



CONSULTING ENGINEERS

**CIVIL • STRUCTURAL
GEOTECHNICAL • ENVIRONMENTAL**

**PROPOSED RESIDENTIAL DEVELOPMENT
MAESTEG,
GWYNFRYN, WREXHAM
FOR
WALES & WEST HOUSING ASSOCIATION**

NOVEMBER 2013

PHASE II GEO-ENVIRONMENTAL INVESTIGATION REPORT

13057

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EXECUTIVE SUMMARY

Site	<i>Approximately 0.15ha in area and located at the junction of Ffodd Isaf and Allt Y Pentref in the village of Gwynfryn</i>
NGR	<i>325731 352495</i>
Site History	<i>The site has a full recorded history as being in agricultural usage.</i>
Investigations	<i>The investigations have extended to:-</i> <i>Intrusive investigations by window sampler boreholes</i> <i>Chemical analyses of soil samples</i> <i>Assessment of results</i>
Ground Conditions	<i>Uniform ground conditions comprising of topsoil 0.3 - 0.4m thick underlain by glaciofluvial sand and gravels deposits extending to at least 3.5m below ground level.</i>
Environmental	<i>Chemical testing has confirmed the topsoil to contain naturally occurring elevated concentrations of Lead. Remediation of topsoil is required. Underlying till deposits are not contaminated</i>
Trees	<i>The site contains a number of trees all of which are located at the main boundaries and are assumed to be retained as part of the development proposals. The ground conditions within the site are assessed to have a Low volume change potential as defined by NHBC</i>
Foundations	<i>Strip footings formed on natural clay strata with a safe bearing capacity of 150kN/m² at a minimum depth of 0.9m below finished ground level. Reinforcement is required in all foundations to protect against possible minor ground movements associated with nearby geological fault.</i>
Slabs	<i>Suspended ground floor slabs are recommended for all plots. All plots require FULL radon gas precautions within the ground floor construction.</i>
Remediation	<i>Topsoil should be removed from the site and replaced with imported topsoil from a certified source. Imported topsoil should be independently validated. FULL radon precautions required</i>

This brief summary should not be assumed to represent a complete account of all the potential geo-environmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.

6.8 Index Properties

6.8.1 A total of five (5 no.) samples of the clay strata encountered during these investigations have been returned to a civil engineering laboratory to determine their index properties. Copies of the laboratory test results are appended to this report for reference. Consideration of these results confirms that the clay soils within the site have a plasticity index in the range of 10% – 14%. Accordingly the clay strata within this site is considered to have a low volume change potential as defined by NHBC Handbook Chapter 4.2.2.

7.0 DISCUSSIONS

7.1 General

7.1.1 The initial desk study of this site has confirmed a history which includes apparent agricultural usage over the whole period. The initial walkover survey of the site has identified no visible evidence of any potentially hazardous contamination but nevertheless consideration of possible non-visible contamination has been considered within this report.

7.1.2 The results of the chemical analyses undertaken upon representative samples of strata obtained from this site have been assessed in section 6 above and subject to further discussion below.

7.2 Metals & Inorganics

7.2.1 The analysis undertaken for this suite of determinants has identified significantly elevated concentrations of lead within the topsoil material. In fact the presence of elevated lead concentrations is a well-recognised phenomenon within this area of North Wales and is associated with potential lead bearing deposits particularly associated with limestone bedrock which lies within the general vicinity. Whilst the elevated concentrations are recognised to represent a natural phenomenon, and it is almost certainly the case that surrounding residential areas contain topsoil within equally elevated lead content, it is nevertheless recognised that the topsoil within this site does present a potential long term hazard to the end users of the site in relation to rear garden areas where food may be grown for consumption.

7.2.2 Accordingly the topsoil within this site is considered to be unsuitable for reuse within a residential environment where plants may be grown for consumption and where close contact of the soils may occur. Remediation by the removal of the topsoil materials and immediately underlying strata will be required at this site.

7.2.3 Representative samples of the natural strata from increased depths have confirmed no evidence of widespread elevated concentrations of lead and it is confirmed that the contamination is contained only within the immediate surface material.

7.3 PAH Suite

7.3.1 The analysis has confirmed no elevated concentrations of any PAH compounds. Indeed all fractions of the PAH grouping have been found to be present at concentrations of less than the limits of detection. PAH compounds do not therefore represent any potential long term hazard to the site.