



**H Fraser  
Consulting**

Contaminated Land  
and Hydrogeology

## The Barn

### Appropriate Assessment for Nutrients



Prepared for: The Barn  
Higher Berse  
Higher Berse Road  
Southsea  
LL11 6PW

Date: 10/03/2025

Status: Final

Reference: 31071 R1

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Prepared by: H Fraser Consulting Ltd



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#### Version History

| Version    | Author                   | Approved by | Issue date | Comment                       |
|------------|--------------------------|-------------|------------|-------------------------------|
| 31071 R1D1 | Holly Tolson & Joe Gomme | Joe Gomme   | 03/03/2025 | Draft report issued to client |
| 31071 R1   | Holly Tolson & Joe Gomme | Joe Gomme   | 10/03/2025 | Final report issued to client |

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## **1. INTRODUCTION**

H Fraser Consulting Ltd. has been commissioned by Mark Wakefield Demolition Ltd to undertake an assessment of the nutrient balance for the proposed change of use of a single residential dwelling into two residential dwellings. The site is located in the catchment of the River Dee Special Area of Conservation (SAC), and the River Dee fails its water quality target for phosphorus. This means that it requires protection and development within the catchment is therefore subject to assessment of its potential impact on phosphorus budgets.

### **1.1 Objective**

To provide an appropriate assessment for phosphorus to support planning application P/2022/1021.<sup>1</sup>

### **1.2 Scope of works**

The following scope of works has been undertaken:

- Desk Study
- Assessment – consider nutrient balance for the existing site use and proposed site use and determine required mitigation measures
- Reporting – collation of assessment and appendices, response to client comments, final report issue

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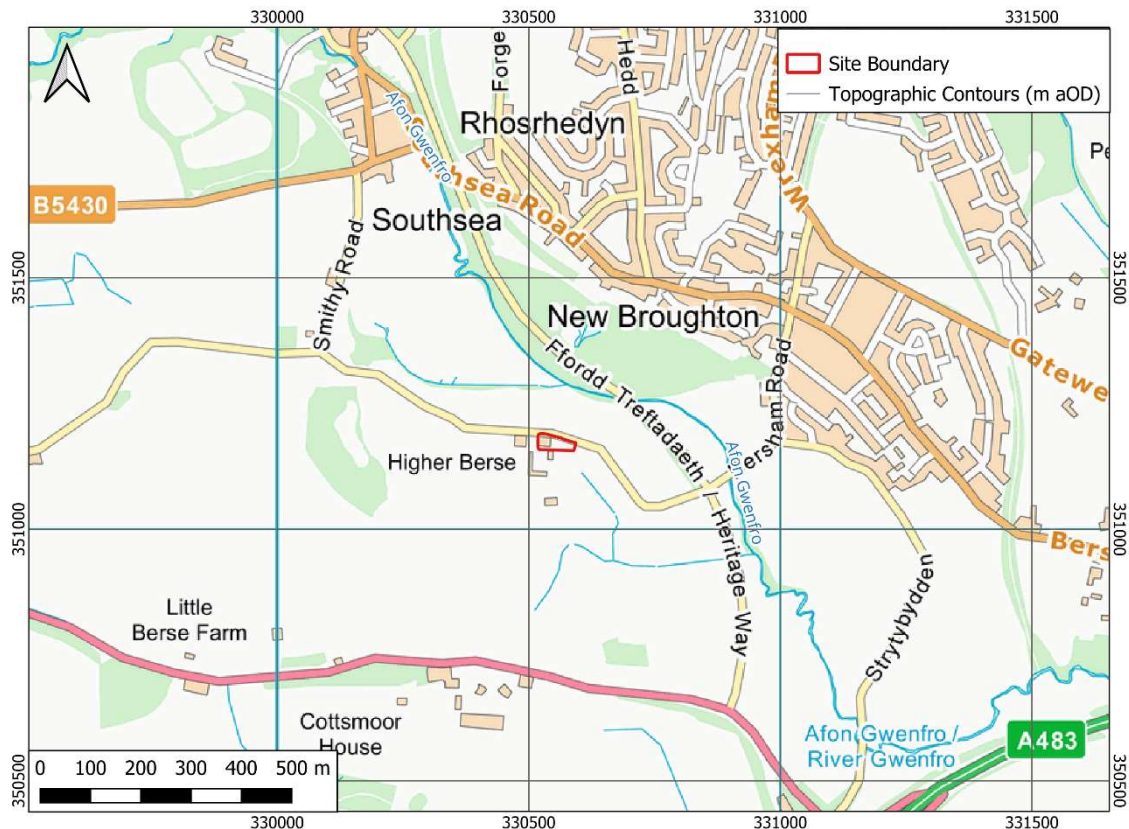
<sup>1</sup> Natural Resources Wales – CAS-270142-JOC3

## 2 DESK STUDY

### 2.1 Site location

The proposed development is located adjacent at The Barn, Higher Berse, Higher Berse Road, Southsea, LL11 6PW. Site plans are included in Appendix A. The site is located c.2.7 km west of Wrexham centre. The A525 lies c.440 m to the south of the site, with the village of Coedpoeth c.1.5 km to the west (Figure 2.1).

The application area extends to 0.19 ha. The proposed development comprises the conversion of one residential dwelling into two residential dwellings.



**Figure 2.1 Site location**

Contains Ordnance Survey data © Crown copyright and database right 2025

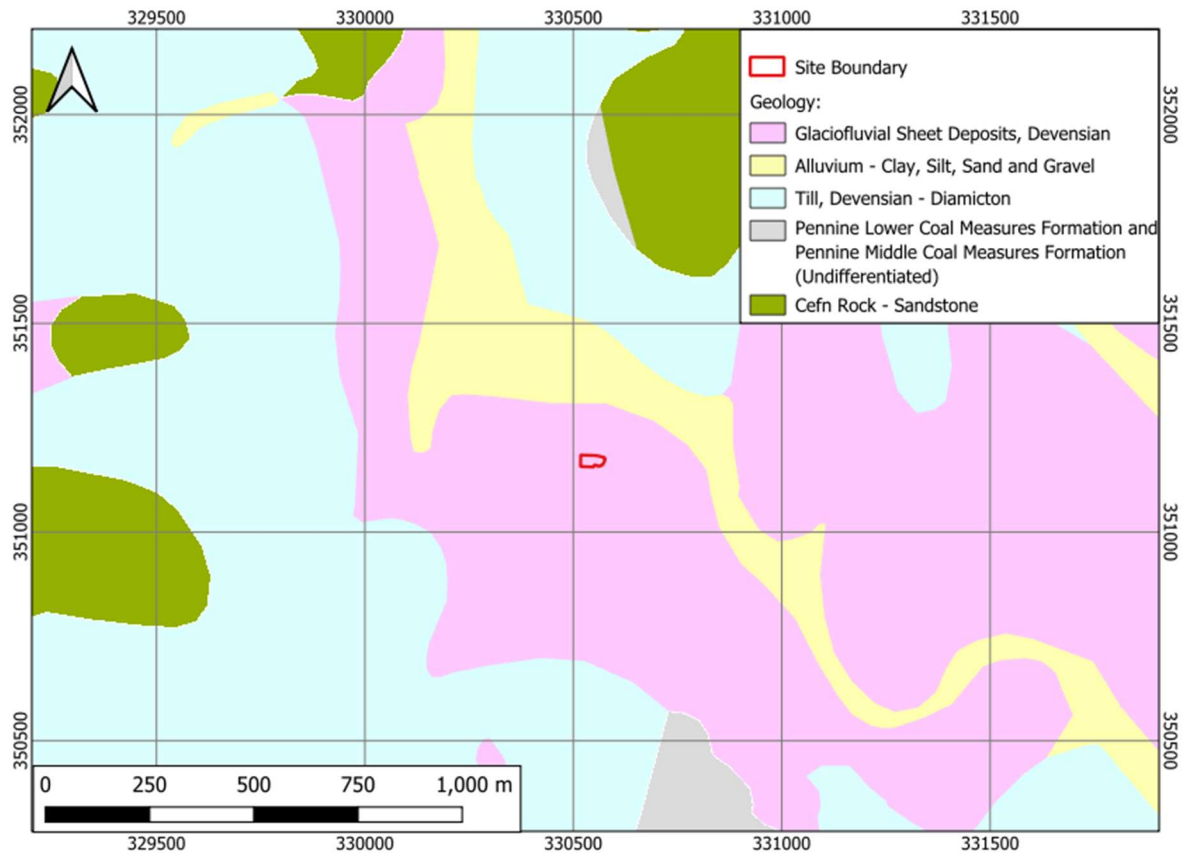
### 2.2 Topography

The site slightly slopes down to the east, with elevations varying between c.128 m aOD in the west of the site, and c.127 m aOD on the eastern side of the site. Generally, across the area the topography slopes down to the east towards the River Dee.<sup>2</sup>

<sup>2</sup><https://en-gb.topographic-map.com/map-vq4s/Wrexham/?center=53.06433%2C-2.99995&zoom=11&popup=53.03795%2C-2.86503>

## 2.3 Geology

According to the British Geological Survey (BGS)<sup>3</sup>, the superficial geology underlying the site comprises of Glaciofluvial Sheet Deposits, Devensian, which consists of Sand and Gravel. See Figure 2.2 below.



**Figure 2.2 Superficial geology**

Contains British Geological Survey materials © UKRI 2024

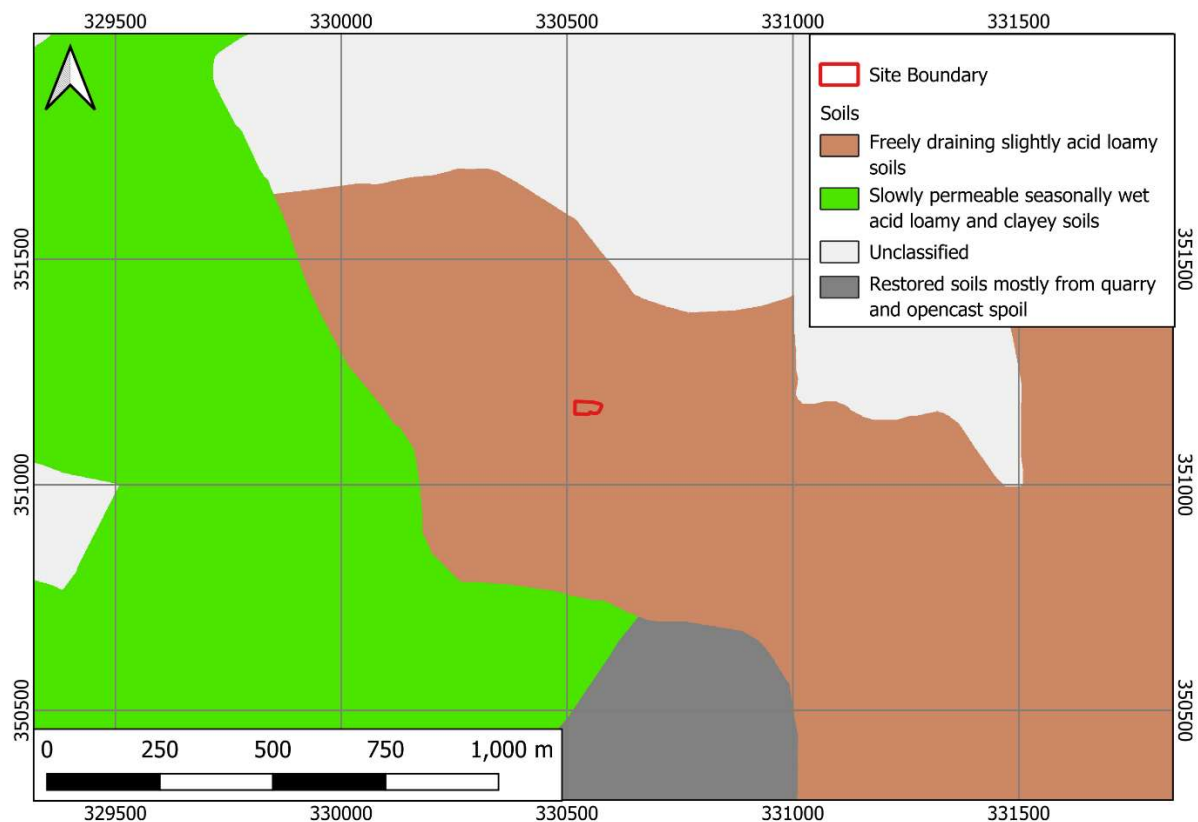
The bedrock geology under the site and the surrounding area is mapped as the Pennine Lower Coal Measures Formation and Pennine Middle Coal Measures Formation (undifferentiated) – Mudstone, Siltstone and Sandstone. The Cefn Sandstone (Middle Coal Measures) crops out to north and west.

## 2.4 Soils

The soils across the site are described as Soilscales 6, which means they are freely draining slightly acid loamy soils.<sup>4</sup>

<sup>3</sup> <https://mapapps2.bgs.ac.uk/geoindex/home.html>

<sup>4</sup> [LandIS - Land Information System - Soilscales soil types viewer](#)



**Figure 2.3 Soils**

## 2.5 Hydrology and hydrogeology

The site is in the catchment of the River Dee SAC. The closest named watercourse is a tributary flowing into the River Gwenfro c.98 m north of the site. The existing package treatment plant discharges to this watercourse.

The site is located on a 'Moderately Productive' Secondary A bedrock and superficial aquifer.<sup>6</sup> The site is not situated in a Source Protection Zone.<sup>6</sup> The site is located in a very low risk area of flooding, and is therefore not susceptible to flooding.<sup>5</sup>

The site does not lie in a Nitrate Vulnerable zone (NVZ)<sup>6</sup>.

<sup>5</sup> [Check your flood risk](#)

<sup>6</sup> <https://magic.defra.gov.uk/magicmap.aspx>

### 3 ASSESSMENT OF NUTRIENT EXPORT FROM PROPOSED DEVELOPMENT

Because of an increase in the number of dwellings (from one residential dwelling to two residential dwellings), an Appropriate Assessment is required to ensure that there are no impacts on the River Dee and Bala Lake SAC. In particular this relates to phosphorus outputs.

Changes to nutrient budgets as a result of a new residential development are usually assessed using local nutrient neutrality calculators agreed by the relevant authority, however, there is not one for the River Dee SAC.

Based on available information, it is plausible to argue that the total phosphorus outputs will decrease as a result of this development, based on the number of occupants and the new improved standard of treatment that will be implemented.

#### 3.1 Site Occupancy

The wider site at Higher Berse currently includes the main house and the barn. This wider site has been occupied since 2012 by the same family, which has a total of nine people. The development is designed to provide for the same group of people, and the site occupancy as a whole will therefore remain unchanged. This would also leave the nutrient output unchanged.

If we consider the longer-term possibility that the site will be sold to other parties, the standard number of occupants per dwelling used in other local nutrient neutrality calculators is generally 2.4 per dwelling or lower. (E.g. those for West Camarthenshire vary between 2.2 and 2.31, and for Norfolk the number is 2.4.) If we consider the future wider site to include the main farm building and two dwellings in the barn site, the nominal occupancy rate anticipated would be 2.4 multiplied by 3, which is 7.2 people. This is a reduction on the nine current occupants prior to the development, and would therefore represent a reduction in nutrient output.

#### 3.2 Improved Specification of the PTP

The existing plant is understood to be at least 15 years old, with unknown specifications. We can therefore reasonably assume that it does not comply with current British Standard (BS EN 12566), introduced in 2020, and its performance will not be as good as more modern plants. Since the nutrient output of the existing system is unknown, we assume that its phosphorus output is the default value again provided for in other local nutrient neutrality calculators. This value is 9.7 mg/l total phosphorus.

The developer proposes to replace the existing plant with a new one with a lower phosphorus output rating. This replacement will therefore contribute to a net reduction in phosphorus output from the property. A specific treatment plant favoured by Wrexham Council or a selected one with a phosphorus output below 4.8 mg/l can be selected, according to agreement with the Council.<sup>7</sup> (Note that an output below 4.8 mg/l would represent a nominal reduction in phosphorus from the development, even applying the default assumptions of typical nutrient calculators. If we assume 2.4 people per dwelling and current phosphorus output of 9.7 mg/l, the number of dwellings at the Barn alone would double and the default calculation for occupancy would also therefore double. Halving the phosphorus output, from 9.7 to 4.8 mg/l, would therefore compensate for the increase in dwellings.)

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<sup>7</sup> Two appropriate examples of PTPs that reach this standard are the Graf One2Clean and the Haba Bio Easyflow. Certificates for these two plants, showing their rated phosphorus output, are included at Appendix B.

## **4 CONCLUSION**

### **4.1 Phosphorus Outputs**

Analysing the actual and projected rates of occupancy and the improved PTP, both assessments are shown to reduce phosphorus outputs. Therefore, the proposed development poses no additional risks to the River Dee and Bala Lake SAC. In fact it represents a small betterment to the current situation.

Other SAC sites in the area are not hydrologically connected, and therefore mitigation is not required.

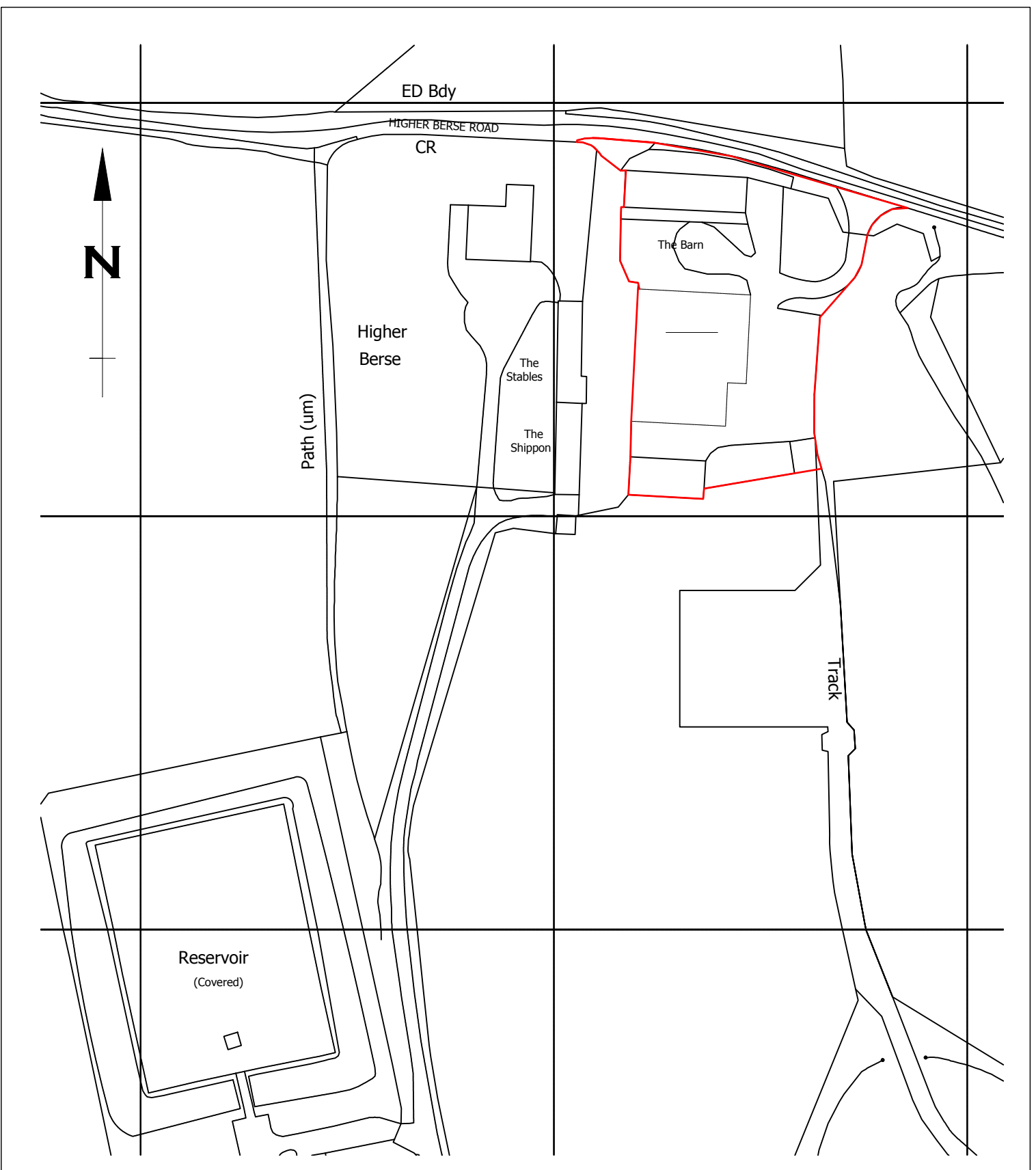
### **4.2 Mitigation**

No additional mitigation is required.

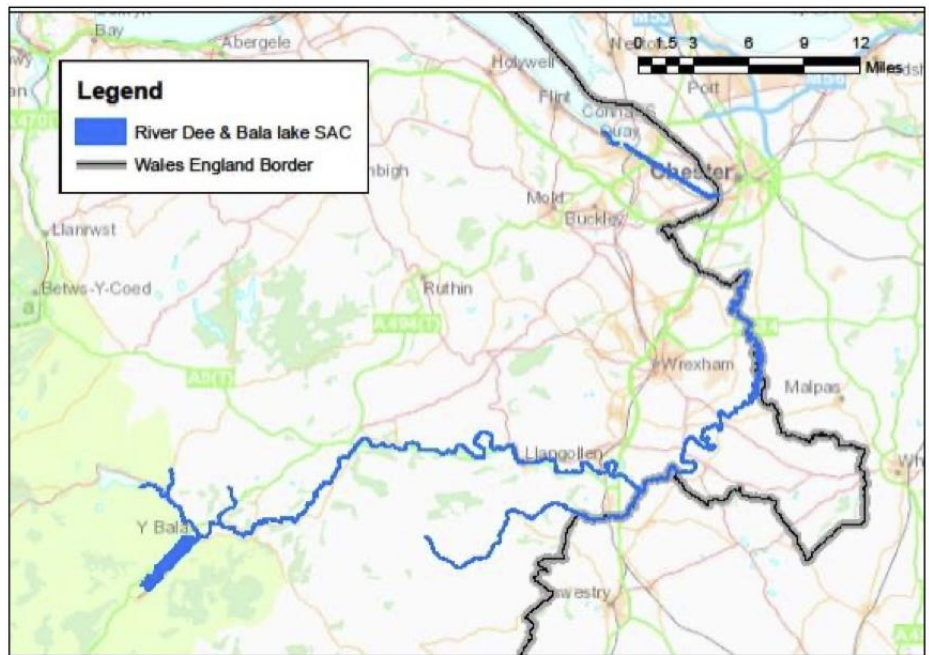
# APPENDIX A

## Site plans

Note:  
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River Dee Lamprey 2014



**NOTES:**

Above map shows extent of Lake Bala and River Dee Special Areas of Conservation (SAC's). Site is to the immediate West of Wrexham and hence in excess of 50m of the SAC.

Clean drain from the LA approved STP discharges via a culvert under the existign private driveway into a designated drain.

The nearest river to the site is in excess of 50m and is the River Gwenfro, a tributary of River Clywedog, neither of which are any of the 9No. rivers that the LA have advised serve into the SAC.

|     |          |                                                 |
|-----|----------|-------------------------------------------------|
| H   | 10.11.24 | Additional drainage details added               |
| G   | 5.11.24  | Additional drainage details added               |
| F   | 7.2.24   | The Shippon & The Stables shown on Site Plan    |
| E   | 11.1.24  | Location of The Shippon clarified               |
| D   | 18.12.23 | Proposed Site Plan annotated                    |
| C   | 11.8.23  | Red Edge to Site Plan confirmed                 |
| B   | 28.6.23  | Roof design of extension altered to match plans |
| A   | 23.2.23  | Red line & site ownership clarified             |
| Rev | Date     | Comment                                         |

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e: rob.lee@portmansurveyors.com

|                                                                    |                         |
|--------------------------------------------------------------------|-------------------------|
| Client:                                                            | Date:                   |
| Mr & Mrs M Wakefield                                               | Aug 2022                |
| Project:                                                           |                         |
| Renovation of The Barn,<br>Higher Berse Road,<br>Wrexham. LL11 6PW |                         |
| Drawing Title:                                                     | Scale:                  |
| PROPOSED                                                           | 1:200 &<br>1:1250 at A1 |
| Site Plan & Location Plan                                          | Status:                 |
|                                                                    | Planning                |
| Drawing No:                                                        | Rev:                    |
| A_342_01                                                           | H                       |

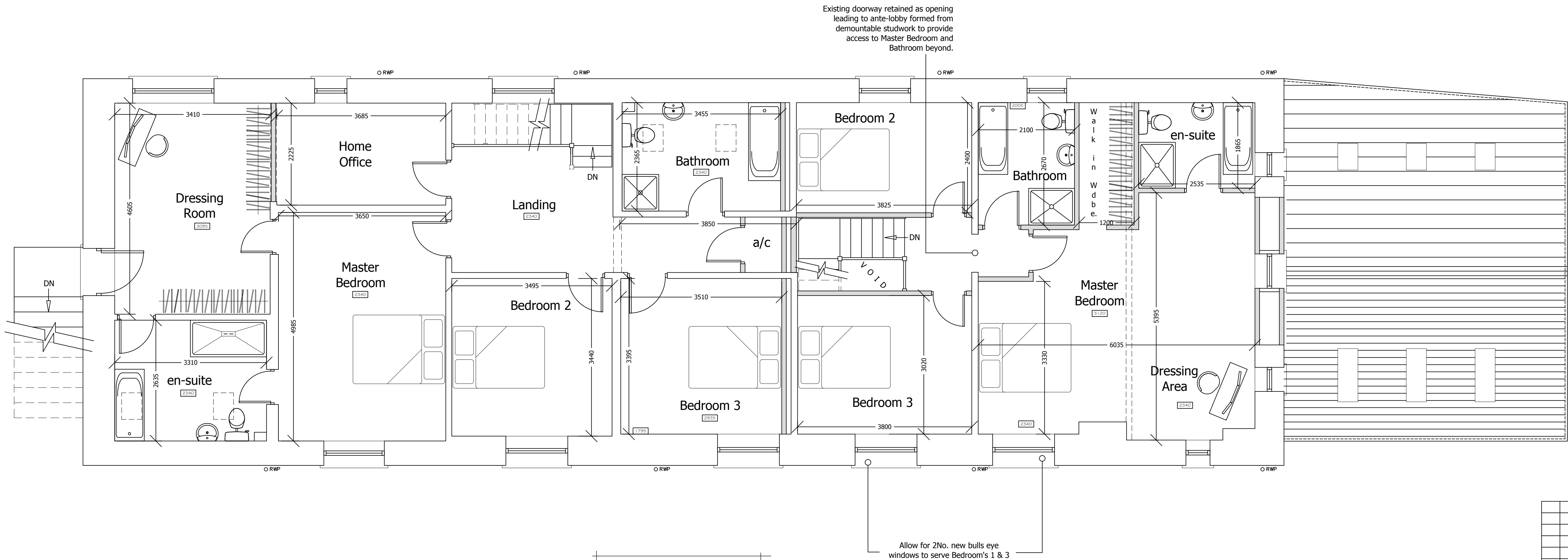


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1:50



1:100



PROPOSED  
First Floor Plan

|     |         |                                                                           |
|-----|---------|---------------------------------------------------------------------------|
|     |         |                                                                           |
|     |         |                                                                           |
|     |         |                                                                           |
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|     |         |                                                                           |
|     |         |                                                                           |
|     |         |                                                                           |
|     |         |                                                                           |
|     |         |                                                                           |
| A   | 13.6.23 | Proposed extension simplified in accordance with Heritage recommendations |
| Rev | Date    | Comment                                                                   |

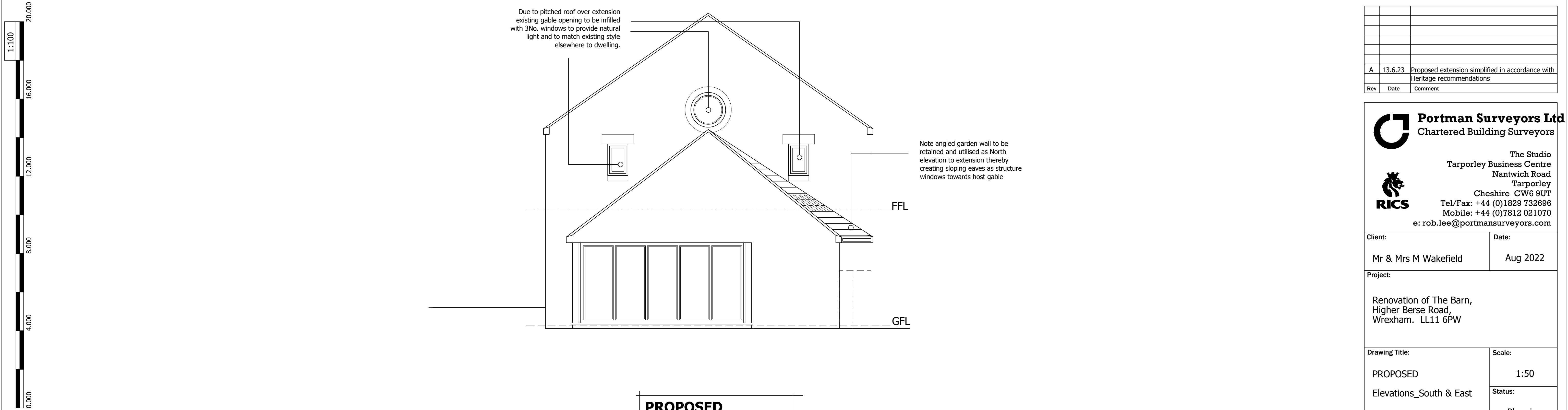


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|                      |                                                                    |  |
|----------------------|--------------------------------------------------------------------|--|
| Client:              | Date:                                                              |  |
| Mr & Mrs M Wakefield | Aug 2022                                                           |  |
| Project:             | Renovation of The Barn,<br>Higher Berse Road,<br>Wrexham. LL11 6PW |  |
| Drawing Title:       | Scale:                                                             |  |
| PROPOSED             | 1:50                                                               |  |
| FF Plan              | Status:                                                            |  |
|                      | Planning                                                           |  |
| Drawing No:          | Rev:                                                               |  |
| A_342_13             | A                                                                  |  |



## PROPOSED South Elevation

## PROPOSED East Elevation

| A   | 13.6.23 | Proposed extension simplified in accordance with Heritage recommendations |
|-----|---------|---------------------------------------------------------------------------|
| Rev | Date    | Comment                                                                   |

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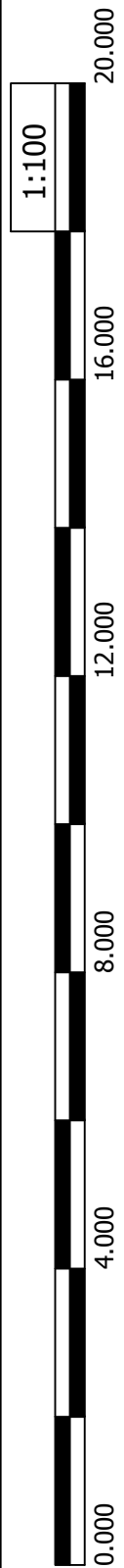
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 **RICS**

|                                                                                    |                      |          |          |
|------------------------------------------------------------------------------------|----------------------|----------|----------|
| Client:                                                                            | Mr & Mrs M Wakefield | Date:    | Aug 2022 |
| Project:<br><br>Renovation of The Barn,<br>Higher Berse Road,<br>Wrexham. LL11 6PW |                      |          |          |
| Drawing Title:<br><br>PROPOSED<br><br>Elevations_South & East                      | Scale:               | 1:50     |          |
|                                                                                    | Status:              | Planning |          |
| Drawing No:<br><br>A_342_14                                                        | Rev:                 | A        |          |



**PROPOSED**  
**North Elevation**



**PROPOSED  
West Elevation**

| A   | 13.6.23 | Proposed extension simplified in accordance with Heritage recommendations |
|-----|---------|---------------------------------------------------------------------------|
| Rev | Date    | Comment                                                                   |

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 **RICS**

|                                                                    |          |
|--------------------------------------------------------------------|----------|
| Client:                                                            | Date:    |
| Mr & Mrs M Wakefield                                               | Aug 2022 |
| Project:                                                           |          |
| Renovation of The Barn,<br>Higher Berse Road,<br>Wrexham. LL11 6PW |          |
| Drawing Title:                                                     | Scale:   |
| PROPOSED                                                           | 1:50     |
| Elevations_North & West                                            | Status:  |
|                                                                    | Planning |
| Drawing No:                                                        | Rev:     |
| A_342_15                                                           | A        |

## APPENDIX B

### PTP certificates



Prüfinstitut für  
Abwassertechnik  
GmbH

## PERFORMANCE RESULTS

**Otto Graf GmbH**

Carl-Zeiss-Str. 2 - 6, 79331 Teningen, Germany

**EN 12566-3**

Small wastewater treatment systems for up to 50 PT

**Small wastewater treatment system one2clean**

SBR plant in one two-zone polypropylene tank

Test report PIA2014-216B14.01.e

|                                          |                      |            |          |
|------------------------------------------|----------------------|------------|----------|
| Nominal organic daily load*              | 0.27                 | kg/d       |          |
| Nominal hydraulic daily load             | 0.75                 | m³/d       |          |
| Material                                 | polypropylene        |            |          |
| Treatment efficiency (nominal sequences) |                      | Efficiency | Effluent |
|                                          | COD                  | 94.2 %     | 43 mg/l  |
|                                          | BOD <sub>5</sub>     | 98.0 %     | 7 mg/l   |
|                                          | SS                   | 96.3 %     | 14 mg/l  |
|                                          | NH <sub>4</sub> -N** | 98.3 %     | 0.5 mg/l |
|                                          | N <sub>tot</sub> **  | 87.0 %     | 7.9 mg/l |
|                                          | P <sub>tot</sub>     | 80.2 %     | 1.6 mg/l |
| Electrical consumption                   | 0.63                 | kWh/d      |          |

\*at a test influent of  $\geq 300$  mg/l BOD<sub>5</sub> (mean)

\*\*determined for temperatures  $\geq 12^{\circ}\text{C}$  in the bioreactor

Performance tested by:

**PIA – Prüfinstitut für Abwassertechnik GmbH**

(PIA GmbH)

Hergenrath Weg 30

52074 Aachen, Germany

This document replaces neither the declaration  
of performance nor the CE marking.



Notified Body  
No.: 1739



Certified according to  
ISO 9001:2008



Deutsche  
Akkreditierungsstelle  
D-PL-17712-01-00

Prüfinstitut für Abwassertechnik GmbH  
  
Geprüft - tested - testé

Elmar Lancé

November 2014

# PROTOCOL

## ON THE ASSESSMENT OF PERFORMANCE OF THE PRODUCT



Czech

### Registration No. 1017 – CPR – 11.381.333, Revision No. 1

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC, and in compliance with Commission Delegated Regulation (EU) No 568/2014, this protocol is issued for the construction product:

#### Domestic wastewater treatment plant up to 50 equivalent inhabitants

Type series: BIO EASY FLOW (rotomoulding): 1RLM, 2RLM, 3RLM, 4RLM, 5RLM, 6RLM, 7RLM, 8RLM, 9RLM, 10RLM, 12RLM

BIO EASY FLOW (pipes spiro): 15RLM, 20RLM, 25RLM, 30RLM, 35RLM, 40RLM, 45RLM, 50RLM

BIO EASY FLOW (concrete): 4RLM, 5RLM, 6RLM, 7RLM, 8RLM, 9RLM, 10RLM, 12RLM, 15RLM, 20RLM, 25RLM, 30RLM, 35RLM, 40RLM, 45RLM, 50RLM

### HABA Sp. z o.o.

Ul. Zdrojowa 51, 62-065 Grodzisk Wielkopolski, Poland  
Company registration No.: 368989081

Place of production: see above

On the basis of testing, calculations, tabulated values and documentation within system 3 according to Annex V 1.4 CPR, TÜV SÜD Czech s.r.o. assessed the relevant characteristics of the product described in Annex ZA of the standard

### EN 12566-3:2005 + A2:2013

The number of pages of this Protocol inclusive the title-page: 4

| Essential characteristics                                               | Performance                                                                                                                                                                                                     |                                                |                                                                                          | Harmonised technical specification |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------|------------------------------------|
| Treatment efficiency at tested organic daily load $BOD_5 = 0,22$ kg/day | $BOD_5$<br>COD<br>SS<br>$N_{TOTAL}$<br>$P_{TOTAL}$                                                                                                                                                              | 99,0 %<br>97,4 %<br>94,6 %<br>84,1 %<br>94,5 % | 3,3 mgO <sub>2</sub> /l<br>21,2 mgO <sub>2</sub> /l<br>12,8 mg/l<br>5,6 mg/l<br>0,8 mg/l | EN 12566-3:2005+A2:2013            |
| Watertightness (water test)                                             | pass                                                                                                                                                                                                            |                                                |                                                                                          | EN 12566-3:2005+A2:2013            |
| Load bearing capacity (calculation)                                     | BIO EASY FLOW (rotomoulding): Backfill 1,0-1,5 m; WET 0,50-0,85 m acc. to type<br>BIO EASY FLOW (pipes spiro): Backfill 1,6 m; WET 1,0 m<br>BIO EASY FLOW (concrete) Backfill 0,0 m, WET 1,3-2,2 m acc. to type |                                                |                                                                                          | EN 12566-3:2005+A2:2013            |
| Durability (PE)                                                         | Pass (test methods: EN ISO 1133-1:2011, EN ISO 1183-1:2012, EN ISO 527-2:2012+Ap1:2013<br>PN-EN 1917:2004/AC:2009)                                                                                              |                                                |                                                                                          | EN 12566-3:2005+A2:2013            |
| Durability (concrete)                                                   |                                                                                                                                                                                                                 |                                                |                                                                                          |                                    |

Prague, date 07.03.2022



on behalf of Notified Body 1017  
Pavla Nerandžičová  
Head of Certification Department