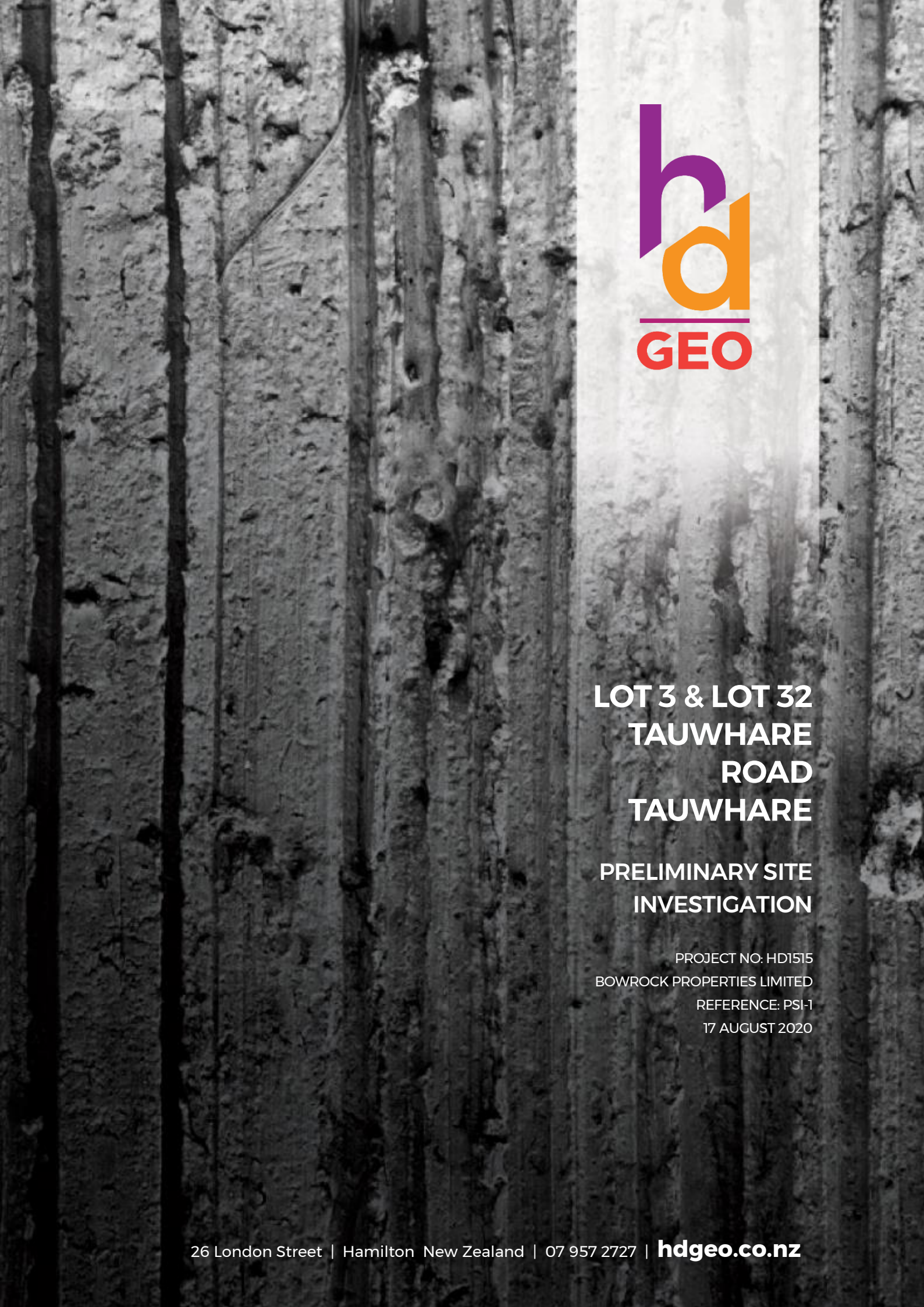


LOT 3 & LOT 32 TAUWHARE ROAD TAUWHARE

PRELIMINARY SITE INVESTIGATION

PROJECT NO: HD1515
BOWROCK PROPERTIES LIMITED
REFERENCE: PSI-1
17 AUGUST 2020

26 London Street | Hamilton New Zealand | 07 957 2727 | **hdgeo.co.nz**

Executive summary

Bowrock Properties Limited (the client) wish to develop Lot 3 and Lot 32 Tauwhare Road, Tauwhare (the site) into rural residential lots.

The site has historically been used as grazing paddocks and farmland. While grazing is not considered a hazardous activities and industries list (HAIL) activity, use of superphosphate fertiliser can lead to elevated cadmium concentrations in the soil. If contaminants are present above guideline value, the site may be classified as a HAIL site.

Where certain activities, such as subdivision and change in land use, are planned at HAIL sites, the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) must be considered. A preliminary site investigation (PSI) is required to evaluate potential as a first step in evaluating potential risk to human health from the planned activity.

There was no visual evidence of contamination during the site walkover. Soil samples were collected and analysed for cadmium and pH. Laboratory results were compared with NESCS soil contaminant standards (SCS) for rural residential land use. Five of the near-surface and 2 of the deeper sample results for cadmium were above the guideline value for protection of human health (0.8 mg/kg).

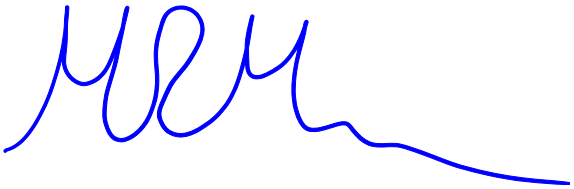
When cadmium is present above guideline values, the site is considered a HAIL site and action is required. There are numerous options, which include (but are not limited to):

- completing additional sampling to better delineate the cadmium concentrations across the site and evaluate native ground pH to determine if the pH can be adjusted
- situate the residences on the site to avoid areas which have elevated cadmium present
- treating the soil with lime to raise the pH, as cadmium toxicity decreases with higher soil pH and develop a long-term management plan for retesting every 10 years
- removing the top ~250 mm of soil from a 2 m lateral extent around the house to remove impacted soil. The removed soil can be disposed of at a licensed landfill. On-site disposal may be possible, but the soil may not be placed in an area where produce would be grown
- tilling and mixing the soil to reduce cadmium concentrations
- placing a “tag” on the title which calls for produce to be grown only in raised beds with imported topsoil

The NESCS applies to this site and consent as a restricted discretionary activity will be required.

Contents

PREPARED BY: **Matt Moore**

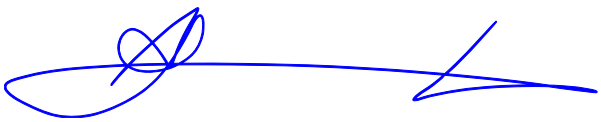


Graduate Geo Environmental Consultant
Matt@hdgeo.co.nz
Tel 027 701 9529

REVIEWED BY: **Terre Nicholson**

Principal Environmental Consultant
Terre@hdgeo.co.nz
Tel 021 061 3983

APPROVED BY: **Andrew Holland**



Technical Director
Principal Engineer
Andrew@hdgeo.co.nz
Tel 022 048 8441

Introduction

Bowrock Properties Limited (the client) wish to develop Lot 3 DP 325499 and Lot 32 DPS 81580 BLK XVI KOMAKORAU SD, located on Tauwhare Road, Tauwhare (the site) into rural residential lots. Draft site development plans are provided in Appendix A and site photos are provided in Appendix B.

The site has historically been used as grazing paddocks and farmland. While grazing is not considered a hazardous activities and industries list (HAIL) activity, use of superphosphate fertiliser can lead to elevated cadmium concentrations in the soil. If contaminants are present above guideline values, the site may be classified as a HAIL site.

Where certain activities, such as subdivision, are planned at potentially contaminated sites, the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS) must be considered.

A preliminary site investigation (PSI) with limited sampling was recommended as a first step in evaluating potential risk to human health from the planned activity. The client has engaged HD Geo Limited (HD Geo) to conduct the PSI.

Scope and purpose

A PSI with limited sampling consists of the following elements:

- a desktop study, which includes the review of historic and recent aerial photos, geology and hydrogeology, applicable council records, and any other environmental studies conducted
- a site inspection with limited soil sampling
- preparation of a report consistent with Ministry for the Environment's Contaminated Land Management Guidelines (CLMG) No. 1

Site details

Site details are provided in Table 1 and site photos are provided in Appendix B.

Table 1: Site details

Item	Description
Site address	Tauwhare Road, Tauwhare
Legal descriptions	LOT 3 DP 325499 LOT 32 DPS 81580 BLK XVI KOMAKORAU SD
Zoning	Rural
Approximate site area	201,551 m^2
Current site use	Pasture for cropping
Proposed site use	Rural residential
District Council	Waikato District Council
Regional Council	Waikato Regional Council

Desktop study

We completed a desk study prior to the site visit to identify areas of interest. This included a review of historical[1] and recent[2] aerial images, geological maps[3], and the evaluation of existing records.

Historic aerial photos

We completed a review of historic and recent aerial photos to evaluate previous land uses and areas of interest. Aerial photos are provided in Appendix C and described in Table 2.

Table 2: Historical aerial photos

Photo year	Description
1950	On site: The site is currently vacant pasture. It is separated into 4 paddocks by internal fencing. There are 3 sheds on site, which include 2 in the north-western paddock and 1 in the central paddock. There are several established trees along the north-western and eastern site boundaries. There are hedgerows along the western and eastern site boundaries. The site is bounded by Tauwhare Road to the north, and pastural land to the east, south, and west. Off site: The surrounding area includes pastural land in all cardinal directions, as well as rural residential houses to the east and west.
1953	The 2 sheds in the north-western paddock have been removed, and a shed constructed on the centre-north side of the site. No other significant changes can be seen on site or in the surrounding area.
1971 to 1986	An access track has been constructed in the centre of the site, running east to west. The paddocks have been further separated by internal fencing. The majority of the hedgerows bounding the eastern and western sides of the site have been removed. Additional residential development has occurred to the north, east, and west. No other significant changes can be seen on site or in the surrounding area.
1990 to 1995	An area in the centre-east side of the site has been cleared of vegetation. No other significant changes can be seen on site or in the surrounding area.
2008	A wetland area has been developed in the centre-north side of the site. Minor earthworks appear to have been completed across the site, as well as cropping. An access track from Tauwhare Road has been constructed on the north-western side of the site. Further residential development has occurred to the east and west of the site. No other significant changes can be seen on site or in the surrounding area.
2014 to 2019	The 2 tracks through the property have been joined together. Further cropping of the area can be seen. Further residential development has occurred to the east of the site. No other significant changes can be seen on site or in the surrounding area.

Geology and hydrogeology

A geologic map of the area indicates that the site is underlain by 2 geologic units, which include the Hinuera Formation and the Walton Subgroup. The Hinuera Formation is made up of cross-bedded pumice sand, silt and gravel with interbedded peat, and is mapped within the low-lying areas along

[1] Sourced from http://retrolens.nz and licensed by LINZ CC-BY. Accessed 29/07/20
[2] Google Earth Pro
[3] 1:250,000 Geological Map of New Zealand (QMAP). *New Zealand Geology Web Map*. GNS, 2013. http://data.gns.cri.nz/geology/. Accessed 29/07/20

the east, north-east, and southern boundaries of the site. The Walton Subgroup is made up of alluvium dominated by primary and reworked, non-welded ignimbrite, and is mapped within the majority of the site. The Walton Subgroup is often mantled by a layer of volcanic ash. Our investigation encountered material consistent with the mapped geology. Groundwater was not encountered within the sample locations during the site investigation.

There are approximately 4 mapped bodies of water within 1 km of the site. These include a drainage ditch running through the site near the eastern site boundary, and 2 drainage features located approximately 170 m north and 750 m east of the site. The Waitakaruru Stream is located approximately 700 m east of the site. Along with the mapped bodies of water, there is also a wetland area within the northern half of the site, which contains 2 main ponds. Based on the topography of the site and surrounding area, it is likely that groundwater flows either to north (down-gradient of the site) or east (towards the Waitakaruru Stream).

According to the Waikato Regional Council GIS[4], there are approximately 16 bores within 1 km of the site. Well depths ranged from 4.2 m to 77.7 m deep. The application of the bores and depth to water was not available.

Council records

Records were requested from the Waikato District Council and Waikato Regional Council. Neither council records the site as having been used for HAIL activities. The Waikato Regional Council notes that the site has been used for pastoral farming activities including dairy farming, and that prolonged use of superphosphate fertilisers associated with these activities has the potential to elevate cadmium concentrations in the soil.

Contaminants of potential concern

Based on the desktop study, we have identified that cadmium is a contaminant of potential concern (COPC). Cadmium is considered a COPC as the site has historically been used for pasture/grazing. Use of superphosphate fertilisers on pasture land can result in elevated concentrations of cadmium.

Conceptual site model

Based on the evaluation of available data and identification of the COPCs, a conceptual site model (CSM) was constructed. The CSM is based on a source-pathway-receptor scenario, where a source of contamination is able to come into contact with a receptor through a completed pathway. For this site, the potential source of contamination is cadmium from superphosphate fertiliser use associated with pasture.

Contact with surface and near-surface soil would represent a possible complete pathway.

The primary pathways of concern are likely to be the following:

- direct human contact (dermal contact, ingestion, inhalation)
- migration from near surface soils to groundwater via leaching
- migration within groundwater
- migration via service lines (irrigation pipes)
- flora and fauna via plant uptake

[4] Waikato Regional Council Groundwater, Local Maps, https://waikatomaps.waikatoregion.govt.nz/Groundwater/. Accessed 29/07/20

The primary receptors at risk are likely to be the following:

- human health – farm owners, future construction workers, and residents
- surface water and runoff
- neighbouring properties and residents

Considerations take into account in constructing the CSM are shown in Table 2, below.

Table 3: Conceptual site model

Item	Description
Soil	If near-surface contamination is present, construction workers and residents could contact contamination through inhalation, ingestion, and dermal contact. The proposed residential lots would likely include houses surrounded by grassed areas which could potentially be used for vegetable gardens or similar activities. The alternate development plan also has the potential for communal gardens which could be used to grow vegetables or similar. This could create a completed pathway between potentially contaminated soil and people.
Surface water	Ponded water was observed within the low-lying area along the southern and northern sides of the site. Water was also observed within a drainage ditch along the eastern site boundary and within the wetland area of the site. Surface water runoff from rain and dust settlement activities may mobilise contaminants and therefore may contribute to migration of contamination.
Groundwater	Groundwater may contribute to migration of contamination from soluble and mobile contaminants. Groundwater was encountered during our geotechnical investigation at a minimum depth of 0.6 m below ground level (bgl) within the low-lying areas of the site.
Subsurface geology	Subsurface geology may influence contaminant transport. The majority of the soils on site typically have a low hydraulic conductivity (silt and clay), which would reduce the vertical migration of contamination. The soils within the low-lying areas (mapped as the Hinuera Formation) have a higher hydraulic conductivity, which would allow the vertical migration of contamination.
Flora and fauna	The site has historically been used for pasture and is currently grassed. The alternate development plans have the potential for the southern side of the site to be used for grazing.
Vapour intrusion	No likely contaminants associated with vapour intrusion were identified during the desk study.

Site inspection

We undertook a site walkover to identify features that have the potential to cause contamination to the soil on site. The site walkover found that the majority of the site is currently grassed pasture, with evidence of recent maize cropping. A wetland area was observed within the northern half of the site, which consists of 2 main ponds surrounded by riparian vegetation. A track gives access to the site from Tauwhare Road, and runs north to south to the western extent of the wetlands, where it then runs west to east through the wetlands to the eastern site boundary.

The site slopes gently down from the road to the wetlands, where it then gently slopes up to the main ridge of the site. This ridge runs through the centre of the site in a north-east to south-west direction. This ridge slopes moderately down towards the south-east and southern site boundaries, ending in a low-lying area where ponded water was observed. A drainage feature is present near the eastern site boundary flowing in a south to north direction.

A burn pile was observed on the north-eastern side of the site, which contained untreated wood (tree stumps and large branches). Along the track to the west of the wetlands, a shipping container, concrete rings, and old metal fencing/concrete posts were seen.

Apart from the burn pile, there was no visual or olfactory signs of contamination within the site at the time of the investigation. No evidence of underground storage tanks, lagoons, or hazardous substance releases were observed at the time of the inspection. No signs of stressed vegetation were observed.

Site sampling

The sampling strategy was based on the CSM and knowledge of contaminant behaviour. Residual contamination from the use of superphosphate fertilisers is likely to be highest within the top 100 mm of soil. Cadmium toxicity is highly pH dependant, with higher toxicity at a lower pH. Figures showing sample locations across the site are included in Appendix A.

The site investigation consisted of the collection of near-surface (50 mm to 100 mm bgl) and shallow subsurface (200 mm to 300 mm bgl) samples taken from 16 locations across the site. The near-surface samples were composited into sets of 4 samples per set and each set was analysed for cadmium and pH.

All shallow subsurface samples collected were placed in cold storage by the laboratory. Sample locations were excavated using a decontaminated sampling equipment and collected in accordance with HD Geo's standard operating procedures. Soil was placed in appropriate laboratory-provided containers using a gloved hand. Gloves were changed between each sample. Samples were transported in a chilly bin to Analytica Laboratories under chain-of-custody protocols. Analytica Laboratories is an IANZ accredited laboratory for the analyses requested.

The investigation was conducted with the oversight of a suitably qualified and experienced practitioner (SQEP) with contaminated land sampling experience in accordance with NESCS requirements. Samples were collected by a suitably trained environmental specialist.

Laboratory results and evaluation

A summary table of results are provided in Appendix E and full laboratory reports are provided in Appendix F. The rural residential guideline value with 25% produce consumption from the NESCS guideline for cadmium of 0.8 mg/kg was used for risk evaluation, along with Waikato regional background concentrations. This guideline value was selected due to the large lot size associated with the subdivision.

Cadmium was below the rural residential guideline value of 0.8 mg/kg in 2 of the composites, but near the guideline value (0.748 mg/kg) in 1 of the composites. Cadmium was slightly above the NESCS guideline value in 1 of the composites, with a concentration of 0.831 mg/kg.

The individual cadmium samples associated with the composites with results near and above the guideline values were also analysed. The analysis found that 5 of the 8 individual near-surface samples analysed were above guideline values, with results that ranged from 0.991 mg/kg to 1.47 mg/kg.

The 5 deeper cadmium samples associated with the samples above guideline values were then analysed. The analysis found that samples beneath ES01 and ES03 were still above the NESCS cadmium guideline value, with results of 1.27 mg/kg and 0.972 mg/kg, respectively. Sample ES03 had a pH of 5.7, which indicates that it may be possible to adjust the guideline values based on soil pH. The remaining 3 underlying samples were all below the guideline value.

Conclusions

Five near-surface and 2 shallow subsurface soil samples were above the NESCS cadmium guideline value for rural-residential land use (0.8 mg/kg).

When cadmium is present above guideline values, action is required. There are numerous options, which include (but are not limited to):

- completing additional sampling to better delineate the cadmium concentrations across the site and evaluate native ground pH to determine if the pH can be adjusted
- situate the residences on the site to avoid areas which have elevated cadmium present
- treating the soil with lime to raise the pH, as cadmium toxicity decreases with higher soil pH and develop a long-term management plan for retesting every 10 years
- removing the top ~250 mm of soil from a 2 m lateral extent around the house to remove impacted soil. The removed soil can be disposed of at a licensed landfill. On-site disposal may be possible, but the soil may not be placed in an area where produce would be grown
- tilling and mixing the soil to reduce cadmium concentrations
- placing a “tag” on the title which calls for produce to be grown only in raised beds with imported topsoil

The elevated cadmium concentrations constitute a HAIL activity and the NESCS applies to the site where elevated cadmium was detected (along with low pH). Consent as a restricted discretionary activity will be required under the NESCS.

Limitations

This document does not include any assessment or consideration of potential health and safety issues under the Health and Safety at Work Act 2015. HD Geo has relied upon information provided by the Client and other third parties to prepare this document, some of which has not been fully verified by HD Geo. This document may be transmitted, reproduced, or disseminated only in its entirety. This report has been prepared for the use of the client and may not be relied upon by others without the express written permission of HD Geo.

From a technical perspective, the subsurface environment at any site may present substantial uncertainty. It is a heterogeneous, complex environment, in which small subsurface features or changes in geologic conditions can have substantial impacts on water, vapour, or chemical movement. HD Geo’s professional opinions are based on its professional judgement, experience, and training. It is possible that testing and analysis might produce different results and/or different

opinions. Should additional information become available, this report should be updated accordingly.

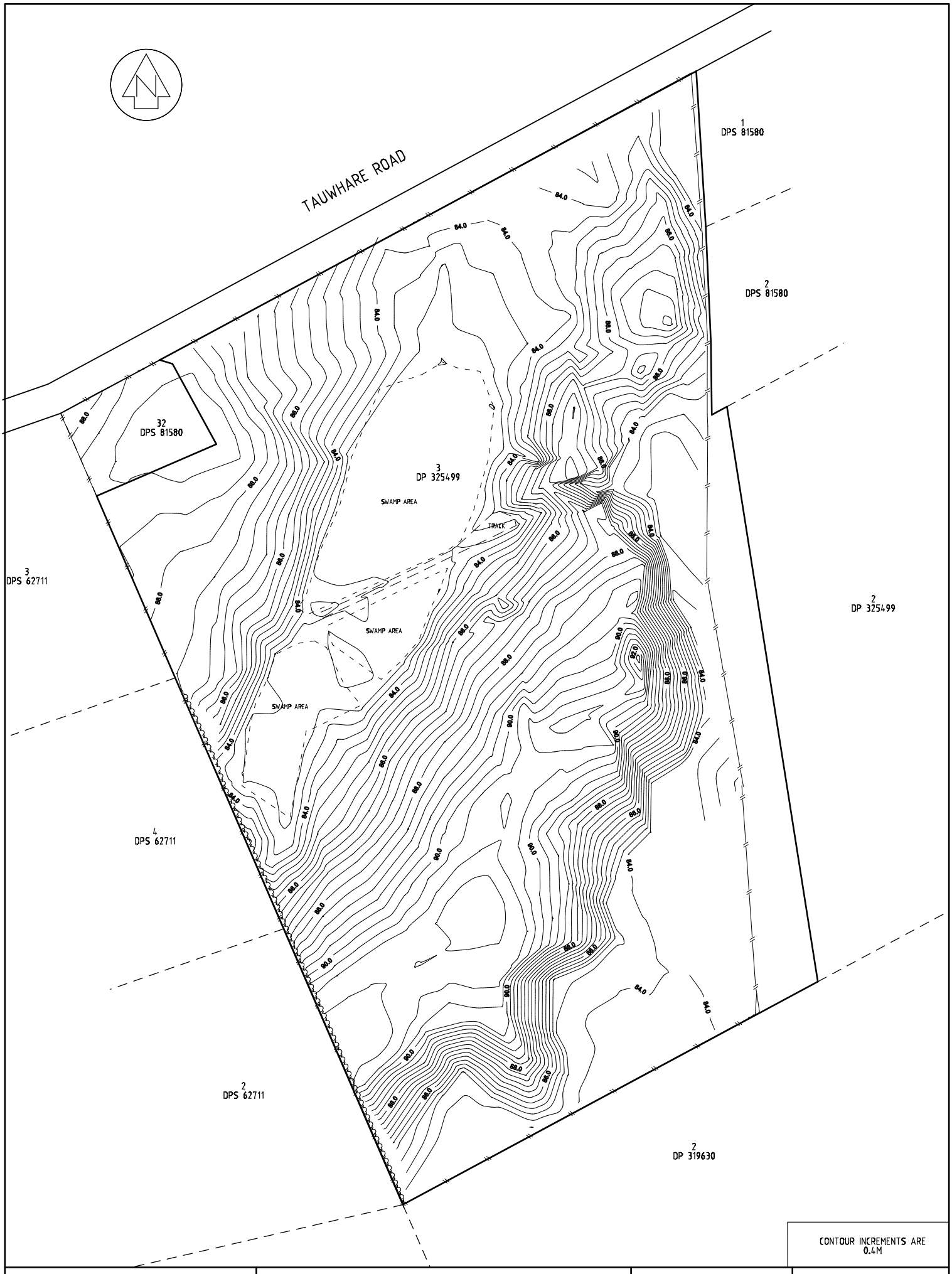
Certification

This report presents information from an environmental site investigation conducted by and under the oversight of a Suitably Qualified and Experienced Practitioner (SQEP) with contaminated land expertise, as required by the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health and who is a Certified Environmental Practitioner – Soil Contamination Specialist. Detailed qualifications are available upon request.

Terre Nicholson

Certified Environmental Practitioner – Soil Contamination Specialty, CEnvP-SC #509 / 400006

APPENDIX A – SITE PLANS



CONTOUR INCREMENTS ARE 0.4M

COGSWELL SURVEYS LTD
REGISTERED PROFESSIONAL SURVEYORS
LAND & ENGINEERING SURVEYORS & DEVELOPMENT CONSULTANTS
11 ANZAC STREET, P.O. BOX 158 CAMBRIDGE
TELEPHONE 07 827 5071 FACSIMILE 07 827 5062 EMAIL coge@xtra.co.nz

REF: –

TOPOGRAPHICAL SURVEY OF LOT 3 DP 325499 - TAUWHARE RD

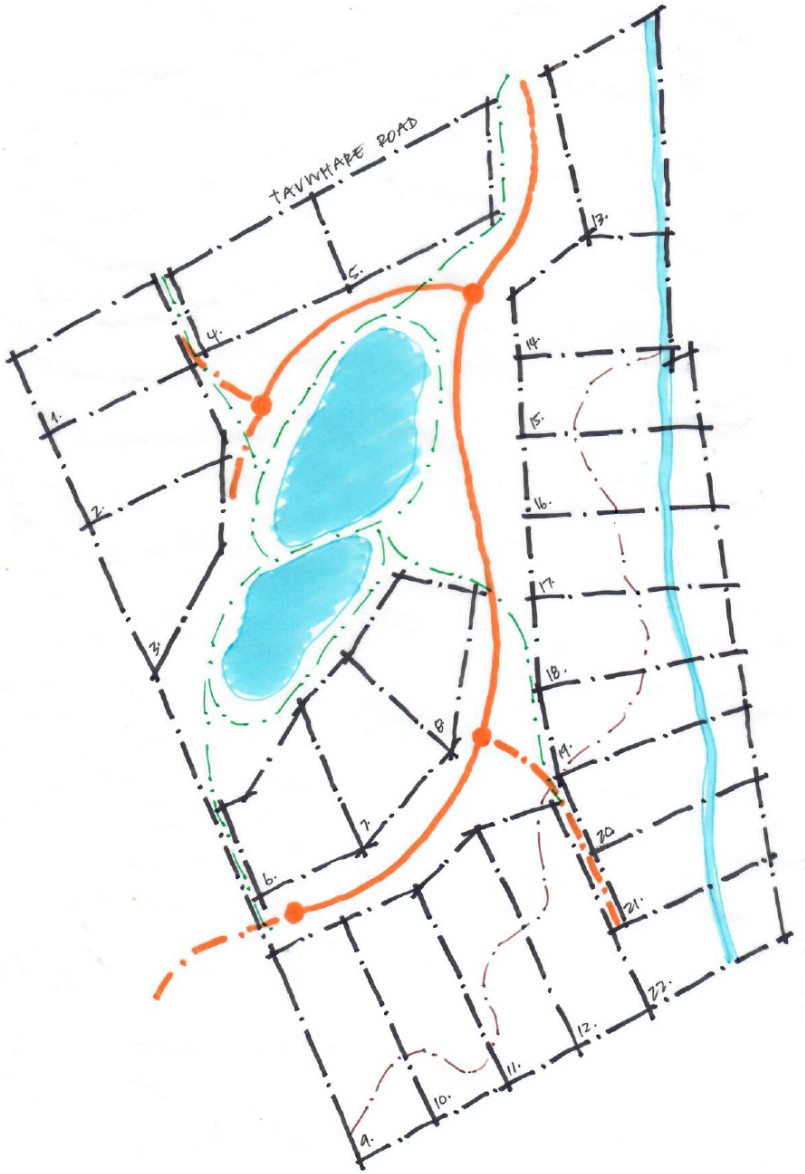
PREPARED FOR: SHASKEY

SCALE: 1:1500

ORIGINAL PLAN SIZE: A2

DATE: SEPT 2006

NOTE: BOUNDARIES AND DIMENSIONS AND AREAS ARE APPROXIMATE AND SUBJECT TO ALTERATION BY APPROVAL OR SURVEY



TYPICAL SUBDIVISION *(5000SQM LOTS)*

ALTERNATIVE SUBDIVISION *(1250SQM LOTS)*

07-079

16 APRIL 2020

PROPOSED TAUWHARE SUBDIVISION
FOR BOWROCK PROPERTIES LIMITED

1110 TAUWHARE ROAD, TAUWHARE

PAUA
pauaarchitects.co.nz
3 Anzac Parade, Hamilton
office@PAUAarchitects.co.nz
T 07 839 6521

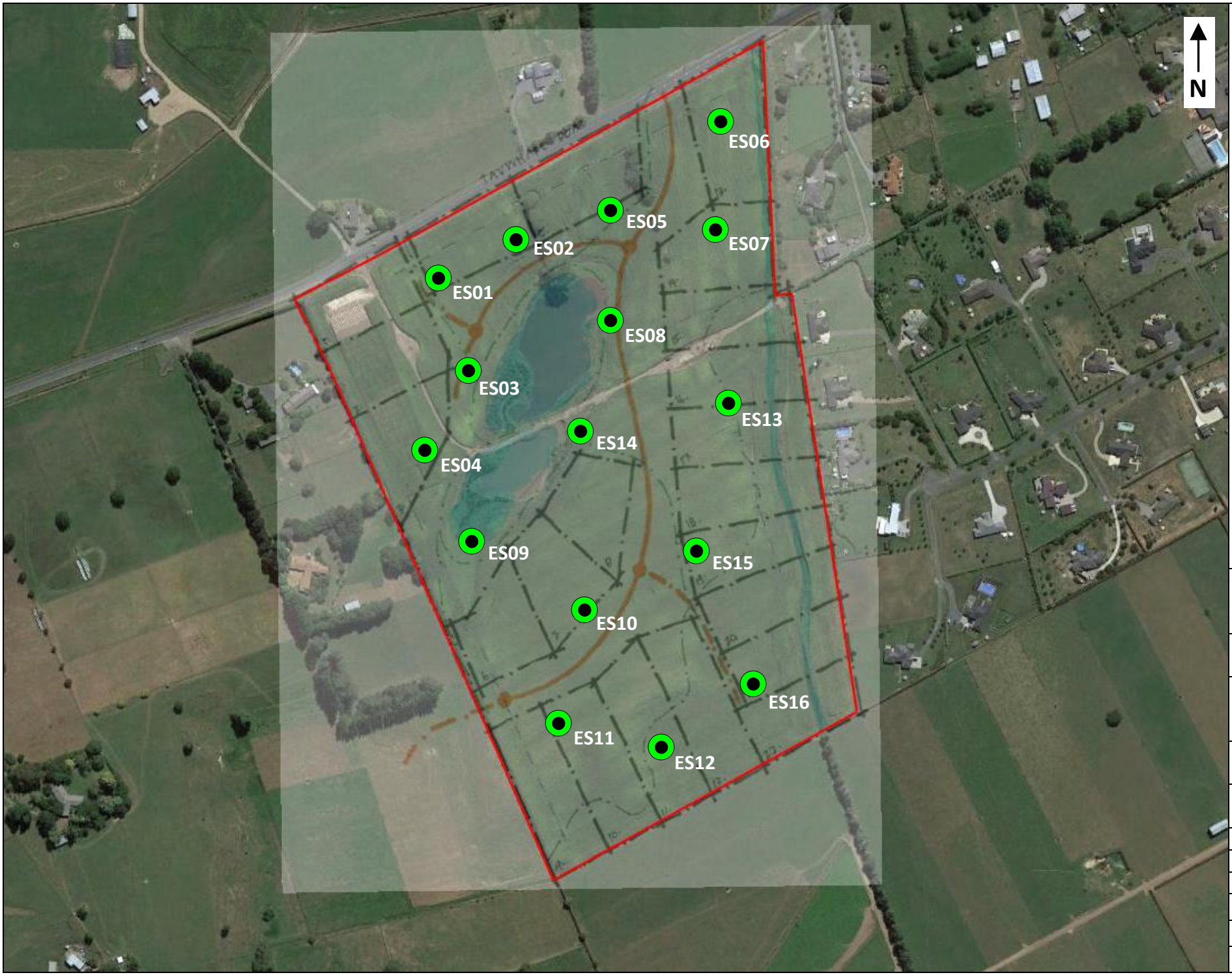


Image from Google Earth Pro

LEGEND:

Site boundary

Environmental sample (ES)

PROJECT: Lot 3 & Lot 32 Tauwhare Road	
PROJECT NO: HD1515	
CLIENT: Bowrock Properties Limited	
TITLE: Site investigation plan	
SCALE: N/A	
Drawing No: 1	
Drawing by: MM	
Rev Number	
0	Initial

APPENDIX B – SITE PHOTOS

HD1515 – Lots 3 & Lot 32 Tauwhare Road photo log – Taken 22.07.20

Photo 1: Site conditions, facing south

Photo 2: Existing track running through wetlands, facing south-east

Photo 3: Site conditions, facing north

HD1515 – Lots 3 & Lot 32 Tauwhare Road photo log – Taken 22.07.20

Photo 4: South-east corner of site, facing east

Photo 5: Southern extent of site (foreground), facing south

Photo 6: Low-lying area (foreground) and hills (background) of site, facing west

HD1515 – Lots 3 & Lot 32 Tauwhare Road photo log – Taken 22.07.20

Photo 7: Drainage features along eastern site boundary, facing north

Photo 8: Existing track cut into fill, facing west

Photo 9: Site conditions, facing west

HD1515 – Lots 3 & Lot 32 Tauwhare Road photo log – Taken 22.07.20

Photo 10: Metal fence, concrete rings, and shipping container east of wetlands, facing west

Photo 11: Existing wetlands on site, facing north

Photo 12: Burn pile on north-eastern side of site, facing north

APPENDIX C – HISTORIC AERIAL PHOTOS

HD1515 – Lot 3 & Lot 32 Tauwhare Road historical aerials – Accessed 29.07.20

1950

1953

HD1515 – Lot 3 & Lot 32 Tauwhare Road historical aerials – Accessed 29.07.20

1971

1974

HD1515 – Lot 3 & Lot 32 Tauwhare Road historical aerials – Accessed 29.07.20

1979

1986

HD1515 – Lot 3 & Lot 32 Tauwhare Road historical aerials – Accessed 29.07.20

1990

1991

HD1515 – Lot 3 & Lot 32 Tauwhare Road historical aerials – Accessed 29.07.20

1995

2008

HD1515 – Lot 3 & Lot 32 Tauwhare Road historical aerials – Accessed 29.07.20

2014

2019

APPENDIX D – COUNCIL RECORDS

Your Ref	In reply please quote	If calling, please ask for
	HAIL0012/21	Sepa Lee

Postal Address
Private Bag 544, Ngaruawahia 3742
New Zealand

0800 492 452
www.waikatodistrict.govt.nz

28 July 2020

HD Geo Limited
26 London Street
Hamilton 3204

Dear Sir/Madam

Property Enquiry - HAIL report

Further to your request for details of whether or not council records indicate that an activity or industry described in the Ministry for the Environment Hazardous Activities and Industries List (HAIL) is being, has been or is more likely than not to have been undertaken on a piece of land I can advise the following:

Property address: **Tauwhare Road TAUWHARE**
VNZ Property ID: **04441/660.08**
Legal description: **LOT 3 DPS 325499 BLK XIII MAUNGAKAWA SD BLK XVI KOMAKORAU SD INT IN ESMT**

No record of a HAIL activity has been found on Council records. **NOTE:** please see comments below for clarification required in respect of some matters found on the records if development on the property is proposed.

Comments:

The site has been used for pastoral farming activities including dairy farming. Prolonged application of superphosphate fertiliser has the potential to elevate cadmium in soil above the default rural-residential soil contaminant standard of 0.8 mg/kg. The soil contaminant standard (SCS) for cadmium is dependent on pH with the default SCS based on pH 5. The SCS increases significantly at higher soil pH. Landcare Research information indicates that the soil pH in the location is likely to vary across the site in a range between 4.9 - 6.4.

If residential activities are proposed, information should be supplied on superphosphate fertiliser use on the property using Council's site history checklist to determine if any investigation in respect of cadmium in soil is required. Where consistent application of fertiliser over time is identified or there is limited information available a screening sample or samples for cadmium should be provided to determine if soil has been impacted by cadmium such that it could be considered a HAIL activity. The samples need not be taken by a contaminated land specialist but should be taken by an independent person with experience in soil analysis such as a fertiliser company representative or soil scientist. A minimum of 3 discrete samples across any proposed residential area is recommended. Sample depth should be between 0-100mm. Soil pH should also be recorded as the soil contaminant standard for cadmium is pH dependent. A soil sample should also be taken for cadmium and pH if possible from an area on the property with similar soil characteristics where the soil has not been modified by application of superphosphate fertiliser and liming to give an indication of the natural soil. Such an area may include gardens of existing older homesteads, roadside berms, etc. The location and description of this sample site should be clearly identified.

A plan of the site should be provided showing the area where the soil cores comprising the composite samples were taken. If the samples show cadmium levels well below the soil contaminant standard then no further action would be necessary. If the sample however indicates cadmium at or very close to the

standard then we would conclude that a HAIL class I has occurred and a site investigation and report carried out by a suitably qualified and experienced practitioner in contaminated land, prepared in accordance with the Ministry for the Environment Contaminated Land Management Guidelines would be required.

The following records (where applicable) were reviewed in this assessment:

Property file including any parent property file from which the property was developed
Waikato District Council Land Use Register
Waikato Regional Council Selected Land Use Register
Subdivision Consent files
Land Use Consent files
Building Consent files
Aerial Photography:

1950, 1953	Site is pastoral with a hedgerow established near the eastern boundary
1971, 1979, 1986, 1990, 1995	Much of the hedgerow is no longer present and a farm track is visible running east-west through the middle of the site
2002	Most of the remaining hedgerow has now been removed, with one small area near the middle of the eastern boundary remaining
2008, 2012	The site no longer appears to be used for pastoral grazing, appearing to be less well maintained. Residential development is being undertaken to the east of the site.

Disclaimer:

This information is based on records held by the Council and/or Waikato Regional Council and reflects the council's current understanding of the site. The council does not accept any liability for any inaccuracy of this information or liability for any loss or damage suffered by any person acting or refraining from acting on this information.

If this information indicates that no record of a HAIL activity has been identified on Council records, this does not imply that no HAIL activity has been undertaken on the site. This simply means that the Council holds no record of a HAIL activity being undertaken on the property at this point in time. However, Council records may be incomplete. Similarly, if one HAIL activity is identified, this does not preclude another HAIL activity having been undertaken of which no record is held. If an activity is proposed to be undertaken on the site that is covered by the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES), Council retains the right to seek further information on the site history of the subject property. Where pastoral farming activities have been identified, Council may seek information in respect of cadmium in soil resulting from application of superphosphate fertiliser if residential activities are proposed.

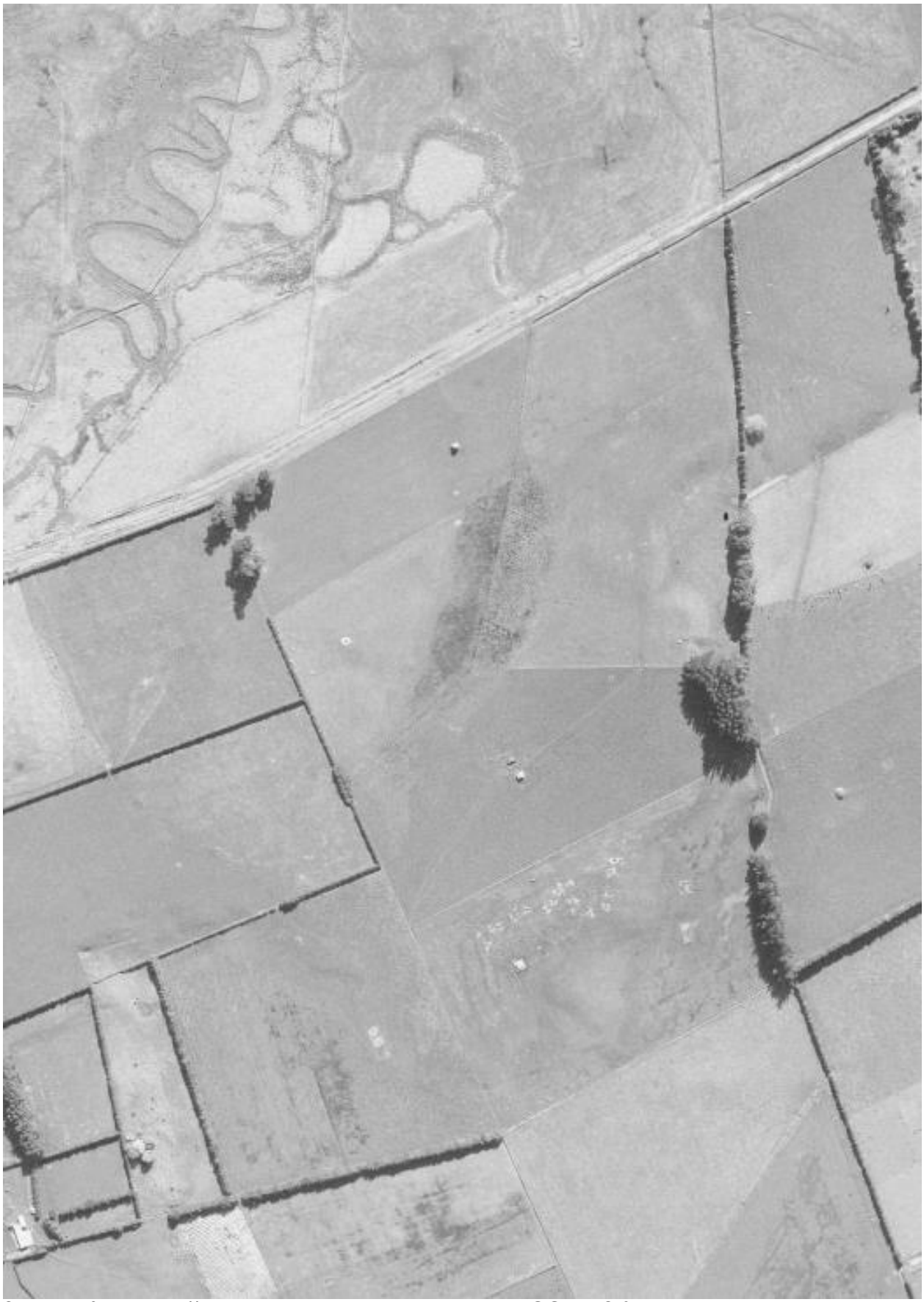
If you have any queries please feel free to call me.

Yours faithfully

Alan Parkes
Contaminated Land Specialist

1950

1953



1971

1979

1986

1990

1995

2002

Sourced from Waikato District Council Intramaps GIS

2008

Sourced from Waikato District Council Intramaps GIS

2012

Sourced from Waikato District Council Intramaps GIS

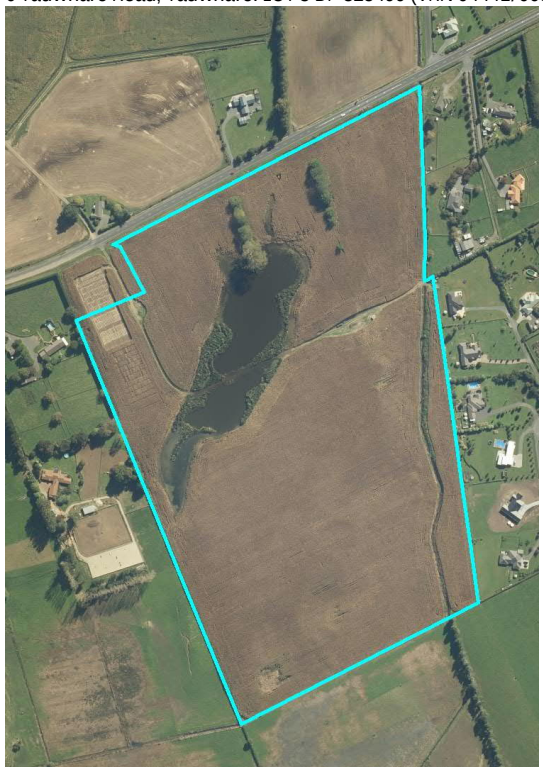
Terre Nicholson

From: Caitlin Holm <Caitlin.Holm@waikatoregion.govt.nz>
Sent: Friday, 17 July 2020 12:36 PM
To: Terre Nicholson
Subject: RE Land Use Information Register enquiry 0 Tauwhare Road, Tauwhare (REQ163427) No SLUS

Dear Terre,

Thank you for your enquiry regarding information the Waikato Regional Council may hold relating to potential contamination at the property indicated below:

- 0 Tauwhare Road, Tauwhare: LOT 3 DP 325499 (VRN 04441/660/08)



Background: The Waikato Regional Council maintains a register of properties known to be contaminated on the basis of chemical measurements, or potentially contaminated on the basis of past land use. This register (called the Land Use Information Register) is still under development and should not be regarded as comprehensive. The 'potentially contaminated' category is gradually being compiled with reference to past or present land uses that have a greater than average chance of causing contamination, as outlined in the Ministry for the Environment's Hazardous Activities and Industries List (HAIL): http://www.mfe.govt.nz/sites/default/files/hazards/contaminated-land/is-land-contaminated/hazardous-activities-industries-list.pdf

This property:

- I can confirm that this property does not currently appear on the Land Use Information Register.

District Councils: Our records are not integrated with those of territorial authorities, so it would also be worth contacting the Waikato District Council to complete your audit of Council records if you have not already done so. In general, information about known contaminated land will be included on a property LIM produced by the territorial authority.

Rural Land Considerations: Examples of sites that are "more likely than not" to have soil contamination (HAIL sites) include timber treatment activities, service stations and/or petroleum storage, panel beaters, spray painters, etc. Whilst pastoral farming is not included on this list, typical farming activities of horticulture, sheep dipping, chemical storage, petroleum storage and workshops are; but are more difficult to identify and may not be as well represented on the Land Use Information Register. Therefore, individuals interested in pastoral land may be interested in completing further investigations in accordance with Ministry for the Environment Guidelines prior to land purchase and/or development.

Additional Information: Please note that:

- Significant use of lead-based paint on buildings can, in some cases, pose a contamination risk; the use of lead-based paint is not recorded on the Land Use Information Register.
- Buildings in deteriorated or derelict condition which contain asbestos can result in asbestos fibres in soil; the use of asbestos in building materials is not recorded on the Land Use Information Register.
- The long term, frequent use of superphosphate fertilisers can potentially result in elevated levels of cadmium in soil; the use of superphosphate fertiliser is not recorded on the Land Use Information Register.
- We are not currently resourced to fully incorporate historic aerial photographs in our region-wide assessment of HAIL activities. A significant proportion of the Crown historical aerial image archive for the Waikato region is available to view free of charge at http://retrolens.nz/. We recommend this resource is consulted for any HAIL assessment.
- Due to the large volume of enquiries being received, we may not be able to respond to your enquiry as quickly as previously. We are resourced to meet 20 day response times as per LGOIMA, but endeavour to respond more quickly when workload permits. If your enquiry is urgent, please note this first in your enquiry and we will do our best to assist.

Please feel free to contact me if you have any further queries on this matter. For any new enquiries or requests for information please continue to use the Request for Service form for 'Contaminated Land/HAIL.'

Regards,

Caitlin Holm | SCIENTIST | Geothermal & Air, Land Ecology & Contamination, Science and Stra
WAIKATO REGIONAL COUNCIL | Te Kaunihera ā Rohe o Waikato
P: +6479497129
M: +64212133330
F: facebook.com/waikatoregion
Private Bag 3038, Waikato Mail Centre, Hamilton, 3240

APPENDIX E – LABORATORY RESULTS SUMMARY

Lot 3 and 32 Tauwhare Road Lab Results Summary

Reference		Units	PQL	Method	Guideline Value	20-26673-33	20-26673-33	20-26673-34	20-26673-35	20-26673-36	20-27176	20-27176	20-27176	20-27176	20-27176	20-27176
Description						HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515
Sample Description						Composite 1 (ES01 ,ES02, ES03 & ES04)	Composite 1 (ES01,ES02,ES03 & ES04)	Composite 2 (ES05, ES06, ES07 & ES08)	Composite 3 (ES09, ES10, ES11 & ES12)	Composite 4 (ES13, ES14, ES15 & ES16)	ES01	ES02	ES03	ES04	ES04	ES09
Sample Date											7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020
Sample No.						33	33	34	35	36	1	2	3	4	4	5
QC Type						Regular	Duplicate	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Duplicate	Regular
Depth											50	50	50	50	50	50
Submitted Sample Type						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
pH*	(pH)	pH	1	pH in Soil	N/A	5	5.1	5.1	4.9	4.9	4.8	6	6	4.6		5.5
Cadmium	(Cd)	mg/kg dry wt	0.005	Elements in Soil	0.8	0.831		0.48	0.748	0.537	1.37	1.47	0.911	0.622	0.588	0.679

Reference		Units	PQL	Method	Guideline Value	20-27176	20-27176	20-27176	20-27176	20-28012	20-28012	20-28012	20-28012	20-28012	20-28012	20-28012
Description						HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515	HD1515
Sample Description						ES10	ES10	ES11	ES12	ES01	ES01	ES02	ES03	ES10	ES11	ES11
Sample Date						7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020	7/22/2020
Sample No.						6	6	7	8	1	1	2	3	4	5	5
QC Type						Regular	Duplicate	Regular	Regular	Regular	Duplicate	Regular	Regular	Regular	Regular	Duplicate
Depth						50	50	50	50	200	200	250	200	200	250	250
Submitted Sample Type						Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
pH*	(pH)	pH	1	pH in Soil	N/A	4.9	4.8	4.9	4.1	5	5.1	5.7	5.7	5.6	5.6	
Cadmium	(Cd)	mg/kg dry wt	0.005	Elements in Soil	0.8	1.31		1.39	0.44	1.27		0.24	0.972	0.64	0.608	0.552

APPENDIX F – LABORATORY REPORTS

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

HD Geo
26 London Street
Hamilton 3204

Attention: Terre Nicholson
Phone: 027 701 9529
Email: terre@hdgeo.co.nz

Lab Reference: 20-26673
Submitted by: Matt Moore
Date Received: 22/07/2020
Testing Initiated: 22/07/2020
Date Completed: 24/07/2020
Order Number: N/A
Reference: HD1515

Sampling Site: Lot 3 Tauwhare Road

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.
Specific testing dates are available on request.

Soil Aggregate Properties and Nutrients

Client Sample ID			Composite 1 (ES01,ES02,ES03 & ES04)	Composite 2 (ES05,ES06,ES07 & ES08)	Composite 3 (ES09,ES10,ES11 & ES12)	Composite 4 (ES13, ES14, ES15 & ES16)
Date Sampled						
Analyte	Unit	*Reporting Limit*	20-26673-33	20-26673-34	20-26673-35	20-26673-36
pH*	pH	*1*	5.0	5.1	4.9	4.9

Elements in Soil

Client Sample ID			Composite 1 (ES01,ES02,ES03 & ES04)	Composite 2 (ES05,ES06,ES07 & ES08)	Composite 3 (ES09,ES10,ES11 & ES12)	Composite 4 (ES13, ES14, ES15 & ES16)
Date Sampled						
Analyte	Unit	*Reporting Limit*	20-26673-33	20-26673-34	20-26673-35	20-26673-36
Cadmium	mg/kg dry wt	*0.005*	0.831	0.48	0.748	0.537

Method Summary

pH in Soil 1:2.5 extraction with 0.1M calcium chloride followed by pH probe determination.(Department of Sustainable Natural Resources).

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

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.

Sharelle Frank, B.Sc. (Tech)
Technologist

Emily Hanna, B.Sc.
Trace Elements Team Leader

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

HD Geo
26 London Street
Hamilton 3204

Attention: Terre Nicholson
Phone: 027 701 9529
Email: terre@hdgeo.co.nz

Lab Reference: 20-27176
Submitted by: Matt Moore
Date Received: 27/07/2020
Testing Initiated: 27/07/2020
Date Completed: 30/07/2020
Order Number: N/A
Reference: HD1515

Sampling Site: Lot 3 Tauwhare Road

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.
Specific testing dates are available on request.

Soil Aggregate Properties and Nutrients

		Client Sample ID	ES01 50	ES02 50	ES03 50	ES04 50	ES09 50
		Date Sampled	22/07/2020	22/07/2020	22/07/2020	22/07/2020	22/07/2020
Analyte	Unit	*Reporting Limit*	20-27176-1	20-27176-2	20-27176-3	20-27176-4	20-27176-5
pH*	pH	*1*	4.8	6.0	6.0	4.6	5.5

Soil Aggregate Properties and Nutrients

		Client Sample ID	ES10 50	ES11 50	ES12 50
		Date Sampled	22/07/2020	22/07/2020	22/07/2020
Analyte	Unit	*Reporting Limit*	20-27176-6	20-27176-7	20-27176-8
pH*	pH	*1*	4.9	4.9	4.1

Elements in Soil

		Client Sample ID	ES01 50	ES02 50	ES03 50	ES04 50	ES09 50
		Date Sampled	22/07/2020	22/07/2020	22/07/2020	22/07/2020	22/07/2020
Analyte	Unit	*Reporting Limit*	20-27176-1	20-27176-2	20-27176-3	20-27176-4	20-27176-5
Cadmium	mg/kg dry wt	*0.005*	1.37	1.47	0.911	0.622	0.679

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.

Elements in Soil

	Client Sample ID		ES10 50	ES11 50	ES12 50
	Date Sampled		22/07/2020	22/07/2020	22/07/2020
Analyte	Unit	*Reporting Limit*	20-27176-6	20-27176-7	20-27176-8
Cadmium	mg/kg dry wt	*0.005*	1.31	1.39	0.44

Method Summary

pH in Soil 1:2.5 extraction with 0.1M calcium chloride followed by pH probe determination.(Department of Sustainable Natural Resources).

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

Matthew Counsell, B.Sc.
Inorganics Team Leader

Emily Hanna, B.Sc.
Trace Elements Team Leader

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

HD Geo
26 London Street
Hamilton 3204

Attention: Terre Nicholson
Phone: 027 701 9529
Email: terre@hdgeo.co.nz

Lab Reference: 20-28012
Submitted by: Matt Moore
Date Received: 31/07/2020
Testing Initiated: 31/07/2020
Date Completed: 4/08/2020
Order Number: N/A
Reference: HD1515

Sampling Site: Lot 3 Tauwhare Road

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.
Specific testing dates are available on request.

Soil Aggregate Properties and Nutrients

		Client Sample ID	ES01 200	ES02 250	ES03 200	ES10 200	ES11 250
		Date Sampled	22/07/2020	22/07/2020	22/07/2020	22/07/2020	22/07/2020
Analyte	Unit	*Reporting Limit*	20-28012-1	20-28012-2	20-28012-3	20-28012-4	20-28012-5
pH*	pH	*1*	5.0	5.7	5.7	5.6	5.6

Elements in Soil

		Client Sample ID	ES01 200	ES02 250	ES03 200	ES10 200	ES11 250
		Date Sampled	22/07/2020	22/07/2020	22/07/2020	22/07/2020	22/07/2020
Analyte	Unit	*Reporting Limit*	20-28012-1	20-28012-2	20-28012-3	20-28012-4	20-28012-5
Cadmium	mg/kg dry wt	*0.005*	1.27	0.24	0.972	0.640	0.608

Method Summary

pH in Soil 1:2.5 extraction with 0.1M calcium chloride followed by pH probe determination.(Department of Sustainable Natural Resources).

Elements in Soil Samples dried and passed through a 2 mm sieve followed by acid digestion and analysis by ICP-MS. In accordance with in-house procedure based on US EPA method 200.8.

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.

Sharelle Frank, B.Sc. (Tech)
Technologist

Emily Hanna, B.Sc.
Trace Elements Team Leader