



Willow Cottage, Herne Lane, Rustington, West Sussex BN16 3EE

Proposed Replacement Residential Dwelling

30 Lagoon Road

Pagham

West Sussex PO21 4TJ

Flood Risk Assessment

On behalf of

Tom Bury

December 2017
1769-R2

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30 LAGOON ROAD
PAGHAM
WEST SUSSEX PO21 4TJ

PROPOSED REPLACEMENT RESIDENTIAL DWELLING

Flood Risk Assessment

1. Background

- 1.1 This report has been produced on behalf of Tom Bury, in support of a planning application for the construction of a replacement residential dwelling at 30 Lagoon Road, Pagham.
- 1.2 The report concerns flood risk and has been prepared generally in accordance with Technical Guidance to the National Planning Policy Framework, March 2012 and on-line advice and guidance from the Environment Agency.
- 1.3 The drawings supporting this report are as follows:
- Dwg. No. 1769/L1.1 – Location Plan
 - Dwg. No. 1769/P1.1 – Proposed New Dwelling
 - Dwg. No. 1769/S1.1 – Site Survey

2. The Site

- 2.1 The site is located to the north of Lagoon Road at the western end of Wythering Close, some 340m southwest of Sea Lane/ Beach Road. It has an area of approximately 1170m² on which there is an existing residential dwelling with a vehicular access onto Wythering Close and a pedestrian access onto Lagoon Road. The floor level of the existing dwelling is at 3.1m AOD (Above Ordnance Datum).
- 2.2 The site is in an established residential area. See Drawing No. 1769/L1.1 for a Location Plan. The OS Grid Reference is SZ 8874 9719.
- 2.3 The foreshore is just over 200m from the site but Pagham Lagoon extends eastwards from the main harbour to just a few metres from the site boundary, with associated marshland extending right up to the edge of the site.

3. Topography

- 3.1 A full topographic survey has been carried out – see Dwg. No 1769/S1.1 - which shows that the site lies at an average level of around 3m AOD falling gently towards the Lagoon at first, then steeply down to the water's edge.

4. Proposed Development

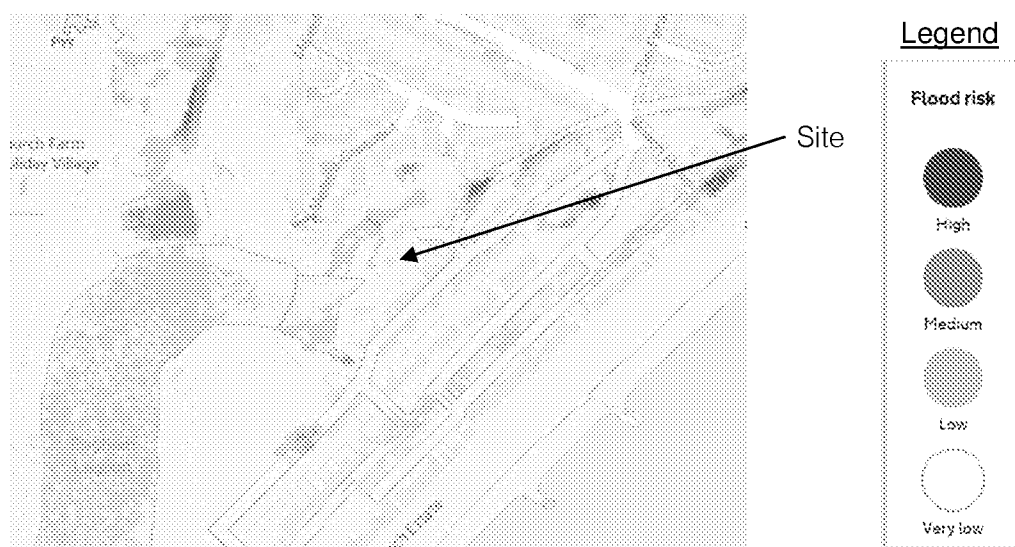
- 4.1 The proposed development comprises the demolition of the existing building, clearance of the site and the construction of a new four-bedroom detached dwelling which has been sited on high ground within the site in a similar location to the existing.
- 4.2 The proposals are indicated on the attached plan, Drawing No. 1769/P1.1.
- 4.3 The finished floor level for the new dwelling has been provisionally set above that of the existing at 3.775m AOD but see paragraph 5.6 below.

5. Flooding Discussion

- 5.1 The site is shown to lie in Flood Zone 3 on the Environment Agency's flood map for planning as indicated below. This is a tidal flood risk assuming that no flood defences are in place and it shows flood water extending from the harbour into the lagoon and beyond.



- 5.2 The site is shown to be at a very low risk (in excess of 1,000 possibility in any one year) of surface water flooding as indicated below.



- 5.3 The Environment Agency has been consulted with regard to predicted flood levels at the site and their response is attached to this report as Appendix 1.
- 5.4 Summary 1 in 200-year flood level results from their 2016 Arun to East Head model are in the report and repeated here for ease of reference:
- | | |
|-----------------------|-----------|
| Undefended year 2016: | 3.63m AOD |
| Undefended year 2070: | 4.11m AOD |
| Undefended year 2115: | 4.74m AOD |
| Defended year 2016: | N/A |
| Defended year 2070: | N/A |
| Defended year 2115: | 4.25m AOD |
- 5.5 These results show that providing the current defences are maintained, then widespread flooding is not likely to occur at the site until after the year 2070. However, a minor breach/ overtopping of the defences could cause some flooding, the extent of which would depend on the severity and duration of the occurrence. We therefore recommend that the floor level of the new dwelling is set as high as reasonably practical to protect against this situation.
- 5.6 A floor level of 3.775m AOD is currently proposed and this would protect against a major breach occurring now, but rising sea levels due to climate change will increase the flood level as indicated above. Floor levels raised to 4.74m or even 4.25m may not be acceptable in planning terms and 3.775m is a significant rise above existing. Indeed, any increase in floor levels over existing would reduce the flood risk and is therefore to be welcomed. We understand that there may need to be a balance here between acceptable levels in planning terms and the extent to which flood risk can be reduced.

- 5.7 Whilst setting floor levels as above is likely to achieve a current **low risk** of flooding from all sources, the risk will increase with climate change, the extent of which is largely unknown and it is therefore recommended that any new works are designed in accordance with good practice in flood risk areas, employing appropriate flood resistance and resilience measures

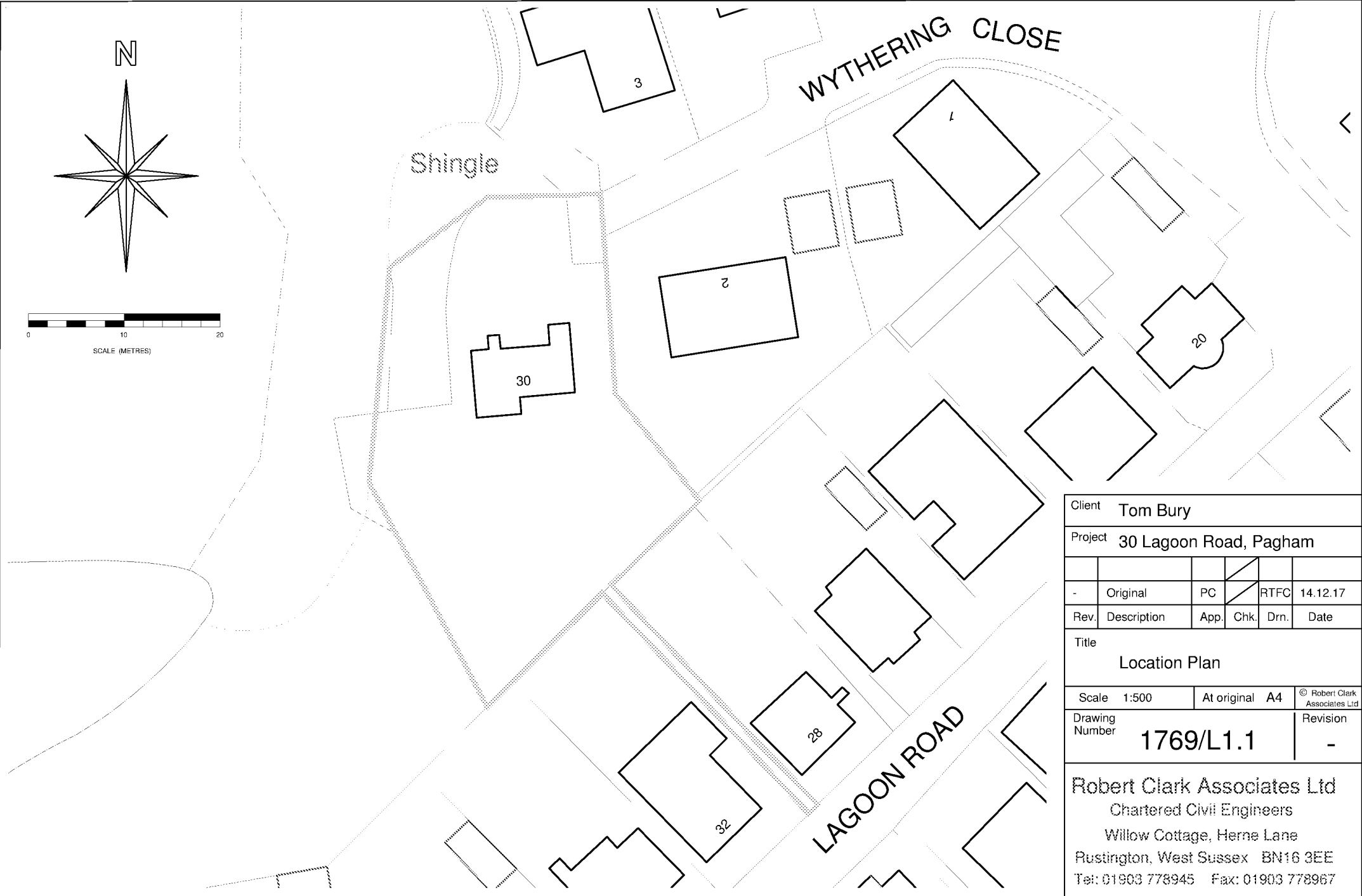
6. Foul and Surface Water Drainage

- 6.1 The existing building drains to a septic tank but the new building will likely be able to drain to the vacuum sewerage system that serves the Pagham Beach Estate. Southern Water Services has not been consulted but it is unlikely that they would object to the additional flow from a single new dwelling. A new sewage treatment plant could be provided if there were any difficulties with a connection to the public sewerage system.
- 6.2 Surface water from the new building may need to drain to the adjacent lagoon but percolation tests to BRE 365 will be undertaken to determine whether soakaways could provide any useful soakage function here.

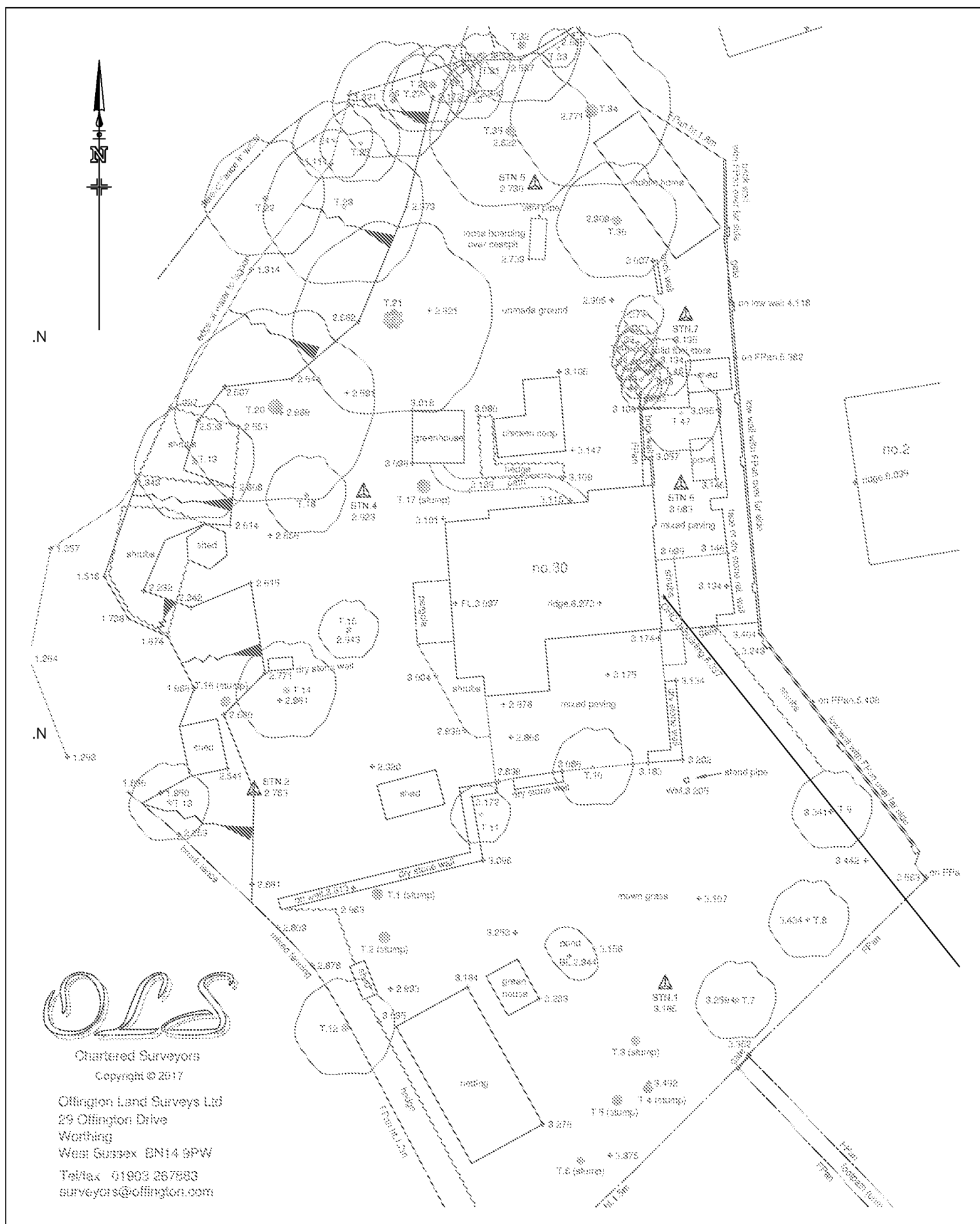
7. Conclusions and Recommendations

- 7.1 The site is shown to lie in Flood Zone 3 on the Environment Agency's Flood Map for Planning and a site-specific Flood Risk Assessment has been carried out in accordance with Technical Guidance to the National Planning Policy Framework.
- 7.2 The Flood Risk Assessment has shown that the proposed new dwelling will be sited on high ground within the site but will nevertheless lie in Flood Zone 3 as indicated on the Environment Agency's Flood Map for Planning. This flood map ignores the presence of defences which are currently in place here to a top level of approximately 4.2m AOD.
- 7.3 It is proposed to set floor levels for the new dwelling above the floor level of the existing building and ideally at 3.775m AOD, which is some 680mm above this, which would provide a substantial reduction in flood risk if it can be achieved.
- 7.4 New surface water drainage will be taken to the adjacent lagoon or to soakaways designed to the Building Regulations and foul drainage will be to the public foul water sewer or to a new sewage treatment plant.
- 7.5 Whilst setting floor levels as indicated here is likely to achieve a current **low risk** of flooding from all sources, the tidal flood risk is predicted to increase with climate change, the extent of which is largely unknown and it is therefore recommended that any new works are designed in accordance with good practice in flood risk areas, employing appropriate flood resistance and resilience measures.

1769-R2



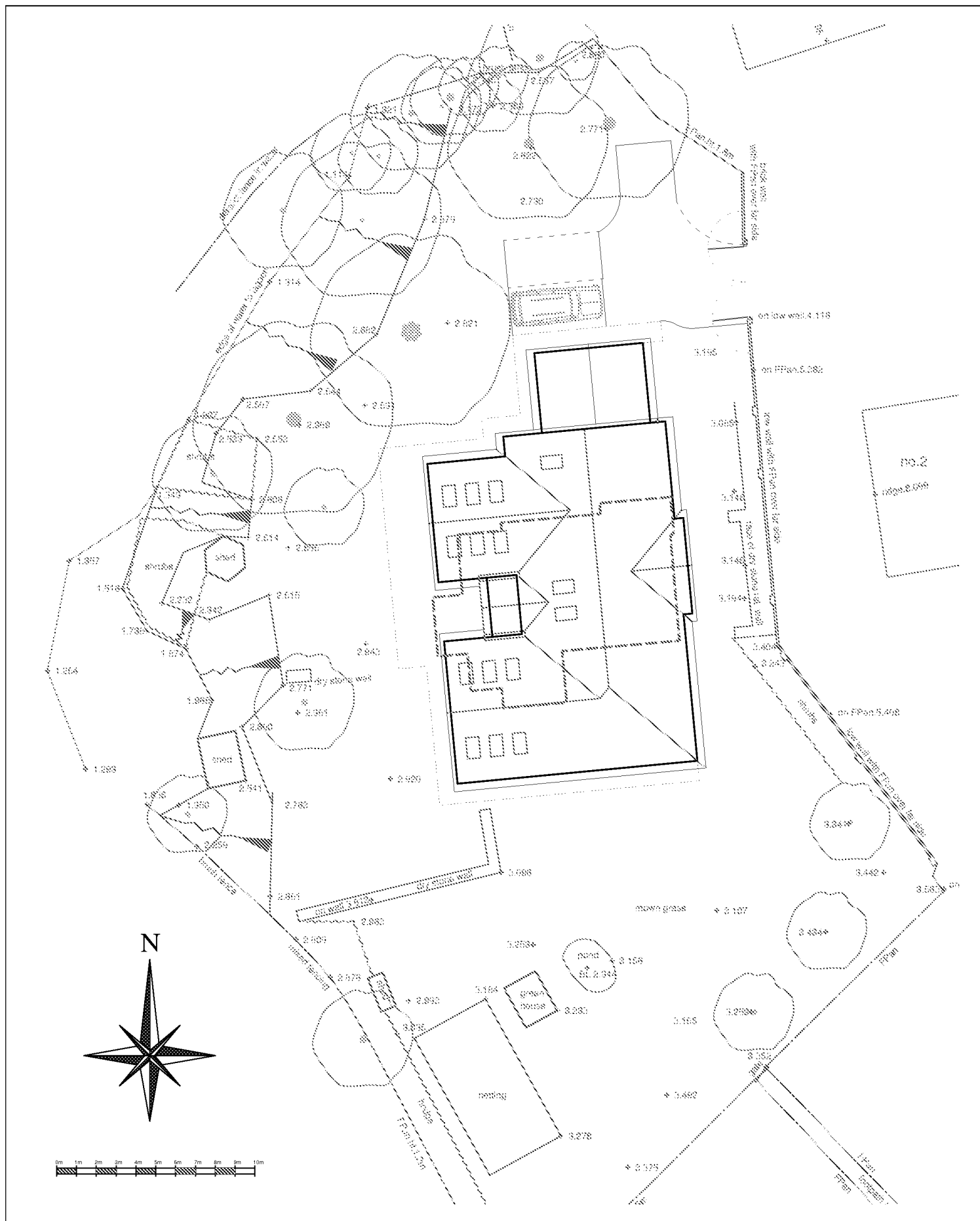
Client Tom Bury					
Project 30 Lagoon Road, Pagham					
-	Original	PC		RTFC	14.12.17
Rev.	Description	App.	Chk.	Drn.	Date
Title					
Location Plan					
Scale 1:500		At original A4		© Robert Clark Associates Ltd	
Drawing Number		1769/L1.1			Revision
					-
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Client	Tom Bury				
Project	30 Lagoon Road, Pagham				
-	Original	PC	RTFC	14.12.17	
Rev.	Description	App.	Chk.	Drn.	Date

Title	Site Survey			
Scale	1:250	At original	A4	© Robert Clark Associates Ltd
Drawing Number	1769/S1.1			Revision
				-



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Client Tom Bury					
Project 30 Lagoon Road, Pagham					
-	Original	PC	RTFC	14.12.17	
Rev.	Description	App.	Chk.	Dm.	Date

Title Proposed New Dwelling		
Scale 1:250	At original A4	© Robert Clark Associates Ltd
Drawing Number 1769/P1.1	Revision -	

Bob Clark
Robert Clark Associates Limited
Willow Cottage
Herne Lane
Rustington
Littlehampton
BN16 3EE

Our ref: SSD68328
Date: 6/12/17

Dear Bob Clark,

Enquiry regarding Product 4 for 30 Lagoon Road, Bognor Regis, PO21 4TJ

Thank you for your enquiry which was received on 22/11/17.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

The information on Flood Zones in the area relating to this address is as follows:

The property is in an area located within Flood Zone 3 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named property is in and is not specific to the property itself as it is influenced by factors such as the height of door steps, air bricks or the height of surrounding walls. We do not have access to this information and is not currently used in our flood modelling.

Flood Zone definitions can be found at www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Flood Defences

There are flood defences in the form of a Shingle Ridge & Timber Breastwork. The Asset ID is 147047. The effective crest level is 4.2. The estimated standard of protection is 1 in 20 (5% AEP). The estimated condition grade is 3.

Model Information

The model used was the Arun to East Head Model which was completed in 2016 by JBA Consulting.

Flood History

We hold no record of previous flooding events affecting this site.

Please note our records are not comprehensive and may not include all events. I recommend contacting the Lead Local Flooding Authority, West Sussex County Council or the Local Authority, Arun District Council for a more comprehensive flood history check.

FRA advisory text

Name	Product 4
Description	Detailed Flood Risk Assessment Map for 30 Lagoon Road, Bognor Regis, PO21 4TJ
Licence	Open Government Licence
Information Warnings	No information warnings.
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- [Flood Map For Planning \(Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences\)](#)
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Leanne Prentice
FCRM Officer – PSO West Sussex

Use of Environment Agency Information for Flood Risk Assessments

Important

The Environment Agency are keen to work with partners to enable development which is resilient to flooding for its lifetime and provides wider benefits to communities. If you have requested this information to help inform a development proposal, then we recommend engaging with us as early as possible by using the pre-application form available from our website:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

We recognise the value of early engagement in development planning decisions. This allows complex issues to be discussed, innovative solutions to be developed that both enables new development and protects existing communities. Such engagement can often avoid delays in the planning process following planning application submission, by reaching agreements up-front. We offer a charged pre-application advice service for applicants who wish to discuss a development proposal.

We can also provide a preliminary opinion for free which will identify environmental constraints related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In preparing your planning application submission, you should refer to the Environment Agency's Flood Risk Standing Advice and the Planning Practice Guidance for information about what flood risk assessment is needed for new development in the different Flood Zones. This information can be accessed via:

<https://www.gov.uk/flood-risk-assessment-standing-advice>
<http://planningguidance.planningportal.gov.uk/>

You should also consult the Strategic Flood Risk Assessment or other relevant materials produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. Information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires an FRA and this is not submitted or is deficient, the Environment Agency may raise an objection.

Product 4 Flood Risk Data Requested by: Robert Clark Associates Limited

Site: 30 Lagoon Road, Bognor Regis, PO21 4TJ

Table 1: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres				
			Undefended Annual Exceedance Probability				
	Eastings	Northings	5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488750	97166	3.39	3.63	4.11	4.74	3.81
2	488733	97176	3.39	3.63	4.11	4.74	3.81
3	488744	97187	3.39	3.63	4.11	4.74	3.81
4	488734	97196	3.39	3.63	4.11	4.74	3.81
5	488745	97201	3.39	3.63	4.11	4.74	3.81

Table 2: Water Levels: Tidal Defended

Node Ref	NGR		Modelled Flood Levels in Metres				
			Undefended Annual Exceedance Probability				
	Eastings	Northings	5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488750	97166	N/A	N/A	N/A	4.25	N/A
2	488733	97176	N/A	N/A	N/A	4.25	N/A
3	488744	97187	N/A	N/A	N/A	4.25	N/A
4	488734	97196	N/A	N/A	N/A	4.25	N/A
5	488745	97201	N/A	N/A	N/A	4.25	N/A

Table 3: Water Depth: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres				
			Undefended Annual Exceedance Probability				
	Eastings	Northings	5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488750	97166	0.19	0.39	0.87	1.49	0.57
2	488733	97176	0.55	0.79	1.27	1.90	0.97
3	488744	97187	0.40	0.64	1.12	1.75	0.82
4	488734	97196	0.71	0.95	1.43	2.06	1.13
5	488745	97201	0.58	0.82	1.30	1.93	1.00

Table 4: Water Depth: Tidal Defended

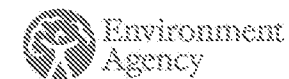
Node Ref	NGR		Modelled Flood Levels in Metres				
	Eastings	Northings	Undefended Annual Exceedance Probability				
			5%	0.5%	0.5% (2070)	0.5% (2115)	0.1%
1	488750	97166	N/A	N/A	N/A	1.01	N/A
2	488733	97176	N/A	N/A	N/A	1.41	N/A
3	488744	97187	N/A	N/A	N/A	1.26	N/A
4	488734	97196	N/A	N/A	N/A	1.57	N/A
5	488745	97201	N/A	N/A	N/A	1.44	N/A

All levels taken from: Arun to East Head Model (2016)

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.

Produced on: 6/12/17

Flood Map for Planning (Rivers and Sea). Centred on PO21 4TJ. Created 6/12/17.



Scale 1: 10,000



Flood Map for Planning (Rivers & Sea)

- Sealed Main Rivers
- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

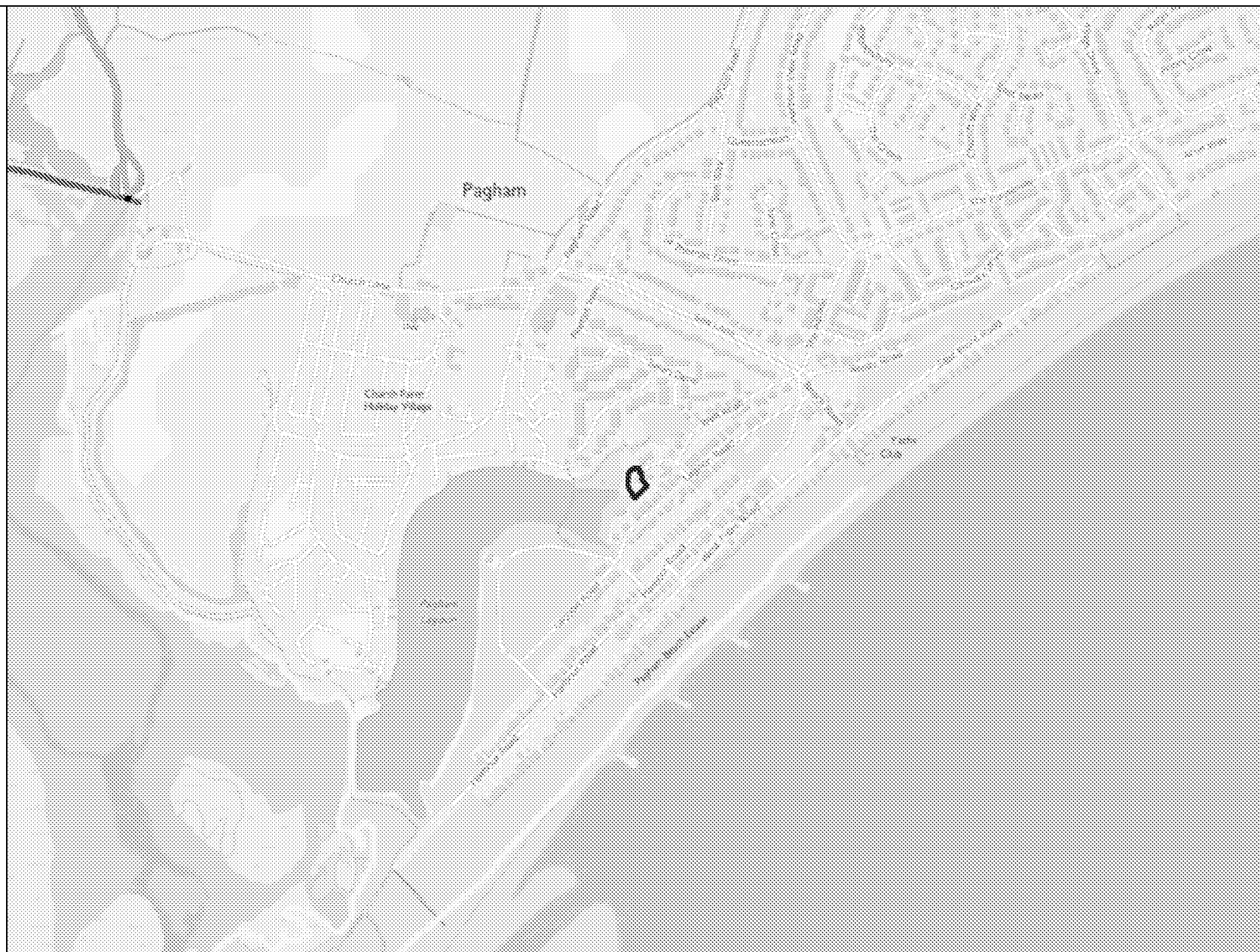
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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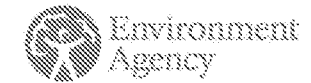
Defences

- | | |
|---|---------------------|
|  | Embankment |
|  | Wall |
|  | Flood Gate |
|  | Demountable Defence |
|  | Bridge Abutment |
|  | High Ground |
|  | Beach |
|  | Barrier Beach |
|  | Promenade |
|  | Quay |
|  | Cliff |
|  | Dunes |
|  | Culvert |



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Modelled Outlines (Defended Tidal) Map 1. Centred PO21 4TJ. Created 6/12/17.

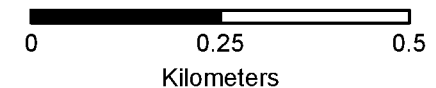


Legend

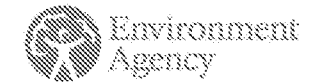
-  Site Boundary
-  20% AEP (Defended Tidal)
-  5% AEP (Defended Tidal)
-  3.3% AEP (Defended Tidal)
-  1.3% AEP (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Modelled Outlines (Defended Tidal) Map 2. Centred PO21 4TJ. Created 6/12/17.

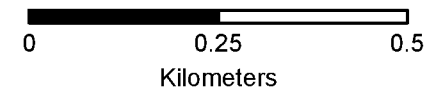


Legend

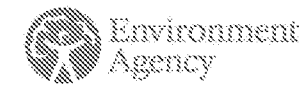
-  Site Boundary
-  1% AEP (Defended Tidal)
-  0.5% AEP (Defended Tidal)
-  0.2% AEP (Defended Tidal)
-  0.1% AEP (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



Modelled Outlines (Defended Tidal) Map 3. Centred PO21 4TJ. Created 6/12/17.

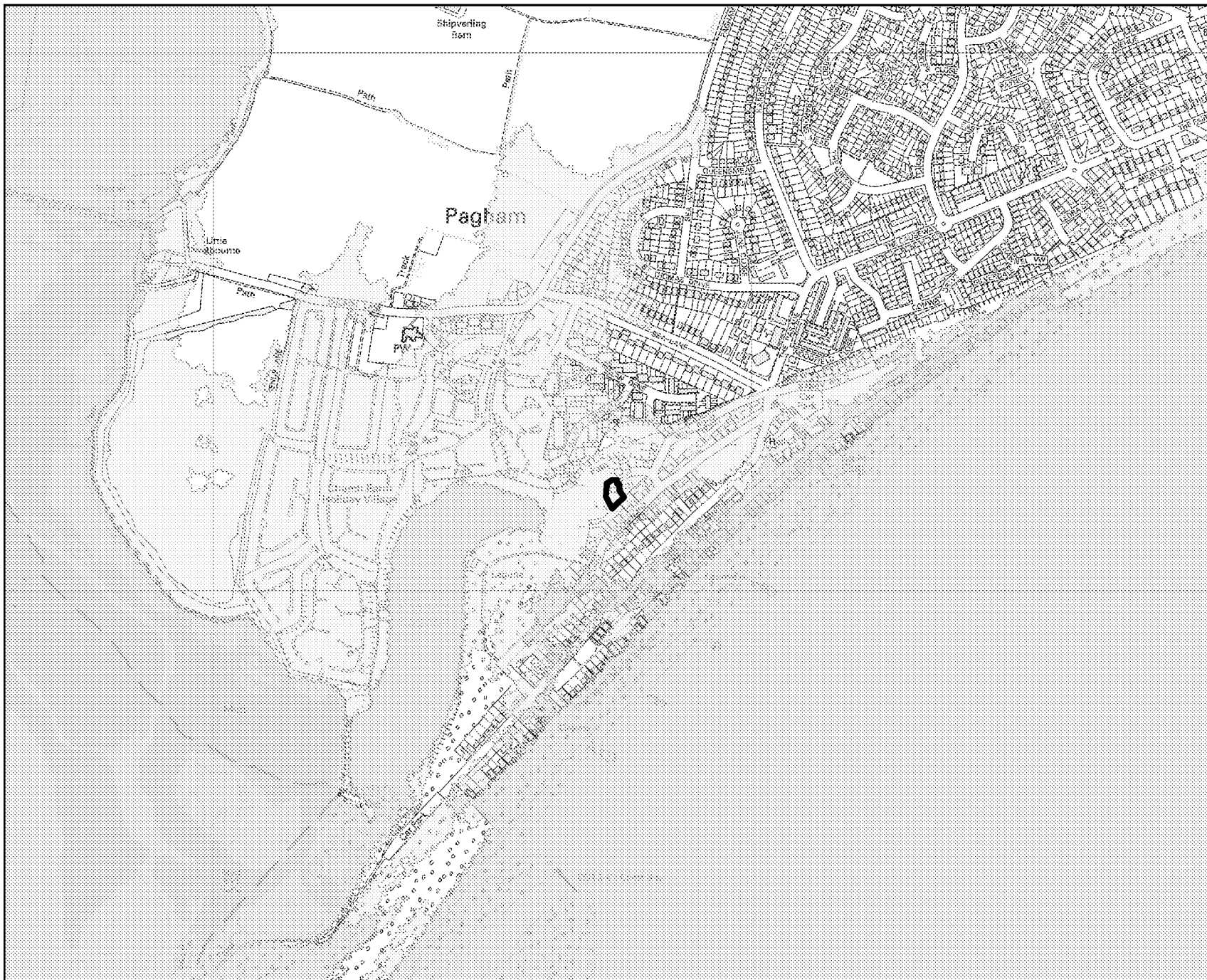
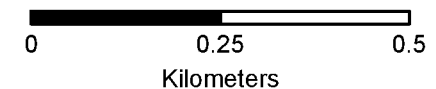


Legend

-  Site Boundary
-  0.5% AEP (2070) (Defended Tidal)
-  0.5% AEP (2115) (Defended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000





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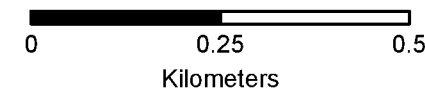


Legend

-  Site Boundary
-  20% AEP (Undefended Tidal)
-  5% AEP (Undefended Tidal)
-  3.3% AEP (Undefended Tidal)
-  1.3% AEP (Undefended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000





Environment
Agency

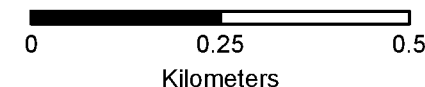


Legend

-  Site Boundary
-  1% AEP (Undefended Tidal)
-  0.5% AEP (Undefended Tidal)
-  0.2% AEP (Undefended Tidal)
-  0.1% AEP (Undefended Tidal)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000





Environment
Agency



Legend



Site Boundary



0.5% AEP (2070) (Undefended Tidal)



0.5% AEP (2115) (Undefended Tidal)

Annual Exceedance Probability
(AEP) The probability of a flood
of a particular magnitude,
or greater occurring in any given
year.

Scale: 1:10,000

