

71 Beach Road, Littlehampton, BN17 5JH

Reference: 213- FRA- 002

Apr-21

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	Section	Page
Introduction	1	2
Site Development Assessment	2	3
National and Local Planning Policy	3	4
Assessment and Mitigation of Flood Risk	4	5
Conclusions	5	14
Appendices		
Site Location Plan	A	
Existing and Proposed Site Layouts	B	
Site Characteristics	C	

Purpose of this report

- 1.1 RIDA Reports Ltd has been appointed by the owner of 71 Beach Road, Littlehampton to undertake a Level 1 Screening Flood Risk Assessment for a development located at BN17 5JH.

Objectives

- 1.2 The objectives of this FRA are to demonstrate the following:
- * Whether the proposed development is likely to be affected by current or future flooding.
 - * Whether the proposed development will increase flood risk elsewhere.
 - * Whether the flood risks associated with the proposed development can be satisfactorily managed.
 - * Whether the measures proposed to deal with the flood risk are sustainable.

Documents Consulted

- 1.3 To achieve these objectives the following documents have been consulted and/or referenced:

The National Planning Policy Framework (NPPF)
CIRIA C753 document The SuDS Manual, 2015
Local Flood Risk Management Strategy (LFRMS)
Level 1 Strategic Flood Risk Assessment (SFRA)
Aerial photographs and topographical survey of the site
British Geological Society Records
Environment Agency flood maps
The CIRIA publication 'C635 Designing for exceedance in urban drainage— Good practice'



Development Site and Location

- 2.1 The site is located at Beach Road, Littlehampton. The nearest post code is BN17 5JH. Refer to appendix A for site location plan.
- 2.2 The current use of the site is a single dwelling. The current use vulnerability classification of the site is More vulnerable . The site is located in the River Flood Zone 3. Refer to Appendix B for more details.

Development Proposals

- 2.3 The proposed development includes the conversion of the existing house into 3 dwellings. Refer to Appendix B for layout of the proposed development.
- 2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

Site Hydrology and Hydrogeology

- Surface Water 2.5 The River Arun is approximately 330 m away from the development.
- Aquifer 2.6 The development is located within a secondary aquifer type A. Aquifers type A consist of permeable layers capable of supporting water supplies at a local rather than strategic scale. They are generally aquifers formerly classified as minor aquifers.
- Source Protection Zone 2.7 The site is not located within a Source Protection Zone.
- Ground Water Levels 2.8 The ground water levels for this site are unknown. However it is likely that the water table is low.

Site Geology

- Bedrock 2.9 The British Geological Society records of the site show that it is located within the White Chalk.
- Superficial Deposits 2.10 The British Geological Society records show that the superficial deposits are Clay, Silt - Brickearth.
- Contaminated Land 2.11 The contaminated land register has not been consulted. The owner suggested that the site is not contaminated



National Planning Policy Framework (NPPF)

- 3.1 The NPPF and its technical guidance is a set of planning policies with the key objective to contribute to the achievement of sustainable development. As part of it, they ensure that flood risk and sustainability are taken into account during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the layout of the development and the application of Sustainable Drainage Systems (SuDS). Adoption of these principles at early stages of the project can ensure that the developments take into account appropriate mitigation which is included within the detailed design of the schemes.

The Flood and Water Management Act (2010)

- 3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides a robust management of flood risk for people, homes and businesses and also encourages the use of SuDS for developments. A robust SuDS strategy should take into account the recommendations given in this Flood Risk Assessment. The drainage strategy should incorporate SuDS within the design and also attenuate all flows to either the greenfield or brownfield run off and take into account the risk from other sources as necessary.

Level 1 Strategic Flood Risk Assessment (SFRA)

- 3.3 The SFRA Level 1 identifies flood risk constraints in the local Area. It gives procedures that should be followed in planning to tackle flood risk during any development.
- 3.4 The Arun District Council Level 1 Strategic Flood Risk Assessment Final Report 2016 was reviewed and followed as part of this report.

Level 2 Strategic Flood Risk Assessment (SFRA)

- 3.5 The SFRA Level 2 provides more information on the area identified in the SFRA Level 1, in order to show whether the Exception Test can be passed.



- 4.1 The flood risks were determined by identifying the sources of flooding and assessing their possible impact and likelihood to the development.

Fluvial Flood Risk - Assessment

- 4.2 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the sequential risk-based approach recommended in the NPPF. The sequential test takes into account the flood risk vulnerability of land uses in relation to the flood zone categorisation. These parameters are assessed in order to determine whether the development is appropriate. Under certain circumstances the exception test is applicable.

Sequential test

- Step 1** 4.3 The proposed development falls within The Environment Agency Flood Zone 3. The Flood Zone 3 is considered to have a high probability of flooding with a 100 years or less annual probability or >1%AEP.
- Flood Zone categorization

- Step 2** 4.4 Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF Planning Practice Guide, the proposed development is classified as 'More vulnerable'.
- Sequential test

- Step 3** 4.5 The Flood Risk vulnerability and Flood Zone Compatibility table of the NPPF Planning Practice Guide states that More vulnerable developments are required to pass the Exception Test in this area.
- Sequential Test Results

The Exception Test

- 4.6 The development requires to pass the Exception Test. For the Exception Test to be passed the following conditions must be met:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic flood risk Assessment (SFRA) where one has been prepared.
- the development should be on previously-developed land or, if It is not on previously developed land, there should be no reasonably alternative sites on developable previously-developed land.
- A FRA must demonstrate that the development will be safe, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.



- 4.7 The development provides wider sustainability benefits as it provides additional housing in the area. The new dwellings will enhance the character of the site.
- 4.8 The benefits for this site outweigh the flood risk as the development provides a much needed housing in this area.
- 4.9 The site is an already developed site. The following sections of this flood risk assessment demonstrate that the proposed development can be safely established with an adequate standard of flood protection, including allowance for climate change, and that proposed surface water management provisions may make a contribution to reduction in flood risk elsewhere. On this basis it is concluded that the proposed development passes the Exception Test.

Fluvial Flood Risk - Flood Levels

- 4.10 The site does not benefit from flood defences. The Environment Agency records show that the area around the site has not been flooded in the past.
- 4.11 The 1% AEP level for this site is unknown.

Table 1: Product 4 information

Annual Exceedance Probability		Levels m AOD
	%	
1 in 100	1%	Unknown

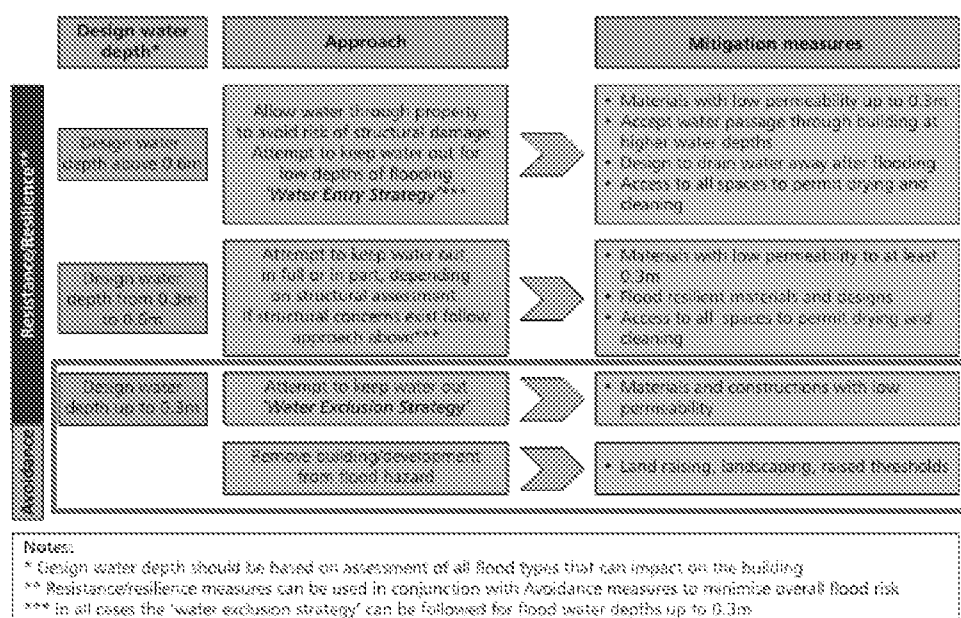
- 4.12 The Climate Change allowances for the site is likely to be a central allowance of 500mm.



Fluvial Flood Risk - Resistance and Resilience Plan

- 4.13 There are not changes to the levels of the building neither substantial changes to the internal layout of the building.
- 4.14 Should changes to the fabric of the building be made, the flood resilience strategy for the development should be based on the CLG 2007 Improving the Flood Performance of New Building. See figure 1 below. The strategy is based on the water level within the proximity to the building.
- 4.15 Since the design water depth is unknown. It has been assumed that it is 300mm above the level of the ground level of the building. The water entry strategy approach has been used with a water exclusion strategy for up to 300mm depth flows.

Figure 1: Rationale for flood resilient and/or resistant design strategies.



- 4.16 The building should utilise building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in Figure 2 shall be used for construction of the new building.

Figure 2: Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
Bricks			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
Blocks			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aercrete	Medium	Poor	Good
Timber board			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
Gypsum plasterboard			
Gypsum Plasterboard, 9mm thick	Poor	Not assessed	Poor
Mortars			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth

4.17 Services and fittings (communications wiring, hearing systems, electrical services, water, electricity and gas meters) should be placed at above the flood level.

4.18 Where possible, all service entries should be sealed (e.g. with expanding foam or similar closed cell material).

4.19 Closed cell insulation should be used for pipes which are below the predicted flood level.

4.20 Fittings should be designed to be replaced after a flood, it is advisable to specify durable fittings that are not appreciably affected by water and can be easily cleaned (e.g. use of plastic materials or stainless steel).



- 4.21 The cost of these fitting and units may need to be balanced against the predicted frequency of flooding. Avoid wood fibre based carcasses and use easily removable solid wood doors and drawers.

Fluvial Flood Risk - Access and Evacuation

- 4.22 Safe egress is achievable by following Selborne Road towards Fitzalan Road, which is shown to be beyond the extent of flooding. See figure 3 below for details.
- 4.23 The site is within an Environment Agency Flood Warning Area. The occupants of the site are encouraged to sign up to the alerts and should use these to form an appropriate Flood Management and Evacuation Plan prior to occupation of the site.

Figure 3: General evacuation route



Fluvial Flood Risk - Surface Water Management

4.24 The surface water run-off will be disposed using SuDS techniques. The aim is to provide a sustainable design that accommodates the proposed attenuation volume and replicated the existing drainage regime using the SuDS hierarchy is shown in the figure 4 below.

4.25 The SuDS techniques highlighted in red below can be used on site. This assessment is based on the ground conditions and the potential discharge points available.

Figure 4: The SuDS Hierarchy (Source:EA Thames region, SuDS a practical guide)

<i>Most Sustainable</i>	<i>SUDS technique</i>	<i>Flood Reduction</i>	<i>Pollution Reduction</i>	<i>Landscape & Wildlife Benefit</i>
	Living roofs	✓	✓	✓
	Basins and ponds	✓	✓	✓
	- Constructed wetlands			
	- Balancing ponds			
	- Detention basins			
	- Retention ponds			
	Filter strips and swales	✓	✓	✓
	Infiltration devices	✓	✓	✓
	- soakaways			
	- infiltration trenches and basins			
	Permeable surfaces and filter drains	✓	✓	
	- gravelled areas			
	- solid paving blocks			
	- porous paviers			
<i>Least Sustainable</i>	Tanked systems	✓		
	- over-sized pipes/tanks			
	- storm cells			

4.26 These SuDS techniques should be implemented and sized during the detailed design of the project.

Fluvial Flood Risk - Working next to a main river

4.27 The development is more than 8 metres of the bank of a main river, or 16 metres if it is a tidal main river. A Flood risk activity Environmental Permit is not required.



Surface water (overland flows) flood risk

- 4.28 The basis of the surface water flood maps is defined by the Environment Agency as follows.

"The nationally produced surface water flood mapping only indicates where surface water flooding could occur as a result of local rainfall

- Ordinary watercourses
- Drainage systems or public sewers caused by catchment-wide rainfall events
- Rivers
- Groundwater.

Due to the modelling techniques used, the mapping picks out depressions in the ground surface and simulates some flow along natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings. Although the maps appear to show flooding from ordinary watercourses, they should not be taken as definitive mapping of flood risk from these as the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled. Also, structures (such as bridges, culverts and weirs) and flood risk management infrastructure (such as defences) are not represented.

The nationally produced surface water flood mapping does not take account of the effect of pumping stations in catchments with pumped drainage. No allowance is made for tide locking, high tidal or fluvial levels where sewers cannot discharge in to rivers or the sea."

- 4.29 The Environment Agency maps show that the flood risk from surface water is medium. The residual risk of localised deep ponding remains likely. The development has incorporated water resilience and resistance interventions to avoid substantial damage to the building.

Flooding from drainage systems in adjacent areas

- 4.30 There are no records of sewer flooding within the site.

- 4.31 The site is outside of a critical drainage area. No mitigation required.



Reservoirs Risks

- 4.32 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes and can be used to help reservoir owners produce on-site plans and the Local Resilience Forum produce off-site plans, and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be within the possible dam breach flooding path. It is recommended that the Local Resilience Forum is contacted during detailed design. See Appendix C.

Groundwater flood risk

- 4.33 The strategic flood risk assessment shows that there is potential for groundwater flooding below ground level within the development. Groundwater levels would tend to vary seasonally and are influenced by ground and meteorological conditions and proximity to water features. The groundwater flooding risk for this site is considered to be low; however it is recommended that groundwater resilience measures should be implemented if the current basement is being utilised. These will include providing tanking to the building to prevent groundwater ingress.



- 5.1 The change of use is compatible the flood zone location. The development fully complies with the NPP guidelines.
- 5.2 The site is within an Environment Agency Flood Warning Area. The occupants of the site are encouraged to sign up to the alerts and should use these to form an appropriate Flood Management and Evacuation Plan prior to occupation of the site.
- 5.3 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.







Appendix A





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Elegant designs

Elegant Designs - Elly Hutton
Tel. 01372 270224

256 Barnett Wood Lane, Ashted,
Surrey KT21 2BY

PROJECT

Change of use from single dwelling to flats
71 Beach Road, Littlehampton,
BN17 5JH
for Dr Chelliah Chandrarajan

SCALE 1:200 & 1:500 on A3

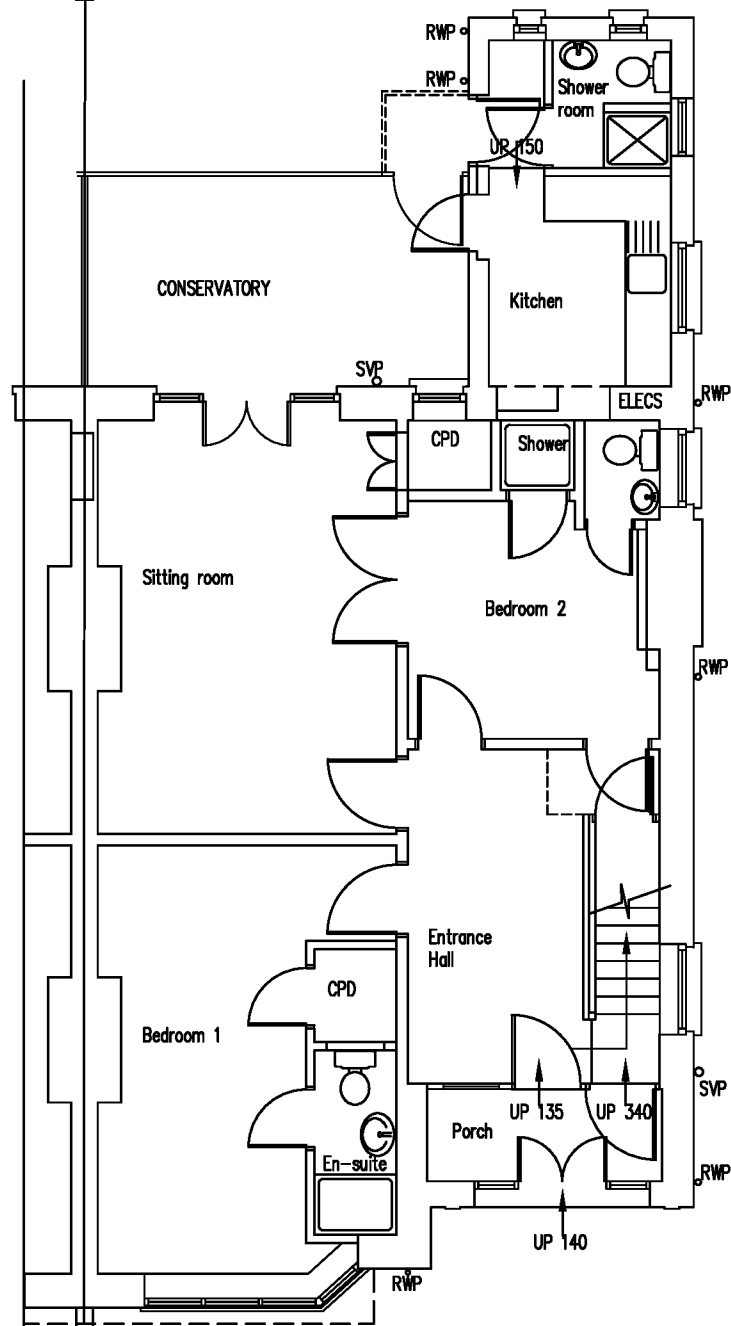
DATE 11/03/21 Drawn by EH

PROJECT DRAWING NUMBER REVISION
BRL-1 01 A



Appendix B



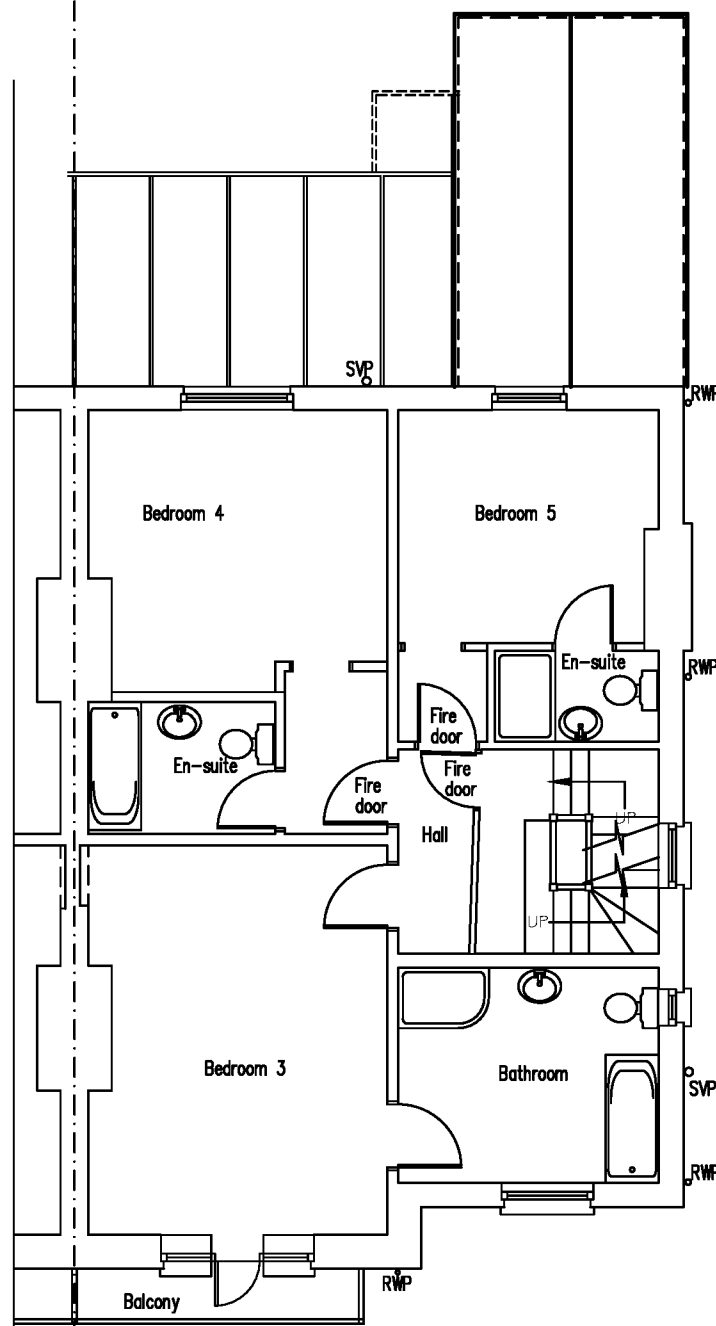


EXISTING GROUND FLOOR PLAN

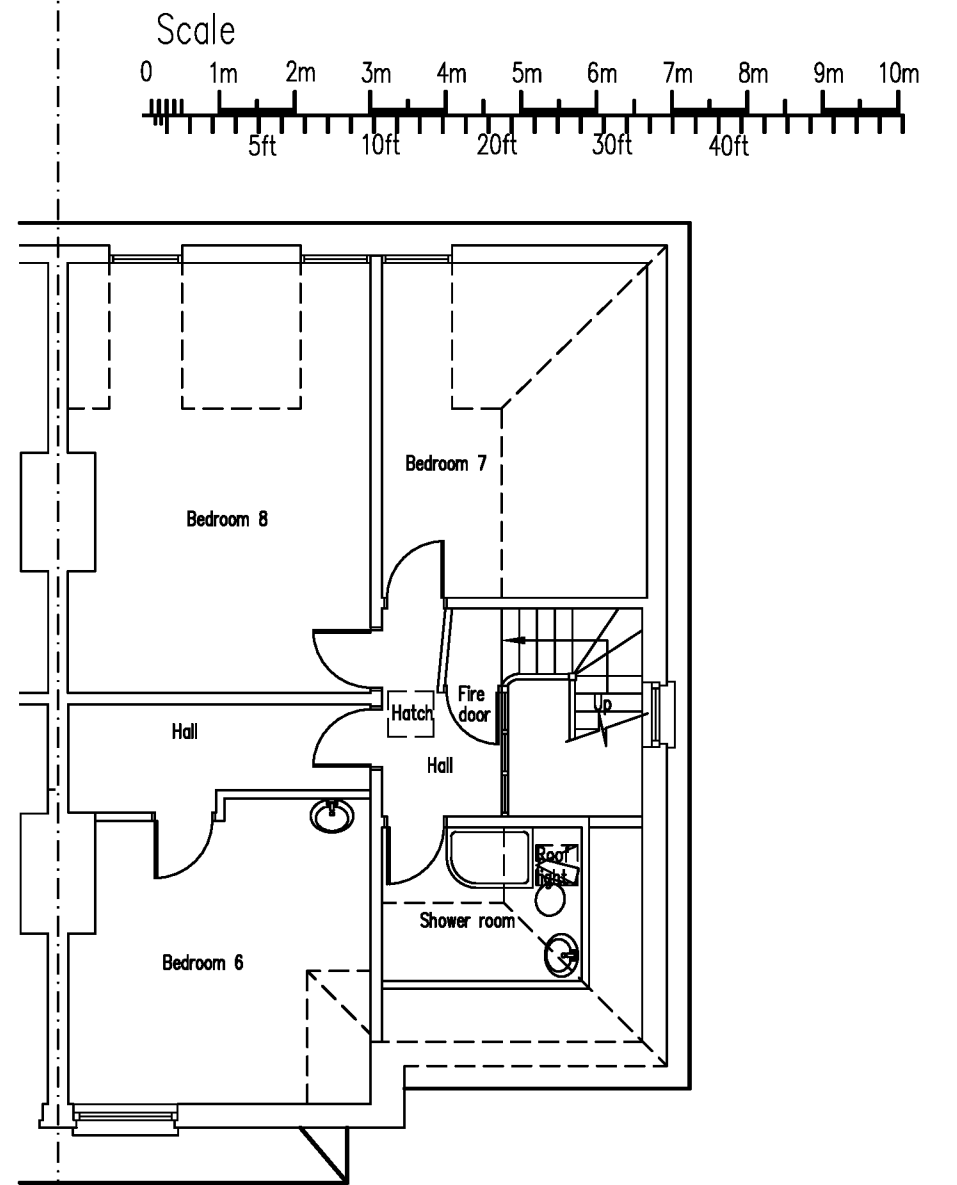
Existing Car Park
allocated for the flats
Parking space 5600x2900mm

Existing Car Park
allocated for the flats
Parking space 5600x2900mm

Existing Car Park
allocated for the flats
Parking space 5600x2900mm



EXISTING FIRST FLOOR PLAN



EXISTING SECOND FLOOR PLAN

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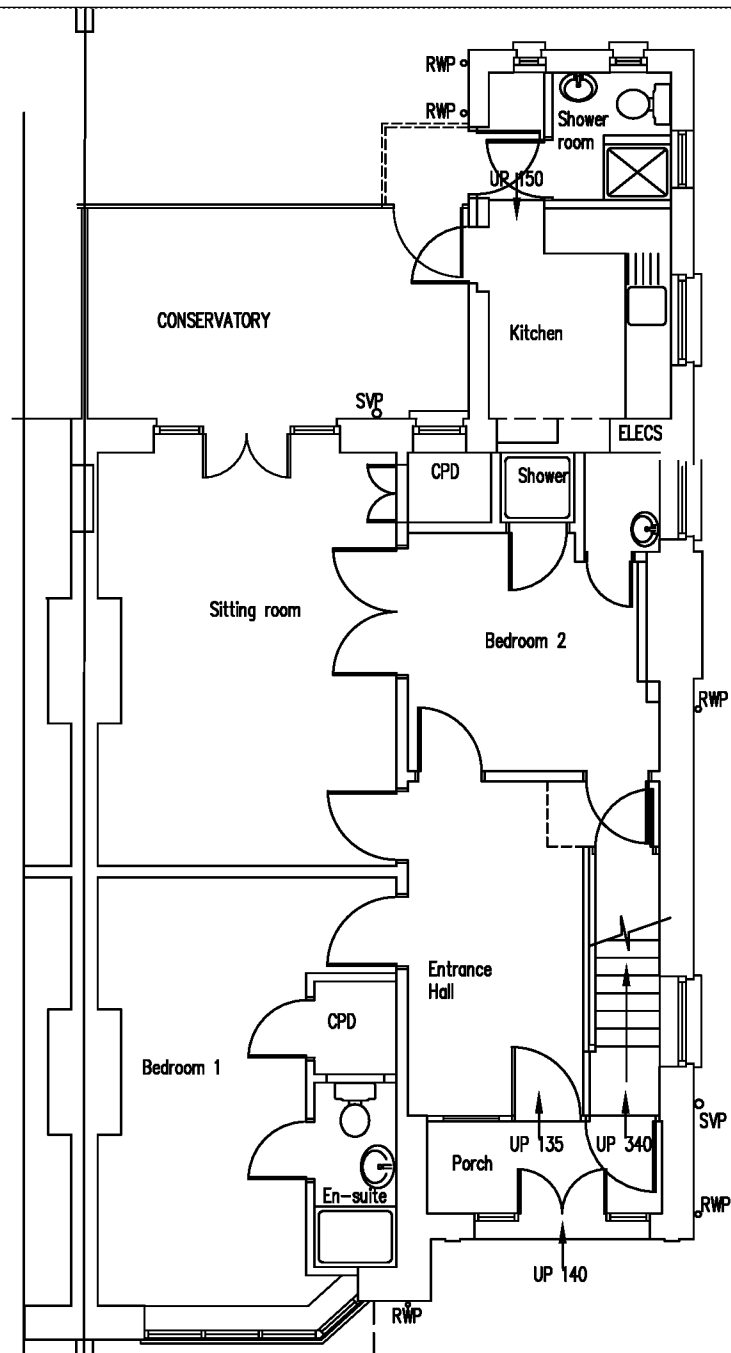
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DATE 11/03/21 Drawn by EH

PROJECT BRL-1
DRAWING NUMBER 02
REVISION A

DRAWING

EXISTING FLOOR PLANS

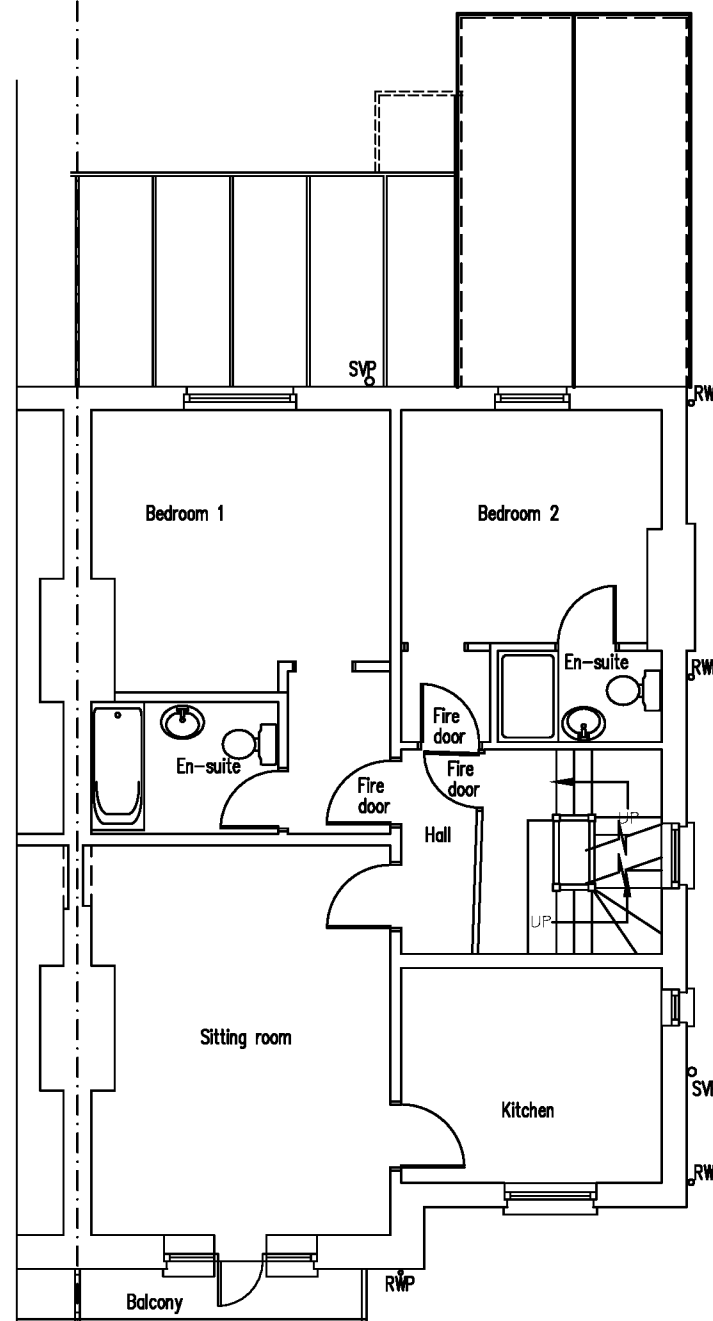


PROPOSED GROUND FLOOR PLAN

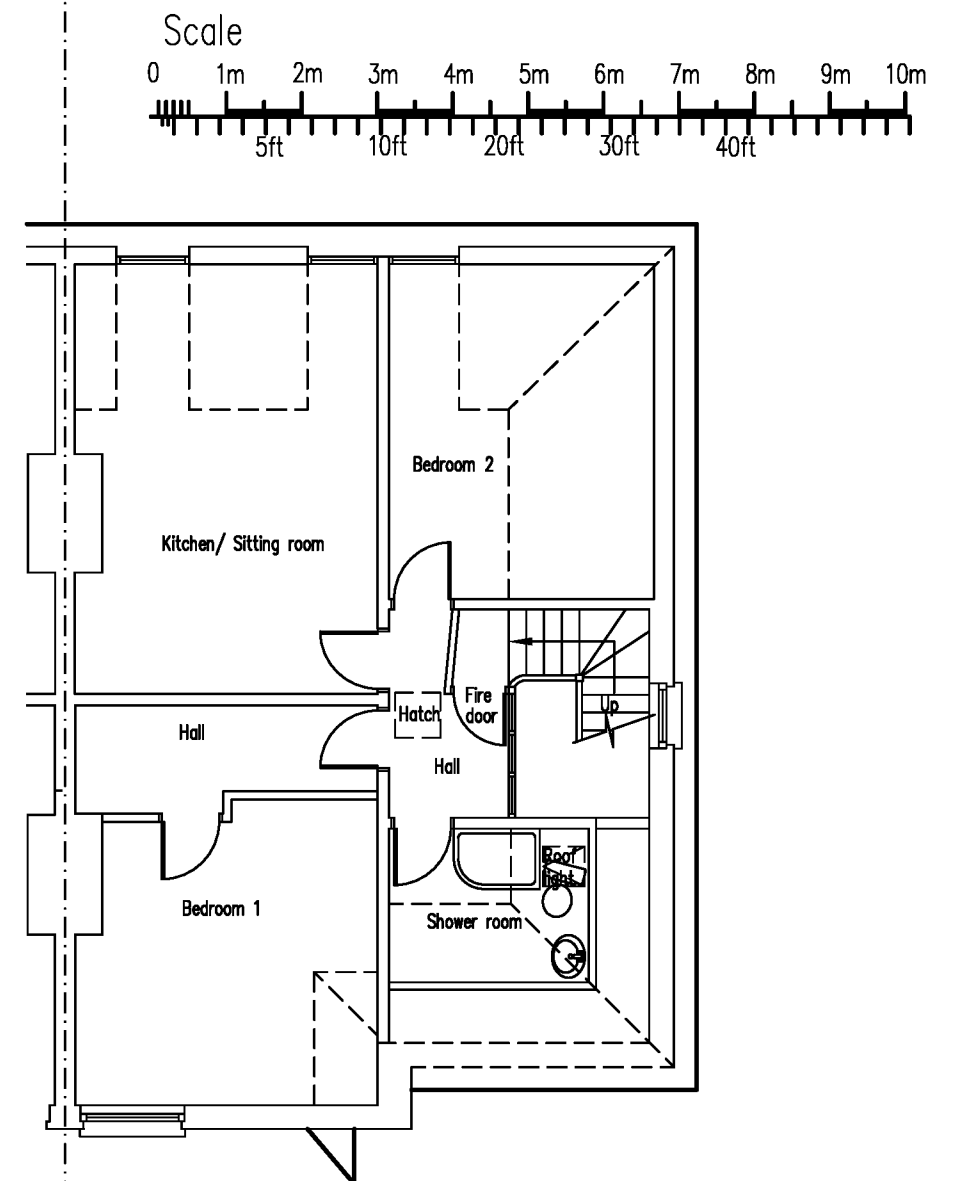
Existing Car Park
allocated for the flats
Parking space 5600x2900mm

Existing Car Park
allocated for the flats
Parking space 5600x2900mm

Existing Car Park
allocated for the flats
Parking space 5600x2900mm



PROPOSED FIRST FLOOR PLAN



PROPOSED SECOND FLOOR PLAN

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SCALE 1:100 on A3

DATE 11/03/21 Drawn by EH

PROJECT DRAWING NUMBER

BRL-1 03 REVISION A

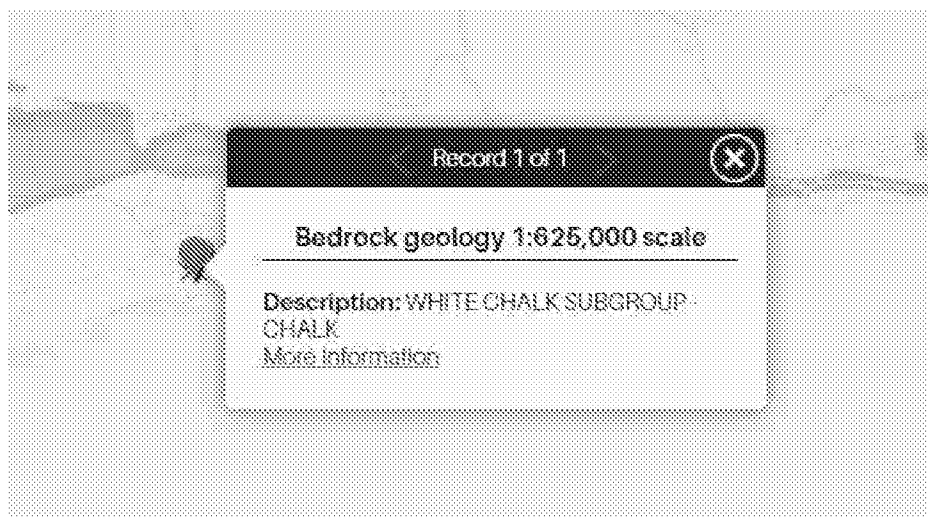
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PROPOSED FLOOR PLANS

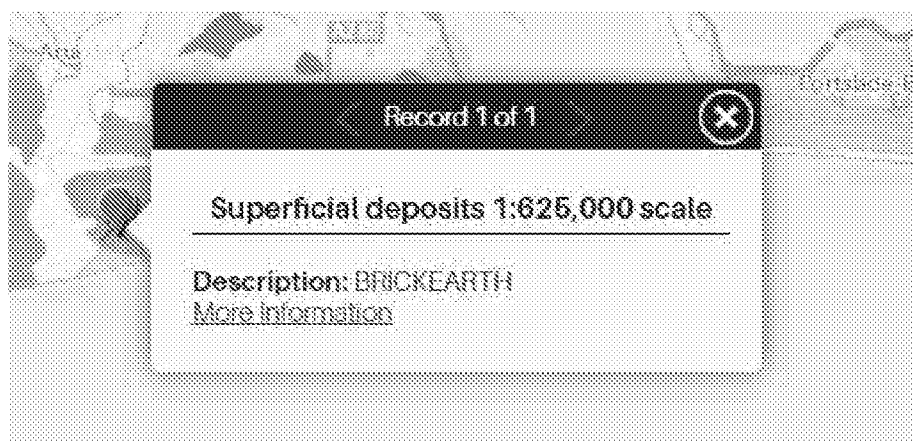
Appendix C



GEOLOGY - BEDROCK – WHITE CHALK

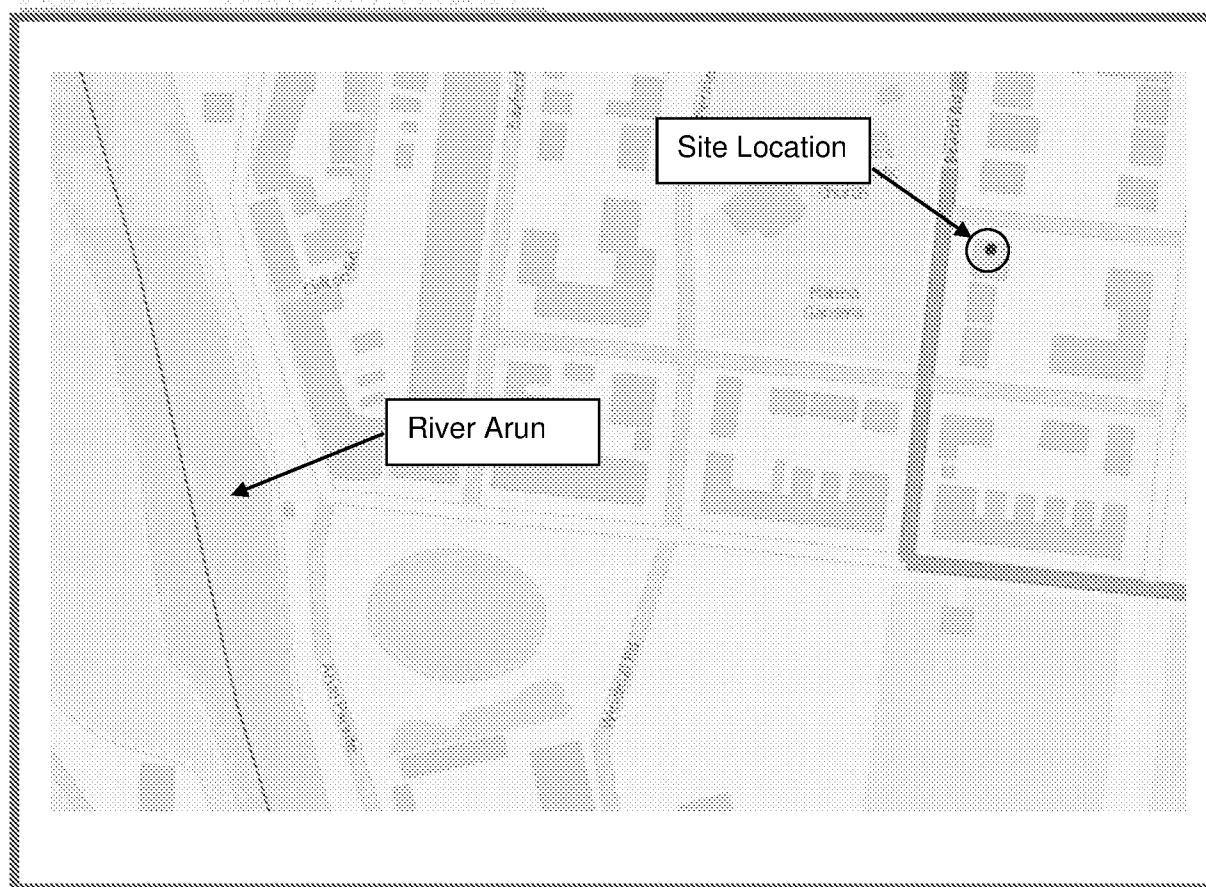


GEOLOGY - SUPERFICIAL DEPOSITS - CLAY AND SILT

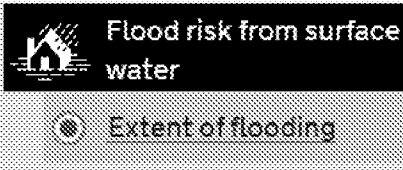




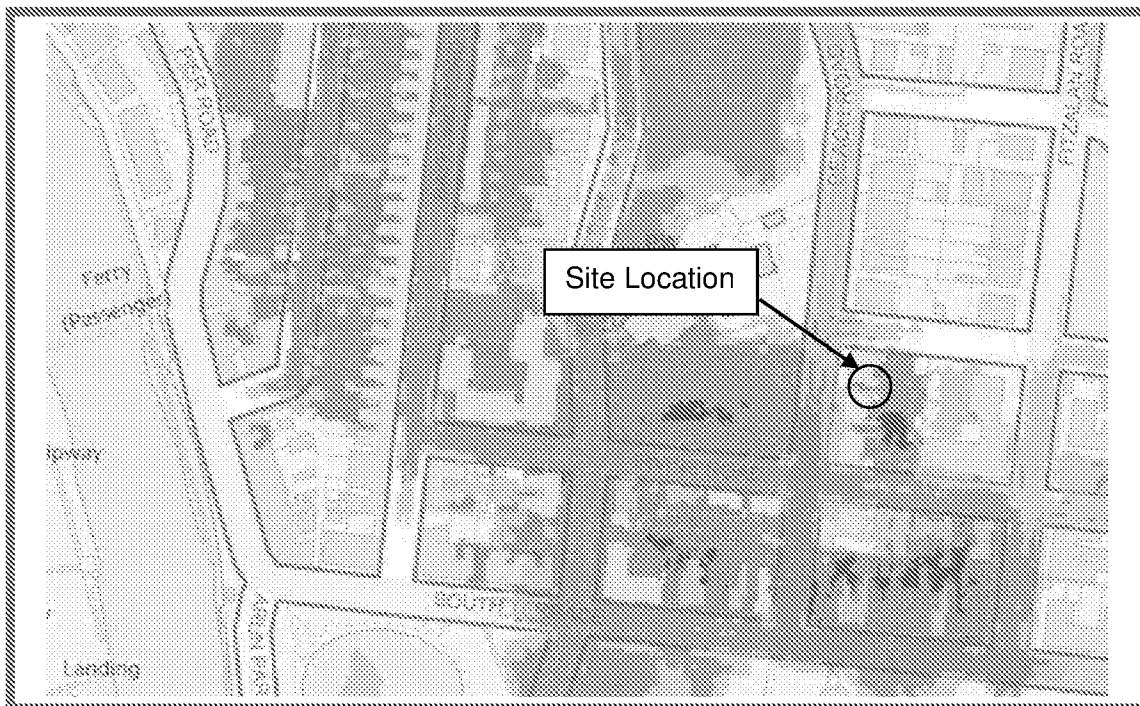
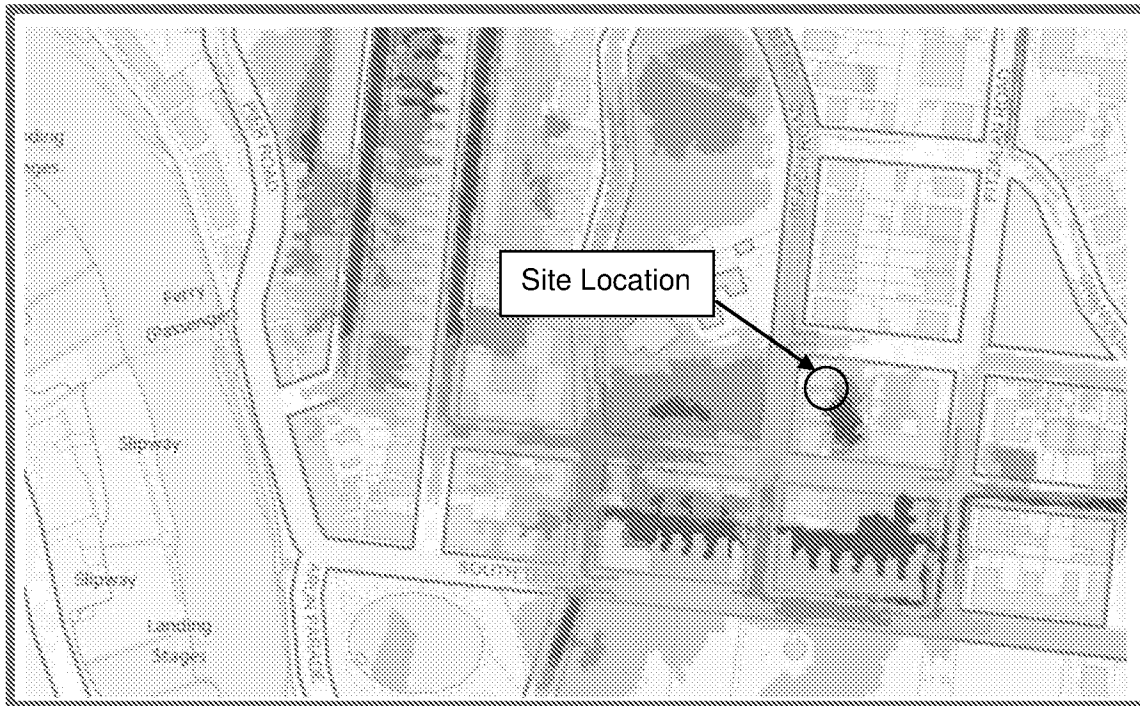
Main River Map



SITE FLOOD RISK



Low risk means that each year this area has a chance of flooding of between 0.1% and 1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.



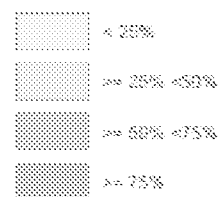
Over 900mm 300 to 900mm Below 300mm

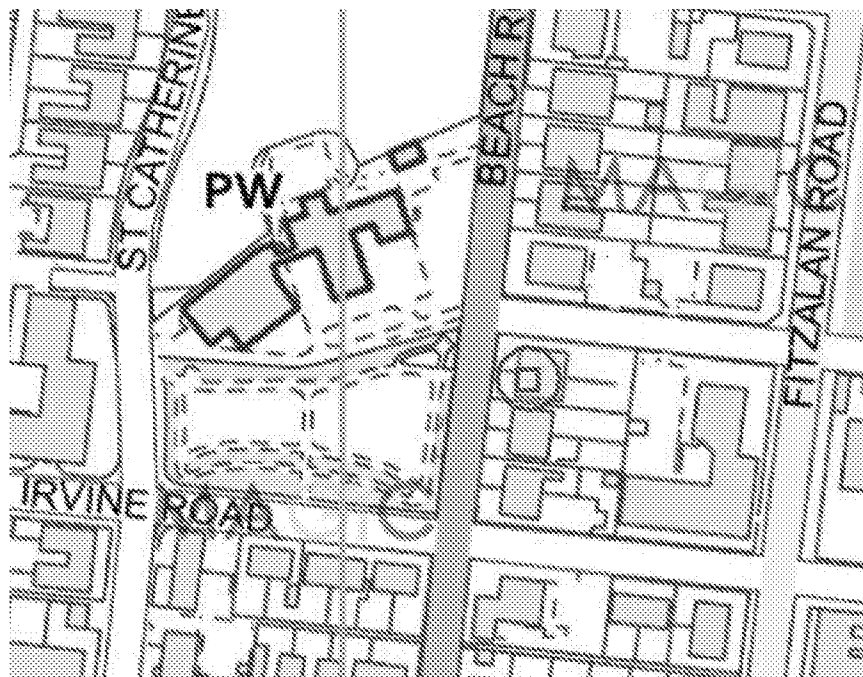


GROUND WATER FLOOD RISK



Areas Susceptible to Groundwater



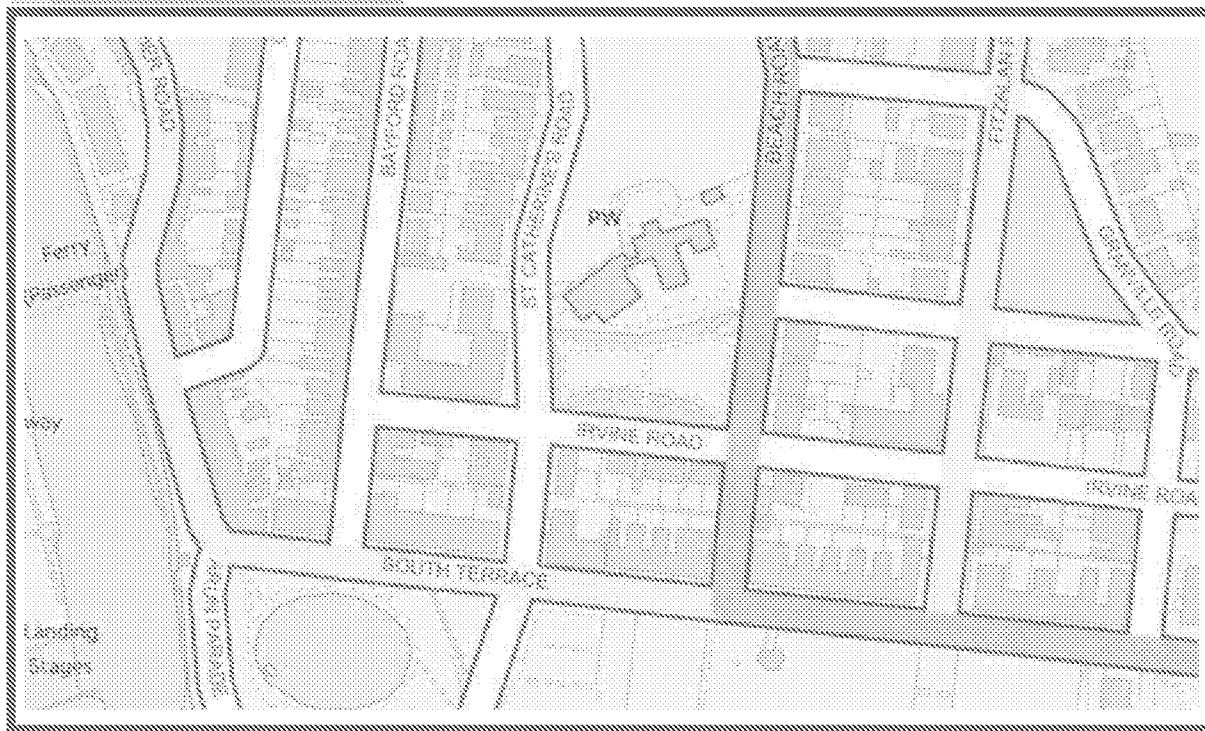


Site Check Results

Site Check Report Report generated on Wed Mar 31 2021
You selected the location: Centroid Grid Ref: TQ03050169
The following features have been found in your search area.

Aquifer Designation Map (Bedrock) (England)	
Typology	Principal
Aquifer Designation Map (Superficial Drift) (England)	
Typology	Secondary A
Source Protection Zones merged (England)	
No Features found	

OK
Cancel
Print



Flood risk



CRITICAL DRAINAGE AREA – N/A



Flood map for planning

Your reference
BN17 5JH

Location (easting/northing)
503065/101685

Created
30 Mar 2021 16:59

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Flood map for planning

Your reference

BN17 5JH

Location (easting/northing)

503065/101685

Scale

1:2500

Created

30 Mar 2021 16:59

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

Page 2 of 2