

Our Ref: ADB/15312/Let2

Your Ref:

Contact: Alan Beattie

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14th March 2019

Mr Muttakir Mohammed (by email)
m.mohammed@npt.gov.uk

For the attn. of Mr Muttakir Mohammed

Dear Sir,

RISK ASSESSMENT AND CONCEPTUAL SITE MODEL: PROPOSED COMMERCIAL DEVELOPMENT, MARDON PARK, BAGLAN

In addition to our previous letter reference ADB/15312/Let1 dated 8th March 2019 please find further clarification of the human health risk from the Coal Authority high risk development area.

1.0 Geological Setting

The 1:50,000 scale geological map (Sheet 247) indicates that the site is underlain by the rocks of the South Wales Middles Coal Measures formation of Carboniferous age. The BGS Lexicon of name rock unit describes this formation as "grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones. The bedrock is seen to dip in a northerly direction at between 40° and 50°.

The geological map shows the big coal seam crossing the north eastern corner of the site. Given the dip this will underlie the north eastern corner of the site.

The bedrock is seen to be overlain by deposits of alluvium. This is likely to comprise, clay and silt deposits with varying amounts of sand and gravel.

An extract of the geological maps can be found on the following page.

1.0 Geological Setting (Continued)

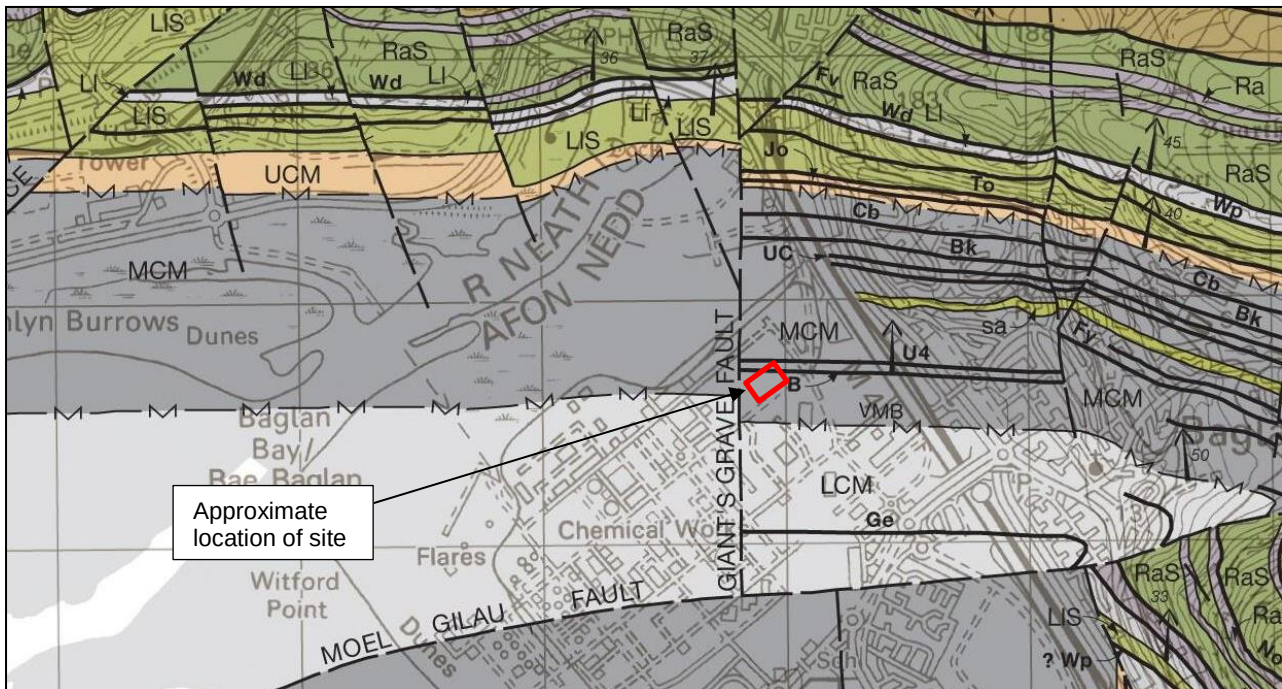


Figure 1 Geological Map Extract

1.0 Borehole Data

A borehole log for the site was made available to Terra Firma (Wales) and confirms the underlying ground conditions. The borehole was sunk to a depth of 20.00m in 2006 by Apex Drilling Services Limited.

The ground conditions as described by the driller are as follows:

Table 1 - Summary of Groundwater Strikes		
Depth Top (m)	Depth Bottom (m)	Description
0.00	1.20	Slag boulders and brick fill
1.20	4.80	Fine brown SAND
4.80	6.50	Coarse grey SAND
6.50	7.80	Grey sandy CLAY
7.80	16.00	Grey SAND
16.00	19.50	Grey silty CLAY
19.50	20.00	Gravelly boulder CLAY
20.00	>20.00	Dense GRAVEL

An installation was put into the borehole however given its age it is considered that it will not be serviceable.

The drillers borehole log can be found in **Annex B**.

2.0 Contaminants of Concern

The potential risk to human health from the high risk mining area associated with the Big Coal Seam requires clarification.

Soil

The Coal Authority reports for the site indicate that the site is not in an area that could be affected by any past recorded underground coal mining. There are also no known coal mine entries within, or within 20 metres of the boundary of the property. The site is also not within the boundary of an opencast site from which coal has been removed. It is therefore concluded that the soils on site would not have been impacted by any contamination arising from coal mining activities in the surrounding area.

Water

As the soils on site are not considered to have been impacted by the high risk coal authority development area by the same logic the aquatic environment is unlikely to be impacted.

Gas

The coal seams below the site are a potential source of mine gas.

Made ground is also a potential source of ground gas on site.

There are no active or historic landfills located within a 250m influencing distance of the site and there is no risk from landfill gas.

No radon protection measures are required for the development.

The Envirocheck datasheet and maps can be found in **Annex A**.

2.1 Potential Receptors and Pathways

2.1.1 Human Receptors

The human receptors are construction workers, neighbouring site users and passers-by and future site users which include residents of, and visitors to the development.

The potential pathways are inhalation and ingestion of soil and soil dust and dermal contact. Site end users are at risk through the same pathways as well as from the consumption of home grown produce and potable water.

2.2 Mitigation and Remedial Measures

2.2.1 Human Health

No contaminants of concern associated with the past mining activities are anticipated on the site.

As good practise, construction workers should adhere to good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate.

If during development works any other unexpected ground conditions or evidence of contamination is found, inspection by a geo-environmental engineer should be made, and any required testing or investigation carried out prior to continuation of works.

2.2.1 Human Health (Continued)

For proposed new supply water pipes, the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' should be consulted.

Any imported soils should be tested and validated as suitable prior to use on site.

To quantify the risk to the proposed development it would be necessary to undertake gas monitoring on the site. This would involve the installation of gas wells and monitoring of these wells for a minimum of six rounds on a fortnightly basis. To negate the need for investing time and resources and to avoid delaying the project it is recommended that gas protection measures are adopted for the new building.

The CL:AIRE Research Bulletin RB17 November 2012, document titled "A Pragmatic Approach to Ground Gas Assessment" proposes an alternative framework for the investigation and assessment of ground gas. This takes the site condition and history into account following an initial desk study and site investigation which have been completed by IFA.

In line with this approach it is recommended that Gas Characteristic Situation 2 protection measures are adopted for the site as per CIRIA C665. These are described below.

All buildings upon the site should be constructed with a gas characterisation situation two floor slab specifications (*CIRIA C665 Table 8.5*) as outlined below.

- Reinforced concrete cast in-situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM² and underfloor venting
- All joints and penetrations sealed and validated by a suitably qualified person

Once the gas membrane is in place we consider that there will be no risk to the site end users.

2.2.2 Aquatic Environment

There are not considered to be any risks to the aquatic environment from site soils.

During the construction period, there is a risk to the environment/adjacent sites from de-watering, digging foundations, drainage misconnections, discharges to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

The risk is considered to be negligible as any adverse effects will be easily preventable by due diligence to good construction practice and housekeeping in preventing surface runoff and the spillage of materials.

The basic measures that should be taken are as follows:

- Prepare a drainage plan and mark the manholes to prevent pollutants accidentally reaching the surface water sewers;
- Carry out any activities that could cause pollution in a designated, bunded area, away from rivers. Where possible it should drain to the foul sewer;
- Use settlement ponds to remove silty water;
- Store all oils and chemicals in a fully bunded area to prevent leaks or spills;
- Get advice on whether you need an environmental permit and apply in good time

2.3 Illustrative Conceptual Site Model

The preceding sections allow a conceptual site model to be drawn up. This can be found on the following page and considers the site conditions and high risk Coal Authority development area.

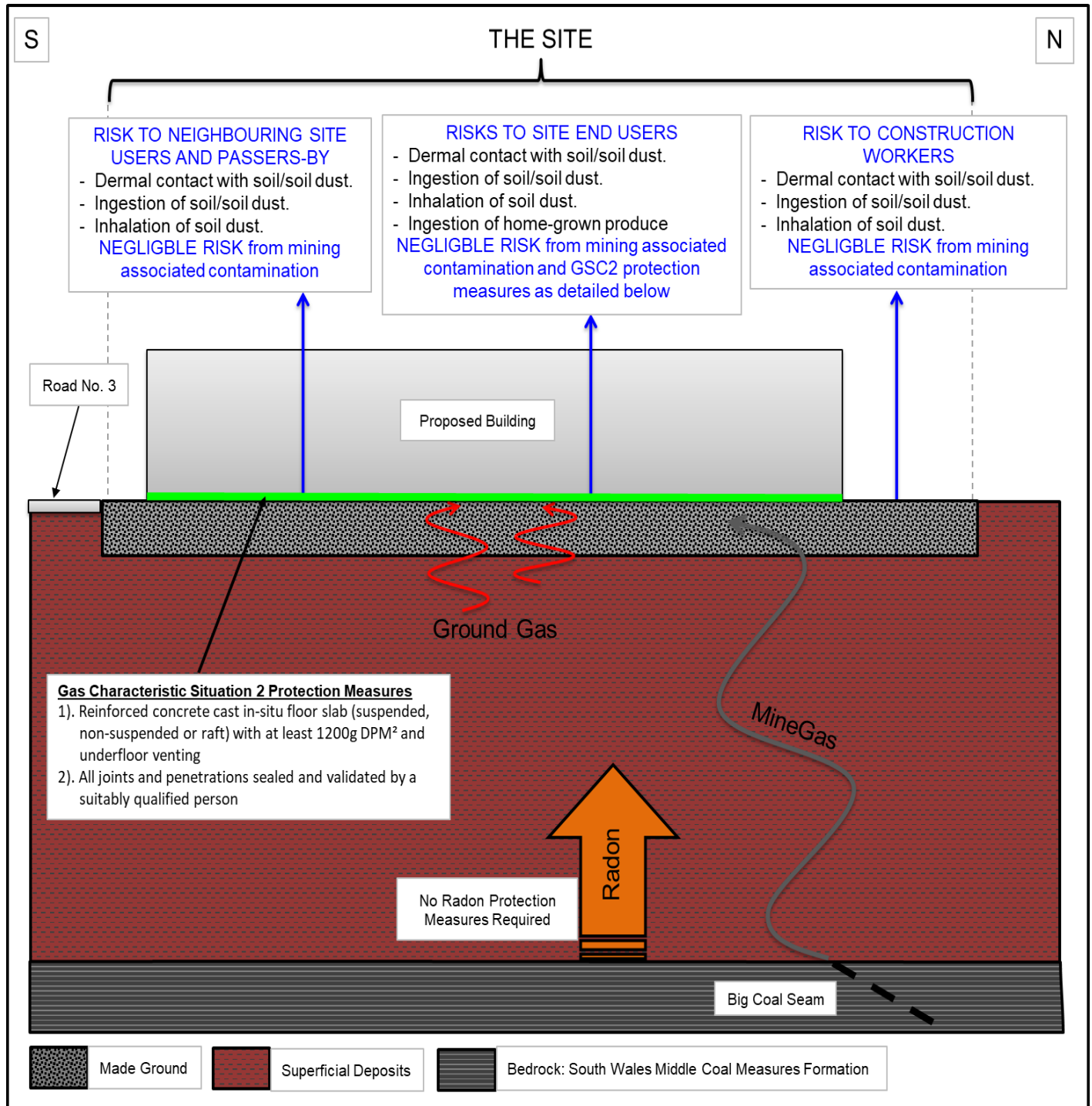


Figure 6.1: Illustrative Conceptual Site Model (not to scale)

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us. In the meantime we await your further instructions.

Your earliest consideration would be greatly appreciated.

Yours sincerely
for: Terra Firma (Wales) Ltd

A handwritten signature in black ink that reads "Alan Beattie".

Mr Alan Beattie

Enc.

Annex A – Envirocheck Maps and Datasheets

Annex B – Apex Borehole Log

ANNEX A
Envirocheck History Report
and Datasheets

ANNEX B
Apex Borehole Log