

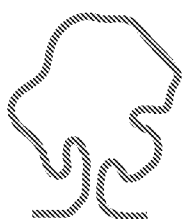
MR & MRS P VOLLER



TARS FARM, CHURCH LANE, BARNHAM, BOGNOR REGIS PO22 0DB

Surface Water Drainage and Foul Sewerage Statement

May 2014



eas ltd

Environmental Assessment Services Ltd.

REPORT DATA SHEET

Requirement	Data
Report Ref:	Voller/TarsBuildings/D&S
Date	May 2014
Client	Mr & Mrs P Voller
Report type	Foul and Surface Water Drainage Assessment
Purpose	Submission to Planning
Revisions	-
Prepared by	Eur Ing Malcolm McKemey BSc (Hons), CEng, CEnv, MICE, MIEAust, MCIWEM, MIEnvSc Signed
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MR & MRS P VOLLER

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May 2014

1. BACKGROUND

- 1.1 The site comprises a small cluster of redundant, agricultural buildings with a central, unsurfaced yard and access track.
- 1.2 It is proposed to redevelop the existing buildings and rebuild in the footprint of former buildings, for one residential dwelling and a holiday let with garages, open storage for land maintenance and an element of equestrian related development.

2. THE SITE AND SURROUNDINGS

- 2.1 The site is located to the south of Barnham. The plan area of the site (comprising the buildings, farmyard and access road) is approximately 0.3 ha. The Ordnance Survey map reference for the centre of the site is SU 9565 0420. The approximate site elevation is + 6.5 m OD. See Appendix A Figure 1: Site Location Plan.
- 2.2 The site is set within a large field (under the same ownership) crossed by drainage ditches (see Figure 2, site layout plan). The Barnham Rife, a narrow watercourse with steep banks flowing to the southwest, lies to the southeast of the site. To the southeast (across the Rife) are dwellings with large gardens. Barnham Railway Station lies to the north of the site and the branch line to Littlehampton lies to the north and west of the site.
- 2.3 The existing site, visited on 6 March 2013, comprises:
 - An unsurfaced yard area measuring approximately 20 m x 50 m.
 - An unsurfaced (two wheel ruts on exposed gravel with grass growing in between) access track extending from the yard to Church Lane covering an area of approximately 1200 m².
 - Two modern concrete block barns (one located to the northwest and one to the east of the central 'yard') with a pitched roof (one clad in corrugated fibre-cement roofing sheets over a metal frame and the other with concrete tiles over a wooden frame).
 - The remnants of what is thought to have been a piggery located to the north of the yard.
 - A brick and flint barn or lodge with pitched slate roof (probably built ca 1900) to the east of the yard.
 - A lean-to type shelter between one of the modern barns and the outer wall of a former brick and flint barn (probably built ca 1800) along the western side of the yard.

- The remnants of a newer concrete block barn/out-building within the southwest corner of the central yard.

3. SURFACE WATER DRAINAGE

- 3.1 A Flood Risk Statement, dated 27 November 2013, has been prepared in relation to the proposed redevelopment of the site. The site was found to lie within Flood Zone 1, low risk of flooding, apart from the access road crossing of the Barnham Rife. See Appendix B. It was concluded that the proposed development, comprising the redevelopment and restoration of existing buildings was not considered likely to increase flood risk elsewhere where adequate surface water drainage attenuation measures were adopted.
- 3.2 There is presently no formal surface water drainage at the site. Rain falling on the farmyard and buildings appears to soak into the ground or runs-off into the surrounding fields. The access track drains in the same manner as the surrounding fields.
- 3.3 The proposed development will increase the impermeable area of the site by the replacement of roof surfaces, paving the farmyard area and upgrading the access track. This will tend to increase peak flow rates and could increase flood risk downstream from the site.
- 3.4 This risk is normally addressed by limiting the flow from the impermeable areas to the equivalent of greenfield flow, or draining to soakaway.
- 3.5 We understand that there are no public surface water sewers in the vicinity of the site. There is a public foul sewer nearby, however, no surface or groundwater will be permitted to discharge to the foul sewerage system; whether by direct connection, underground leakage or inundation from the surface.
- 3.6 It is our client's preferred option for surface water drainage to discharge into the Barnham Rife using the existing drainage network. For this option, it would be necessary to provide attenuation storage in the form of a balancing pond or tank to store the peak flow and release it at a controlled greenfield flow rate. The total volume of attenuation storage required in this case has initially been calculated at 200 m³. See Appendix C.
- 3.7 The Sustainable Urban Drainage Systems (SUDS) solution would be to discharge the run-off from impermeable areas to soakaway. The underlying geology at the site (Late Pleistocene Brickearth over Plateau Gravel over Cretaceous Chalk) suggests that soakaways would probably work, however, the groundwater level is relatively high in this area and soakaways would have to be fairly shallow. It would be necessary to carry out soakage testing at the site to verify the feasibility of this option.
- 3.8 The soakaway option may be maximised by the use of permeable paving in the farmyard area. If the access road is to have impermeable surfacing, a soakaway in the form of a gravel-filled trench alongside the road may be suitable to deal with run-off from the road surface.

4. FOUL SEWERAGE

- 4.1 There is currently no foul sewage connection from the existing site.
- 4.2 From the WRc publication Sewers for Adoption 7th Edition 2012, the design foul sewage flow should be 4000 l/day for each dwelling. For the proposed two dwellings, this would give a design flow rate of 0.093 l/s.
- 4.3 The preferred foul sewage disposal option would be discharge to the existing Southern Water maintained public foul sewer that runs parallel with the Barnham Rife to the southeast. However, there is some concern that there is no spare capacity in the nearby sewer and there is recent history of this sewer flooding on to our client's land, which may be an indication of capacity problems.
- 4.4 An application to connect to the public foul sewer should be made in due course. Depending on the response from Southern Water, a capacity check may also be required in advance of the application to connect. Where capacity is found to be inadequate, it would be necessary to contribute to the cost of sewer reinforcement.
- 4.5 Where it is not found feasible to connect to the public foul sewer, the sewage from the proposed two residences may be discharged to a septic tank with effluent discharged to a soakaway or land drains. It would be possible to discharge to a watercourse, but this would require a much higher standard of effluent than achievable using a septic tank and a package sewage treatment plant would be required. Environment Agency approval would be required for these options. The site does not lie within a groundwater source protection zone.

5. SUMMARY AND CONCLUSIONS

- 5.1 The Environment Agency flood mapping shows the site to lie within Flood Zone 1 (low risk of flooding), apart from the access road crossing of the Barnham Rife. There are no significant flood related risks likely to adversely impact on the proposed future residents within the site. The site does not lie within a groundwater source protection zone.
- 5.2 The nearest significant watercourse is the Barnham Rife, although there are connecting drainage ditches very close to the site.
- 5.3 There is presently no formal surface water drainage at the site. Rain falling on the site appears to soak into the ground or runs-off into the surrounding fields.
- 5.4 The principal concern will be the risk of exacerbated surface water flooding downstream of the site due to the proposed increase in impermeable area as part of the proposed development. This may be addressed by providing attenuation storage and discharging to the nearest watercourse at a greenfield rate. The attenuation storage volume required has been calculated at 200 m³. The recommended SUDS solution would be to discharge the run-off from the impermeable areas to soakaway. The underlying geology would appear to be suitable for soakaway drainage, but this cannot be verified without carrying out soakage testing.

- 5.5 There is presently no foul sewerage at the site.
- 5.6 The preferred option for draining the foul sewage from the proposed two residences would be to connect into the existing public foul sewer to the southeast of the site. However, there are reputed to be capacity problems in this foul sewer and it has flooded on to our client's land in the past. It is recommended that an application to connect to the public foul sewer should be submitted to Southern Water.
- 5.7 In the event that connection to the public foul sewer is not found to be feasible, the site may be drained to a septic tank with effluent discharged to soakaway or land drains. The alternative would be a package sewage treatment plant discharging to a ditch or watercourse. Environment Agency consent would be required for this option and maintenance costs could be significant.

6. RECOMMENDATIONS

- 6.1 It is recommended that soakage testing should be carried out at the site to discover the feasibility of this option and design the soakaway(s).
- 6.2 It is recommended that an application to connect to the public foul sewer should be made to Southern Water.

☆ ☆ ☆ ☆ ☆ ☆ ☆

APPENDIX A

Figures



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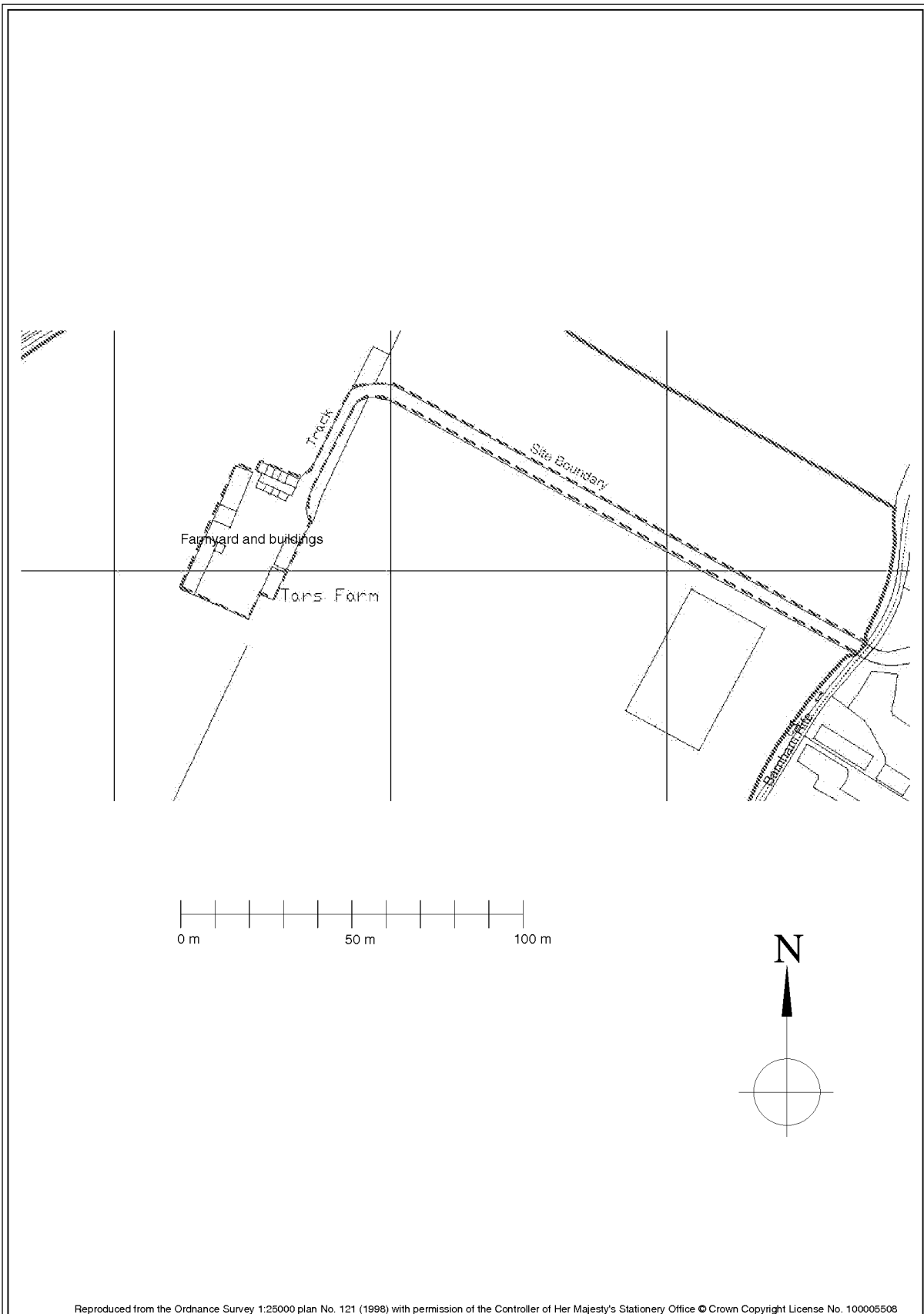
MR & MRS P VOLLER

Scale 1:25000

TARS FARM, CHURCH LANE, BARNHAM, WEST SUSSEX

Figure 1: Site Location

May 2014



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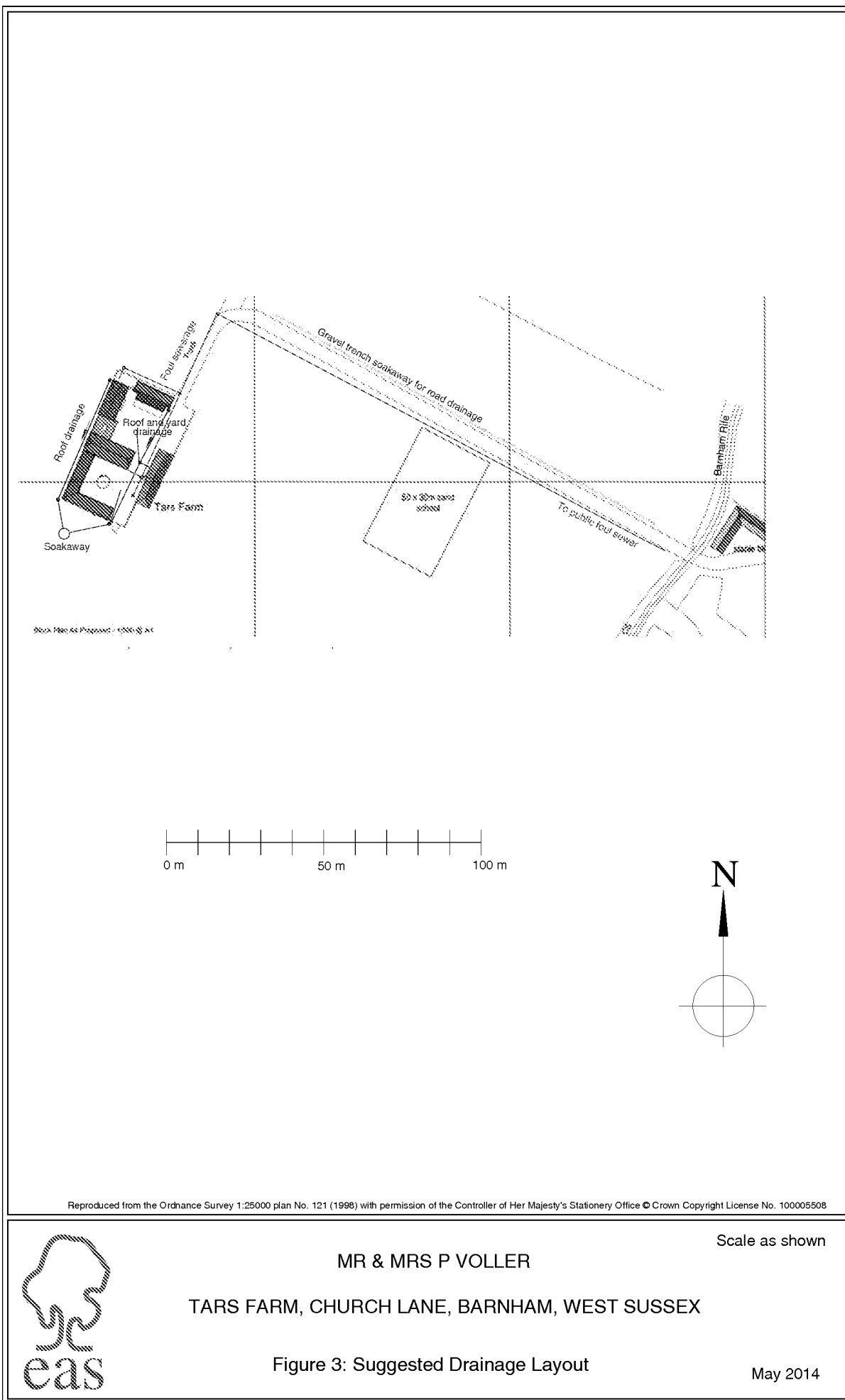


MR & MRS P VOLLER
TARS FARM, CHURCH LANE, BARNHAM, WEST SUSSEX

Scale as shown

Figure 2: Site Layout Plan

May 2014



APPENDIX B
Environment Agency Flood Plain Map

We are interested in understanding why you use this site. Please click [here](#) to complete a short survey

Enter a postcode or place name:

PO22 0DB

Other topics for this area...



Flood Map for Planning (Rivers and Sea)

Flood Map for Planning (Rivers and
Sea)

Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

☒ Flood Map for Planning (Rivers and Sea) 

 Flood Zone 3

 Flood Zone 2

 Flood defence
(Not all may be shown*)

 Areas benefiting from
flood defence
(Not all may be shown*)

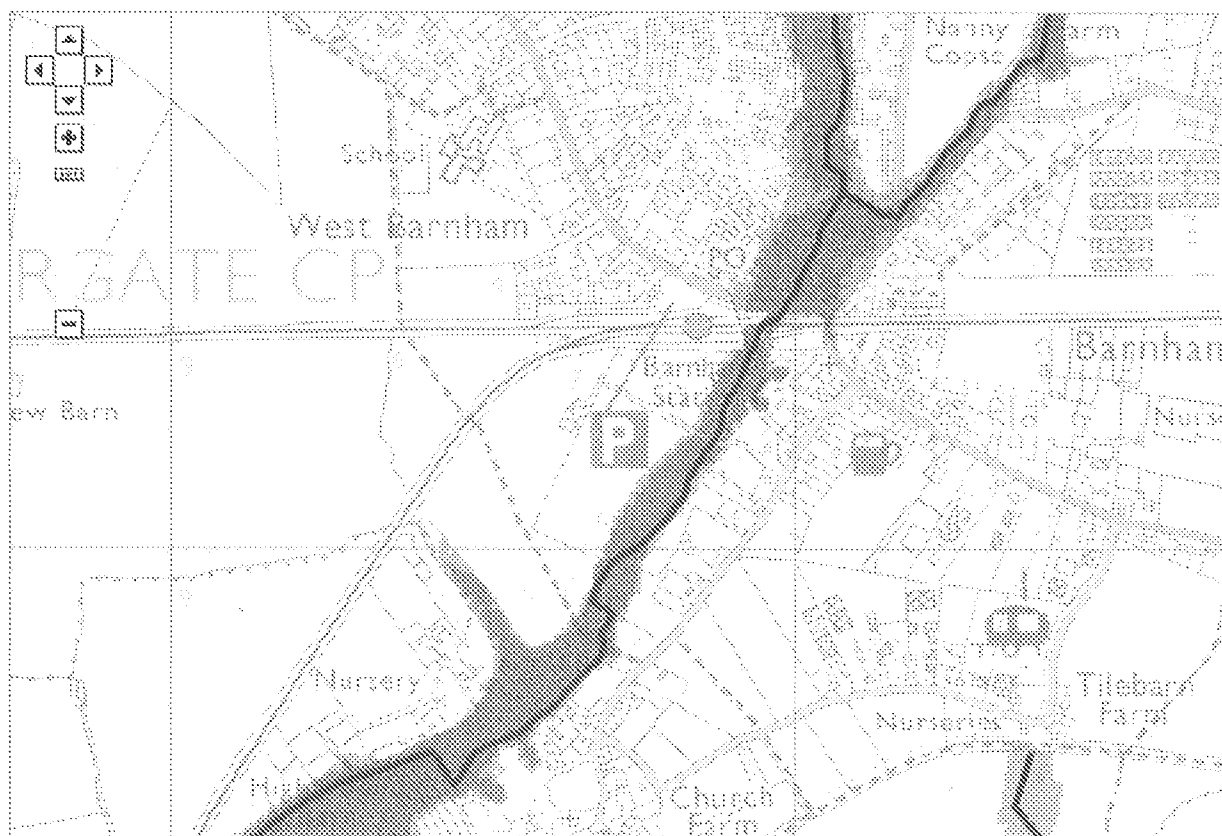
 Main rivers

PO22 0DB at scale 1:10,000

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Customised Maps - From 1 April 2013 Natural Resources Wales (NRW) has taken over the responsibilities of the Environment Agency in Wales.
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More about flooding:

Understanding the Flood Map for Planning (Rivers and Sea)

A more detailed explanation to help you understand the flood map shown above.

Current flood warnings

We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

* **Legend information:** Flood defences and the areas benefiting from them are gradually being added through updates. Please contact your local environment agency office for further details.

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Author: The Environment Agency | enquiries@environment-agency.gov.uk

Last updated: 1st May 2014

APPENDIX C

Attenuation Storage Volume Report

Surface water storage requirements for sites

Site name: Tars Farm

Site location: Barnham

Site coordinates

Latitude:

Longitude:

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", WPS-OTAIN/TP1/1 rev. B (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Reference: 000000000000 / 0.3

Date: 9 May 2014

Site characteristics

Total site area	0.3	ha
Significant public open space	0	ha
Area positively drained	0.3	ha
Impermeable area	0.25	ha
Percentage of drained area that is impermeable	83.33	%
Impervious area drained via infiltration	0	ha
Return period for infiltration system design	100	year
Impervious area drained to rainwater harvesting systems	0	ha
Return period for rainwater harvesting system design	10	year
Compliance factor for rainwater harvesting system design	66	%
Net site area for storage volume design	0.3	ha

Methodology

Greenfield runoff method	IH124
Volume control approach	Use Long Term Storage
Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
SOIL type	3
HOST class	N/A
SPR	0.37

Hydrological characteristics

	Default	Entered	
SAAR	0	780	mm
M5-60 Rainfall Depth	20	20	mm
r Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.97	0.97	
Hydrological region	1	1	
Growth curve factor: 1 year	0	0.85	
Growth curve factor: 10 year		1.45	
Growth curve factor: 30 year	0	1.95	
Growth curve factor: 100 year	0	2.48	

Design criteria

Climate change allowance factor	1.3	
Urban creep allowance factor	1.1	
Interception rainfall depth	5	mm

Greenfield runoff rates

	Default	Entered	
Qbar		0.98	l/s
1 in 1 year		5.00	l/s
1 in 30 years		5.00	l/s
1 in 100 years		5.00	l/s

Please note that a minimum flow of 5 l/s applies to any site

Estimated storage volumes

	Default	Entered	
Interception storage	10.00	10.00	m³
Attenuation storage		131.58	m³
Long term storage		56.07	m³
Treatment storage		48.66	m³
Total storage		197.65	m³

HR Wallingford Ltd, the Environment Agency and any local authority are not liable for the performance of a drainage scheme which is based upon the output of this report

Surface water storage requirements for sites

Site name: Tars Farm
Site location: Barnham

Site coordinates

Latitude:

Longitude:

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", NIS-0742A/TR01/1 rev. B (2012) and the CIRIA GUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Reference: 000000000000 / 0.3

Date: 9 May 2014

Site characteristics

Total site area	0.3	ha
Significant public open space	0	ha
Area positively drained	0.3	ha
Impermeable area	0.25	ha
Percentage of drained area that is impermeable	83.33	%
Impervious area drained via infiltration	0	ha
Return period for infiltration system design	100	year
Impervious area drained to rainwater harvesting systems	0	ha
Return period for rainwater harvesting system design	10	year
Compliance factor for rainwater harvesting system design	66	%
Net site area for storage volume design	0.3	ha

Methodology

Greenfield runoff method	FEH	
Volume control approach	Use Long Term Storage	
Qmed estimation method	Calculate from BFI and SAAP	
BFI and SPR estimation method	Calculate from dominant HOST	
HOST class	N/A	
BFI / BFIHOST	0.00	
SPR / SPRHOST	0.0	
Qmed	N/A	l/s
Qbar / Qmed Conversion Factor	N/A	

Hydrological characteristics

	Default	Edited	
SAAR	0	780	mm
M5-60 Rainfall Depth	20	20	mm
T Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.97	0.97	
Hydrological region	1	1	
Growth curve factor: 1 year	0	0.85	
Growth curve factor: 10 year		1.45	
Growth curve factor: 30 year	0	1.95	
Growth curve factor: 100 year	0	2.48	

Design criteria

Climate change allowance factor	1.3	
Urban creep allowance factor	1.1	
Interception rainfall depth	5	mm

Greenfield runoff rates

	Default	Edited	
Qbar	---	---	l/s
1 in 1 year	---	---	l/s
1 in 30 years	---	---	l/s
1 in 100 years	---	---	l/s

Please note that a minimum flow of 5 l/s applies to any site

Estimated storage volumes

	Default	Edited	
Interception storage	---	---	m ³
Attenuation storage	---	---	m ³
Long term storage	---	---	m ³
Treatment storage	---	---	m ³
Total storage	---	---	m ³

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APPENDIX D
Southern Water Sewer Plans

SOUTHERN WATER



The portions of paper shown on this plan are believed to be correct, but Southern Water Network Ltd accepts no responsibility for the error of measurement. The actual positions should be determined on site.

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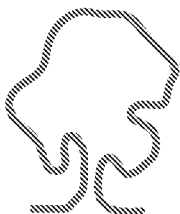


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