

Date 28 February 2023
Reference CL823.280223.1
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Department for Operations

Dean Clapworthy
Bury Council Development Control

Dear Dean

Land between Butterstile Close and Hilton Lane, Prestwich, Bury, Planning Application: 67816 – Contaminated Land

I write regarding the request to discharge Conditions 3 and 4 of the above planning application. The Environment Section has received copies of the following reports:

- Phase 2 Geo-Environmental Investigation, Risk Assessment and Remediation Strategy, Hilton Lane, Prestwich, LK Consult, Reference: CL-602-LKC 21 1545-02 R0, 24 May 2022.
- Addendum to Method Statement/Risk Assessment of 25 Jan 2023, Butterstile Close, Hilton Lane, Prestwich, Massey Foundations and Piling Ltd, Reference: PHN/RE 2726.RAMS Addendum, 31 January 2023.
- Supplementary Ground Investigation, Hilton Lane, Prestwich, LK Consult, Reference: CL-602-LKC 21 1545-03, January 2023.

The Environment Section has reviewed the above information in order to assess the following points:

1. The adequacy of the desk study information available for this site.
2. The adequacy of the site investigation.
3. The adequacy of the final risk assessment.
4. The acceptability of the proposed remediation strategy.
5. Whether the information submitted is sufficient to determine that the site presents a low risk to human health and the environment.

The site is currently an overgrown area which appears to have been used as a garden in the past. Current land uses in the surrounding area include residential, a garage, open space and a burial ground. Previous uses at the site have included infilling or land raising activities and garages. Part of the site is located within the boundary of a former landfill known as Butterstile Lane Landfill (Reference: C082). This site was given planning permission for tipping in 1949 and is shown on the 1952, 1953, 1960 and 1970 historical maps as an area of filled or disturbed ground. A second landfill known as Rainsough Brow Landfill is located approximately 15m to the west. Based on the historic OS maps it is likely that a tributary of the River Irwell is culverted close to the northern boundary of the site. The site is situated on fluvioglacial sand and gravel deposits over the Manchester Marls Secondary B Aquifer and Sherwood Sandstone Principal Aquifer.

It is understood that the proposed development comprises 8 no. residential dwellings.

1. The adequacy of the desk study information available for this site

The following desk study and preliminary risk assessment report has previously been submitted and approved:

- Phase 1 Preliminary Risk Assessment, Hilton Lane, Prestwich, Bury, LK Consult, Reference no. CL-602-LKC 21 1545-01, October 2021.

As part of the site walkover on 8 October 2021, a single hand dug trial hole was excavated to confirm shallow ground conditions. Ground conditions were found to comprise made ground to 0.3m bgl comprising dark brown gravelly silty sand with frequent brick fragments. At the time of the walkover, the site was vacant with no buildings but some areas of hardstanding. Made ground was noted on the site surface (brick). Evidence of fly tipping was noted across site surface. No significant visual or olfactory evidence of contamination identified.

The report concluded that there was a potential risk to human health and environment, and an intrusive investigation was proposed.

The following site investigation proposal was received and approved in January 2022:

- 5 no. window samples to 5-6m bgl with gas and groundwater wells installed at 4 locations.
- 1 no. cable percussion borehole to 20m bgl with a gas and groundwater monitoring well.
- 7 no. soil samples tested for a suite of analysis that includes asbestos, metals, speciated PAHs, TPH CWG, BTEX, MTBE, SVOCs, VOCs and glycol.
- 3 no. groundwater samples tested for suite of analysis that includes metals, speciated PAHs, TPH CWG, BTEX, MTBE, SVOCs, VOCs and glycol.

This section recommended that soil samples taken to assess the risks from human health should focus on the top 1 metre of strata. Additionally, if insufficient groundwater is encountered to take samples, soil leachability testing should be considered to assess the risk to controlled waters.

2. The adequacy of the site investigation

Two phases of site investigation were undertaken in February (CP101 and WS101-WS105) and later December 2022 (CP201) following comments from the Environment Agency and comprised the following:

Technique	No.	Comments
Cable percussion boreholes	2	Excavated to a depth of between 15.47m bgl (CP101) and 17.4m bgl (CP201).
Window samples	5	Excavated to a depth of between 5.45 and 7.45m bgl (WS101-WS105).
Soil sampling	8	8 no. samples of made ground were analysed for a suite of analysis that included metals, speciated PAHs and

		asbestos. 2 no. samples were tested for phenol, TPH CWG and BTEX. 1 no. sample tested for ethylene glycol.
Groundwater sampling	2	Samples analysed for a suite of analysis that included metals, speciated PAHs, cyanide, phenol, TPH CWG and BTEX (CP101 Deep and WS102).
Ground gas monitoring	6 visits over 3 months	Monitoring wells installed with responses in made ground (CP101 Shallow and WS101), made ground and sand (WS102 and WS103), sand and clay (WS104) and clay (CP101 Deep).

Site Ground Conditions: Ground conditions at the site comprise of various layers of mainly granular made ground up to 7.0m bgl within the former landfill, which is located in the southwest of the site (CP101, WS101 and WS102). The made ground was found to contain brick, coal, ash, clinker, concrete, pottery, glass, metal. Lenses of organic material were noted in CP101. Asbestos containing material (ACM) was noted in WS101 at 0.5m. Outside of the former landfill, the granular made ground was found to be between 0.8 and 2.2m deep containing brick, coal, ash, plastic and glass. Natural strata comprised sand deposits, over clay strata which was encountered to 15.6m in CP201. Bedrock of sandstone was encountered at 15.6m bgl in CP201 (Sherwood Sandstone).

Site Water Conditions: During the investigation groundwater was encountered at 5.0m bgl in WS102 and WS105 associated with sand strata. In CP101 groundwater was encountered above the natural clay strata within the made ground (6.9-7.0m bgl).

During the gas monitoring programme, groundwater was encountered in WS102 (4.3 to 4.55m) and in the deep groundwater well in CP101 at 7.5-7.8m bgl (higher than the slotted pipe section that started at 8m bgl). The remaining boreholes were mainly found to be dry.

Site Ground Gas Conditions: A total of 6 visits have been carried out over a period of 3 months with atmospheric pressure less than 1000mb on 2 occasions and falling on two occasions. Methane was recorded at a maximum concentration of 0.1 %v/v. Elevated concentrations of carbon dioxide were recorded in WS101, WS102, WS103 (maximum 9.9%v/v in WS101). Depleted oxygen conditions were encountered in WS101, WS102 and WS103.

The response zone of CP101 Deep was flooded on all occasions.

3. The adequacy of the final risk assessment

Ground Assessment: The soil analysis results have been compared to the Defra C4SLs and CIEH/LQM S4ULs where available and ATRISK SSVs / CLAIRE GACs for residential with homegrown produce land use. Benzo(a)pyrene and naphthalene have been used as surrogate markers for PAHs.

The following elevated concentrations of contaminants were found in the made ground:

- Arsenic – Sample WS102 0.9-1.5m (39mg/kg) based on C4SL of 37mg/kg.
- Lead – Samples WS101 0.0-0.5m (330mg/kg), WS102 0.9-1.5m (480mg/kg), WS105 0.4-1.4m (480mg/kg) based on C4SL of 200mg/kg.
- Benzo(a)pyrene - Samples WS101 3-4m (14mg/kg), WS102 0.9-1.5m (240mg/kg), WS104 0.0-0.6m (16mg/kg), CP101 1.3-1.7m (8.9mg/kg) based on C4SL of 5mg/kg.
- Naphthalene – Samples - WS102 0.9-1.5m (100mg/kg – 17% SOM), WS104 0.0-0.6m (14mg/kg – 4% SOM) based on S4ULs of 2.3mg/kg (1% SOM) / 5.6mg/kg (2.5% SOM) / 13mg/kg (6% SOM).

No asbestos was detected in any of the samples, but the ACM encountered in the former landfill material in WS101 at 0.5m was found to consist of chrysotile paper. No elevated concentrations of TPH or no elevated PID readings were recorded. No elevated levels of glycol were found.

Based on the elevated concentrations of heavy metals and PAHs found, the consultant concludes that there is potential risk to human health and that remedial action is required.

Elevated concentrations of naphthalene were identified in WS102 and WS104. The consultant recommended that further assessment was required to determine the risks to human health from vapours. However, no further information has been received. Please submit a vapour assessment.

Controlled Waters Assessment: The groundwater analysis results have been compared to the River Basin District, updated Water Framework Directive, Private Water Supply, UK Drinking Water and Environmental Quality Standards. Petroleum hydrocarbon fractions have been compared to the WHO criteria presented in the CL:aire report on drinking water.

The following elevated concentrations of contaminants were found in the groundwater samples:

- Arsenic – Sample WS102 (11µg/l) based on UKDWS of 10µg/l.
- Zinc – Sample CP101 Deep (51.6 µg/l) based on WFD M-BAT Criteria of 50.41µg/l.

No concentrations of TPH CWG or PAHs exceeded the level of detection. No free product was noted. The lack of TPH CWG or PAHs in the groundwater samples suggests that the elevated concentrations of PAHs found in the soil samplers are not mobile and are likely due to ash, clinker and possible inclusions of bitumen or tarmac. The underlying aquifer is overlain by clay deposits (5.5m thick in CP201).

The consultant considers that the marginal exceedances of arsenic and zinc found do not pose a significant risk to the underlying Principal Aquifer (Sherwood Sandstone) or surface waters and that no groundwater remediation is required.

This assessment appears reasonable, however, please note that the Environment Agency is the regulator of controlled waters. Confirmation that the EA have approved the controlled waters assessment is required.

Ground Gas Assessment: The consultant has used the methodology set out in CIRIA 665 and BS8485:2015 to assess the gas regime at the site. Worst-case Gas Screening Values of 0.0002 l/h for methane and 0.0198 l/h for carbon dioxide have been calculated (0.1%v/v methane, 9.9%v/v carbon dioxide and 0.2 l/h flow). GSVs have also been calculated for individual boreholes. All the calculated GSVs suggest that the gas regime of the site is representative of NHBC Green / CIRIA Characteristic Situation (CS) 1. However, the maximum concentration of carbon dioxide exceeded 5%v/v in the vicinity of the former landfill site (9.9%v/v) which suggests that the characteristic situation maybe increased to CS2.

The consultant has also used the CL:aire RB17 methodology to assess the potential gas risk. Based on Soil Organic Matter (SOM) and calculated Total Organic Carbon (TOC) of the made ground samples (4% to 21% SOM) the site would be considered CS3. However, the consultant considers that the high SOM/TOC is likely due to the ash and clinker identified in the made ground, which would not be capable of generating high levels of gas. The low flow rates and lack of putrescible material identified would support this interpretation. However, as the made ground in the former landfill area exceeds the 5m depth threshold set out in RB17, the consultant considers that CS2/Amber 1 measures would be appropriate for the plots in the vicinity of the former landfill (Plots 1-5). Plots 6-8 located to the east of the former landfill where thinner made ground was encountered (0.8-2.2m) are not considered to require gas protection measures and would be classified as CS1/Green.

The ground gas assessment appears reasonable. However, elevated concentrations of naphthalene were identified in WS102 (within the former landfill) and WS104 (outside the former landfill). Further assessment of the potential risks to human health from vapours was recommended but no further information has been received. Please submit a vapour assessment and recommendations for any vapour protection measures that might be required.

4. The acceptability of the proposed remediation strategy

The following measures are proposed so that the contamination identified on site no longer presents a risk:

- **Watching brief** – In order to identify and deal with any previous unforeseen contamination at the site, a watching brief will be kept during the development. If any visual or olfactory evidence of contamination is encountered, further investigation and assessment will be required. Details of any contamination encountered will be included in the validation report.
- Further sampling to delineate the naphthalene contamination identified in the vicinity of WS102 and WS104. Samples will be taken at 5m centres and further assessment undertaken to consider the risk to human health from vapours.

Please note that this assessment will be required for the remediation strategy can be agreed.

- **Clean Cover System** will be installed in all garden and landscaped areas and comprise the following:
 - **Garden areas (600mm)** – 500mm clean imported soil over 100mm physical break layer, or 600mm clean imported soils over geotextile membrane.
 - **Private front gardens / landscaped areas (450mm)** – 350mm clean imported soil over 100mm physical break layer, or 450mm clean imported soils over geotextile membrane.

The imported cover soils will be tested at a rate of 1 per 50m³ for topsoil and subsoil with a minimum of 3 samples from each source. Recycled stone for the break later will be tested a rate of 1 per 500m³. Samples will be tested for a suite of analysis that will include metals, speciated PAHs and asbestos as a minimum. The results will be compared to generic assessment criteria for residential with homegrown produce (C4SL and S4UL).

The depth of cover will be validated using trial holes and photographic evidence. Photographs of the physical break layer/geotextile will be provided.

Please note that this Section requires that all private gardens have the full 600mm depth of clean cover. An updated remediation strategy is required which confirms that this change.

- **Gas Protection Measures** - CS2 / Amber 1 measures in Plots 1 to 5 (in the vicinity of the former landfill) and will comprise the following:
 - Passive subfloor or active subfloor ventilation system
 - Methane and carbon dioxide resistant membrane installed as per manufacturers instructions.
 - Ventilation of confined spaces within the building
 - Well-constructed reinforced suspended, raft or cast in situ ground slab.
 - Minimum penetration of ground slab by services.
 - All joints and penetrations to be sealed.

Further details regarding the proposed gas protection measures to be installed in Plots 1-5 is required, including a copy of the manufacturer's specification sheet for the chosen proprietary gas membrane and foundation drawings showing the measures to be installed.

Additionally, a copy of the vapour assessment is required as this may change the gas protection measures required the plots. No gas protection measures are currently proposed for Plots 6-8 but elevated concentrations of naphthalene were noted this area in WS104.

- **Re-Use and Excess Soil Material** - Any re-use of soil material should have the appropriate U1 and T5 exemptions or be undertaken under the CL:aire Definition of Waste Code of Practice. If the CL:aire Code of Practice is to be used a copy of the Materials Management Plan will be required. Excess soil

material will be disposed of at a suitable waste disposal facility. Waste transfer documentation will be included in the validation report.

- **Asbestos Management Plan** – Due to the potential presence of asbestos containing materials within the made ground, an appropriate Asbestos Management Strategy should be developed and implemented during groundworks to protect site staff and nearby residents.
- **Piling in Contaminated Land** – Environment Agency guidance will be followed to ensure the underlying Principal Aquifer is not impacted during piling works. A statement has been provided that the steel-cased piles installed terminated within the clay layer.

The remediation strategy is generally acceptable to this Section. However, the following further information is required:

- This Section requires that all private gardens have the full 600mm depth of clean cover. An updated remediation strategy is required which confirms that this change.
- Further details regarding the proposed gas protection measures to be installed in Plots 1-5 including a copy of the manufacturer's specification sheet for the chosen proprietary gas membrane and foundation drawings showing the measures to be installed.
- Vapour Risk Assessment to determine if vapour protection measures will be required in Plots 1-8.

All parties involved with waste and soil movement at the site should be aware that materials illegally deposited or deposited at inappropriate sites may be subject to relevant landfill taxes, payable by all parties. Only robust due diligence is a defence against joint liability. Illegal deposits can include moving waste soil material on sites, or between sites, without the appropriate permits, exemptions or duty of care.

5. Whether the information submitted is sufficient to determine that the site presents a low risk to human health and the environment

In order for this Section to be satisfied that this development does not pose a risk to human health or the environment, the following information needs to be submitted to the Council for approval:

- (i) Further sampling to delineate the naphthalene contamination identified in the vicinity of WS102 and WS104 and risk assessment to determine the risk to human health from vapours.
- (ii) Confirmation that the EA have approved the controlled waters assessment.
- (iii) Updated remediation strategy and validation plan to include:
 - Confirmation that all private gardens (front and back) will have the full 600mm depth of clean cover.
 - Further details regarding the proposed gas protection measures to be installed in Plots 1-5 including a copy of the manufacturer's specification sheet for the chosen proprietary gas membrane and foundation drawings showing the measures to be installed.

- Vapour Risk Assessment to determine if vapour protection measures will be required in Plots 1-8 and full details of vapour protection required.
- (iv) After completion of site works, a verification report is required to validate that the work undertaken conforms to the remediation proposals received and agreed by this Section.

This Section cannot recommend discharge of Condition 3 until items (i) to (iii) above have been submitted and approved.

Condition 4 requires the submission and approval of a validation report.

Please do not hesitate to contact me if you require any clarification of the above.

Yours sincerely



Rebecca Jones
Environmental Protection Officer

Please Note: The Environment Section has used all reasonable endeavours to determine the risk from contaminated land and ground gas based upon the information available to it. However, the comments made above should not be taken to imply that the land is safe or otherwise suitable for this or any other development. The responsibility for safe development rests with the developer.

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