Golder Associates

Kincett Mitchell
RESOURCE & ENVIRONMENTAL CONSULTANTS

REPORT ON

PRELIMINARY CONTAMINATION ASSESSMENT
86A EDWARD STREET, LINCOLN
CANTERBURY

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Golder Associates (NZ) Ltd
Level 1, 79 Cambridge Terrace, Christchurch. PO Box 2281, Christchurch, NEW ZEALAND
Tel: +64 (3) 377 5696 Fax: +64 (3) 377 9944 www.golder.co.nz
Golder Associates: Operations in Africa, Asia Pacific, Europe, North America and South America

EXECUTIVE SUMMARY

Broadfield Estates Limited commissioned Golder Associates (NZ) Limited (Golder) to undertake a preliminary site investigation at 86A Edward Street, Lincoln, Canterbury. The site is currently largely unoccupied although used partly for grazing and agricultural purposes. It is understood by Golder that a request has been made to Selwyn Council to determine if former horticultural land use activities have impacted on soil quality at the site. This work is to be completed at the site before a subdivision consent can be issued. The proposed subdivision is understood to include the redevelopment of the site for residential purposes.

Based on the results of the investigation completed, it is considered that the site represents a low risk in terms of significant ground contamination. The investigation established only limited evidence of soil contamination, and is not likely to warrant site-wide remediation measures prior to its proposed subdivision and residential redevelopment.

Heavy metal contamination was encountered; most notably, three elevated copper concentrations were recorded surrounding the former chemical store and chemical dispensing point. Such contamination is not unusual for a former horticultural site, on account of the regular use of copper sulphate within the treatment chemicals used. Furthermore, these samples were taken from a very small isolated area of the site (c.5m^2) and are not considered to be an indication of site-wide conditions. It is recommended that by reworking and homogenising the small quantity of 'contaminated' material with the surrounding clean surface material, these concentrations will become diluted and fall below the relevant guideline criteria, albeit that validation testing will be required to confirm this. Limited copper contamination was also encountered in composite samples from the Paddock areas, although these were not corroborated by discrete sample analysis and as such, are not considered to represent a significant risk at the site.

No significant organic pesticide contamination is noted at the site on account of the treatment of the former orchard; all samples being well below both the human health criteria and ecological criteria guidelines. Likewise, no significant hydrocarbon contamination was noted, associated with the former diesel AST; as all TPH and BTEX samples were well below the relevant criteria.

As a result of this investigation it is considered that the site should not be considered as potentially contaminated land, and is considered suitable for the proposed residential redevelopment.

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1.0 INTRODUCTION

Broadfield Estates Ltd. (the client) commissioned Golder Associates (NZ) Limited (Golder) to undertake a preliminary site investigation at 86A Edward Street, Lincoln, Canterbury. It is understood by Golder that a request has been made to Selwyn District Council to assess the potential presence of contaminated land at the site before a proposed residential subdivision can be approved. This request, submitted to Selwyn District Council by a local resident, is provided in Appendix D and indicates that there is no

> "contamination characterization details presented in the *(original)* application" and "the extent of contamination currently present on the property *(the site)* is unclear" (Page 2 Para 5).

This investigation aims to characterize any contamination present at the site and confirm if the site is suitable for the proposed residential sub-division and redevelopment. The investigation will also identify any actions necessary to manage significant risks identified, with regard to soil contamination issues.

1.1 Scope of Works

As stated in Golder's proposal dated 19 June 2007 (Ref: P806/01) the preliminary contamination site assessment will combine the elements of a Stage 1 preliminary site inspection and Stage 2 intrusive site investigation works, as detailed by the Ministry for the Environment (MfE) guidance documents.

The following was proposed to be investigated to fulfill these guidance requirements:

- A 'desk study' incorporating site history, geology, hydrogeology and hydrology;
- A preliminary site walkover undertaken by Golder on 21 June 2007 incorporating interviews with previous site owners/users regarding potentially contaminative activities at the site;
- Soil sampling strategy and rationale (using both discrete (targeted) and composite sampling);
- Field soil sampling and screening;
- Chemical laboratory testing and data assessment;
- Site characterisation; and
- Conclusions and recommendations for further investigation, remediation or site management, if necessary.

This report details the information sources consulted, presents the findings of the intrusive investigation works undertaken, and documents the results and assessment of the chemical laboratory testing. Conclusions and recommendations with respect to contamination issues identified are also included.

2.0 THE SITE

2.1 Site Location

The site is located on Edward Street, approximately 1km from the town centre of Lincoln, Canterbury. The legal description of the site is Lot 2 DP1401 and the approximate grid reference for the centre of the site is E2469238 N5728673 NZMG. The site location is illustrated in Figure 1.

2.2 Site Description

The site is approximately rectangular in shape and occupies an area of approximately 27 hectares; 1.2km at its longest point and approximately 400m at its widest point. The site is generally flat lying throughout, although the southern tip of the site is at a slightly lower elevation than the remainder of the site, and in this regard, it was reported that this southern 5% of the site is susceptible to flooding events.

The site boundary to the east is defined by an unnamed surface water stream, which is a tributary of Springs Creek and flows towards Lake Elsmere. The site is defined to the south by a man-made culvert (photograph 8), to the east by a fenced boundary and to the north by Edward Street.

Entrance to the site is gained by a gravel track from Edward Street (photograph 1) which leads to a central development of buildings. The majority of the site comprises soft landscaping (c.95%), with hard standing, building cover or gravel tracks occupying the remaining 5% of the site. The soft landscaped areas of the site comprise largely undeveloped arable land within four distinct land use areas:

- Animal grazing occupies the north and parts of the south-west area of the site (c.35% of the site);
- Crop growing currently occupies the central area (c.25% of the site);
- Undeveloped land, predominantly in the south and south-east occupied c.35%; and,
- A central development of unoccupied vacant buildings which cover approximately 5% of the site.

The central development of properties formerly provided the infrastructure for a former orchard. This development comprised a residential property, a former shop, which adjoins a large warehouse (which was formerly a cool storage facility), a former warehouse/workshop and former hazardous chemical store (photographs 3 and 4). These buildings are currently vacant and as mentioned above, occupy less than 5% of the entire site. Adjacent to these properties a small surface water pond is present on the site's eastern boundary, immediately surrounded by soft landscaping (imported topsoil).

2.3 Site Surroundings

The site is located within a mixed residential and agricultural setting on the outskirts of Lincoln. The site is surrounded as follows:

- To the west by a residential development (similar to that proposed for the site itself); and
- To the north, south and east by undeveloped agricultural land.

In the wider area, Lincoln (1km to the west) represents the only significant urban development in the surrounding area.

2.4 Proposed Use

According to information provided by the client, it is proposed that the majority of the site will be subdivided into 178 lots (of approximately equal size), over six 'Stages' which will be redeveloped for residential purposes (i.e. housing, soft landscaped gardens and hard surfaced roads). The proposed redevelopment will occupy approximately 85% of the site; the current surface water pond will remain as such and will be immediately surrounded by an area of soft landscaping (c.5% of the site). Furthermore, it is understood that the southern c.10% of the site will remain as undeveloped pasture land. The proposed subdivision plan is presented in Figure 3.

2.5 Site History

Selwyn District Council (SDC) offices in Leeston were visited on 21 June 2007 in order to obtain any relevant information with regard to the site. It is understood that historically the site has been used for agricultural/horticultural activities. SDC consents were also issued for the following noteworthy historical developments:

- Oct 1963 – Pluming and drainage installed;
- March 1976 – Erection of implement shed;
- November 1986 – Erection of packing shed;
- February 1987 – Residential dwelling; and
- April 1987 – Erection of garage.

It was documented within a demolition consent of March 2007 (ref: 070230), that 'potential fill' was anticipated at the site and a high water table was referenced. This shallow groundwater is discussed further in Section 4.2 below. In a separate demolition consent

regarding a residential dwelling in September 2005 a milking shed and tractor shed were documented on site.

It was stated in the council records that the site was registered as Lincoln Grange Ltd. (to Mr Brian Tweedy) and operated as Geneva Orchards from the early 1990s until mid 2006. Golder was able to interview Mr Brian Tweedy, who ran the orchard site, and he was able to confirm this previous use of the site during this period. It is understood that, when operational, the orchard formerly occupied approximately 80% of the site (approximately 21.6ha); only the southern 20% of the site was not occupied by fruit growing.

No documentation was available indicating previous bulk storage of fuels at the site, however, anecdotal information supplied by the client and Mr Brian Tweedy suggest that a former diesel Above Ground Storage Tank (AST) was located in the east of the site for refuelling of site vehicles (tractors etc.) The approximate location this AST is shown in photograph 6. It is understood that the tank was removed in 2006 and the area has since been re-surfaced with imported topsoil (Photograph 6).

2.5.1 Historic sources of contamination

On the basis of the available council records, anecdotal information, and observations made during an initial site walkover, the following historic sources have been identified as potentially representing a risk with regard to soil or groundwater contamination:

- A former diesel AST located in the east of the site;
- A former chemical storage shed also located in the east of the site (photograph 3 and 4);
- A former chemical dispensing point in the east of the site (photograph 5); and
- The direct application of pesticide sprays to orchard crops.

2.6 Geology

The site geology is mapped by the Geological Map of New Zealand (Sheet 21 Christchurch, 1:250,000 scale) as comprising materials of the Springston Formation. These materials are described as "alluvial gravel, sand and silt and historic river flood channels" and are of recent age.

The only available borehole log at the site itself (M36/4402) is presented in Appendix A and indicates that the underlying ground conditions comprise an upper 0.3m of topsoil, which is underlain by grey clay, to a depth of approximately 4.20m. The underlying lithology subsequently comprises variations of gravel and clay, with occasional sand at depth. The borehole logs from the immediate surrounding area indicate that the prevailing ground conditions in the general area to be largely similar to those documented at the site itself; although silt and silty clay are more predominant than documented at the site.

Based on observations made during the collection of samples from test pits onsite, the shallow geology comprised a silty topsoil, largely brown or dark brown, with occasional fine (mainly rounded) gravels.

The conditions encountered on site are discussed further in Section 4.1 below.

2.7 Hydrology

A surface water pond is located in the north-east of the site. The pond is surrounded by imported topsoil material. It is understood that this area will become a landscape feature during the redevelopment, and will be designated as a Reserve (photograph 7). The surface water represents the source of an adjacent stream (tributary of Springs Creek) which runs along and forms the eastern boundary of the site (flowing from north to south). The importance of this watercourse, and it's interaction with groundwater is discussed further in Section 4.2 below.

In addition, the southern boundary of the site is defined by a man-made culvert (photograph 8), although during the site inspection did not appear to be in hydraulic continuity with the aforementioned water course. As discussed in Section 2.2, anecdotal information suggests that the southern 5% of the site is susceptible to flooding events.

No drainage infrastructure is known to currently exist for the majority of the site and surface drainage is understood to pass via natural drainage channels to the adjacent surface stream (on the eastern boundary), which flows directly towards Lake Elsmere.

2.8 Hydrogeology

Evidence of artesian groundwater was noted in the surface pond during Golder's initial site visit (water rising directly from the groundwater to the surface water) and is discussed further in Section 4.2 below. Groundwater flow is anticipated to be of a south-easterly / easterly direction.

According to Environment Canterbury (ECan) consent records, there are two groundwater wells located on the site itself, only one of which has a documented borehole log. Both wells are currently active; one for irrigation and the other for stock supply. There are a further six groundwater wells within 200m of the site as presented in Table 1 below.

Table 1 – Groundwater wells / borehole logs on and close to the site

Well ID	Distance from site (m)	Direction from site	Depth (m)	Comment
M36/2922	On site (centre)	-	34.80	Active; stock supply
M36/4402	On site (south)	-	20.50	Active; Irrigation
M36/7560	70	West	3.30	Active; Groundwater Quality
M36/7559	40	West	4.70	Active; Groundwater Quality
M36/1983	40	West	23.00	Active; Irrigation
M36/0576	140	East	16.80	Active; Irrigation

M36/4673	90	East	20.00	Active; Domestic Supply
M36/3115	90	North-west	20.00	Active; Domestic and stockwater

The shallow groundwater beneath the site discussed further in Section 4.2 below and in general represents a sensitive receptor for any former or future contamination incidents. Given the agricultural setting and known underlying groundwater resource, the site is considered to be located in a moderately sensitive environmental setting, particularly prevalent with regard to its future residential use.

3.0 GROUND INVESTIGATION WORKS

3.1 Fieldwork

The fieldwork was undertaken on 22 June 2007, immediately after a period of significant rainfall.

3.1.1 Methodology

The selection of composite samples were taken with reference to the Ministry for the Environment (MfE) Contaminated Land Management Guidelines (No's 1 to 5 inclusive), specifically, MfE Guideline No.5, chapter 3.6.4 *Composite sampling.* The selected sample locations were intended to represent a general coverage at the site in addition to targeting specific areas, where potentially contaminative operations have previously existed (as defined in Section 2.4.2).

3.1.2 Sampling Technique

The MfE guidelines recommend sampling at sites which have been subject to pesticide treatment at a depth between 0 and 0.15m. However, the former orchard site has been felled and the ground has subsequently been extensively reworked and ploughed. Specifically, information received from the client regarding the application for Resource Consent (Appendix D) states that;

> "An apple shelter and tree plantings were removed over the 2006/2007 summer and burnt on site in large piles. Residual ash was then spread across the site soil surfaces. The land was then fertilised, ploughed and sown" (Submission for Resource Consent, 13 June 2007, Page 1, Para 3).

On account of the above information and information received from the client and former owner of the site; confirming that the upper 0.3 m of the surface has been reworked, it is apparent that any pesticide residue would no longer be confined to the upper 0.15m of the soil surface. Therefore, composite samples were taken from the former orchard cropping area at a depth of between 0.0 and 0.3m, thus incorporating the entire soil profile which could potentially be contaminated.

3.1.3 Sampling

For the purpose of the site investigation, the site was divided into 18 'paddocks', as illustrated in Figure 2, and a composite sample was taken from each of the 18 paddocks (from the soil profile between 0.0 and 0.3m). Anecdotal evidence confirmed that the orchard formerly harvested apples (Paddock 1, 2, 4, 5, 8-14), pears & peaches (Paddock 6 and 7), apricots (Paddock 16 and 17) and plums (Paddock 18). The composite samples comprised of five sub-samples from around an area of approximately $5m^2$. The sub-samples were collected using a

hand tool (shovel), and further homogenised within a clean plastic 'bulk bag' before sampling.

It is understood that specific pesticides (of different chemical compounds) were used depending on the type of fruit harvested (the general differentiation was for fruits with pips and for fruits with stones). Therefore an additional three discrete samples were taken from the specific areas of the site (e.g. from paddocks growing apples) which allowed for correlation with the composite sample results.

A further two discrete samples were taken from the area formerly occupied by the diesel AST (D07 and D08), two discrete samples from the former chemical store in the east of the site (D04 and D06), and two from the former fill point within Paddock 5 (D05 and D09) in order to target the aforementioned hotspot sources of potential contamination.

To minimise the potential for cross contamination between exploratory positions and samples, fresh, clean disposable gloves were used in handling and collecting samples and the shovel was decontaminated between samples. The samples were collected and dispatched in analytically clean glass jars, to allow for the organics and hydrocarbon testing. All sample containers and jars were supplied by Hill Laboratories Limited.

The above sampling provided a comprehensive general coverage as well as targeting the specific, potentially contaminative, previous uses. A summary of the fieldwork programme and rationale is documented in Table 2 below.

Table 2 – Summary of Fieldwork Programme

Location	Former Use	Current Use	Aim
Paddock (PAD) 01	Apple Orchard	Sheep Grazing	Obtain general coverage
PAD02	Apple Orchard	Sheep Grazing	General coverage
PAD03	Apple Orchard	Open land (topsoil)	General coverage
PAD04	Apple Orchard	Sheep Grazing	General coverage
PAD05	Apple Orchard	Sheep Grazing	General coverage
PAD06	Pear/Peach Orchard	Sheep Grazing	General coverage
PAD07	Pear/Peach Orchard	Sheep Grazing	General coverage
PAD08	Apple Orchard	Crops	General coverage
PAD09	Apple Orchard	Crops	General coverage
PAD10	Apple Orchard	Crops	General coverage
PAD11	Apple Orchard	Crops	General coverage
PAD12	Apple Orchard	Crops	General coverage

Location	Former Use	Current Use	Aim
PAD13	Apple Orchard	Grassed Paddock	General coverage
PAD14	Apple Orchard	Grassed Paddock	General coverage
PAD15	Cattle Grazing	Pasture	General coverage
PAD16	Apricot Orchard	Grassed Paddock	General coverage
PAD17	Apricot Orchard	Grassed Paddock	General coverage
PAD18	Plum Orchard	Grassed land	General coverage
Discrete (D01)	PAD04	Sheep Grazing	Confirm findings of composite samples within **Apple** Orchards
D02	PAD06/PAD07	Sheep Grazing	Confirm findings of composite samples within **Pear/Peach** Orchards
D03	PAD17	Grassed Paddock	Confirm findings of composite samples within **Apricot** Orchards
D04 & D06	Chemical store	Vacant building	Target the former chemical storage at the site
D05 & D09	Chemical dispensing point	Disused	Target the former chemical dispensing point at the site
D07 & D08	Diesel AST	Imported topsoil	Target the former diesel storage at the site

3.2 Contamination Field Screening

A photo ionisation detector (PID) was used to assist with the field assessment of materials from the composite and discrete samples, for the presence of contamination by organic compounds. Measuring in parts per million (ppm), the PID gives an indication of the presence of different organic compounds such as diesel, petrol and solvents. Golder considers PID field headspace analysis screening readings between 30 - 50 ppm as indicative of possible soil contamination requiring the collection of suitable samples for laboratory analysis.

A calibrated PID was used in field screening of soil samples collected from the exploratory locations. The results obtained are discussed in Section 4.3 below.

3.3 Contamination Laboratory Testing

For each of the composite samples collected laboratory analysis was undertaken for the following:

- **Metals suite.** Comprising arsenic, copper and lead; and
- A combined **Organic Pesticide** screen comprising Organochlorine Pesticide (OCP), Organonitrogen Pesticide (ONP) and Organophosphorus Pesticides (OPP).

In addition, the samples taken from the area surrounding the former AST in the east of the site were also analysed for the following contaminants:

- TPH. Comprising total petroleum hydrocarbon (TPH) carbon bands $C_7 - C_9$, $C_{10} - C_{14}$, $C_{15} - C_{36}$ and "total" (C_7 to C_{36}) hydrocarbons and;
- BTEX. Comprising Benzene, Toluene, Ethlybenzene and Xylene (BTEX).

The laboratory test results are discussed in Section 5 and presented in full in Appendix B.

4.0 GROUND INVESTIGATION RESULTS

4.1 Encountered Materials

The samples were each taken from the upper 0.3m of the site surface, which, in most cases comprised either imported topsoil or recently ploughed topsoil, thus confirming what is documented in the only available borehole log at the site. However, within samples PAD12, D07 and D08 extensive gravel fill was encountered and the excavation was unable to penetrate beyond 0.2 – 0.25m

A description of each sample taken is provided in Table 3, although can be summarised as follows:

- Silty topsoil, largely brown or dark brown, occasionally clayey, low to medium plasticity, generally moist to wet (although samples in the north of the site were dry) with some root material and occasion fine (mainly rounded) gravels present.

Within PAD11, evidence of fill material was encountered comprising fragments of ceramic. No further evidence of such fill was apparent at any other part of the site, and as such is not thought to be indicative of the site as a whole.

4.2 Groundwater

Groundwater was not encountered in the sample locations during the investigation. However, during the sampling of D08 and D09 the underlying material was observed to be entirely saturated and indicated the presence of shallow groundwater. This may be a function of the weather preceding the fieldwork; as significant rainfall was experienced during the 36 hours prior to the investigation, although it should be noted that shallow groundwater is documented in council records and by former site occupants.

In this regard, during the preliminary site walkover on 21 June 2007, evidence of artesian groundwater was observed, thus confirming its perceived depth beneath the site. The groundwater is anticipated, for much of the time, to be in hydraulic continuity with surface water at the site and therefore the groundwater is essentially flushed through the site on a regular basis (particularly after heavy rain events).

4.3 Field Screening and Evidence of Contamination

Soils from each of the composite and discrete samples were screened with a PID to evaluate the presence of volatile hydrocarbons. The individual PID readings are presented in Table 3.

A single PID reading of 2.2 ppm (well below the abovementioned threshold of 50ppm) was recorded from discrete sample D09 adjacent to the former diesel AST, at 0.2m depth. This reading is very unlikely to have been as a result of the former AST and is not considered to represent a significant issue at the site. In the majority of other samples, PID values were

recorded as 0.0ppm, which indicates that significant volatile organic compounds were not present within the soil samples screened.

Table 3 – Summary of sample characteristics and Photo Ionisation Detector Field Screening

Location	Headspace reading (ppm)	Lithology and observations
PAD01	0.4ppm	Silty TOPSOIL. Low plasticity, light brown, occasional fine root material. Dry.
PAD02	0.4ppm	Silty TOPSOIL. Low plasticity, light brown, occasional fine root material. Dry.
PAD03	0.0ppm	Silty TOPSOIL. Dark Brown. Low - Medium Plasticity, frequent root material. Moist.
PAD04	0.1ppm	Silty TOPSOIL. Medium Plasticity, Brown to dark brown, root material. Moist
PAD05	0.1ppm	Silty TOPSOIL. Medium Plasticity, Brown to dark brown, root material. Moist
PAD06	0.1ppm	Clayey SILT topsoil. Dark Grey/Brown Medium Plasticity. Trace brownish/orange sand. Some root material. Moist
PAD07	0.0ppm	Clayey SILT topsoil. Dark Grey/Brown Medium Plasticity. Trace brownish/orange sand. Some root material. Moist
PAD08	0.0ppm	Silty TOPSOIL. Medium plasticity, Dark brown, occasional fine root material. Moist.
PAD09	0.0ppm	Silty TOPSOIL. Medium plasticity, Dark brown, occasional fine root material. Moist.
PAD10	0.1ppm	Silty TOPSOIL. Medium plasticity, Dark brown, occasional fine root material. Moist.
PAD11	0.0ppm	Silty TOPSOIL. Medium plasticity, Dark brown, occasional fine root material and occasional fragments of ceramic fill material. Moist.
PAD12	0.1ppm	Clayey SILT. Dark Brown, Medium Plasticity, frequent rounded gravels. Moist to Wet Gravels struck at 0.2m. Sample at 0.2m
PAD13	0.2ppm	Silty TOPSOIL. Medium plasticity, Dark brown, occasional fine root material. Moist.
PAD14	0.0ppm	Silty TOPSOIL. Medium plasticity, Dark brown, occasional fine root material. Moist.
PAD15	0.0ppm	Silty TOPSOIL. Trace fine to medium light brown sand. Low plasticity. Some root material and fine (rounded - sub rounded) gravels. Moist
PAD16	0.0ppm	Silty TOPSOIL. Low plasticity, Dark brown, occasional fine root material. Moist.
PAD17	0.0ppm	Silty TOPSOIL. Trace fine to medium light brown sand. Low plasticity. Some root material and fine (rounded - sub rounded) gravels. Moist
PAD18	0.1ppm	Silty TOPSOIL. Dark Brown. Infrequent pockets of sandy clay (mottled grey/light brown). Frequent root material. Moist.
D01	0.0ppm	Silty TOPSOIL. Medium Plasticity, Brown to dark brown, root material. Moist
D02	0.0ppm	Clayey SILT topsoil. Dark Grey/Brown M Plasticity. Trace brownish/orange sand. Some root material. Moist
D03	0.0ppm	Silty TOPSOIL. Low plasticity. Some root material and fine (rounded - sub rounded) gravels. Moist
D04	0.0ppm	Silty TOPSOIL. Low plasticity. Significant root material and coarse (rounded - sub rounded) gravels. Dry.
D05	0.0ppm	Clayey SILT. Mottled dark Brown, grey/orange. Medium

Location	Headspace reading (ppm)	Lithology and observations
		Plasticity. Many roots (fine to coarse). Moist
D06	0.2ppm	TOPSOIL. Dark Brown, frequent root material. Low density organic material present. Dry
D07	2.2ppm	Silty TOPSOIL. Low plasticity. Occasional pockets of high plasticity Clay (mottled grey/Brownish orange). Frequent gravel fill (rounded to sub rounded). Wet
D08	0.0ppm	Silty TOPSOIL. Low plasticity. Occasional pockets of high plasticity Clay (mottled grey/Brownish orange). Frequent gravel fill (rounded to sub rounded). Wet - indication of groundwater.
D09	0.0ppm	Silty TOPSOIL. Dark brown, low to medium plasticity. Fine root material, frequent gravels (rounded to sub rounded).

The precise location of each sampling location is provided in Figure 4.

5.0 CONTAMINATION ASSESSMENT

5.1 Selection of Assessment Criteria

Golder understands that the site owners propose to redevelop the site, which will include subdividing it into 178 lots for residential purposes. In assessing the site with respect to soil contamination, it is assumed that each lot will incorporate a soft landscaped garden area, in addition to portions of hard standing and building cover; no specific plans detailing the specific end layout have been received by Golder end use, although a general layout is provided in figure 3.

The Contaminated Land Management Guidelines published by MfE provides guidance on the selection of suitable assessment criteria for various land uses. The MfE prefer New Zealand (and Australian) human health risk based criteria be employed first, and international human health risk based criteria second. These criteria, designated Tier 1 and 2 respectively are followed by threshold criteria (Tiers 3 and 4). In assessing the analytical data obtained from the subject site, Tier 1 criteria have been used and where no applicable New Zealand (or Australian) criteria is available, international Tier 2 criteria have been used.

The MfE Contaminated Land Management Guideline No. 5, Chapter 3.6.4 details the required methodology, sampling technique and appropriate analysis when using composite samples. Documented within this chapter is the requirement for using an adjusted guideline value with which to compare the laboratory analysis. This adjusted value is based on the number of sub-samples used in the composite sample. The adjusted guideline value is equal to the original value, divided by the number of sub-samples from which the composite was taken (in this instance the number of sub-samples was 5). This compensates for potential diluting of material (from the sub-samples) during sampling.

In assessing the concentrations of Organochlorine Pesticides at the site (specifically DDT), the most stringent residential end use guideline criteria of 1.72mg/kg for total DDT (sum of the individual isomers) from the *Canadian Council of Ministers for the Environment* was used. However, this guideline is most appropriately used for the protection of ecological receptors, and as such, consideration was also given to the guideline value of 25mg/kg (for total DDT) suggested by J.E Cavanagh (November 2004) as a guideline for human health for a residential end use. Again, an appropriate guideline adjustment was considered for the composite samples.

In addition, reference has been made to the Auckland Regional Council (ARC) document *Residential Sites with Former Horticultural Landuse (December 2004)* and the *Draft Sampling Protocol for Horticultural Sites, Preliminary Draft (October 2002).*

5.2 Laboratory Test Results

A summary of the laboratory test results and the land use criteria used in assessing metals within the composite samples are presented in Table 4 and analysis for metals, TPH and BTEX within the discrete samples, are presented in Table 5.

The results for organochlorine pesticides (OCPs) are presented in Table 6 and Table 7. The full laboratory test results are presented in Appendix B.

Table 4 – Summary of Composite Laboratory Tests for Metals

Determinand	Number of samples tested	Recorded Concentrations			Residential Land Use Criteria		
		Min	Max	Average	Criteria	Adjusted guideline[3]	Samples exceeding criteria
Arsenic	18	2	8	3.4	30[1]	6	1
Copper	18	8	66	25.3	130[1]	26	6
Lead	18	11.4	85.7	21.8	300[2]	60	1

[1] New Zealand Timber Treatment Guidelines MfE 1997

[2] Australian National Environment Protection Measure

[3] Adjusted guideline value used for composite sampling = original guideline value, divided by the number of sub samples taken (in this case 5).

For the samples analysed above, materials exceed relevant land use criteria as follows:

- PAD14 is affected by elevated **arsenic** concentrations. A single concentration of 8mg/kg was encountered and exceeds the adjusted residential land use criteria of 6mg/kg.
- PAD 7, 13, 15, 16, 17 and 18 are affected by elevated **copper** concentrations. Concentrations of between 42mg/kg and 66mg/kg were encountered in the respective locations and exceed the adjusted residential land use criteria of 26mg/kg.
- PAD 18 is affected by elevated **lead** concentrations. A single concentration of 85.7mg/kg was encountered and exceeds the residential land use criteria of 60mg/kg.

Although it is apparent that the above represent exceedances for individual contaminants when compared to the adjusted guideline value, this does not necessarily represent a significant risk at the site. The single arsenic and lead concentrations are not representative of the site as a whole, and a single such concentration is not sufficient to indicate significant contamination across the site. The elevated copper concentrations indicate the presence of copper within the above stated areas, although discrete sampling from the relevant areas will corroborate these findings.

Table 5 – Summary of Discrete Laboratory Tests for Metals, TPH and BTEX

Determinand	Number of samples tested	Recorded Concentrations			Residential Land Use Criteria	
		Min	Max	Average	Criteria	No. of samples exceeding criteria
Arsenic	7	3	15	8.4	30[1]	0
Copper	**7**	**8**	**177**	**90.8**	**130[1]**	**3**
Lead	7	12.7	43.0	25.6	300[2]	0
TPH (C_7-C_9)	2	< 8	< 8	-	120[3]	0
TPH (C_{10}- C_{14})	2	< 20	< 20	-	470[3]	0
TPH (C_{15}-C_{36})	2	90	< 40	-	>20,000[3]	0
TPH (total)	2	90	< 60	-	N/A	0
Benzene	2	< 0.05	< 0.05	-	1.1[3]	0
Toluene	2	< 0.05	< 0.05	-	68[3]	0
Ethylbenzene	2	< 0.05	< 0.05	-	53[3]	0
o-Xylene	2	< 0.05	< 0.05	-	48[3]	0
m & p-	2	< 0.1	< 0.1	-	48[3]	0

[1] New Zealand Timber Treatment Guidelines MfE 1997

[2] Australian National Environment Protection Measure

[3] New Zealand Petroleum Hydrocarbon Guidelines, MfE 1999

For the samples analysed above, materials exceed relevant land use criteria for a single contaminant, as follows:

- D05, D06 and D09 are affected by elevated **copper** concentrations. Concentrations of 177mg/kg, 172mg/kg and 138mg/kg were encountered in the respective locations and exceed the residential land use criteria of 130mg/kg.

However, of the elevated heavy metal contamination identified above, it should be noted that D05 was taken from the former chemical dispensing point, with D06 & D09 sampled from material surrounding the former chemical store. These both represent point sources of contamination, and therefore such elevated concentrations are not unexpected. The above exceedences are not indicative of site-wide contamination.

It is important to note that the elevated concentrations of copper encountered during the composite samples (Table 4) have not been corroborated by the corresponding discrete sampling. For example, the discrete samples taken from PAD07 (D02) and from PAD 16 & 17 (D03) were well below the unadjusted guideline value of 130mg/kg.

No evidence of hydrocarbon contamination was recorded (i.e. TPH & BTEX) within any of the discrete samples tested. These findings correspond with the field observations and field screening undertaken (Table 3).

Table 6 – Summary of Composite Sample Laboratory Tests for Organochlorine Pesticides (OCP's)

Location	Recorded Concentrations					
	2,4'-DDD (mg/kg)	2,4'-DDE (mg/kg)	2,4'-DDT (mg/kg)	4,4'-DDD (mg/kg)	4,4'-DDE (mg/kg)	4,4'-DDT (mg/kg)
PAD01	< 0.01	< 0.01	< 0.01	< 0.01	0.08	< 0.01
PAD02	< 0.01	< 0.01	< 0.01	< 0.01	0.05	< 0.01
PAD03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAD04	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01
PAD05	< 0.01	< 0.01	< 0.01	< 0.01	0.14	0.01
PAD06	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01
PAD07	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
PAD08	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAD09	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.01
PAD10	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.01
PAD11	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.01
PAD12	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.02
PAD13	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.02
PAD14	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	0.02
PAD15	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
PAD16	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.02
PAD17	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
PAD18	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Adjusted Residential Land use criteria	0.14[1]	0.14[1]	0.14[1]	0.14[1]	0.14[1]	0.14[1]
Number of samples exceeding criteria	0	0	0	0	0	0

[1]Canadian Council of Ministers for the Environment (adjusted from the original value of 0.7mg/kg, and divided by the 5 sub-samples).

The majority of composite samples tested indicated concentrations of OCP's well below the adjusted guideline value, and therefore, the data presented does not indicate a significant presence of OCPs at the site. However, a single sample (PAD05) recorded a concentration of 4,4'-DDE (an individual isomer of total DDT) at 1.4mg/kg; which is precisely the same concentration as the guideline value itself. This does not exceed the adjusted guideline, and on account of the documented low results for the remaining individual isomers, the total DDT (which is not provided in the laboratory analysis) will be below the aforementioned human health criteria of 25 (J.E Cavanagh, November 2004), and the more stringent ecological

guideline value of 1.72, for a residential end use. As such, this isolated value is not considered to represent a significant risk at the site.

Table 7 – Summary of Discrete Sample Laboratory Tests for Organochlorine Pesticides (OCP's)

Location	Recorded Concentrations					
	2,4'-DDD (mg/kg)	**2,4'-DDE** (mg/kg)	**2,4'-DDT** (mg/kg)	**4,4'-DDD** (mg/kg)	**4,4'-DDE** (mg/kg)	**4,4'-DDT** (mg/kg)
D01	< 0.01	< 0.01	0.02	< 0.01	0.44	0.04
D02	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
D03	< 0.01	< 0.01	< 0.01	< 0.01	0.05	0.02
D04	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.02
D05	0.02	< 0.01	< 0.01	0.04	0.03	< 0.01
D06	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.03
D09	< 0.01	< 0.01	< 0.01	< 0.01	0.06	< 0.01
Residential Land use criteria	0.7[1]	0.7[1]	0.7[1]	0.7[1]	0.7[1]	0.7[1]
Number of samples exceeding criteria	0	0	0	0	0	0

[1]Canadian Council of Ministers for the Environment.

No evidence of significant organic pesticide contamination was apparent from the laboratory analysis, of the discrete samples, as presented in Table 7. Each of the individual isomers representing the total DDT (2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT) are all below the residential land use criteria of 0.7mg/kg. Furthermore, on account of the documented low results for the individual isomers, the total DDT (which is not provided in the laboratory analysis) will be below the aforementioned human health criteria of 25 (J.E Cavanagh, November 2004), and the more stringent ecological guideline value of 1.72, for a residential end use.

In addition it should be noted that the discrete samples indicated no differential levels of contamination between areas used for fruit with pips (apples) or fruit with stones (peaches, pears etc.).

Organonitrogen & Organophosphorus Pesticides (ONP's and OPP's)

In addition to the above testing for OCPs, laboratory testing for ONP and OPP was also undertaken, in order to fully assess the presence of residual pesticides at the site (i.e for avoidance of doubt). The complete analysis for ONP's and OPP's are provided in Appendix B and it is evident that no significant values were encountered of any of the individual isomers

thereof. All laboratory recordings were below the laboratory detection limits, with the exception of a single trace element of Terbuthylazine, which was encountered at 0.18 mg/kg (detection limit <0.06).

Although a trace concentration of a Terbuthylazine, within a single sample (from a sample batch of 25) has been identified, there is currently no available guideline value established for soil with which to make a comparison (based on an assessment using the MfE hierarchy of guideline values). However, it should be emphasized, that on the basis of the laboratory analysis the site is not considered to be contaminated with regard to ONP or OPP use at the site.

5.3 Risk Assessment

The site is currently largely unoccupied (other than grazing sheep and crops) and is awaiting residential redevelopment. The current activities at the site are not considered to represent a significant risk with regard to soil or groundwater contamination. It is understood that the site was in use as an orchard for approximately 15 years, and incorporated a diesel AST for vehicle refuelling in addition to a former chemical storage shed, with associated dispensing point. The cropping areas of the site were also sprayed with pesticides during this period.

The proposed use of the site incorporates residential subdivisions, each of which is likely to include a soft landscaped garden area. The principal *receptors* to any contamination sources are considered to be construction workers (during site development only), and future residents (most sensitive receptor being children). Potential *pathways* linking these sources and receptors include dermal contact, inhalation of fugitive dusts and ingestion of home grown produce and soil. It is considered that a complete *source – pathway – receptor linkage* is currently present at the site, and furthermore, is likely to exist in the future.

In this regard, the only potential significant *source* established during the ground investigation relates to the elevated copper values encountered at the site which are likely to be as a result of previous chemical storage and use, specifically copper sulphate. However, the concentrations were limited to a small area of the site surrounding the aforementioned chemical storage shed and chemical dispensing point, covering approximately 5m^2.

The maximum recorded concentration of copper at the site was 177mg/kg (D06), which is approximately 135% of the guideline value of 130mg/kg. This does not represent a significant concentration which is likely to require extensive remediation management. On account of the relatively small area of contaminated material (in relation to the size of the site) and the marginally elevated results, it is considered by Golder that by reworking the 'contaminated' surface material with surrounding 'non-contaminated' material, high concentrations of copper will become diluted, and thus fall below the guideline value of 130mg/kg. Likewise, the elevated copper values within the composite samples are likely to diluted during redevelopment, and any discrete samples taken from these areas, will fall below the recommended guideline values, as the discrete sampling proved during this investigation.

Furthermore, it is important to note that copper is a phytotoxic element and the guideline criteria of 130mg/kg is primarily associated with the protection of plants, rather than representing a significant risk to human health.

Elsewhere across the site, based on the laboratory analysis, no potential sources are considered to exist. Therefore it is considered that for the remainder of the site, no *source – pathway – receptor linkage* is present which is likely to represent a risk to future users. As such, it can be stated that the limited soil contamination encountered during this investigation (elevated copper values), relate to the association of storage and concentrated use of chemicals (beneath the dispensing point) at the site, and does not relate to the widespread use of said chemicals as a treatment of the former orchard.

On the understanding that the aforementioned 'contaminated' surface material is extensively and sufficiently homogenised with the surrounding clean material, it is the opinion of Golder that the encountered site ground conditions do not represent a significant risk to current or future site users.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the investigation completed at 86A Edward Street, Lincoln by Golder Associates, it is considered from the samples tested that the site represents a low risk in terms of significant ground contamination. The investigation established only limited evidence of ground contamination, which is not likely to warrant site-wide remediation measures prior to its proposed subdivision and redevelopment.

A degree of heavy metal contamination was encountered; most notably three elevated copper concentrations were recorded surrounding the former chemical store and chemical dispensing point. Such contamination is not unusual for a former horticultural site, on account of the regular use of copper sulphate within the treatment sprays. Furthermore, these samples were taken from a very small isolated area of the site (c.5m^2) and are not considered to be an indication of site-wide ground conditions. It is recommended that by reworking and homogenising the small quantity of 'contaminated' material with the surrounding clean surface material, these concentrations will become diluted and fall below the relevant guideline criteria, albeit that validation testing will be required to confirm this. Limited copper contamination was also encountered in composite samples from the Paddock areas, although these were not corroborated by discrete sample analysis and as such, are not considered to represent a significant risk at the site. In any case, the redevelopment process at the site, will dilute these concentrations.

No significant organic pesticide contamination was established at the site as a result of the treatment of the former orchard; all sample tested being well below both the human health criteria and ecological criteria guidelines. Likewise, no significant hydrocarbon contamination was noted, associated with the former diesel AST; as all TPH and BTEX samples were well below the relevant criteria.

As a result of this investigation it is considered that the site should not be considered as potentially contaminated land, and is considered suitable for the proposed residential redevelopment.

Future attention should be drawn to the sensitivity of the site with regard to the surface water course and shallow groundwater, particularly during the redevelopment process. Although there is currently no evidence to indicate contamination of these water courses, future site users should be aware of the sensitivity of these resources with regard to impacting off-site receptors as a result of on-site actions. In this regard, it may be diligent to undertake a programme of surface water sampling to ensure surface water resources have not been impacted by previous contamination incidents (if present).

7.0 LIMITATIONS

(i). This report has been prepared for the particular purpose outlined in the project brief and no responsibility is accepted for the use of any part in other contexts or for any other purpose.

(ii). Assessments made in this report are based on the conditions indicated from the site inspection and investigation described. Variations in conditions may occur between locations and times inspected however and there may be special conditions appertaining to the site (conduits and infrastructure contained therein) which have not been revealed by investigation and which have not therefore been taken into account in the report. No warranty is included, either expressed or implied, that the actual conditions will conform exactly to the assessments and recommendations contained in this report.

(iii). Where data supplied by the client or other external sources, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility can be accepted by Golder Associates (NZ) Ltd for inaccuracies within data supplied by others.

(iv). This report is provided for sole use by the Client and is confidential to him and his professional advisers. No responsibility whatsoever for the contents of this report will be accepted to any person other than the Client.

(v). This Limitation should be read in conjunction with Golder Associates (NZ) Ltd's Conditions of Engagement provided separately.

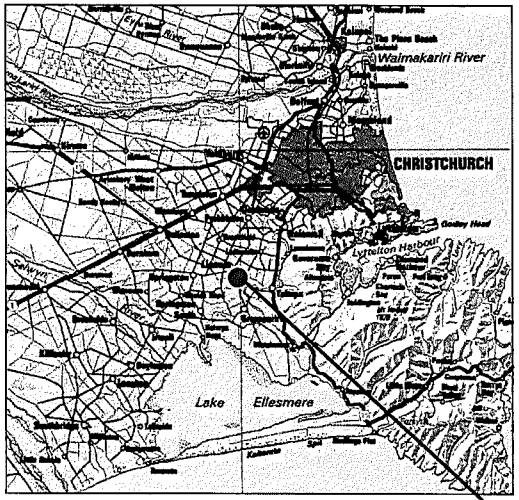
Yours sincerely,

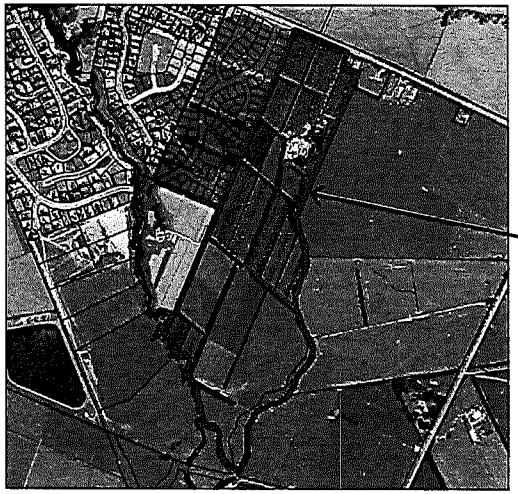
GOLDER ASSOCIATES (NZ) LTD

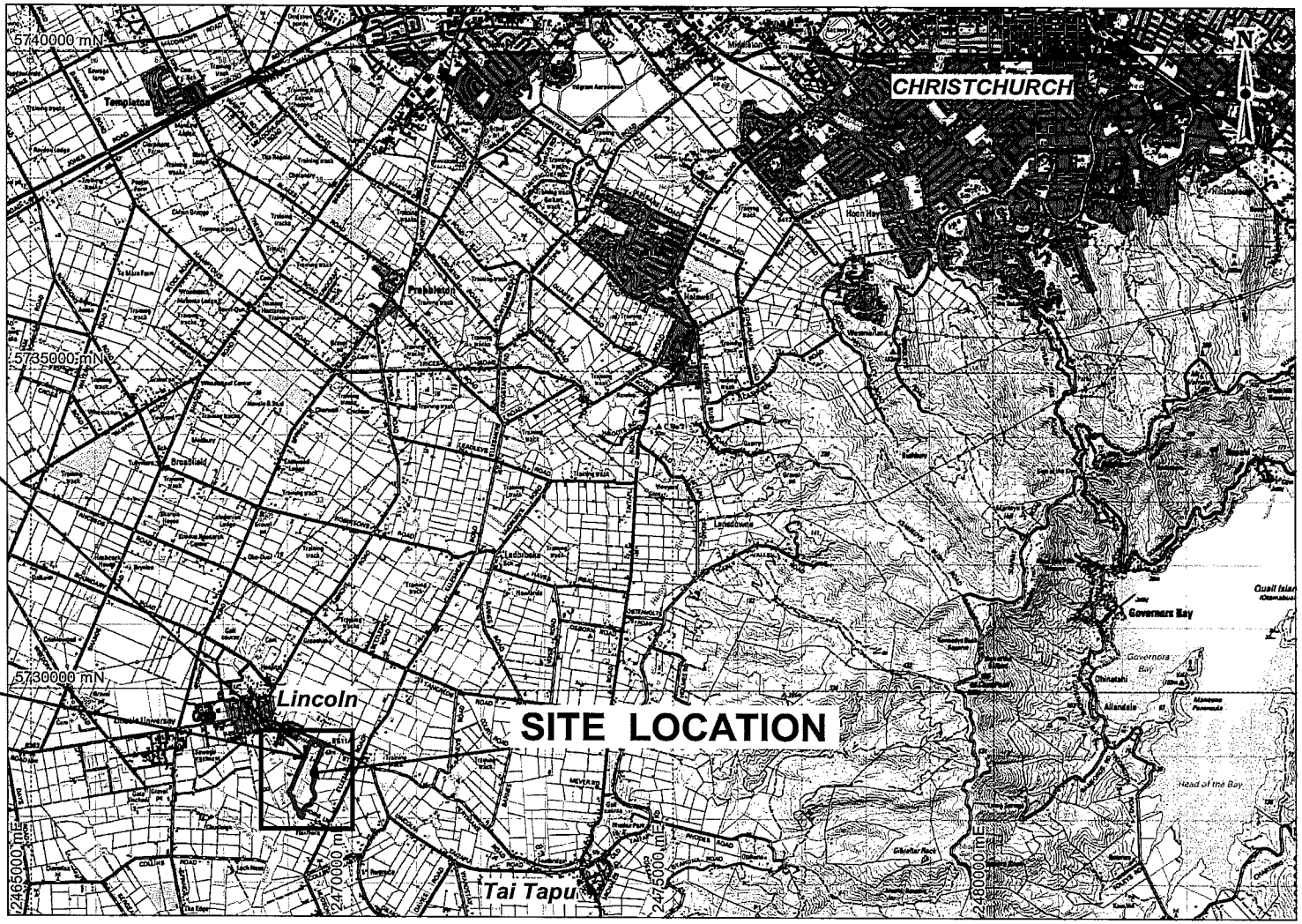
Phil Johnson
Environmental Consultant

Brendon Love
Principal Environmental Consultant

FIGURES







Aerial photo scale 1:20 000 (Source: ECAN GIS)

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kilometres
Datum: NZGD1949
Projection: NZ Map Grid

Source: Land Information New Zealand
NZMS Topographical Map
Crown Copyright Reserved

Golder Associates

CLIENT: Broadfield Estates Ltd		PROJECT: Preliminary Contamination Assessment 86A Edward Street, Lincoln Canterbury	
DRAWN: MCD	DATE: July 2007		
CHECKED	DATE	TITLE: SITE LOCATION	
SCALE: 1:100 000 A4	FILE: Locati or	PROJECT No: 077813078	REPORT No: R077813078/02
VERSION No: 1	FIGURE No: 1		

File location: S:\2007Jobs\077813078_Broadfield_Estates_ContamAss_Edward_St_Lin\2_Tech_Info\Mapinfo\Location.wor

Note: Base image source: ECAN GIS

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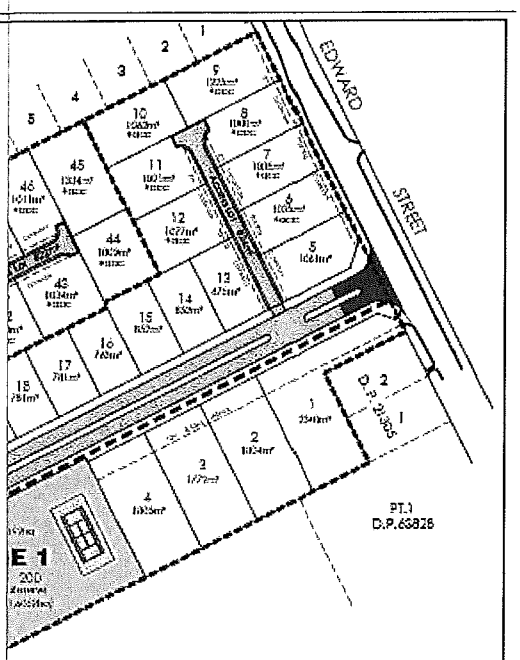
metres
Datum: NZGD1949
Projection: NZ Map Grid

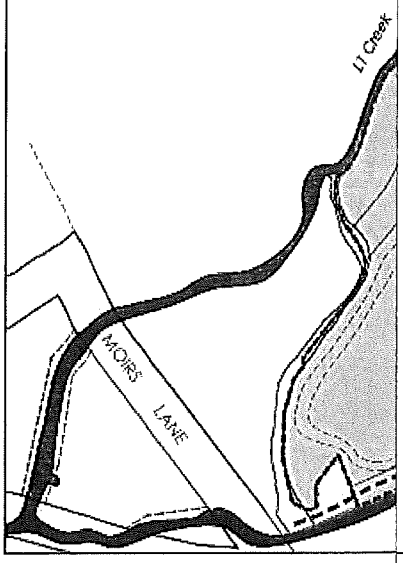
Golder Associates

CLIENT: Broadfield Estates Ltd				PROJECT: Preliminary Contamination Assessment, 86A Edward Street, Lincoln, Canterbury		
DRAWN: MCD	DATE: July 2007					
CHECKED	DATE			TITLE: SITE LAYOUT		
SCALE: 1:4000	FILE: SiteLayout.wor	A3	PROJECT No: 077813078	REPORT No: R077813078/02	VERSION No: 1	FIGURE No: 2

File location: S:\2007Jobs\077813078_Broadfield_Estates_ContamAss_Edward_St_Lin\2_Tech_Info\Mapinfo\SiteLayout.wor



Possible Rail Trail



NOTES:
1. Areas are subject to final survey and deposit of plans.
2. This plan has been prepared for subdivision consent purposes only. No liability is accepted if this plan is used for any other purpose.

SCHEDULE OF AREAS

Description	Area
Residential Lots (Lots 1-179 Net Areas)	16.3979ha
Residential Lots (Access Areas)	2097m²
Access Lots (Lots 179-192)	3679m²
Reserves to Vest in Selwyn District Council (Lots 200, 201, 202, 206, 207)	4.4730ha
Road to Vest in Selwyn District Council (Lots 193-198)	4.5197ha
Local Purpose (Esplanade Reserve) to Vest in Selwyn District Council (Lots 203, 204, 205)	1.9145ha
Total Area : (C.T. Area 28.8836ha)	25.0717ha
Comprised in: C.T. 355/344	

DAVIE LOVELL-SMITH

79 Cambridge Terrace PO Box Christchurch New Zealand
Telephone 03 379-0741 Fax 03 379-2487 mail@dlsmith.co.nz

JOB TITLE:
Broadfield Estates Ltd.
Edward St - Lincoln

SHEET TITLE:
Proposed Subdivision of Pt Lot 2 D.P.1401

DRAWING STATUS:
Subdivision Consent

SCALE : 1:1500@A1 1:3000@A3 DATE April 2007

CAD FILE: S:\5750\Concept\R11.dwg (Ra 40° @ 0.0)

DRAWING No : C 15750 SHEET No: 1 of 2

REVISION : R11

NOTE:
Proposed Development plan from Davie Lov
Concept R11.dwg R11, April 2007

PROJECT
Preliminary Contamination Assessment
86A Edward Street, Lincoln
Canterbury

TITLE
PROPOSED DEVELOPMENT

PROJECT No	REPORT No	VERSION No	FIGURE No
077813078	R077813078/02	1	3

File location: S:\2007Jobs\077813078_Broadfield_Estates_ContamAss_Edward_St

D03	2,469,101	5,728,391
D04	2,469,356	5,728,918
D05	2,469,358	5,728,929
D06	2,469,357	5,728,922
D07	2,469,414	5,728,906
D08	2,469,407	5,728,901
D09	2,469,366	5,728,931

Site area: 27 Ha

Note: Base image source: ECAN GIS

40 0 40 80
metres
Datum: NZGD1949
Projection: NZ Map Grid

Golder Associates

CLIENT	Broadfield Estates Ltd			PROJECT	Preliminary Contamination Assessment 86A Edward Street, Lincoln Canterbury	
DRAWN	MCD	DATE	July 2007			
CHECKED		DATE		TITLE	SAMPLE LOCATION POINTS	
SCALE	1:4000	FILE	SamplePoints.wor A3	PROJECT No	REPORT No	VERSION No / FIGURE No
				077813078	R077813078/02	1 / 4

File location: S:\2007Jobs\077813078_Broadfield_Estates_ContamAss_Edward_St_Lin\2_Tech_Info\Mapinfo\SamplePoints.wor

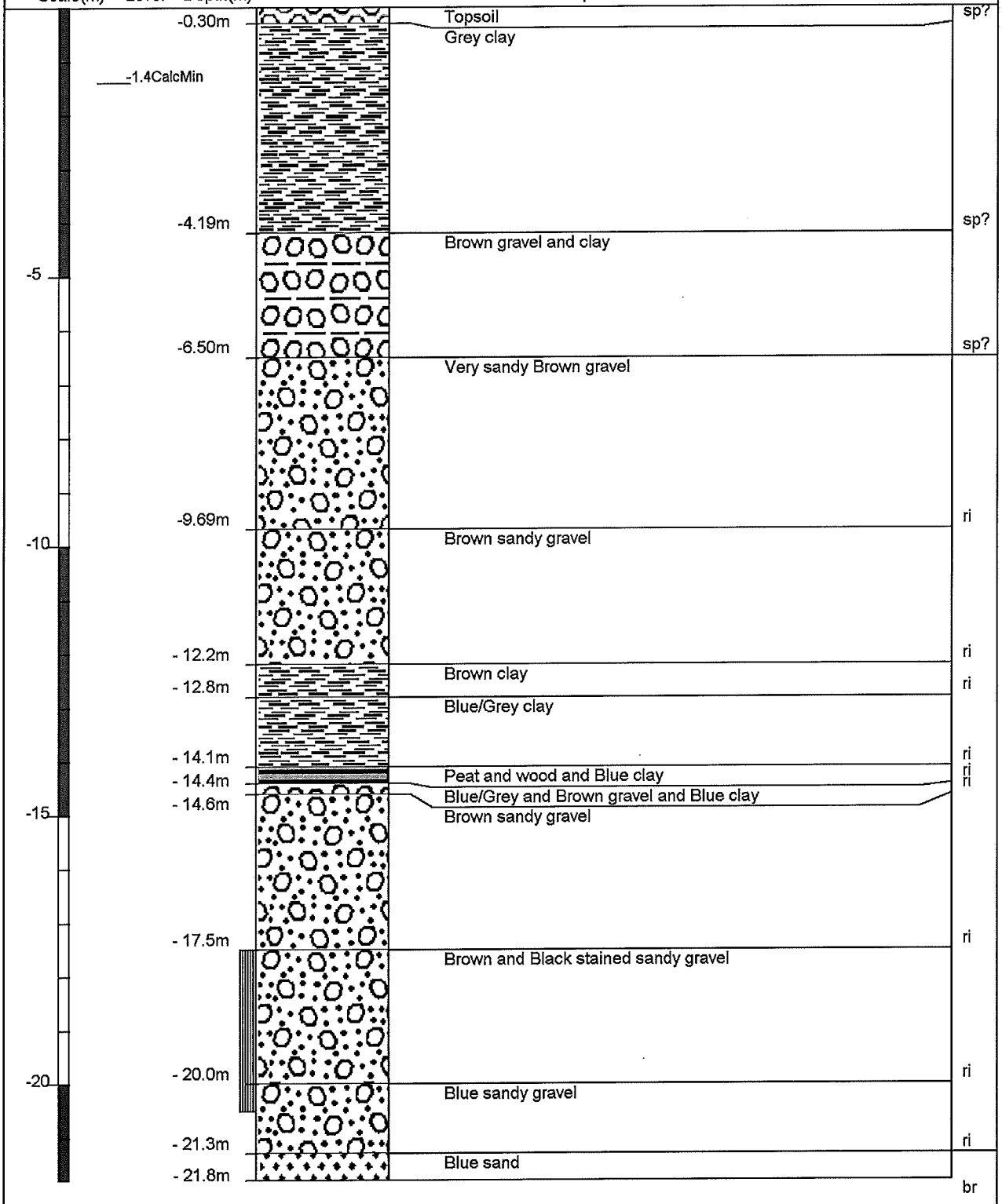
APPENDIX A

Site Borehole Log

Borelog for well M36/4402

Gridref: M36:693-287 Accuracy : 4 (1=best, 4=worst)
Ground Level Altitude : 8.2 +MSD
Driller : McMillan Water Wells Ltd
Drill Method : Cable Tool
Drill Depth : -21.79m Drill Date : 26/09/1991

Environment Canterbury
Your regional council



APPENDIX B

Laboratory Results

Hill Laboratories
A WORLD LEADER IN ANALYTICAL SERVICES

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

Client: Golder Associates (NZ) Ltd
Address: P O Box 2281,
CHRISTCHURCH
Contact: Mark Morley

Laboratory No: 457281
Date Registered: 23/06/2007
Date Completed: 5/07/2007
Page Number: 1 of 17

Client's Reference: Edward Street (P806)

The results for the analyses you requested are as follows:

Sample Type: Environmental Solids, Soil

Sample Name	Lab No	Dry Matter (g/100g as rcvd)
PAD 01 22/06/07	457281/1	82.3
PAD 02 22/06/07	457281/2	85.6
PAD 03 22/06/07	457281/3	76.4
PAD 04 22/06/07	457281/4	82.2
PAD 05 22/06/07	457281/5	79.7
PAD 06 22/06/07	457281/6	75.7
PAD 07 22/06/07	457281/7	72.8
PAD 08 22/06/07	457281/8	80.7
PAD 09 22/06/07	457281/9	76.3
PAD 10 22/06/07	457281/10	77.1
PAD 11 22/06/07	457281/11	77.7
PAD 12 22/06/07	457281/12	77.5
PAD 13 22/06/07	457281/13	77.7
PAD 14 22/06/07	457281/14	78.0
PAD 15 22/06/07	457281/15	79.6
PAD 16 22/06/07	457281/16	77.3
PAD 17 22/06/07	457281/17	79.1
PAD 18 22/06/07	457281/18	74.8
D01 22/06/07	457281/19	85.2
D02 22/06/07	457281/20	75.9
D03 22/06/07	457281/21	80.9
D04 22/06/07	457281/22	70.1
D05 22/06/07	457281/23	72.8
D06 22/06/07	457281/24	60.1
D07 22/06/07	457281/25	79.9
D08 22/06/07	457281/26	79.7
D09 22/06/07	457281/27	71.5

Sample Type: Environmental Solids, Soil

Sample Name	Lab No	Total Recoverable Arsenic (mg/kg dry wt)	Total Recoverable Copper (mg/kg dry wt)	Total Recoverable Lead (mg/kg dry wt)
PAD 01 22/06/07	457281/1	3	10	11.4
PAD 02 22/06/07	457281/2	2	11	11.9
PAD 03 22/06/07	457281/3	3	17	15.7
PAD 04 22/06/07	457281/4	< 2	12	11.6
PAD 05 22/06/07	457281/5	2	13	14.7
PAD 06 22/06/07	457281/6	6	25	21.5
PAD 07 22/06/07	457281/7	3	52	20.7
PAD 08 22/06/07	457281/8	3	9	13.9
PAD 09 22/06/07	457281/9	< 2	9	16.4
PAD 10 22/06/07	457281/10	2	14	18.5
PAD 11 22/06/07	457281/11	4	16	18.2
PAD 12 22/06/07	457281/12	4	19	42.9
PAD 13 22/06/07	457281/13	3	47	17.2
PAD 14 22/06/07	457281/14	8	8	27.1
PAD 15 22/06/07	457281/15	5	27	16.1
PAD 16 22/06/07	457281/16	3	58	15.8
PAD 17 22/06/07	457281/17	3	66	13.3
PAD 18 22/06/07	457281/18	3	42	85.7
D01 22/06/07	457281/19	7	8	12.7
D02 22/06/07	457281/20	4	27	18.9
D03 22/06/07	457281/21	3	33	14.4
D04 22/06/07	457281/22	7	81	29.1
D05 22/06/07	457281/23	10	172	27.0
D06 22/06/07	457281/24	15	177	43.0
D09 22/06/07	457281/27	13	138	34.2

Organonitrogen & Organophosphorus Pesticides

Sample Name	PAD 01 22/06/07	PAD 02 22/06/07	PAD 03 22/06/07	PAD 04 22/06/07	PAD 05 22/06/07
Lab No	457281/1	457281/2	457281/3	457281/4	457281/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Acephate	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Acetochlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Alachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desisopropyl	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Azinphos-methyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Bitertanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromacil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromopropylate	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Captan	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbaryl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Sample Name	PAD 01 22/06/07	PAD 02 22/06/07	PAD 03 22/06/07	PAD 04 22/06/07	PAD 05 22/06/07
Lab No	457281/1	457281/2	457281/3	457281/4	457281/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Carbofuran	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorfluazuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlortoluron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cyanazine	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyfluthrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyhalothrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cypermethrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Deltamethrin	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Diuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlofluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Dicloran	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorvos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Difenoconazole	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diphenylamine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fenpropimorph	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluometuron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Furalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Flusilazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluazifop-p-butyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Haloxyfop-r-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Hexazinone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Iprodione	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Kresoxim-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Linuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metolachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metribuzin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Myclobutanil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Norflurazon	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oxadiazon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Oxyfluorfen	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Paclobutrazol	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Parathion-ethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Parathion-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pendimethalin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Permethrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimicarb	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimiphos methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prochloraz	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Procymidone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Sample Name	PAD 01 22/06/07	PAD 02 22/06/07	PAD 03 22/06/07	PAD 04 22/06/07	PAD 05 22/06/07
Lab No	457281/1	457281/2	457281/3	457281/4	457281/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Prometryne	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propiconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Quizalofop-p-ethyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Simazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbacil	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tebuconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbumeton	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tolyfluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Triazophos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Vinclozolin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Organonitrogen & Organophosphorus Pesticides

Sample Name	PAD 06 22/06/07	PAD 07 22/06/07	PAD 08 22/06/07	PAD 09 22/06/07	PAD 10 22/06/07
Lab No	457281/6	457281/7	457281/8	457281/9	457281/10
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Acephate	< 0.2	< 0.3	< 0.2	< 0.2	< 0.2
Acetochlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Alachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desisopropyl	< 0.2	< 0.3	< 0.2	< 0.2	< 0.2
Azinphos-methyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Bitertanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromacil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromopropylate	< 0.2	< 0.3	< 0.2	< 0.2	< 0.2
Captan	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbaryl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Carbofuran	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorfluazuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlortoluron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cyanazine	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyfluthrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyhalothrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cypermethrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Deltamethrin	< 0.2	< 0.3	< 0.2	< 0.2	< 0.2

Sample Name	PAD 06 22/06/07	PAD 07 22/06/07	PAD 08 22/06/07	PAD 09 22/06/07	PAD 10 22/06/07
Lab No	457281/6	457281/7	457281/8	457281/9	457281/10
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Diazinon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Diuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlofluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Dicloran	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorvos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Difenoconazole	< 0.2	< 0.3	< 0.2	< 0.2	< 0.2
Diphenylamine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fenpropimorph	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluometuron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Furalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Flusilazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluazifop-p-butyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Haloxyfop-r-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Hexazinone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Iprodione	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Kresoxim-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Linuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metolachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metribuzin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Myclobutanil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Norflurazon	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oxadiazon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Oxyfluorfen	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Paclobutrazol	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Parathion-ethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Parathion-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pendimethalin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Permethrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimicarb	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimiphos methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prochloraz	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Procymidone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prometryne	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propiconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Quizalofop-p-ethyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Simazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbacil	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tebuconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbumeton	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Sample Name	PAD 06 22/06/07	PAD 07 22/06/07	PAD 08 22/06/07	PAD 09 22/06/07	PAD 10 22/06/07
Lab No	457281/6	457281/7	457281/8	457281/9	457281/10
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Terbuthylazine desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tolyfluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Triazophos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Vinclozolin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Organonitrogen & Organophosphorus Pesticides

Sample Name	PAD 11 22/06/07	PAD 12 22/06/07	PAD 13 22/06/07	PAD 14 22/06/07	PAD 15 22/06/07
Lab No	457281/11	457281/12	457281/13	457281/14	457281/15
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Acephate	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Acetochlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Alachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desisopropyl	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Azinphos-methyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Bitertanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromacil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromopropylate	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Captan	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbaryl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Carbofuran	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorfluazuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlortoluron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cyanazine	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyfluthrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyhalothrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cypermethrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Deltamethrin	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Diuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlofluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Dicloran	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorvos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Difenoconazole	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diphenylamine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fenpropimorph	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluometuron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Furalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Sample Name	PAD 11 22/06/07	PAD 12 22/06/07	PAD 13 22/06/07	PAD 14 22/06/07	PAD 15 22/06/07
Lab No	457281/11	457281/12	457281/13	457281/14	457281/15
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Flusilazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluazifop-p-butyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Haloxyfop-r-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Hexazinone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Iprodione	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Kresoxim-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Linuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metolachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metribuzin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Myclobutanil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Norflurazon	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oxadiazon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Oxyfluorfen	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Paclobutrazol	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Parathion-ethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Parathion-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pendimethalin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Permethrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimicarb	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimiphos methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prochloraz	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Procymidone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prometryne	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propiconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Quizalofop-p-ethyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Simazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbacil	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tebuconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbumeton	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tolyfluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Triazophos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Vinclozolin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Organonitrogen & Organophosphorus Pesticides

Sample Name	PAD 16 22/06/07	PAD 17 22/06/07	PAD 18 22/06/07	D01 22/06/07	D02 22/06/07
Lab No	457281/16	457281/17	457281/18	457281/19	457281/20
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Acephate	< 0.2	< 0.2	< 0.3	< 0.2	< 0.2
Acetochlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Alachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Atrazine-desisopropyl	< 0.2	< 0.2	< 0.3	< 0.2	< 0.2
Azinphos-methyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Bitertanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromacil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bromopropylate	< 0.2	< 0.2	< 0.3	< 0.2	< 0.2
Captan	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbaryl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Carbofuran	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorfluazuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlortoluron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Chlorpyrifos-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cyanazine	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyfluthrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Cyhalothrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Cypermethrin	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Deltamethrin	< 0.2	< 0.2	< 0.3	< 0.2	< 0.2
Diazinon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Diuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlofluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Dicloran	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dichlorvos	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Difenoconazole	< 0.2	< 0.2	< 0.3	< 0.2	< 0.2
Diphenylamine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fenpropimorph	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluometuron	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Furalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Flusilazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Fluazifop-p-butyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Haloxyfop-r-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Hexazinone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Iprodione	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Kresoxim-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Linuron	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Malathion	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metalaxyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Metolachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Sample Name	PAD 16 22/06/07	PAD 17 22/06/07	PAD 18 22/06/07	D01 22/06/07	D02 22/06/07
Lab No	457281/16	457281/17	457281/18	457281/19	457281/20
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Metribuzin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Myclobutanil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Norflurazon	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oxadiazon	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Oxyfluorfen	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Paclobutrazol	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Parathion-ethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Parathion-methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pendimethalin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Permethrin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimicarb	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Pirimiphos methyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prochloraz	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Procymidone	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Prometryne	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propachlor	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Propiconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Quizalofop-p-ethyl	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Simazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbacil	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tebuconazole	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbumeton	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Terbuthylazine desethyl	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Tolyfluanid	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Triazophos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Trifluralin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06
Vinclozolin	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06

Organonitrogen & Organophosphorus Pesticides

Sample Name	D03 22/06/07	D04 22/06/07	D05 22/06/07	D06 22/06/07	D09 22/06/07
Lab No	457281/21	457281/22	457281/23	457281/24	457281/27
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Acephate	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3
Acetochlor	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Alachlor	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Atrazine	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Atrazine-desethyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Atrazine-desisopropyl	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3
Azinphos-methyl	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Benalaxyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Bitertanol	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Bromacil	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1

Sample Name	D03 22/06/07	D04 22/06/07	D05 22/06/07	D06 22/06/07	D09 22/06/07
Lab No	457281/21	457281/22	457281/23	457281/24	457281/27
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Bromopropylate	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3
Captan	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Carbaryl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Carbofuran	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Chlorfluazuron	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Chlortoluron	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Chlorpyrifos	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Chlorpyrifos-methyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Cyanazine	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Cyfluthrin	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Cyhalothrin	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Cypermethrin	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Deltamethrin	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3
Diazinon	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Diuron	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Dichlofluanid	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Dicloran	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Dichlorvos	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Difenoconazole	< 0.2	< 0.3	< 0.3	< 0.3	< 0.3
Diphenylamine	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Fenpropimorph	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Fluometuron	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Furalaxyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Flusilazole	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Fluazifop-p-butyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Haloxyfop-r-methyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Hexazinone	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Iprodione	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Kresoxim-methyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Linuron	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Malathion	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Metalaxyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Metolachlor	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Metribuzin	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Myclobutanil	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Norflurazon	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Oxadiazon	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Oxyfluorfen	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Paclobutrazol	< 0.3	< 0.3	< 0.3	< 0.4	< 0.3
Parathion-ethyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Parathion-methyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Pendimethalin	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Permethrin	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Pirimicarb	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Pirimiphos methyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07

Sample Name	D03 22/06/07	D04 22/06/07	D05 22/06/07	D06 22/06/07	D09 22/06/07
Lab No	457281/21	457281/22	457281/23	457281/24	457281/27
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Prochloraz	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Procymidone	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Prometryne	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Propachlor	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Propazine	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Propiconazole	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Quizalofop-p-ethyl	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Simazine	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Terbacil	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Tebuconazole	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Terbumeton	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Terbuthylazine	< 0.06	< 0.07	< 0.06	0.18	< 0.07
Terbuthylazine desethyl	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Tolyfluanid	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Triazophos	< 0.1	< 0.1	< 0.1	< 0.2	< 0.1
Trifluralin	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07
Vinclozolin	< 0.06	< 0.07	< 0.06	< 0.08	< 0.07

Organochlorine pesticides, screening

Sample Name	PAD 01 22/06/07	PAD 02 22/06/07	PAD 03 22/06/07	PAD 04 22/06/07	PAD 05 22/06/07
Lab No	457281/1	457281/2	457281/3	457281/4	457281/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
2,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.08	0.05	< 0.01	0.04	0.14
4,4'-DDT	< 0.01	< 0.01	< 0.01	< 0.01	0.01
Aldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Alpha-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Beta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Delta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Gamma-BHC (Lindane)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Chlordane ((cis+trans)*100/42)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan I	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan II	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan sulphate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Sample Name	PAD 01 22/06/07	PAD 02 22/06/07	PAD 03 22/06/07	PAD 04 22/06/07	PAD 05 22/06/07
Lab No	457281/1	457281/2	457281/3	457281/4	457281/5
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Heptachlor epoxide	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Organochlorine pesticides, screening

Sample Name	PAD 06 22/06/07	PAD 07 22/06/07	PAD 08 22/06/07	PAD 09 22/06/07	PAD 10 22/06/07
Lab No	457281/6	457281/7	457281/8	457281/9	457281/10
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
2,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.03	0.02	< 0.01	0.02	0.02
4,4'-DDT	< 0.01	< 0.01	< 0.01	0.01	0.01
Aldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Alpha-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Beta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Delta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Gamma-BHC (Lindane)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Chlordane ((cis+trans)*100/42)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan I	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan II	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan sulphate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Organochlorine pesticides, screening

Sample Name	PAD 11 22/06/07	PAD 12 22/06/07	PAD 13 22/06/07	PAD 14 22/06/07	PAD 15 22/06/07
Lab No	457281/11	457281/12	457281/13	457281/14	457281/15
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
2,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.02	0.02	0.04	< 0.01	0.02
4,4'-DDT	0.01	0.02	0.02	< 0.01	< 0.01
Aldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Alpha-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Beta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Delta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Gamma-BHC (Lindane)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Chlordane ((cis+trans)*100/42)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan I	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan II	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan sulphate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Organochlorine pesticides, screening

Sample Name	PAD 16 22/06/07	PAD 17 22/06/07	PAD 18 22/06/07	D01 22/06/07	D02 22/06/07
Lab No	457281/16	457281/17	457281/18	457281/19	457281/20
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
2,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	< 0.01	< 0.01	< 0.01	0.02	< 0.01
4,4'-DDD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDE	0.04	0.02	< 0.01	0.44	0.01
4,4'-DDT	0.02	< 0.01	< 0.01	0.04	< 0.01
Aldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Alpha-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Beta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Delta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Gamma-BHC (Lindane)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Sample Name	PAD 16 22/06/07	PAD 17 22/06/07	PAD 18 22/06/07	D01 22/06/07	D02 22/06/07
Lab No	457281/16	457281/17	457281/18	457281/19	457281/20
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
Total Chlordane ((cis+trans)*100/42)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan I	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan II	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan sulphate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Organochlorine pesticides, screening

Sample Name	D03 22/06/07	D04 22/06/07	D05 22/06/07	D06 22/06/07	D09 22/06/07
Lab No	457281/21	457281/22	457281/23	457281/24	457281/27
Units	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)	(mg/kg dry wt)
2,4'-DDD	< 0.01	< 0.01	0.02	< 0.01	< 0.01
2,4'-DDE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,4'-DDT	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4,4'-DDD	< 0.01	< 0.01	0.04	< 0.01	< 0.01
4,4'-DDE	0.05	0.01	0.03	0.02	0.06
4,4'-DDT	0.02	0.02	< 0.01	0.03	< 0.01
Aldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Alpha-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Beta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Delta-BHC	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Gamma-BHC (Lindane)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-Chlordane	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Chlordane ((cis+trans)*100/42)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan I	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan II	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endosulphan sulphate	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin aldehyde	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Heptachlor epoxide	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobenzene	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Methoxychlor	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Sample Type: Environmental Solids, Soil

BTEX Screen

Sample Name	D07 22/06/07	D08 22/06/07
Lab No	457281/25	457281/26
Units	(mg/kg dry wt)	(mg/kg dry wt)
Benzene	< 0.05	< 0.05
Toluene	< 0.05	< 0.05
Ethylbenzene	< 0.05	< 0.05
o-Xylene	< 0.05	< 0.05
m & p-Xylene	< 0.1	< 0.1

Total Hydrocarbons by GC-FID [OIEWG carbon bands]

Sample Name	D07 22/06/07	D08 22/06/07
Lab No	457281/25	457281/26
Units	(mg/kg dry wt)	(mg/kg dry wt)
C7-C9	< 8	< 8
C10-C14	< 20	< 20
C15-C36	90	< 40
TOTAL	90	< 60

Sample Containers

The following table shows the sample containers that were associated with this job.

Container Description	Container Size (mL)	Number of Containers
Glass Jar (Soils)	300	27

Details of sample bottle preparation procedures are available upon request.

Summary of Methods Used and Detection Limits

The following table(s) gives a brief description of the methods used to conduct the analyses for this job.
The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Substance Type: Environmental Solids

Parameter	Method Used	Detection Limit
Dry and sieve sample	Air dry (35 °C), sieved to pass 2mm.	N/A
Total Recoverable digest	Nitric / hydrochloric acid digestion. US EPA 200.2	N/A
Dry Matter	Dried at 103°C, gravimetric (removes 3-5% more water than air drying at 35°C)	0.1 g/100g as rcvd
Total Recoverable Arsenic	Nitric / hydrochloric acid digestion, ICP-MS. US EPA 200.2	2 mg/kg dry wt
Total Recoverable Copper	Nitric / hydrochloric acid digestion, ICP-MS. US EPA 200.2	2 mg/kg dry wt
Total Recoverable Lead	Nitric / hydrochloric acid digestion, ICP-MS. US EPA 200.2	0.4 mg/kg dry wt
Total Hydrocarbons by GC-FID [OIEWG carbon bands]	ASE or Sonication Extraction, GC-FID Quantitation US EPA 8015B/NZ OIEWG	N/A
Organochlorine pesticides, screening	Sonication extraction, GC-ECD	N/A
Organonitrogen & Organophosphorus Pesticides	ONOP screen method, soil: Sonication extraction, GC-MS. In-house	N/A
BTEX Screen	Methanol extraction, headspace GC-MS	N/A

Analyst's Comments:

These samples were collected by yourselves and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the submitter.

T.P. Cooney

Terry Cooney MSc (Hons), PhD, MNZIC
Technical Consultant

Peter Robinson MSc (Hons), PhD, FNZIC
Client Services Manager - Environmental Division

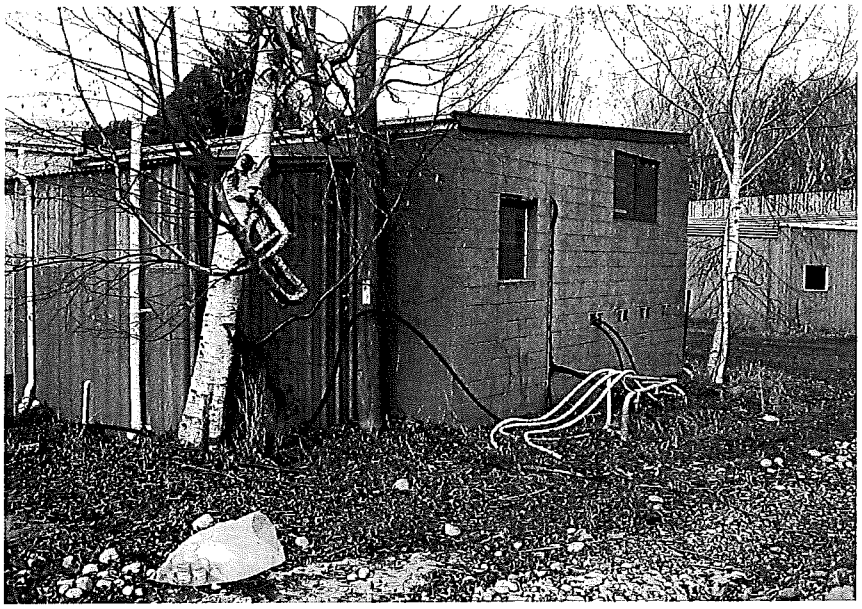
APPENDIX C

Site Photographs

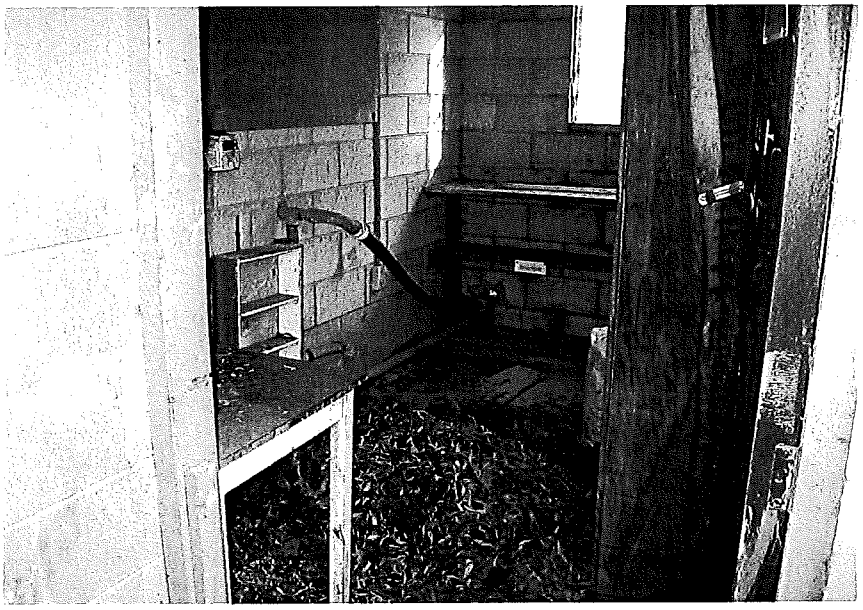
Photograph 1 - Site entrance track (to the right)

Photograph 2 - Central dirt track with Paddock 09 (R) and Paddock 10 (L)

Golder Associates	TITLE	Site photographs	
	PROJECT	86A Edward Street, Lincoln, Canterbury	
	CLIENT	Broadfield Estates	
	PROJECT No.	R 077813078 / 02	Photograph No 1 & 2

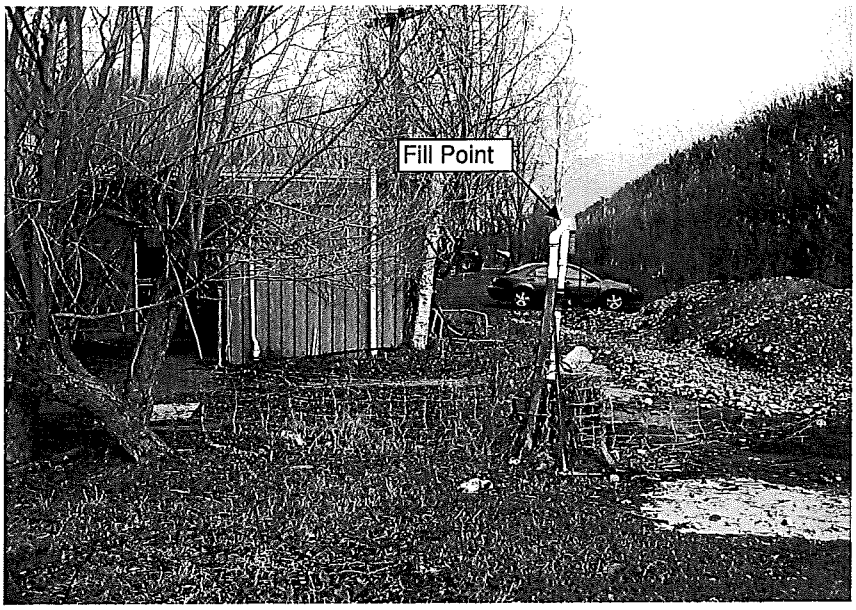


Photograph 3 - Former chemical store

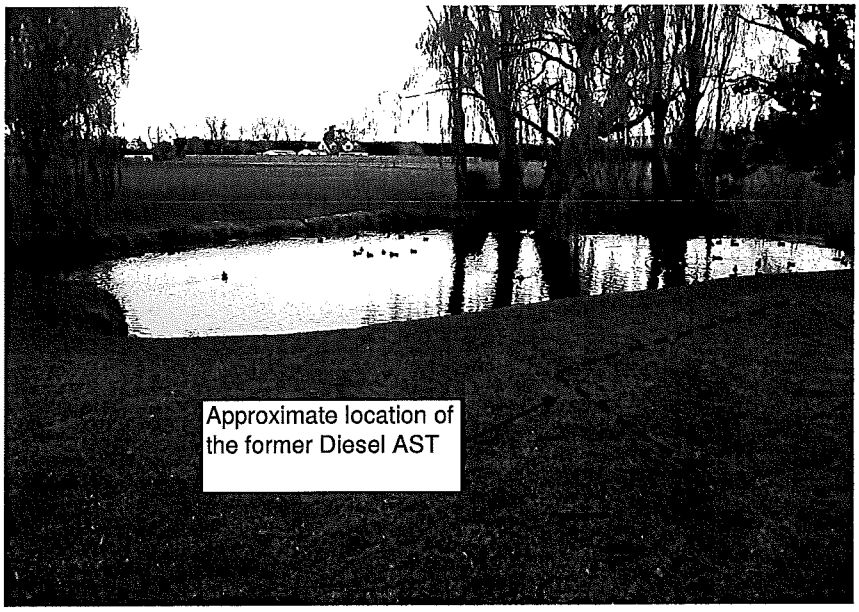


Photograph 4 - View inside former chemical store

Golder Associates	TITLE	Site photographs	
	PROJECT	86A Edward Street, Lincoln, Canterbury	
	CLIENT	Broadfield Estates	
	PROJECT No.	R 077813078 / 02	Photograph No 3 & 4

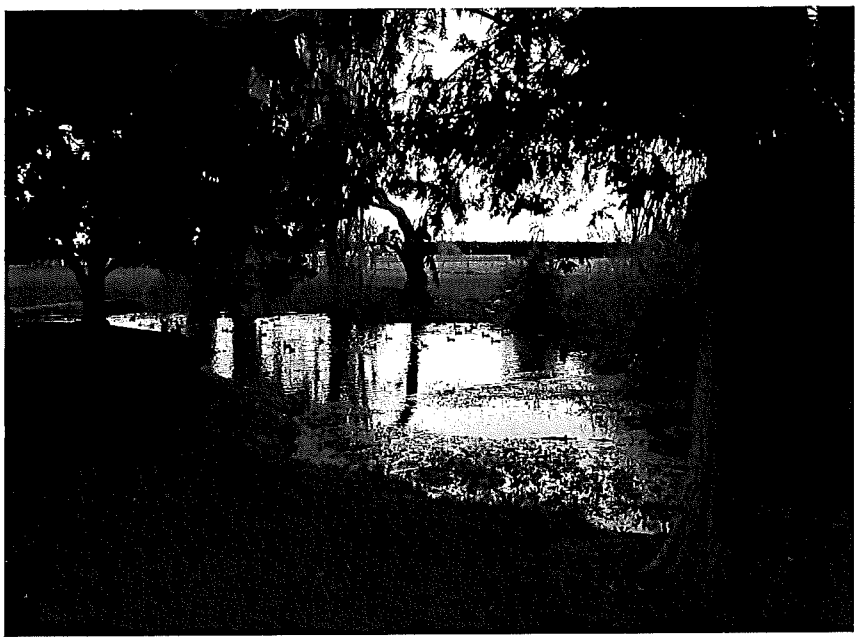


Photograph 5 - Former chemical dispensing point.



Photograph 6 - Surface water and former AST location

Golder Associates	TITLE	Site photographs	
	PROJECT	86A Edward Street, Lincoln, Canterbury	
	CLIENT	Broadfield Estates	
	PROJECT No.	R 077813078 / 02	Photograph No 5 & 6



Photograph 7 - Surface water in the east of the site, looking north-east.

Photograph 8 - Man-made culvert in the south of the site

TITLE	Site photographs		
PROJECT	86A Edward Street, Lincoln, Canterbury		
CLIENT	Broadfield Estates		
PROJECT No.	R 077813078 / 02	Photograph No	7 & 8

APPENDIX D

Submission on applications for Resource Consent

SUBMISSION ON APPLICATIONS FOR RESOURCE CONSENT UNDER SECTION 96 OF THE RESOURCE MANAGEMENT ACT 1991

To: Selwyn District Council
Private Bag 1
Leeston

Name: Vin & Sarah Smith
3 Kidson Lane
Lincoln

1. *Vin & Sarah Smith* **oppose** *Notified Resource Consent Applications 065412 & 0654136 of Broadfield Estates Ltd to:*

   Subdivide 27.0127ha at 86a Edward Street, Lincoln into 178 staged residential allotments over a ten (10) year period. To erect a dwelling on each residential allotment, and undertake earthworks for roads, reserves and section development over a 15-year period.

2. *The particular part of the application that Vin & Sarah Smith oppose is:*

   The application in its' entirety, but in particular:

   a. Proposed investigation into on-site contamination, and proposed remediation;
   b. Dust management during construction; and
   c. Lapsing period of subdivision consent.

3. *The reasons for Vin & Sarah Smith making a submission are:*

   The northern half of 86a Edward Street, Lincoln was previously a pipfruit orchard (apples). All apple and shelter tree plantings were removed over the 2006/2007 summer and burnt on-site in large piles. Residual ash was then spread across site soil surfaces. The land was then fertilised, ploughed and sown.

   Site management during the land use change phase was negligible, with little or no consideration given to potential adverse effects on adjoining properties during various development operations. Adjoining residents (in the Lincoln Dale subdivision) were regularly subjected to adverse effects from ash and smoke (due to vegetation burning) and dust (from fertiliser spreading, erosion of bare soil surfaces through wind action, and bare soil surfaces being worked prior to and during seed sowing).

   Adverse effects experienced by adjoining residents have included soiling of indoor and outdoor household surfaces by dust, ash and fertiliser (from spreading activities), soiling of washing (from dust, ash and smoke) and windows requiring to be being kept closed on warm days (due to the presence of smoke, ash and dust in the air). These effects are consistent with soiling and amenity value effects identified

in New Zealand dust emission management literature (published by the Ministry for the Environment)[1].

The above adverse effects identified/experienced by adjoining residents does not give confidence that the applicant will adequately manage the future development process to ensure that adverse effects are no more than minor.

a. Orchards are identified in the Ministry for the Environment HAIL list[2] as an activity considered likely to cause land contamination resulting from hazardous substance use, storage or disposal. Orchards are included on the HAIL list (in a group that includes market gardens and glasshouses) due to potential historic use of persistent agricultural chemicals on such properties.

District Council functions include:

"the prevention or mitigation of any adverse effects of the development, subdivision, or use of contaminated land" (s31(iia)RMA).

The application does not present an adequate discussion of past site history, so it is impossible to determine what hazardous substances could potentially have been used within the orchard.

The area of the site used as an orchard has not be adequately defined (no map indicated this area was presented in the application). A general description (*"northern or front half of the application site"*) is the only description given.

There is no site contamination characterization details presented in the application (and it appears from p6 and 12 of the application that this has not occurred to date), so the extent of contamination currently present on the property is unclear. The application acknowledges that there is likely to be contamination present on the site, particularly around spray storage areas. Whilst contamination is likely to be found around storage areas, it is also highly likely that widespread contamination is present across the area of the site previously used as an orchard.

Any proposed sampling to define on-site contamination should be designed to generate a statistically valid investigation of all possible contamination present on the site. The description of the proposed programme in the application (general soil samples taken across the site, testing around former spray storage areas) is not detailed enough to be able to determine if best practice contaminated land investigation guidelines will be followed.

The applicant has proposed remediation measures but given that no site contamination characterization has occurred to date, it cannot be determined if such measures are appropriate to protect future receptors (residents living on and adjacent to the site). Other remediation methods may be more suitable, depending

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[1] Ministry for the Environment (2001): *Good practice guide for assessing and managing the environmental effects of dust emissions.*

[2] Ministry for the Environment (2004): *Contaminated Land Management Guidelines – Schedule B Hazardous Activities and Industries List (HAIL) with Hazardous Substances.*

on the contamination levels found across the site, but this possibility is not addressed in the application.

The applicant indicates (on p12 of the application) that without specific details available regarding contamination, the proposal is considered appropriate to address any contamination found and ensure that the site is appropriately remediated.

It is considered that, without site contamination characterisation having been undertaken prior to application for consent, appropriate remediation measures cannot be formulated.

Therefore, the applicant should be required to appropriately characterize contamination present on the site (according to relevant guidelines and standards) prior to resource consent approval. Appropriate remediation measures can then be developed to ensure that any potential adverse effects on receptors (residents living on the site and adjacent to the site) can be adequately mitigated via remedial measures.

b. The applicant has indicated that topsoil stockpiles on the site will be managed to ensure they do not create a dust nuisance. Water carts will be used during construction to mitigate dust nuisance.

The Silt Control Management Plan accompanying the application indicates (on p2) that earthworks are expected to be undertaken during summer. This would therefore indicate that dust control (to avoid adverse effects on neighbouring properties) will be of high importance, given typical climatic conditions experienced in Canterbury during summer (high air temperatures, strong wind conditions).

Given that there has been no contamination characterization undertaken, and little consideration was given to effects on adjoining landowners from dust generated during recent development works on the site, it is highly likely that contaminated soil (in the form of dust) has been and will continue to be blown onto adjoining properties. As such, reverse sensitivity effects that are greater than minor will occur, if appropriate dust management methods are not used during development works.

Relevant New Zealand dust management guideline literature[3] indicates that:

"..effective dust control systems will only be achieved through good site management and by ensuring that the appropriate operational procedures are in place....

The proposed dust control measures presented in the application are considered appropriate, but additional measures are required to ensure any effects from dust generation are not adverse. Such measures are outlined in relevant New Zealand dust management guideline literature[3] and include (but are not limited to) the following:

[3] Ministry for the Environment (2001): *Good practice guide for assessing and managing the environmental effects of dust emissions.*

- A minimum water application rate from the proposed water carts to potentially dusty surfaces. All water carts to be used should meet such a minimum requirement;
- Limiting the height and slope of topsoil stockpiles, to reduce wind entrainment;
- Minimizing potentially dusty material drop heights into trucks and from machinery;
- Minimizing double handling of potentially dusty material as much as possible;
- Imposition of a maximum on-site speed for all vehicles moving on bare soil and unconsolidated surfaces on the site;
- The use of wheel wash facilities at the site exit onto Edward Street, to avoid material being tracked from the site onto the road, with subsequent dust generation through abrasion by traffic;
- Cessation of all potentially dust-generating activities on the site when on-site wind speed exceeds a pre-determined value (on-site speed established using a measurement device);
- A complaints procedure, including details of how and who complaints regarding dust nuisance should be directed and investigated; and
- A review procedure for the dust management plan to ensure that the most appropriate management methods are being used, appropriate records are being kept and the dust management plan is being implemented correctly by all staff and sub-contractors on the site.

Relevant New Zealand dust management guideline literature[4] indicates that:

"..effective dust control systems will only be achieved through good site management and by ensuring that the appropriate operational procedures are in place. These procedures and the effects that they mitigate should be clearly described in a Dust Management Plan for the site."

Without such a dust management plan, and associated resource consent conditions to give effect and enforce, the adverse effects will be more than minor.

c. A ten (10) year subdivision consent lapsing period has been requested.

The applicant has identified that the "size of the development" and managing "market conditions" as the reasons for requesting the extended subdivision lapsing period.

The property is zoned Rural Outer Plains which provides for subdivision to 20ha as a controlled activity. Should an extended subdivision lapsing period be approved then adjoining property owners will be subjected to adverse nuisance effects (as described above) including noise that are greater than minor for a significant period of time.

Section 125 RMA provides adequate assurance to the applicant (given the reasons for the requested extended lapsing period) that should the appropriate clauses be met then the subdivision lapsing period can be extended.

The application as notified is therefore inconsistent with or contrary to:

i. The provisions of the Proposed Selwyn District Plan (Rural Volume) including:
   - Objective 2, Policies 1, 2 and 3 (pgs 35 & 36)
   - Objectives 1 & 3 (pg 133)
   - Objectives 1 & 2, Policies 6 & 15 (pgs152, 157 & 160)
   - Objective 2 (pg 167)

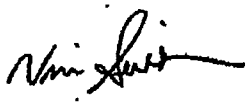
ii. The provisions of the Proposed Selwyn District Plan (Township Volume) including:
   - Objective 1, Policies 1, 2, 3 & 4 (pgs 28 - 30)
   - Objectives 1 & 2, Policies 1, 2 & 7 (pgs 38, 39 & 42)
   - Objective 2, Policy 3 (pgs 48 & 50)
   - Objectives 1 & 3, Policies 13 & 15 (pg 140 & 145)
   - Objective 2, Policies 2 & 5 (pg 166 & 167)

iii. Purpose and Principles of the Resource Management Act 1991 including:
   - S5 (1), (2)(a), (b) & (c);

4. *Vin & Sarah Smith wish the consent authority to make the following decision:*

   That the application for resource consent be declined.

5. *Vin & Sarah Smith wish to be heard in support of this submission.*



Vin & Sarah Smith
Date: 13 June 2007

Address for service:

3 Kidson Lane
Lincoln

Phone: (03) 325 7476

Copy to:

C/- Davie Lovell-Smith
PO Box 679
Christchurch
Attention: J Comfort