

Our Ref: 1078/SJG
Your Ref:

29th November 2013

WRT & Oldham Council
c/o Wiggett Construction Ltd.
Viking House
449 Middleton Road
Chadderton
Oldham
OL9 9LB

Dear Sirs

Re: Land Off Huddersfield Road, Diggle – Landfill Gas Survey

Further to the recommendations in the Site Investigation Report to re-assess the gas protection measures upon completion of the landfill gas monitoring, please find enclosed the completed gas monitoring results.

BS 8485 Code of Practice for the characterisation and remediation from ground gas in affected developments and CIRIA C665 Assessing Risks posed by hazardous ground gases to buildings have been used to assess the risk from landfill gases on the site.

The made ground identified beneath the site to depths of 0.1m to in excess of 3.3m consisted of concrete and tarmac over sandy clay, sand, ash, stone, brick, concrete, slag and slate with occasional clinker, plastic, metal, glass, plant and root remains and wood fill. Elevated PAH's and TPH's have been identified consistent with the ash identified in the made ground, these are potential sources of hydrocarbon vapours and the plant and root remains and wood in the fill are potential sources of landfill gases.

Off Site Historical landfill sites are recorded 1m north of the site off Ward Lane and 14m northwest of the site off Huddersfield Road. Historical maps confirm that the site 1m north is an infilled Mill Pond for the former Wrigley Woollen Mill in the north half of the site. The pond did feed into the former mill on the site. Historical Maps also indicate spoil heaps on the site 14m west. This site has since been developed as housing. Spoil Heaps and Infilled ponds and reservoirs may contain organic materials/silts/sediments that are potential sources of landfill gases that could migrate to the site.

CIRIA C665 recommends a minimum of 12 visits over 6 months for a high risk use (school) with a moderate source (on-site/off-site landfill).

Sub Surface Ltd. carried out landfill gas monitoring at the site. Three gas wells were monitored on 6 occasions over 3 months initially to ascertain whether further monitoring is considered necessary. Methane, Carbon Dioxide and Oxygen are measured together with the atmospheric

pressure, gas flow rate, temperature and water depth. The landfill gas survey results are enclosed and have identified no Methane levels, Carbon Dioxide levels up to 3.8% , Oxygen levels down to 10% and Gas flows <0.1 l/hr.

The maximum GSV for the site to date is 0.0038 which falls into CS1 in accordance with BS 8485, which is no special precautions.

However, the depleted oxygen levels indicate potential anaerobic conditions which could result in the future production of methane and/or carbon dioxide therefore either further gas monitoring or gas protection measures in accordance with CS2 are recommended and should be incorporated in the substructures. For public buildings, a score of 3 is required, this can be achieved by providing the following gas protection measures:-

- Reinforced concrete cast in-situ, beam and block or pre-cast concrete floor slabs with low permeability gas membranes with taped joints and sealed entries using specialist approved gas prevention tape and underfloor ventilated void or vented layer or:
- Cast in-situ concrete floor slabs with minimum penetrations and low permeability gas membranes with taped joints and sealed entries using specialist approved gas prevention tape installed and validated by a specialist.

The above will need to be agreed with the local authority and validation of the installation of the gas membrane will be required with photographic evidence of gas taped sealed joints/entries and certificates of inspection by a specialist if required.

Should you require any further information please do not hesitate to contact us.

Yours faithfully

Sarah Griggs

For and on behalf of Build Vision

**SUB SURFACE**SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Insitu Test Results

Site: HUDDERSFIELD ROAD, DIGGLE, OLDHAM

Client: WIGGETT CONSTRUCTION LIMITED

Engineer: BUILD VISION CONSULTING ENGINEERS

Job Number

5751

Sheet:

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Ground Gas and Groundwater Monitoring Results Sheet

Date	Hole No.	Methane (% Volume)	Carbon Dioxide (% Volume)	Oxygen (% Volume)	Gas Flow Rate (l/hr)	Atmospheric Pressure (m bars)	Depth to Groundwater (m)
17/07/2013	1	0.0	1.8	18.1	<0.1	1003	DRY
	2	0.0	3.8	12.6	<0.1	1003	1.50
	3	0.0	0.9	18.1	<0.1	1003	2.30
	4	0.0	0.0	15.3	<0.1	1003	2.65
31/07/2013	1	0.0	2.1	16.1	<0.1	991	DRY
	2	0.0	3.3	10.6	<0.1	991	1.35
	3	0.0	0.5	16.4	<0.1	991	2.10
	4	0.0	0.0	13.3	<0.1	991	2.50
14/08/2013	1	0.0	1.9	17.8	<0.1	999	DRY
	2	0.0	2.9	10.0	<0.1	999	1.35
	3	0.0	0.5	18.9	<0.1	999	2.05
	4	0.0	0.2	15.7	<0.1	999	2.50
02/09/2013	1	0.0	1.2	19.3	<0.1	1003	DRY
	2	0.0	2.4	11.7	<0.1	1003	1.40
	3	0.0	0.4	19.4	<0.1	1003	2.15
	4	0.4	0.4	17.1	<0.1	1003	2.50
01/10/2013	1	0.0	1.8	16.7	<0.1	987	DRY
	2	0.0	1.8	10.1	<0.1	987	1.40
	3	0.0	0.5	19.6	<0.1	987	2.15
	4	0.0	0.6	18.2	<0.1	987	2.50
08/10/2013	1	0.0	0.8	17.8	<0.1	1000	DRY
	2	0.0	1.7	10.5	<0.1	1000	1.40
	3	0.0	0.4	17.6	<0.1	1000	2.20
	4	0.0	0.6	17.9	<0.1	1000	2.50

Remarks: Elevated levels of methane and carbon dioxide and depleted levels of oxygen are shown in **bold/italics**.