Appendix I – Contamination Assessment

Envirochem Evaluation Ltd

Preliminary Site Investigation (PSI) Report

DRAFT

Prepared for

Waikato Racing Club Incorporated

Prepared by

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Preliminary Site Investigation (PSI) Report

PDF Attachment: *HCC Sir Tristram Ave LGOIMA response 2014-10-08*

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Executive Summary

Envirochem Evaluation Ltd was engaged by Waikato Racing Club Incorporated to determine the preliminary National Environment Standard (NES) soil status of a proposed residential zone change at the Te Rapa Racecourse. The potential layout depicted in this report shows the area proposed for medium density residential use and illustrates a possible development scenario for initial assessment of zone change effects. If residential zone change was implemented, subsequent land use and subdivision consents could be required based on the actual developmental design.

A review of historical aerial photography of the area intended for future residential use revealed a series of buildings and structures that supported the activities of the Te Rapa Racecourse. Two significant stockpiles of soil are present at the site. Prior to any future residential development, it is recommended that a Detailed Site Investigation (DSI) is performed targeting (1) the general site (2) soil immediately adjacent to the existing and historic buildings and (3) the existing stockpiles. The results should designate appropriate end-points for soil, for example:

(1) Remain onsite in the proposed residential and recreational land use scenarios.
(2) Remove from the site to a clean-fill disposal facility.
(3) Remove from the site to a licensed contaminated soil disposal facility.

If a DSI concluded that soil contamination is unlikely to exceed NES standards in the intended residential land use scenario, the potential future *subdivision, change of use,* and *soil disturbance/removal* would be NES controlled activities, as stated in Sections 9(1) & 9(3) of the Resource Management (National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. In this situation, an NES Site Management Plan (SMP) should be required to support the developmental earthworks.

If a DSI concluded that soil contamination is likely to exceed NES standards in the intended residential land use scenario, the potential future *subdivision, change of use,* and *soil disturbance/removal* would be NES restricted discretionary activities, as outlined in Section 10(1-4) of the Resource Management (National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. In this circumstance, a Remedial Action Plan (RAP), Site Validation Report (SVR) and/or Site Management Plan (SMP) would be required to support the development.

1 Introduction

Waikato Racing Club Incorporated has proposed a zoning change to residential land use on Sir Tristram Ave, Te Rapa (Figure 1), adjacent to the established Te Rapa Racecourse. Envirochem Evaluation Ltd was engaged by Waikato Racing Club Incorporated to assess the initial NES status of the area intended for future residential use. The potential new residential area would essentially change from the recreational to residential land-use scenario. This report presents a preliminary assessment of soil contamination risk at the site - with respect to the proposed zoning change and subsequent potential *subdivision*, *change of use* and *soil disturbance/removal* activities - by consideration of previous use and structures at the location.

This 2017 Preliminary Site Investigation (PSI) Report intends to fulfil the requirements of the Resource Management (National Environmental Standard (NES) for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. This report has been prepared in general accordance with the following two MfE guideline documents for investigating contaminated sites: Contaminated Land Management Guidelines No 1 – Reporting on Contaminated Sites in New Zealand (2011) and Contaminated Land Management Guidelines No 2 – Hierarchy and Application in New Zealand of Environmental Guideline Values (2011).

2 Scope of Work

The purpose of this document is to assess the suitability of the soils for the potential residential use at the subject site through consideration of previous land use. This investigation primarily considers the area currently proposed for future residential development (Figure 1). The assessment of this PSI report will determine if a Detailed Site Investigation Report (DSI) is required based on the likelihood of (1) significant health risk due to soil contamination at the location and (2) appropriate soil disturbance and removal procedures during developmental earthworks.

3 Site Description

The subject site is on Sir Tristram Ave, Te Rapa, Lot 6 DP 443687 & Lot 2 DP 351868 (Figure 1).

The intended site for residential zone change exhibits flat contours, predominantly grassed land with buildings supporting the Te Rapa Racecourse activities (Figure 2). The geology of the site is based on alluvial pumice, silt, sand and gravel (Hinuera Formation), with potential isolated layers of peat.[1]

[1] Edbrooke, S. W. 2005, *Geology of the Waikato Area. Institute of Geological and Nuclear Sciences*. 1:250,000 Geological Map 4. Institute of Geological and Nuclear Sciences

Figure 1. Concept plan showing prospective residential areas (brown)

Figure 2. Proposed residential zone change area in modern aerial photography (refer to Figure 1)

4 History and Aerial Photography

A review of historical aerial photography revealed the Te Rapa Racecourse was established before 1950 with small racetrack stands (Figure 5). Accessory buildings (since removed) and horse yards/stables were also established before 1950. The basis of the existing main racetrack buildings and stand were constructed before 1963, along with a horse training track (Figure 5). Two modern horse stables were constructed south of the original horse yards/stables between 1974 and 1979 (Figure 4). It is apparent that a third modern stable was constructed (at the site of an original horse yard/stable) before 1993 (Figure 3). The existing stables are of typical design featuring separate stalls for individual animals, constructed primarily with unpainted concrete walls and some painted timber (Figure 6).

A modern industrial yard was developed before 2002 in the eastern corner of the site (Figures 2 & 3). The observed Stockpile B of soil may have been generated during construction of this yard (Figures 2 & 7). A second stockpile (Stockpile A) was created with topsoil removed from a recent industrial building development north of the Te Rapa Racecourse (Figures 2 & 7).

5 Conceptual Site Model

This report is assessing a zoning change application and the indicated future residential layout (Figure 1) is subject to change. If soil contamination is present at significant levels in the general intended residential land use scenario, there could be potential harm to human health. The two major exposure pathways are (1) consumption of produce grown at the site and (2) direct contact. This investigation was primarily designed to provide an initial assessment of the health risk due to soil contamination for future residents occupying the location (brown shading in Figure 1), noting that the site would undergo significant developmental earthworks prior to residential use.

Significant arsenic, lead and organo-chloride pesticide contamination is possible at locations where farm animals or orchards were treated historically with pesticide chemicals. There is no significant evidence for commercial orchards or farming activity in the aerial photos (Figure 2-5) of the area proposed for residential use (brown shading in Figure 1).

Significant lead contamination from paint and building materials is often detected near old long-term buildings and structures. Soil adjacent to buildings is also potentially contaminated with chemicals and hydrocarbon fuels, particularly in storage areas or where equipment is washed. The historical racecourse accessory buildings and probable horse yards/stables observed in 1950 (Figure 5) appear to have remained at the site for a prolonged period (Figures 3-5).

In 2014 the Hamilton City Council (HCC) noted the potential for HAIL activity A10 *Persistent Pesticide Bulk Storage and Use* at the subject site (see attached *HCC Sir Tristram Ave LGOIMA response 2014-10-08*).

Figure 3. **Historical aerial photography (2002 & 1993) of proposed zone change location (refer to Figures 1 & 2)**

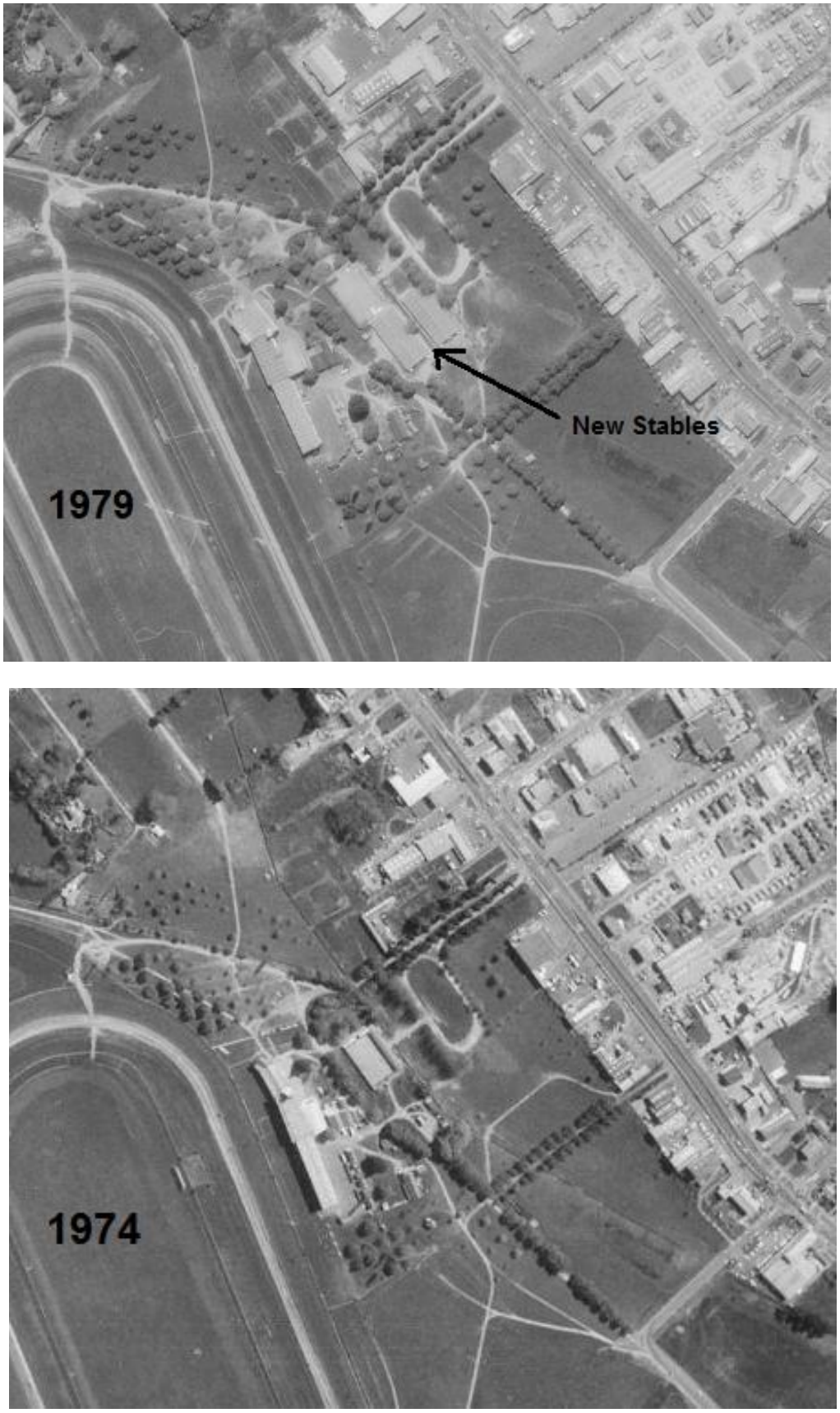

Figure 4. **Historical aerial photography (1979 & 1974) of proposed zone change location (refer to Figures 1 & 2)**

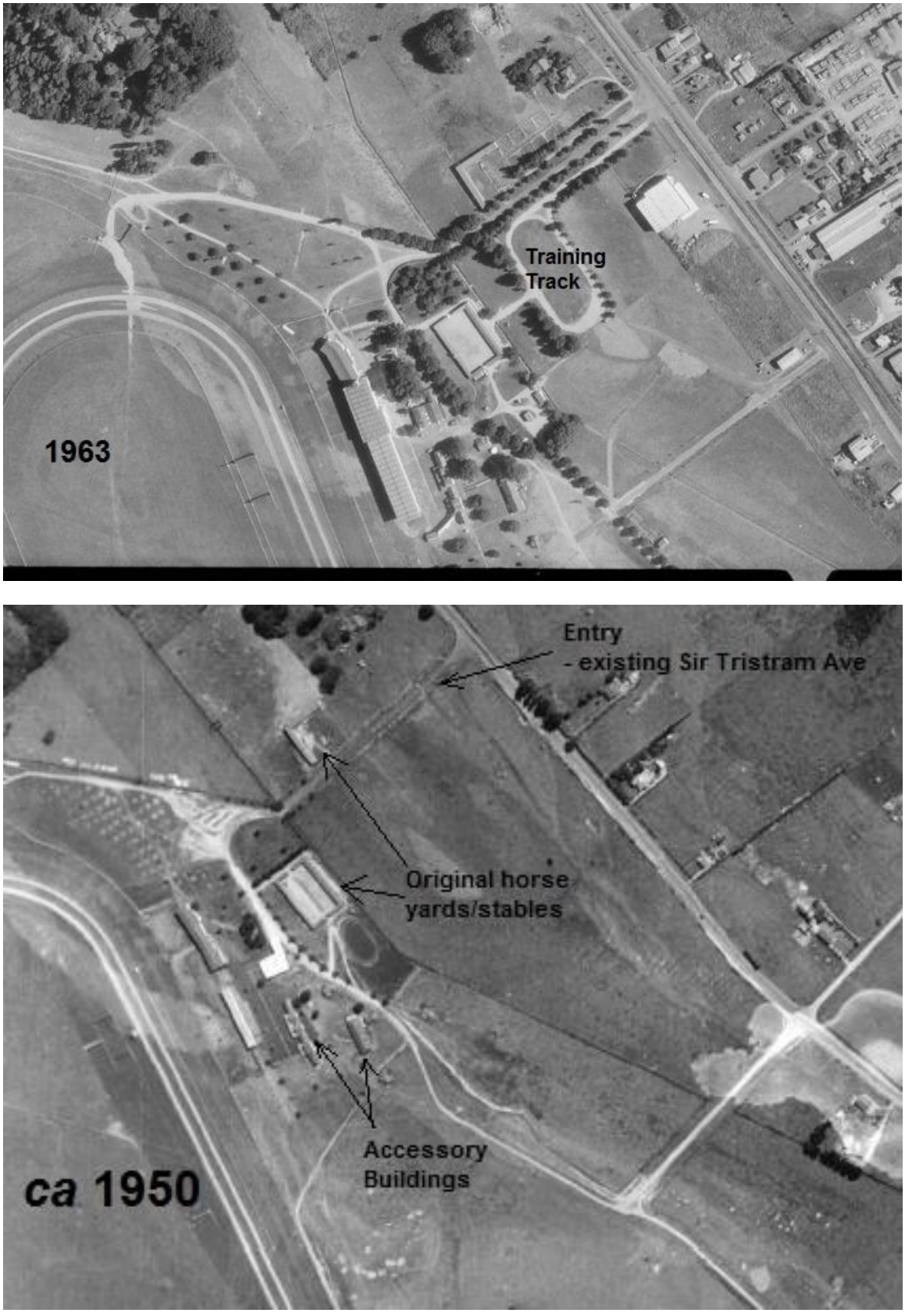

Figure 5. Historical aerial photography (1963 & 1950) of proposed zone change location (refer to Figures 1 & 2)

6 Site Characterisation

A zoning change to residential has been proposed on Sir Tristram Ave, Te Rapa, Lot 6 DP 443687 & Lot 2 DP 351868 (Figure 1). The historic aerial photography presented in this report indicates the existing horse racing track was established prior to 1950, along with initial racecourse buildings, stables and yards (Figure 5). The area currently proposed for future residential use features three modern horse stables, two stockpiles of soil and an industrial storage yard (Figure 2). Soil adjacent to these current and previous features may exhibit elevated contaminant levels, for example, pesticides, petroleum hydrocarbons and lead from degraded building materials.

The current buildings and structures would be removed from the land prior to any residential development. Soil from these areas should then be assessed in a Detailed Site Investigation Report (DSI), along with the identified historic sites of potentially soil-contaminating features. If the DSI reveals contaminated soil - with respect to applicable NES standards (Appendices 1 & 2) - appropriate remediation steps should be outlined in a Remedial Action Plan (RAP). The remediation could involve removal of any significantly contaminated soil to a facility licensed to receive contaminated soil and/or movement of any slightly-affected soil to non-residential reserve areas within the development.

Figure 6. Typical existing horse stable construction at site showing painted timber (left) and concrete walls of individual stalls (right)

Figure 7. Observed stockpiles of soil at site: Stockpile A (left) and Stockpile B (right) – refer to Figure 2

7 Conclusion and Recommendations

After a site inspection of the potential residential zone change at Sir Tristram Ave, Te Rapa, Lot 6 DP 443687 & Lot 2 DP 351868 (brown shading in Figure 1) and considering the historical aerial photography and apparent site activities and buildings, this Preliminary Site Investigation Report (PSI) concludes that soil contamination could exceed applicable NES standards in specific areas. Appropriate methods should be adopted during developmental earthworks to (1) minimise the risk of significantly contaminated soil remaining onsite around the residential building locations and (2) ensure soil removed from the site is disposed of at suitable locations. It is recommended that a Detailed Site Investigation (DSI) is performed, primarily targeting the buildings and other features identified in the historical aerial photography presented in this PSI (Figures 2-5). The NES component of future residential developmental works could potentially follow these five steps, catalogued through a DSI, Remedial Action Plan (RAP), Site Validation Report (SVR) and/or Site Management Plan (SMP):

(1) Professionally remove the existing buildings from the areas proposed for residential construction leaving no remaining building debris or remnants. The previous corners of the buildings should be marked onsite immediately after removal.

(2) Accurately determine the onsite location of historic building features at the site (see for example, the accessory buildings and probable horse stables present in 1950 (Figure 5)) and compare the locations with proposed residential construction areas.

(3) Perform DSI soil sampling over the entire site, with particular emphasis on soil adjacent to previous buildings and any other identified potentially-contaminating structures. The soil sampling results should allow designation of soil as (1) suitable to remain onsite for completion of residential sites, (2) appropriate for transfer to recreational areas onsite or (3) requiring off-site transportation to either a clean-fill disposal location or a landfill licensed to receive contaminated soil. Based on the DSI conclusions, produce a RAP outlining the necessary remedial earthworks.

(4) Complete remedial actions from RAP report. This could potentially involve (1) removing soil identified as significantly contaminated (with respect to the proposed residential land use scenario (see Appendices 1 & 2)) or containing deleterious material to a landfill licensed to receive contaminated soil and/or (2) onsite movement of soil considered appropriate for recreational use to reserve areas (for example, green shading in Figure 1).

(5) Perform validation soil testing of (1) remedial excavation margins and (2) any generated and existing (A & B in Figure 2) stockpiles prior to redistribution of soil. Display soil testing results in a SVR.

If a DSI concluded that soil contamination is unlikely to exceed NES standards in the intended residential land use scenario, the potential future *subdivision, change of use,* and *soil disturbance/removal* would be controlled activities, as stated in Sections 9(1) & 9(3) of the Resource Management (National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011, with the earthworks likely requiring a SMP.

If a DSI concluded that soil contamination is likely to exceed NES standards in the intended residential land use scenario, the potential future *subdivision, change of use,* and *soil disturbance/removal* would be restricted discretionary activities, as outlined in Section 10(1-4) of the Resource Management (National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. In this situation, a Remedial Action Plan (RAP), Site Validation Report (SVR) and/or Site Management Plan (SMP) would be required to support the development.

The features noted in Figures 2-5 were identified from historic aerial photography. Any other potentially contaminating anthropogenic structures and materials (including, but not limited to, landfills, rubbish dumps, building debris, concrete and chemical containers) discovered during all future earthworks at the site should remain undisturbed and be reported to the Hamilton City Council and a NES Suitably Qualified and Experienced Practitioner (SQEP) for assessment. It is the responsibility of Waikato Racing Club Incorporated to ensure that their appointed earthworks contractors are informed of the appropriate course of action if any potentially soil-contaminating anthropogenic structures and materials are discovered at the site.

8 Limitations

This report was prepared for the single specific purpose of investigating the initial NES soil status of a residential zone change proposed by the Client (Waikato Racing Club Incorporated) on Sir Tristram Ave, Te Rapa, Lot 6 DP 443687 & Lot 2 DP 351868 (Figure 1). Envirochem Evaluation Limited is not responsible for the use of this document for any other purpose.

The conclusions and recommendations conveyed in this document are based on information supplied by the Client, aerial photography (Figures 2-5) and the apparent previous activities at the site. It is possible that potentially contaminating anthropogenic structures and features currently remain undetected at the site, for example, short-term historic buildings/structures and covered landfills. Envirochem Evaluation Ltd accepts no responsibility for site conditions that were not evident based on the information supplied by the Client and the historic aerial photography presented in this report.

Draft Report prepared by Envirochem Evaluation Ltd

Dr Trevor Mathieson (Director)

Appendix 1. NES Soil Contaminant Standards (SCS) Protective of Human Health – 2012

Soil contaminant standards for health ($SCSs_{(health)}$) for inorganic substances

	Arsenic	Boron	Cadmium (pH 5)[1]	Chromium		Copper	Inorganic lead	Inorganic mercury
				III	VI			
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Rural residential / lifestyle block 25% produce	17	>10,000	0.8	>10,000	290	>10,000	160	200
Residential 10% produce	20	>10,000	3	>10,000	460	>10,000	210	310
High-density residential	45	>10,000	230	>10,000	1,500	>10,000	500	1,000
Recreation	80	>10,000	400	>10,000	2,700	>10,000	880	1,800
Commercial / industrial outdoor worker (unpaved)	70	>10,000	1,300	>10,000	6,300	>10,000	3,300	4,200

Notes: All concentrations refer to dry weight (ie, mg/kg dry weight).

[1] Default value is for soil that is pH 5. Concentrations increase with increasing pH (see *Methodology*).

Soil contaminant standards for health ($SCSs_{(health)}$) for organic compounds

Scenario	BaP[1]	DDT	Dieldrin[2]	PCP	Dioxin	
					TCDD	Dioxin-like PCBs
	mg/kg TEQ	mg/kg	mg/kg	mg/kg	µg/kg TEQ	µg/kg TEQ
Rural residential / lifestyle block 25% produce	6	45	1.1	55	0.12	0.09
Residential 10% produce	10	70	2.6	55	0.15	0.12
High-density residential	24	240	45	110	0.35	0.33
Recreation	40	400	70	150	0.6	0.52
Commercial / industrial outdoor worker (unpaved)	35	1,000	160	360	1.4	1.2

Notes: All concentrations refer to dry weight (ie, mg/kg dry weight or µg/kg dry weight).

[1] For benzo(a)pyrene, the equivalent BaP concentration is calculated as the sum of each of the detected concentrations of nine carcinogenic PAHs (benz(a)anthracene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene and indeno(1,2,3-cd) pyrene), multiplied by their respective potency equivalency factors (see table 40 of the *Methodology*).

[2] The SCS is applicable to either dieldrin or aldrin separately, or to the sum of aldrin and dielrin if both are involved.

TEQ = Toxic equivalency, an indication of the toxicity of a mixture of compounds.

For dioxins and dioxin-like PCBs the total toxicity is assessed as a toxic equivalency (TEQ) to 2,3,7,8-TCDD using toxic equivalency factors (TEF). The TEQ is defined as the sum of the products of the concentration of each compound multiplied by the value of its TEF (see table 46 of the *Methodology*).

Appendix 2. NES Land Use Scenarios

Land-use scenarios

Scenario	Description
Rural / lifestyle block	Rural residential land use, including home-grown produce consumption (25 per cent). Applicable to the residential vicinity of farm houses for protection of farming families, but not the productive parts of agricultural land. Note: Consumption of eggs, milk and meat from animals raised on site is excluded. Produce consumption is limited to home-grown vegetables. Sites for which consumption of home-grown eggs, milk or meat is important will need to be evaluated on a site-specific basis.
Residential	Standard residential lot, for single dwelling sites with gardens, including home-grown produce consumption (10 per cent).
High-density residential	Urban residential with limited soil contact, including small ornamental gardens but no vegetable garden (no home-grown produce consumption); applicable to urban townhouses, flats and ground-floor apartments with small ornamental gardens, but not high-rise apartments.
Parks / recreational	Public and private green areas and reserves used for active sports and recreation. This scenario is intended to cover playing fields and suburban reserves where children play frequently. It can also reasonably cover secondary school playing fields but not primary school playing fields.
Commercial / industrial outdoor worker (unpaved)	Commercial / industrial site with varying degrees of exposed soil. Exposure of outdoor workers to near-surface soil during routine maintenance and gardening activities with occasional excavation as part of maintaining subsurface utilities (ie, a caretaker or site maintenance personnel). Also conservatively applicable to outdoor workers on a largely unpaved site.

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8 October 2014

Bloxam Burnet & Olliver
PO Box 9041
Hamilton 3240
Attn: Ben Inger

Dear Ben

Reference: Request under Section 10 of the Local Government Official Information and Meetings Act 1987

This letter provides the response to your request for information under Section 10 of the Local Government Official Information and Meetings Act. The property that is the subject of this request (details as provided by you) is as follows:

Address	:	Sir Tristram Ave, Hamilton
Legal description	:	Lot 6 DP 443687 & Lot 2 DP 351868

Note: No inspection of the subject property has been carried out as a result of this application.

As at **8 October 2014** a search of the environmental health records has shown that information in relation to the likely presence of hazardous contaminants is held by the Environmental Health Unit in respect of this property. Council records show that the above site has or is being used for the following land-use(s):-

HAIL Land use	:	Persistent pesticide bulk storage (etc)
Site Category	:	Land Use Information – Confirmed

The above land-use has been confirmed as one that appears on the Hazardous Activities and Industries List (HAIL) however the site has not been investigated for the presence of hazardous contaminants in relation to the historical/current land use. For more information about HAIL guidelines visit:
http://www.mfe.govt.nz/issues/haszardous/contaminated/guidelines.html.

Disclaimer:-
Records are kept of sites where certain hazardous activities and industries are known to be occurring, or have occurred in the past, at the site. However, a record does not necessarily imply contamination. It may contain errors or omissions and no reliance should be placed on it. Any person who wishes to make any commercial decisions that involves an assessment of whether the site is contaminated should make their own enquiries and decisions.

Hamilton City Council and Waikato Regional Council accepts no liability for any inaccuracy in, or omission from, the information provided.

Please be advised that this information is in relation to the specific information you have requested. A search of all Council records has not been made in relation to this request. There may be other records held by Council that relate to the subject property.

Environmental Health

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Please contact me if you require any further assistance.

Yours sincerely

C Mangan

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Environmental Health