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Flood Risk and Drainage Statement

Proposed Barn Conversion for Residential Use at

South Barn, Drove Lane,

Yapton, West Sussex

On behalf of

Landlink Estates Limited

September 2014

ARUN DISTRICT COUNCIL Y/84/14/PD

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1 Existing Site

1.1 Site Location

1.1.1 The development site is located in a rural setting at South Barn on the north side of Drove Lane, Yapton, West Sussex at Postcode BN18 0EB, Ordnance Survey Reference SU 965 028.

1.1.2 The site is 3.2km from the coast and 210m to the south of the closest watercourse which is classified as main river.

1.1.3 A site location plan is located in Appendix 1 at the rear of this report.

1.2 Site Description

1.2.1 The site is approximately 350m^2 in area not including the access driveway which will remain unaltered. South Barn has a footprint of approximately 100m^2 and the remainder of the site comprises a walled unsurfaced grassed area.

1.2.2 Local borehole records confirm the presence of approximately 2 metres of clay over chalk subsoil.

1.2.3 A copy of the existing site plan is located in Appendix 2 and local borehole records are located in Appendix 3 at the rear of this report.

1.3 Drainage

1.3.1 There are no foul sewers in the vicinity of the site and no foul water discharged from the existing barn.

1.3.2 Surface water from the site currently drains to ground by soakage. There is no positive drainage from the existing roof runoff.

2 Flood Risk

2.1 Flood Zone and Flood Defences

2.1.1 The Environment Agency flood modelling shows that the site is not at risk of fluvial flooding but is located within Flood Zone 2 close to the boundary of tidal Flood Zone 3 assuming the existing coastal defences to the southwest at Bognor Regis and Elmer to the south were removed.

2.1.2 The Bognor Regis flood defences comprise a foreshore and wave return wall with a crest height of between 5.64 and 6.5m AOD and a secondary defence concrete wall also with a crest height of between 5.64 and 6.5m AOD.

2.1.3 The Elmer flood defences comprise a wave return wall with a crest height of 5.5m AOD together with sections of rock armour and shingle defences with crest heights ranging between 4.6 and 5.5m AOD.

2.1.4 The existing defences offer a standard level of protection of 1:200 and exceed the level of the predicted 2115 future year 1:200 year Tidal Flood event which has been identified by the Environment Agency at 4.43m AOD.

2.2 Flood History

2.2.1 The Environment Agency's have confirmed they hold no record of the site having been flooded.

2.2.2 West Sussex County Council have confirmed that as Drove Lane is not a public highway they do not hold any records of it having flooded.

2.2.1 The Strategic Flood Risk Assessment undertaken by Capita Symonds on behalf of Arun District Council dated February 2008 does not identify any historic record of incidents of flooding affecting the site.

2.2.2 Arun District Council have confirmed in writing that they hold no record of the site ever having flooded.

2.2.3 The Strategic Flood Risk Assessment does not identify any records of historic groundwater flooding in the vicinity and no water strikes were recorded in the local boreholes which extended to 6m below ground level.

2.3 Flooding Potential

2.3.1 The site is not at risk of flooding from fluvial sources.

2.3.2 The site is defended against a 1:200 year tidal flood event including the predicted effects of future climate change.

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2.3.3 The mapping within the Strategic Flood Risk Assessment undertaken by Capita Symonds on behalf of Arun District Council confirms the location of the site at the outer edge of Flood Zones 2 and 3.

2.3.4 The Strategic Flood Risk Assessment undertaken by Capita Symonds on behalf of Arun District Council identifies the site as being within an area at high risk of groundwater flooding and within a Groundwater Emergence Zone.

2.3.5 Local borehole records undertaken in the late autumn months extend to 6m and no water strikes are recorded suggesting that the immediate locality of the site is not at a significant risk of groundwater flooding.

2.3.6 Strategic Flood Risk Assessment undertaken by Capita Symonds on behalf of Arun District Council identifies the wider region in which the site is located as being at Medium to High Risk of flooding from overland flows. There are recorded instances of flooding due to overland flow in the wider area but none in the vicinity of the site and the risk to the site from overland flows is considered low.

2.3.7 Copies of correspondence, flood maps and associated data received from the Environment Agency, West Sussex County Council and Arun District Council are located in Appendix 4 at the rear of this report.

3 Proposed Development

3.1 Description

3.1.1 The development proposals are for a change of use of the existing barn to provide a single two bedroom house. There are external works to provide a parking and turning area together with a private garden.

3.1.2 Approximately 100m^2 of the site will have an impermeable surface being the footprint of the existing building. The parking and turning area is 94m^2 in area to be constructed as a permeable surface with the remainder of the site comprising the private garden.

3.1.3 The development will remain served by the existing access drive onto Drove Road which will remain unaltered from its present layout.

3.1.4 A copy of the proposed site layout plan is located in Appendix 5 at the rear of this report.

3.2 Foul Water Drainage Strategy

3.2.1 The new dwelling will be served by a private package foul water treatment plant discharging to ground via a drainage field.

3.2.2 Based on the guidance of PPG4 the flood area of a suitable drainage field is equal to $p \times V_p \times 0.25$.

3.2.3 With a maximum population of 8 persons and assuming a low percolation figure V_p of 100 the maximum area of a suitable drainage field is 200m^2.

3.2.4 This is achievable in the land to the north of the site which is within the ownership of the applicant.

3.3 Surface Water Drainage Strategy

3.3.1 Surface water from the driveway and parking areas will be discharged to ground by infiltration as is presently the case with roof water discharged to ground via a voided sub base within the parking area.

3.3.2 The detailed design is yet to be confirmed and will be dependant on the final layout and on site permeability tests but may include other suitable SuDS drainage systems that are defined in The SuDS Manual (CIRIA document C697).

3.3.3 A preliminary surface water drainage soakage calculation based on an assumed low infiltration rate for chalk of 1×10^{-6} m/s in order to demonstrate that the drainage strategy is achievable is attached in Appendix 5 at the rear of this statement.

3.4 The Sequential and Exception Tests

3.4.1 Paragraph 104 of The National Planning Policy Framework states that *'applications for minor development and changes of use should not be subject to the Sequential or Exception Tests but should still meet the requirements for site-specific flood risk assessments.'*

3.4.2 The development is not subject to the Sequential Test and there is no requirement for an Exception Test

4 Conclusions

4.1 The site is not at risk of fluvial flooding and is defended against tidal flooding from the coastal flood defences at Bognor Regis and at Elmer.

4.2 The building is located within Flood Zone 2 based on undefended modelling scenarios and would therefore not be affected by the 1:200 year return period tidal flood even if the flood defences failed.

4.3 The site is not at a significant risk of flooding from groundwater or overland flows and there are no records of flooding from any source having historically affected the site.

4.4 Foul water will be discharged to a private package foul water treatment plant discharging to ground via a drainage field.

4.5 Surface water from the site will be discharged to ground by infiltration.

4.6 Storage will be provided to accommodate a 1:100 year pluvial event plus an additional allowance for climate change thereby providing a significant benefit to the wider area.

4.7 The National Planning Policy Framework confirms that the Sequential Test does not apply to Changes of Use.

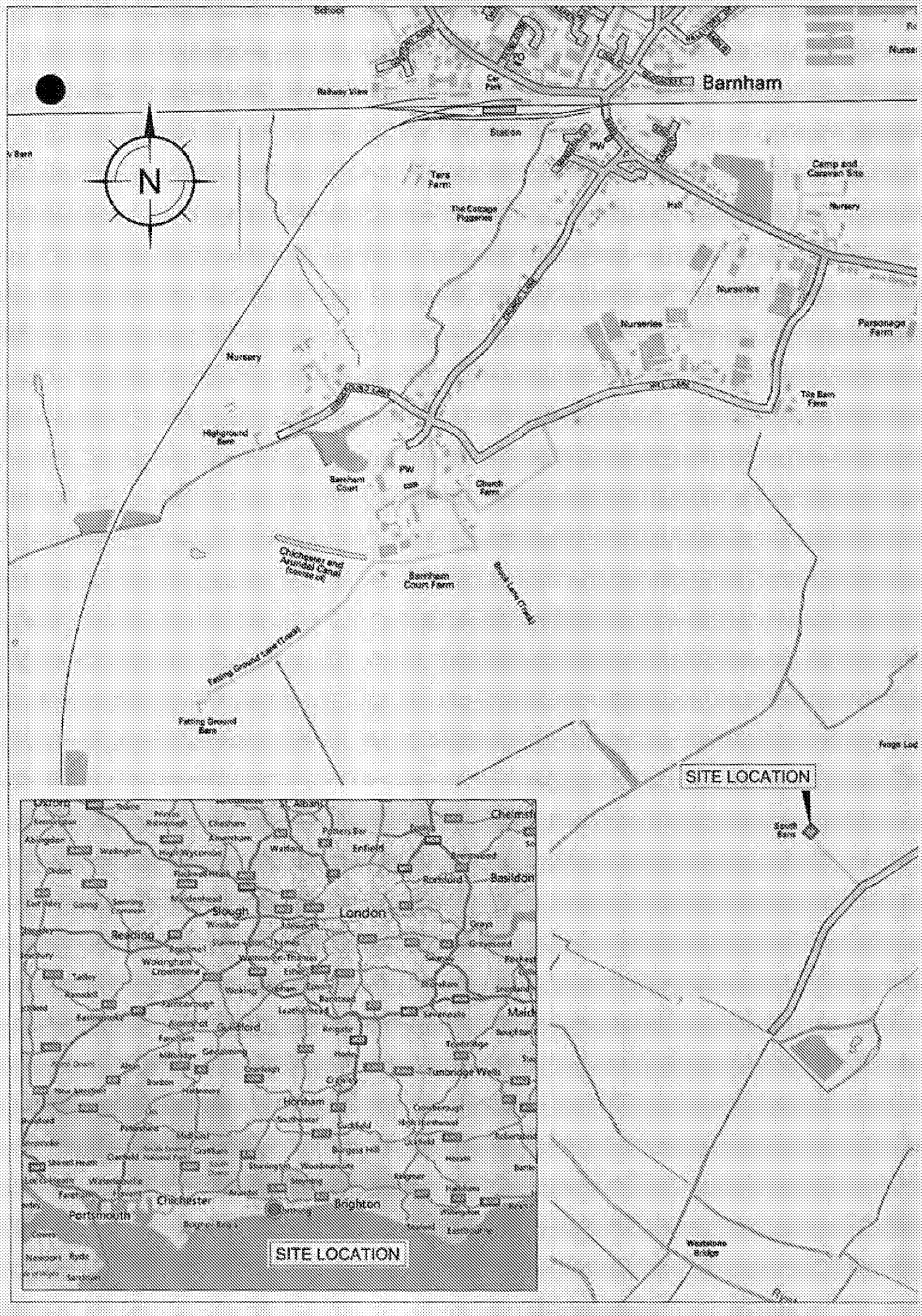
4.8 The proposed conversion is suitable at this location and in terms of flood risk is considered acceptable.

5 List of Appendices

Appendix 1	Site Location Plan
Appendix 2	Existing Site Layout Plan
Appendix 3	Local Borehole Records
Appendix 4	Correspondence, Flood Maps and Data received from The Environment Agency, West Sussex County Council and Arun District Council
Appendix 5	Proposed Site Layout Plan and Preliminary Surface water Drainage Strategy Calculations

Appendix 1

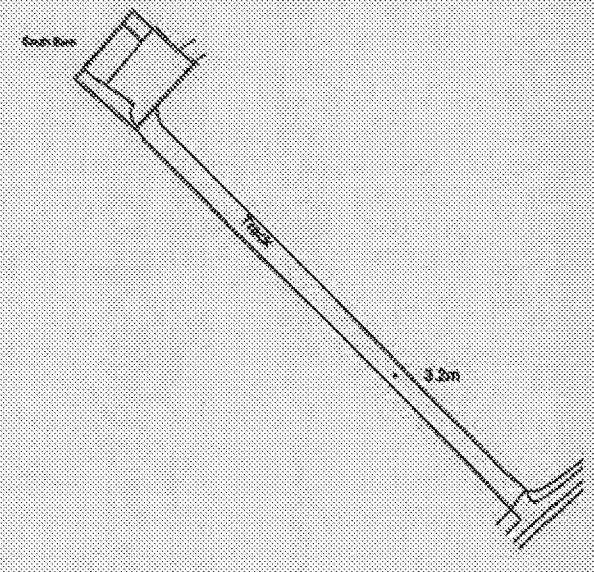
Site Location Plan


Barnham
N
Railway View
Station
Tarra Farm
The Cottage Pigeonries
Camp and Caravan Site
Nursery
Nurseries
Nurseries
Parsonage Farm
Nursery
Highground Farm
Barnham Court
PW
Church Farm
Tye Barn Farm
Chichester and Arundel Canal (Closed)
Barnham Court Farm
Fishing Ground Lane (Track)
Fishing Ground Farm
Froge Lane
SITE LOCATION
South Barn
Oxford
Reading
Slough
London
Bexhill
Guildford
Horsham
Chichester
Portsmouth
Brighton
SITE LOCATION
Westerton Bridge

Appendix 2

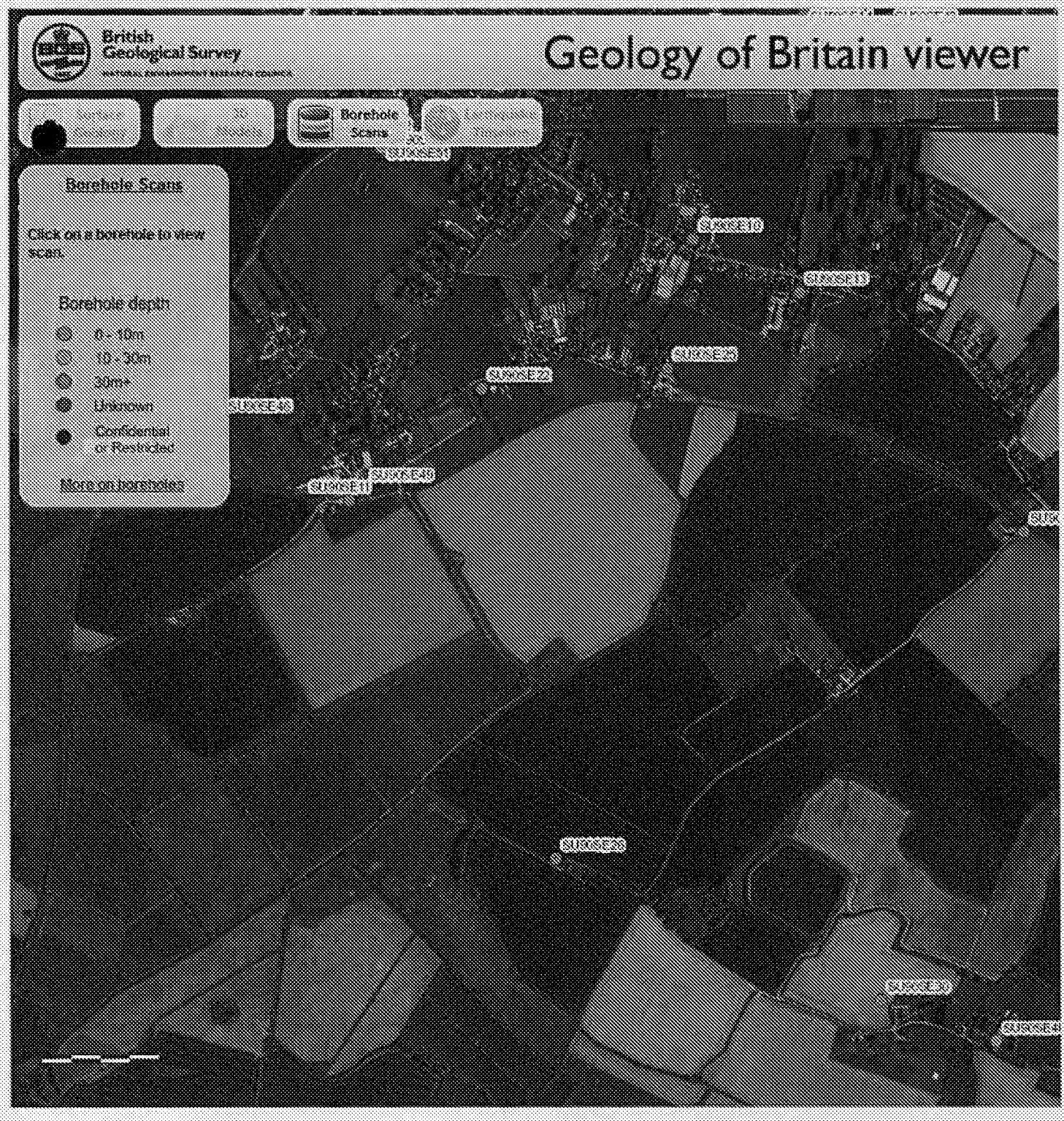
Existing Site Layout Plan


South Barn
-5
0
5
10
15
20m
Scale 1:500


South Barn
Track
3.2m

Appendix 3

Local Borehole Records



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SU 90 SE 26 9618 0268 Hams, Tapton Block H

Surface level +3.5 m
Water not struck
September 1981

Waste 4.6 m
Bedrock 3.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil and made ground	0.5	0.5
Brickearth	Clay, silty, brown and mottled brown an grey, with some peat particles and rare angular flint pebbles	1.8	2.3
Raised Beach Deposits (younger)	Silt, olive and olive brown, very sandy and chalky, with abundant chalk and a few angular flint pebbles	1.7	4.0
Upper Chalk	Chalk, soft, with nodular flints, weathered at top	2.2+	6.3

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SU 90 SE 29 9725 8333 North-east end of Drove Lane, Yapton Block H

Surface level +6.6 m
Water struck at +1.9 m
October 1981

Overburden 3.9 m
Mineral 1.0 m
Bedrock 2.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.5	0.5
Brickearth	Clay, brown, silty	1.4	1.9
Raised Beach Deposits (younger)	Silt, chalky, with chalk pebbles	1.0	2.9
	'Very clayey' sandy gravel Gravel: coarse with flint dominant, and fine with chalk dominant; some cobbles Sand: fine with some medium and coarse; coarse mostly chalk Fines: silt and clay, chalky	1.0	3.9
Upper Chalk	Chalk, rubbly, soft, silty and sandy to 6.6 m	2.3+	6.2

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
				Fines	Sand			Gravel		
Fines	Sand	Gravel		-¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm	
35	38	27	2.9-3.9	35	28	4	6	10	14	3

96

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SU 90 SE 30 9783 0314 Bilshaw Farm Block B

Surface level +5.1 m
Water not struck
October 1981

Waste 4.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Brickearth	Clay, silty, brown and mottled grey brown	2.0	2.4
Raised Beach Deposits (younger)	Silt, very sandy, chalky, with chalk and some flint pebbles	1.6	4.0
Upper Chalk	Chalk, soft, with nodular flints	1.0+	5.0

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Appendix 4

Correspondence, Flood Maps and Data received from The Environment Agency, West Sussex County Council and Arun District Council

Steve Doughty
The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate, West Sussex
BN41 1RA

Our ref: SSD/4480/PC
Your ref:

Date: 05/08/2014

Dear Mr Doughty

Provision of Product 4 for South Barn, Droves Farm, Yapton

Thank you for your request to use Environment Agency data. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the detail in the attached advisory text on the use of Environment Agency Information for Flood Risk Assessments / Flood Consequence Assessments.

Supporting Information

This information is provided subject to the enclosed notice, which you should read.

Modelled Data

The tidal depths and levels provided were taken from the 2009 Arun to Pagham TUFLOW modelling study. The site falls outside of all fluvial flood extents and defended tidal extents.

Flood History

We do not have any records of previous flood events affecting this site. I would suggest contacting Arun District Council for a more comprehensive flood history check.

Guildbourne House, Chatsworth Road, Worthing, West Sussex BN11 1LD
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

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Flood Defences

There are no formal raised flood defences to protect this area from river flooding. Coastal flood defences offer a standard of protection of approximately 1in200 (0.5%). Please see attached information.

If you have any queries or would like to discuss the content of this letter further please don't hesitate to contact me.

Yours faithfully

[redacted]

Jon Denman
FCRM Officer
Partnership and Strategic Overview Team – West Sussex

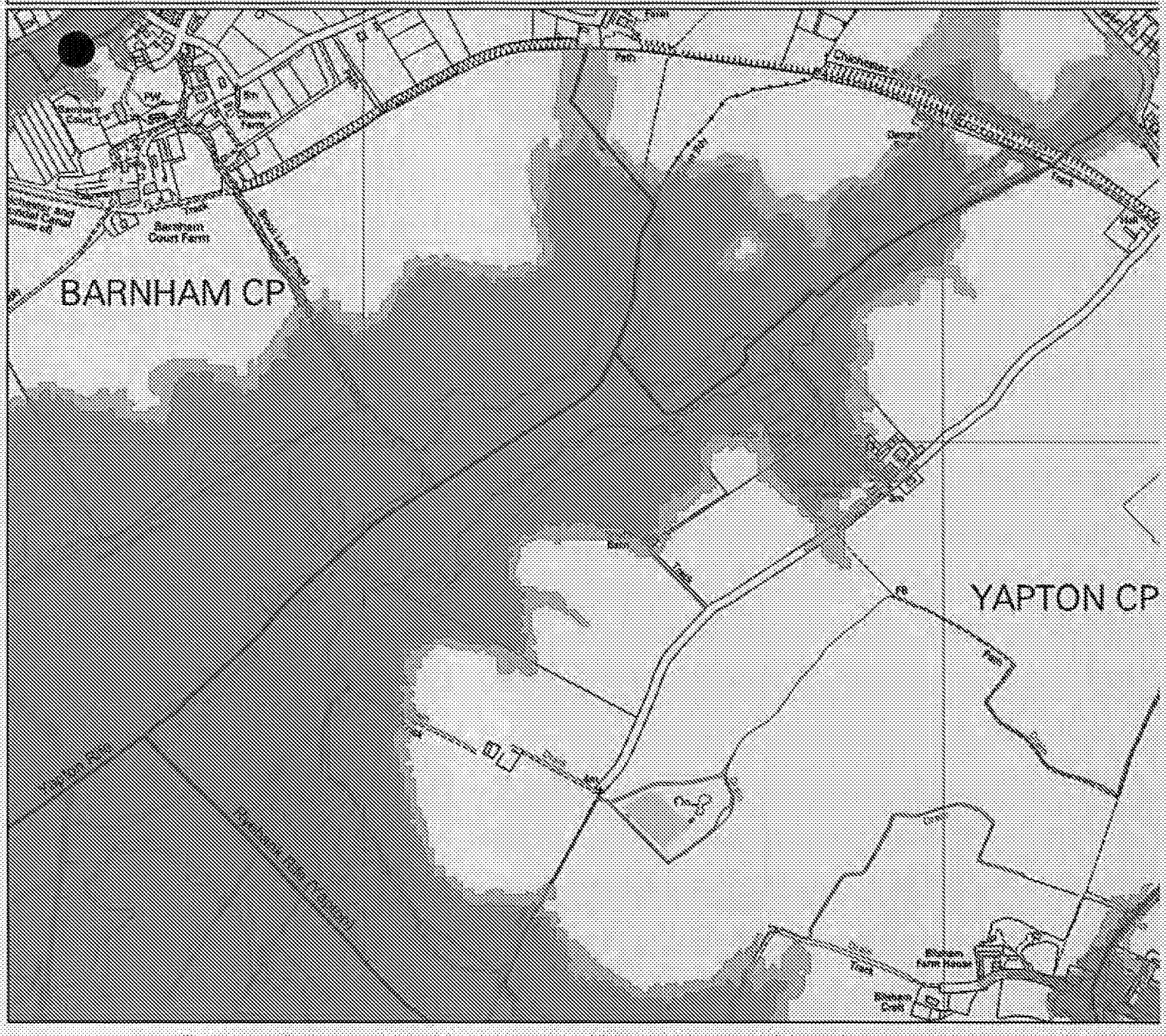
[redacted]

Enc. Detailed FRA/FCA Map, Modelled Levels and extents, Flood Defences

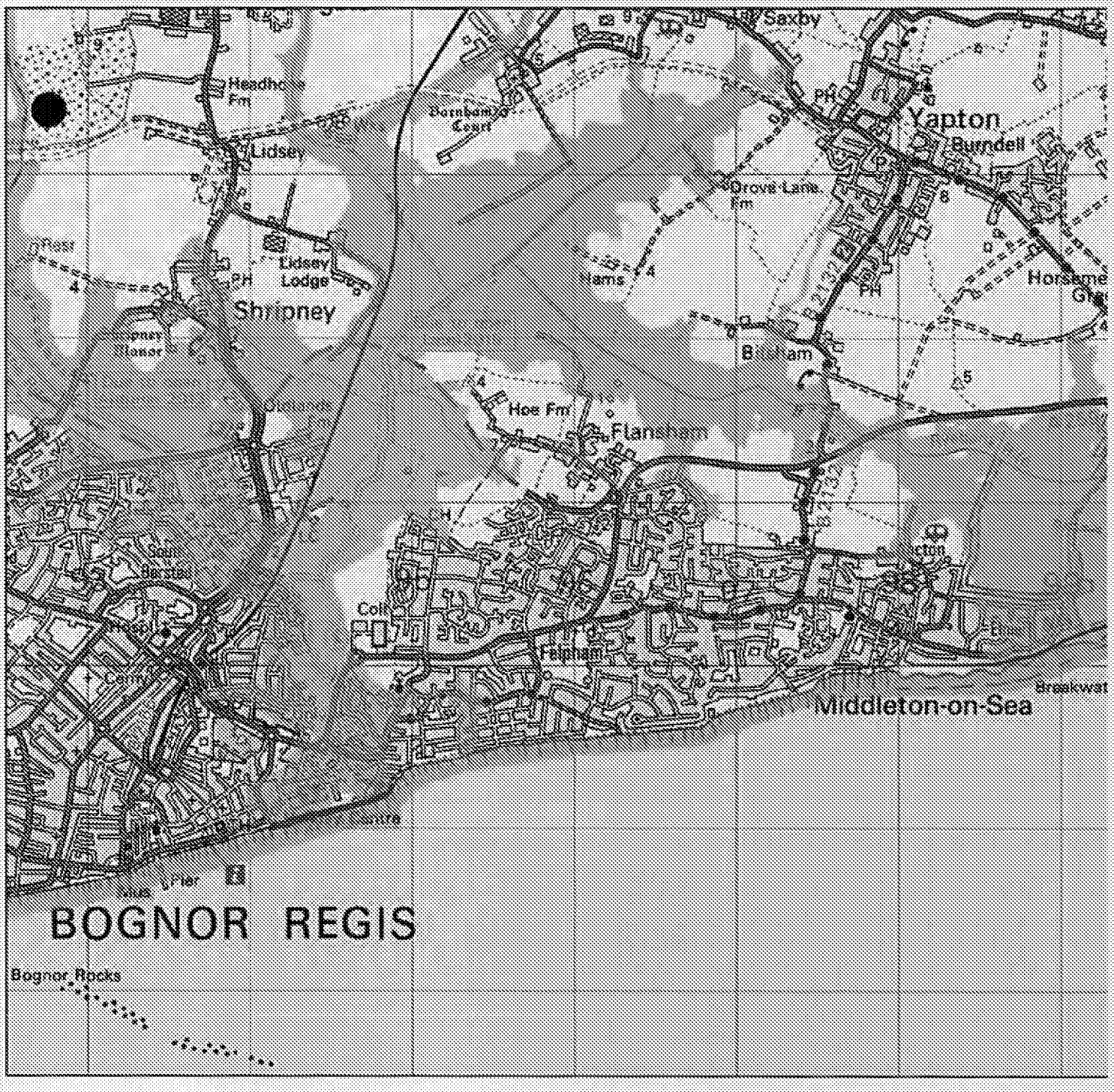
[Standard Notice]

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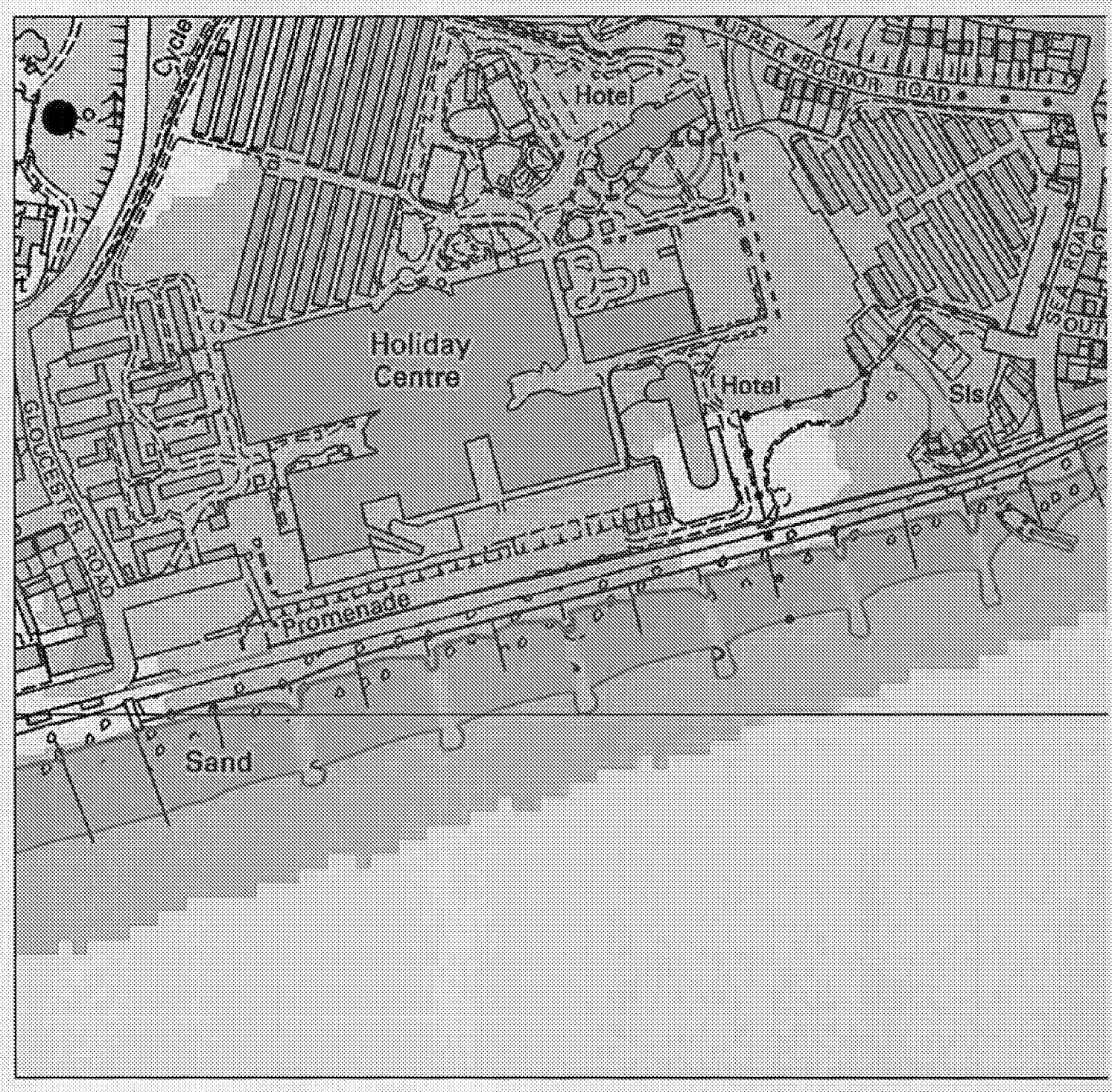
Flood Map for Planning Centered on South Barn, Droves Fa
Created 05/08/2014 [Ref: SSD/4480/PC]

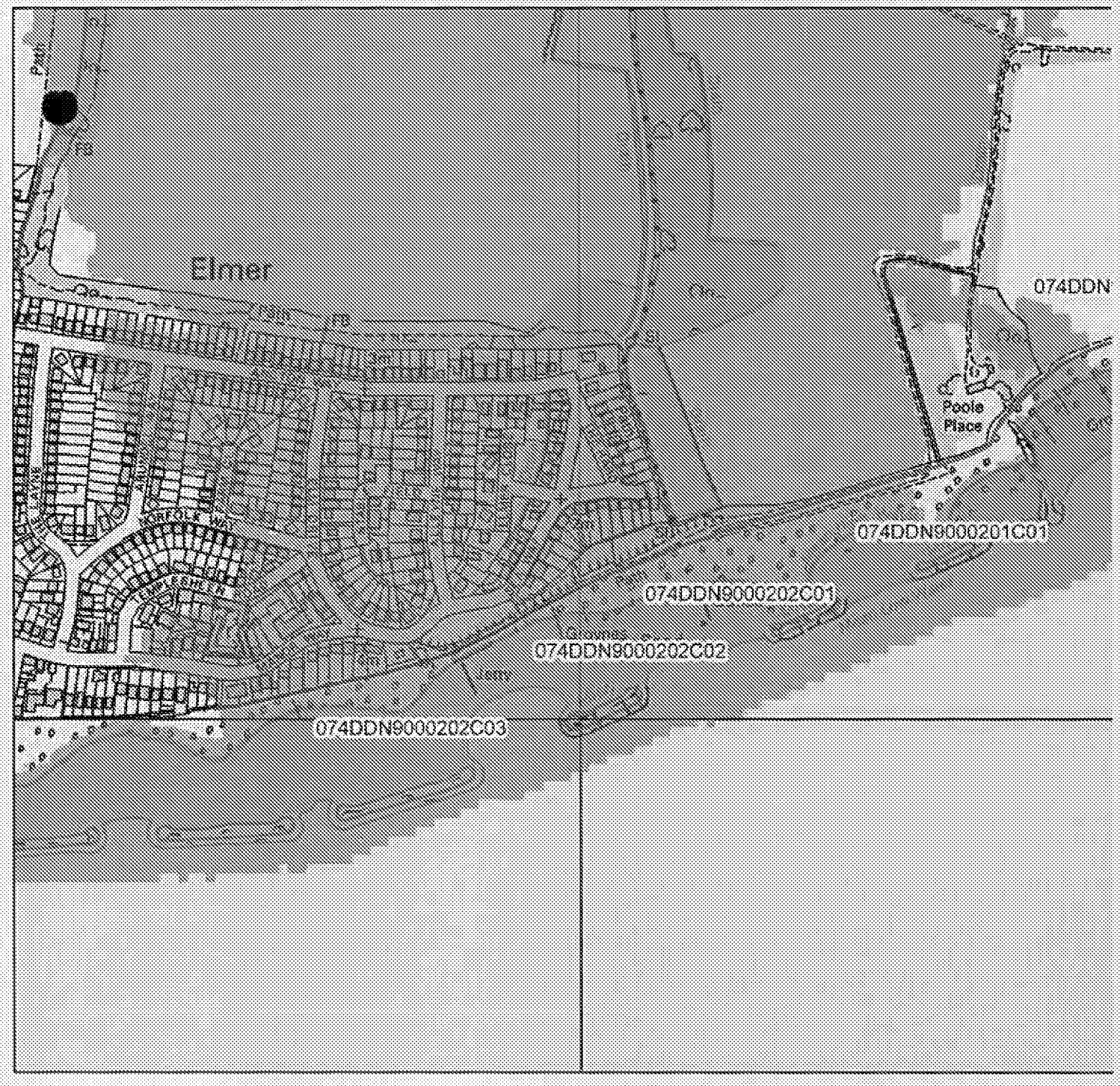


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Cycle
Hotel
Holiday
Centre
Hotel
Sls
Promenade
Sand


Elmer
074DDN
Poole Place
074DDN9000201C01
074DDN9000202C01
074DDN9000202C02
074DDN9000202C03

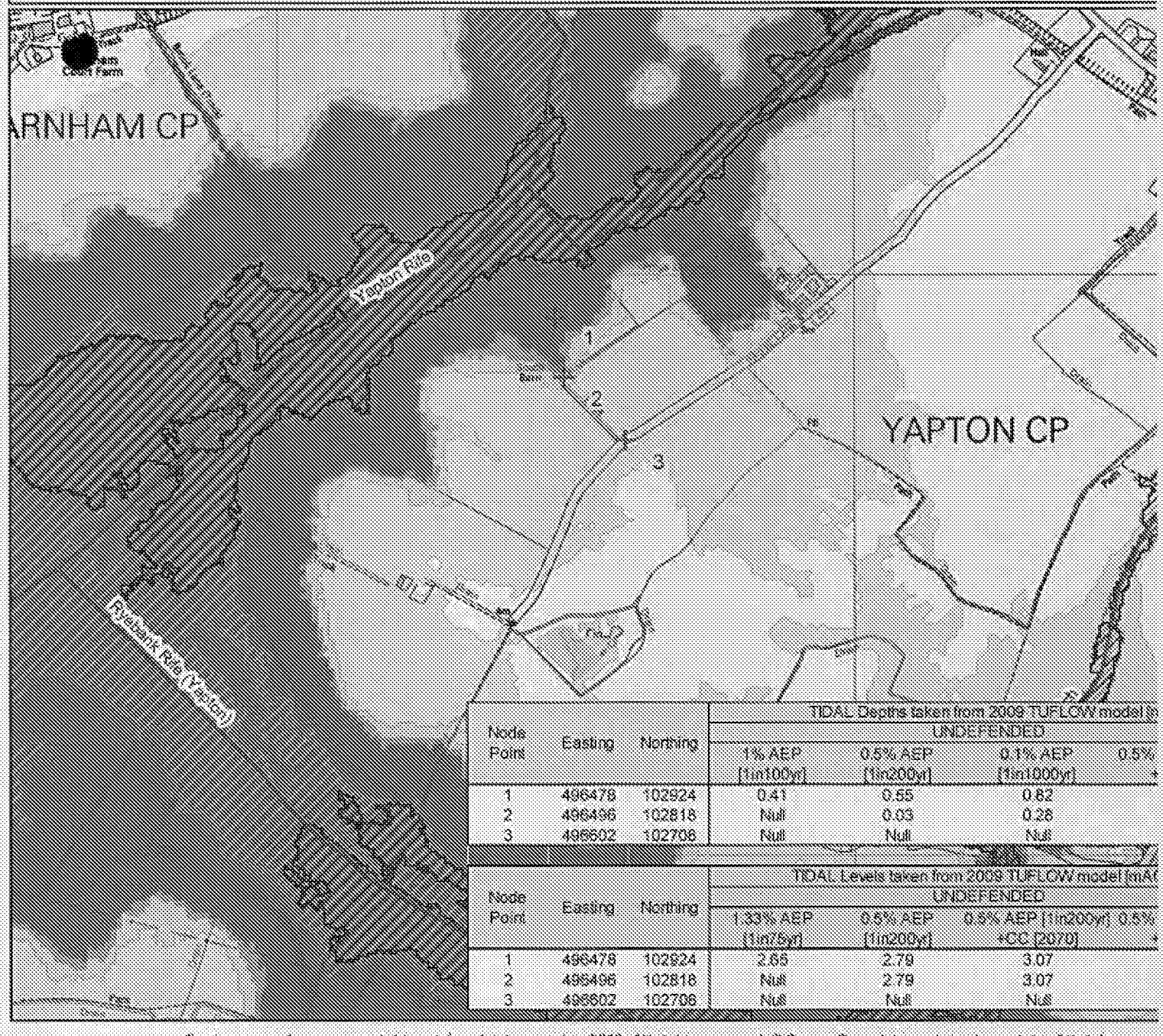
Bognor Regis

Asset Ref	Maintainer	Asset Type	Description	Leng
074DDN9000305C01	Environment Agency	Sea Defence (man-made)	Foreshore and wave return wall	4
074DDN9000305C02	Environment Agency	Sea Defence (man-made)	Foreshore and wave return wall	7
074DDN9000305C03	Environment Agency	Sea Defence (man-made)	Concrete Wall (Secondary Defence)	5
074DDN9000305C04	Environment Agency	Sea Defence (man-made)	Concrete Wall (Secondary Defence)	6
074DDN9000305C05	Environment Agency	Sea Defence (man-made)	Concrete Wall (Secondary Defence)	1

Elmer

074DDN9000202C03	Environment Agency	Sea Defence (man-made)	Shingle defence and wave return wall	2
074DDN9000202C02	Environment Agency	Sea Defence (man-made)	Rock armour and shingle defence	1
074DDN9000202C01	Environment Agency	Sea Defence (man-made)	Shingle Defence	1
074DDN9000201C01	Environment Agency	Sea Defence (man-made)	Shingle Defence	4
074DDN9000102C04	Environment Agency	Sea Defence (man-made)	Shingle Defence	7

Modelled Outputs Centered on South Barn, Droves Farm
Created 05/08/2014 [Ref: SSD/4480/PC]



Node Point	Easting	Northing	TIDAL Depths taken from 2009 TUFLOW model [m AOD] UNDEFENDED 1% AEP [1in100yr]	0.5% AEP [1in200yr]	0.1% AEP [1in1000yr]	0.5% +
1	496479	102924	0.41	0.55	0.82	
2	496496	102818	Null	0.03	0.28	
3	496502	102706	Null	Null	Null	

Node Point	Easting	Northing	TIDAL Levels taken from 2009 TUFLOW model [mAO UNDEFENDED 1.33% AEP [1in75yr]	0.5% AEP [1in200yr]	0.5% AEP [1in200yr] +CC [2070]	0.5% +
1	496479	102924	2.65	2.79	3.07	
2	496496	102818	Null	2.79	3.07	
3	496502	102706	Null	Null	Null	

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Steve Doughty

F[redacted]: Benjamin Whiffin [redacted] on behalf of Highways [redacted]
Sent: 08 July 2014 09:14
To: [redacted]
Subject: Enquiry 102120 - Drove Lane, Yapton

Good morning Steve,

Thank you for the enquiry you have sent us regarding drainage at the above location in Yapton. I can confirm that Drove Lane does not form part of the public highway and therefore we would have no drainage in the area. I think it would be worth your time speaking to a representative from Yapton parish Council who will have more information on flooding and land drainage issues in the vicinity.

Regards

Ben Whiffin
Assistant Highway Manager

Ben Whiffin | Assistant Highway Manager, Arun West and Joint Downland West Sussex County Council | Location: Western Area Office, Drayton
[redacted]

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ARUN DISTRICT COUNCIL Y/84/14/PD

Steve Doughty

From: Roger Spencer [Roger.Spencer@arun.gov.uk]
Sent: 08 July 2014 13:49
To: [redacted]
Subject: 22420 South Barn, Droves Farm, Yapton

Dear Steve,

Your message of yesterday has been passed to me for attention.

We have no knowledge of flooding but our records are not definitive, as we rely upon reports being given to us; for this site, it is unlikely to have been be reported as the site is quite remote.

I am sure that you have referred to the EA's Flood Maps and you will have seen that the site partially within the fluvial flood plain. It could also be subject to surface water flooding (refer to EA mapping - http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=495619&y=103795&scale=11).

The site is in the South West Sussex Internal Drainage District – I assume therefore that you have consulted EA (as the EA acts as the Board of the IDD in this area – try John Smith [Hampshire Area of South East Region]) and also WSCC as LLFA[redacted]

Regards,

Roger Spencer | Engineering Services Manager, Arun District Council | Location: Second Floor, Arun Civic Centre, Maltravers Road, Littlehampton, BN17 5LF
Internal: 37812 | External: +44 (0) 1903 737812 | E-mail: roger.spencer@arun.gov.uk

Arun is working in Partnership with Chichester District Council. Visit our web sites at www.arun.gov.uk and www.chichester.gov.uk

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DX 57406 Littlehampton

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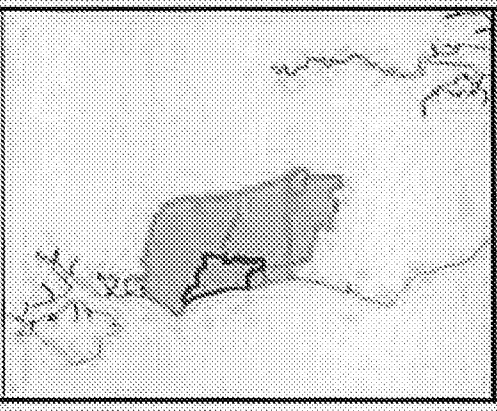
The Arun SFRA is a strategic assessment of flooding. Users of the SFRA should be aware of this when interpreting the information presented. The user is directed to the SFRA reports which outline the uncertainties associated with the studies. Particular attention is drawn to the following:

- Flood extent boundaries are not considered definitive. Land adjacent to these areas may also be at risk.
- Some flooding mechanisms have not been included in the assessment. The 'coastal risk area' is based on advice from LA Engineers and requires further assessment.

Events - Areas

e Water

wm



0 2 4

Kilometres

Scale at A3: 1:80,000

Date: 31/01/2008

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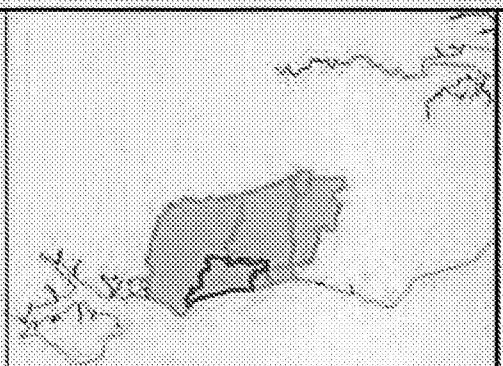
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0 2 4

Kilometres

Scale at A3: 1:80,000

Date: 31/01/2008

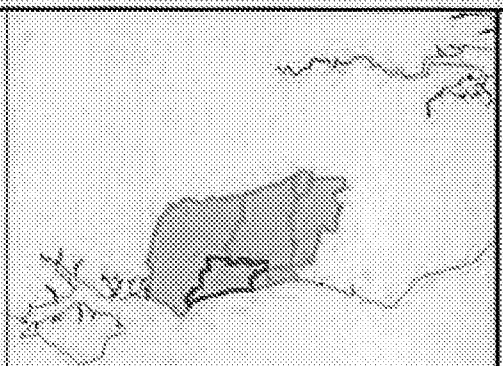
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Map_L.wor



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The Arun SFRA is a strategic assessment of flooding. Users of the SFRA should be aware of this when interpreting the information presented. The user is directed to the SFRA reports which outline the uncertainties associated with the studies. Particular attention is drawn to the following:
- Flood extent boundaries are not considered definitive. Land adjacent to these areas may also be at risk.
- Some flooding mechanisms have not been included in the assessment. The 'coastal risk area' is based on advice from LA Engineers and requires further assessment.



0 2 4

Kilometres

Scale at A3: 1:80,000

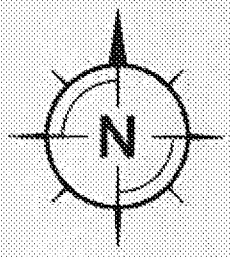
Date: 31/01/2008

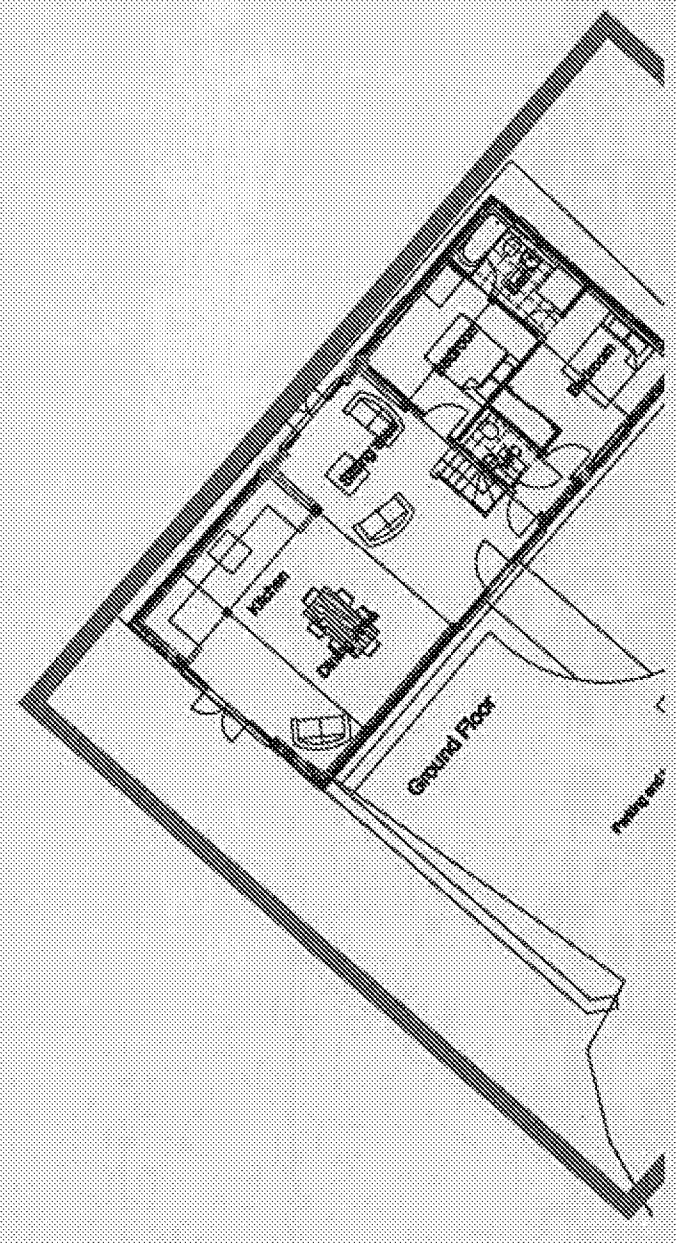
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Map_G1.wor

Appendix 5

Proposed Site Layout Plan and Preliminary Surface Water Drainage Calculation


N


Kitchen
Bedroom
Ground Floor

Base Draining Soakaway Storage Calculation

the Civil Engineering Practice

Project Name:	South Barn, Drove Lane, Yapton, West Sussex
Project Number:	22420

Impermeable Area

Impermeable Area	100 m^2
Infiltration Rate	1 x10^{-6} m/s
Available Base Area	84 m^2
Outflow	0.094 l/s

Return Storm Period Assessments available are: 1, 2, 5, 10, 20, 25, 50, 100 years.
Ratio r1 in the range 0.12, 0.15, 0.18, 0.21, 0.24, 0.27, 0.30-0.45

Storm Profiles

Return Period	100 years
M5-60	20 mm
Ratio r1	0.33
Consider Storms Beyond 6 hour duration?	no

Storm Duration (mins)	Z1	R M5-D (mm)	Z2	R M(x)-D (mm)	I (cu.m)	Outflow (cu.m)	Storage Required
5	0.36	7.20	1.84	13.25	1.32	0.03	1.30 m^3
10	0.51	10.20	1.91	19.48	1.95	0.06	1.89 m^3
15	0.62	12.40	1.95	24.18	2.42	0.08	2.33 m^3
30	0.79	15.80	1.99	31.44	3.14	0.17	2.98 m^3
60	1.00	20.00	2.03	40.60	4.06	0.34	3.72 m^3
120	1.23	24.60	2.01	49.45	4.94	0.68	4.27 m^3
180	1.37	27.40	1.99	54.53	5.45	1.02	4.44 m^3
240	1.51	30.20	1.97	59.49	5.95	1.35	4.60 m^3
300	1.60	32.00	1.96	62.56	6.26	1.69	4.56 m^3
360	1.69	33.80	1.94	65.57	6.56	2.03	4.53 m^3
480	1.82	36.30	1.93	69.88	6.99	2.71	4.28 m^3
600	1.94	38.80	1.91	74.11	7.41	3.38	4.03 m^3
840	2.09	41.89	1.88	78.92	7.89	4.74	3.15 m^3
1140	2.29	45.74	1.85	84.72	8.47	6.43	2.04 m^3
1440	2.48	49.60	1.82	90.27	9.03	8.12	0.91 m^3

Peak Storage

4.6 m^3

Additional 30% for future climate change
6.0 m^3

38% voided sub base
depth required = 212 mm

ARUN DISTRICT COUNCIL Y/84/14/PD