing Authorities (NATA), Australia for the analysis undertaken.

10.1 ACCEPTANCE CRITERIA AND RELEVANT GUIDELINES

The NES mandates fourteen soil contaminant standards (SCS) for the protection of human health for organic compounds and inorganic elements for various landuse criteria. The NES human health SCS criteria for a commercial / industrial outdoor worker (unpaved) have been applied to the proposed change in landuse, subdivision, and development.

The AUP(OP) also set permitted activity environmental discharge and soil acceptance criteria for potentially contaminated land.

Results are also compared to the background concentration ranges of inorganic elements in soils in the Auckland Region for volcanic soils.

11 ANALYTICAL RESULTS

A comparison of the analytical results with the relevant guideline criteria is provided in Table 2 below. Copies of the laboratory chain of custody document (COC) and analytical transcripts are attached in Appendix D, while a discussion of the results is provided below. No OCPs or PAHs were detected in any of the soil samples and have subsequently been omitted from the table of results.

TABLE 1: ANALYTICAL RESULTS¹

	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc
SS1	12	-	-	75	45	-	-
SS2	12	-	-	71	57	-	-
SS3	11	-	-	65	38	-	-
SS4	11	-	-	71	39	-	-
SS5	11	-	-	71	40	-	-
SS6	12	-	-	84	45	-	-
SS7	12	ND	18	22	24	6.2	51
SS8	130	ND	51	81	53	13	160
SS9	11	ND	28	110	36	16	110
SS10	8.2	ND	22	41	170	13	150
SS11	18	ND	32	41	34	11	72
SS12	15	ND	24	60	47	10	120
SS13	14	ND	28	140	150	12	170
SS14	4.2	ND	260	18	17	11	59
COMP1	11	-	-	62	51	-	-
COMP2	-	-	-	-	300	-	-
NES ²	70	1,300	6,300	>10,000	3,300	NL	NL
AUP(OP) ³	100	7.5	400	325	250	105	400
Background ⁴	0.4 - 12	<0.1 – 0.65	3 - 125	20 - 90	<5 - 65	4 - 320	54 – 1,160

Notes:

1. All metal concentrations measured in mg/kg.
2. National Environmental Standards (NES) for assessing and managing contaminants in soil to protect human health – *Commercial / industrial outdoor worker (unpaved)*.
3. Auckland Unitary Plan (Operative in Part) – Table E30.6.1.4.1 *Permitted Activity Soil Acceptance Criteria*.
4. Auckland Regional Council Technical Publication No.153 (2001) – Table 3 *Background Concentrations of Inorganic Elements in Soils from the Auckland Region (volcanic soils)*.
5. Values in **BOLD** exceed the NES criteria, values in **BOLD** exceed the AUP(OP) criteria, Values in **BOLD** exceed the Background Ranges.
6. NA = Not applicable / NL = No Limit / ND= not detected / - = not analysed.

11.1 HEAVY METALS

Half of the soil samples collected returned concentrations of contaminants of concern below the expected naturally occurring background ranges for volcanic soils in the Auckland region. Of the remaining eight samples, six returned concentrations that exceeded the expected naturally occurring background ranges.

One discrete soil sample, SS8, collected from a small stockpile of unverified material in the south-western corner of the property returned concentrations of arsenic in excess of the NES soil contaminant standard (SCS) for commercial / industrial outdoor workers (unpaved), and the AUP(OP) permitted activity soil acceptance criteria. A second sample, the composite soil sample from the dwelling curtilage (Comp2) also exceeded the AUP(OP) permitted activity soil acceptance criteria, but not the NES SCS.

11.2 ORGANOCHLORINE PESTICIDES (OCP's)

None of the soil samples analysed returned detections of organochlorine pesticides (OCPs).

11.3 POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

None of the soil samples analysed returned detections of polycyclic aromatic hydrocarbons (PAHs).

12 CONCLUSIONS

The PSI conducted in November 2018 by GSL identified a number of locations on site where it was more likely than not that activities listed on the MfE HAIL had, or are currently occurring. This included ingress of material from the neighbouring horticultural fields, potential historical horticulture on the site itself, a number of stockpiles of unverified fill material, buried rubble, and potential lead contamination from lead-based paints in soils around an old dwelling. Consequently, GSL developed a conceptual model with judgemental soil sampling targeting the potentially contaminated areas identified.

Analysis of the soil samples revealed that:

- One discrete soil sample returned concentrations in excess of the NES SCS for commercial / industrial outdoor workers (unpaved), and the AUP(OP) permitted activity soil acceptance criteria for arsenic;
- One composite sample returned concentrations in excess of the AUP(OP) permitted activity soil acceptance criteria for lead;
- Six additional discrete soil samples returned concentrations of heavy metals in excess of the expected naturally occurring background ranges for volcanic soils in the Auckland region;
- Seven discrete soil samples and one composite soil samples returned concentrations below the expected naturally occurring background ranges for volcanic soils in the Auckland region;
- No organochlorine pesticides (OCPs) or polycyclic aromatic hydrocarbons (PAHs) were detected in any of the analysed samples.

GSL therefore conclude that previous landuses have impacted soil quality in discrete locations on the site to the extent that remediation of soils in two locations will be required.

12.1 THE NATIONAL ENVIRONMENTAL STANDARDS (NES)

Under the NES, land is considered to be actually or potentially contaminated if an activity or industry on the Hazardous Activities and Industries List (HAIL) has been, is, or is more likely than not to have been, undertaken on the land.

The presence of heavy metal concentrations which exceed the expected naturally occurring background ranges for volcanic soils of the Auckland Region will preclude the activity from being able to meet the requirements of the NES under Regulation 5(9). Furthermore, the presence of arsenic concentrations in excess of the NES SCS for commercial / industrial outdoor workers (unpaved) requires that appropriate controls and measures be in place to minimise the risk of exposure to site workers, both during and after development. As such, the development activities will be considered a Restricted Discretionary Activity under Regulation 10 of the NES, with remedial actions and site validation required prior to development commencing, in accordance with an approved Remediation Action Plan (RAP) and Site Validation Report (SVR).

12.2 THE AUCKLAND UNITARY PLAN (OPERATIVE IN PART) (AUP(OP))

Two of the soil samples analysed exceeded the AUP(OP) permitted activity soil acceptance criteria (including the sample that exceeded the NES criteria as described above). As such, the site meets the definition of *land containing elevated levels of contaminants*, and will be subject to the requirements of Regulation E30.6.2 as a Controlled Activity under the AUP(OP) Chapter E30 *Contaminated Land*. As a Controlled Activity under the AUP(OP), the development activities will require a suitable RAP to ensure that potential discharge of contaminants to the environment is minimised.

13 FURTHER WORKS REQUIRED

As a result of the findings detailed above, and to meet the requirements of the NES, and the AUP(OP), the following further works will be required:

- preparation of a suitable remediation action plan (RAP), which will have to be approved by Council prior to earthworks commencing, which will detail the extent of the contamination and the methodologies for removal of the impacted material, including the site management practices and soil disposal methods that will be employed throughout the duration of the works to reduce the potential risks to human health and the environment during the process; and;
- the collection and analysis of representative soil samples in accordance with the RAP for preparation of a site validation report, to be submitted to Auckland Council upon completion of the works.

14 REFERENCES

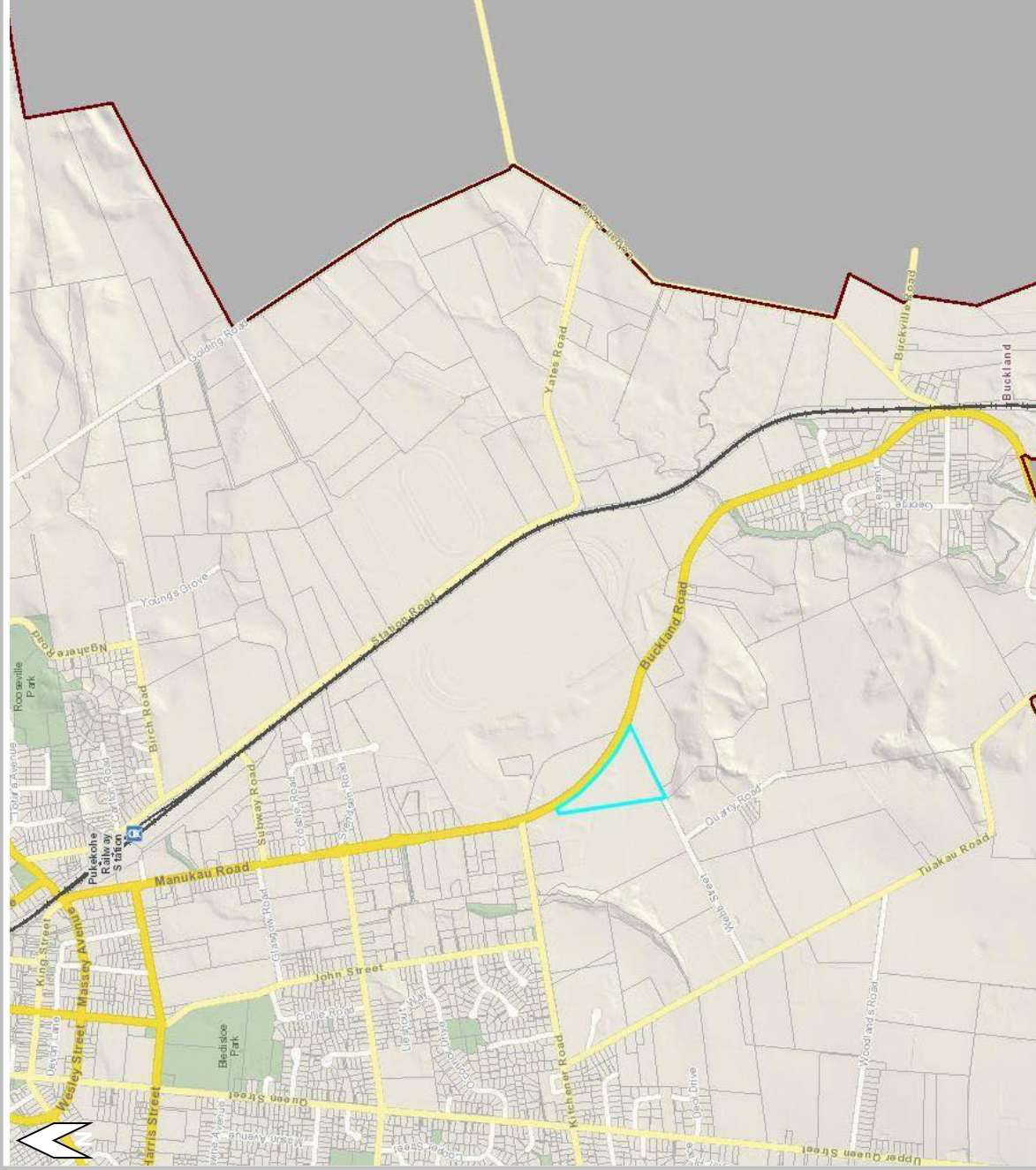
1. Ministry for the Environment (2003) — *Contaminated Land Management Guidelines No.1: Reporting on contaminated Sites in New Zealand*. Ministry for the Environment, Wellington, New Zealand.
2. Ministry for the Environment (2003) — *Contaminated Land Management Guidelines No.5: Site Investigation and Analysis of Soils*. Ministry for the Environment, Wellington, New Zealand.
3. Ministry for the Environment (2012) - Users Guide National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health. Ministry for the Environment, Wellington, New Zealand.
4. Ministry for the Environment (2011) – *Methodology for Deriving Standards for contaminants in Soil to Protect Human Health*. Ministry for the Environment, Wellington, New Zealand.
5. Auckland Council (2013) –*Auckland Unitary Plan (Operative in Part)*, Auckland, New Zealand.
6. Auckland Regional Council (2001) – *Background Concentrations of Inorganic Elements in Soils from the Auckland region (TP153)* – Auckland.
7. Edbrooke, S.W (2001) — *Geology of the Auckland Urban Area*, Institute of Geological and Nuclear Sciences Geological Map 3, Lower Hutt, New Zealand.
8. Auckland Council (2011) - *Auckland Council GEOMAPS*.
<http://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html>
9. Ministry for the Environment (rev 2011) - *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand*. Ministry for the Environment, Wellington, New Zealand.

15 LIMITATIONS

The conclusions and all information in this Report are given strictly in accordance with and subject to the following limitations and recommendations:

1. The assessment undertaken to form this conclusion is limited to the scope of work agreed between GSL and the client, or the client's agent as outlined in this Report. This report has been prepared for the sole benefit of the client and neither the whole nor any part of this report may be used or relied upon by any other party.
2. The investigations carried out for the purposes of the report have been undertaken, and the report has been prepared, in accordance with normal prudent practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this report.
3. This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by GSL for use of any part of this report in any other context.
4. This Report was prepared on the dates and times as referenced in the report and is based on the conditions encountered on the site and information reviewed during the time of preparation. GSL accepts no responsibility for any changes in site conditions or in the information reviewed that have occurred after this period of time.
5. Where this report indicates that information has been provided to GSL by third parties, GSL has made no independent verification of this information except as expressly stated in the report. GSL assumes no liability for any inaccuracies in or omissions to that information.
6. Given the limited Scope of Works, GSL has only assessed the potential for contamination resulting from past and current known uses of the site.
7. Environmental studies identify actual sub-surface conditions only at those points where samples are taken and when they are taken. Actual conditions between sampling locations or differ from those inferred. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from that predicted. Nothing can be done to prevent the unanticipated and GSL does not guarantee that contamination does not exist at the site.
8. Except as otherwise specifically stated in this report, GSL makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials ("ACM") on the site. If fill has been imported on to the site at any time, or if any buildings constructed prior to 1970 have been demolished on the site or materials from such buildings disposed of on the site, the site may contain asbestos or ACM .
9. No investigations have been undertaken into any off-site conditions, or whether any adjoining sites may have been impacted by contamination or other conditions originating from this site. The conclusion set out above is based solely on the information and findings contained in this report.
10. Except as specifically stated above, GSL makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.
11. The investigation and remediation of contaminated sites is a field in which legislation and interpretation of legislation is changing rapidly. Our interpretation of the investigation findings should not be taken to be that of any other party. When approval from a statutory authority is required for a project, that approval should be directly sought by the client.
12. Use, development or re-development of the site for any purpose may require planning and other approvals and, in some cases, environmental regulatory authority and accredited site auditor approvals. GSL offers no opinion as to whether the current use has any or all approvals required, is operating in accordance with any approvals, the likelihood of obtaining any approvals, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.
13. GSL makes no determination or recommendation regarding a decision to provide or not to provide financing with respect to the site. The on-going use of the site and/or use of the site for any different purpose may require the owner/user to manage and/or remediate site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this report.
14. Except as required by law, no third party may use or rely on, this report unless otherwise agreed by GSL in writing. Where such agreement is provided, GSL will provide a letter of reliance to the agreed third party in the form required by GSL.
15. To the extent permitted by law, GSL expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. GSL does not admit that any action, liability or claim may exist or be available to any third party.
16. Except as specifically stated in this section, GSL does not authorise the use of this report by any third party.

FIGURES



Worobell Road



Title:

Project name:

Figure 1 - Site Location

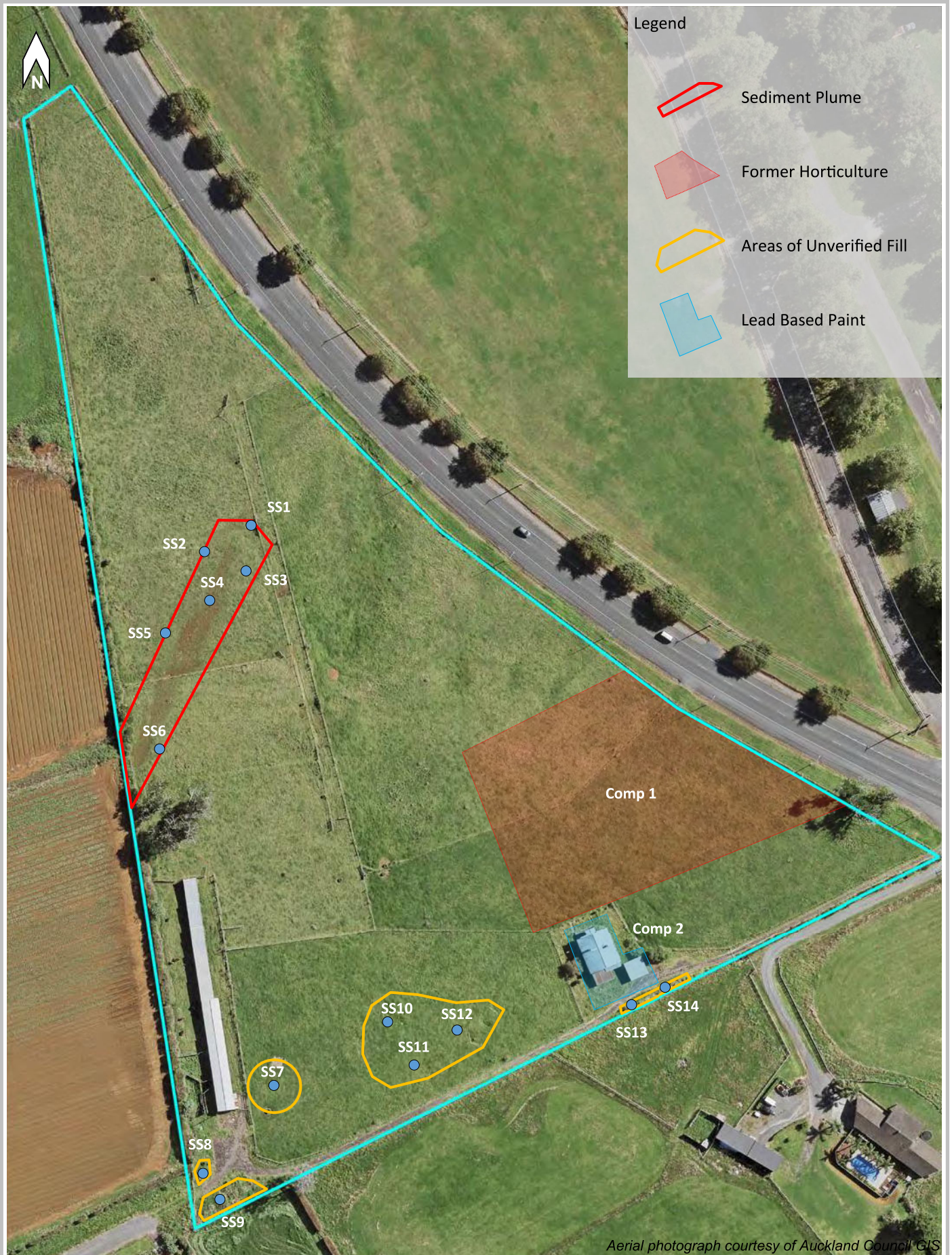
301 Buckland Road, Buckland

Reference: J1258

Date: 15-11-2018

Drawn: CD

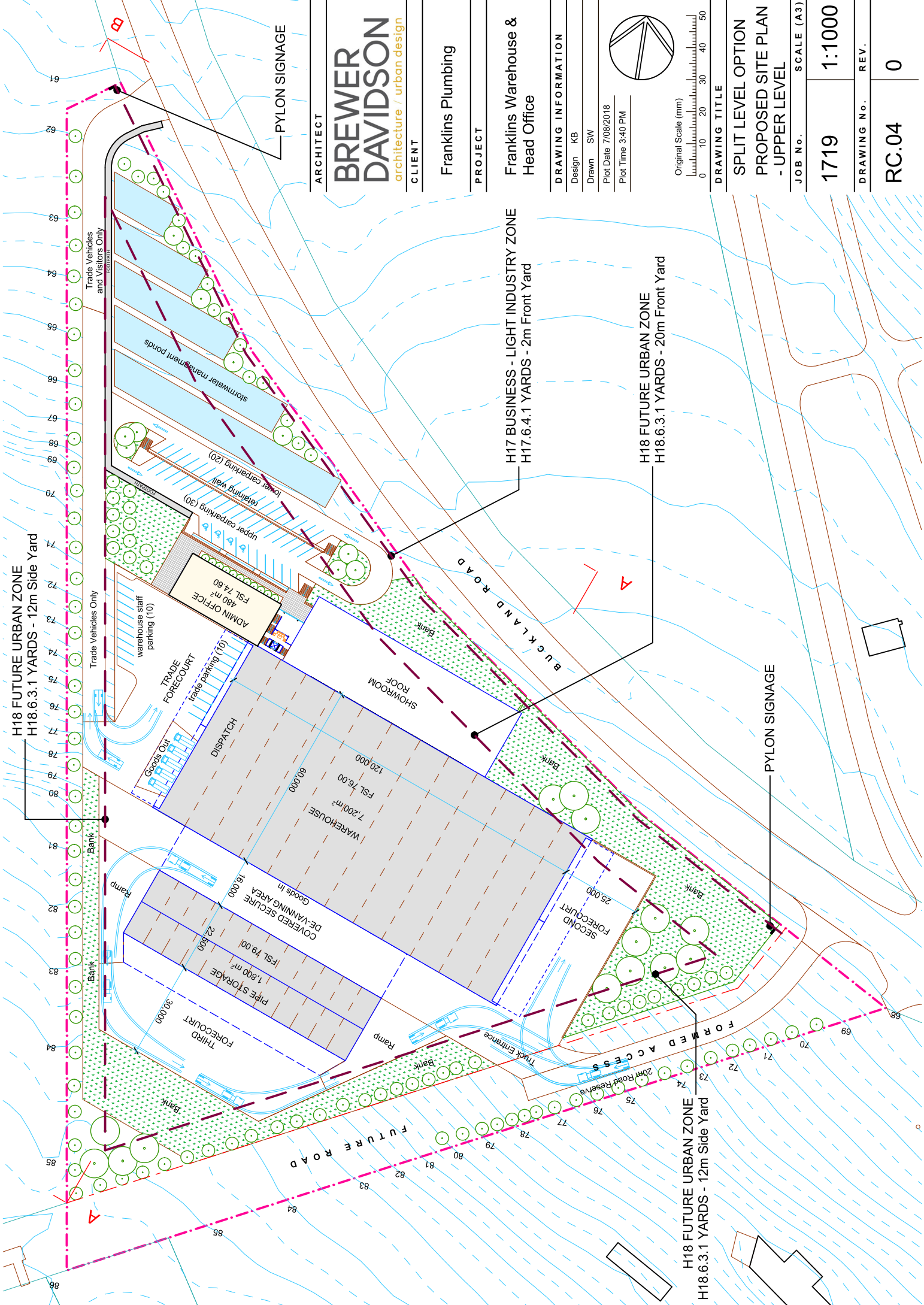
Approved: COB



Title:	Figure 2 - Soil Sample Locations	Reference: J1258a
Project name:	301 Buckland Road, Buckland	Date: 15-01-2019
geosciences <small>lid</small> <small>ENVIRONMENTAL</small>	Level 1, 47 Clyde Road, Browns Bay, 0630, Tel: (09) 475 0222	Drawn: CD Approved: COB

APPENDIX A

PROPOSED EARTHWORKS PLAN



H18 FUTURE URBAN ZONE
H18.6.3.1 YARDS - 12m Side Yard

H18 FUTURE URBAN ZONE
H18.6.3.1 YARDS - 12m Side Yard

H18 FUTURE URBAN ZONE
H18.6.3.1 YARDS - 12m Side Yard

H17 BUSINESS - LIGHT INDUSTRY ZONE
H17.6.4.1 YARDS - 2m Front Yard

H18 FUTURE URBAN ZONE
H18.6.3.1 YARDS - 20m Front Yard

PYLON SIGNAGE

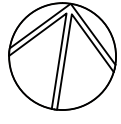
PYLON SIGNAGE

ARCHITECT
BREWER DAVIDSON
architecture / urban design

CLIENT
Franks Plumbing

PROJECT
Franks Warehouse & Head Office

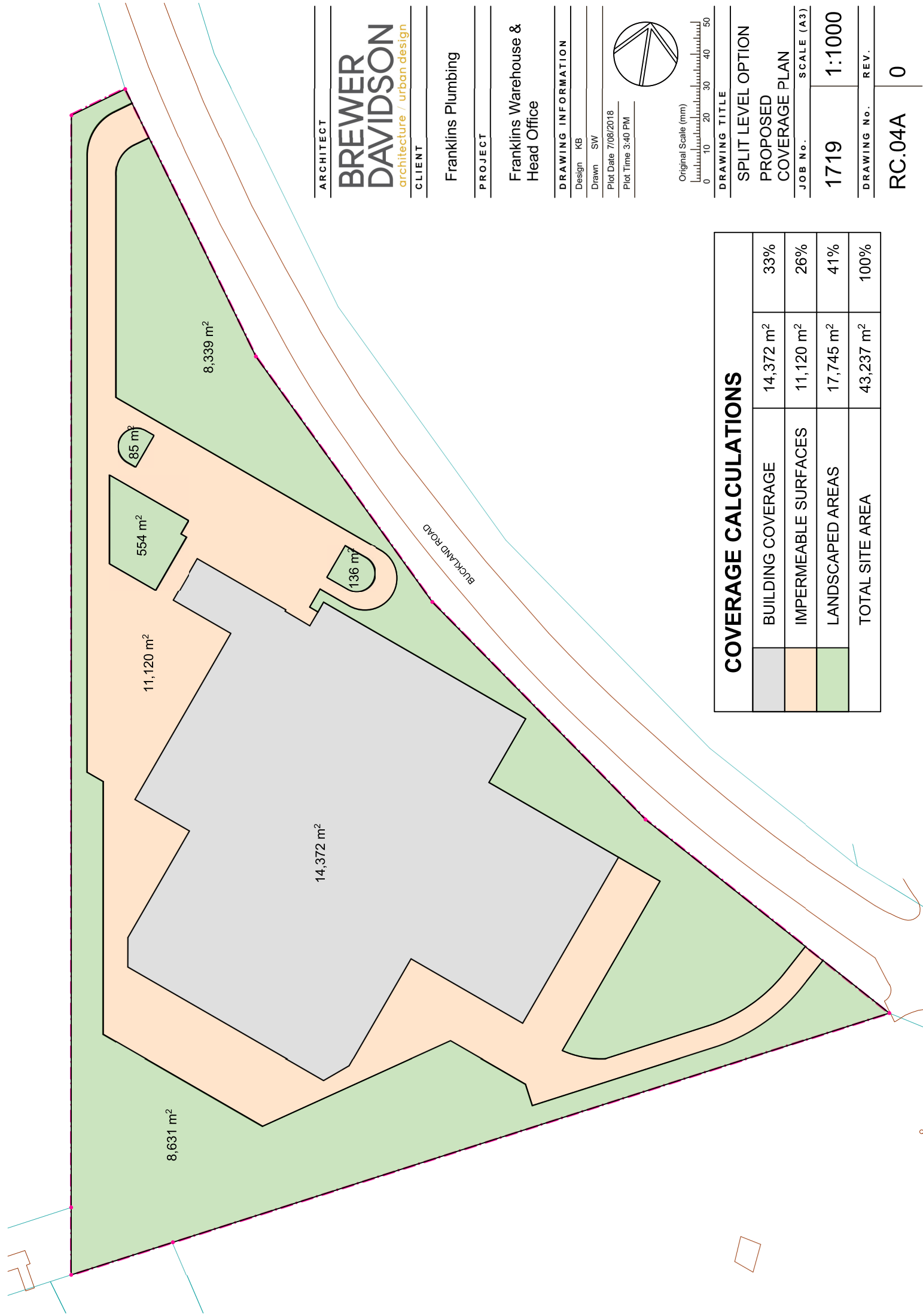
DRAWING INFORMATION
Design KB
Drawn SW
Plot Date 7/08/2018
Plot Time 3:40 PM



Original Scale (mm)
0 10 20 30 40 50

DRAWING TITLE
SPLIT LEVEL OPTION
PROPOSED SITE PLAN
- UPPER LEVEL

JOB No.	SCALE (A3)
1719	1:1000
DRAWING No.	REV.
RC.04	0



COVERAGE CALCULATIONS

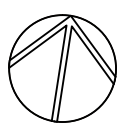
BUILDING COVERAGE	14,372 m ²	33%
IMPERMEABLE SURFACES	11,120 m ²	26%
LANDSCAPED AREAS	17,745 m ²	41%
TOTAL SITE AREA	43,237 m²	100%

ARCHITECT
BREWER DAVIDSON
 architecture / urban design

CLIENT
 Franks Plumbing

PROJECT
 Franks Warehouse & Head Office

DRAWING INFORMATION
 Design KB
 Drawn SW
 Plot Date 7/08/2018
 Plot Time 3:40 PM

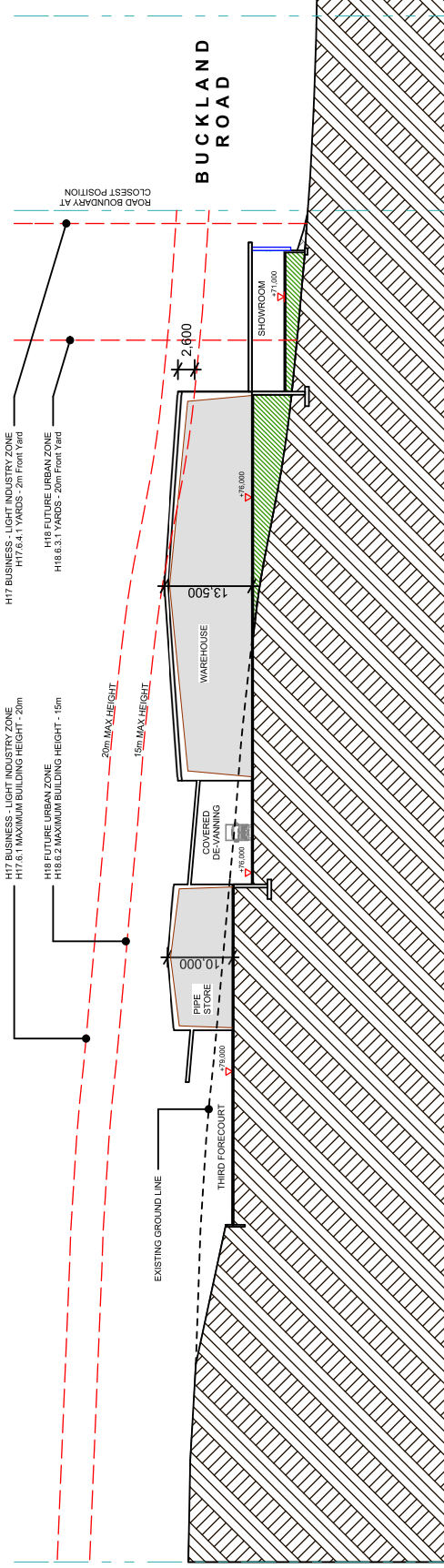


Original Scale (mm)
 0 10 20 30 40 50

DRAWING TITLE
 SPLIT LEVEL OPTION
 PROPOSED
 COVERAGE PLAN

JOB No. SCALE (A3)
 1719 1:1000

DRAWING No. REV.
 RC.04A 0

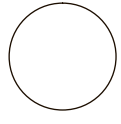


ARCHITECT
BREWER DAVIDSON
 architecture / urban design
 CLIENT

PROJECT
 Franklins Plumbing

Franklins Warehouse & Head Office

DRAWING INFORMATION
 Design KB
 Drawn SW
 Plot Date 7/08/2018
 Plot Time 3:40 PM



Original Scale (mm)
 0 10 20 30 40 50

DRAWING TITLE
 SPLIT LEVEL OPTION
 SECTION A-A

JOB No. SCALE (A3)
 1719 1:750

DRAWING No. REV.
 RC.05 0

EARTHWORKS NOTES:

1. ALL WORKS TO COMPLY WITH THE RELEVANT LOCAL AUTHORITY STANDARDS.
2. EROSION CONTROL MEASURES MUST BE INSTALLED PRIOR TO ANY WORKS COMMENCING AND SHALL BE INSTALLED IN ACCORDANCE WITH AC GD005 'EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES'.
3. REFER TO EARTHWORKS SPECIFICATION FOR EARTH FILL OPERATIONS (PRIOR TO REMOVAL OF UNSUITABLE) AND EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT. CONTRACTOR TO VIEW THE REPORT TO INFORM THEMSELVES.
4. ALL MATERIAL FROM GULLIES DEEMED BY THE ENGINEER TO BE UNSUITABLE SHALL BE EXCAVATED, STOCKPILED AND REMOVED FROM THE SITE. MATERIAL THAT CAN BE STRIPPED FROM STEEP AREAS/GULLIES USING EXCAVATOR/TRACTOR AND SCOOP SHALL BE CLASSIFIED AS SUBSOIL/TOPSOIL STRIPPING.
5. ALL GULLIES SHALL BE SURVEYED AFTER CLEARING OPERATIONS (PRIOR TO REMOVAL OF UNSUITABLE) AND AGAIN AFTER UNSUITABLE REMOVAL FOR VOLUMES.
6. UNSUITABLE MATERIAL SHALL BE CLASSIFIED AS SOILS DEEMED BY THE ENGINEER TO HAVE EXCESSIVE NATURAL WATER CONTENT AND/OR ORGANIC CONTENT REQUIRING MULTIPLE HANDLING, DRYING/CONDITIONING AND STOCKPILING/STORAGE.
7. THE LOCATION OF ALL STOCKPILES ARE WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE LOCATED CLEAR OF ALL EARTHWORKS OPERATIONS AND AWAY FROM GEOTECHNICAL UNSTABLE LAND. NO PAYMENT SHALL BE MADE FOR RELOCATION OF ANY STOCKPILES THAT HAVE BEEN FOUND TO HAVE BEEN RELOCATED TO AN UNSUITABLE LOCATION.
8. ALL SETOUT TO BE UNDERTAKEN BY THE CONTRACTOR. IT IS THE CONTRACTORS RESPONSIBILITY FOR HEALTH & SAFETY & SECURITY ON SITE, APPROPRIATE FENCING AND SIGNAGE SHALL BE ERECTED AND MAINTAINED AT ALL TIMES TO KEEP THE GENERAL PUBLIC OFF SITE. FINAL QUANTITIES AND EXTENT OF EARTHWORKS TO BE DETERMINED BY THE ENGINEER.

EARTHWORKS LEGEND:

85 — PROPOSED CONTOURS - MAJOR (1:0)

EARTHWORKS CUT-FILL TABLE				
FROM	TO	UNIT	CLOUR	RANGE VOLUME (m³)
0	1	m	Green	42086
0	-1	m	Red	-31785



2
DP 411744

FOR CONSENT

Issue Description	Checked	Date	Date	Scale:
01 PRELIMINARY	GW	26.03.18	22.07.18	1:1250
02 ISSUED FOR CONSENT	SS	30.07.18	22.07.18	
			30.07.18	(A3 Original)
			SS	30.07.18
			SS	30.07.18

Job No: **W3150** Dwg No: **210** Rev: **02**

PROPOSED EARTHWORKS PLAN
CUT FILL

WAREHOUSE AND HEAD OFFICE
FRANKLIN PLUMBING
301 BUCKLAND ROAD, PUKEKOHE

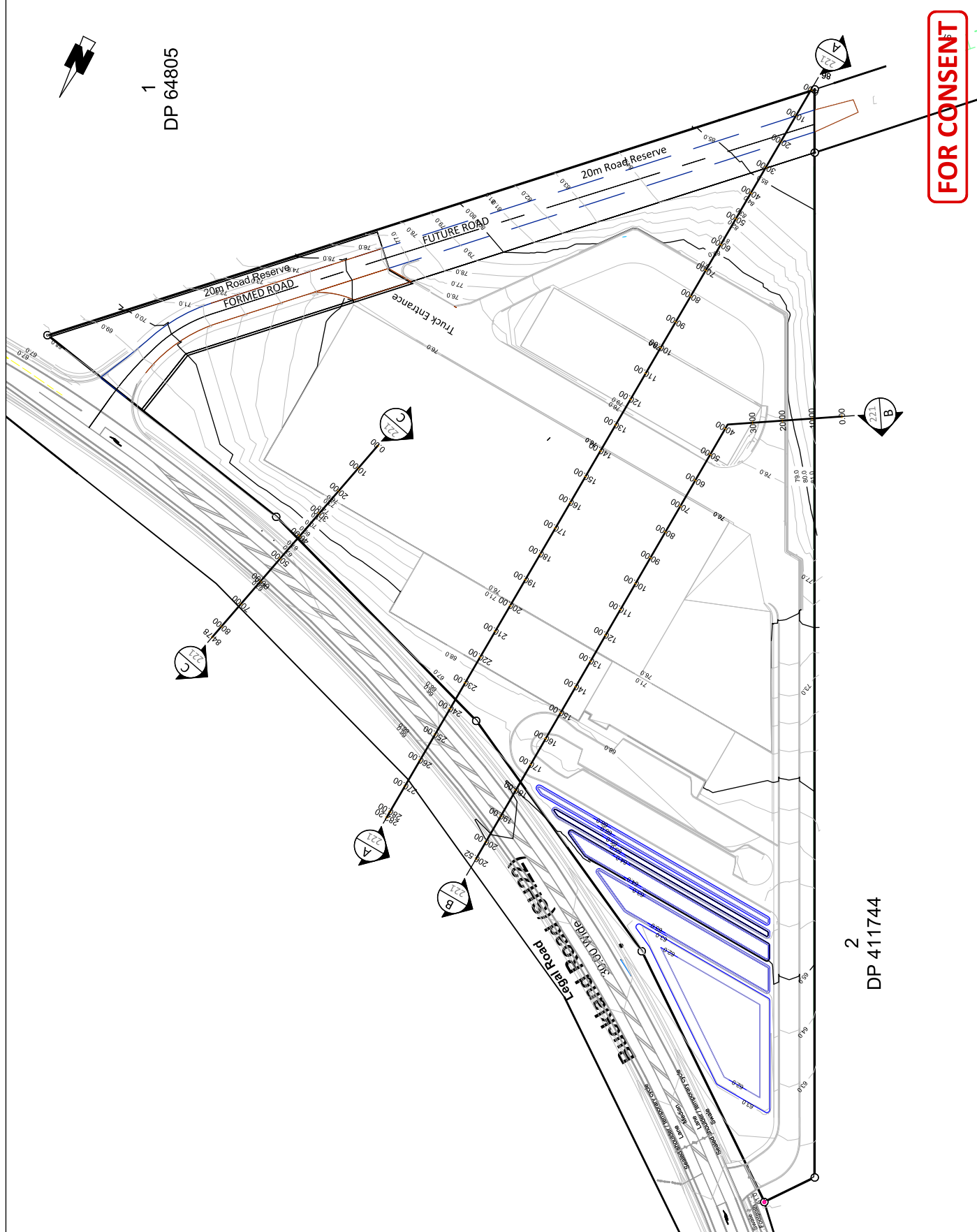
Auckland Office:
A: 25 Broadway, Newmarket
P: 09 524 7029
Hamilton Office:
A: 100 Hamilton Road, Hamilton
P: 07 849 9921
Te Awamutu Office:
A: 103 Market Street, Te Awamutu
P: 07 871 6144

EARTHWORKS NOTES:

1. ALL WORKS TO COMPLY WITH THE RELEVANT LOCAL AUTHORITY STANDARDS.
2. EROSION CONTROL MEASURES MUST BE OPERATIONAL PRIOR TO ANY WORKS COMMENCING AND SHALL BE INSTALLED IN ACCORDANCE WITH AC GD005 'EROSION AND SEDIMENT CONTROL GUIDE FOR LAND DISTURBING ACTIVITIES'.
3. REFER TO EARTHWORKS SPECIFICATION FOR EARTHILL AND EARTHWORKS TO BE UNDERTAKEN IN ACCORDANCE WITH GEOTECHNICAL INVESTIGATION REPORT. CONTRACTOR TO VIEW THE REPORT TO INFORM THEMSELVES.
4. ALL MATERIAL FROM GULLIES DERIVED BY THE ENGINEER TO BE UNSUITABLE SHALL BE EXCAVATED, STOCKPILED AND STRIPPED FROM THE SITE.
5. AREAS/GULLIES USING EXCAVATOR/TRACTOR AND SCOOP SHALL BE CLASSIFIED AS SUBSOIL/TOPSOIL STRIPPING.
6. ALL GULLIES SHALL BE SURVEYED AFTER CLEARING OPERATIONS (PRIOR TO REMOVAL OF UNSUITABLE) VOLUMES. AGAIN AFTER UNSUITABLE REMOVAL FOR DEEMED BY THE ENGINEER TO HAVE EXCESSIVE NATURAL WATER CONTENT AND/OR ORGANIC CONTENT REQUIRING MULTIPLE HANDLING, DRYING/CONDITIONING AND STOCKPILING/SPREADING AS DIRECTED.
7. GULLIES ARE WHOLLY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE LOCATED CLEAR OF ALL EARTHWORKS OPERATIONS AND AWAY FROM GEOTECHNICAL UNSTABLE LAND. NO PAYMENT SHALL BE MADE FOR RELOCATION OF ANY STOCKPILES THAT HAVE BEEN FOUND TO HAVE BEEN ALL SET OUT TO BE UNDERTAKEN BY THE CONTRACTOR.
8. IT IS THE CONTRACTORS RESPONSIBILITY FOR HEALTH & SAFETY & SECURITY ON SITE, APPROPRIATE FENCING AND SIGNAGE SHALL BE ERCTED AND MAINTAINED AT ALL TIMES TO KEEP THE GENERAL PUBLIC OFF SITE. FINAL QUANTITIES AND EXTENT OF EARTHWORKS TO BE DETERMINED BY THE ENGINEER.

EARTHWORKS LEGEND:

— 85 — PROPOSED CONTOURS - MAJOR (1:0)



1
DP 64805

2
DP 411744

FOR CONSENT

Issue Description	Checked	Date	Scale:
01 ISSUED FOR CONSENT	SS	30.07.18	1:1250
		Designed: MJW 22.07.18	
		Drawn: MJW 22.07.18	
		Checked: SS 30.07.18	
		(A3 Original)	
		Job No: W3150	Rev: 01
		Dwg No: 220	

PROPOSED EARTHWORKS SECTION LINES PLAN

**WAREHOUSE AND HEAD OFFICE
FRANKLIN PLUMBING
301 BUCKLAND ROAD, PUKEKOHE**

Auckland Office:
A: 25 Broadway, Newmarket
P: 09 524 7029
Hamilton Office:
A: 1000 Hamilton Road, Hamilton
P: 07 849 9921
Te Awamutu Office:
A: 103 Market Street, Te Awamutu
P: 07 871 6144

APPENDIX B

FORMER INVESTIGATION EXTRACTS

EXECUTIVE SUMMARY

Geosciences Ltd (GSL) has been requested by Scott Wilkinson Planning on behalf of their client, Franklins Plumbers & Builders Supplies Ltd, to conduct a Preliminary Site Investigation (PSI) of the property located at 301 Buckland Road, Buckland (“the site”). It is proposed to develop the through the removal of existing structures on site, and construction of a commercial warehouse, showroom, and office complex. The site is located on the southern edge of Pukekohe’s light industrial zone, in an area where historical and current horticultural farming is common.

The PSI included a review of the property file held by Auckland Council, the available historic aerial photographs, the certificates of title, and any available previous investigations at the site. Following the desktop review, a site inspection was undertaken to confirm findings in the review. The aim of the PSI was to identify whether any activities on the Ministry for the Environment’s (MfE) Hazardous Activities and Industries List (HAIL) are more likely than not to currently be, or historically have been, occurring on site.

The historic photograph investigation revealed that the property has been used for pastoral farming for the majority of its recorded history. However, possible horticultural practices (HAIL Item A.10) prior to the 1960s cannot be conclusively ruled out based on aerial photographs of the site between 1942 and 1961. Recent aerial photographs revealed the migration of sediment from the neighbouring horticultural field onto the site (HAIL Item H), confirmed by the site inspection. As the dwelling has been located on the site since before 1942, the use of lead-based paint is likely (HAIL Item I).

The review of a recent geotechnical investigation suggests that unverified fill material (HAIL Item I) may be present on site. While it is likely the fill material encountered is locally derived material disturbed by pastoral farming activities, the lack of records regarding potential filling activities warrants further investigation. This should include the areas of buried concrete and building rubble located in the pasture west of the residential dwelling, where a pre-1940 building was located before its demolition, as well as the stockpiles of material located along the southern boundary of the site.

The investigation, carried out in accordance with the MfE contaminated land management guidelines, has found evidence to suggest it is more likely than not that the site has been the location of possible historic and current HAIL activity. Consequently, the site does not meet the definition of *Land not covered* under Regulation (9) of the National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health. A Detailed Site Investigation (DSI) will therefore be required to determine the activity status of the proposed development under the NES and the Auckland Unitary Plan (AUP(OP)) *Chapter E.30 Contaminated Land*.

APPENDIX C

SITE PHOTOGRAPHS



PLATE 1: Arsenic impacted stockpile



PLATE 2: Area of sediment plume from adjacent property



PLATE 3: Dwelling curtilage



PLATE 4: Dwelling curtilage

APPENDIX D

LABORATORY TRANSCRIPTS

Company		Geosciences Ltd			Purchase Order			
Address		47 Clyde Road, Browns Bay, Auckland, 0630			Eurofins mgt Quote No.			
Contact Name		Chris Davies			Eurofins mgt Project No.		Carl O'Brien J1258a	
Contact Phone No		09 475 0222			Eurofins mgt Project Name		301 Buckland Rd DSI	
Special Direction		PAGE 1/2			Electronic Results Format		pdf, excel	
Requisitioned by					Email for Results		chris@geosciences.co.nz carl@geosciences.co.nz	
(Signature)					Turn Around Requirements		<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std) <input type="checkbox"/> Other { } <small>* Surcharges apply</small>	
(Time / Date)		09:20 11/12/18			Containers		<input checked="" type="checkbox"/> Courier (# 435603) <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal	
Client Sample ID		Date		Matrix		Method of Shipment		
No						Sample Comments / DG Hazard Warning		
1	SS1	10/12/2018	SOIL	X				
2	SS2	10/12/2018	SOIL	X				
3	SS3	10/12/2018	SOIL	X				
4	SS4	10/12/2018	SOIL	X				
5	SS5	10/12/2018	SOIL	X				
6	SS6	10/12/2018	SOIL	X				
7	SS7	10/12/2018	SOIL	X				
8	SS8	10/12/2018	SOIL	X				
9	SS9	10/12/2018	SOIL	X				
10	SS10	10/12/2018	SOIL	X				
11	SS11	10/12/2018	SOIL	X				
12	SS12	10/12/2018	SOIL	X				
Analysis				B22-NZ				
(Note: Where metals are requested, please specify "Total" or "Filtered")				M7-NZ				
				PAH (standard)				
Laboratory Use Only		Received By		Date		Signature		
Received By		MANSI		11/12/18				
Received By								
AUCK WELL MELB		AUCK WELL MELB		Date		Signature		
Report No		632269		Temperature				



Company		Geosciences Ltd		Purchase Order		Eurofins mgt Quote No		Project Manager		Carl O'Brien		Project Name		301 Buckland Rd DSI			
Address		47 Clyde Road, Browns Bay, Auckland, 0630		Eurofins mgt Auckland Office		Project No		J1258a		Electronic Results Format		pdf, excel		Email for Results			
Contact Name		Chris Davies		Special Order		Analysis		Turn Around Requirements		Containers		Method of Shipment		Sample Comments / DG Hazard Warning			
Contact Phone No		09 475 0222		Special Direction		PAGE 2/2		<input type="checkbox"/> 1 DAY* <input type="checkbox"/> 2 DAY* <input type="checkbox"/> 3 DAY* <input checked="" type="checkbox"/> 5 DAY (Std.) <input type="checkbox"/> Other ()		<input checked="" type="checkbox"/> Courier (# 435603) <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal		<input type="checkbox"/> Courier (#) <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Postal		*Standard apply))	
Relinquished by (Signature)				Analysis (Note: Where metals are requested, please specify "Total" or "Filtered")		M7-NZ		PAH (standard)		B22-NZ		Lead (Pb)					
(Time / Date)		9:20		10/11/18													
Client Sample ID		Date		Matrix													
1		SS13		10/12/2018		SOIL		X		X							
2		SS14		10/12/2018		SOIL		X		X							
3		COMP1		10/12/2018		SOIL				X							
4		COMP2		10/12/2018		SOIL						X					
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
Laboratory Use Only		Received By		Date		Time		Signature		Temperature		Report No					
Received By		Date		Time		Signature		Temperature		Report No							
AUCK WELL MELB		AUCK WELL MELB		AUCK WELL MELB		Date		Time		Signature		Temperature		Report No			

Geosciences Ltd
 First Floor, 47 Clyde Road
 Browns Bay
 Auckland NZ 0630



NATA Accredited
 Accreditation Number 1261
 Site Number 1254

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

Attention: Chris Davies

Report 632269-S
 Project name 301 BUCKLAND RD DS1
 Project ID J1258A
 Received Date Dec 11, 2018

Client Sample ID			SS1	SS2	SS3	SS4
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			K18-De12629	K18-De12630	K18-De12631	K18-De12632
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Organochlorine Pesticides (NZ MfE)						
2.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDD	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDE	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4.4'-DDT	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
a-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
b-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlordanes - Total	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
d-BHC	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dieldrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan I	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan II	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endosulfan sulphate	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Endrin ketone	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
g-BHC (Lindane)	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toxaphene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibutylchloroendate (surr.)	1	%	109	100	98	120
Tetrachloro-m-xylene (surr.)	1	%	83	86	88	105
Heavy Metals						
Arsenic	2	mg/kg	12	12	11	11
Copper	5	mg/kg	75	71	65	71
Lead	5	mg/kg	45	57	38	39
% Moisture	1	%	26	27	27	30

Client Sample ID			SS5	SS6	SS7	SS8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			K18-De12633	K18-De12634	K18-De12635	K18-De12636
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
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	-	-
a-BHC	0.01	mg/kg	< 0.01	< 0.01	-	-
Aldrin	0.01	mg/kg	< 0.01	< 0.01	-	-
b-BHC	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-BHC	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-BHC (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	0.1	mg/kg	< 0.1	< 0.1	-	-
trans-Chlordane	0.01	mg/kg	< 0.01	< 0.01	-	-
Dibutylchloroendate (surr.)	1	%	111	127	-	-
Tetrachloro-m-xylene (surr.)	1	%	90	88	-	-
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
p-Terphenyl-d14 (surr.)	1	%	-	-	82	73
2-Fluorobiphenyl (surr.)	1	%	-	-	103	111

Client Sample ID			SS5	SS6	SS7	SS8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			K18-De12633	K18-De12634	K18-De12635	K18-De12636
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	11	12	-	-
Copper	5	mg/kg	71	84	-	-
Lead	5	mg/kg	40	45	-	-
Metals M7 (NZ MfE)						
Arsenic	2	mg/kg	-	-	12	130
Cadmium	0.4	mg/kg	-	-	< 0.4	< 0.4
Chromium	5	mg/kg	-	-	18	51
Copper	5	mg/kg	-	-	22	81
Lead	5	mg/kg	-	-	24	53
Nickel	5	mg/kg	-	-	6.2	13
Zinc	5	mg/kg	-	-	51	160
% Moisture	1	%	30	29	25	26

Client Sample ID			SS9	SS10	SS11	SS12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			K18-De12637	K18-De12638	K18-De12639	K18-De12640
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
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
Benzo(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
p-Terphenyl-d14 (surr.)	1	%	77	138	142	72
2-Fluorobiphenyl (surr.)	1	%	104	114	106	56
Metals M7 (NZ MfE)						
Arsenic	2	mg/kg	11	8.2	18	15
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	28	22	32	24
Copper	5	mg/kg	110	41	41	60
Lead	5	mg/kg	36	170	34	47
Nickel	5	mg/kg	16	13	11	10
Zinc	5	mg/kg	110	150	72	120

Client Sample ID			SS9 Soil K18-De12637 Dec 10, 2018	SS10 Soil K18-De12638 Dec 10, 2018	SS11 Soil K18-De12639 Dec 10, 2018	SS12 Soil K18-De12640 Dec 10, 2018
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
% Moisture	1	%	24	25	27	33

Client Sample ID			SS13 Soil K18-De12641 Dec 10, 2018	SS14 Soil K18-De12642 Dec 10, 2018	COMP1 Soil K18-De12643 Dec 10, 2018	COMP2 Soil K18-De12644 Dec 10, 2018
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
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	-
a-BHC	0.01	mg/kg	-	-	< 0.01	-
Aldrin	0.01	mg/kg	-	-	< 0.01	-
b-BHC	0.01	mg/kg	-	-	< 0.01	-
Chlordanes - Total	0.01	mg/kg	-	-	< 0.01	-
cis-Chlordane	0.01	mg/kg	-	-	< 0.01	-
d-BHC	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-BHC (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	0.1	mg/kg	-	-	< 0.1	-
trans-Chlordane	0.01	mg/kg	-	-	< 0.01	-
Dibutylchloroendate (surr.)	1	%	-	-	82	-
Tetrachloro-m-xylene (surr.)	1	%	-	-	72	-
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	-	-

Client Sample ID			SS13	SS14	COMP1	COMP2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			K18-De12641	K18-De12642	K18-De12643	K18-De12644
Date Sampled			Dec 10, 2018	Dec 10, 2018	Dec 10, 2018	Dec 10, 2018
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
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	-	-
p-Terphenyl-d14 (surr.)	1	%	75	72	-	-
2-Fluorobiphenyl (surr.)	1	%	59	52	-	-
Heavy Metals						
Arsenic	2	mg/kg	-	-	11	-
Copper	5	mg/kg	-	-	62	-
Lead	5	mg/kg	-	-	51	300
Metals M7 (NZ MfE)						
Arsenic	2	mg/kg	14	4.2	-	-
Cadmium	0.4	mg/kg	< 0.4	< 0.4	-	-
Chromium	5	mg/kg	28	260	-	-
Copper	5	mg/kg	140	18	-	-
Lead	5	mg/kg	150	17	-	-
Nickel	5	mg/kg	12	11	-	-
Zinc	5	mg/kg	170	59	-	-
% Moisture						
	1	%	28	12	31	33

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Eurofins mgt Suite B22-NZ: OCP, Metals (As,Cu,Pb) (NZ MfE)			
Organochlorine Pesticides (NZ MfE)	Melbourne	Dec 17, 2018	14 Day
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Heavy Metals	Melbourne	Dec 18, 2018	180 Day
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M7 (NZ MfE)	Melbourne	Dec 18, 2018	6 Months
- Method: USEPA 6010/6020 Heavy Metals			
Polycyclic Aromatic Hydrocarbons (NZ MfE)	Melbourne	Dec 17, 2018	14 Day
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
% Moisture	Melbourne	Dec 11, 2018	14 Day
- Method: LTM-GEN-7080 Moisture			

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 NATA # 1261
 Site # 23736

Company Name: Geosciences Ltd
Address: First Floor, 47 Clyde Road
 Browns Bay
 Auckland NZ 0630
Project Name: 301 BUCKLAND RD DS1
Project ID: J1258A

Order No.:
Report #: 632269
Phone: 0011 64 9 4760 454
Fax:

Received: Dec 11, 2018 11:30 AM
Due: Dec 18, 2018
Priority: 5 Day
Contact Name: Chris Davies

Eurofins | mgt Analytical Services Manager : Swati Shahaney

Sample Detail

Auckland Laboratory - IANZ#						
Christchurch Laboratory - IANZ#1290						
Eurofins Australia Laboratory						
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	SS1	Dec 10, 2018		Soil	K18-De12629	X
2	SS2	Dec 10, 2018		Soil	K18-De12630	X
3	SS3	Dec 10, 2018		Soil	K18-De12631	X
4	SS4	Dec 10, 2018		Soil	K18-De12632	X
5	SS5	Dec 10, 2018		Soil	K18-De12633	X
6	SS6	Dec 10, 2018		Soil	K18-De12634	X
7	SS7	Dec 10, 2018		Soil	K18-De12635	X
8	SS8	Dec 10, 2018		Soil	K18-De12636	X
9	SS9	Dec 10, 2018		Soil	K18-De12637	X
10	SS10	Dec 10, 2018		Soil	K18-De12638	X
Eurofins mgt Suite B22-NZ: OCP, Metals (As,Cu,Pb) (NZ MfE)						
Polycyclic Aromatic Hydrocarbons (NZ MfE)						
Metals M7 (NZ MfE)						
Moisture Set						
Lead						

Company Name: Geosciences Ltd
Address: First Floor, 47 Clyde Road
 Browns Bay
 Auckland NZ 0630
Project Name: 301 BUCKLAND RD DS1
Project ID: J1258A

Order No.: 632269
Report #: 0011 64 9 4760 454
Phone:
Fax:

Received: Dec 11, 2018 11:30 AM
Due: Dec 18, 2018
Priority: 5 Day
Contact Name: Chris Davies

Eurofins | mgt Analytical Services Manager : Swati Shahaney

Sample Detail		Lead	Moisture Set	Metals M7 (NZ MfE)	Polycyclic Aromatic Hydrocarbons (NZ MfE)	Eurofins mgt Suite B22-NZ: OCP, Metals (As,Cu,Pb) (NZ MfE)
Auckland Laboratory - IANZ#						
Christchurch Laboratory - IANZ#1290						
Eurofins Australia Laboratory						
External Laboratory						
11	SS11	Dec 10, 2018	Soil			X
12	SS12	Dec 10, 2018	Soil	X	X	
13	SS13	Dec 10, 2018	Soil	X	X	
14	SS14	Dec 10, 2018	Soil	X	X	
15	COMP1	Dec 10, 2018	Soil	X		X
16	COMP2	Dec 10, 2018	Soil	X		
Test Counts						7

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
- All soil results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

- 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.
- 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.
- Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
- Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
- Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
- Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- 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							
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-BHC	mg/kg	< 0.01			0.01	Pass	
Aldrin	mg/kg	< 0.01			0.01	Pass	
b-BHC	mg/kg	< 0.01			0.01	Pass	
Chlordanes - Total	mg/kg	< 0.01			0.01	Pass	
cis-Chlordane	mg/kg	< 0.01			0.01	Pass	
d-BHC	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-BHC (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	
Hexachlorobenzene	mg/kg	< 0.01			0.01	Pass	
Methoxychlor	mg/kg	< 0.01			0.01	Pass	
Toxaphene	mg/kg	< 0.1			0.1	Pass	
trans-Chlordane	mg/kg	< 0.01			0.01	Pass	
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							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Method Blank							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M7 (NZ MfE)							
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Organochlorine Pesticides (NZ MfE)							
2.4'-DDD	%	117			70-130	Pass	
2.4'-DDE	%	114			70-130	Pass	
2.4'-DDT	%	92			70-130	Pass	
4.4'-DDD	%	117			70-130	Pass	
4.4'-DDE	%	113			70-130	Pass	
4.4'-DDT	%	78			70-130	Pass	
a-BHC	%	98			70-130	Pass	
Aldrin	%	90			70-130	Pass	
b-BHC	%	99			70-130	Pass	
Chlordanes - Total	%	116			70-130	Pass	
cis-Chlordane	%	114			70-130	Pass	
d-BHC	%	113			70-130	Pass	
Dieldrin	%	100			70-130	Pass	
Endosulfan I	%	101			70-130	Pass	
Endosulfan II	%	105			70-130	Pass	
Endosulfan sulphate	%	73			70-130	Pass	
Endrin	%	87			70-130	Pass	
Endrin aldehyde	%	78			70-130	Pass	
Endrin ketone	%	125			70-130	Pass	
g-BHC (Lindane)	%	81			70-130	Pass	
Heptachlor	%	88			70-130	Pass	
Heptachlor epoxide	%	105			70-130	Pass	
Hexachlorobenzene	%	107			70-130	Pass	
Methoxychlor	%	80			70-130	Pass	
trans-Chlordane	%	118			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons (NZ MfE)							
Acenaphthene	%	84			70-130	Pass	
Acenaphthylene	%	80			70-130	Pass	
Anthracene	%	109			70-130	Pass	
Benz(a)anthracene	%	104			70-130	Pass	
Benzo(a)pyrene	%	77			70-130	Pass	
Benzo(b&j)fluoranthene	%	98			70-130	Pass	
Benzo(g,h,i)perylene	%	82			70-130	Pass	
Benzo(k)fluoranthene	%	106			70-130	Pass	
Chrysene	%	88			70-130	Pass	
Dibenz(a,h)anthracene	%	72			70-130	Pass	
Fluoranthene	%	109			70-130	Pass	
Fluorene	%	89			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	78			70-130	Pass	
Naphthalene	%	81			70-130	Pass	
Phenanthrene	%	98			70-130	Pass	
Pyrene	%	81			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	100			80-120	Pass	
Copper	%	103			80-120	Pass	

Test		Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code	
Lead		%	103		80-120	Pass		
LCS - % Recovery								
Metals M7 (NZ MfE)								
Cadmium		%	102		80-120	Pass		
Chromium		%	107		80-120	Pass		
Nickel		%	99		80-120	Pass		
Zinc		%	98		80-120	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Heavy Metals				Result 1				
Arsenic	K18-De12637	CP	%	102		75-125	Pass	
Copper	K18-De12637	CP	%	103		75-125	Pass	
Lead	K18-De12637	CP	%	101		75-125	Pass	
Spike - % Recovery								
Metals M7 (NZ MfE)				Result 1				
Cadmium	K18-De12637	CP	%	103		75-125	Pass	
Chromium	K18-De12637	CP	%	107		75-125	Pass	
Nickel	K18-De12637	CP	%	101		75-125	Pass	
Zinc	K18-De12637	CP	%	123		75-125	Pass	
Spike - % Recovery								
Organochlorine Pesticides (NZ MfE)				Result 1				
2,4'-DDD	K18-De07179	NCP	%	122		70-130	Pass	
2,4'-DDE	K18-De07179	NCP	%	118		70-130	Pass	
2,4'-DDT	K18-De07179	NCP	%	89		70-130	Pass	
4,4'-DDD	K18-De07179	NCP	%	126		70-130	Pass	
4,4'-DDE	K18-De07179	NCP	%	125		70-130	Pass	
4,4'-DDT	K18-De07179	NCP	%	88		70-130	Pass	
a-BHC	K18-De07179	NCP	%	82		70-130	Pass	
Aldrin	K18-De07179	NCP	%	88		70-130	Pass	
b-BHC	K18-De07179	NCP	%	97		70-130	Pass	
Chlordanes - Total	K18-De07179	NCP	%	106		70-130	Pass	
cis-Chlordane	K18-De07179	NCP	%	102		70-130	Pass	
d-BHC	K18-De07179	NCP	%	98		70-130	Pass	
Dieldrin	K18-De07179	NCP	%	100		70-130	Pass	
Endosulfan I	K18-De07179	NCP	%	111		70-130	Pass	
Endosulfan II	K18-De07179	NCP	%	116		70-130	Pass	
Endosulfan sulphate	K18-De07179	NCP	%	122		70-130	Pass	
Endrin	K18-De07179	NCP	%	124		70-130	Pass	
Endrin aldehyde	K18-De07179	NCP	%	122		70-130	Pass	
Endrin ketone	K18-De07179	NCP	%	127		70-130	Pass	
g-BHC (Lindane)	K18-De07179	NCP	%	84		70-130	Pass	
Heptachlor	K18-De07179	NCP	%	78		70-130	Pass	
Heptachlor epoxide	K18-De07179	NCP	%	102		70-130	Pass	
Hexachlorobenzene	K18-De07179	NCP	%	102		70-130	Pass	
Methoxychlor	K18-De07179	NCP	%	90		70-130	Pass	
trans-Chlordane	K18-De07179	NCP	%	109		70-130	Pass	
Spike - % Recovery								
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1				
Acenaphthene	K18-De12640	CP	%	109		70-130	Pass	
Acenaphthylene	K18-De12640	CP	%	109		70-130	Pass	
Anthracene	K18-De12640	CP	%	123		70-130	Pass	
Benz(a)anthracene	K18-De12640	CP	%	117		70-130	Pass	
Benzo(a)pyrene	K18-De12640	CP	%	89		70-130	Pass	
Benzo(b&j)fluoranthene	K18-De12640	CP	%	98		70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g,h,i)perylene	K18-De12640	CP	%	80			70-130	Pass	
Benzo(k)fluoranthene	K18-De12640	CP	%	97			70-130	Pass	
Chrysene	K18-De12640	CP	%	101			70-130	Pass	
Dibenz(a,h)anthracene	K18-De12640	CP	%	87			70-130	Pass	
Fluoranthene	K18-De12640	CP	%	112			70-130	Pass	
Fluorene	K18-De12640	CP	%	110			70-130	Pass	
Indeno(1,2,3-cd)pyrene	K18-De12640	CP	%	79			70-130	Pass	
Naphthalene	K18-De12640	CP	%	109			70-130	Pass	
Phenanthrene	K18-De12640	CP	%	124			70-130	Pass	
Pyrene	K18-De12640	CP	%	106			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	K18-De12633	CP	%	30	32	6.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons (NZ MfE)				Result 1	Result 2	RPD			
Acenaphthene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Acenaphthylene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Anthracene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benz(a)anthracene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(a)pyrene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(b&j)fluoranthene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(g,h,i)perylene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Benzo(k)fluoranthene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Chrysene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Dibenz(a,h)anthracene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluoranthene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Fluorene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Naphthalene	K18-De12603	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Phenanthrene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Pyrene	K18-De12603	NCP	mg/kg	< 0.03	< 0.03	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	K18-De12636	CP	mg/kg	130	120	6.0	30%	Pass	
Copper	K18-De12636	CP	mg/kg	81	82	2.0	30%	Pass	
Lead	K18-De12636	CP	mg/kg	53	56	6.0	30%	Pass	
Duplicate									
Metals M7 (NZ MfE)				Result 1	Result 2	RPD			
Cadmium	K18-De12636	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	K18-De12636	CP	mg/kg	51	55	7.0	30%	Pass	
Nickel	K18-De12636	CP	mg/kg	13	14	5.0	30%	Pass	
Zinc	K18-De12636	CP	mg/kg	160	160	2.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	K18-De12637	CP	mg/kg	11	11	<1	30%	Pass	
Copper	K18-De12637	CP	mg/kg	110	110	6.0	30%	Pass	
Lead	K18-De12637	CP	mg/kg	36	37	3.0	30%	Pass	
Duplicate									
Metals M7 (NZ MfE)				Result 1	Result 2	RPD			
Cadmium	K18-De12637	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	K18-De12637	CP	mg/kg	28	29	2.0	30%	Pass	
Nickel	K18-De12637	CP	mg/kg	16	17	4.0	30%	Pass	
Zinc	K18-De12637	CP	mg/kg	110	110	3.0	30%	Pass	

Duplicate								
Organochlorine Pesticides (NZ MfE)				Result 1	Result 2	RPD		
2,4'-DDD	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDE	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
2,4'-DDT	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDD	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDE	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
4,4'-DDT	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
a-BHC	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Aldrin	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
b-BHC	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Chlordanes - Total	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
cis-Chlordane	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
d-BHC	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Dieldrin	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan I	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan II	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endosulfan sulphate	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin aldehyde	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Endrin ketone	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
g-BHC (Lindane)	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Heptachlor epoxide	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Hexachlorobenzene	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Methoxychlor	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
trans-Chlordane	M18-De16886	NCP	mg/kg	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	K18-De12643	CP	%	31	31	<1	30%	Pass

Comments

Eurofins | mgt accreditation number 1261, corporate site 1254 and 14271 is currently in progress of a controlled transition to a new custom built location at 6 Monterey Road, Dandenong South, Victoria 3175. All results on this report denoted as being performed by Eurofins | mgt 2-5 Kingston Town Close, Oakleigh Victoria 3166 corporate site 1254, will have been performed on either Oakleigh or new Dandenong South site.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
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

Swati Shahaney	Analytical Services Manager
Chris Bennett	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)



Glenn Jackson General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please [click here](#).

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