

# Site Investigation Report

(Incorporating foundation construction details)

at

**No 49 Aber Llchwyr  
Llanelli  
SA14 8AH**

for

**Mr & Mrs Wyatt**

**Barratt Associates**

Civil, Structural & Geotechnical Engineering Consultants



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Site investigation report

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## 1.0 Executive summary

The site investigation carried out at No 49 Aber Llchwyr demonstrated that the site appears to be entirely composed of made ground comprising waste material from earlier building activity on the site. Foundations would need to either penetrate the waste and sit on virgin ground at depth or sit on the surface in the knowledge that there would not be any adverse settlement due to loading. Piled foundations of any description would be extremely difficult. To replace the waste with a more acceptable fill would be expensive.

With the foregoing factors in mind two types of foundation have been considered:

- Wide reinforced concrete strip footings at depth to support sleeper walls constructed up to ground level on which could be constructed a block and beam or conventional reinforced concrete slab
- A flat reinforced concrete slab constructed on dynamically compacted fill overlying the existing filled ground

Ground water is not present.

Permeability tests demonstrated the ground is impermeable and therefore natural soak-away pits for surface water drainage would be of little use.

## **2.0 Introduction**

### **2.1 Instruction**

The instruction to carry out a site investigation at Aber Llchwyr was issued by David Darkin of Darkin Architects in Llanelli.

### **2.2 Scope of works**

The scope of the works was to review the mining report and to carry out a ground investigation to determine the requirements for:

- Foundation design
- Drainage design

### **2.3 Objectives**

The principle objective of the investigation was to investigate ground conditions and provide sufficient data for the design of foundations and drainage for the proposed timber framed dwelling.

### **2.4 Weather conditions**

Weather conditions at the time of the investigation were dry and sunny.

### **3.0 Site Information**

#### **3.1 History**

The site is a building plot on the Aber Lluchwr development in Llanelli. It is an area of earlier mining activity where the Coal Authority has no plans to grant a licence to remove or work coal.

The main detailed findings of the mining report are summarised as:

- There are two coal seams at shallow depth to 490 m
- The seams were last worked in 1906
- There are no current plans to abstract coal from these seams
- There is no record of damage due to geological faults or weak lines
- The Coal Authority has not received any recent claims for the site
- There are no records of gas emission requiring action

The site appears to have been used in recent times as a dump for waste material from earlier building activity on adjacent houses.

It is proposed to build a new timber-framed house on the site in the near future.

#### **3.2 Description of the site**

The site is relatively level with a slight slope towards the rear. At the eastern boundary the site slopes very steeply to a footpath which borders on to a railway line.

The entire site appears to be made up of building waste with hard-core of broken concrete and asphalt in random blocks up to 300 mm in size. The rear of the site is mostly clayey soil with inclusions of plastic bags, many large stones and miscellaneous waste. It was estimated that the thickness of the waste could extend down to approximately 2.5 m based on relative levels taken between the footpath at the lower level and the north-east corner of the site in the vicinity of the proposed garage.

The railway line is approximately 3 m below the level of the site and the estuary an estimated 5 m below the railway line.

The house in its proposed location would sit on a relatively shallow layer of hard material at the front of the site and a thicker, much softer layer of material at the rear.

#### **4.0 Geotechnical investigation strategy and findings**

##### **4.1 Objectives**

The main objective for the site investigation was to determine the ground conditions and design foundations for the proposed dwelling and to carry out a percolation test with a view to designing a soakaway for surface water.

##### **4.2 Investigation methodology**

The methodology of the investigation was to carry out Mackintosh probe tests and excavate trial pits as follows:

Five probes were attempted but probes 2, 2B and 3 encountered obstruction almost immediately and had to be abandoned.

Three trial pits were excavated at points around the perimeter of the site one of which was also used to carry out a permeability test.

##### **4.3 Hydrology & Hydrogeology**

The site is random filling and so it would be pure chance to find an area that would be suitable for use as a filter bed.

A location towards the back of the site was chosen from a practical point but the resulting Vp was zero percolation in 30 minutes.

The only conclusion that can be drawn from this is that an artificial soakaway area constructed at the rear of the site might be an option for the disposal of surface water but this could only be done with the agreement of Natural Resources Wales.

##### **4.4 Ground conditions and recommendations for foundations**

The entire site appears to be made up entirely of building waste. Broken concrete and asphalt in random sized predominate in the front of the site with clayey soil and mixed waste including plastic bags and miscellaneous waste in the rear half of the site. The thickness of the waste could extend down to approximately 2.5 m based on relative levels taken between the



footpath at the lower level and the north-east corner of the site in the vicinity of the proposed garage.

Foundations would need to either penetrate the waste and sit on virgin ground at depth or sit on the surface in the knowledge that there would not be any adverse settlement due to loading. Piled foundations of any description would be extremely difficult and no reliance could be placed on a surface slab as settlement could not be guaranteed to be uniform. Moreover to replace the waste with a more acceptable fill would be expensive.

With the foregoing factors in mind two types of foundation are suggested:

- Wide reinforced concrete strip footings at depth to support sleeper walls constructed up to ground level on which could be constructed a block and beam slab or a conventional reinforced concrete slab
- A flat reinforced concrete slab constructed on dynamically compacted fill overlying the existing filled ground

The close proximity of the garage to the edge of the near-vertical filled embankment is not recommended and this should be relocated

## **5.0 Conclusions**

### **5.1 Geotechnical**

The main points from the site investigation are:

- The ground profile consists generally of made-up ground comprising building and domestic waste.
- The ground has an inadequate permeability and an artificial drainage bed should be constructed at the back of the site having first obtained the agreement of Natural Resources Wales.
- There is no evidence of ground water

### **5.2 Structural**

Two foundation types would be suitable for the buildings:

- Wide reinforced concrete strip footings at depth to support sleeper walls constructed up to ground level on which could be constructed a block and beam slab or a conventional reinforced concrete slab
- A flat reinforced concrete slab constructed on dynamically compacted fill overlying the existing filled ground

For simplicity and economy of construction it is recommended that a flat reinforced concrete slab on dynamically compacted fill be used for the construction of the foundations.

The construction of the foundations are within the abilities of the average experienced builder but the dynamic compaction of the site should be carried out and supervised by an experienced engineer.

The position of the garage should be relocated away from the edge of the embankment

## **6.0 Geotechnical investigation logs and drawings**

The following documents include:

Site investigation logs

Outline drawings for foundations

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