Contaminated Land Register Cover Sheet

Property Address – 47 Marlpool Drive, Redditch, Worcestershire, B97 4RX

Summary - A number of houses in Marlpool Drive, Redditch, are situated on a former landfill site. The site was historically used for the extraction of clay as part of a local brickwork's operation. The excavation was infilled with waste materials prior to 1970. 34 houses were built on the site in 1986.

Detailed investigation and assessment undertaken between 1990-2010 identified that elevations of ground gas (methane and carbon dioxide) presented an unreasonable health risk to residents of some of the dwellings. 16 properties were determined as being 'contaminated' in accordance with Part IIA of the Environmental Protection Act 1990 including 47 Marlpool Drive in July 2011.

The determination notice for the property can be found below.

Remediation - In 2011 the council secured grant funding to pay for the installation of gas mitigation measures. 16 'Positive Pressurisation Units' (PPUs) were installed at each of the determined properties including number 47. These units permanently ventilate the foundation system of these houses and provide an effective safety break preventing gas migrating into the properties. In 2012 the PPU systems were independently evaluated for their performance, and it was concluded that they were effective and rendered the properties safe to live in.

Current Land Status - Presently the property is not considered 'contaminated' as the potential for gas ingress is prevented by the PPU unit. However, power and maintenance of these units is critical to the preservation of the 'not contaminated' status and residents are required to ensure that the units are powered and accessible for essential maintenance. A failure to maintain operation of the PPU would result in there being an unacceptable risk to the properties.

Documents for 47 Marlpool Drive	
Determination	**Environmental Protection Act 1990 Section 78B, record of Determination that Land is Contaminated Land - July 2011 (document is provided below).**
Remediation	**Marlpool Drive, Redditch Remediation of Part 2A Contaminated Land – Remediation Verification Report No 47 Marlpool Drive (June 2012)** no-47-marlpool-drive-verification-report-june-2012.pdf (worcsregservices.gov.uk) **No 47 Verification Report Part 2 – Appendix 2 Verification Monitoring Results (June 2012)** 47-marlpool-drive-verification-report-appendix-2.pdf (worcsregservices.gov.uk) **Retrospective Positive Pressure System Installation Report (January 2012)** installation-report-47-49-marpool-drive-17-1-12.pdf (worcsregservices.gov.uk)

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ENVIRONMENTAL PROTECTION ACT 1990, SECTION 78B

RECORD OF DETERMINATION THAT LAND IS CONTAMINATED LAND

In accordance with Part 2A of the Environmental Protection Act 1990 Redditch Borough council has determined that the land at:

47 MARLPOOL DRIVE, REDDITCH, WORCESTERSHIRE B97 4RX

(*identified on the attached plan as land within the red boundary*)

Land Registry ref: HW168986

is CONTAMINATED LAND, as defined by section 78A(2) of the Environmental Protection Act 1990, because:

Redditch Borough Council has identified the presence of a contamination source, a pathway, and a receptor with respect to the current use of the land. The Council is satisfied that as a result of this pollutant linkage a significant possibility of significant harm exists, with no suitable and sufficient risk management arrangements in place to prevent such harm.

A summary of the basis on which this determination has been made is set out in the Schedules to this record.

Dated 6th July 2011

Sue Hanley

Deputy Chief Executive \ Executive Director for Leisure, Environment & Community Services

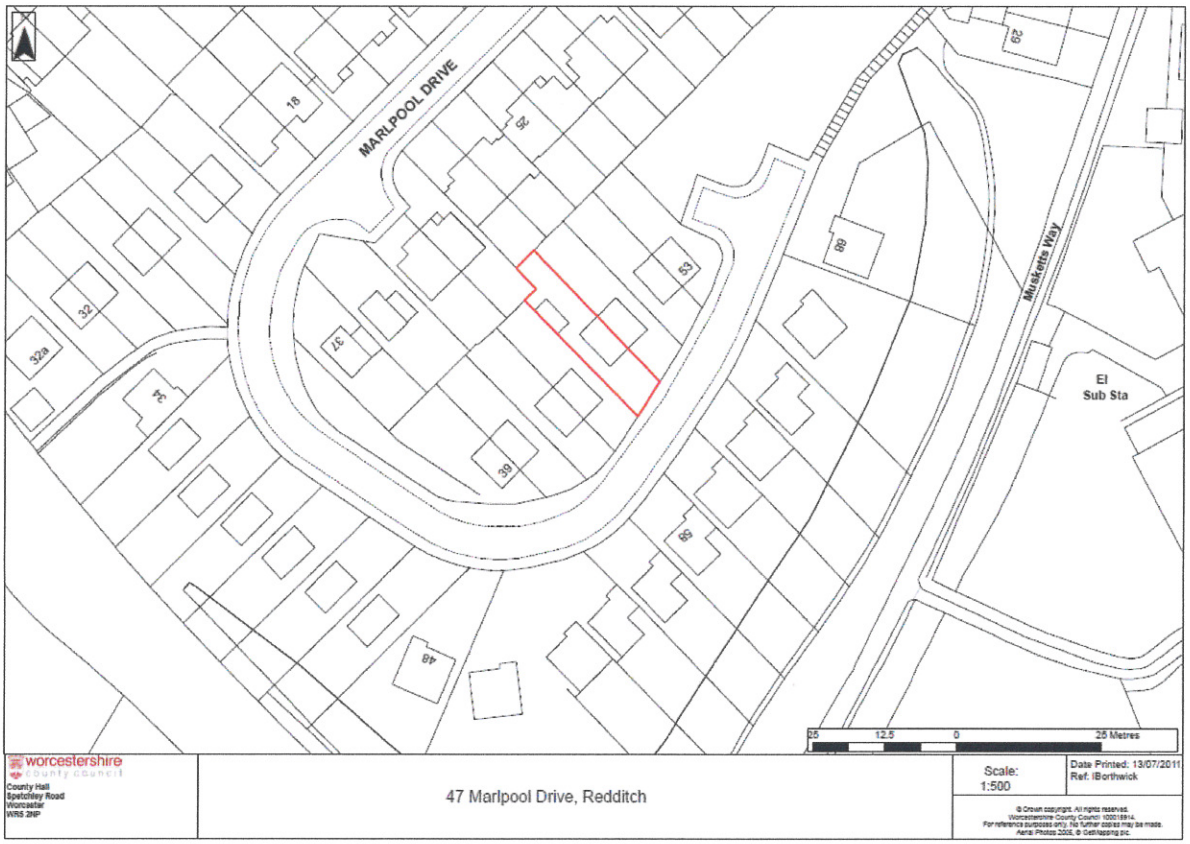
Redditch Borough Council

RECORD OF DETERMINATION

SCHEDULE 1 – The Land

The physical extent of the land determined as Contaminated Land is outlined in red on the map below.

The Site Address: 47 Marlpool Drive, Redditch, Worcestershire, B97 4RX



SCHEDULE 2

Table 1: Significant Pollutant Linkages

SPL Ref	Source	Pathway	Receptors	
	Description	**Description**	**Human Health**	**Building**
Methane Linkages				
1	Landfill Waste	Vertical migration via stone columns, accumulation beneath building perimeter, ingress via cracks and service entries, accumulation leading to fire and/or explosion risk	Occupants of residential properties	Residential Properties
2	Landfill Waste	Vertical migration via stone columns, accumulation beneath building perimeter and venting through underfloor vents leading to fire and/or explosion risk	Occupants of residential properties	Residential Properties
Carbon Dioxide linkages				
3	Landfill Waste	Vertical migration via stone columns, accumulation beneath building perimeter, ingress via cracks and service entries, accumulation in confined spaces and inhalation leading to asphyxiation risk and toxic effect	Occupants of residential properties	Residential Properties

Key evidence upon which determination is based:

Evidence of the existence of the above Significant Pollutant Linkages has been gathered from a number of investigations. These have included landfill gas measured in the passive gas dispersion system vents, measurement of landfill gas within the property, and surveys of pathways into properties and effectiveness of vents using a harmless tracer gas. The table below is a summary of the key results (in bold) from the various assessments which have lead to the determination of the property as contaminated land:

Table 2: Summary of Key Evidence

	Parameter (no. of visits)	**Result (no of measurements within property)**	**Conclusion**
Source 1	Max recorded CH4 in property 2009-11 (1)	<10ppm	Not significant
Source 2	Max recorded CH4 in vents 2009-11 (2)	0.2%	Not significant but results likely effected by Pathway1
Source 3	Max recorded CO2 in vents 2009-11 (2)	<0.1%	Not significant but results likely effected by Pathway1
Source 4	Max recorded CH4 in vents 1991 (13)	2.1%	**Significant elevated level**
Source 5	Max recorded CO2 in vents 1991 (13)	4.8%	**Significant elevated level**
Pathway 1	Tracer gas survey of vents	3 poor performing vents	**Current gas dispersion system not working efficiently**
Pathway 2	Tracer gas surveys in property	3 – 50 units (9) 80 - 300 units (5)	**Significant entry points**
Receptor 1	SPLs met	1, 2 and 3	

Summary

Significantly elevated levels of methane identified in the subfloor gravel blanket, inefficiently dispersed and with a significant number of entry points that permit access inside the property to methane during a low pressure event with an ignition source available has created a significant possibility of significant harm from explosion due to methane (SPL1) as demonstrated in Table 2 above by Source 4 and Pathways 1, 2.

Significantly elevated levels of methane have been identified in the subfloor gravel blanket, which combined with inefficient gas dispersion system and a low pressure event has created a significant possibility of significant harm (SPL2) as demonstrated in Table 2 above by Sources 4 and Pathway 1.

Significantly elevated levels of carbon dioxide identified in the subfloor gravel blanket, inefficiently dispersed and with a significant number of entry points that permit access inside the property to carbon dioxide during a low pressure event has created a significant possibility of significant harm from asphyxiation due to carbon dioxide (SPL3) as demonstrated in Table 2 above by Source 5 and Pathway 1, 2.

RECORD OF DETERMINATION OF CONTAMINATED LAND

(Paragraph B52 DEFRA Circular 01/2006 Environmental Protection Act 1990: Part 2A)

Local Authority is required to prepare a written record of the determination to include (refer B.52):

- a description of the significant pollutant linkage(s) on which the determination is based;
- a summary of the evidence on which the determination is based;
- a summary of the assessment of the evidence, and;
- a summary of the way in which the LA considers the requirements of the relevant parts (Chapter A and B of the Statutory Guidance have been met.

Glossary of Terms

Acronyms	Long Name
CH_4	Methane
CO_2	Carbon Dioxide
EA	Environment Agency
EPA	Environment Protection Act
H_2S	Hydrogen Sulphide
LEL	Lower Explosive Limit (of methane)
UEL	Upper Explosive Limit (of methane)
Ppm	Part per million
RBC	Redditch Borough Council
'Site'	Site referred to in the text relates to the historic extent of the landfill
SPL	Significant Pollutant Linkage
SPOSH	Significant possibility of significant harm

1.0 Site Setting

The site is located approximately 1km to the west of Redditch town centre at National Grid Reference (NGR) SP 033 672. The area of Marlpool Drive underlain by landfill is irregular in shape and approximately 1.7ha in size, and slopes downwards from the north east to south west by some 4m. The eastern and southern boundaries are formed by a steep bank rising upwards, beyond which are further residential properties to the east, a golf course to the south and Pitcher Oak Wood to the west. Further residential properties border the site to the north.

The geological map of the area identifies the surrounding area to be underlain by the Keuper Marl of the Triassic Period. The Marl can generally be described as reddish brown sandy silty clay.

The site was historically used for the extraction of clay for the adjacent Ferney Hill brickworks which resulted in a large depression, known as Aspen Hollow. Planning permission was granted in 1962 to the owners Ferney Hill brickworks for the infilling of 'marle hole'. The permission stipulated that no industrial, liquid or combustible material or household refuse shall be tipped on site. Evidence from planning records indicates that Birmingham City Council confirmed they were granted permission in February 1963 for the exclusive rights to deposit material in marle hole, then owned by Ferney Hill Brickworks Ltd.

The depression was subsequently infilled with some 10m of screened dust, residue from incinerated household refuse, industrial boiler ash and clinker, hardcore and soil. The waste was covered with approximately 2.5m to 3m of clay fill. Tipping operations were complete by December 1970.

Tarmac Homes Midlands Ltd bought the site and developed it with permission granted (Application 86/35) for residential development of 20 detached and 14 semi-detached properties in 1986 with the properties being completed by the end of that year. Subsequently a further detached property was built in 2005.

The residential properties were constructed on a raft foundation supported off vibro replacement stone columns, which are considered likely to penetrate the full depth of the waste. Gas protection measures incorporated a very basic means of passive gas dispersion installed beneath the floor slabs. This was intended to direct gas accumulating in the voids of the coarse stone blanket to the perimeter of the house via a minimum of four plastic vent pipes.

A number of properties have subsequently undergone conversions and have had extensions constructed. Most have incorporated a degree of gas protection measures within the design of new extensions.

2.0 Toxicity

Landfill gas comprises predominately two gases Methane CH_4 and Carbon Dioxide CO_2 and additionally much smaller quantities of other 'trace of gases' such as Hydrogen Sulphide H_2S. It is produced by the breakdown of organic matter e.g. food and plant substances.

Both methane and carbon dioxide are colourless and odourless but effects from and the harm caused by the two gases is different.

Methane

Methane can, if accumulated at sufficient levels, and in the presence of oxygen and an ignition source, give rise to risk of fire and explosion. The lower explosive limit (LEL) of methane is 5% v/v (per volume of air) and the upper limit is 15% v/v (CIRIA C665).

For an explosion to occur there must be an accumulation of methane, sufficient oxygen must be present for a flame to ignite the gas and an ignition source must be present. This can be anything from the firing of a central heating boiler or gas hob to the lighting of a match or a discarded lit cigarette.

The flammability of methane varies with gas composition; if the oxygen concentrations are reduced the limits of flammability are reduced. Above 15% v/v methane is no longer flammable and therefore explosive because of the reduced level of oxygen. Similarly, methane Is rendered non-flammable where concentrations of 25% or greater Carbon Dioxide are present.

Receptors at risk from fire and explosion: Residential Buildings and Human Occupants.

Carbon Dioxide

Symptoms of excess carbon dioxide will vary from shortness of breath, dizziness and nausea at relatively low levels through to unconsciousness and asphyxiation at extremely high levels.

Principal Hazard	Effect	Conc. By volume of air %
Toxic	Headaches and Shortness of Breath	3 to 6%
Toxic	Visual Distortion, headaches, tremors and rapid loss of consciousness	10 to 11%
Toxic	Fatality	>22%
Asphyxiant	Unconsciousness or death	6 to 20%

(CIRIA C665)

Receptors at risk from asphyxiation; Human Occupants.

Accumulation

Accumulation of methane to necessary concentrations within the explosive range either within or beneath the properties is necessary for any explosion to occur. Similarly accumulation of Carbon Dioxide to necessary levels within properties is required to cause detrimental effects. Accumulation to the necessary concentrations is more likely to occur in confined spaces such as cupboards.

Periods of low and falling atmospheric pressure encourage more ready flow of gas out of the ground and into properties via the stone column foundations and any cracks and gaps within the floor slab.

Accumulation is less likely to occur where properties are in daily use and doors and windows are being opened and so on. It is more likely to occur where properties are unoccupied for a period of time and therefore not being regularly vented, e.g. where residents are on holiday or properties are being sold whilst unoccupied.

3.0 Summary of the evidence: Site Inspection/Intrusive Investigations undertaken

SKM Enviros undertook a comprehensive assessment of risk from landfill gas at 35 properties on Marlpool Drive, Redditch. This investigation built on information obtained during previous investigations and work at the site:

During May 1990, following a planning application to construct an extension on a property within the site, 5 shallow gas monitoring wells were sunk to depths of 1.5m to 3m bgl. In two of the wells elevated levels of CH4 were recorded at 3% and 10%. The consulting engineers acting on behalf of the owners of the property advised RBC in a letter 'The existing property including the garage is founded on 22 pressure points of vibro flotation placed by GKN Keller Foundations.'

Following this during 1990-91, remedial works were undertaken by NHBC to a number of properties where methane was detected within the cavity walls.

Following the discovery of elevated concentrations of methane at the site, RBC instigated further site investigations, summarised as follows:

Industrial Research Laboratories (1991) Marlpool Drive. This report contained information on the waste deposition from planning records indicating that the authorised waste comprised: screened dust from household refuse, residues from household refuse, ash from British Electric Authority, brick hardcore, industrial boiler ash and clinker. It also noted that the efficiency of incineration is dependent upon the process used and that significant organic residues could therefore remain.

Industrial Research Laboratories (1991) *Assessment of Gas Emissions from Marlpool Drive, Redditch.* This investigation included the installation 7 monitoring boreholes to determine the area affected by gas emissions and extent of lateral migration, and additionally internal monitoring was undertaken. E horizontal vent pipes were concluded to be 600 to 1140mm in length (i.e. not penetrating the full width or length of the building). Monitoring of gas vents of all properties were undertaken on 14 occasions. The report also concluded;

- the area of the pit was covered with 2.5m to 3m layer of cohesive material prior to development with houses founded on vibro replacement stone columns;
- that a simple passive gas dispersion device was installed beneath the floor slabs intended to direct gas accumulating into the voids of the coarse stone blanket to the perimeter of the house via plastic pipes;

- there is no evidence of the presence of a gas membrane being incorporated into the floor and evidence suggests only the normal polyethylene sheet had been used as a damp proof membrane.

Industrial Research Laboratories, 1991. *Assessment of Landfill Gas Emissions from Additional Boreholes at Marlpool Drive, Redditch.* This investigation included the installation of two new boreholes outside of the area of the original landfill in order to assess the possibility of off site migration. Each borehole was monitored on 6 different occasions and no significant levels of landfill gas were recorded.

Industrial Research Laboratories, 1994. *Installation of Additional Monitoring Stand pipes and Central Venting Boreholes at Marlpool Drive, Redditch. SI/93/051955.* This investigation included the installation of a further 5 monitoring boreholes and 4 venting boreholes. No gas monitoring data has been found in the records.

Site investigation prior to extension at no 40 Marlpool Drive, August 1994. 2 trial pits were excavated to 1m bgl and 6 gas spikes to a further metre from base of pits recorded concentrations of methane between 0 to 46.6% and CO_2 between 0 and 26.2%.

Site investigation prior to extension at no 50 Marlpool Drive, 1996. A total 15 spike surveys were taken to 1m bgl recording concentrations between 0 and 2% CH4 and between 0.4 and 2.5% CO2.

Site investigation prior to construction of no 32a Marlpool Drive, Dec 2005. Two boreholes were drilled within footprint of the proposed property to 4m bgl and gas monitoring pipes installed. They were monitored once with one pipe recording negligible results and the other pipe recorded 28.1% CH4 and 24.5% CO2.

RBC returned to site to undertake gas monitoring in July, 2008 and a number of replacement boreholes were drilled and gas monitoring pipes installed. Following this SKM Enviros was commissioned to undertake a site specific gas risk assessment in 2009, internal surveys of properties in 2009/10, Further Assessment Actions in 2010 and a Remediation Options Appraisal in 2011. These investigations are summarised as follows:

SKM Enviros. March, 2010. *Marlpool Drive Internal Gas Surveys.* This letter report included results of internal gas surveys and external vent monitoring of 24 of the 35 properties on Marlpool Drive and monitoring results from 5 boreholes also undertaken in February 2010.

SKM Enviros, April, 2010. *Marlpool Drive Gas Risk Assessment.* The scope of this report was to review and assess all of the available information on ground conditions and the soils gas regime including all of the reports summarised above; identify the foundation details of the properties constructed on site; identification and assessment of potential gas migration pathways into residential properties; formation of a conceptual site model; site specific quantitative assessment of the gas risk; and recommendations for further phases of work. It also included assessment of internal gas surveys undertaken on 10 properties in 2009.

The report concluded that elevated concentrations of methane and carbon dioxide had been recorded within underfloor vents and within the properties themselves confirming gas migration

pathways and pollutant linkages. SKM also concluded that the greatest risk of ingress was likely to be from a sudden drop in atmospheric pressure and that the granular venting layer is not performing as designed. The report recommended further works to assess the significance of gas ingress into the properties.

SKM Enviros. June, 2011. *Marlpool Drive, Redditch Report on Further Assessment Actions. This* investigation followed on from the recommendation of the above report and included; tracer gas surveys to test the effectiveness of the underfloor gas dispersion system and locate gas ingress points within buildings; internal gas surveys of 8 properties not previously surveyed; installation of 2 additional monitoring wells; and real time monitoring for a set period of time of two boreholes and underfloor vents at 2 properties to better understand the gas regime. The objective was to confirm pollutant linkages and improve confidence in assessing if the site required determination as Contaminated land and consideration for remediation.

4.0 Summary of the Assessment of the Evidence

Evidence of gas ingress was identified during the internal gas surveys carried out by SKM Enviros between 2009 -11 within 8 properties within the eastern half of the site. The ingress points were primarily located at the floor-wall joints along the internal perimeter; at the floor-wall joints to extensions, conservatories and porches; and service entries. Concentrations of methane recorded at point sources within properties have generally been below 1%. However concentrations of 3.5% and 6.5% have been recorded within the two properties with the latter property also recording 5% CO2.

Elevated concentrations of methane (above 1%) and carbon dioxide (above 2%) were generally also recorded within the underfloor vents to the properties located within the eastern half of the site, with maximum concentrations of 28% methane and 15.3% carbon dioxide recorded since 2009. Much lower concentrations <1% methane and <2% carbon dioxide continue to be recorded within the underfloor vents within the western half of the site, and significantly lower concentrations have been recorded within one borehole located in this area.

Tracer gas pumped into the underfloor gas dispersion layer was detected in all properties confirming that pathways for gas ingress into the properties are present. The main ingress area was at the floor-wall joints along the internal perimeter of each property. This corresponds to the location of stone column foundations. Tracer gas was also detected in a number of properties where service entries penetrate the floor slab. The detection of tracer gas in the properties demonstrates that an appropriate gas resistant membrane was not installed into the properties, or if there was an appropriate membrane, it was not installed appropriately. There does not appear to be any gas protection measures to a number of porches and conservatories and a limited number of garages.

A total of 24 out of the 35 properties contained either i) one or more of underfloor vents that took longer than 60 minutes to clear of tracer gas; or ii) vents that appeared to be blocked, as no tracer gas was detected during the initial tracer gas input cycle. Those properties with poor gas dispersion and potentially blocked vents can be considered as not having adequate gas dispersion and venting. The majority of these properties are located within the eastern half of the site.

In a number of cases the underfloor gas dispersion layer to properties was not efficient at dispersing the tracer gas and would therefore not be effective in dispersing ground gases. Within a number of properties, the tracer gas was recorded within the property but not recorded in certain vents, suggesting the possibility that vents were blocked or the pathway to them was impaired.

Real time monitoring (using "Gas Clams") placed in 2 boreholes within the eastern half of the site showed gas concentrations varied between 0% and 30.4% methane and 0% and 14.2% carbon dioxide within those boreholes. Maximum sustained concentrations related to periods of falling atmospheric pressure, which occurred approximately 20% of the time. During stable atmospheric conditions, gas concentrations were variable and when atmospheric pressure was rising, methane and carbon dioxide concentrations were generally below limits of detection.

Real time monitoring (using "Gas Clams") installed within one underfloor vent of each of two properties recorded concentrations of methane between 0 and 26.6% at property 1 and 0 to 38% at property 2. Methane above 5% (Lower Explosive Limit) was recorded between 50 and 55% of the time and methane greater than 20% was recorded 20% of the time at Property 1 and 46% of the time at property 2. Carbon dioxide was measured between 0 and 14.6% maximum.

Elevated and sustained concentrations of methane were detected within both of the underfloor vents during the monitoring period. Variations in gas concentrations recorded within the underfloor vents mirrored those recorded within the adjacent boreholes confirming the frequency and duration of elevated concentrations i.e. maximum sustained concentrations related to periods of falling atmospheric pressure, and during stable atmospheric conditions, concentrations were variable and when atmospheric pressure was rising, methane and carbon dioxide were generally not detected.

The results of the underfloor vent monitoring confirm that it is most likely that the stone columns are acting like boreholes, with soil gas migrating vertically up the columns. The vents are located laterally across or between the stone columns and this may account for the variations in gas concentrations between vents i.e. those directly above stone columns contain the highest gas concentrations.

Gas concentrations and flows indicate that gas generation is very low as would be expected given the nature of the waste materials and time from waste deposition. That is waste material that has a slow rate of gas generation but over a lengthy period of time. These low flow rates will limit the potential for lateral migration within the waste materials themselves.

The results of the continuous gas monitoring from Gas Clams installed within the underfloor vents, has confirmed that the driving force causing gas to migrate from the ground to beneath the floor slabs is falling atmospheric pressure. Falling pressure causes gas in the ground to expand and migrate via permeable pathways, in this case the vertical stone columns. Once in the coarse stone blanket beneath floor slabs, gas has potential to enter properties either by diffusion or more likely via slight negative pressure gradient within the property itself, causing gas to be pulled in via cracks, joints or service entries. Potential for gas ingress to buildings is increased if the underfloor gas dispersion system is not operating effectively and / or vents are blocked, as demonstrated by the tracer gas surveys.

5.0 Determination Summary

Only within two properties have methane and carbon dioxide exceeded generally accepted threshold values of 1% methane and 1.5% carbon dioxide during the limited internal surveys. However, with evidence of gas ingress within a number of other properties and with elevated methane and carbon dioxide concentrations recorded beneath floor slabs (as measured within underfloor vents), there is a significant possibility that gas ingress could occur at concentrations above threshold values during low atmospheric pressure events. Once inside a building, dispersion and dilution of gas is reliant on use of the room and activities of the occupants (e.g. if windows are opened in a room, if the room or space is accessed frequently (e.g. regular opening of cupboard doors). Accumulation to hazardous levels could occur within small confined areas such as cupboards and small rooms, especially during long periods of house closure such as occupants being away for extended periods.

In addition, there is a potential risk that methane being emitted from vents could be ignited (such as if a stray cigarette lands close to the vents). Depending on gas composition in the underfloor vent, this could lead to an explosion.

Based on the results of the surveys and monitoring completed to date, SKM Enviros have divided the properties into two risk categories:

- 18 High risk properties located within the eastern half of the site;
- 16 Low risk and 1 very low risk property located within the western half of the site

The high risk properties are classified as those where one or more SPLs are present. To confirm the presence of SPLs, the following lines of evidence have been used:

i) Evidence of gas ingress during any internal gas survey. This is the primary mechanism of selection as the presence of detectable flammable gas within a property significantly above background or ambient concentrations has the potential to accumulate to hazardous concentrations.

ii) Gas concentrations within the underfloor vents recording greater than 1% methane and greater than 2% carbon dioxide on any monitoring occasion since monitoring commenced. A further primary mechanism of selection, as pathways into all properties have been established from the tracer gas surveys, so once present beneath the property, there is the potential for ingress and accumulation.

iii) Blocked or missing vents. This will significantly reduce the efficiency of the gas dispersion layer as any accumulated gas will not be diluted.

iv) Poor performance of the gas dispersion layer. Low permeability of the gas dispersion layer will not enable soil gas to be diluted or migrate to the vents. .

v) Elevated soil gas concentrations. There is a general correlation between methane and carbon dioxide concentrations recorded within boreholes and those recorded within the underfloor vents.

The selected high risk properties identified based on the above criteria, are all located within the eastern half of the site, where elevated concentrations of methane and carbon dioxide continue to be recorded within the underlying soils and vents to the underfloor gas dispersion layer. Evidence of gas ingress from a limited number of internal gas surveys have been confirmed within eight of these properties. Tracer gas surveys confirmed that the majority of these properties contain a gas dispersion layer that is either poor performing or whose vents are missing or blocked.

Section 78A (2) of the Environmental Protection Act 1990 defines contaminated land as any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that;

a) Significant harm is being caused or there is a significant possibility of such harm being caused; or

b) Pollution of controlled waters is being, or is likely to be, caused .

WRS on behalf of RBC consider from the evidence provided to it as detailed above that under section 87A (2) of the Environmental Protection Act 1990 that there is a significant possibility of significant harm being caused to human health and/or buildings and will continue to exist unless remediation takes place to 16 of the properties on Marlpool Drive satisfying the statutory definition of Contaminated Land.

6.0 Summary of the way in which WRS considers that the requirements of the statutory guidance have been met

Based on an assessment of the advice and analysis provided within the SKM Enviros reports and Worcestershire Regulatory Services own assessment of this evidence on behalf of Redditch Borough Council, the Authority is satisfied that the significant pollutant linkages 1, 2 and 3 as detailed in Table 1 of this schedule exist and have resulted in the 'significant potential of significant harm' to human health and buildings within the area identified in Schedule 1.

The requirements of the statutory guidance have been satisfied and the area of land identified on the attached map schedule 1 has been determined as Contaminated Land and requires appropriate remedial action.

References

CIRIA C665. *Assessing Risks posed by hazardous ground gases to buildings*. 2007

DEFRA Circular 01/2006. *Environmental Protection Act 1990: Part 2A. Contaminated Land*. Sep, 2006.

SKM Enviros. *Marlpool Drive Internal Gas Surveys letter Report*. Dec, 2009.

SKM Enviros. *Marlpool Drive Gas Risk Assessment*. Apr, 2010.

SKM Enviros. *Marlpool Drive, Redditch Report on Further Assessment Actions*. July, 2011.