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Dear Shaun

**Proposed Screen Hub (including accommodation) - Ayrburn
Contaminated Site Considerations**

A screen hub (including accommodation) facility is being proposed to be constructed on part of the property at 1 Ayr Avenue (Lot 4 DP 540788) near Arrowtown. The proposed development is located to the west of Mill Creek, as shown in Figure 1. The land is part of Ayrburn Farm which operated from the 1860's and contained a sheep dip, woolshed and yards, a farm landfill and underground and above-ground fuel storage tanks. These are activities on the Hazardous Activities and Industries List (HAIL), due to the potential to cause soil contamination. The proposed activity constitutes a change of use of the land.

This letter addresses the potential for soil contamination within the proposed development area and the broader application boundary by reviewing and summarising the Preliminary Site Investigation (PSI)¹, Detailed Site Investigation (DSI)² and subsequent remediation earthworks³ and additional sampling undertaken in May 2020.

The PSI covered the entire property identified as Ayrburn Farm and Waterfall Park (Lots 1-4 DP 540788) and included extensive surface soil sampling for contaminants identified as being associated with past HAIL activities (heavy metals and pesticides). The sampling across the property identified the only areas of contamination were associated with the farm homestead, the farmyard precinct and adjacent landfill area. Within the proposed development site a possible landfill area was initially identified and is recorded on the HAIL database (HAIL.01692.05), but no evidence of landfilling was seen during the PSI site inspection and subsequent investigations, and no soil contamination was found. This area of land has now been assigned a status of "Verified Non-HAIL". The site history is well understood and nothing in the site history indicates that localised contamination would be expected to have occurred these areas identified.

¹ EC Otago Ltd, 2016. *Preliminary Site Investigation for Soil Contamination - Ayrburn Farm and Waterfall Park Residential Development, Wakatipu*. Job Reference: 16-16 Waterfall.

² EC Otago Ltd, 2018. *Detailed Site Investigation - 341-345 Arrowtown-Lake Hayes Road, Wakatipu*. Job Reference: 54-17 Ayrburn.

³ EC Otago Ltd, 2020. *Site Remedial Action Plan v7 - 341 – 345 Arrowtown-Lake Hayes Road, Wakatipu*. Job Reference: 112-18 Ayrburn Remediation.



Figure 1: Site plan for the proposed screen hub facility outlined in red.

The PSI found exceedances of the applicable soil contamination standard (SCS) for arsenic and lead in the soils around the existing homestead, farmyard buildings and the adjacent landfill.

Subsequently a DSI was undertaken to better define the HAIL sites by ascertaining the extent of contamination which was confirmed in three sites (A, B and C) and to inform remediation options.

Remedial earthworks have subsequently been undertaken under consents RM181597 and RM18.426.01-03, with contaminated soils removed from the sites being placed into a purpose designed encapsulation cell to isolate contaminants and prevent remobilisation. The location and extent of the three sites and the Encapsulation Cell is shown in Figure 2 in turquoise. These areas are all located outside of the proposed development area.

The possible landfill within the proposed development area was identified by the former Ayrburn Farm Manager as a result of occasionally observing metal scraps when grading the farm road adjacent to this area where the road runs through a cutting in the terrace face. He considered that this may indicate an old farm landfill, however there was no evidence of landfilling at this location during the site inspection. No samples collected from this area during the PSI found elevated levels of contaminants. In May 2020 an additional investigation was undertaken of the possible landfill area. No indications of buried materials, rubble or rubbish were uncovered, and contaminant levels were found to be consistent natural background levels from the PSI. Based on these results, there is no evidence that this area was used as a landfill, instead it appears earthworks have occurred in this area.



Figure 2: Site layout showing the locations of the contaminated sites (A, B and C) and the Encapsulation Cell in turquoise, and the area originally considered a possible landfill outlined in pink. The site is outlined in red.

Based on the findings of the PSI and DSI, and the subsequent remedial works, only the areas shown in Figure 2 should be considered HAIL sites. Following the remedial works, Sites B and C are fully remediated and Site A is capped and contained. Site A and the Encapsulation Cell have long-term management plans in place. The contaminated soil is contained and not anticipated to affect the proposed development which is located to the west of these areas, separated by a creek and road infrastructure and with buildings located at a higher elevation. A flood assessment previously undertaken found flooding associated with 20- and 100-year average recurrence interval flood flows affected land to the east of Mill Creek not the west, indicating that in the unlikely event containment is breached the contamination is unlikely to affect the facility buildings.

The PSI found that across the greater part of the property contaminants were present at concentrations that are likely to be the natural background levels. The sampling locations that encompassed the area proposed to be developed as the screen hub are shown in Figure 3 and the results are summarised in Table 1. Samples were collected in groups of 4, with one sample analysed as an individual and three analysed as a composite to increase the sampling density while controlling analysis costs. The individual results are consistent with the composites.

The subsequent sampling undertaken in the possible landfill area were consistent with the findings of the PSI.

Table 1: Summary of results from PSI samples collected within the application boundary

Sample ^A	Arsenic	Cadmium	Mercury	Lead	Organochlorine Pesticides
Composite samples					
G1, G2 & G3	9	< 0.10	< 0.10	14.7	ND
H1, H2 & H3	9	< 0.10	< 0.10	16.5	ND
I1, I2 & I3	9	< 0.10	< 0.10	17	ND
J1, J2 & J3	9	< 0.10	< 0.10	16.7	ND
K1, K2 & K3	9	< 0.10	< 0.10	14.4	ND
L1, L2 & L3	8	< 0.10	< 0.10	14.2	ND
M1, M2 & M3	6	< 0.10	< 0.10	13.4	ND
N1, N2 & N3	7	< 0.10	< 0.10	14.8	ND
O1, O2 & O3	8	< 0.10	< 0.10	13.3	ND
P1, P2 & P3	10	< 0.10	< 0.10	28	ND
Q1, Q2 & Q3	8	< 0.10	< 0.10	18.1	ND
R1, R2 & R3	9	< 0.10	< 0.10	16.2	ND
S1, S2 & S3	7	0.1	< 0.10	13.6	ND
<i>Average</i>	8	< 0.10	< 0.10	16	-
<i>RSD</i>	13%	-	-	24%	-
<i>UCL</i>	9	-	-	18	-
Individual samples					
G	6	0.15	< 0.10	14.1	ND
H	10	< 0.10	< 0.10	14.9	ND
I	9	0.1	< 0.10	14.2	ND
J	8	< 0.10	< 0.10	13.8	ND
K	9	< 0.10	< 0.10	15.6	ND
L	6	0.12	< 0.10	12.1	ND
M	9	< 0.10	< 0.10	14.5	ND
N	6	< 0.10	< 0.10	12.0	ND
O	8	< 0.10	< 0.10	11.3	ND
P	9	< 0.10	< 0.10	31	ND
Q	10	< 0.10	< 0.10	17.8	ND
R	9	0.11	< 0.10	14.8	ND
S	7	0.12	< 0.10	12.4	ND
BRIDGEFILL 1 (0-20)	7	< 0.10	-	9.9	-
BRIDGEFILL 2 (20-40)	7	< 0.10	-	9.5	-
<i>Average</i>	8	< 0.12	< 0.10	15	-
<i>RSD</i>	18%	18%	-	35%	-
<i>UCL</i>	9	< 0.14	-	17	-
Soil Acceptance Criteria					
NES ^B SCS	20	3	310	210	-
Predicted Background ^C					
Median	2.88	0.066	-	12.2	-
95 th Quantile	12.06	0.34	-	44.34	-

^A Results for total concentration analysis, average, soil acceptance criteria and predicted background in mg/kg dry weight, RSD in %. ND is not detected. – indicates not applicable or not analysed.

^B Ministry for the Environment, 2012. *Users' Guide, National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health*. Residential land use criteria applied.

^C Landcare Research, 2015. *Background soil concentrations of selected trace elements and organic contaminants in New Zealand*. Chemical4 Factor: gravel predicted median and 95th Quantile reported. Also refer: (<https://iris.scinfo.org.nz/layer/48470-pbc-predicted-background-soil-concentrations-new-zealand>).



Figure 3: Sampling locations from the PSI undertaken in 2016, with the site outlined in red.

In summary, it is highly unlikely that use of the land as a screen hub including accommodation units will present a risk to human health as a result of soil contamination.

We trust that this provides sufficient information to address the potential for soil contamination in relation to the proposed development. Please feel free to contact us if additional information is required.

Yours faithfully,

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Reviewed by:

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