



Unit 12, Watersedge Business Park, Modwen Road, Salford Quays, Manchester, M5 3EZ

Our Ref: DP/MB/RCEF53132-002

Date: 26th July 2017

Sarah Hufford
Rocco Homes
11A High Street,
Cobham, Surrey,
KT11 3DH

By Email: sarah@roccohomes.co.uk

Dear Sarah

**Flood Risk and Drainage Scoping Study,
14 Coastal Road, Littlehampton, Worthing**

1. Introduction

This report presents a brief summary in relation to flood risk and drainage in support of the proposed residential development at 14 Coastal Road.

A desktop study has been undertaken to gather and review the existing readily available data on flood risk to the site. In addition, RPS has also contacted the Environment Agency and West Sussex County Council, who act as the Lead Local Flood Authority, to determine the requirements for surface water run-off from the proposed development.

This report has been produced in accordance with the guidance detailed in the National Planning Policy Framework (NPPF). Reference has also been made to the CIRIA SuDS Manual (C753) and the Arun District Council Level 1 Strategic Flood Risk Assessment.



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2. Planning Policy

2.1 National Planning Policy

The National Planning Policy Framework (NPPF) released in March 2012, advises of the requirements for a site specific Flood Risk Assessment (FRA) for any of the following cases:

- All proposals (including minor development and change of use) located within the Environment Agency designated floodplain, recognised as either Flood Zone 2 (medium probability) or Flood Zone 3 (high probability);
- All proposals greater than 1 hectare (ha) located in Flood Zone 1 (low probability);
- All proposals within an area which has critical drainage problems (as notified to the Local Planning Authority by the Environment Agency); and
- Where proposed development may be subject to other sources of flooding.

2.2 Local Planning Policy

The Arun District Council Local Plan was adopted in 2003 and contains the following policies relating to flood risk and drainage:

“Policy GEN9 Foul and Surface Water Drainage

Planning permission for development which will materially increase foul and/or surface water discharges will be refused unless the Local Planning Authority is satisfied that either adequate drainage capacity exists or appropriate drainage capacity can be provided as part of the development. Consideration should also be given to the use of Sustainable Urban Drainage Systems (SuDS) as alternatives to conventional drainage where appropriate.

Policy GEN10 Tidal Flooding and Coastal Defence

Planning permission will be refused for development which would be at an unacceptable risk of tidal flooding and/or where proposals are detrimental to the integrity of tidal defences or the ability to maintain or improve them,

In areas identified to be at risk:

(i) outside the built-up areas, planning permission will not be granted for new development, or the significant intensification of existing development; and



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(ii) within the built-up areas, planning permission will only be granted where the local planning authority is satisfied that appropriate flood and coastal defence mitigation measures have been provided so that the development will not itself be at unacceptable risk and furthermore does not post an unacceptable risk to existing development in the area.

Policy GEN11 Inland Flooding

Permission for development which would be at risk from flooding and/or materially decrease the capacity of a floodplain to store or pass flows of floodwater, will be refused unless the Local Planning Authority is satisfied that compensatory flood storage/waterway areas can be provided as part of the development and the function and effectiveness of existing watercourses, or their replacements, are not adversely affected."

The adopted Local Plan is set to be replaced by the emerging Arun District Local Plan 2011 – 2031. The emerging Local Plan contains the following policies relating to flood risk and drainage:

"Policy W DM2 – Flood Risk

Development in areas at risk from flooding, identified on the latest Environment Agency flood risk maps and the Council's Strategic Flood Risk Assessment (SFRA), will only be permitted where all of the following criteria have been satisfied:

- a. The sequential test in accordance with the National Planning Policy Framework Technical Guidance has been met.*
- b. A site specific Flood Risk Assessment demonstrates that the development will be safe, including access and egress, without increasing flood risk elsewhere and reduce flood risk overall.*
- c. The scheme identifies adaptation and mitigation measures.*
- d. Appropriate flood warning and evacuation plans are in place; and*
- e. New site drainage systems are designed to take account of events which exceed the normal design standard i.e consideration of flood flow routing and utilising temporary storage areas.*

The reports prepared as part of the criteria above must take into account contingency allowances, taking climate change into account as set out in the NPPF Technical Guidance.



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In locations where strategic flood defence or resilient and resistant construction measures are necessary within the site itself, proposals will be required to demonstrate how measures have been incorporated as an intrinsic part of the scheme in a manner which is compatible with the Strategic Flood Risk Assessment.

All development proposals must take into account of relevant Surface Water Management Plans, Catchment Flood Management Plans and related Flood Defence Plans and strategies such as the Lower Tidal River Arun Strategy. The Council may require financial contributions from development on sites where measures to address flood risk or to improve the environmental quality of watercourses have been identified by these Plans and Strategies.

Developments shall also be consistent with all other Local Plan Policies.

Policy W DM3 – Sustainable Urban Drainage Systems

To increase the levels of water capture and storage and improve water quality, all development must identify opportunities to incorporate a range of Sustainable Urban Drainage Systems (SUDS), appropriate to the size of development, at an early stage of the design process.

Proposals for both major and minor development proposals must incorporate SuDS within the private areas of the development in order to provide source control features to the overall SuDS design. These features include:

- *Green roofs;*
- *Permeable driveways and parking;*
- *Soakaways;*
- *Water harvesting and storage features including water butts.*

Proposals for major development must also integrate SUDS within public open spaces and roads, in liaison with West Sussex County Council (the SUDS Approval Body) or its agent. SUDS must therefore be integrated into the overall design of a development and must:

- a. Contribute positively to the appearance of the area;*
- b. Effectively manage water (including its quality);*



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- c. Accommodate and enhance biodiversity by making connections to existing Green Infrastructure assets and;*
- d. Provide amenity for local residents (ensuring a safe environment) and;*
- e. Retain existing open drainage ditches in their current form.*

In order to ensure that SUDS discharge water from the development at the same or less rate, as prior to construction, developers must:

- f. Follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations and the SUDS manual produced by CIRIA.*
- g. Undertake up to six months groundwater monitoring within the winter period.*
- h. Undertake winter percolation testing in accordance with BRE365.*
- i. The proposed drainage system must be designed to ensure that there is no flooding on a 1 in 30 year storm event;*
- j. The design must also take account of the 1 in 100 year storm event plus 30% allowance for climate change, on stored volumes, to ensure that there is no flooding of properties or the public highway or inundation of the foul sewerage system. Any excess flows must be contained within the site boundary, and within designated storage areas.*
- k. Flow routes through the development must be demonstrated as a first stage in the design process, demonstrating how water will travel at or near the surface for three types of flow:*

- **Low flow routes:** *Once surface water run-off has been collected, cleaned and controlled in source control features it will either be stored where it fell as rain in permeable pavement, or flow onward to local storage structures. The day-to-day flows from these features should travel in low flow channels through the development in a controlled way contributing to landscape quality;*
- **Overflows:** *In the event of local blockages or surcharge a simple overflow arrangement should allow water to bypass the obstruction and return to the management train sequence until conditions return to normal;*
- **Exceedance routes:** *When SUDS are overwhelmed by exceptional rainfall then exceedance routes protect people and property by providing unobstructed overland flow routes from the development and should be considered for all drainage schemes. The SUDS design must demonstrate that flow routes have been considered at each design*



stage to take into account the effect of proposed development on the natural flow pattern for the site. Exceedance routes should also be protected from future changes in land use.

Developments shall also be consistent with all other Local Plan Policies.”

3. Consultation

3.1 Environment Agency

Reference to the Environment Agency’s online flood map indicates that the site is located within Flood Zone 1 therefore no further consultation with the Environment Agency is required.

3.2 Lead Local Flood Authority

Preliminary consultation with West Sussex County Council, who act as the Lead Local Flood Authority (LLFA), has identified that surface water run-off should be restricted to the greenfield run-off rate unless extenuating circumstances determine that this restriction is not achievable.

4. Site Description

4.1 Description

The site is located at National Grid Reference 508341 101581. It is rectangular in shape occupying an area of approximately 0.11 ha. A site location plan is provided at Figure 1.

The site is currently occupied by an existing residential dwelling and associated hardstanding (approximately 50% of the site) and soft landscaped garden areas (approximately 50% of the site). Vehicular and pedestrian access to the site is provided in the south western corner of the site via Coastal Road.

4.2 Topography

A Topographic Survey of the site has been produced to an arbitrary datum (Cadmap Ltd, May 2017, drawing no. CM/17696) and is included as Appendix A. The Topographic Survey is described as follows:

- The highest point of the site is located in the north western corner of the site. The lowest point of the site is located within the south western corner of the site.
- The site falls in a southerly direction at a gradient of approximately 1 in 200; and
- The survey identifies manholes within the site therefore indicating the presence of an existing private drainage system. Further details are provided in section 4.3 below.



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4.3 Existing Drainage

Reference to Southern Water asset location plans indicates that there are no public surface water sewers within the vicinity of the site. Southern Water plans identify a foul water sewer located beneath Coastal Road, trending in a westerly direction.

It is understood that foul and surface water from the existing dwelling currently drain to the public sewer network via a combined outfall.

4.3 Proposed Development

The proposed development comprises the demolition of the existing residential building to provide a replacement dwelling of similar footprint. Vehicular and pedestrian access to the site will continue to remain as per the existing situation. Development plans are included as Appendix B.

The proposed use of the site is classified as 'More Vulnerable' within the NPPG.

5. Hydrological Setting

5.1 Nearest Watercourse

The mean high water level of the English Channel is located approximately 100 m south of the site.

An unnamed ordinary watercourse is located approximately 250 m west of the site. The watercourse is shown to flow in a southerly direction before discharging into tidal waters.

The nearest Environment Agency defined Main River is Ferring Rife which is located approximately 750 m east of the site at its nearest point. Ferring Rife is shown to flow in a southerly direction before discharging into tidal waters.

5.2 Flood Risk Classification

Reference to the Environment Agency's online Flood Map for Planning (included as Figure 2) indicates that the site is located within Flood Zone 1, whereby the annual probability of flooding is classified as being less than 1 in 1000.



Reference to the Environment Agency's online Risk of Flooding from Surface Water Map indicates that the site is categorised as having a very low risk of surface water flooding. Environment Agency surface water mapping is included as Figure 3.

Reference to the Environment Agency's online Risk of Flooding from Reservoirs Map identifies that the site is located in an area that is not at risk from flooding in the event of reservoir failure. Environment Agency reservoir mapping is included as Figure 4.

5.3 Arun District Council Strategic Flood Risk Assessment

The Arun District Council Strategic Flood Risk Assessment (SFRA) produced by JBA Consulting, was published in 2008. The SFRA was updated in August 2016 to take into account the Environment Agency's new climate change allowances published in February 2016. Key information of relevance to the proposed development is summarised below:

- Appendix C of the SFRA identifies within the Arun District. Reference to the mapping identifies that the subject site is located within Flood Zone 1;
- Appendix D of the SFRA identifies the future Flood Zones based on the latest guidance for climate change published by the Environment Agency. The mapping states that "For tidal/coastal models, undefended case still water level and defended case still water level with wave overtopping simulations have been completed to inform future flood risk within the Arun District. Climate Change allowance predictions are for the years 2031, 2061 and 2111. Based on the new climate change allowances, there does not appear to be any additional impact to the development site therefore the site is considered to remain within Flood Zone 1;
- Appendix E of the SFRA identifies surface water flood risk within the District. The site is shown to be located within an area that is not at risk from surface water flooding;
- Appendix F identifies that the site is located within an area that is classified as having a less than 25% susceptibility to groundwater flooding;
- Appendix H of the SFRA provides records of historical flooding. The mapping indicates flooding occurred within the vicinity of the unnamed watercourse as a result of a 'failure'. No further information is provided.
- Appendix I of the SFRA provides information in relation to flood defences within the district. The SFRA identifies that the beach to the south of the site is classified as a defence which comprises a shingle beach maintained by the Local Authority.



SFRA mapping is included as Appendix C.

6. Geological Setting

Reference to the British Geological Survey online mapping (1:50,000 scale) indicates that the site is underlain by superficial River Terrace Deposits which are described as comprising Sand, Silt and Clay. The site is further underlain by the Lewes Nodular Chalk Formation which is described as comprising Chalk.

6. Analysis of Existing Data Sources

Based on the information identified above, the site is considered to be located within Flood Zone 1, taking into account the new climate change allowances and is considered to have a low risk of flooding from all other sources. Table 3 within the PPG identifies that 'More Vulnerable' developments are considered appropriate within Flood Zone 1.

7. Additional Considerations

Notwithstanding the above, further policy and technical considerations would be required as noted below.

7.1 Sequential Test and Exception Test

The Local Authority will require the Sequential Test to be passed. The proposed development is located within Flood Zone 1 and is considered to have a low risk of flooding from all other sources. The development therefore passes the Sequential Test.

According to Table 3 of the PPG, 'More Vulnerable' developments are considered appropriate within Flood Zone 1 without the requirement to apply the Exception Test. Therefore, application of the Exception Test is not required for the proposed development.

7.2 Safe Access and Egress

A safe access and egress route should be provided with a 'very low flood hazard' in accordance with guidance document FD2320. Reference to the Environment Agency's online flood map indicates that the route to the west towards East Preston is located within Flood Zone 1 therefore safe access and egress is available.



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8. Foul and Surface Water Management

Preliminary consultation with the Lead Local Flood Authority has identified that the proposed development should seek to limit surface water run-off to the greenfield run-off rate unless extenuating circumstances determine that this restriction is not achievable.

The proposed development comprises the demolition of the existing building and replacement with a new residential dwelling of similar footprint. It is understood that there will be no significant increase in hardstanding areas post development therefore there will be no increase in surface water run-off. Notwithstanding this, the proposed development comprises the use of a green roof which will provide some betterment over the existing situation.

Foul and Surface water run-off will continue to drain to the public sewer network via the existing combined outfall as per the existing situation.

9. Conclusion

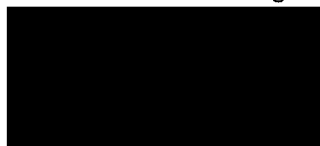
The scoping study described herein has established the nature of the readily available sources of flood risk information within the vicinity of the site. Based on the available data, it is considered that the proposed development has a low risk of flooding from all sources and there is no requirement to undertake a full Flood Risk Assessment.

The proposed development will not result in a significant increase in hardstanding areas within the site therefore there will be no increase in surface water run-off post development. Foul and surface water from the proposed development will continue to drain via the existing combined outfall as per the existing situation.

We trust this study is of assistance however should you have any queries with regard to the above, please do not hesitate to contact us.

Yours sincerely,

For RPS Consulting Services Ltd



Daniel Percival

Environmental Consultant



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Figures

Figure 1 – Site Location Plan

Figure 2 – Environment Agency Flood Map

Figure 3 – Environment Agency Surface Water Map

Figure 4 – Environment Agency Reservoir Map

Appendices

Appendix A – Topographic Survey

Appendix B – Development Plans

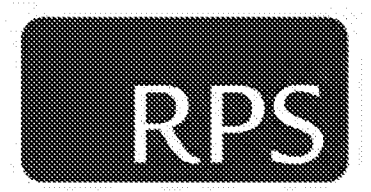
Appendix C – SFRA Mapping

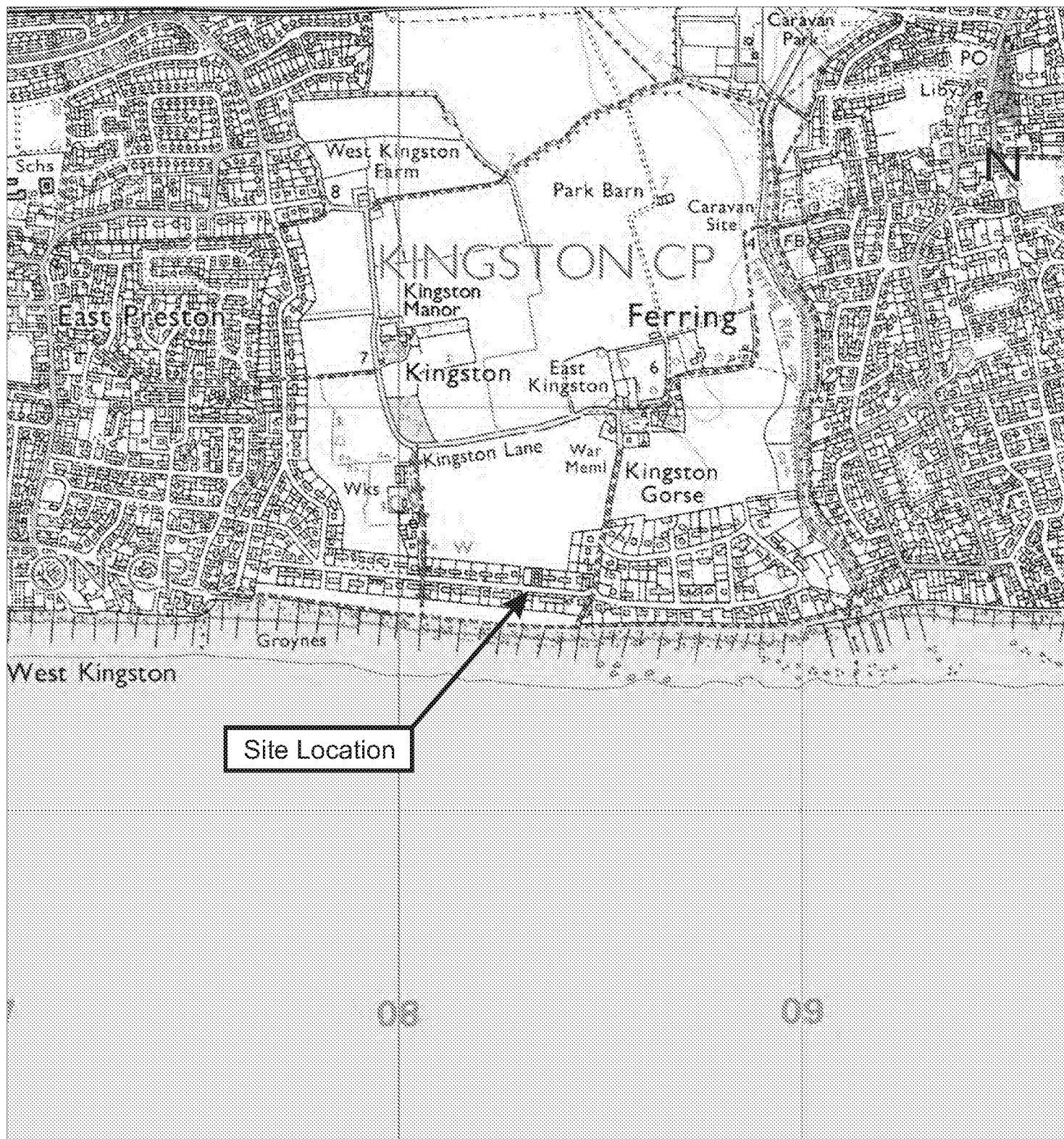


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Figure 1

SITE LOCATION PLAN





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T +44 (0)161 874 3737 F +44 (0)161 877 3959 W rpsgroup.com

Client: Mr and Mrs Clarke

Date: June 2017

Scale: NTS

Project: 14 Coastal Road

Figure: 01

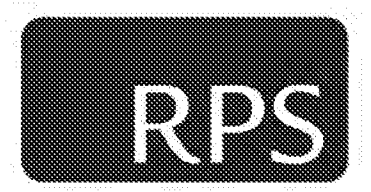
Rev: 00

Title: Site Location Plan

Job Ref: RCEF53132

Figure 2

ENVIRONMENT AGENCY FLOOD MAP





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Date: June 2017

Scale: NTS

Project: 14 Coastal Road

Figure: 02

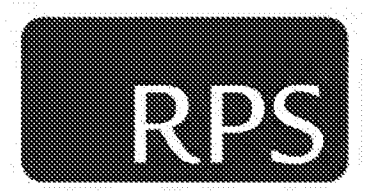
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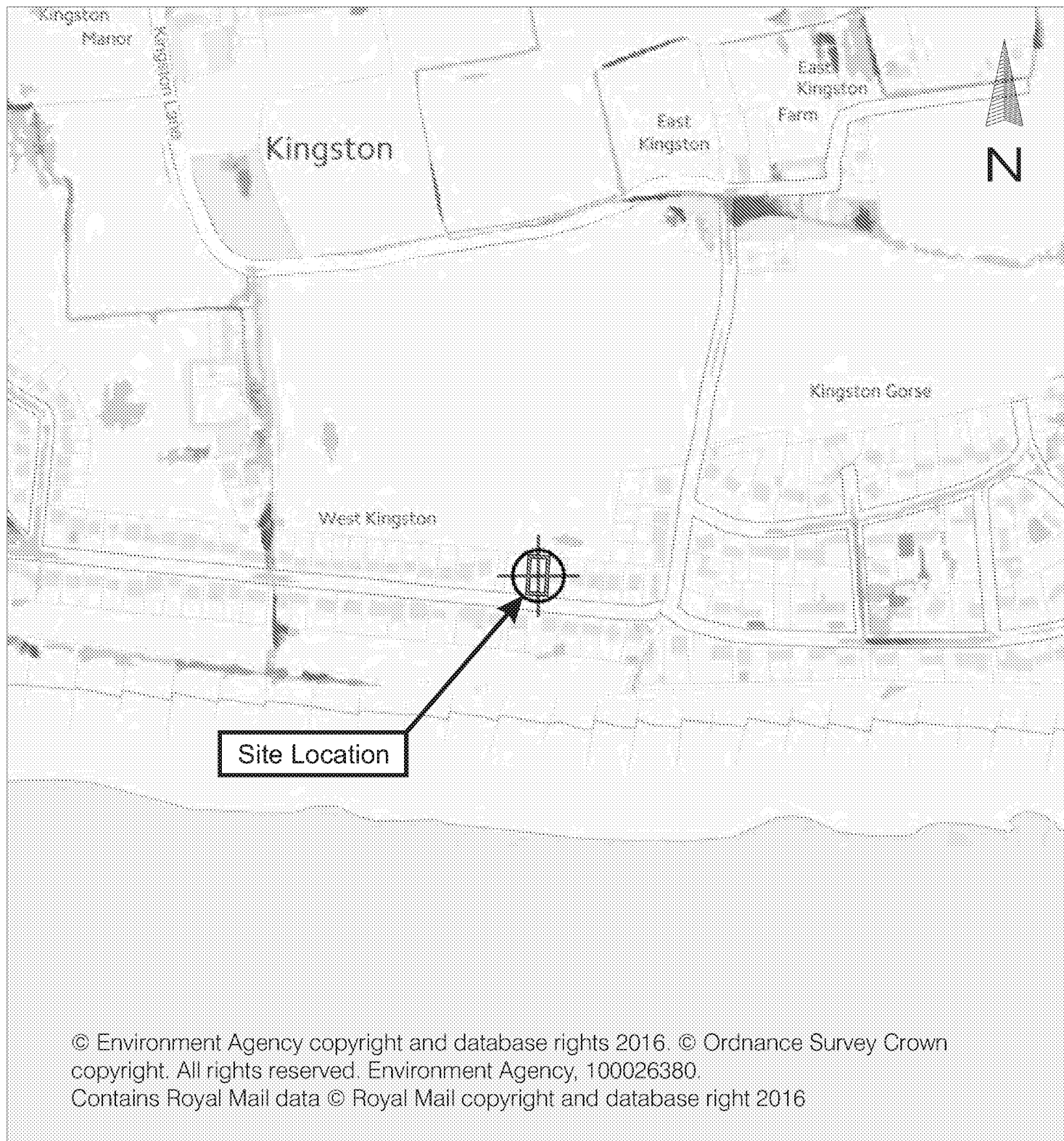
Title: Environment Agency Flood Map

Job Ref: RCEF53132

Figure 3

ENVIRONMENT AGENCY SURFACE WATER MAP





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Date: June 2017

Scale: NTS

Project: 14 Coastal Road

Figure: 03

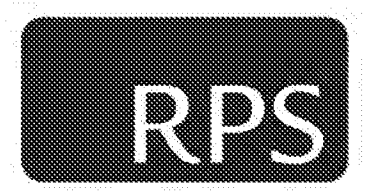
Rev: 00

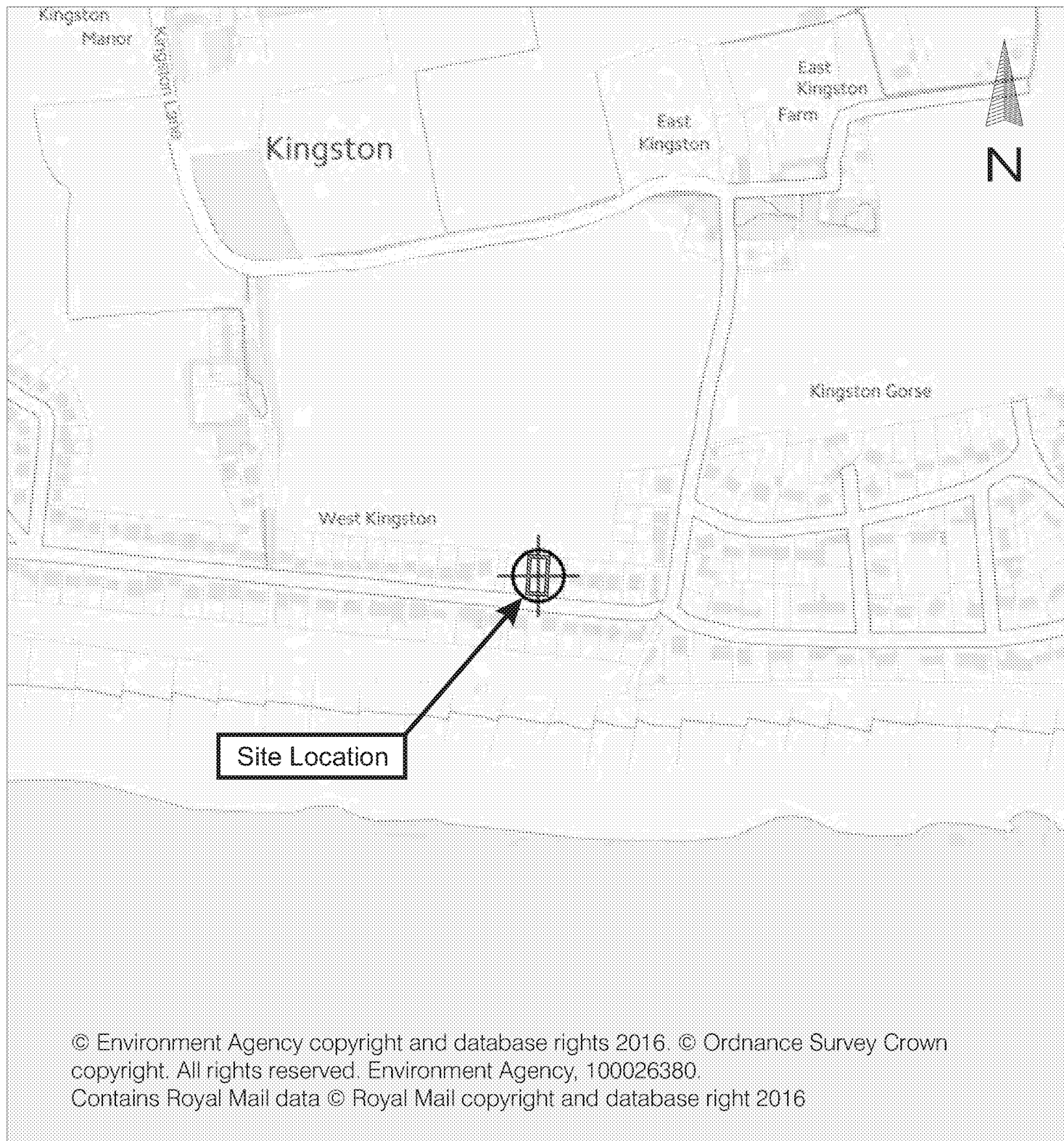
Title: Environment Agency Surface Water Mapping

Job Ref: RCEF53132

Figure 4

ENVIRONMENT AGENCY RESERVOIR MAP





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Client: Mr and Mrs Clarke

Date: June 2017

Scale: NTS

Project: 14 Coastal Road

Figure: 04

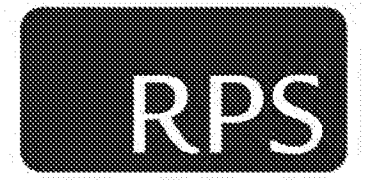
Rev: 00

Title: Environment Agency Reservoir Mapping

Job Ref: RCEF53132

Appendix A

TOPOGRAPHIC SURVEY



1040N

1020N

1000N

980N

960E

980E

1000E

1020E

1040N

1020N

1000N

980N

960E

980E

1000E

1020E

Important Information:

We advise that an arborologist be appointed to correctly determine the species and condition of all trees surveyed prior to any design work.

All information contained in this drawing (including digital data) should be checked and verified prior to any fabrication or construction.

Survey Legend

FENCES			
BARRIED WIRE FENCE	BSW	Trees	
CORRUGATED IRON FENCE	CI		
CLOSE SCOPED FENCE	CS		
CHESTNUT PALING FENCE	CIP	Hedges	
IRON PALING FENCE	IP		
POST AND RAIL FENCE	PR		
POST AND WIRE FENCE	PWF		
CHARLTON FENCE	CL		
LARCH LAF FENCE	LL		
INTERWOVEN FENCE	IWF		
WIRE MESH FENCE	WM		
ABBREVIATIONS			
BOLLARD	B	MANHOLE	MH
BRITISH TELECOM	BT	NOTICE BOARD	NB
CONCRETE PAVING SLAB	CPS	PARKING METER	PM
COVER LEVEL	CL	POLE NAME PLATE	PNP
DRAINAGE	DC	ROAD SIGN	RS
ELECTRIC INSPECTION COVER	EC	RODDING EYE	RE
ELECTRICITY POLE	EP	RETAINING WALL	RW
FIRE HYDRANT	FH	RAINWATER PIPE	RWP
FLOWER BED	FB	STOP VALVE	SV
FOOTPATH	FP	TELEGRAPH POLE	TP
GAS VALVE	GV	TELEPHONE CALL BOX	TGB
GULLY	Gy	TRAFFIC LIGHT	TL
INSPECTION COVER	IC	UNABLE TO LIFT	UTL
PIPE RAMP LEVEL	R	UNKNOWN	UNK
WATER OUTLET	WO	VENT PIPE	VP
WATER METER	WM	WATER METER	WM
THRESHOLD	TH	DRAINAGE	D

North:



Grid: Local Grid

Levelling: Arbitrary Datum Based On Station MH
As Shown Value Used 50.00m

Drawing Title:

Topographical Survey

Site Address:

14 Coastal Road
Littlehampton

Client:

ROCCOHOMES

Surveyor: JL Drawn By: AH Verified By: AF Date: 12.05.17

CM No: CM17896

Rev:

Scale: 1:200m @ A2

Date: May 2017

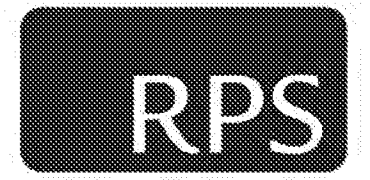


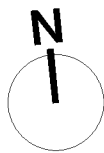
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87 Meadowside Drive
Barnsley, Wokingham, Glos GL20 4TF
T: 01488 421085
E: info@cadmap.co.uk
W: www.cadmap.co.uk



Appendix B

DEVELOPMENT PLANS





Exisiting timber post & rail fence

P/R 1.00m

BUSH

C/B 1.85m

Conc

Gy

Rooflight

DPipe
Eaves
54.99

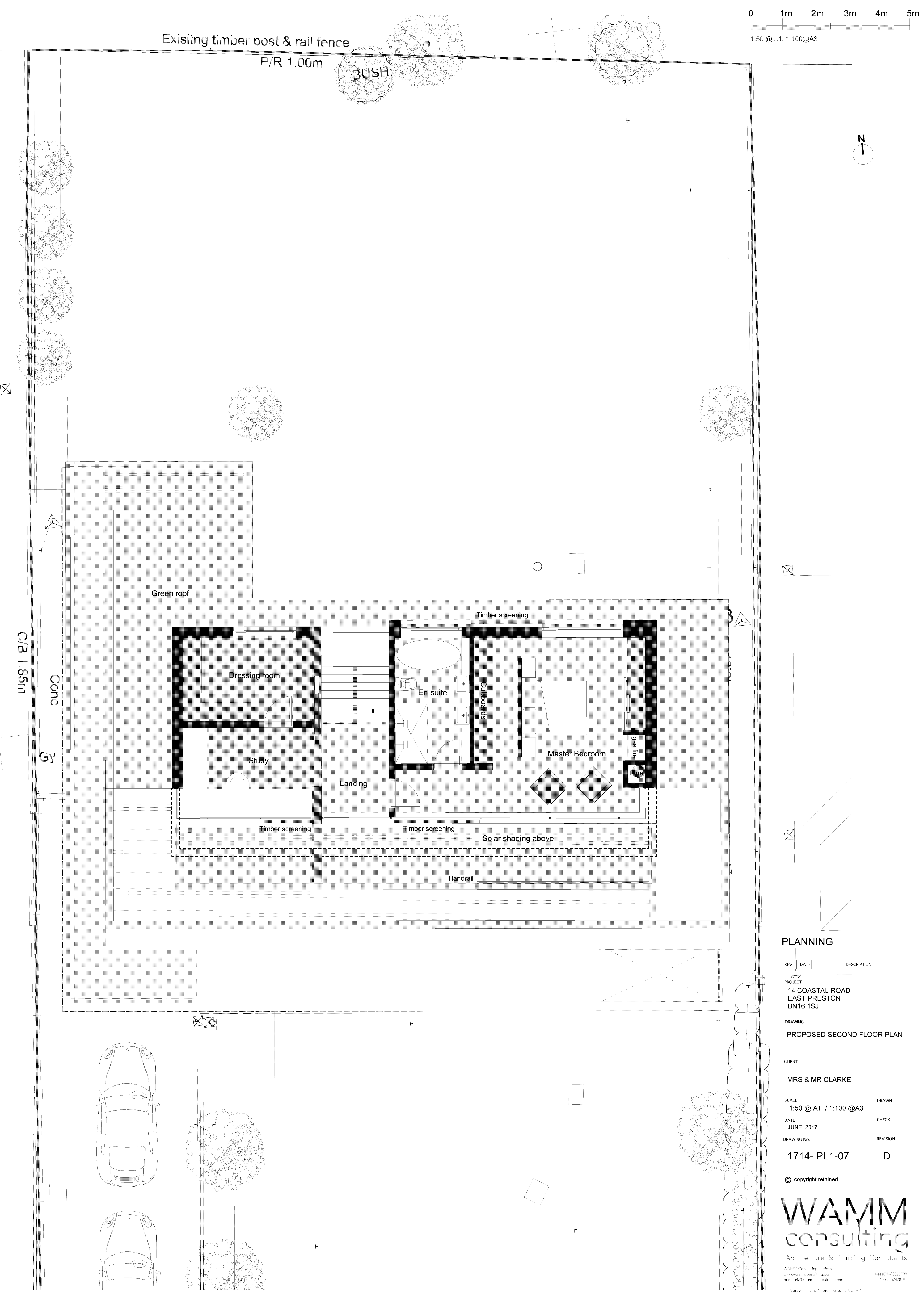
PLANNING

REV.	DATE	DESCRIPTION
PROJECT		
14 COASTAL ROAD EAST PRESTON BN16 1SJ		
DRAWING		
PROPOSED ROOF PLAN		
CLIENT		
MRS & MR CLARKE		
SCALE	1:50 @ A1 / 1:100 @A3	DRAWN
DATE	JUNE 2017	CHECK
DRAWING No.	1714- PL1-08	REVISION
		B
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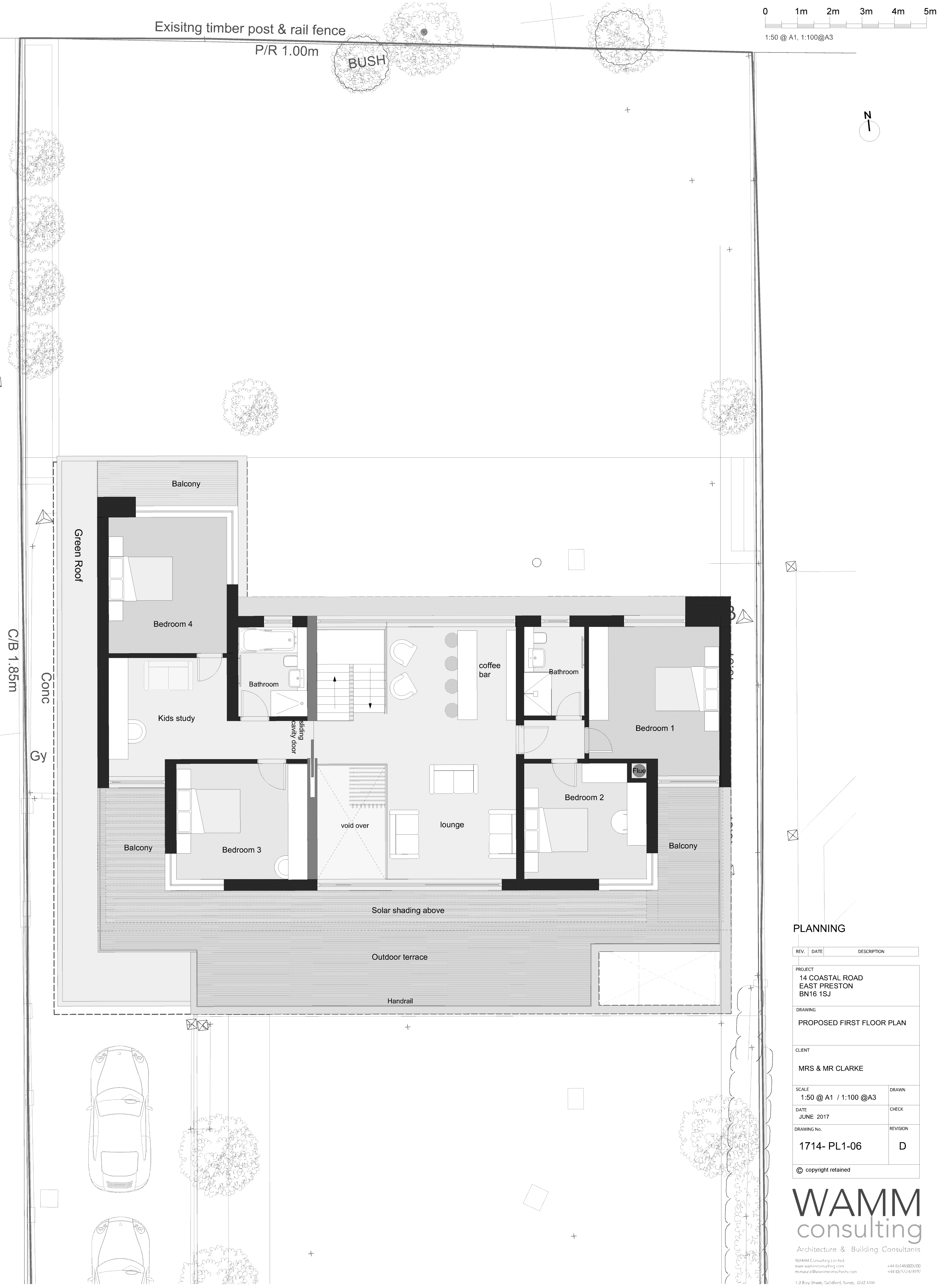
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consulting
Architecture & Building Consultants

WAMM Consulting Limited
wammmconsulting.com
m.mauz@wammmconsultants.com
+44 (0)1483332500
+44 (0)7557478197
1-3 Bury Street, Guildford, Surrey, GU2 4AW

PROPSED ROOF PLAN



PROPOSED SECOND FLOOR PLAN



PROPOSED FIRST FLOOR PLAN

Exisitng timber post & rail fence

P/R 1.00m

BUSH

0 1m 2m 3m 4m 5m
1:50 @ A1, 1:100@A3



Proposed back garden
Grass

+49.98

C/B 1.85m

built in bbq area

Proposed rear patio

Outdoor Workshop

sliding timber screening

Wc

store

Garage

Timber garage door

Scullery / laundry

Guest Wc

Snug

Entrance

49.84

Proposed front garden
Grass

+49.87

Sliding glass door

Sliding glass doors

ceiling + lighting detail above

Dining

double sided fireplace

Living area

Sliding glass doors

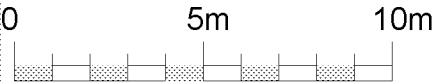
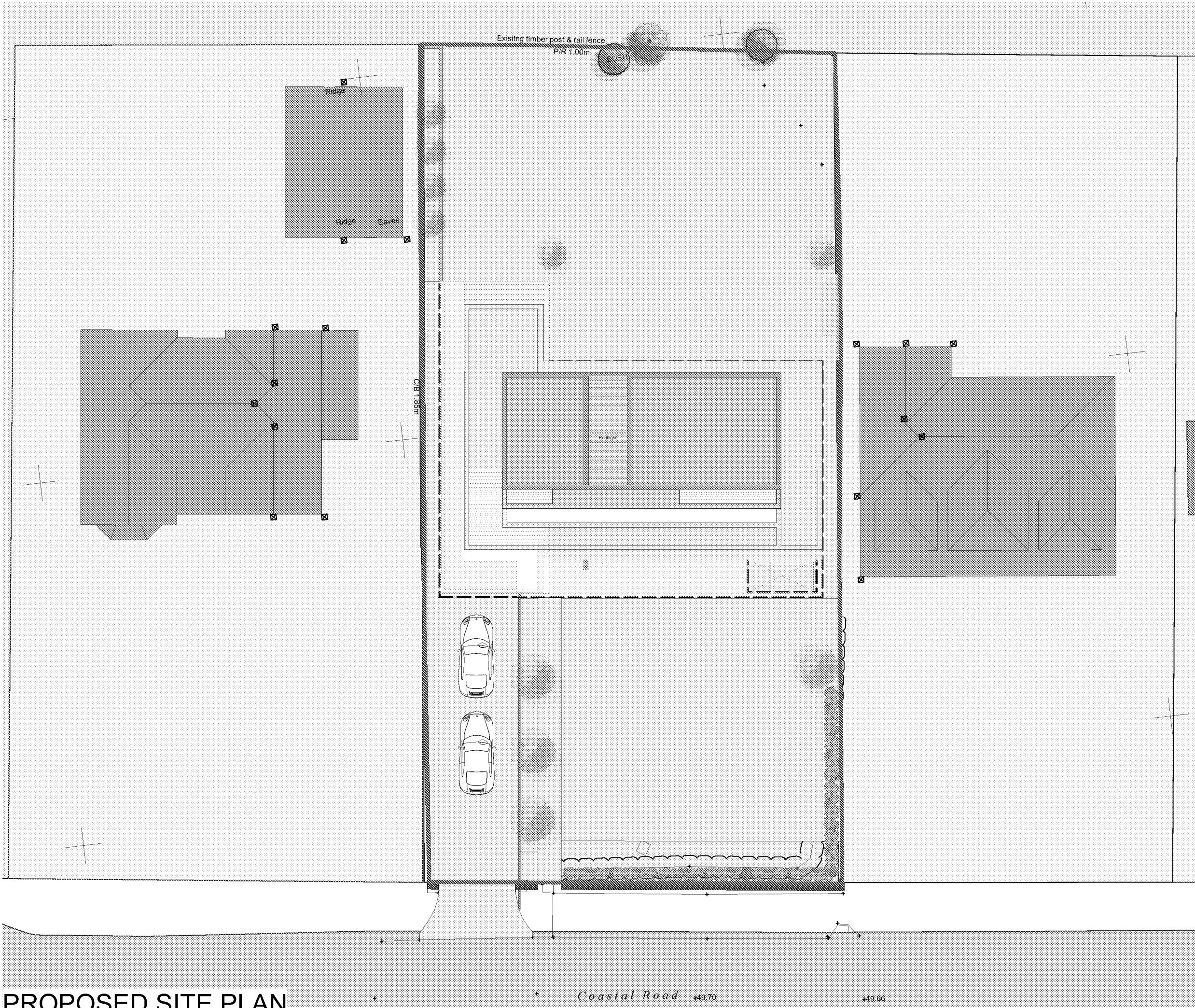
Proposed front patio

PLANNING

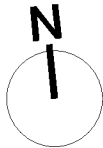
REV.	DATE	DESCRIPTION
PROJECT 14 COASTAL ROAD EAST PRESTON BN16 1SJ		
DRAWING PROPOSED GROUND FLOOR PLAN		
CLIENT MR & MRS CLARKE		
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DATE JUNE 2017		CHECK
DRAWING No. 1714- PL1-05		REVISION D
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consulting
Architecture & Building Consultants
WAMM Consulting Limited
www.wammconsulting.com
m.wam@wammconsultants.com
1-3 Bury Street, Guildford, Surrey, GU2 4AW
+44 (0)1483 8025700
+44 (0)7574 76197

PROPOSED GROUND FLOOR PLAN



1:200 @ A3



KEY

APPLICATION BOUNDARY

PLANNING

REV.	DATE	DESCRIPTION
------	------	-------------

PROJECT
 14 COASTAL ROAD
 EAST PRESTON
 BN16 1SJ

DRAWING
 PROPOSED SITE PLAN

CLIENT
 MR & MRS CLARKE

SCALE 1:200 @A3	DRAWN -
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DATE JUNE 2017	CHECKED -
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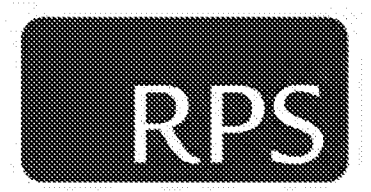
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WAMM Consulting Limited
 Bury House, 1-3 Bury Street, Guildford, Surrey, GU2 4PW
 www.wammconsulting.com
 +44 (0)1483 625700

PROPOSED SITE PLAN

Appendix C

SFRA MAPPING





Notes

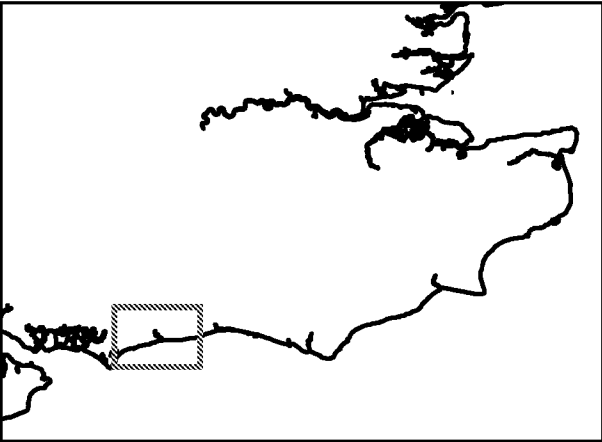
Zone 1: Comprised of land having a less than 1 in 1,000 annual probability of river or sea flooding in any year.

Zone 2: Comprised of land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding or 1 in 200 and 1 in 1,000 annual probability of sea flooding in any year.

Zone 3a: This zone comprises land assessed as having a greater than 1 in 100 annual probability of river flooding or a greater than 1 in 200 annual probability of flooding from sea in any year.

Zone 3b: This zone comprises land where water has to flow or be stored in times of flood (the functional floodplain). The SFRA identified this Flood Zone as land which would flood with an annual probability of 1 in 20 years, where detailed modelling exists. In the absence of detailed hydraulic model information, a precautionary approach has been adopted with the assumption that the extent of Flood Zone 3b would be equal to Flood Zone 3a. If development is shown to be in Flood Zone 3a, further work should be undertaken as part of a detailed site specific

Key Plan



Legend

- Arun District SFRA boundary
- Flood Zone 3b
- Flood Zone 3a
- Flood Zone 2

REF	Date	Comments
A	June 2016	-

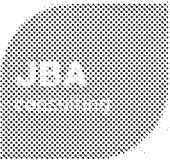


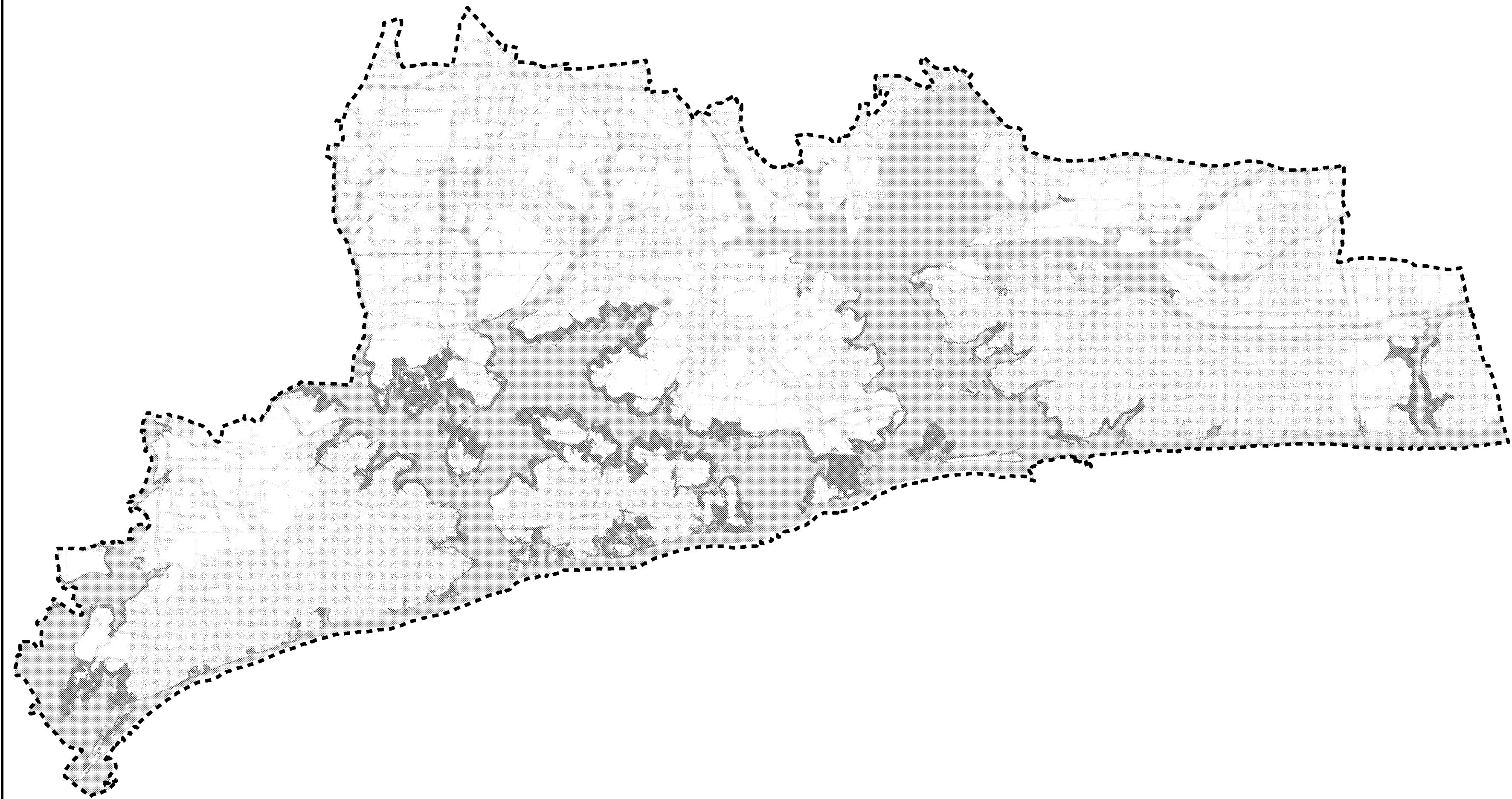
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ARUN DISTRICT COUNCIL

SFRA: APPENDIX C
FLOOD ZONES

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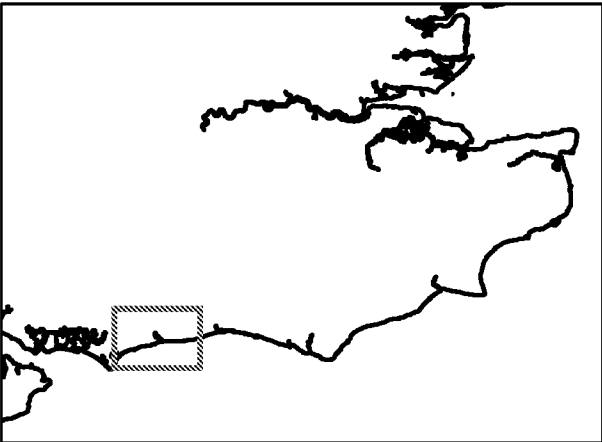
Notes

Hydraulic modelling has been undertaken as part of this SFRA to provide updated climate change flood mapping in the Arun District for Flood Zone 3a. This modelling followed the latest guidance for climate change in FRAs/SFRAs released by the Environment Agency in February 2016 (and updated in April 2016). Climate change for fluvial events has been based on the Higher Central estimates for the years 2031, 2061 and 2111. Present day flood risk information is available for comparison. Arun District is within the South East River Basin District and therefore allowance are:

- 2031 = +15% flows
- 2061 = +30% flows
- 2111 = +45% flows

For tidal/coastal models, undefended case still water level and defended case still water level with wave overtopping simulations have been completed to inform future flood risk within the Arun District. Again, climate change allowance predictions are for the years 2031, 2061 and 2111, with present day outputs for comparison.

Key Plan



Legend

- Arun District SFRA boundary
- Present Flood Zone 3a
- Future Flood Zone 3a (2031)
- Future Flood Zone 3a (2061)
- Future Flood Zone 3a (2111)

REF	Date	Comments
A	August 2016	.

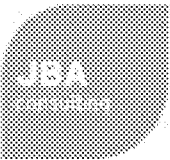


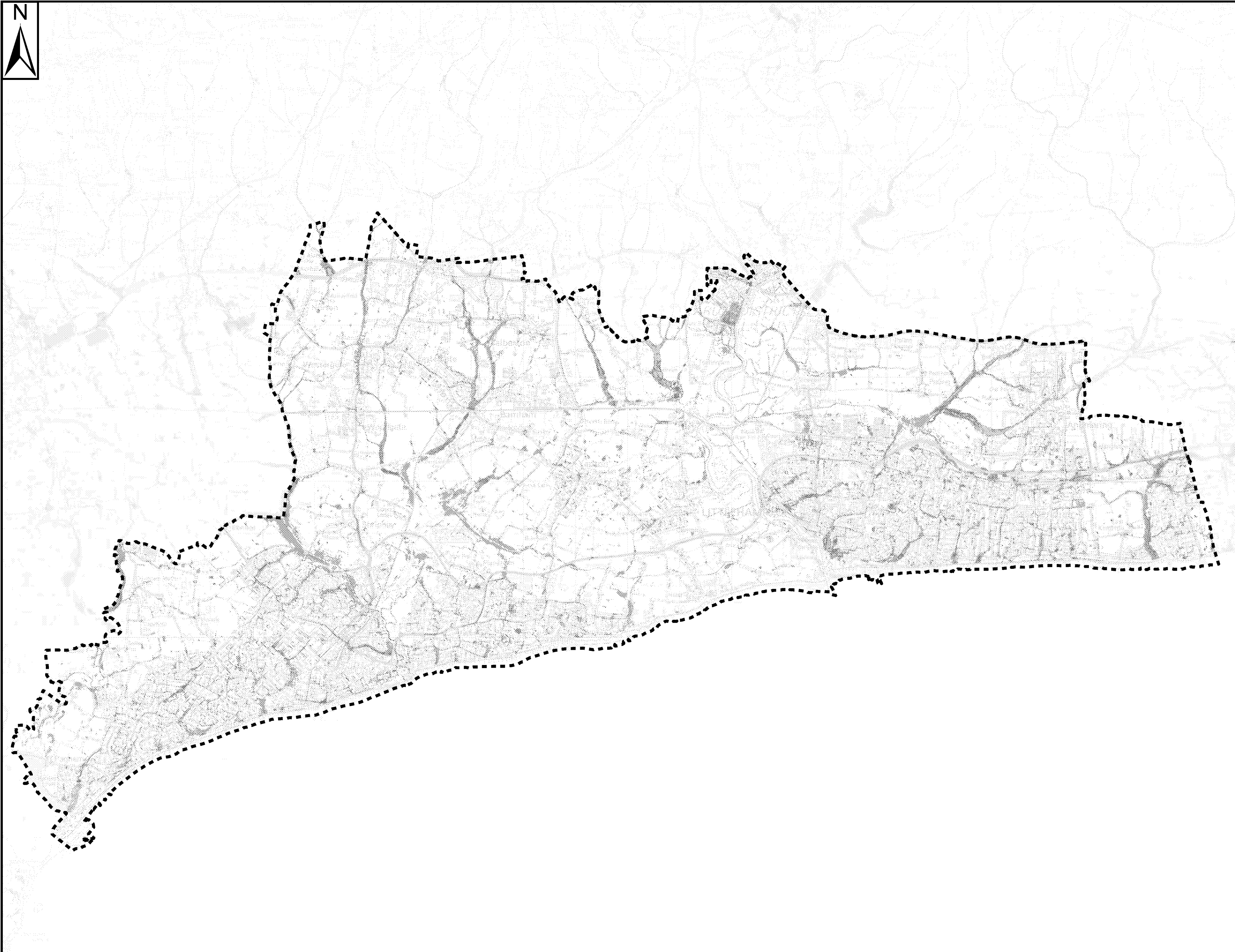
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ARUN DISTRICT COUNCIL

SFRA: APPENDIX D
CLIMATE CHANGE MAPPING

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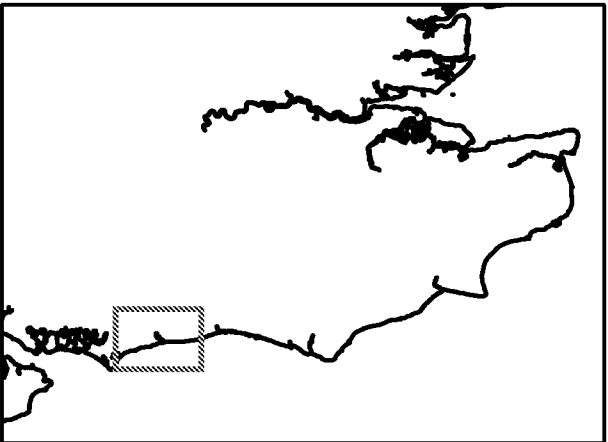
Notes

The updated Flood Map for Surface Water (uFMISW) shows the flooding that takes place from the 'surface runoff' generated by rainwater (including snow and other precipitation) which:
(a) is on the surface of the ground (whether or not it is moving), and
(b) has not yet entered a watercourse, drainage system or public sewer.

The uFMISW will pick out natural drainage channels, rivers, low areas in the floodplain and flow paths between buildings but it will only indicate flooding caused by local rainfall.

Note: The uFMISW shows predictions of flooded areas but does not show whether individual properties will be affected by surface water flooding or have been affected in the past. The uFMISW should not be used to predict if individual properties will flood.

Key Plan



Legend

- Arun District SFRA boundary
- uFMISW 30-year extent
- uFMISW 100-year extent
- uFMISW 1,000-year extent

REF	Date	Comments
A	June 2016	-



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SFRA: APPENDIX E
SURFACE WATER FLOOD RISK

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