RUSHBY BREWSTER
CONSULTING CIVIL & STRUCTURAL ENGINEERS

DRAINAGE AND SUDS ASSESSMENT

FOR

Dwellings
38 Bushy Mead
Widley
Portsmouth
Hampshire
PO7 5DY

Client:
Mrs A Allaway
383 Havant Road
Farlington
Hampshire
PO6 1DD

Architect:
Harrington Design + Bloomfield Architects
6 The Old Flour Mill
Queen Street
Emsworth
Hampshire
PO10 7BT

Issue		A	B
Issued By	Steve Brewster		
Date	January 2012		
Purpose	Planning		
Approved By	AWR		

Project No. RBB 132

The Town House, St George's Square, Bishops Waltham, Southampton SO32 1AF
T: 01489 890004 F: 01489 890005
E: admin@rushbybrewster.co.uk W: www.rushbybrewster.co.uk
Directors: Allen Rushby IEng.AMIStructE; Stephen Brewster BSc (Hons), CEng. MICE

38 Bushy Mead, Widley

DRAINAGE STATEMENT

1. Introduction

It is understood that this particular site and its environs periodically suffer storm-water flooding as a result of overland flow and a spring line. Whilst it is not necessarily deep, the water acts as a wide shallow stream affecting properties to the north (lower) in Valley Close and Serpentine Road.

2. Strategy

It is the intention to reduce the impermeable area of the existing site by selection of appropriate surfacing materials (e.g. porous pavements) and to disperse the roof drainage to ground via soakaways. It is further intended to introduce an 'up-stream' grip or french drain (which will require long-term maintenance) and to provide raised floor levels to the properties with piped through flow under the slabs such that the houses do not act as a buffer to simply deflect water elsewhere. The latter proposals will mitigate cross-ground flow by imposing a diffusing collector in the first instance and supplementing this, where possible, with non-interrupted through flow under the houses for any cross-ground passage of water. Whilst the soakage values are poor, the size of the collector medium and the use of an overflow to the porous pavement sub-base will have a reducing effect upon cross-site flow whilst actual flows generated from the site itself will be reduced in proportion to the impermeable areas.

3. Information

Data provided therein is as follows:-

- Surface area considerations
- Porosity review and soakaway designs
- Soil data (initial)
- Environment Agency mapping
- Site layout/strategy with appropriate details

Calculations

CALCULATIONS

RUSHBY | BREWSTER
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

The Town House
St George's Square
Bishops Waltham
Southampton SO32 1AF
T: 01489 890004
F: 01489 890005

Job Title	Job No.		Sht. No.	
38 BUSHY MEAD WOLEY	RBB 132		STORM – 1	
Element	Prepared	Date	Checked	Date
	SB	JAN '12		

EXISTING IMP. SURFACE :

HOUSE – 12x9 = 108

OUTBUILDINGS/PAVING – 22x6 + 6x6 + 6x3 = 186

TURNING – 12x8 = 96

ACCESS – 55x2.5 = 138

528 m^2.

PROPOSED IMP. SURFACE :

ROADWAY – POROUS 0

ROOFS – 9x10 = 90

" = 90

8x9 = 72

" = 72

9x10 = 90

6x6 = 36

450 m^2 < 528 m^2.

POROSITY TESTING PROVED SUB SOIL VERY POOR.
SHEET S/A1 SHOWS SOAKAWAY DESIGN FOR ONE HOUSE USING A 'WORST CASE' POROSITY OF 1×10^{-6} VALUE
THESE WILL THEN BE CONNECTED VIA OVERFLOW TO THE SOAKAWAY LAYER OF THE POROUS PAVEMENT.

STRUCTURAL SOILS REPORT IS RECOMMENDED.

Soils Data

Steve Brewster

From: Sinan.Al-Jassar@soils.co.uk

Sent: 18 January 2012 12:32

To: steve.b@rushbybrewster.co.uk

Subject: 38 Bushy Mead Soakaway test

Hi Steve
Please find attached two soakaway test results for the above site. The water didn't move in both tests. The soil below 0.3m is firm to stiff yellow brown slightly silty CLAY. Soil samples from the four trial pits indicate that the soil across the site is generally consistent up to 2.0m depth. The test result indicates that the drainage characteristic of the soil (up to 2.0m depth) is "Practically Impervious".

Regards
Sinan

Sinan Al-Jassar BSc MSc PhD
Principal Engineer
Structural Soils Ltd
The Old School
Stillhouse Lane
Bedminster
Bristol
BS3 4EB
United Kingdom

A member of the RSK Group plc
Switchboard: +44 (0) 117 947 1000
Fax: +44 (0) 117 947 1004
email: sinan.al-jassar@soils.co.uk
http://www.soils.co.uk
Structural Soils Ltd is registered in England at 2Spring Lodge, 172 Chester Road, Helsby, Cheshire, WA6 0AR, UK
Registered number: 828694
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Before printing think about your responsibility and commitment to the **ENVIRONMENT!**

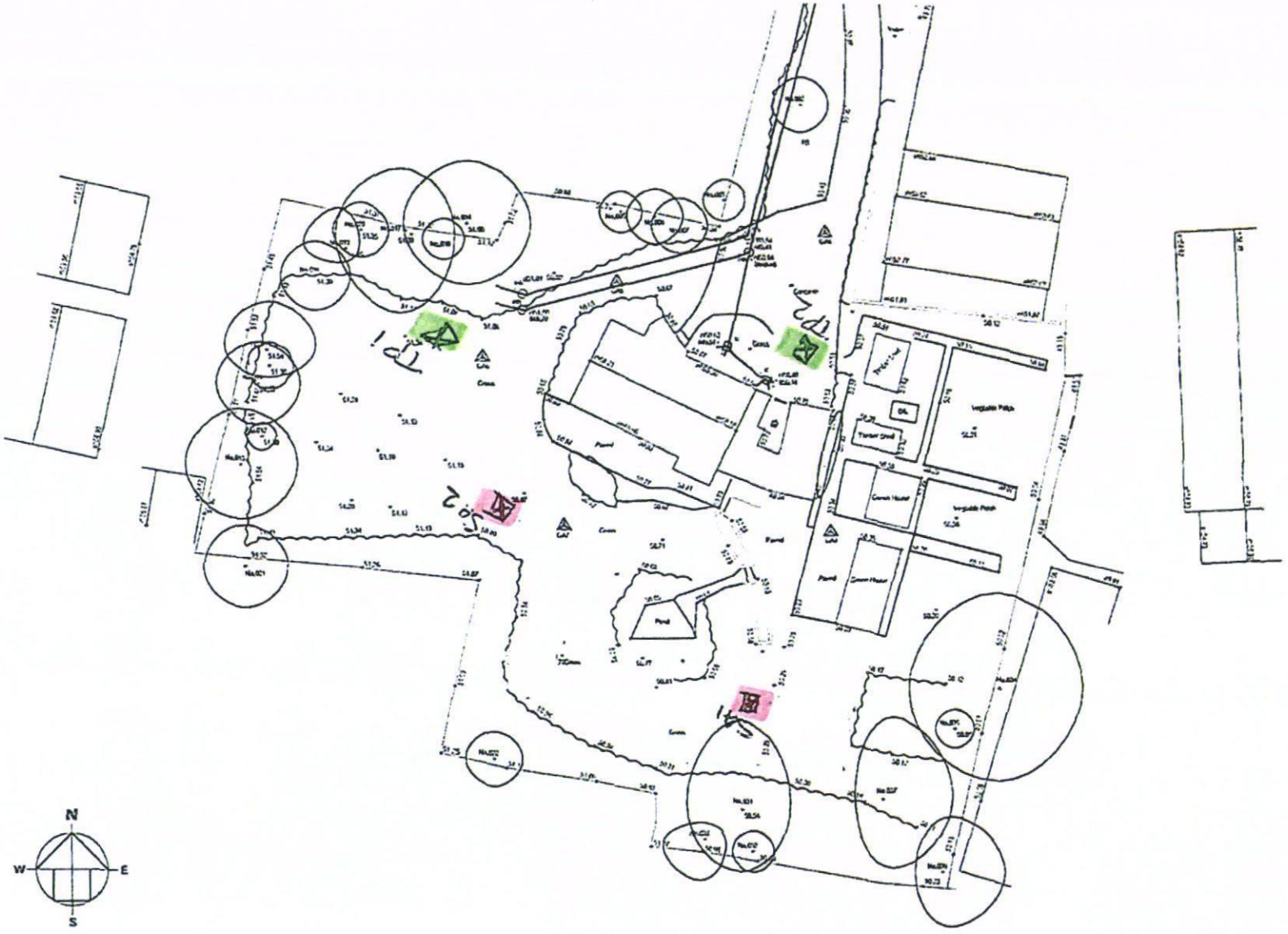
STRUCTURAL SOILS LTD

SITE INVESTIGATION

SOIL, ROCK & MATERIAL TESTING

GEOTECHNICAL CONSULTANCY

CONTAMINATED LAND ASSESSMENT



0 5 10 15 20 30 40 50

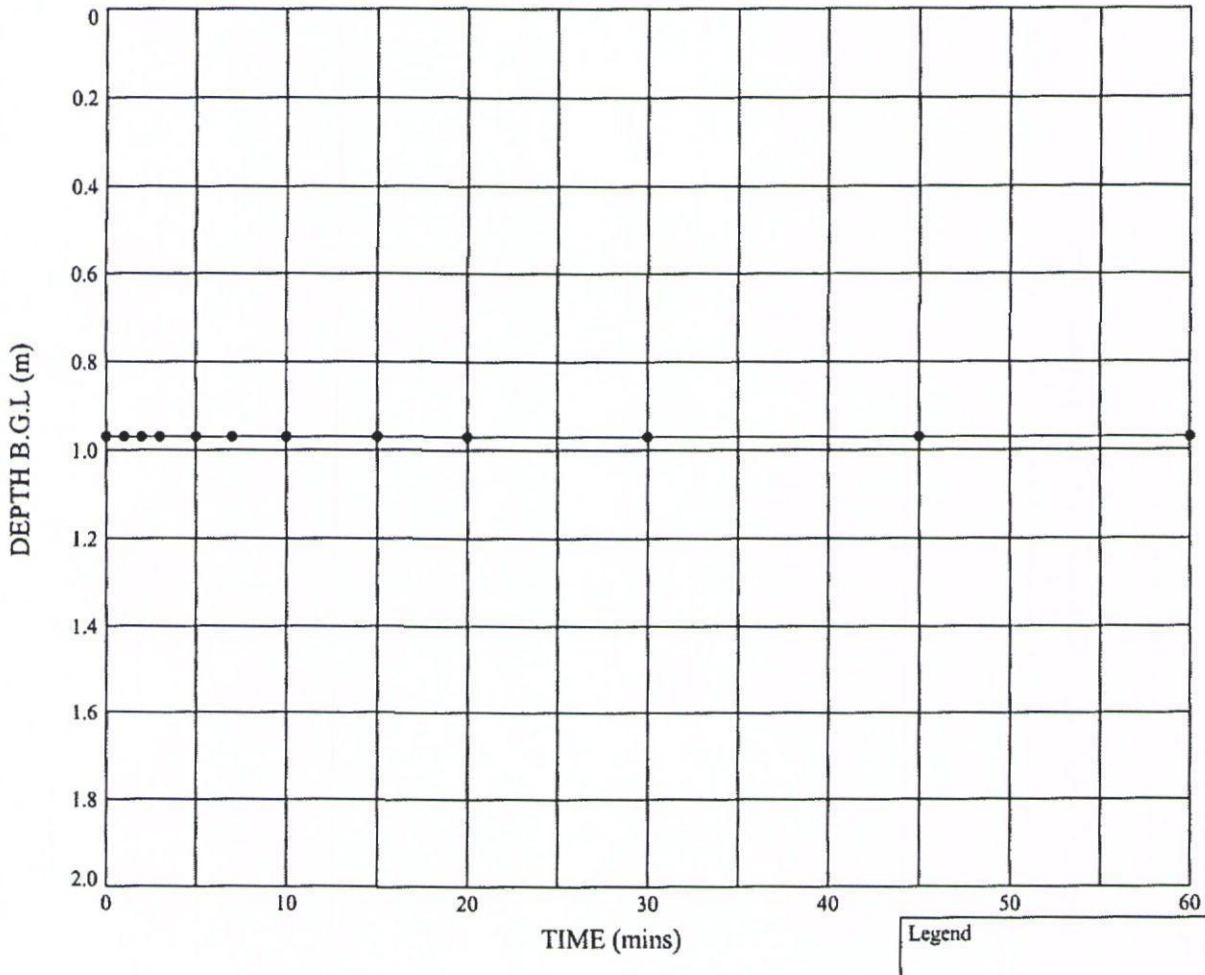
SCALE IN METRES

FULL SCALE SOAKAWAY TEST

Non standard test

Soakaway Test - Position ID : **SA1**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



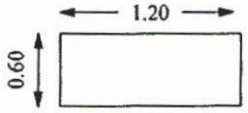
Legend

● Test 1 (13.01.12)

Effective depth, De	=	0.93	m
Effective storage volume, V_{p75-25}	=	0.3348	m^3
Surface area, a_{p50}	=	2.3940	m^2
Time, t_{p75-25}	=	NA	secs
Infiltration rate, f	=	NA	m/s

Notes : No drop in water level. Unable to calculate infiltration rate

Plan (Not to scale)



No Bearing Taken

Approved Signatories: D. TROWBRIDGE A. FROST F. HAMILTON M. STOKES

STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By	Date	Checked By	Date
A. Frost	18/01/12		

Contract: **Bushy Mead, Portsmouth**

Contract Ref: **742633**

Page: of

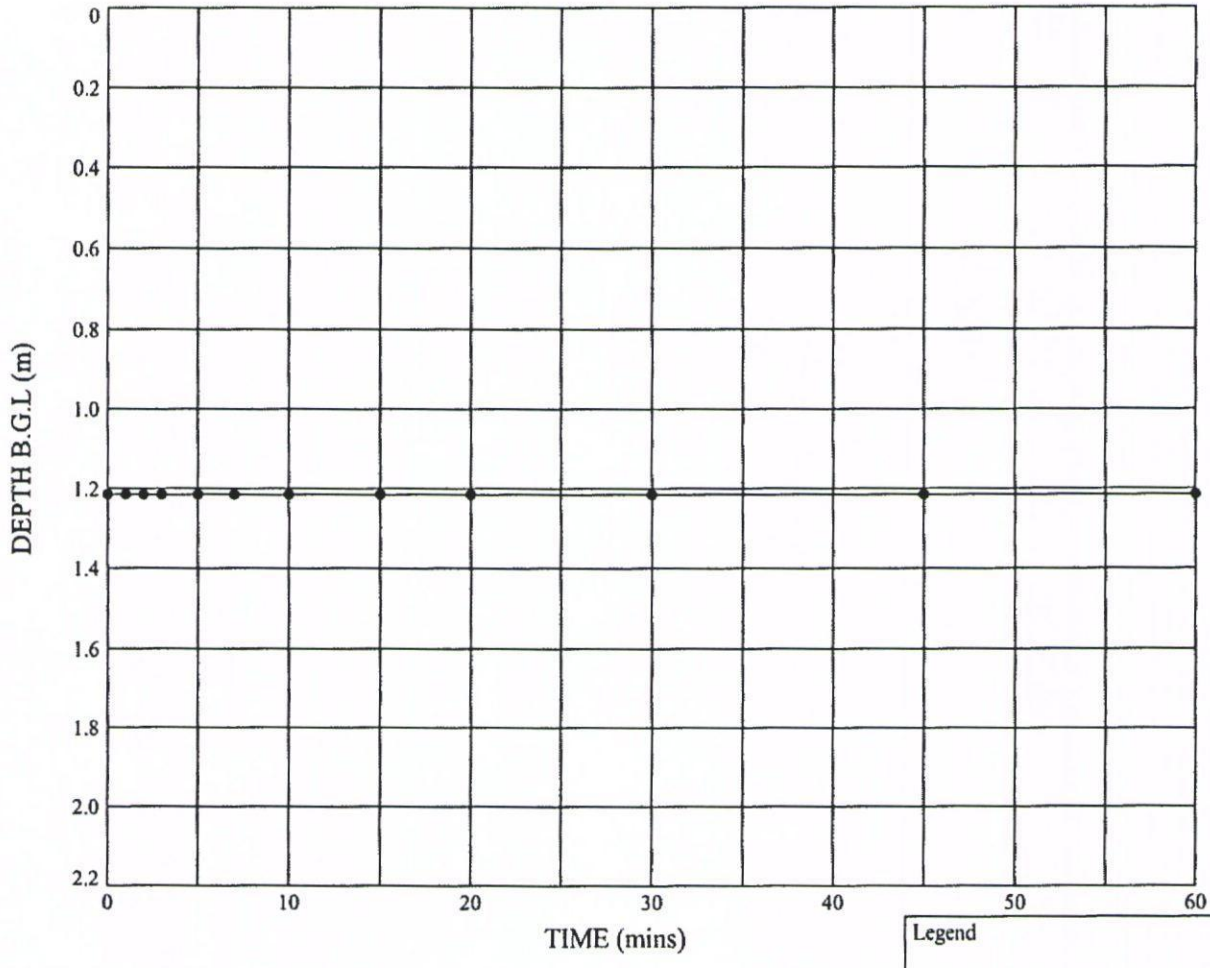
GINT_LIBRARY_V8_04.GLB!! - TP SOAKAWAY BY EXTRAPOLATION | LAB_742633.GPJ - v8_04 | 18/01/12 - 06:53 | AF.

FULL SCALE SOAKAWAY TEST

Non standard test

Soakaway Test - Position ID : **SA2**

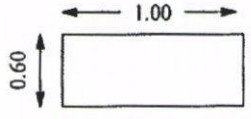
PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Legend

● Test 1 (13.01.12)

Plan (Not to scale)



No Bearing Taken

Effective depth, De	= 0.83	m
Effective storage volume, V_{p75-25}	= 0.2475	m³
Surface area, a_{p50}	= 1.9200	m²
Time, t_{p75-25}	= NA	secs
Infiltration rate, f	= NA	m/s

Notes : No drop in water level. Unable to calculate infiltration rate

Approved Signatories: D. TROWBRIDGE A. FROST F. HAMILTON M. STOKES

STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By	Date	Checked By	Date
A. J. Frost	18/01/12		

Contract: **Bushy Mead, Portsmouth**

Contract Ref: **742633**

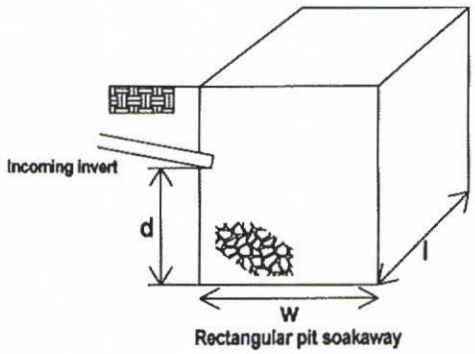
Page: of

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	Project				Job no.	
	Bushy Mead Widley				RBB 132	
	Calcs for				Start page no./Revision	
	Soakaway (1/10yr)				S/A - 1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	SB	Jan 2012				

SOAKAWAY DESIGN – BRE DIGEST 365

TEDDS calculation version 1.0.01



Rectangular pit soakaway

Rectangular Pit Design

Pit length	l = **2500** mm	Pit width	w = **2500** mm
Pit depth below invert	d = **3600** mm	Free volume	V_{free} = **95.0** %
Location of soakaway	**England and Wales**	Return period	**10 years**
Ratio of 60 minute to 2 day rainfalls of 5 year return period (BRE digest 365 - fig 1)			r = **0.35**
Impermeable area	A = **80.0** m^2	Soil infiltration rate	f = **0.0000010** m/s

Surface area of soakaway to 50% storage depth

$$A_{s50} = 2 \times (l + w) \times d / 2 = \mathbf{18.000}\ m^2$$

Outflow factor $AF = A_{s50} \times f = \mathbf{18.0 \times 10^{-6}}\ m^3/s$

M5 rainfalls are calculated from table 1 BRE digest 365 using Factor Z1

Duration	M5 rainfalls	Growth factor Z2	10 year rainfall	Inflow	Outflow	Storage required
5 mins	7.1 mm	1.20	8.6 mm	0.7 m^3	0.0 m^3	0.7 m^3
10 mins	10.1 mm	1.22	12.4 mm	1.0 m^3	0.0 m^3	1.0 m^3
15 mins	12.3 mm	1.23	15.2 mm	1.2 m^3	0.0 m^3	1.2 m^3
30 mins	15.7 mm	1.24	19.5 mm	1.6 m^3	0.0 m^3	1.5 m^3
1 hour	20.0 mm	1.24	24.8 mm	2.0 m^3	0.1 m^3	1.9 m^3
2 hours	24.5 mm	1.24	30.3 mm	2.4 m^3	0.1 m^3	2.3 m^3
4 hours	29.9 mm	1.22	36.5 mm	2.9 m^3	0.3 m^3	2.7 m^3
6 hours	33.8 mm	1.21	40.9 mm	3.3 m^3	0.4 m^3	2.9 m^3
10 hours	38.9 mm	1.19	46.5 mm	3.7 m^3	0.6 m^3	3.1 m^3
24 hours	49.6 mm	1.17	58.1 mm	4.6 m^3	1.6 m^3	3.1 m^3

Required storage volume S_{reqd} = **3.1** m^3

Soakaway storage volume $S_{act} = l \times d \times w \times V_{free}$ = **21.4** m^3

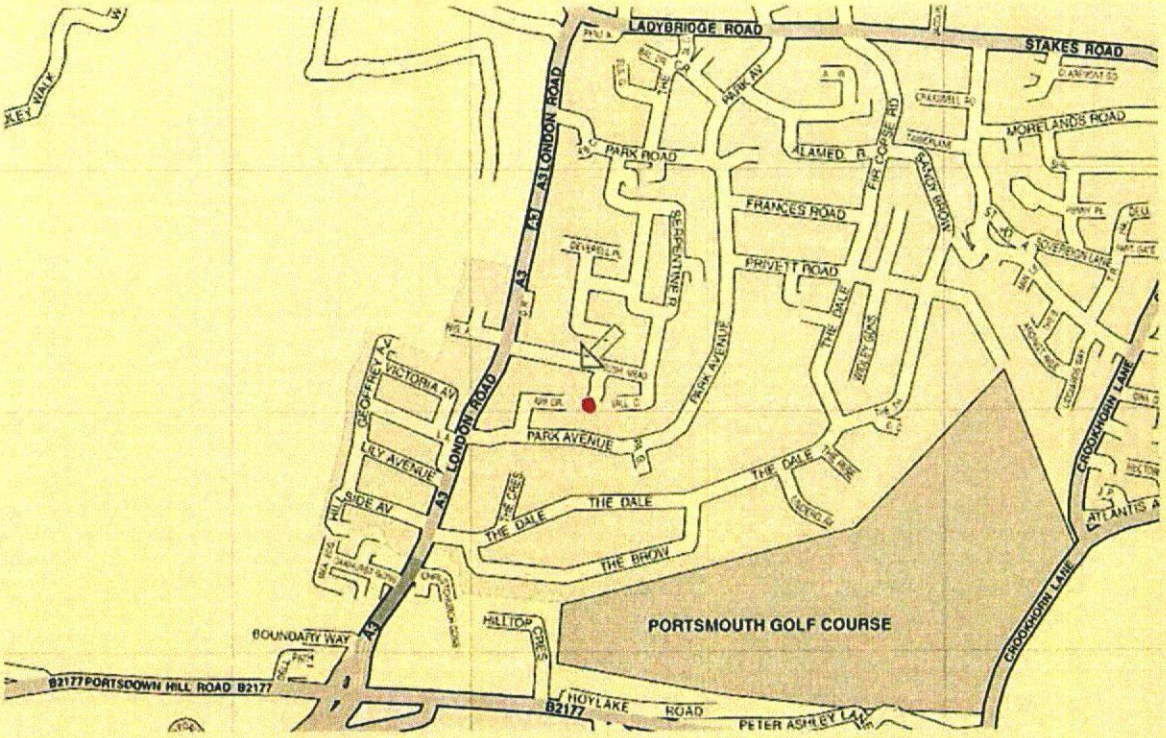
Soakaway storage volume- OK

Time for emptying soakaway to half volume

$$T_{s50} = S_{reqd} \times 0.5 / (A_{s50} \times f) = \mathbf{23}\ hr\ \mathbf{50}\ min\ \mathbf{48}\ s$$

Soakaway discharge time - OK

Environment Agency



BGS SOIL DATA:
HEAD MATERIAL OVER LONDON CLAY.

Environment Agency

Enter a postcode or place name: PO7 5DY Go

Other topics for this area... Risk of Flooding from Rivers and Sea

Ris

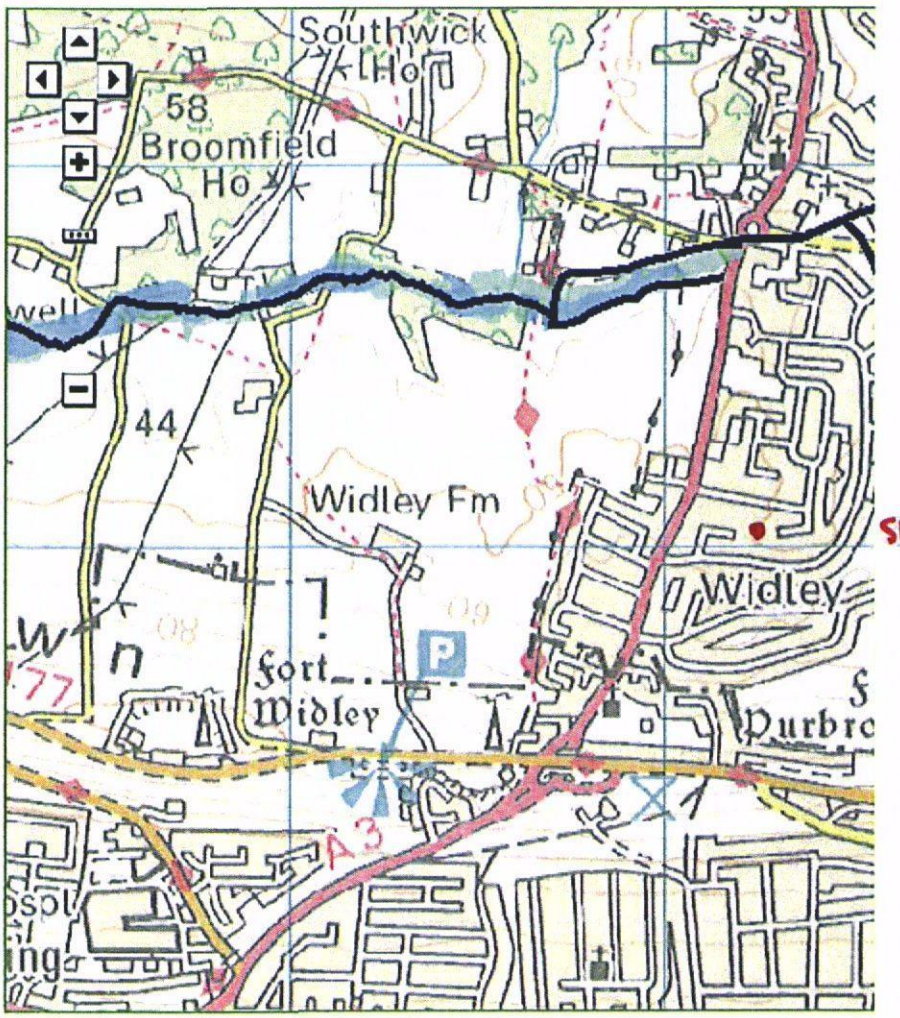
Map legend

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
- Areas benefiting from flood defences
- Main rivers

PO7 5DY at scale 1:20,000



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Flood Map – Information Warnings

Manchester Ship Canal

Flood Mapping of the Manchester Ship Canal in Trafford, Salford and W representations. For further information please contact the Environment Users of the Flood Zone Map should be aware that we have received a Manchester Ship Canal at Trafford, Salford and Warrington on the grour

Interactive Maps

Flood Risk for X:467247, Y:107026

Be prepared

We do not have an assessment of flood risk for the area which you have selected. This may be because the area selected is outside the floodplain. It could also be because we have been unable to assess the likelihood of flooding for this area because we did not have sufficient information (this applies to fewer than 1% of the properties in England and Wales in the flood outline)

For a fuller explanation of flood likelihood, click here.

Be aware:

Our maps only cover flooding from rivers and the sea. Flooding can occur at any time and in any place from sources such as rising ground water levels, burst water mains, road drains, run-off from hillsides, sewer overflows etc.
Click here to find out more.
To find out how to be prepared for all types of flooding go to our Floodline pages or call Floodline on tel: 0845 988 1188.
The information on the likelihood of flooding is not intended to be used by people applying for planning permission for new developments. To find out how the Flood Map can help when planning a new development, click here.

creating a better place

Author: The Environment Agency | WAYBYSUPPORT@environment-agency.gov.uk
Last updated: 17th November 2011

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Sketches

John Bloomfield

From: Steve Mountain [Steve.Mountain@havant.gov.uk]
Sent: 25 January 2012 14:54
To: 'steve.b@rushbybrewster.co.uk'; John Bloomfield
Cc: Clement Gowlett; Keith Oliver; Steve Weaver
Subject: RE: 38 Bushy Mead, Purbrook

I have now reviewed the submitted design and have the following comments.

Although the soil investigation indicates that the ground is (to all intents) impermeable, in reality this only reflects the existing use of the site with areas laid to driveway and used for various buildings. The storage available within the SUDS design will provide for at least the initial 5mm of the design storm to be held on site, as required by current standards. This represents an improvement over the existing situation up to and including the 100 year+30% storm, whereby water outflows from the site almost immediately a storm commences.

Once the onsite storage is filled, the design will provide a mechanism for the site to react in the same way as it does so at present. This meets the overall philosophy of PPS25, and although will result in no change to properties a lower elevation (i.e. in Bushy Mead and Serpentine Road) this is not a material concern for this specific development.

Consideration *could* be given to an alternative means of draining roof water once it has overflowed the soakaways provided as part of the SUDS scheme. It *may* be preferable to positively drain that element of the SUDS content arising from roof water directly into the surface water sewer (subject to Southern Water consent and capacity check), rather than into the road formation. This would have the potential for further reducing the amount of water flowing out of the site. If this is not possible, I would like a detail of how the drainage layer under the road will drain once it too is at capacity - i.e. will it be positively drained somewhere (no pipes are indicated on the layout plan) or will it be expected to 'ooze' out within the subsoil? If the latter, consideration needs to be given to how this will be handled especially in icy conditions.

I would like to see a commitment for the various facilities comprising the SUDS - the 'french drain', porous surfaces and undercrofts - are maintained for the life of the development; although this can be included in the O&M manual for future owners' reference, I would also wish to see this enforceable either by condition or (preferably) a S106 (assuming one is to be created for the development).

Best wishes

Steve Mountain
Special Projects Engineer
Transport & Implementation Team
Environment & Neighbourhood Quality
Havant Borough Council
Southmoor Offices and Depot, 2 Penner Road, Havant, PO9 1QH
[Location Map] [Get here by bike (journey planner)] [Get here by bus (journey planner)]
[For a more sociable way of travelling, why not Car Share?]

Telephone: 023 9244 6444
Fax: 023 9249 8031
HBC on the web: www.havant.gov.uk

From: Steve Mountain
Sent: 24 January 2012 21:11
To: 'steve.b@rushbybrewster.co.uk'; 'John Bloomfield'
Cc: 'Clement Gowlett'; Keith Oliver; Steve Weaver
Subject: RE: 38 Bushy Mead, Purbrook

OK thanks for that confirmation. I will circulate any comments no later than Thursday.

Best wishes

Steve Mountain
Special Projects Engineer
Transport & Implementation Team
Environment & Neighbourhood Quality
Havant Borough Council
Southmoor Offices and Depot, 2 Penner Road, Havant, PO9 1QH
[Location Map] [Get here by bike (journey planner)] [Get here by bus (journey planner)]
[For a more sociable way of travelling, why not Car Share?]

Telephone: 023 9244 6444
Fax: 023 9249 8031
HBC on the web: www.havant.gov.uk

From: Steve Brewster [mailto:steve.b@rushbybrewster.co.uk]
Sent: 24 January 2012 16:16
To: Steve Mountain; 'John Bloomfield'
Cc: 'Clement Gowlett'; Keith Oliver
Subject: RE: 38 Bushy Mead, Purbrook

Steve, we can confirm that the design takes into account the SUDS documentation. We have checked it against 1/100 year + 30% climate change and the storage below ground is well in. The use of porous paving to reduce effective impermeable area has been used, too. We have avoided any connection to the storm water system and have tried to keep the system as discharging to ground.

Regards Steve Brewster

From: Steve Mountain [mailto:Steve.Mountain@havant.gov.uk]
Sent: 24 January 2012 14:08
To: 'John Bloomfield'
Cc: Steve Brewster; Clement Gowlett; Keith Oliver
Subject: RE: 38 Bushy Mead, Purbrook

You are probably aware of the draft National SUDS Standards now published. It is not expected that these will be subject to further significant change.

http://www.defra.gov.uk/consult/files/suds-consult-annexa-national-standards-111221.pdf

Please could you provide a statement that you have tested your solution against these draft standards (and how that has been done). I will then consider the detail of the documentation.

Best wishes

Steve Mountain
Special Projects Engineer
Transport & Implementation Team
Environment & Neighbourhood Quality
Havant Borough Council
Southmoor Offices and Depot, 2 Penner Road, Havant, PO9 1QH
[Location Map] [Get here by bike (journey planner)] [Get here by bus (journey planner)]
[For a more sociable way of travelling, why not Car Share?]

Telephone: 023 9244 6444
Fax: 023 9249 8031
HBC on the web: www.havant.gov.uk

From: John Bloomfield [mailto:john@harringtonbloomfield.co.uk]
Sent: 24 January 2012 13:51
To: Keith Oliver; Steve Mountain
Cc: Steve Brewster; Clement Gowlett
Subject: 38 Bushy Mead, Purbrook

Dear Mr Oliver,

Please find attached the drainage engineers preliminary proposal for the surface water drainage of the above site.

Please note that it is proposed to introduce a 'french drain' as well as the SUDS porous surfacing to the road and parking areas, which will be a considerable improvement on the existing situation. We have also indicated finishes ground floor levels which would avoid any surface water issues in the unlikely event that they would arise after the proposed design is in place.

I have sent this direct to Mr Steve Mountain for expediency and his comment.
Can you please confirm that you find this proposal acceptable and whether you require any additional information. I will then forward hard copies as necessary.

Regards,

John

John Bloomfield

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Harrington Design + Bloomfield, 6 The Old Flour Mill, Queen Street, Emsworth, Hants PO10 7BT

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HAVANT BOROUGH COUNCIL
01 FEB 2012
RECEIVED

BUSHY MEAD

Bin Collection Area

36

40

New Access Way

POROUS PAVING (WITH 350mm MIN GRANULAR SUMP)

CCTV & CLEAR THROUGH

KEY
+50.0 EXTG GRD LEVEL
FOUL
STORM
225ϕ PIPE + GRILLE, TIMBER SUBFLOOR VOID.
SOAKAWAY 2.5x2.5x 3.6dp + 100ϕ O/FLOW TO POROUS SUMP. (UNO)

VALLEY CLOSE

17

14

27

Applewood Grove

50.90

51.30

49.95

51.60

51.40

51.20

51.20

50.80

PLOT 1

PLOT 2

PLOT 3

PLOT 4

PLOT 5

51.50

51.07

51.25

50.93

50.23

GRIP/FRENCH DRAIN

200

VARIES TO KEEP PIPE LEVEL

LINGR

40 S.S.

20 S.S.

100ϕ PIPE (POROUS)

450

N.B. MAINTENANCE OF THIS TO BE INCLUDED IN SITE O&M/HSE MANUAL.

0 5 10 15 20 30 40 50

SCALE IN METRES

Do not scale from these drawings except for planning purposes. Use figured dimensions only.

Where applicable this drawing is to be read in conjunction with other consultants' drawings.

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Rev.	Date	Amendment

harrington design + bl
ARCH
6 The Old Flour Mill, Queen Street, Emsworth
Tel: 44 (0) 1243 373855
Fax: 44 (0) 1243 373245
e-mail: info@harringtonbloomfield.co.uk

For P.Denley / A.Allaway

Project: Redevelopment at 38 Bushy Mead, Widley

Title: House Types Site Layout

Date	Drawn	Scale
08.11.11	CG	1:200@A1

Job Number	Prefix	Drawing Number
10001	P	111

RUSHBY | BREWSTER
CONSULTING CIVIL AND STRUCTURAL ENGINEERS
The Town House, St George's Square, Bishops Waltham, Hants SO32 1AF

Project: 38 BUSHY MEAD WIDLEY

Drawing No: RBB 132 - SK1

Title: DRAINAGE STRATEGY.