

**PERMEABILITY TESTING
AT
WERN DDU BUNGALOW
BRYNCOCH
NEATH**

SHEAR design
Consulting Civil and Structural Engineers

Shear Design were commissioned to carry out permeability testing at a Wern Ddu bungalow, Tyllwyd, Bryncoch, Neath.

Testing was carried out on the 12th November 2012 by Matt Jessop, Chartered Engineer.

The attached results and site plan indicate the location of the tests and the permeability results.

Due to access constraints, Soakaway 2 was not able to be positioned in the rear garden of the proposed development and is instead carried out on an adjacent land parcel. We are satisfied that soil conditions at the test location are similar to those in the proposed garden. Standing water was evident in the test location and the proposed garden.

Permeability at the rear of the existing property was very low and no detectable permeability was evident in the sub soils and underlying strata.

Permeability testing at the front of the garden was undertaken in the lower garden level as approximately indicated on the attached plan. There was moderate to good permeability in the upper 700mm however ground water was present at a depth of approximately 700mm. Infiltration systems can be employed at the front of the property provided adequate consideration is given to the depth of the drainage and also the external levels to ensure that any gullies and manholes used for draining the proposed property are either sealed or are set higher than the design water level in the soakaway.

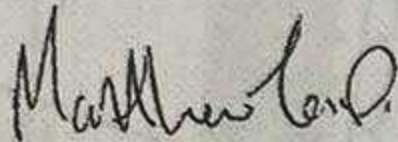
PERMEABILITY TESTING

AT

WERN DDU BUNGALOW, BRYNCOCH, NEATH

22ND NOVEMBER 2012

The designer of the new property and rear garden will need to give consideration to the waterlogged nature of the existing ground and should consider introducing some sub soil drainage and free draining topsoil to minimise wet gardens.



**MATT JESSOP BEng Msc CEng M.I.C.E.
SHEAR DESIGN LTD
DIRECTOR**

APPENDIX v.

v. *EA and WG Flood Map*

Enter a postcode or place name:

Other topics for this area...

Risk of Flooding from Rivers and Sea

SA10 7DX

Go

Risk of Flooding from Rivers and Sea

Data search Text only version

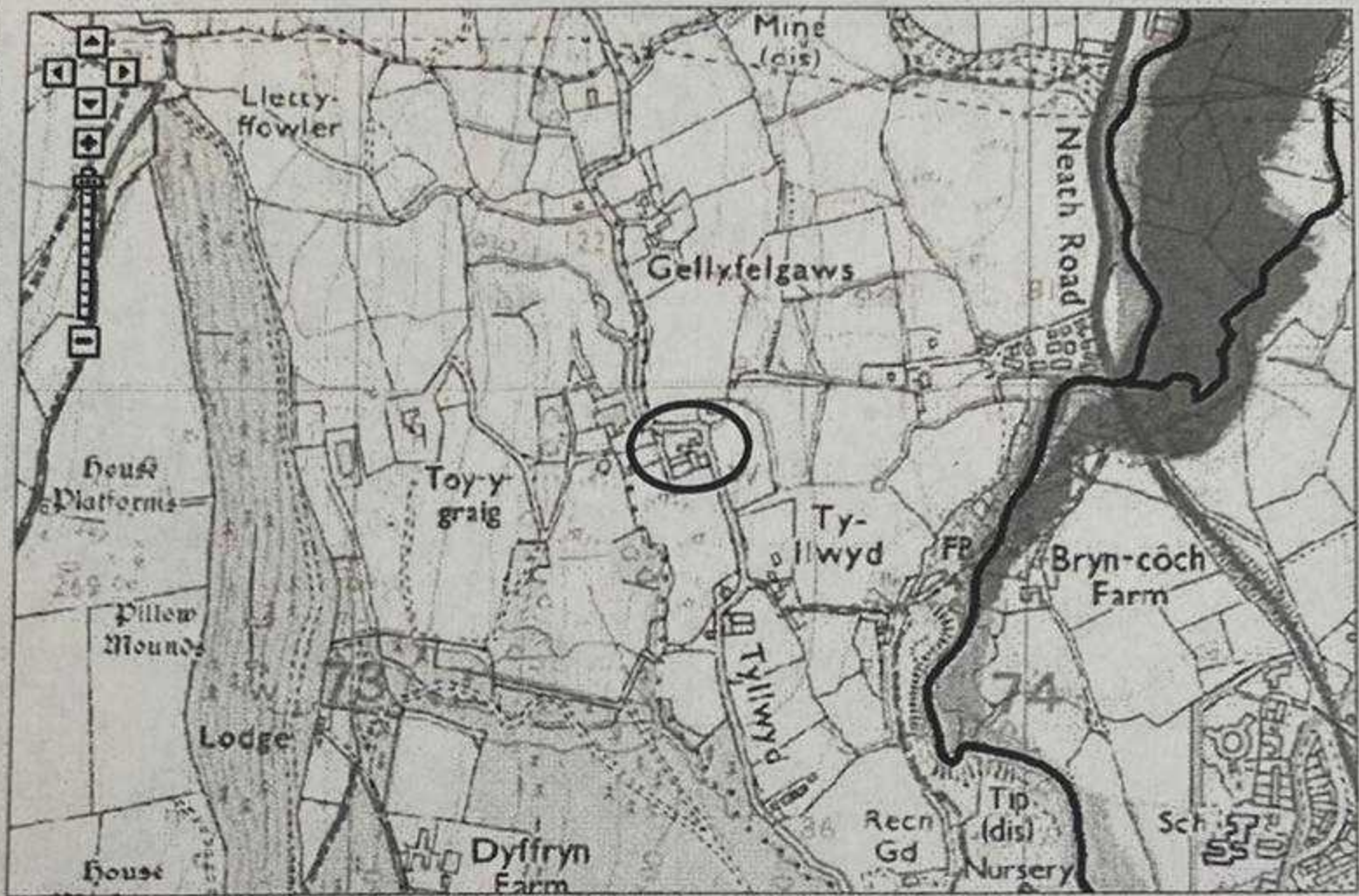
Map legend

Click on the map to see what is the Risk of Flooding at a particular location.

Flood Maps

- Flooding from rivers or sea without defences
- Extent of extreme flood
- Flood defences (Not all may be shown*)
- Areas benefiting from flood defences (Not all may be shown*)
- Main rivers

SA10 7DX at scale 1:10,000



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Flood Map - Information Warnings

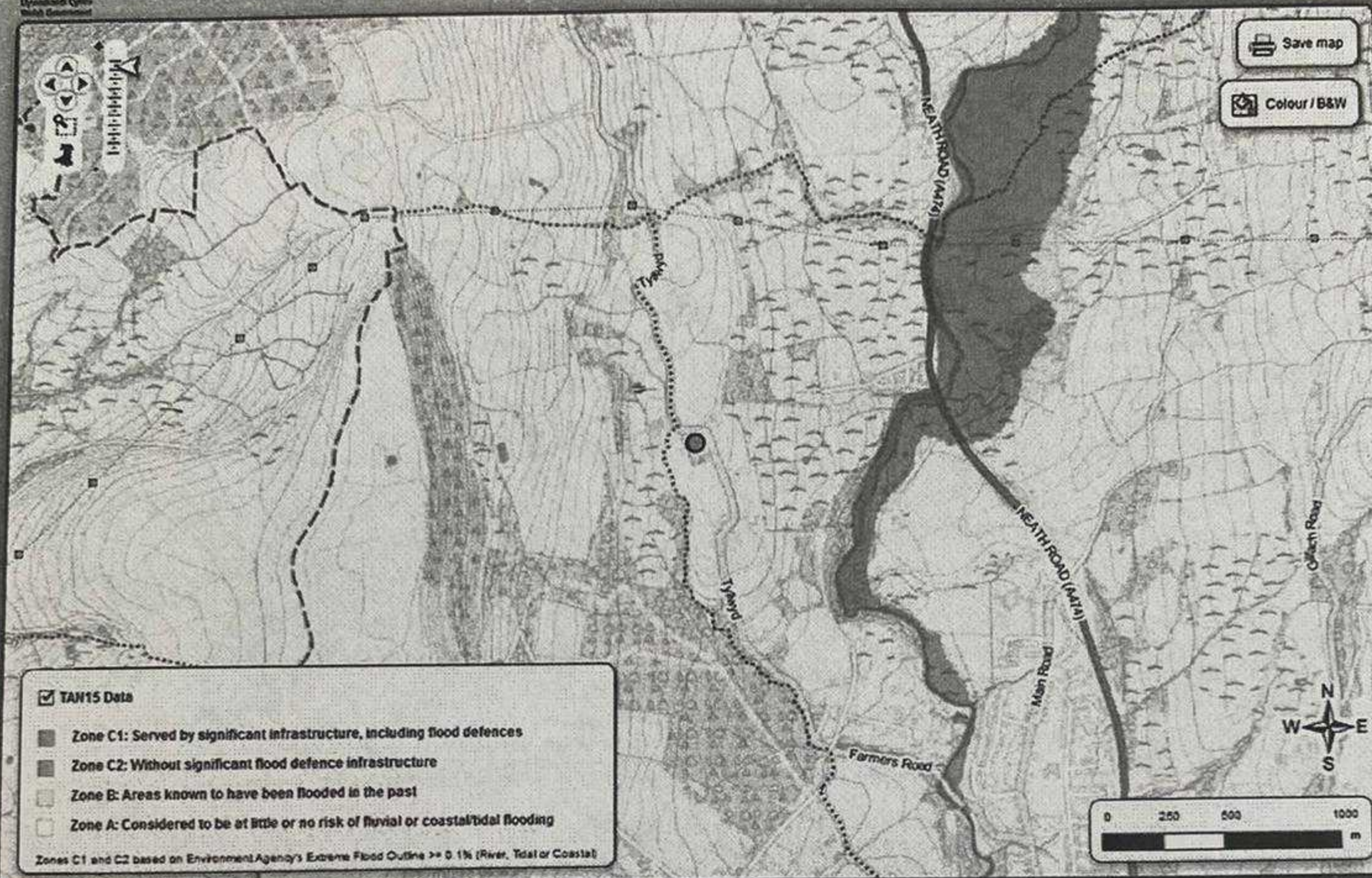


TAN 15 Development and Flood Risk
Development Advice Map

Search:

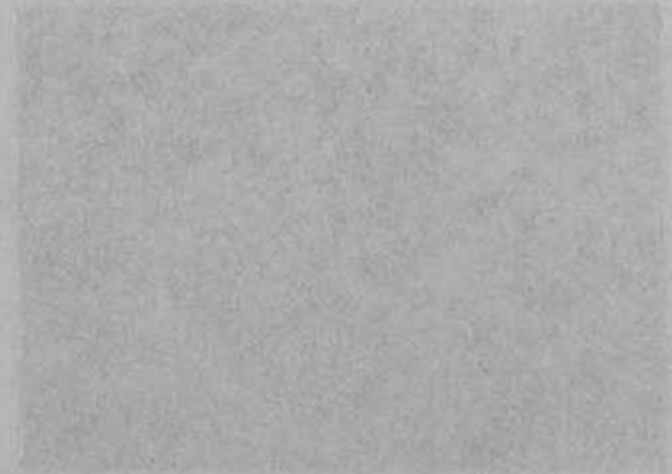
[About](#)

[English / Cymraeg](#)



APPENDIX iv.

iv. SUR 1 worksheet and selected Microdrainage Calcs.



120 min Summer	24,740	0.0
240 min Summer	27,112	0.0
360 min Summer	16,714	0.0
48 min Winter	116,047	0.0
96 min Winter	73,828	0.0
144 min Winter	32,742	0.0
192 min Winter	23,406	0.0
240 min Winter	20,313	0.0
288 min Winter	15,144	0.0



Shear Design Ltd		Page 1
Fabri House 7 Ashtree Court Woodsy Close		
Date 16/12/2012 13:21 File PREDEV100_6HOUR...	Designed By matt.jessop Checked By	
Elstree Computing Ltd	Source Control W.12.4	

Summary of Results for 100 year Return Period (+30%)

Critical storm not identified, please run longer storm durations.

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	97.078	0.078	0.0	0.0	0.0	7.8	O K
30 min Summer	97.107	0.107	0.1	0.0	0.1	10.7	O K
60 min Summer	97.140	0.140	0.1	0.0	0.1	14.0	O K
120 min Summer	97.176	0.176	0.1	0.0	0.1	17.6	O K
180 min Summer	97.197	0.197	0.1	0.0	0.1	19.7	O K
240 min Summer	97.212	0.212	0.1	0.0	0.1	21.2	O K
360 min Summer	97.233	0.233	0.1	0.0	0.1	23.3	O K
15 min Winter	97.087	0.087	0.1	0.0	0.1	8.7	O K
30 min Winter	97.120	0.120	0.1	0.0	0.1	12.0	O K
60 min Winter	97.157	0.157	0.1	0.0	0.1	15.7	O K
120 min Winter	97.198	0.198	0.1	0.0	0.1	19.8	O K
180 min Winter	97.221	0.221	0.1	0.0	0.1	22.1	O K
240 min Winter	97.238	0.238	0.1	0.0	0.1	23.8	O K
360 min Winter	97.263	0.263	0.1	0.0	0.1	26.3	O K

Storm Event	Rain (mm/hr)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	116.002	0.0	27
30 min Summer	79.998	0.0	42
60 min Summer	52.662	0.0	72
120 min Summer	33.322	0.0	132
180 min Summer	24.998	0.0	190
240 min Summer	20.313	0.0	250
360 min Summer	15.144	0.0	370
15 min Winter	116.002	0.0	27
30 min Winter	79.998	0.0	41
60 min Winter	52.662	0.0	70
120 min Winter	33.322	0.0	130
180 min Winter	24.998	0.0	188
240 min Winter	20.313	0.0	246
360 min Winter	15.144	0.0	364

Category 4: Surface Water Runoff

Sur 1 Summary Template – November 2010 Version

Introduction

This template can be used to demonstrate compliance with the criteria specified in Sur 1 in the Code for Sustainable Homes (for the November 2010 version). The form can be used by the Code Assessor to aid in assessing the Sur 1 issue and can be provided as supporting evidence **in addition** to the items listed in the schedule of evidence for Sur 1. Completing this template is optional.

National policy documents have been used to set the standards for the mandatory element of Sur 1. PPS25 Development and Flood Risk (ODPM, 2006) and the SuDS manual are two of the key documents used. Further reading is listed in the References section of the Technical Guide.

Instructions

Where submitting this template as supporting evidence for a Code assessment please ensure that the **assessor completes the contact details (page 2)** and the **appropriately qualified professional completes the rest of the template**, ensuring that it is signed and dated.

If the form is incomplete and / or unsigned it will not be accepted as evidence supporting a Code assessment.

The Technical Guide states the calculation methodologies to be used to demonstrate compliance with some aspects of the criteria, for example the greenfield runoff rates. Although flexibility in choice of methodology is available for some of the criteria, best practice methodologies should always be used. If required, information regarding applicable calculation methodologies can be found in the SUDS Manual (CIRIA, 2007). Reputable software, such as Microdrainage, can be used for calculation purposes

Permeability trial pit SA1

12176 - Wern Ddu, Bryncoch, Neath

Pit Dimensions

1
Length (m)
Width (m)
Depth (m)

Weather Rain, moderate and persistent, overcast, 12 degrees C.

Test 1

Note Permeability was moderate to good in this trial pit however ground water was present at a depth of approximately 0.71m below ground level. Infiltration systems will need to be designed with this in mind. The depth to ground water appeared to approximately coincide with subsoil and organic shaley deposits with cobbles becoming slightly more gravelly with depth. ground water levels may vary with rainfall and seasons.

Actual Depth of Water (Dip from top in m)

Percent test	Time (Mins)	Effective depth (may not be full depth if test terminated or stopped at water table)	Dip at 75%	Dip 25%	Dip 50%
100%	09:58:00	0	0.51	0.3275	0.455
75%	10:00:00	0.2			
	10:01:07	0.29			
	10:03:00	0.3275			
	10:05:00	0.39			
50%	10:06:15	0.455			
	10:11:00	0.55			
25%	10:16:51	0.5825			
	10:20:00	0.6			
	10:30:00	0.65			
	10:40:00	0.7			
0%	11:00:00	0.71			

Volume Outflowing between 75% and 25% of effective depth:

$$V_{p75-25} = \text{length} \times \text{width} \times (\text{depth } 75 - \text{depth } 25) = 0.9 \times 0.255 = 0.2295$$

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and including the base of the pit:

$$\begin{aligned} \text{Average depth} &= 0.255 \\ a_{p50} &= (1.5 \times 0.255 \times 2) + (0.6 \times 0.255 \times 2) + (1.5 \times 0.6) = 0.765 + 0.306 + 0.9 = 1.971 \end{aligned}$$

Time for the outflow between 75% and 25% effective depth:

$$t_{p75-25} = 00:15:43 \text{ in secs} = 15 \times 60 = 900$$

Soil Infiltration Rate:

$$f = \frac{0.2295}{1.971 \times 943} = \frac{0.000123}{1.23 \times 10^{-4}}$$



Soakaway Trial Pit 1

Soakaway Trial Pit 1

Permeability Trial Pit SA2 (test 1)

12176 - Wern Ddu, Bryncoch, Neath

Pit Dimensions	1
Length (m)	1.40
Width (m)	0.60
Depth (m)	1.20
Test 1	

Weather Rain, moderate and persistent, overcast, 12 degrees C.

Note Trial pit was effectively impermeable, no change was observed in water levels over the course of the test.

Percent test	Time (Mins)	Actual Depth of Water (Dip from top in m)	Effective depth (may not be full depth if test terminated or stopped at water table)	Dip at 75%	Dip 25%	Dip 50%
100%	10:50:00	0	0.2	0	0.2	0.2
	11:00:00	00:10:00	0.2			
75%	#DIV/0!	#DIV/0!	0.2			
	11:07:00	00:17:00	0.2			
50%	#DIV/0!	#DIV/0!	0.2			
	11:27:00	00:37:00	0.2			
25%	#DIV/0!	#DIV/0!	0.2			
	11:49:00	00:59:00	0.2			
	12:01:00	01:11:00	0.2			
	12:44:00	01:54:00	0.2			
0%	14:00:00	03:10:00	0.2			

Volume Outflowing between 75% and 25% of effective depth:

$$V_{p75-25} = \text{length} \times \text{width} \times (\text{depth 75} - \text{depth 25}) =$$

$$0.84 \times 0 = 0$$

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and including the base of the pit:

$$\text{Average depth} = 0$$

$$a_{p50} = (1.5 \times 0.255 \times 2) + (0.6 \times 0.255 \times 2) + (1.5 \times 0.6) =$$

$$0 + 0 + 0.84 = 0.84$$

Time for the outflow between 75% and 25% effective depth:

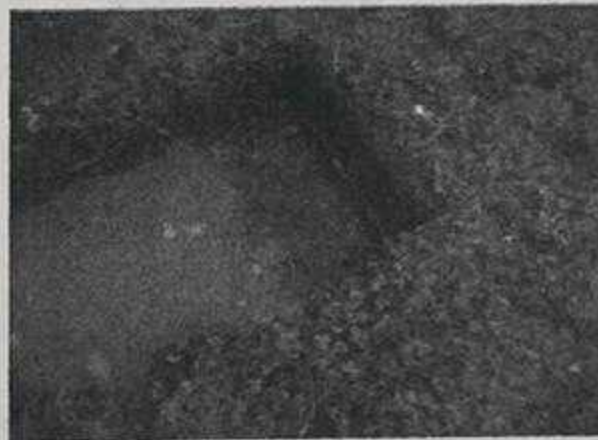
$$t_{p75-25} = \frac{\#DIV/0!}{\#DIV/0!} \text{ in secs} = \frac{\#DIV/0!}{\#DIV/0!}$$

Soil Infiltration Rate:

$$f = \frac{0}{0.84 \times 100000000000} = \frac{\#DIV/0!}{0}$$



Waterlogged ground in Soakaway 2 location



Water level static during test



Excavation arrisings
Topsoil, subsoil dark organic shale/gravel possibly colliery spoil underlain by firm orange clay at approx 1m

Permeability Trial Pit SAI (test 2)

Pit Dimensions		Weather	
Length (m)	1.50	Rain, moderate and persistent, overcast, 12 degrees C.	
Width (m)	0.60		
Depth (m)	1.00		

Test 2

Note Permeability was moderate to good in this trial pit however ground water was present at a depth of approximately 0.71m below ground level. Infiltration systems will need to be designed with this in mind. The depth to ground water appeared to approximately coincide with subsoil and organic shaley deposits with cobbles becoming slightly more gravelly with depth. ground water levels may vary with rainfall and seasons.

Percent test	Time (Mins)	Actual Depth of Water (Dip from top in m)	Effective depth (may not be full depth if test terminated or stopped at water table)	Dip at 75%	Dip 25%	Dip 50%
100%	10:41:00	0	0.15	0.56	0.29	0.57
	10:46:00	00:05:00	0.28			0.43
75%	10:46:28	00:05:28	0.29			
	10:52:00	00:11:00	0.41			
50%	10:53:14	00:12:14	0.43			
	11:00:00	00:19:00	0.54			
25%	11:03:30	00:22:30	0.57			
	11:07:00	00:26:00	0.6			
	11:49:00	01:08:00	0.65			
	12:01:00	01:20:00	0.66			
0%	12:44:00	02:03:00	0.71			

Volume Outflowing between 75% and 25% of effective depth:

$V_{p75-25} = \text{length} \times \text{width} \times (\text{depth } 75 - \text{depth } 25) = 0.9 \times 0.28 = 0.252$

The mean surface area through which the outflow occurs, taken to be the pit sides to 50% effective depth and including the base of the pit:

Average depth 0.28

$a_{p50} = (1.5 \times 0.28 \times 2) + (0.6 \times 0.28 \times 2) + (1.5 \times 0.6) = 0.84 + 0.336 + 0.9 = 2.076 \text{ m}^2$

Time for the outflow between 75% and 25% effective depth:

$t_{p75-25} = 00:17:02 \text{ in secs} = 1020$

Soil Infiltration Rate:

$f = \frac{0.252}{2.076 \times 1022} = 0.000119$

1.19×10^{-4}



The below sections to be completed by the Assessor

Contact Details**Consultant/engineer details**

Company Name	Shear Design
Company Address	7 Ashtree Court, Woodsy Close, Cardiff Gate Business Park, Cardiff. CF23 8RW
Contact Name	Matt Jessop
Contact Telephone Number	02902 547000

Developer/client details

Company Name	Robbins Consulting
Company Address	20 Caswell Avenue, Swansea, SA3 4RU
Contact Name	Andrew Robbins
Contact Telephone Number	07703 043 608

Development details

Development Name	Wern Ddu Bungalow
Development Address	Tyllwyd, Bryncoch, Neath
BRE Reference Number	
Client Reference Number (if applicable)	
Number of dwellings on the site:	1



All of the following sections of the template to be completed by the Engineer / Consultant

MANDATORY REQUIREMENTS

Appropriately Qualified Professional

1. ☒ I can confirm that I am an appropriately qualified professional in line with the Code definition.¹

Assessment Information

2. For sites containing a mixture of non-Code and Code assessed dwellings there are several assessment options for Sur 1. The first would be to assess the whole site (including the non-Code dwellings) under the Code criteria. The second would be to demonstrate with several separate reports that each group of Code dwellings (and the associated sub catchments serving those dwellings) on the site have met the criteria individually. Please tick one of the following boxes;
- ☐ A. The site contains a mixture of Code and non-Code dwellings and the whole site has been assessed under the Sur 1 criteria including any associated sub catchments serving these dwellings.
- OR**
- ☐ B. The site contains a mixture of Code and non-Code dwellings and there is more than one assessed area for Sur 1 within the site boundary.
Please write the number of assessed areas within the site in the space provided below (you will need to complete this template for each assessed area)².
- Number of assessed areas:**
- OR**
- ☒ C. The site only contains Code assessed dwellings and the associated sub catchment serving those dwellings.

Site Information

3.	A. Please provide the site area ³ (delete units of measurement as applicable)	1164m ²
	B. Please provide the impermeable area of the site pre-development (delete units of measurement as applicable)	500m ²
	C. Please provide the impermeable area of the site post development (delete units of measurement as applicable)	364m ²

Special Cases⁴

4. Please tick the relevant box below to identify where a special case applies for the site:

¹ Refer to the technical guide for details on the definition of an appropriately qualified professional.

² It would aid the QA process to provide a site plan highlighting each assessment area and highlighting which area is being assessed in this report.

³ The site area will include all areas within the boundaries of the site, including both permeable and impermeable areas. If box 2B has been ticked, the 'site area' will be only that for which this template demonstrates compliance.

⁴ Refer to the Technical Guide for details on the supporting evidence required to demonstrate compliance with these special cases. This evidence must be provided to demonstrate how the special case is being met.



☐	A. The impermeable area has decreased as a result of the development, and the mandatory element of this issue has been met by default.								
☐	B. A minimum flow rate or maximum storage requirement has been set by the sewerage undertaker (or other statutory body).								
☐	C. Planning approval has been granted for the detailed drainage strategy prior to the Code requirement being set for the development.								
☐	D. The assessed dwelling is directly connected to existing infra-structure which pre-dates the Code requirement.								
5. Tick one or both of the following to confirm if some or all of the highways will be omitted from the impermeable areas in the calculations for one of the following reasons ⁵ :									
☐	A. The highways are being adopted								
☒	B. The Code dwellings are being built beside existing highways.								
SECTION 1: Peak Rate of Runoff									
6.	<table border="1"> <tr> <td>A. Pre-development peak rate of runoff for the 1 year return period event⁶</td> <td>4.1l/s</td> </tr> <tr> <td>B. Post-development peak rate of runoff for the 1 year return period event⁶ (this figure must be less than or equal to A, except where the 5l/s rule has been used)</td> <td>0l/s</td> </tr> <tr> <td>C. Pre-development peak rate of runoff for the 100 year return period event⁶</td> <td>13.0l/s 30min winter 1:100 event</td> </tr> <tr> <td>D. Post-development peak rate of runoff for the 100 year return period event⁶ (this figure must be less than or equal to C, except where the 5l/s rule has been used)</td> <td>0l/s</td> </tr> </table>	A. Pre-development peak rate of runoff for the 1 year return period event ⁶	4.1l/s	B. Post-development peak rate of runoff for the 1 year return period event ⁶ (this figure must be less than or equal to A, except where the 5l/s rule has been used)	0l/s	C. Pre-development peak rate of runoff for the 100 year return period event ⁶	13.0l/s 30min winter 1:100 event	D. Post-development peak rate of runoff for the 100 year return period event ⁶ (this figure must be less than or equal to C, except where the 5l/s rule has been used)	0l/s
A. Pre-development peak rate of runoff for the 1 year return period event ⁶	4.1l/s								
B. Post-development peak rate of runoff for the 1 year return period event ⁶ (this figure must be less than or equal to A, except where the 5l/s rule has been used)	0l/s								
C. Pre-development peak rate of runoff for the 100 year return period event ⁶	13.0l/s 30min winter 1:100 event								
D. Post-development peak rate of runoff for the 100 year return period event ⁶ (this figure must be less than or equal to C, except where the 5l/s rule has been used)	0l/s								
7.	Please tick this box to confirm that the 5l/s rule has been applied where the peak rates of runoff have increased post development, but are still equal to or less than 5l/s.								
☐									
8.	If, post-development, it was necessary to reduce the peak rate of runoff to meet the Code criteria, please provide a brief explanation below describing how the peak rate was reduced. For example, 'soakaways reduce the peak rate of runoff to pre-development levels'. ⁷								

⁵ Refer to the technical guide for details on when an adoptable road can be omitted from the assessment.

⁶ Peak rate of runoff calculations should be carried out for the range of storm durations up to and including the 6 hour storm. The peak rate of runoff for the storm event will then be the 'worst case' runoff rate for the range of storm durations. The climate change allowance should be added only to the post development calculations.

⁷ Note that detailed documentary evidence (as per the schedule of evidence table in the Technical guide) is required to demonstrate how the peak rate of runoff has been reduced.

	Post development area is less than pre development area. Soakaways are also utilised to reduce flow off site N/A ☒ Post development flow is in fact, lower than pre development.
9.	☒ Please tick this box to confirm that the post development peak rate of runoff calculations include an allowance for climate change in accordance with current best practice (PPS25, 2006).
10.	Please tick one of the following boxes as applicable to this site: ☐ A. This is a greenfield site and is less than 50 ha therefore runoff rate calculations have been carried out in accordance with the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994). The pro rata method on the size of catchment detailed in table 4.2 of the SuDS manual has been used. ☐ B. This is a greenfield site of 50 to 200 ha therefore runoff rate calculations have been carried out in accordance with the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994). ☐ C. This is a greenfield site of more than 200 ha (or where there is a preference to do so and the catchment is considered suitable for its application) therefore runoff rate calculations have been carried out in accordance with the 'Flood estimation handbook' (Centre for Ecology and Hydrology, 1999). ☐ D. This is a greenfield site of more than 200ha where the Flood Estimation handbook is considered inappropriate for the development therefore the IH Report 124 has been used. ☒ E. This is a brownfield site and runoff rates have been calculated in accordance with current best practice simulation modelling. ☐ F. This is a Brownfield site where the pre development surface water drainage system is not known therefore the runoff rates have been calculated using the Greenfield runoff model ticked above (please tick the relevant methodology), but using soil type 5.

SECTION 2: Volume of Runoff
Section 2A

11. ☒ Please tick this box to confirm that the following post development volume of runoff calculations include an allowance for climate change in accordance with current best practice (PPS25, 2006).

☒ Please tick this box to confirm that the following volume of runoff calculations are for the 100 year event of 6 hour duration.

12.	A. Pre-development volume of runoff	Area 500m ² 1:100 year hour event 28.7m ³
	B. Volume of runoff caused by the new development prior to mitigation	Area 364m ² 1:100 6 hour + 30% climate change 26.3m ³
	C. Additional predicted volume of rainwater caused by the new development prior to mitigation (= 12B – 12A)	0m ³
	D. If the answer to 12C is greater than zero, please provide a brief explanation below describing how you have reduced the additional volume discharged from the developed site, for example, 'soakaways will infiltrate all of the additional volume': Notwithstanding the reduction in hard standing, Soakaways are provided and will be sized to accommodate the 1:100 year event for the new development area. N/A ☐ (criterion 2A cannot be satisfied, see section 13)	
	Please provide the additional volume of runoff discharged from the site when all (if any) mitigation measures described in 12D are in place.	0m ³

13. A. Where there is an increase in the volume of runoff as a result of the development and criteria 2A cannot be satisfied via infiltration or other SuDS techniques (as listed below), please provide an explanation below (evidence to support the reasoning should be provided in the hydrological report):

Soakaways:

Porous/Pervious paving:

Rainwater re-use harvesting:

Green Roof:

Other surface infiltration techniques:

N/A ☒ (all additional volumes of run-off have been dealt with)

**Section 2B**

- 14.** Where it has not been possible to reduce all of the additional volume by infiltration or other SuDS techniques, the volume of runoff should be discharged in accordance with one of the following rates of runoff, whichever is the higher. Please tick one of the boxes below to confirm the level of flow control that has been achieved:
- ☐ A. The peak discharge rate has been reduced to pre development 1 year peak flow rate
- Please state the pre development 1-year peak flow rate l/s
- OR**
- ☐ B. The peak discharge rate has been reduced to the site's estimated mean annual flood flow rate (Qbar).
- Please state Qbar: l/s
- OR**
- ☐ C. The peak discharge rate has been reduced to 2l/s/ha.
- Please state the peak discharge rate at 2l/s/ha: l/s
- OR**
- ☐ D. The limiting discharge rate requires a flow rate of less than 5l/s at a discharge point, therefore a flow rate of up to 5l/s has been used.

breglobal	Code for Sustainable Homes – November 2010	
	Mandatory Requirements Summary Template – Sur 1	

Signature	
The following declaration should be signed by the appropriately qualified professional responsible for ensuring that the development meets the Sur 1 mandatory criteria and the necessary criteria to allow the awarding of credits, where applicable.	
I confirm that the information provided in this document is truthful and accurate at the time of completion.	
Name of Appropriately Qualified Professional:	MATT SESSOP MICE
Signature of Appropriately Qualified Professional:	<i>Matthew Sessop</i>
Date:	17th / 12 / 2012

**SECTION 3: Designing for Local Drainage System failure**

15. ☒ Tick here to confirm that the consequences of system failure caused by extreme rainfall, lack of maintenance, blockage or other causes, have been considered and evaluated fully and there will be no increased risk to dwellings either on or off site.⁸
- The site is served off an existing access road which is at a lower level than the property. In the event of a failure of the surface water drainage system water would flow overland and off site in the direction of the access road. There are no properties between the development site and the access road.
- In any case the area of harstanding is reduced post development and so there can be no increase in risk

AWARDING OF CREDITS: WATER QUALITY CRITERIA⁹

16. ☒ A. Tick here to confirm that there will be no discharge from the developed site for rainfall depths up to 5 mm. Please provide a brief explanation below describing how the runoff from rainfall depths up to 5 mm will be prevented from leaving the site:
- Soakaways are utilised to intercept surface water run-off and infiltrate into the ground. Permeability testing has been carried out and permeability of 1.23×10^{-4} identified at the front of the building.
- ☒ B. Tick here to confirm that the runoff from all hard surfaces shall receive an appropriate level of treatment in accordance with the SuDS Manual to minimise the risk of pollution to the receiving watercourse. Please provide a brief explanation below describing how the hard surfaces will receive an appropriate level of treatment:
- The proposed development is one property and the majority of discharge will direct from roof drainage systems.
- There is small area of drive way at the front of the building which will be designed either as permeable paving with filtration layers for pollution control or may be positively drainage using trapped gullies either of which would be appropriate pollution control for a development of this size in accordance with PPG 3 Para 1b.

⁸ Refer to the technical guide for details on the evidence that would be required to demonstrate that this has been considered fully.

⁹ Note that where the mandatory element has been met by special cases 3. C and 3.D, no credits can be achieved.