

LISEVE LODGE
84 NORTH BERSTED STREET
BOGNOR REGIS
PO22 9AQ

FLOOD RISK ASSESSMENT.

NOVEMBER 2020

REVISION -

Consulting Civil Engineers

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1. INTRODUCTION

Baker & Associates Ltd have been appointed to provide a Flood Risk Assessment for the extension of Liesve Lodge, 84 North Bersted Street, Bognor Regis, PO22 9AQ.

This Flood Risk Assessment (FRA) is to be submitted as part of the planning application for the development of the site.

2. SITE DESCRIPTION

2.1 SITE LOCATION AND SURROUNDING AREA

The site is located 2500m to the north of Bognor Regis town centre, off North Bersted Street, see figures 2.1.1 to 2.1.3.

The existing site is 1,668m² in size and consists of a 36m² existing 2 storey, dwelling, three existing sheds/summerhouses with floor areas of 27m², 41 m², 49m², a 29m² area of block paving. The remainder of the site is gravel or soft landscaping.

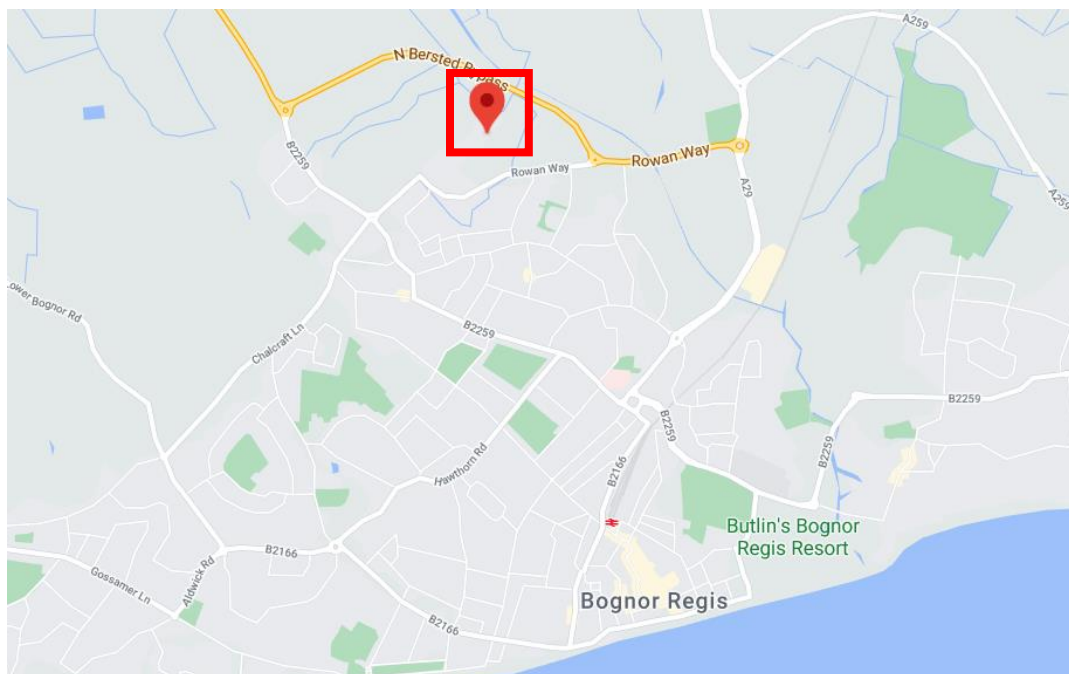


FIGURE 2.1.1 SITE LOCATION

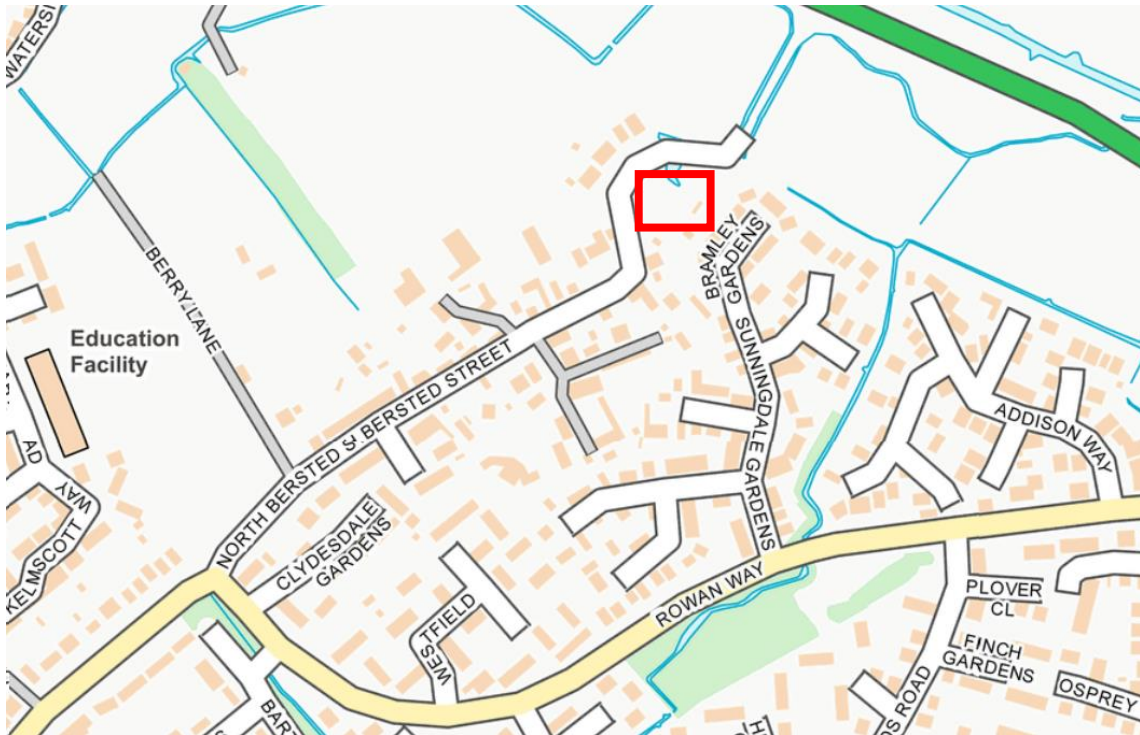


FIGURE 2.1.2 SITE LOCATION



FIGURE 2.1.3 AERIAL IMAGE OF SITE LOCATION

2.2 GEOLOGY

British Geological Survey maps indicate that the substrata beneath the site is Lewes Nodular Chalk, refer to figure 2.2.1.

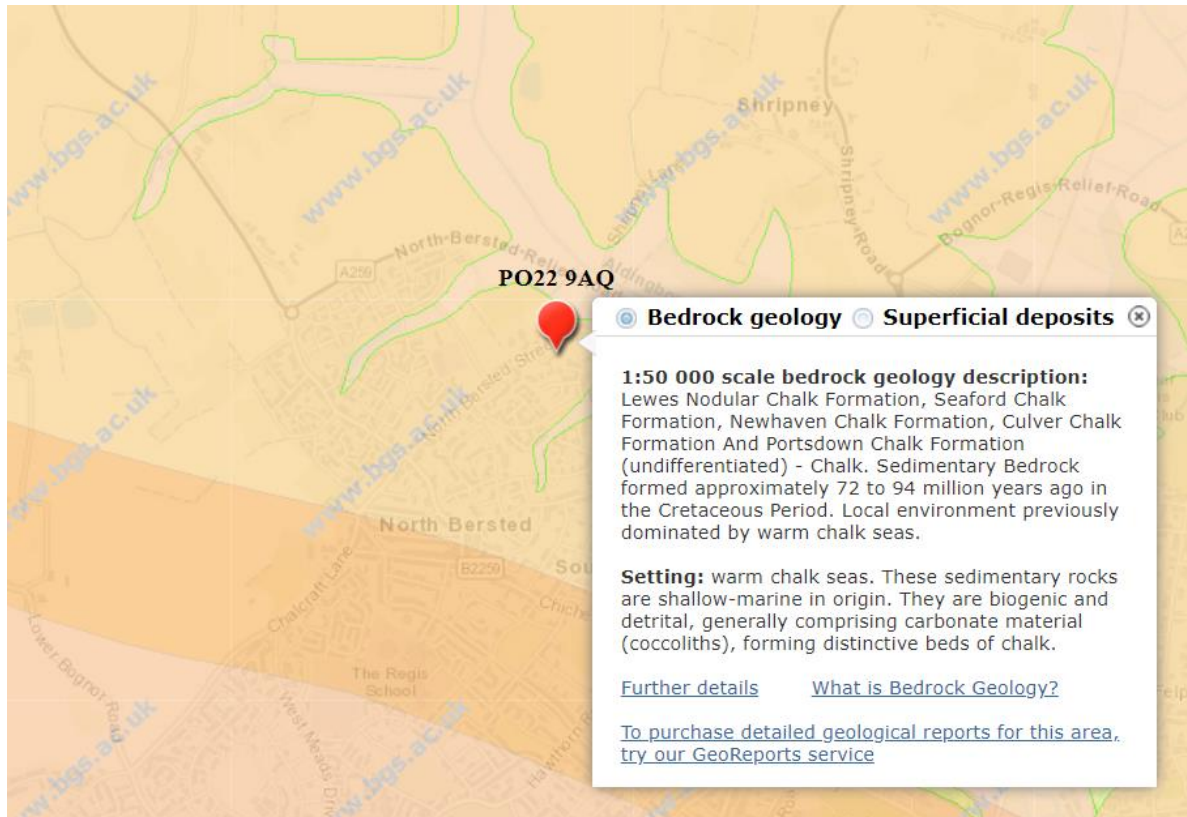


FIGURE 2.2.1 British Geological Survey Map

2.3 TOPOGRAPHY

The Finished Floor Level (FFL) of the existing dwelling is 1.921mAOD and the building is located at the low point of the site. The levels South East of the dwelling rise to 3.6mAOD, levels North are approximately 2.00mAOD and 3.7mAOD North East of the existing dwelling, refer to Appendix A for a topographical survey of the site.



3. STRATEGIC FLOOD RISK ASSESSMENT

A combined Level 1 & 2 Strategic Flood Risk Assessment (SFRA) was carried out in February 2019 by JBA Consulting, the SFRA was produced for Arun District Council.

The purpose of the SFRA was to assess and map the most up to date flood risk information for groundwater, surface water, sewer and river sources taking into account climate change predications.

The relevant details and appendices from the SFRA have been incorporated within section 4.

4. POTENTIAL SOURCES OF FLOODING

4.1. TIDAL

The site is 2800m north of the English Channel, however it is located within a Tidal Flood Zone due to the influence of the tide on the Aldingbourne Rife which is located 245m north east of the site.

4.2. FLUVIAL (RIVERS)

The EA produces floodplain maps for the UK, which show the areas at risk of fluvial and tidal flooding. The magnitudes of the flooding events considered are defined in terms of their return period. Generally, when determining the impact of any development within the floodplain of a fluvial reach, the design standard against which the EA will consider the feasibility of any scheme is typically the 1% annual probability flood (1 in 100 year return period flood) for sites within the floodplain, or the effects of a 1 in 100 year storm if outside the floodplain.

The EA Flood Zone maps identify undefended floodplain, giving the horizontal extent of low (Zone 1), medium (Zone 2) and high-risk flood zones (Zones 3a and 3b) depending on the severity of the flood event.

The site falls within Flood Zone 2, of the Aldingbourne Rife, as indicated on the Environment Agency's Risk of Flooding from Rivers & Sea Map (Figure 4.2.1).

The SFRA confirms that the site is within Flood Zone 3a (*SFRA Appendix C Flood Zones, sheet 10*).



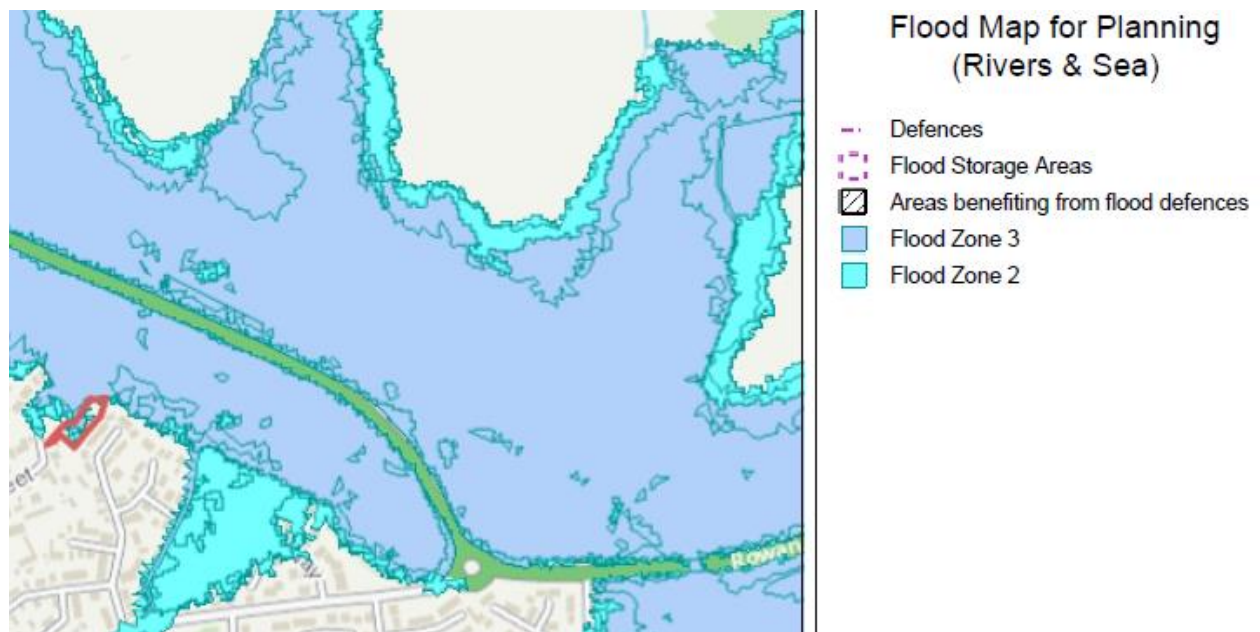


FIGURE 4.2.1 ENVIRONMENT AGENCY FLUVIAL FLOOD RISK MAP

The Environment Agency have provided the JBA Consulting Aldingbourne Modelling Study, this data only contains information for the node 2 & 3 (figure 4.2.2) undefended fluvial water levels for the 1% plus 105% climate change (2070-2015 upper end) which has been determined as 2.28mAOD, refer to Tables 1, 2 & 3, full flood model data is contained within Appendix C.



**Table 1: Water Levels: Fluvial Un defended**

Node Ref	NGR		Modelled Flood Levels in Metres AOD					
			Un defended Annual Exceedance Probability					
	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	492761	101417	-	-	-	-	-	-
2	492777	101420	-	-	-	-	2.28	-
3	492789	101435	-	-	-	-	2.28	-
4	492800	101450	-	-	-	-	-	-

Table 2: Water Levels: Fluvial Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD					
			Defended Annual Exceedance Probability					
	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	492761	101417	-	-	-	-	-	-
2	492777	101420	-	-	-	-	2.28	2.09
3	492789	101435	-	-	-	-	2.28	2.09
4	492800	101450	-	-	-	-	-	-

Table 3: Water Levels: Tidal Un defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
			Un defended Annual Exceedance Probability			
	Eastings	Northings	0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	492761	101417	-	-	3.60	-
2	492777	101420	-	2.49	3.60	1.85
3	492789	101435	1.53	2.49	3.60	1.85
4	492800	101450	-	-	3.60	-

TABLE 1, 2 & 3 ALDINGBOURNE MODELLING STUDY DATA



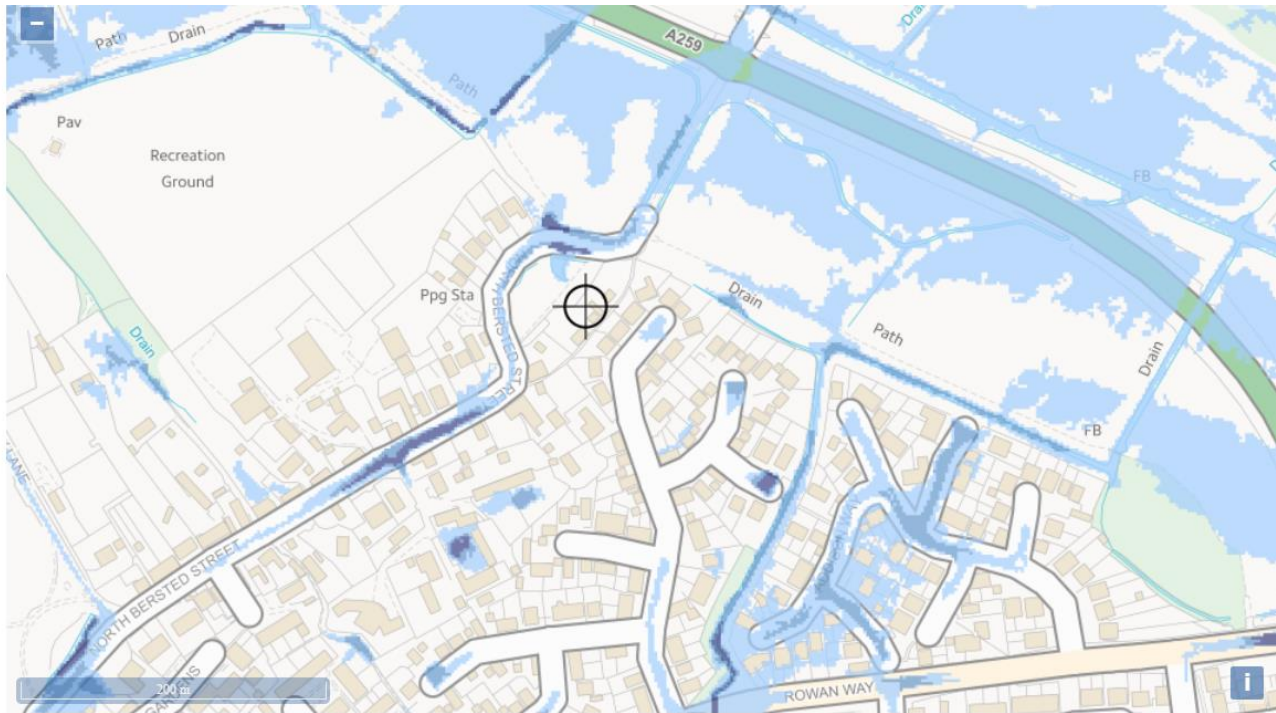


FIGURE 4.2.2 MODEL NODE LOCATIONS

4.3. PLUVIAL (SURFACE WATER)

The Environment Agency also produce maps which highlight the risk of flooding from surface water flows illustrating when the capacity of existing surface water drainage networks and channels are exceeded in extreme rainfall events.

The Environment Agency's risk of flooding from surface water map (below) shows that the site is at very low risk of surface water (pluvial) flooding, figure 4.3, this is also the extent confirmed in the *SFRA, Appendix E Surface Water Flood Risk, sheet 10*.



Extent of flooding from surface water

● High
 ● Medium
 ● Low
 Very low
 ⊕ Location you selected

FIGURE 4.3 ENVIRONMENT AGENCY PLUVIAL FLOOD RISK MAP

4.4.FOUL/SURFACE WATER SEWERS

The SFRA does not highlight the P022 9 postcode as an area suffering from Sewer flooding .

4.5.GROUND WATER

The SFRA highlights the site as being within an area of less <25% susceptible to groundwater flooding with a high risk, although no historic incidents within the area have occurred. refer to *SFRA Appendix F Areas Susceptible to Ground Water Flooding, sheet 10*.

4.6.RESERVOIRS/CANALS AND OTHER ARTIFICIAL SOURCES

The Environment Agency dataset 'Risk of Flooding from Reservoirs' identifies areas that could be flooded if a large reservoir were to fail and release the water it holds. The site is not shown to be at risk of reservoir flooding and is not located near other artificial sources:



4.7. HISTORIC FLOODING

The *West Sussex County Council Report on June 2012 Flood Event*, highlights the site to be within Cluster 6 & 7, an area where flood incidents occurred, however the area is not highlighted as having flooded.

The SFRA does not highlight the site as being in an area which has suffered from historic flooding, *SFRA Appendix H Historic Flood Records, sheet 10*.

5. DEVELOPMENT PROPOSALS

The site is located 2500m to the north of Bognor Regis town centre, off North Bersted Street, see figures 2.1.1 to 2.1.3.

The existing site is 1,668m² in size and consists of a 36m² existing 2 storey, dwelling, three existing sheds/summerhouses with floor areas of 27m², 41 m², 49m², a 29m² area of block paving. The remainder of the site is gravel or soft landscaping

It is proposed to construct an 89m² extension to the east and a 23m² orangery extension to the west side of the existing dwelling. The three sheds/summer houses are proposed to be removed.

SITE DRAINAGE

It is proposed that the roof drainage for the extension and existing building will be discharge to a soakaway design to cater for the 1:100+40% storm return period. Soil infiltration testing will be undertaken prior to construction to enable an infiltration rate to be obtained and soakaway size designed.





6. FLOOD RISK MANAGEMENT MEASURES

The proposed dwelling falls within Flood Zone 2, therefore mitigation measures are to be put into place to reduce the risk to persons living/staying at the dwelling and to the dwelling itself.

The extension is less than 250m² and therefore the proposal is to be considered as 'minor development' in relation to flood risk.

6.1 FINISHED FLOOR LEVELS

The existing floor level is 1.921mAOD, the new extension is proposed to match the existing finished floor level.

The FFL will be 359mm below the 1% AEP +105% flood level of 2.28mAOD.

6.2 FLOOD RESILIENT CONSTRUCTION

The dwelling will be sited within Flood Zone 2 with the finished floor level set 0.359mm below the 1% AEP +105% flood level.

To mitigate against the potential fluvial flood risk to the dwelling flood resilient construction needs to be incorporated into the design and construction of the dwelling. Figure 6.2.1 indicates the potential routes for entry of flood water into a dwelling.



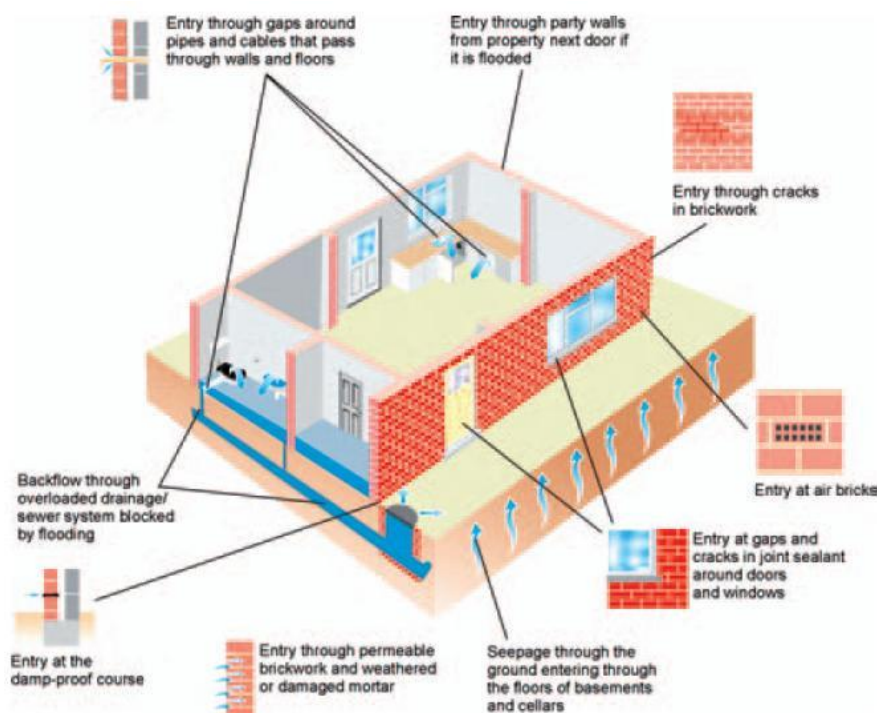


FIGURE 6.2.1 CIRIA POTENTIAL ROUTES FOR ENTRY OF FLOOD WATER INTO A DWELLING

The architect, structural engineer and builder should review and incorporate the recommendations outlined in Communities and Local Government, Improving the Flood Performance of New Buildings, Floor Resilient Constructions.

In particular the following should be incorporated into the dwelling:

- Flood resilient construction methods and materials for floors and walls.
- Anti-flood air bricks or vent covers to the extension and existing dwelling
- Back flow valves for existing and proposed foul water drainage.
- Sealed entry points existing and proposed for services.
- Demountable flood water gates for existing and proposed doors.
- Electrical services located 600mm above the flood level
- Demountable flood gates to all doors

6.3 FLOOD WARNING SYSTEM

The dwelling owners and occupiers should sign up to the Environment Agency Flood Warning Scheme (<https://fwd.environment-agency.gov.uk/app/olr/register>) so that they are aware of the possible onset of flooding and can prepare for the site flooding. This is a free service which allows flood warnings to be received by phone, text or





email.

Further update information can also be found during a flood event at the following locations:

Contact Details for the Environment Agency:

Call Floodline on 0345 9881188

Web site: <https://www.gov.uk/check-if-youre-at-risk-of-flooding>

When the situation is serious, flood warnings will also be broadcast on local television and radio news.

There are 4 Flood Warnings that will be issued by The Environment Agency, refer to Table 6.3.

	Status
	Severe Flood Warning: Severe flooding. Danger to life.
	Flood Warning: Flooding is expected. Immediate action required.
	Flood Alert: Flooding is possible. Be prepared
	Warning no longer in force: Flood warning and flood alerts that have been removed in the last 24 hours

TABLE 6.3 ENVIRONMENT AGENCY FLOOD WARNINGS

The actions that should be undertaken by persons living/staying at the dwellings for each level of flood warning is set out below.

Flood Alert

Ensuring that you are prepared for the site being flooded and the access to the dwelling being unpassable. Stock up on food, bottled water and medication. Ensure that batteries for torches are charged and torches to hand. Remove valuable items





from the ground floor.

Prepare a flood kit to be used in the event that the property needs to be evacuated which should contain a torch, warm and waterproof clothing for a few days, water, food, medication, toys for children and pets, rubber gloves and wellingtons.

Flood Warning

Alternative accommodation should be sought due to the risk of flooding at the site. The dwelling is at a high risk of flooding due to its floor level being below the 1% AEP +105% flood level.

The owner or occupier of the dwelling should put the demountable flood gates in place prior to leaving the dwelling.

Sever Flood Warning

Do not attempt to access the dwelling.

Warning no longer in force

Check that flood water levels have reduced and that no debris has blocked the site or surrounding road network. Remove the demountable flood gates if safe to do so. Only re-occupy the dwelling if it has not been flooded.

6.2 ACCESS & EGRESS

The risk to persons whilst staying in the property is high and therefore the property should be evacuated when a flood warning is issued, by staying at the property or leaving during a Severe Flood Warning the risk becomes greater.

Cars will stop and/or float in water as shallow as 0.5m, whilst some emergency vehicles may survive in water of 1m. A fire engine remains controllable in depths of 0.5m up to a flow velocity of 5 m/sec, due to high-level air intakes/exhausts.

The local road network could be used by vehicles until such time as there is a risk of:

- The presence of water stopping the engine functioning;
- The vehicle floating; or
- The vehicle becoming difficult to control.

The access and egress route from the dwelling to a road outside of the Flood Zone will involve walking to the access road into the site which is above the 1%+105% Flood level, refer to figures 6.2.1 to 6.2.2. Care will need to be taken when travelling past the Junction of North Bersted Street and Rowan Way as this is shown to be within Flood Zone 2 & 3.



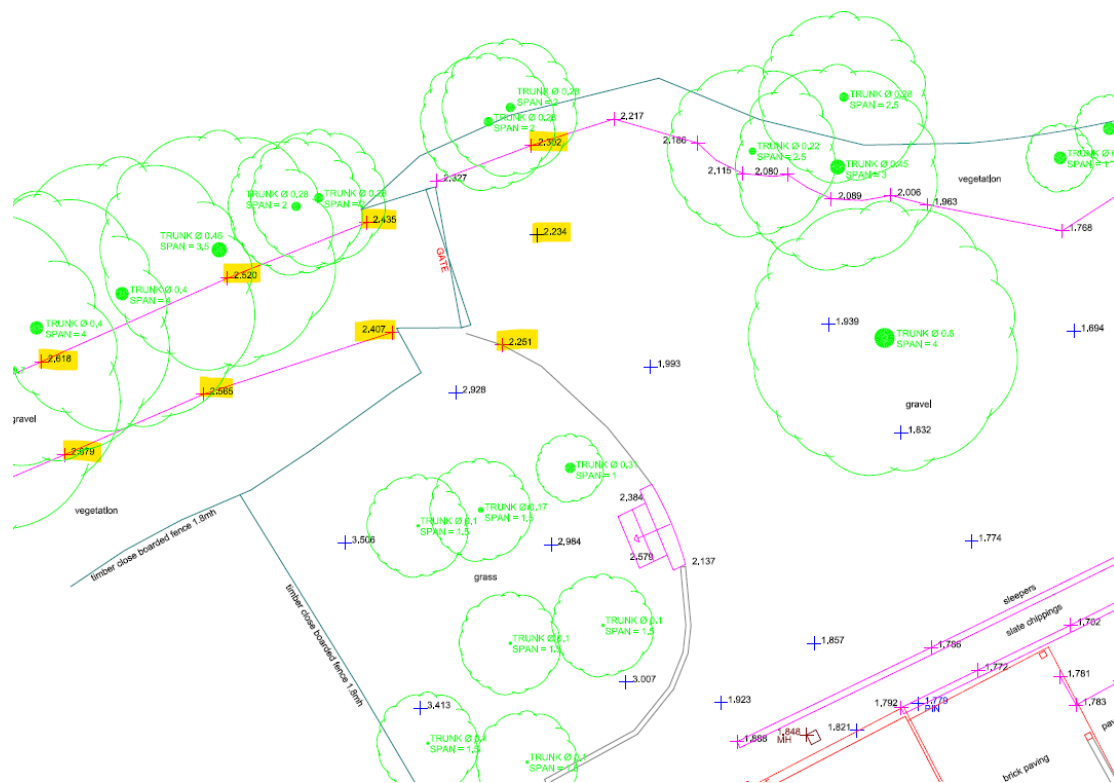


FIGURE 6.2.1 EXISTING SITE LEVELS ABOVE THE 1%+105% FLOOD LEVEL

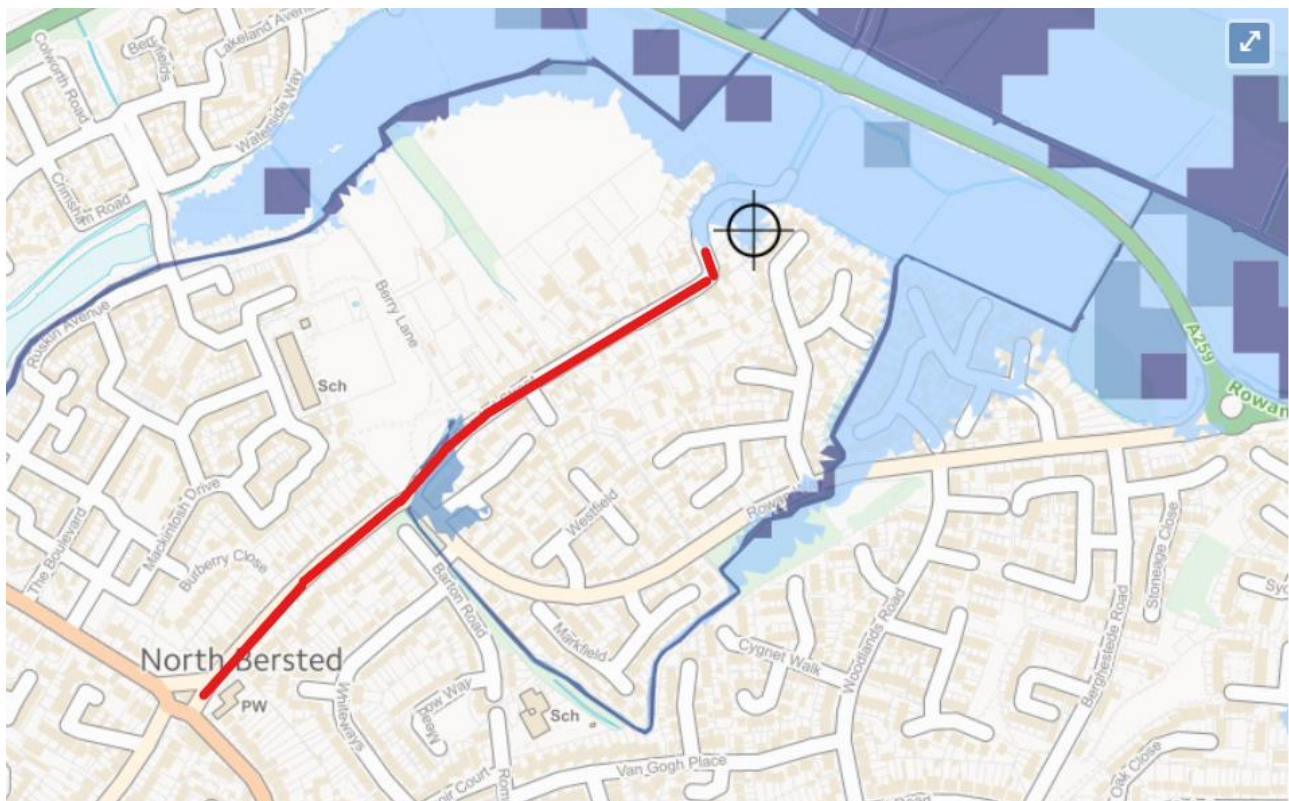


FIGURE 6.2.1 ROUTE TO AREA OUTSIDE FLOOD ZONE





7. SUMMARY AND CONCLUSIONS

The existing dwelling is sited within Flood Zone 2, however with a 105% climate change factor added to the modelled flood levels it is deemed to be at a higher risk.

The extension FFL will match the existing dwelling FFL which is 359mm below the 1% AEP +105% flood level of 2.28mAOD.

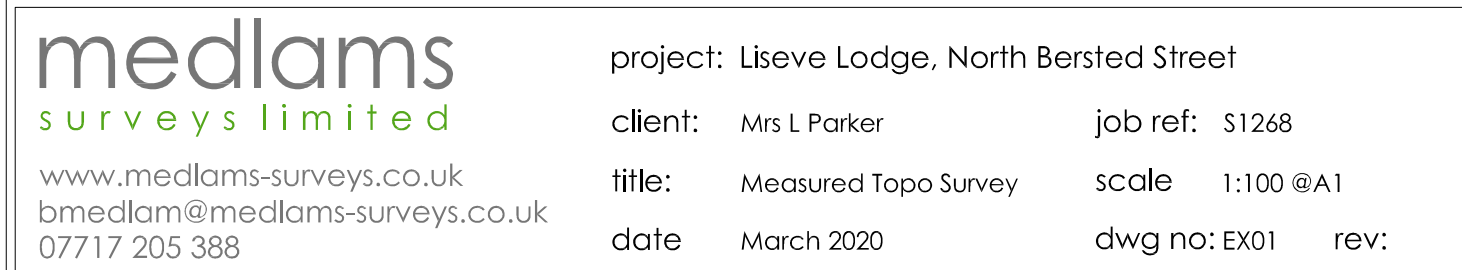
The extension will be constructed using flood resistance construction methods to mitigate the risk of flood water entering the dwelling.

The owner/occupiers of the site will be connected to the Environment Agency's floodline and a set of procedures has been set out to for the site being flooded.





Kerb levels have been taken on the top of the channel.



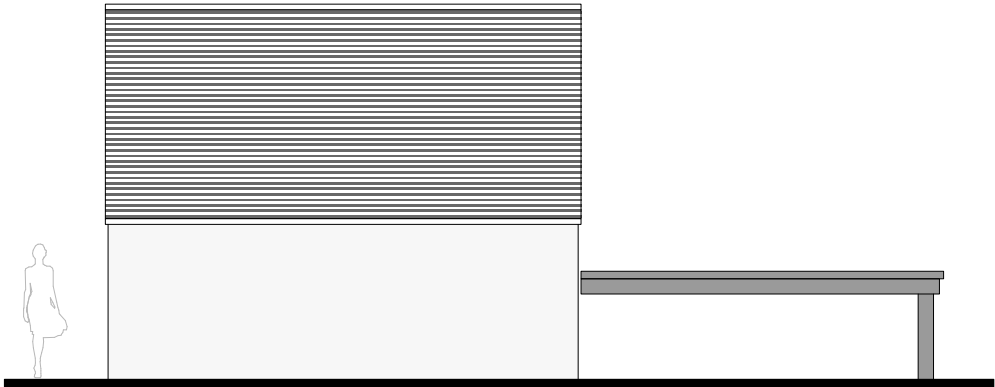


APPENDIX B – DEVELOPMENT PROPOSALS





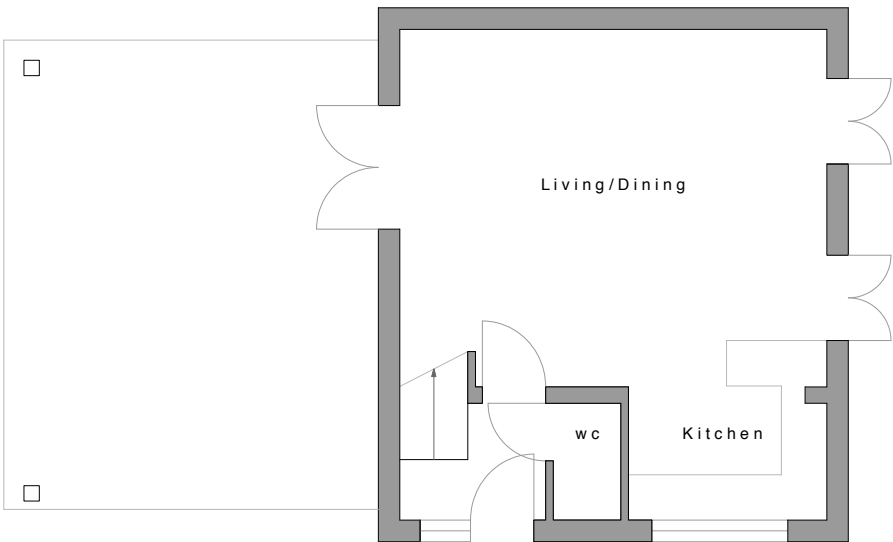
Existing Front Elevation at 1:100 scale
NORTH WEST



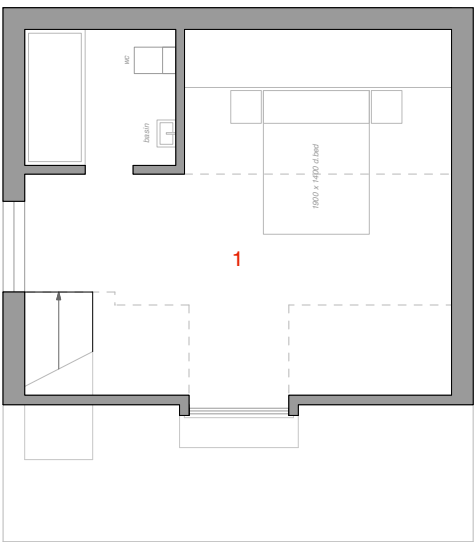
Existing Rear Elevation at 1:100 scale
SOUTH WEST



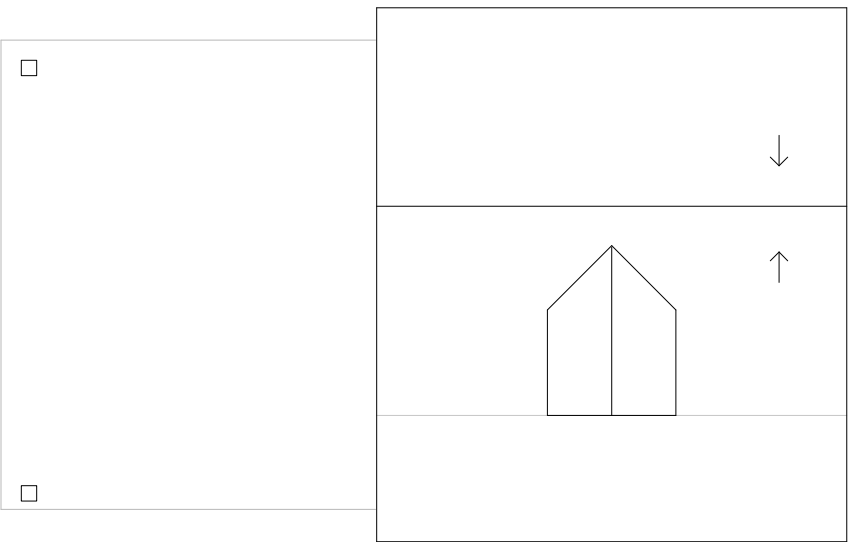
Existing Side Elevation at 1:100 scale
NORTH EAST



Existing GF Plan at 1:100 scale



Existing FF Plan at 1:100 scale



Existing Roof Plan at 1:100 scale

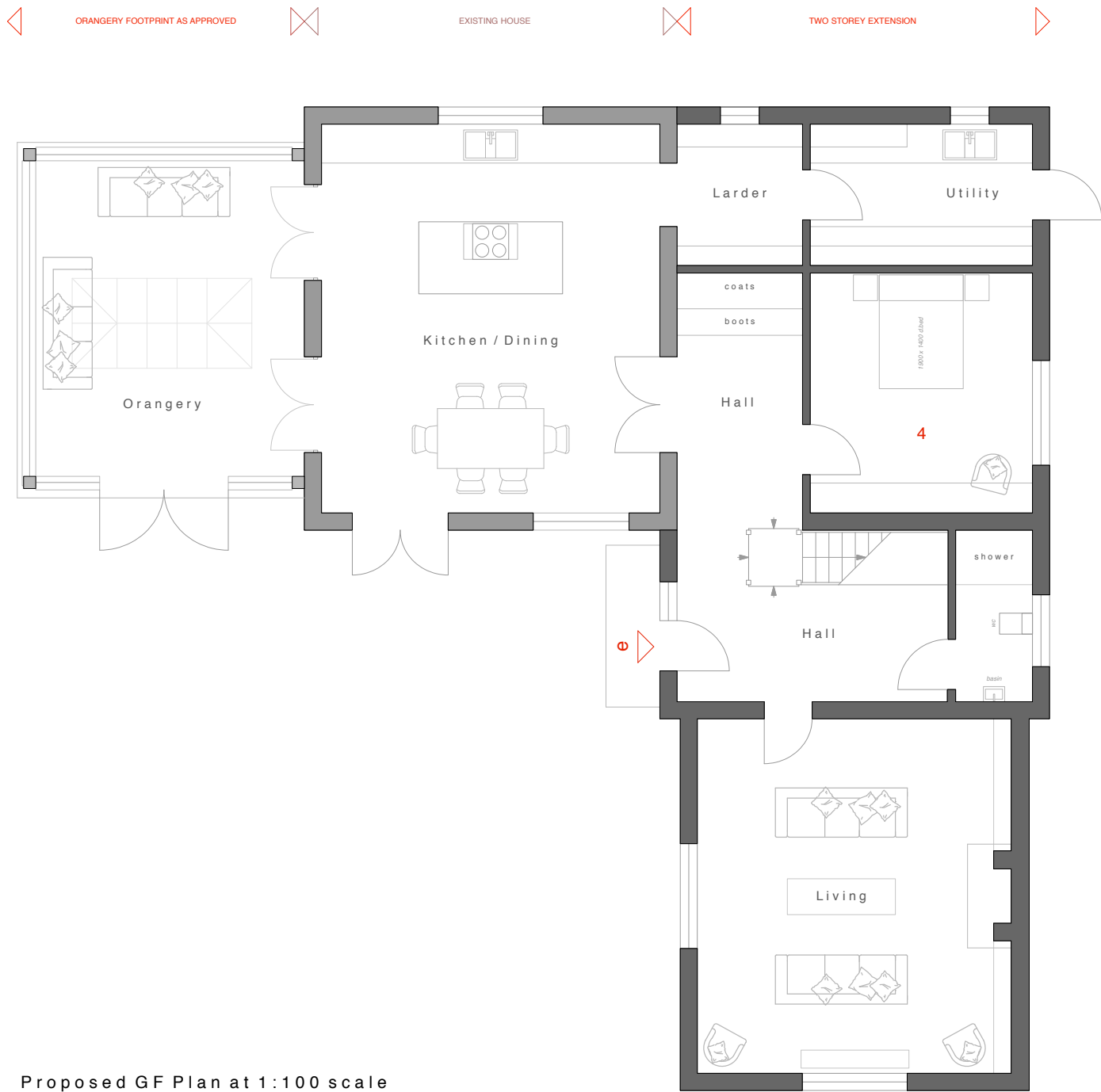
0 1.5 m 3 m
scale bar 1: 100
Drawings & Scale Bar are for
Planning Purposes Only.
These are not Survey Drawings

0. DRAWINGS ARE INDICATIVE AND STRICTLY FOR PLANNING PURPOSES ONLY.
1. DRAWINGS ARE NOT TO BE SCALED EXCEPT FOR PLANNING PURPOSES.
2. ROOM DIMENSIONS WHERE SHOWN ARE APPROXIMATE.
3. ALL DIMENSIONS TO BE CONTRACTOR-CHECKED ON SITE BEFORE USE.
4. PROPOSED DRAWINGS ARE SUBJECT TO LOCAL AUTHORITY PLANNING / LBC & BUILDING REGULATIONS APPROVAL.
5. ALL DIMENSIONS MUST BE CHECKED AND CONFIRMED BY CONTRACTOR PRIOR TO ANY CONSTRUCTION WORKS TAKING PLACE.
6. THESE ARE NOT SURVEY DRAWINGS. SCALE BAR FOR PLANING PURPOSES ONLY.
7. DRAWINGS REMAIN COPYRIGHT OF CORINTHIAN ARCHITECTURAL DESIGN AND CANNOT BE REPRODUCED OR USED BY ANOTHER PARTY WITHOUT PRIOR WRITTEN CONSENT.
ARUN DISTRICT COUNCIL BE/17/21/HH

CLIENT	Mrs L Parker	DRAWING	001 Existing Plans & Elevations		
SITE	84 North Bersted Street, Bognor Regis	DATE	09 09 20	AUTHOR	AH
PROJECT	Extensions & Alterations	SCALE	1: 100 @ A3	STATUS	PL

CORINTHIAN ARCHITECTURAL DESIGN

Main Road, Fishbourne, West Sussex. PO18 8BD
01243 576 078 > contact@corinthianad.co.uk > www.corinthianad.co.uk

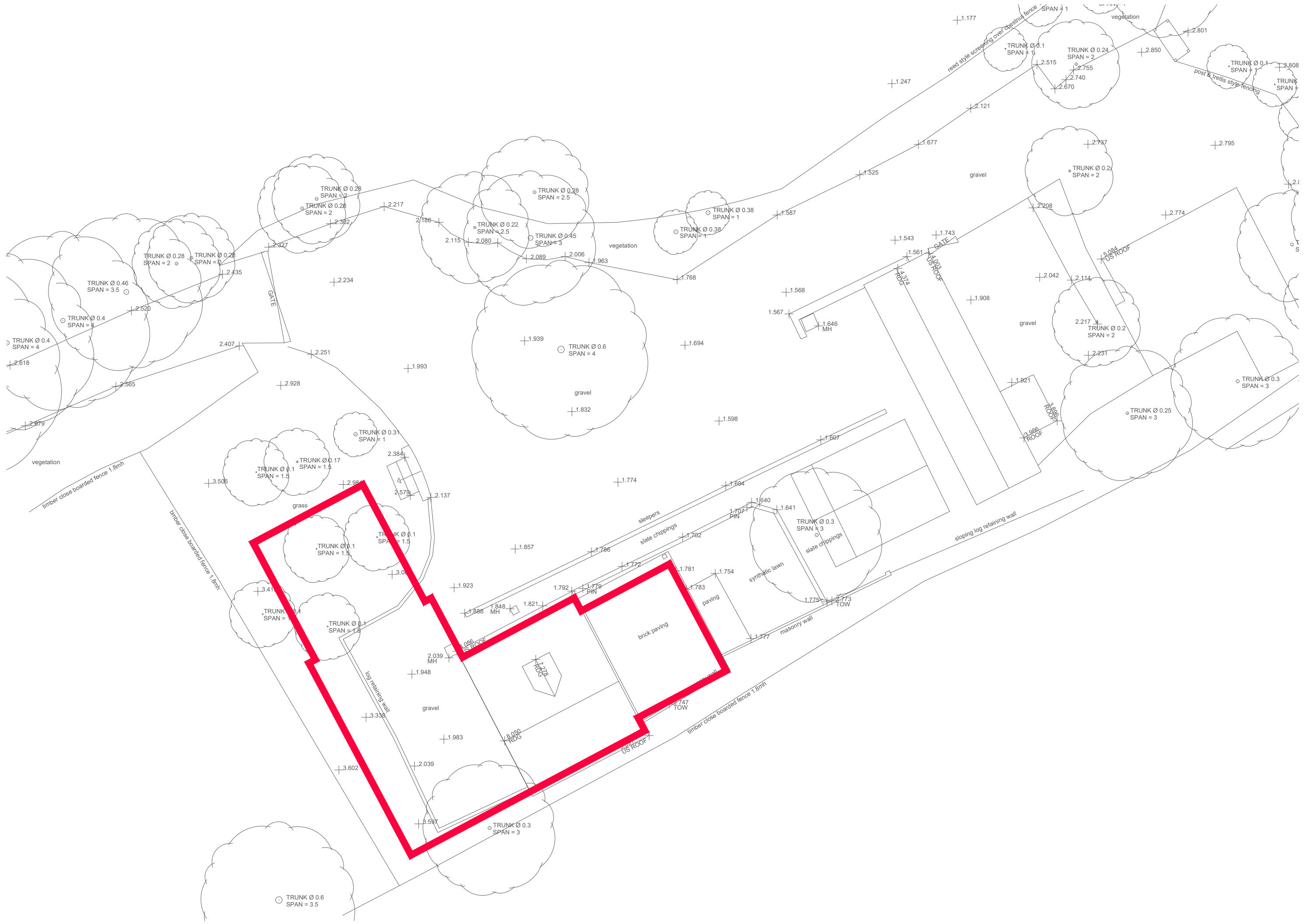


0. DRAWINGS ARE INDICATIVE AND STRICTLY FOR PLANNING PURPOSES ONLY.
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CLIENT	Mrs L Parker	DRAWING	002 Proposed Floor Plans		
SITE	84 North Bersted Street, Bognor Regis	DATE	09 09 20	AUTHOR	AH
PROJECT	Extensions & Alterations	SCALE	1: 100 @ A3	STATUS	DRAFT

CORINTHIAN ARCHITECTURAL DESIGN

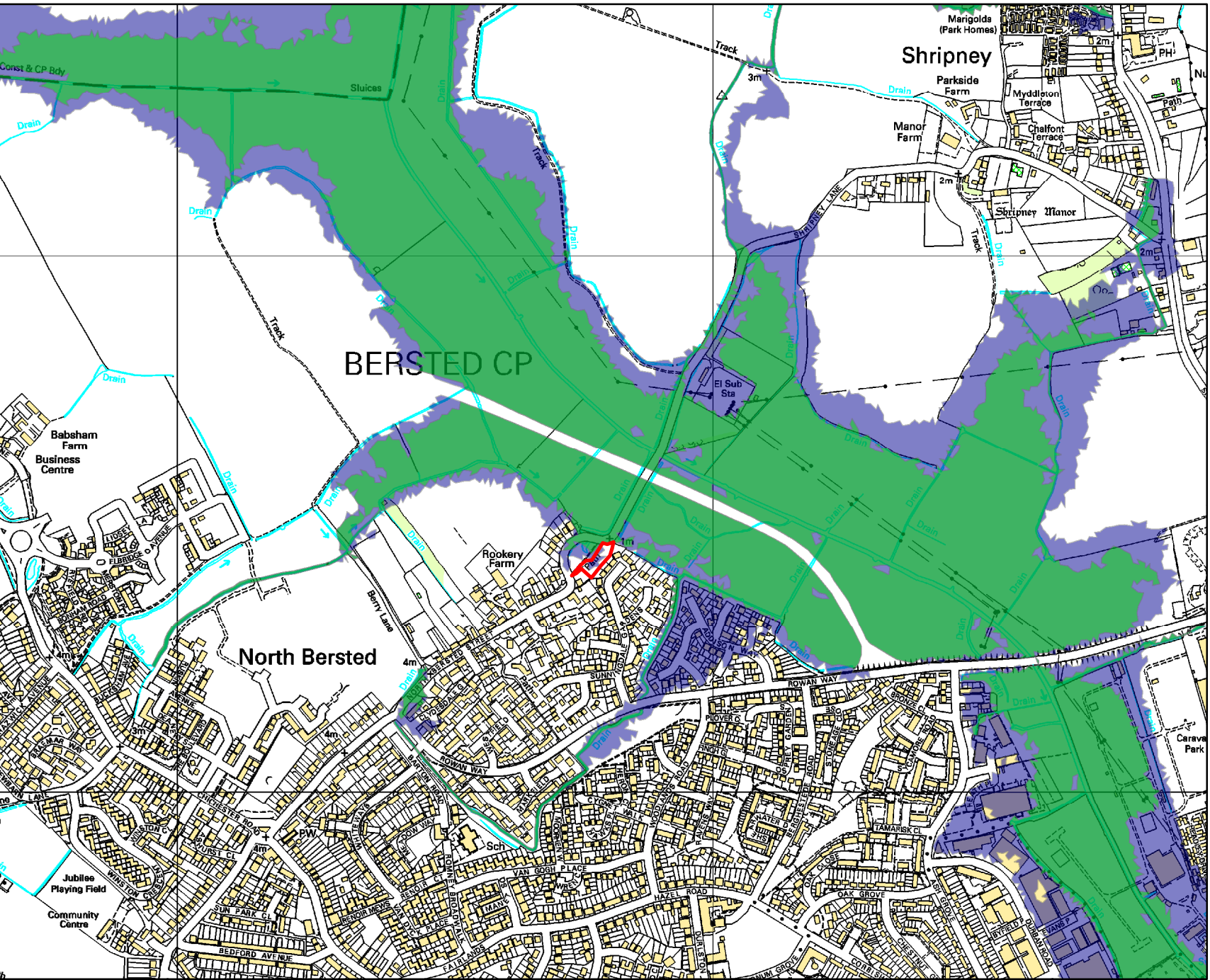
Main Road, Fishbourne, West Sussex. PO18 8BD
01243 576 078 > contact@corinthianad.co.uk > www.corinthianad.co.uk



APPENDIX C – EA FLOOD DATA



Modelled Flood Outlines (undefended fluvial) - Created 21/10/20





Environment
Agency

N



Legend

 Site Boundary

 1% AEP (Undefended Fluvial)

 0.1% AEP (Undefended Fluvial)

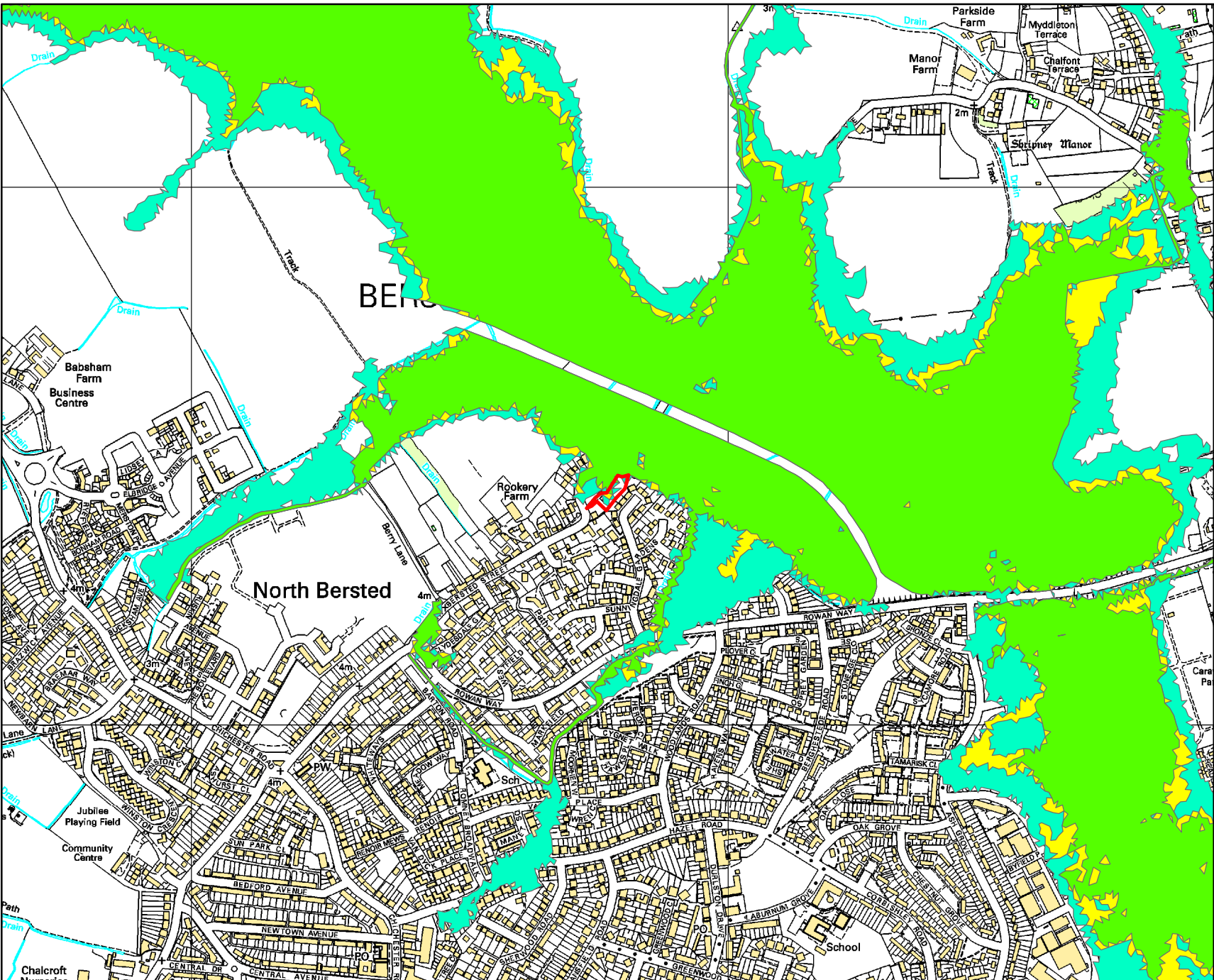
Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



0 0.225 0.45
Kilometers

Modelled Flood Outlines (Climate Change Allowances Undefended Fluvial) - Created 21/10/20



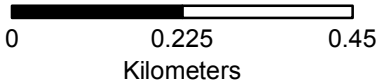
Environment
Agency



Legend

- Site Boundary
- ALD_FLUV_undef_0135_max
- ALD_FLUV_undef_0145_max
- ALD_FLUV_undef_0205_max

Scale: 1:10,000



Product 4 Flood Risk Data Requested by: Baker and Associates

Site: 84 North Bersted Street, Bognor Regis. PO22 9AQ

Table 1: Water Levels: Fluvial Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD					
			Undefended Annual Exceedance Probability					
	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	492761	101417	-	-	-	-	-	-
2	492777	101420	-	-	-	-	2.28	-
3	492789	101435	-	-	-	-	2.28	-
4	492800	101450	-	-	-	-	-	-

Table 2: Water Levels: Fluvial Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD					
			Defended Annual Exceedance Probability					
	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	492761	101417	-	-	-	-	-	-
2	492777	101420	-	-	-	-	2.28	2.09
3	492789	101435	-	-	-	-	2.28	2.09
4	492800	101450	-	-	-	-	-	-

Table 3: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
			Undefended Annual Exceedance Probability			
	Eastings	Northings	0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	492761	101417	-	-	3.60	-
2	492777	101420	-	2.49	3.60	1.85
3	492789	101435	1.53	2.49	3.60	1.85
4	492800	101450	-	-	3.60	-

Table 4: Water Depths: Fluvial Undefended

Node Ref	NGR		Modelled Flood Depths in Metres					
			Undefended Annual Exceedance Probability					
	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	492761	101417	-	-	-	-	-	-
2	492777	101420	-	-	-	-	0.43	-
3	492789	101435	-	-	-	-	0.35	-
4	492800	101450	-	-	-	-	-	-

Table 5: Water Depths: Fluvial Defended

Node Ref	NGR		Modelled Flood Depths in Metres					
			Defended Annual Exceedance Probability					
	Eastings	Northings	5%	1%	1% +CC (35%)	1% +CC (45%)	1% +CC (105%)	0.1%
1	492761	101417	-	-	-	-	-	-
2	492777	101420	-	-	-	-	0.43	0.24
3	492789	101435	-	-	-	-	0.35	0.16
4	492800	101450	-	-	-	-	-	-

Table 6: Water Depths: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
			Undefended Annual Exceedance Probability			
	Eastings	Northings	0.5%	0.5% (2070)*	0.5% (2115)*	0.1%
1	492761	101417	-	-	1.18	-
2	492777	101420	-	0.9	2.01	0.26
3	492789	101435	0.04	0.52	1.64	0.12
4	492800	101450	-	-	0.78	-

All levels taken from:

Fluvial: Aldingbourne Flood Risk Mapping Study, completed in 2015 by JBA Consulting, plus climate change allowances (2016). Tidal: River Arun to East Head, completed in 2016 by JBA Consulting.

Produced on: 21/10/2020

***The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019.**

You should refer to '[Flood risk assessments: climate change allowances](#)' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

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

Office Address: Guildbourne House, Chatsworth Road, Worthing BN11 1LD.
Customer services line: 03708 506 506. Email: enquiries@environment-agency.gov.uk
www.gov.uk/government/organisations/environment-agency



Environment
Agency



Legend

● Site Nodes

□ Site Boundary

Scale: 1:1,000

