THE COAL AUTHORITY – RISK ASSESSMENT

POTENTIAL FOR HARM CAUSED BY MIGRATION OF MINE GASES WITHIN AND BEYOND THE SITE BOUNDARY

This gas risk assessment must be discussed with and approved by all parties identified at the end of this document

Location: [redacted] **Donnington, Telford, TF2 7ND**	**Ref: P-019466**	**Date of Assessment 27/08/2015**	**Notifiable under CDM? Yes**
Assessor(s) Rachel Norton			

Purpose and Description of Work:
The affected properties are a pair of 1960's semi-detached bungalows which have suffered from severe tilt and cracking.

According to previous site investigations there is broken ground and some voiding associated with unrecorded coal workings at a depth of c. 8m beneath the party wall of the two properties. There are recorded workings beneath the properties with various coal and ironstone seams between 20m and 65m depth. There is a recorded mine entry in the driveway of [redacted], this mine entry will not be intersected during the proposed works. There are no recorded geological disturbances in the general vicinity.

The proposed works involve the demolition of [redacted] to the party wall with [redacted]. No mine workings or coal seams will be intercepted during the demolition phase.

The area beneath the party wall will then be grouted as shown on the attached plan to form support for the new gable wall. A combination of up to 13 vertical and horizontal grout holes will be drilled to a depth of around 8m and the ground stabilised.

There have been various ground investigations previously undertaken at the property and no mine gases have been detected and no alarms activated during these works.

Risk Factor	Factors	Yes	Un-known	No	N/A	Likelihood (None/L/H/M) (1)
Source What is the likelihood that coal workings or strata contacted by drilling will contain hazardous atmospheres and/or that gases	**Are there likely to be shallow coal workings beneath the site of operations?** (***Blackdamp*** also called Stythe or carbon dioxide is likely to be present and should be assumed to be unless there is clear evidence to the contrary. Methane could also be present)	x				M
	Is there made ground which may contain coal material? (Made ground with high levels of coal debris or carbonaceous material could contain ***Blackdamp*** – especially if permeable ground.)			x		
	Is there any previous history of *Blackdamp* at the location or in area?			x		
	Is there any history of methane in coal workings in the area? (***Methane*** is not likely to be seen in shallow workings, unless migrating up from deeper workings. Some areas unlikely to see methane in shallow workings.)			x		

could be produced?	**Is there any history of or are there any seams prone to spontaneous combustion which may be affected by operations?** (***Carbon monoxide*** may be present if any coal seams are on fire - it may also be produced if air is blown through seams which are prone to spontaneous combustion)			x		
	If there are shallow mine workings – are they unflooded? (Flooded workings will not represent a gas risk due to the exclusion of gas and the sealing of pathways.)	x				
	Any Other Factors? Is there any other evidence or likelihood of other gases or sources of gas?			x		
Pathway What is the likelihood that there are potential pathways between the gas source and the surface?	**Are the workings close to the surface?** (The closer the workings to the surface the more likely that there may be points of weakness in the strata due to differential ground movement. For deep workings gas only likely to escape from mine entries)	x				M
	Is there a likelihood of shafts or adits in the vicinity? (Mine entries are potential paths for gas - recorded and unrecorded)	x				
	Is there permeable made ground? (Such ground can act as a pathway for transmission both vertically and laterally)		x			
	Are there impermeable strata such as thick layers of clay between the workings and the surface? (Impermeable strata will reduce the risk of gas escape to the surface except at breaks in the cover)			x		
	Are there any geological disturbances such as faults or ground movement due to deep mining such as fissuring? (Areas of geological disturbances can produce pathways through areas of locally enhanced permeability)			x		
	Any Other Factors? Is there any other evidence or likelihood of other pathways?			x		
Receptor What is the likelihood that gas could affect people in properties if gas were to arise from the ground?	**Are buildings located close to the operations?** (The closer properties are to operations the more likely they are to be influenced)	x				H
	Are such buildings built on strip foundations? (Strip foundations allow gas to migrate into a property from beneath)	x				
	If foundations are raft type, are services sealed? (Service entries are weak points through which gas can enter buildings. They are especially important if the building is otherwise protected from gas ingress from beneath)				x	
	Do buildings lack installed gas protection measures? (Properties with designed gas protection measures installed as part of the design of the house are at a lower risk than others)	x				
	Are the floors wooden boards? (Floorboards present less resistance to gas flow than concrete floors)			x		
	Are there any basements or cellars below ground level?			x		

	(These low points may act as collection areas for gas as Blackdamp is generally heavier than air. The walls below ground level may also act as route for gas from the ground into the building.)					
	Are there any services such as drains which could allow gas flow into property? (Service runs can represent low permeability routes along which gas might migrate)	x				
	Are there any residents who, due to age, illness or disability, would be unable to understand or react as quickly as normal to an alarm or an unusual occurrence?	x				
	Any Other Factors Are there any other factors which would affect the risk to the receptor?			x		

Notes:

(1) Definition of None, Low, Medium and High. This is the assessed probability of the risk factor. For example, with source, is there a low, medium or high risk of there being hazardous gases in the workings.

Control of Risk. This table should include planned actions which will reduce the probability of a risk factor. A list of possible actions is provided, but others may also be considered depending on circumstances.

Risk Factor	Potential Controls	Controls to be used (and those responsible for implementation)
Source	The presence of gas in coal workings is effectively out of the control of any operations. The risk of generation of carbon monoxide due to drilling can be substantially reduced by the use of water as a flushing medium. This is due to eliminating the flow of air through the coal and the cooling effect of the water at the bit.	The shallow unrecorded working could potentially be a source for mine gases although none have been recorded during previous site investigations.
Pathway	The pathways themselves are not generally amenable to treatment. However, it is possible to provide an additional pathway of low resistance with the aim of encouraging any flow through this preferential route rather than through the strata. Monitoring holes along the boundary prior to commencement of works might also be considered.	Any mine gases potentially contained within shallow mine workings could migrate to surface but the most obvious pathway would be through the boreholes used to grout the workings. These boreholes will be monitored throughout the works.
Motive Force To what degree will the method of drilling encourage flow to the surface?	Measures can be taken to reduce the potential flow. Air flush probably represents the highest risk as it can inject large volumes of fluid at high pressure, thereby displacing gas in the ground or workings some distance. Water flush could pressurise small volumes of ground containing gas, but because the volumes are small the risk would be reduced. Use of augers or digging might be considered as alternatives in some circumstances.	Water flush will be utilised during drilling to reduce motive force on any gases potentially contained within workings.
Receptor	If, allowing for mitigation of the risk of flow to the surface, there is still a significant risk of gas entry into properties, the properties should be evacuated. Otherwise, alarms in the property or properties with any residual risk should be considered as a means of validation of the control methods employed. Controls should include required action in the event of an alarm condition occurring, including cessation of operations. Deployment of any gas monitoring / alarm equipment will also require the issue of standard operation instructions and a gas action plan.	There will be a gas alarm at the drill rig as per the Coal Authority Gas Monitoring Policy. There will be a carbon dioxide and carbon monoxide alarm installed at Rowan and Westdene throughout the works and the occupier will be given instruction on how to respond in the event of an alarm. [redacted]TCA Gas Specialist, will be supervising the works.
Vulnerable Receptor	In cases where vulnerable people may be involved, further precautions or supervision may be required, depending on overall level of risk.	[redacted] the occupier of [redacted], has hearing difficulties but has previously had the alarms installed and has been able to hear them when tested.

		The contractor has also been notified about his hearing difficulties and will immediately evacuate [redacted] from the property should their own alarms activate during the works.

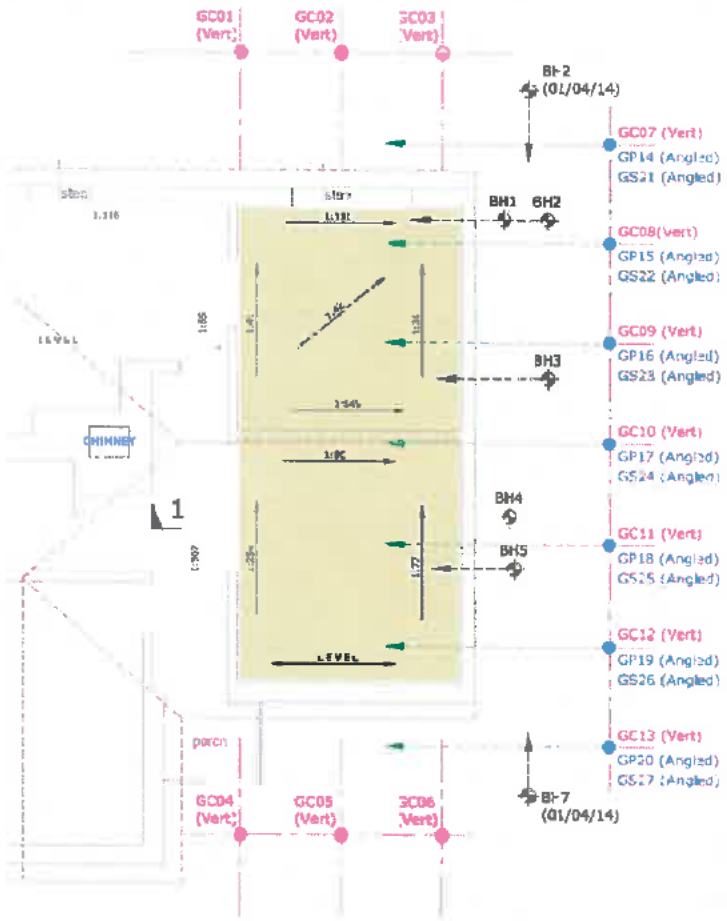
How long are the gas monitors to remain in place following site works?	2 weeks

This Gas Risk Assessment has been approved / rejected by:

NAME	TITLE	SIGNATURE	DATE
	Project Manager/Senior Project Manager/Consultant	[redacted]	
	Project Manager (Gas Specialist)		21/07/15
	*Principal SHE Manager/SHE Construction Co-ordinator		21/09/15

* Notifiable projects - must be signed by Principal SHE Manager (or SHE Construction Co-ordinator in his/her absence)


JOHNSTONE CLOSE
Ivy Cottage
Holly Cottage
Cottage
Larkfield
Cranford
Rose Way
Chanterol
Posts
Posts
The (PH)
The Moss
Fairoaks
Jacquoet
Sunavon
Deepdale
Girtan
Avalon
188.5m
MAFEKING DRIVE
JOHNSTONE CLOSE
Shrangri-La
Safari
Rowan
57 GEORGES ROAD
Path (um)
Green Gables
BROCKWARDINE WOOD
Windyridge
Whispering Pines
Roschill
Shieker
109.1m
109.1m



PROPOSED GROUT PLAN

IDENTIFIED TREATMENT AREA (SIGNIFICANT TILTING)

GC03 (Vert)	PROPOSED GROUT CURTAIN BOREHOLES
GP14 (Angled)	PROPOSED PRIMARY GROUT BOREHOLES
GS21 (Angled)	SECONDARY GROUT BOREHOLES (to be assessed depending on grout pressure readings obtained from primary grouting)
BH2	BOREHOLE FROM PREVIOUS G.I.

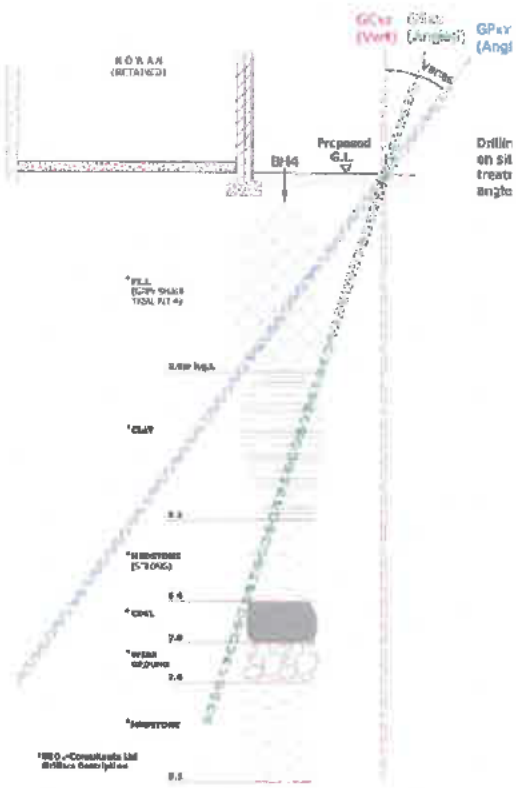
DOCUMENTS TO BE READ IN CONJUNCTION WITH THIS DRAWING :

- Design Risk Assessment
- Specification for Grouting Works (Stabilising Mine Workings with PFA Grouts; Environmental Code of Practice 'BRE Report 509:2009')

NOTE:-
THE NUMBER, DEPTH & INCLINATION OF THE GROUT BOREHOLES MAY BE VARIED AS INSTRUCTED BY THE COAL AUTHORITY'S PROJECT ENGINEER AS THE WORKS PROCEED

NOTE:-
FACE OF PROPERTY TO BE PROTECTED USING SHEETING DURING GROUTING

PROTECTIVE MEASURES TO BE ADOPTED ALONG EXISTING BOUNDARIES



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