Flood Risk Assessment for Planning

Prepared for:
NJ Portfolio Limited

August 2023

Location:
5 Bath Place
Worthing
BN11 3BA

Our reference:
93236-NJ-BathPlace



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Document Issue Record

Project:	Flood Risk Assessment for Planning
Client:	NJ Portfolio Limited
Application:	Change of use to convert the first, second and third floors to residential to create a four-bedroom flat.
Location:	5 Bath Place, Worthing, BN11 3BA
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Version:	v1.0 010823

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1. Key Facts

1.1 Flood Risk Posed:

- The site is situated entirely within Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea).
- The risk would appear to be predominantly tidal and originate from the English Channel located approximately 100m south of the site.
- The site is shown to be within an Area benefitting from flood defences.
- Modelled flood levels and flood extents have been requested from the EA.
- Comparison of the undefended 1:200 year Higher Central and Upper End flood levels (5.28mAOD and 5.66mAOD respectively) with topographic site levels 4.71mAOD to 4.78mAOD based on LiDAR, shows that the site is below both the 1:200 year Higher Central flood level and 1:200 year Upper End flood level.
- The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very Low" to "High" risk of flooding from surface water. The site itself is at "Very Low" risk of flooding from Surface Water. Bath Place, the street of which the site sits, is shown to be at "Medium" to "Low" risk of flooding from surface water.
- No EA records of historical flooding at the site.
- No further information has been provided to suggest that the site has flooded from groundwater or sewer surcharge flooding.

1.2 Flood Risk Mitigation:

- The development is located above any expected flood levels - change of use of first, second and third floors of the existing grade II listed building.
- Due to the nature of the development, existing drainage arrangements will be retained.
- There will be no increase in impermeable coverage post development.
- There will be no increase in the built footprint.
- A flood warning and evacuation plan will be implemented post development.
- The applicant will register with the free Environment Agency Floodline Alert Direct service.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

2. Introduction

Unda Consulting Limited have been appointed by NJ Portfolio Limited (hereinafter referred to as "the applicant") to undertake a Flood Risk Assessment for the proposed development at 5 Bath Place, Worthing, BN11 3BA (hereinafter referred to as "the site"). The purpose of the study is to support a planning application for the proposed development.

This report presents our findings based on the readily available information and data relating to the site and surrounding drainage area.

The site appears to be located within Flood Zone 3 as defined by the Environment Agency (EA) on their Flood Map for Planning. Under the National Planning Policy Framework (NPPF), a FRA is required if a proposed development:

- includes building or engineering works in Flood Zone 2 or 3;
- includes building or engineering works on land classified by the Environment Agency as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is larger than 1 hectare.

The assessment should demonstrate to the Local Planning Authority (LPA) and EA how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its potential users.

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

3. Existing Situation

3.1 Site Usage:

The existing property is a mid-terraced building with 5 floors. The basement is used for staff facilities, the main shop is at ground floor level and the 3 floors above are a mixture of studios and storage. Currently, the building is vacant, but was last used as a hair salon.

5 Bath Place is a grade II listed building and dates from the early 19th Century. The property is located in the South Street Conservation Area.

A map showing the site location is presented below in Figures 1 and 2.



Figure 1: Aerial imagery of site and surrounding area (Source: Google Earth)



Figure 2: Site Location (Source: Planning Portal)

3.2 Topography:

Environment Agency LiDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LIDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LiDAR technique records an elevation accurate to +0.3m every 2m. This dataset is derived from a combination of our full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LIDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital Terrain Model (DTM) produced by removing objects from the Digital Surface Model.

1m horizontal resolution LiDAR remotely sensed digital elevation data suggests that the ground topography on site ranges from approximately 4.71mAOD to 4.78mAOD.

3.3 Geography and Soil:

The British Geological Survey (BGS) Map indicates that the bedrock underlying the site is Lewes Nodular Chalk Formation – Chalk, with superficial deposits of River Terrace Deposits 9Undifferentiated) – Sand, Silt and Clay.

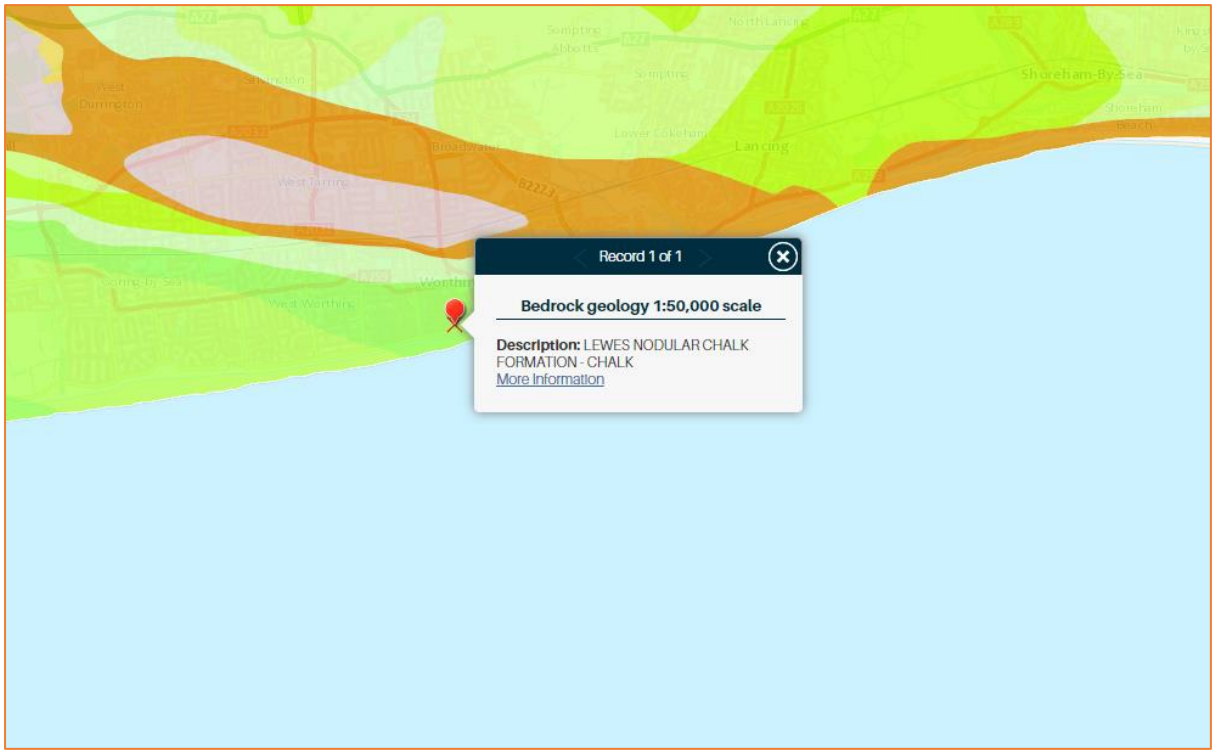

Figure 3: Geology (Source: BGS)

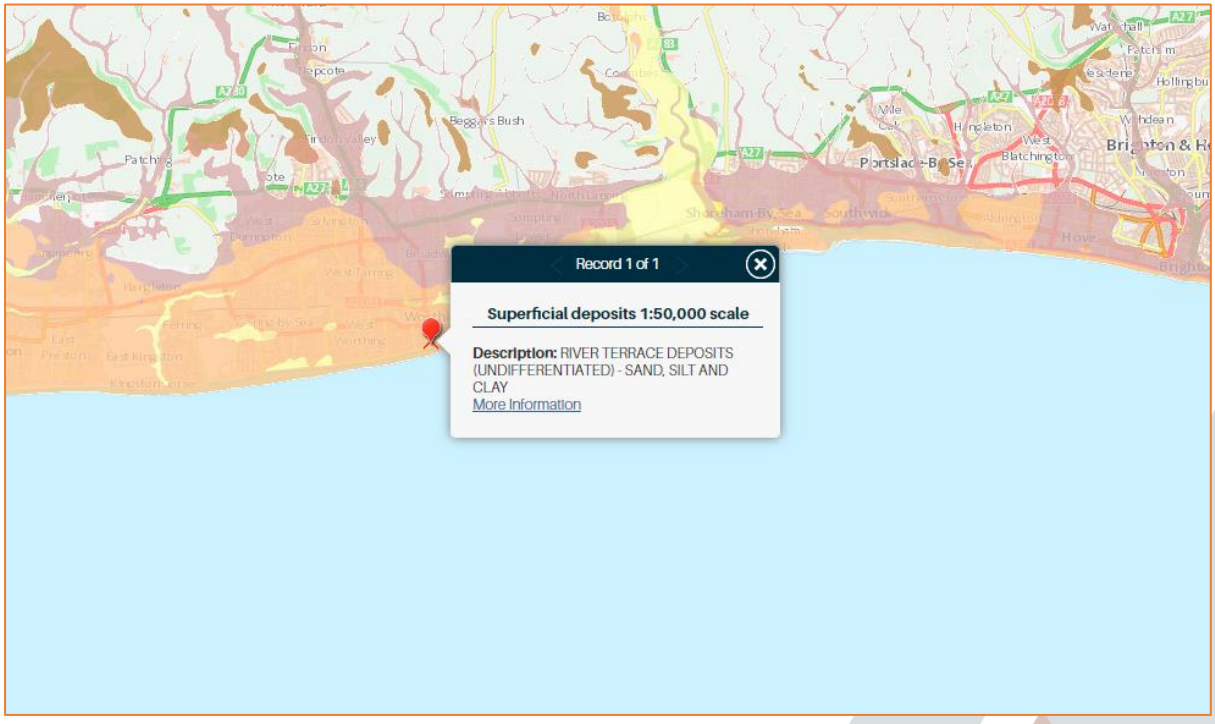

Figure 4: Superficial deposits (Source: BGS)

The soil type taken from the UK Soil Observatory website is relatively deep soils from Sand Loess parent material, with a silt to sand texture.



Figure 5: Soil Types (Source: UKSO)

4. Development Proposal

The proposed planning application is for the change of use to convert the first, second and third floors to residential to create a four-bedroom flat.

It is understood the ground floor and basement will be retained as commercial use.

Proposed site plans can be found in the Appendix.

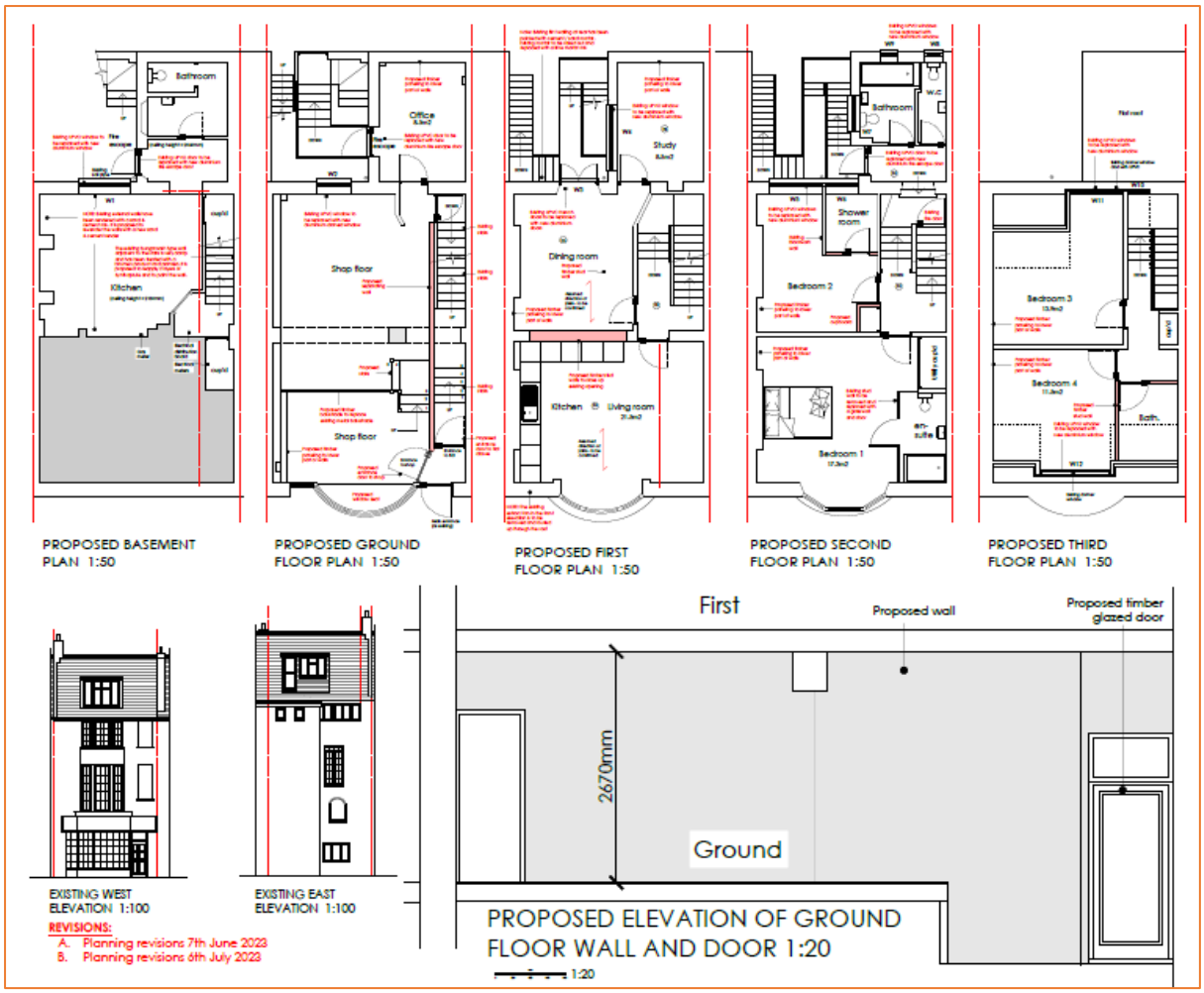

Figure 6: Proposed floor plans (Source: Atterbury Moore Associates)

5. Assessment of Flood Risk

5.1 Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's website.

Flood Zone	Definition
Zone 1 **Low Probability**	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 **Medium Probability**	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a **High Probability**	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b **The Functional Floodplain**	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 1: Flood Zones

The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

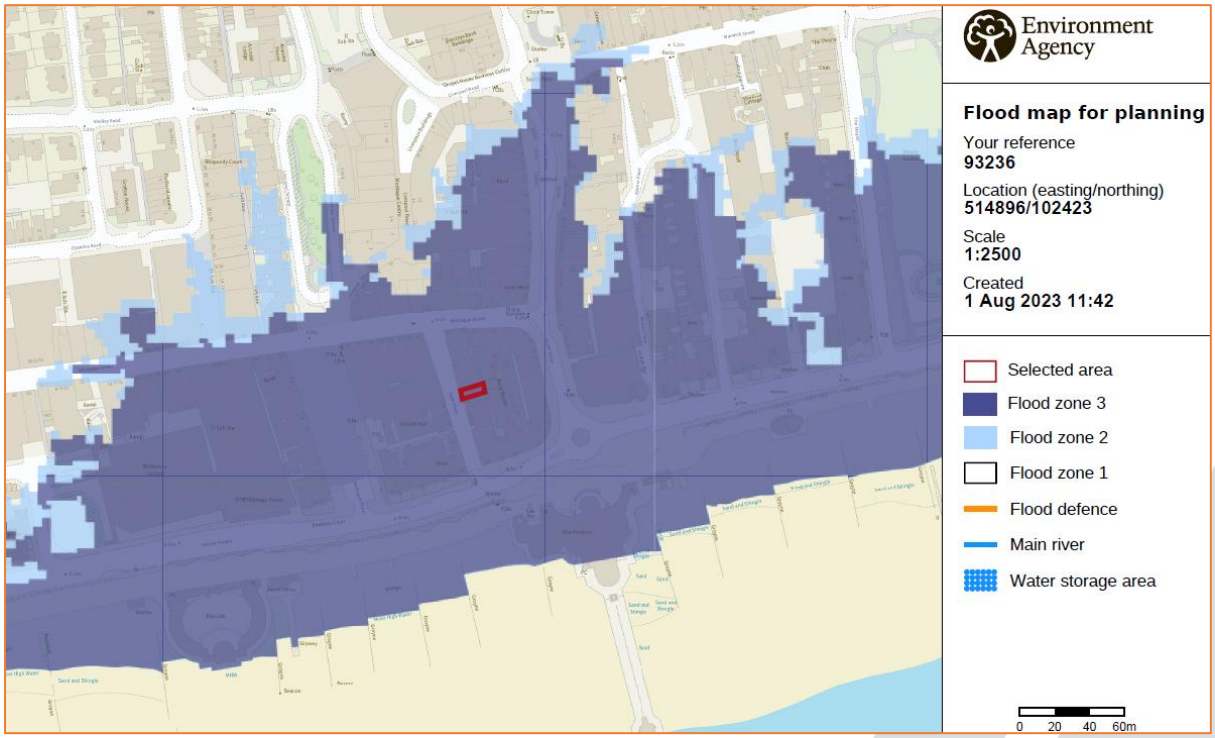

Figure 7: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1 in 100 / 1 in 200 annual probability of fluvial / tidal flooding. The site is shown to be within an Area benefitting from flood defences.

The risk would appear to originate from the English Channel approximately 130m to the south of the site.

5.2 Tidal (English Channel)

5.2.1 English Channel

The English Channel (The Channel) is the body of water that separates southern England from northern France and joins the southern part of the North Sea to the Atlantic Ocean. It is about 560km long and varies in width from 240km at its widest to 33.1km in the Strait of Dover. It is the smallest of the shallow seas around the continental shelf of Europe, covering an area of some 75,000km^2.

Uniquely, The Channel acts as a funnel that amplifies the tidal range from less than a metre as observed at sea to more than 6 metres as observed in the Channel Islands, the west coast of the Cotentin Peninsula and the north cost of Britany. The time difference of about 6 hours between high water at the eastern and western limits of the Channel are indicative of the tidal range being amplified further by resonance. Some areas along the south coast are particularly vulnerable to severe storms moving from the Atlantic eastwards along the English Channel.

5.2.2 Detailed flood modelling:

Modelled flood levels and extents have been requested from the EA for use within this report. The EA has provided undefended onsite modelled flood levels and depths from the Adur Coastal Modelling (2012) which was completed by JBA Consulting in 2012.

Site specific undefended flood levels have been extracted for a range of return periods:

	1:200yr	1:1000yr	1:200yr 2115	1:1000yr 2115
Modelled flood level	Outside	Outside	5.26mAOD	5.45mAOD

Table 2: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

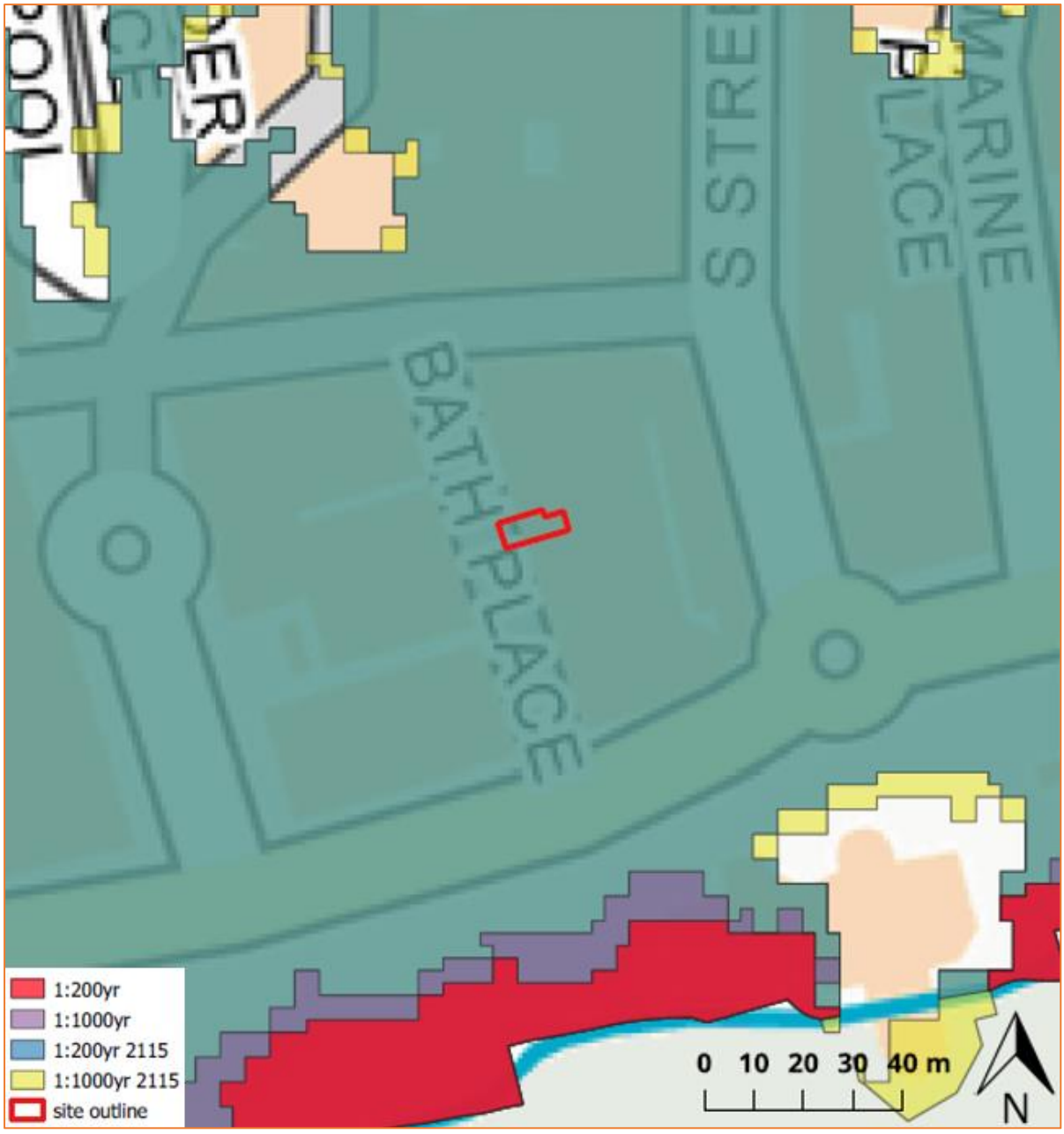

Figure 8: Modelled undefended flood extents (Source: EA)

The site is shown to be entirely outside of the undefended 1:200 year and 1:1000 year extents at the present day, but within the undefended extents for 2115.

The site is located partially within Flood Zone 3 and is classified as “less vulnerable” and “more vulnerable”. The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states for flood risk assessments both the higher central and upper end allowances should be assessed.

The 'Flood risk assessments: climate change allowances' guidance for the Southeast area of England provides the following sea level allowances:

Area of England		2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 / metres (m)
South East	**Higher Central**	5.7	8.7	11.6	13.1	1.2
South East	**Upper End**	6.9	11.3	15.8	18.2	1.6

Table 3: Sea Level Allowances for the South East River Basin District for each epoch in mm per year (Source: 'Flood risk assessments: climate change allowances)

Area of England		2012 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2017 to 2125 / metres (m)
Site	**Higher Central**	137	261	348	393	1.14
Site	**Upper End**	166	339	474	546	1.52

Table 4: Sea Level Allowances for the site for each epoch in mm per year (Source: 'Flood risk assessments: climate change allowances)

The design flood levels for planning are the 1:200 year with Higher Central, and Upper End climate change. The undefended 1:200 year and 1:1000 year flood levels at the present day are 4.14mAOD and 4.33mAOD respectively from the Adur Coastal Modelling (2012). The site is shown to be entirely outside of the undefended flood extents at the present day.

	2125 Higher Central	**2125 Upper End**
1:200 year	5.28mAOD	5.66mAOD
1:1000 year	5.47mAOD	5.85mAOD

Table 5: Modelled climate change flood levels

Comparison of the undefended 1:200 year Higher Central and Upper End flood levels (5.28mAOD and 5.66mAOD respectively) with topographic site levels 4.71mAOD to 4.78mAOD based on LiDAR, shows that the site is below both the 1:200 year Higher Central flood level and 1:200 year Upper End flood level.

5.2.3 Flood defences:

Flood defences are structures which affect flow in times of flooding in order to reduce the risk water entering property. They generally fall into one of two categories; 'formal' or 'informal'.

A 'formal' flood defence is a structure which has been specifically built to control floodwater. It is maintained by its owner or statutory undertaker so that it remains in the necessary condition to function. In accordance with the Flood and Water Management Act, the Environment Agency has powers to construct and maintain defences to help against flooding.

An 'informal' defence is a structure that has not necessarily been built to control floodwater and is not maintained for this purpose. This includes road and rail embankments and other linear infrastructure (buildings and boundary walls) which may act as water retaining structures or create enclosures to form flood storage areas in addition to their primary function.

According to the EA data and The Strategic Flood Risk Assessment of West Sussex (Volume II Technical report January 2010, Capital Symonds) the flood defences consists of a naturally raised shingle beach over sand which are heavily groyned and feature sea walls at the rear.

The North Beachy Head to Selsey Bill Shoreline Management Plan and the Worthing Borough Council's River Arun to Adur Flood and Erosion strategy states that the current strategy is one of protecting the shoreline in its present position (Hold-the-Line). The Hold the Line/ Sustain policy means that policy is in place, to at worst, maintain the current level or upgrade the level of protection provided by existing coastal defences for the foreseeable future.

Therefore, given that flood risk provided by the local defences (which are council maintained) protect the development site from Tidal flooding and policy is in place to maintain that level of defence (worst case), the site is therefore deemed to be protected now and into the future.

5.2.4 Residual risk (breach or overtopping of flood defences):

Breaching of flood defences can cause rapid inundation of areas behind flood defences as flow in the river channel discharges through the breach. A breach can occur with little or no warning, although they are much more likely to concur with extreme river levels or tides when the stresses on flood defences are highest. Flood water flowing through a breach will normally discharge at a high velocity, rapidly filling up the areas behind the defences, resulting in significant damage to buildings and a high risk of loss of life. Breaches are most likely to occur in soft defences such as earth embankments although poorly maintained hard defences can also be a potential source of breach.

Overtopping of flood defences occurs when water levels exceed the protection level of raised flood defences. The worst case occurs when the fluvial or tidal levels exceed the defence level as this can lead to prolonged flooding. Less severe overtopping can occur when flood levels are below defence levels, but wave action causes cyclic overtopping, with intermittent discharge over the crest level of the defence. Flood defences are commonly designed with a freeboard to provide protection against overtopping from waves. The risk from overtopping due to exceedance of the flood defence level is much more significant than the risk posed by wave overtopping. Exceedance of the flood defence level can lead to prolonged and rapid flooding with properties immediately behind the defences at highest risk.

There remains a residual risk in the incidence of failure. Overtopping or breach are the principal mechanisms of flooding.

5.2.5 Historical flood events:

The EA have no records of historic flooding at the site.

5.3 Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

In 2013 the EA, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- High: Greater than or equal to 3.3% (1 in 30) chance in any given year (3.3%)
- Medium: Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low: Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low: Less than 0.1% (1 in 1,000) chance in any given year

The mapping below shows the Risk of Flooding from Surface Water centred on the site. Please note that the EA to not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of “Very Low” to “High” risk of flooding from surface water. The site itself is at “Very Low” risk of flooding from Surface Water. Bath Place, the street of which the site sits, is shown to be at “Medium” to “Low” risk of flooding from surface water.

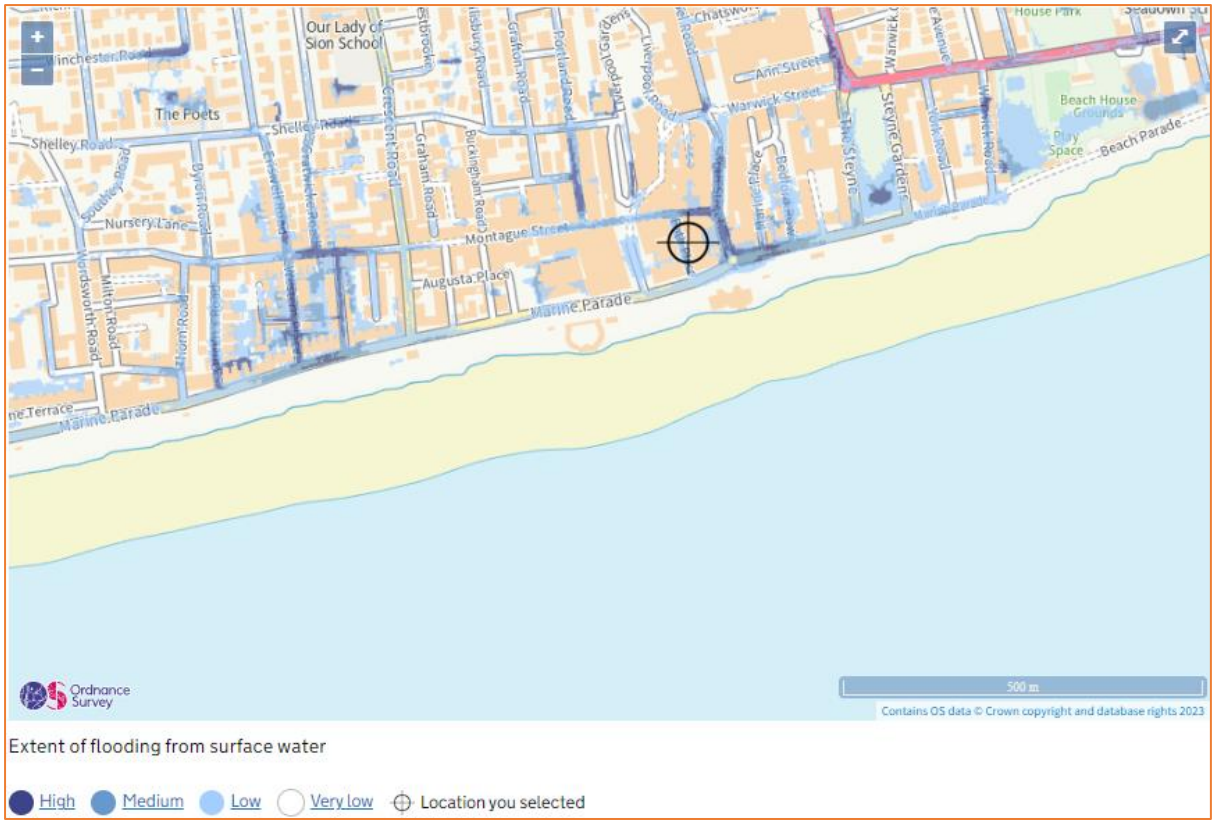

Figure 9: Extract from Environment Agency RoFSW map (Source: EA)

5.4 Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

The EA states that flooding from groundwater is unlikely in this area. No records of groundwater flooding in the vicinity of the site have been provided.

The EA states that flooding from groundwater is unlikely in this area. No further records of groundwater flooding in the vicinity of the site have been provided.

5.5 Sewer Surcharge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

No records of sewer flooding at the site have been provided.

5.6 Other Sources:

Reservoirs with an impounded volume in excess of 25,000 cubic metres (measured above natural ground level) are governed by the Reservoirs Act and are listed on a register held by the Environment Agency. The site is outside the maximum inundation extent on the EA Reservoir Inundation Map. The EA also advise on their website that reservoir flooding is extremely unlikely. There has been no loss of life in the UK from reservoir flooding since 1925. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. In accordance with the Reservoirs Act 1975 in England, these inspections are monitored and enforced by the EA themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial / tidal flooding to occur. The Environment Agency Reservoir Flood Map illustrated below, illustrates the largest area that might be flooded if the storage area were to fail and release the water it is designed to hold during a flood event.

Records of flooding from reservoirs and canals are erratic as there is no requirement for the Environment Agency to provide information on historic flooding from canals and raised reservoirs on plans. In particular, the NPPF does not require flood risk from canals and raised reservoirs to be shown on the Environment Agency flood zones.

Overflows from canals can be common as they are often fed by land drainage, and often do not have controlled overflow spillways. Occasionally, major bank breaches also occur, leading to rapid and deep flooding of adjacent land.

No further information has been provided to suggest the site is susceptible to from the failure of canals or other artificial infrastructure from the risk of flooding.

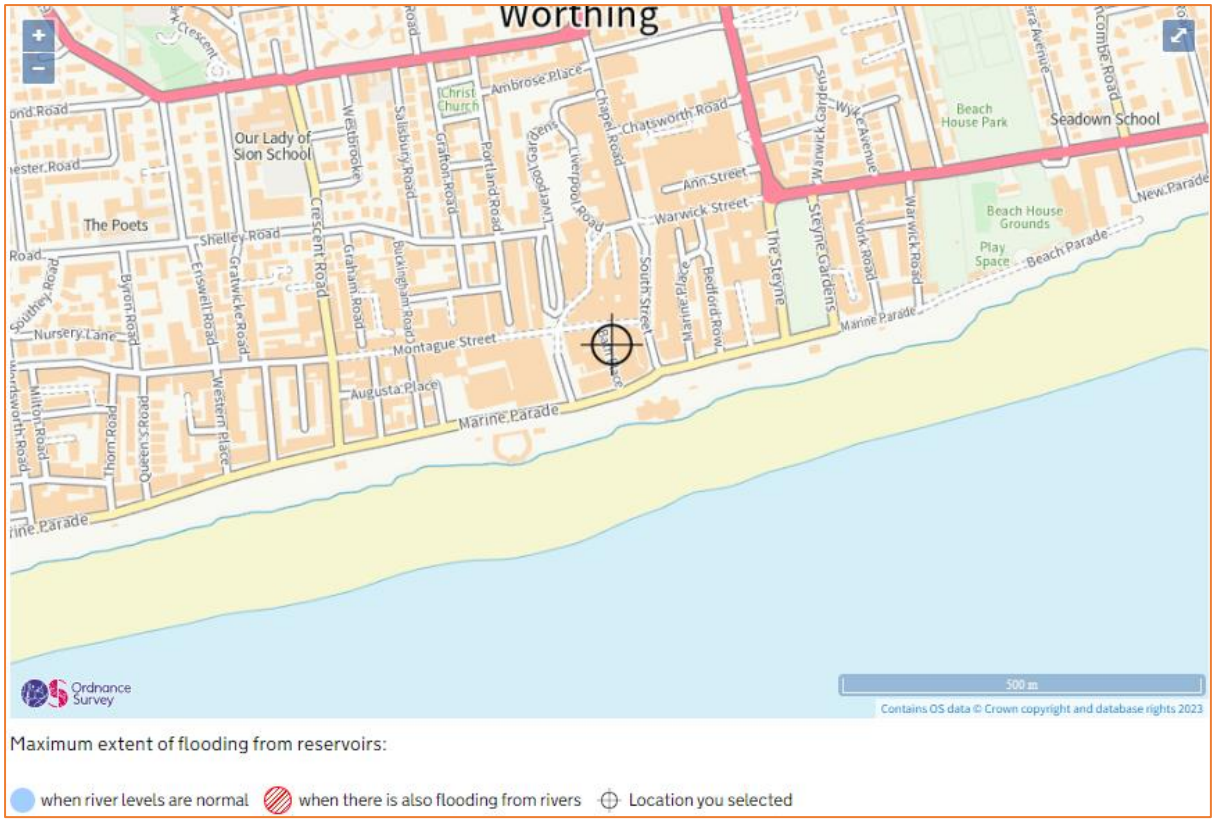

Figure 10: Extract from Environment Agency Risk of Flooding from Reservoirs Map (Source: EA)

6. Flood Risk Management

6.1 Vulnerability to flooding:

The NPPF classifies property usage by vulnerability to flooding.

The existing site usage is classified as “less vulnerable” throughout, as the basement is used for staff facilities, the main shop is at ground floor level, and the 3 floors above are a mixture of studios and storage. Currently the building is vacant. Post development, the site usage is classified as “less vulnerable” on the ground floor and basement (commercial), and “more vulnerable” on the upper floors (residential).

Accordingly, it is considered that while the vulnerability of the site as a whole will increase post development, as there will be the introduction of a residential dwelling on the upper floors of the existing building.

6.2 EA Standing Advice:

The EA Standing Advice guidance is for domestic extensions and non-domestic extensions where the additional footprint created by the development does not exceed 250m2. It should not be applied if an additional dwelling is being created, e.g. a self-contained annexe or additional commercial unit.

6.3 Physical Design Measures:

The application is for the change of use of first, second and third floors of the existing grade II listed building. The development is located above any expected flood levels.

6.4 Safe Escape and Flood Action Plan:

The NPPF requires a route of safe escape for all residents and users to be provided from new residential properties in Flood Zone 3. Safe escape is usually defined as being through slow moving flood water no deeper than 25cm during the 1:100 year fluvial / 1:200 year tidal plus allowance for climate change flood event.

The site is situated within Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea).

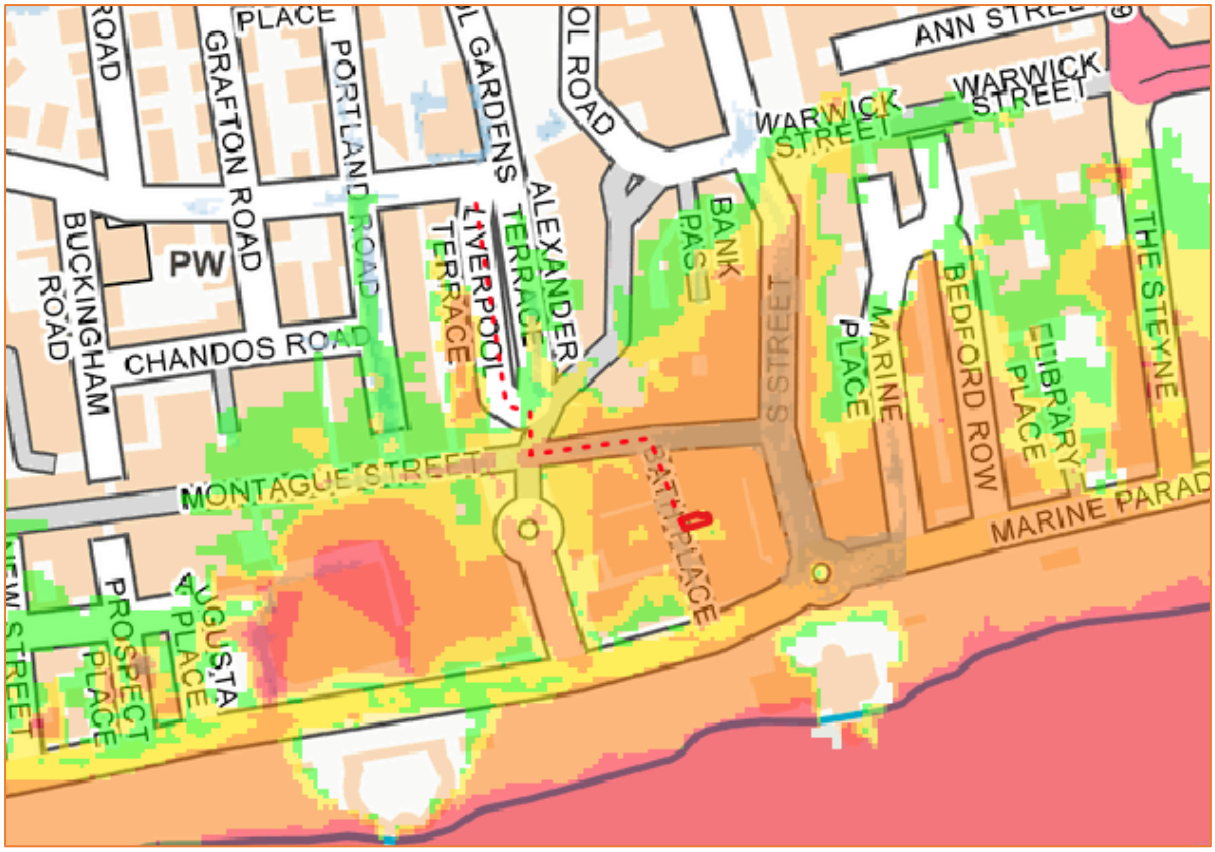

Figure 11: Modelled flood hazard for 2115 undefended 1:200 year event (Source: EA)

Based on the Adur Coastal Modelling, safe escape from the site can be provided during the 1:200 year event in 2115. Site users should exit the site to Bath Place, before travelling north onto Montague Street, then west onto Montague Place, onto Liverpool Terrace, where it is hazard-free.

Residents and users should follow the warning and evacuation procedure detailed in the following section.

6.5 Flood Warning:

The EA is responsible for issuing flood warnings. Flood warnings are issued to the emergency services and local authorities. Both private individuals and organisations can sign-up to receive warnings via phone, text or email. This system of receiving warnings is currently voluntary.

Advice regarding severe flood warnings will generally be given during weather forecasts on local radio and TV. In the case of extreme events, warnings can also be disseminated via door to door visits by the police or locally appointed flood wardens.

The EA issue flood warnings/alerts to specific areas when flooding is expected. It is recommended that the applicant registers online with the free Environment Agency Floodline Warnings/Alert Direct service at www.gov.uk/sign-up-for-flood-warnings to receive flood warnings by phone, text or email.

The site is located within the Rustington, Worthing and Lancing flood warning area (quick dial 316036).

The applicant has agreed to subscribe to the EA's flood alert/warning service.

The flood warning service has three types of warnings that will help you prepare for flooding and take action:

Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning
			
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.
When it's used?	Two hours to two days in advance of flooding.	Half an hour to one day in advance of flooding.	When flooding poses a significant threat to life.
What to do?	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.

Table 6: EA Flood Warning Service

The applicant has prepared the following flood plan to protect life and property during a flood event:

Before a flood:

- Find out if you are at risk of flooding.
- Find out if you can receive flood warnings.
- Prepare and keep a list of all your important contacts to hand or save them on your mobile phone.
- Think about what items you can move now and what you would want to move to safety during a flood such as pets, cars, furniture, and electrical equipment.
- Know how to turn off gas, electricity and water supplies.
- Prepare a flood kit of essential items and keep it handy. It can include copies of important documents, a torch, a battery-powered or wind-up radio, blankets and warm clothing, waterproofs, rubber gloves and a first aid kit including all essential medication.
- Consider buying flood protection products such as flood boards and airbrick covers to help reduce flood water getting into your property.

During a flood:

- Tune into your local radio station on a battery or wind-up radio.
- Fill jugs and saucepans with water.
- Grab your flood kit - if you have prepared one.
- Collect blankets, torch, first aid kit, medication and food.
- Move important documents, personal items, valuables, and lightweight belongings upstairs or to high shelves.
- Raise large items of furniture, or put them in large bags if you have them.
- Move people, outdoor belongings, cars and pets to higher ground.
- Switch off water, gas and electricity at mains when water is about to enter your home. Do not touch sources of electricity when standing in water.
- Fit flood protection products, if you have them, for example flood boards, airbrick covers, sandbags.
- Put plugs in sinks and baths. Weigh them down with a pillowcase or plastic bag filled with soil.
- If you do not have non-return valves fitted, plug water inlet pipes with towels or cloths.
- Move your family and pets upstairs or to a high place with a means of escape.
- Listen to the advice of the emergency service and evacuate if told to do so.
- Avoid walking or driving through flood water. Six inches of fast-flowing water can knock over an adult and two feet of water can move a car.

After a flood:

- If you have flooded, contact your insurance company as soon as possible.
- Take photographs and videos of your damaged property as a record for your insurance company.
- If you don't have insurance, contact your local authority for information on grants and charities that may help you.
- Flood water can contain sewage, chemicals and animal waste. Always wear waterproof outerwear, including gloves, wellington boots and a face mask.
- Have your electrics, central heating and water checked by qualified engineers before switching them back on.

6.6 Off-Site Impacts:

6.6.1 Fluvial floodplain storage:

The NPPF requires that where development is proposed in undefended areas of floodplain, which lie outside of the functional floodplain, the implications of ground raising operations for flood risk elsewhere needs to be considered. Raising existing ground levels may reduce the capacity of the floodplain to accommodate floodwater and increase the risk of flooding by either increasing the depth of flooding to existing properties at risk or by extending the floodplain to cover properties normally outside of the floodplain. Flood storage capacity can be maintained by lowering ground

levels either within the curtilage of the development or elsewhere in the floodplain, in order to maintain at least the same volume of flood storage capacity within the floodplain.

In undefended tidal areas, raising ground levels is unlikely to impact on maximum tidal levels so the provision of compensatory storage should not be necessary.

For development in a defended flood risk area, the impact on residual flood risk to other properties needs to be considered. New development behind flood defences can increase the residual risk of flooding if the flood defences are breached or overtopped by changing the conveyance of the flow paths or by displacing flood water elsewhere. If the potential impact on residual risk is unacceptable then mitigation should be provided.

The site is situated in Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea). The proposed development is for the change of use to convert the first, second and third floors to residential to create a four-bedroom flat, with no external alterations. Therefore, post development there will be no loss of fluvial floodplain. Additionally, the site is located within an area of tidal flood risk.

6.6.2 Surface Water Drainage:

The development will utilise Sustainable Urban Drainage (SuDs) design in accordance with the NPPF for Planning Applications and the drainage hierarchy as follows:

1. Store rainwater for later use;
2. Infiltration techniques;
3. Discharge rainwater into watercourse;
4. Discharge rainwater into surface water sewer;
5. Discharge rainwater into a combined sewer;

It is understood that there will be no increase in impermeable surfacing post development. As such, there will be no need for additional surface water drainage features. The proposed development will utilise the existing drainage arrangements on site.

7. Sequential and Exception Test

The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available. The site is situated in Flood Zone 3 when using the Environment Agency Flood Map for Planning (Rivers and Sea). The proposed development is considered to be both 'less vulnerable' (commercial) and 'more vulnerable' (residential).

Flood Zones	**Flood Risk Vulnerability Classification**				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Table 7: Flood risk vulnerability and flood zone 'compatibility'

The Sequential and Exception Tests do not need to be applied to minor developments and changes of use. The application is for a change of use.

8. Discussion and Conclusions

Unda Consulting Limited have been appointed by NJ Portfolio Limited to undertake a Flood Risk Assessment for the proposed development at 5 Bath Place, Worthing, BN11 3BA. The purpose of the study is to support a planning application for the proposed development.

This report presents our findings based on the readily available information and data relating to the site and surrounding drainage area.

The existing site is a mid-terraced grade II listed building with 5 floors. The basement is used for staff facilities, the main shop is at ground floor level and the 3 floors above are a mixture of studios and storage. Currently the building is vacant, but it was last used as a hair salon.

The proposed planning application is for the change of use to convert the first, second and third floors to residential to create a four-bedroom flat.

The existing site usage is classified as "less vulnerable" throughout, as the basement is used for staff facilities, the main shop is at ground floor level, and the 3 floors above are a mixture of studios and storage. Currently the building is vacant. Post development, the site usage is classified as "less vulnerable" on the ground floor and basement (commercial), and "more vulnerable" on the upper floors (residential).

Accordingly, it is considered that while the vulnerability of the site as a whole will increase post development, as there will be the introduction of a residential dwelling on the upper floors of the existing building.

The site is located within Flood Zone 3 (High Probability), which means it is defined as land having at least a 1 in 100 / 1 in 200 annual probability of fluvial / tidal flooding. The risk would appear to originate from the English Channel approximately 130m to the south of the site.

The site is shown to be within an Area benefitting from flood defences.

Modelled flood levels and extents have been requested from the EA for use within this report. The EA has provided undefended onsite modelled flood levels and depths from the Adur Coastal Modelling (2012) which was completed by JBA Consulting in 2012.

Site specific undefended flood levels have been extracted for a range of return periods.

The site is shown to be entirely outside of the undefended 1:200 year and 1:1000 year extents at the present day, but partially within the undefended extents in 2115.

The site is located partially within Flood Zone 3, and is classified as "more vulnerable". The Flood Risk Assessments: climate change allowances guidance – updated May 2022, states for flood risk assessments both the higher central and upper end allowances should be assessed.

The design flood levels for planning are the 1:200 year with Higher Central, and Upper End climate change. The undefended 1:200 year and 1:1000 year flood levels at the present day are 4.14mAOD and 4.33mAOD respectively from the Adur Coastal Modelling (2012). The site is shown to be entirely outside of the undefended flood extents at the present day.

Comparison of the undefended 1:200 year Higher Central and Upper End flood levels (5.28mAOD and 5.66mAOD respectively) with topographic site levels 4.71mAOD to 4.78mAOD based on LiDAR, shows that the site is below both the 1:200 year Higher Central flood level and 1:200 year Upper End flood level.

The EA has confirmed that they have no record of flooding in the area.

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Very Low" to "High" risk of flooding from surface water. The site itself is at "Very Low" risk of flooding from Surface Water. Bath Place, the street of which the site sits, is shown to be at "Medium" to "Low" risk of flooding from surface water.

Additionally, the risk of flooding posed to the site by sewer, groundwater and sewer surcharge flooding would appear to be low.

Based on the Adur Coastal Modelling, safe escape from the site can be provided during the 1:200 year event in 2115. Site users should exit the site to Bath Place, before travelling north onto Montague Street, then west onto Montague Place, onto Liverpool Terrace, where it is hazard-free.

The applicant has confirmed that:

- The development is located above any expected flood levels - change of use of first, second and third floors of the existing grade II listed building.
- Due to the nature of the development, existing drainage arrangements will be retained.
- There will be no increase in impermeable coverage post development.
- There will be no increase in the built footprint.
- A flood warning and evacuation plan will be implemented post development.
- The applicant will register with the free Environment Agency Floodline Alert Direct service.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Appendix

- Existing and Proposed Plans.
- EA Flood Map for Planning

Location Plan

Site Address: **Shaun Slater Gould, 5, Bath Place, Worthing Central, Worthing, BN11 3BA**

Date Produced: **08-May-2023**

Scale: **1:1250 @A4**



Planning Portal Reference: **PP-12131444v1**

0 50

Metres

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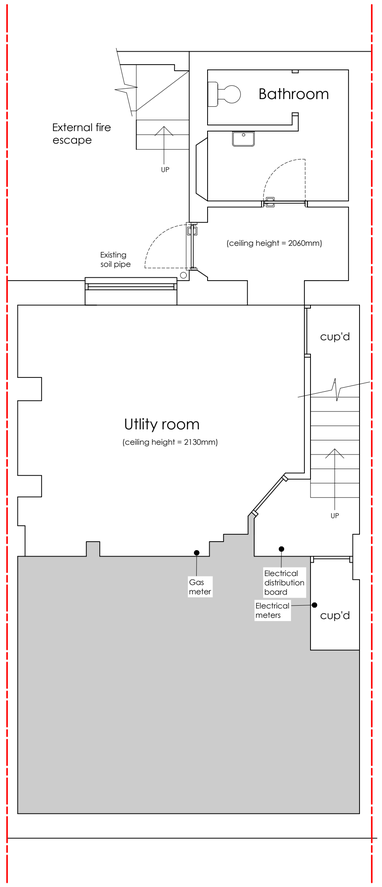
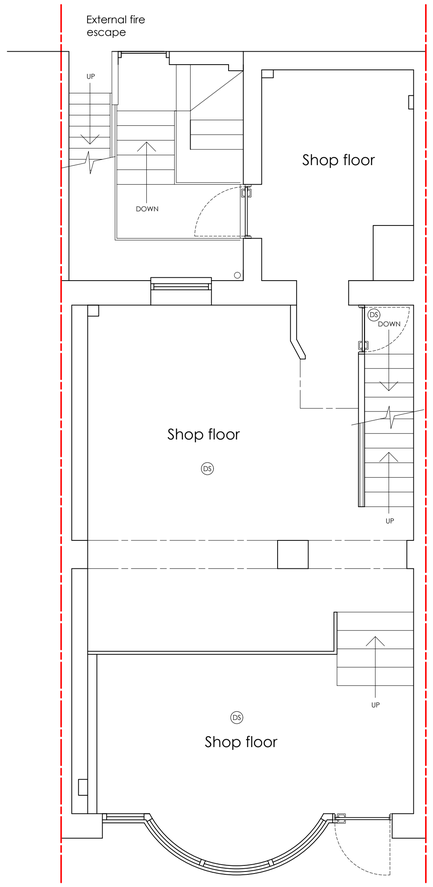


EXISTING BASEMENT PLAN 1:50



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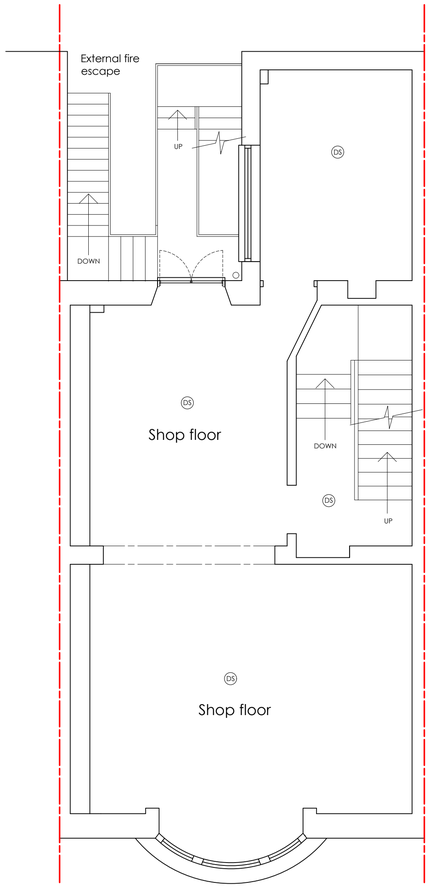

EXISTING FIRST FLOOR PLAN 1:50



PROPOSED WEST ELEVATION 1:50

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1:200

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1:10

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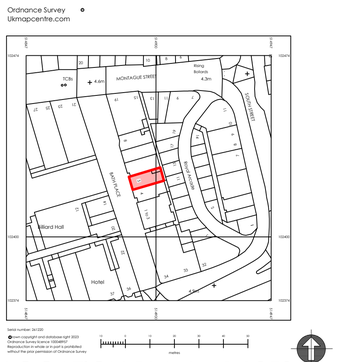
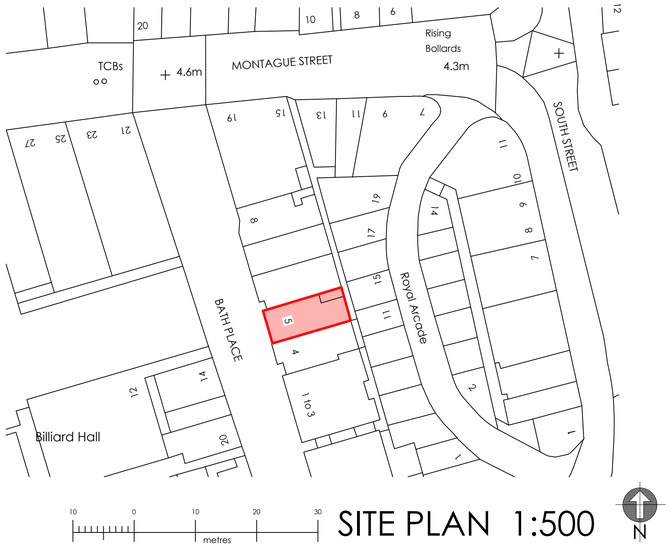


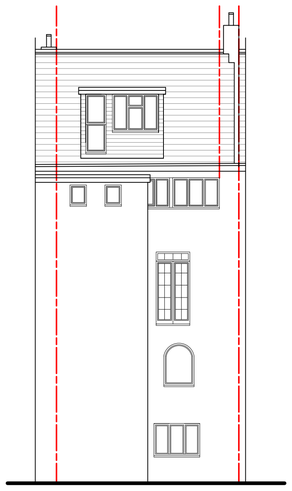
LOCATION PLAN 1:1250



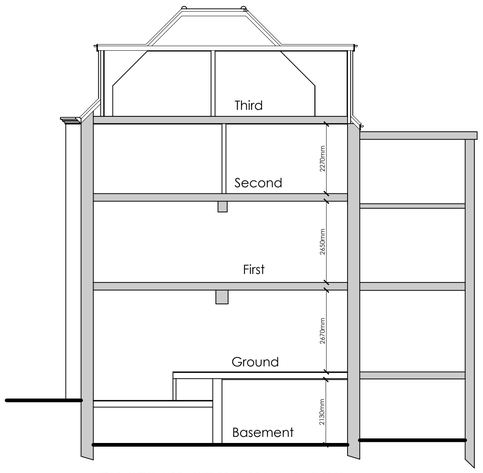
SITE PLAN 1:500

REVISIONS:

A. Planning revisions 7th June 2023



EXISTING EAST ELEVATION 1:100



EXISTING SECTION 1:100

ama architectural & quantity surveying services
atterbury moore associates

Unit 1 Gosling Croft Business Park
Long Furlong
Clapham Worthing
West Sussex BN13 3UT

01903 871131
carl@atterburymoore.co.uk

Client:

Address of Works: 5 Bath Place
Worthing
West Sussex
BN11 3BA

Drawing Title: Proposed Flat Conversion
PLANNING & BUILDING REGS

Paper Size: A1	Date: March 2023	
Job Number: WG-263	Drawing Number: 01	Revision: A - 07/06/23

General Notes:

1: Do not scale from these drawings (unless for planning purposes).
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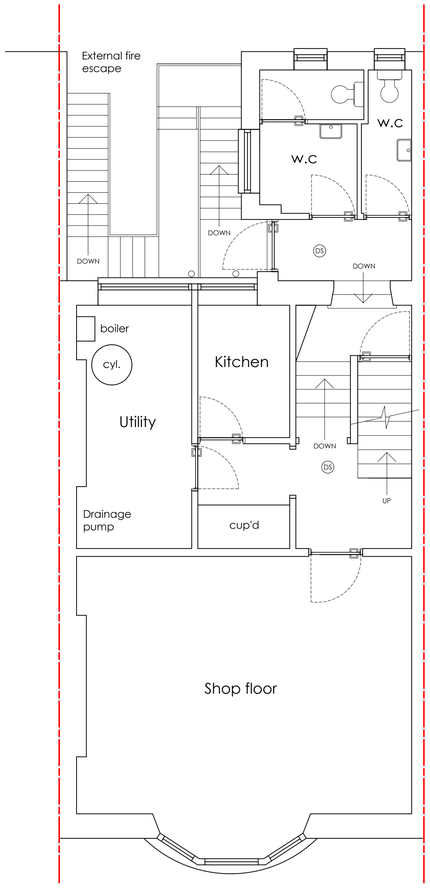
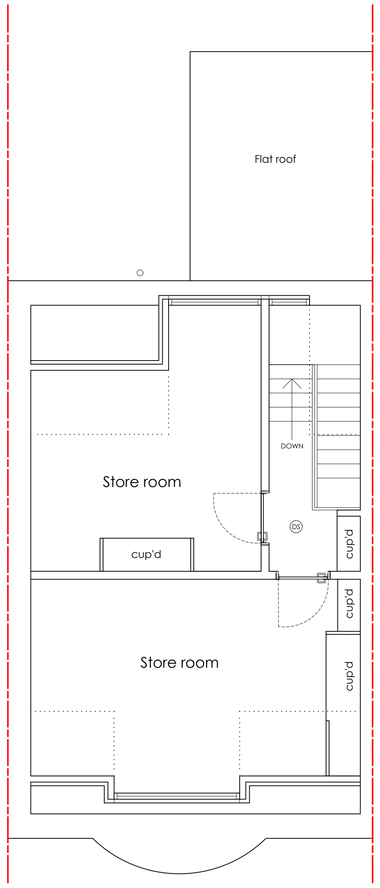
Revision	Date	Amendment



EXISTING SECOND FLOOR PLAN 1:50



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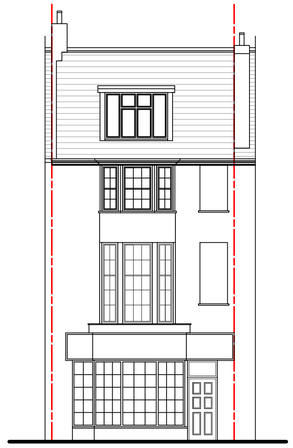

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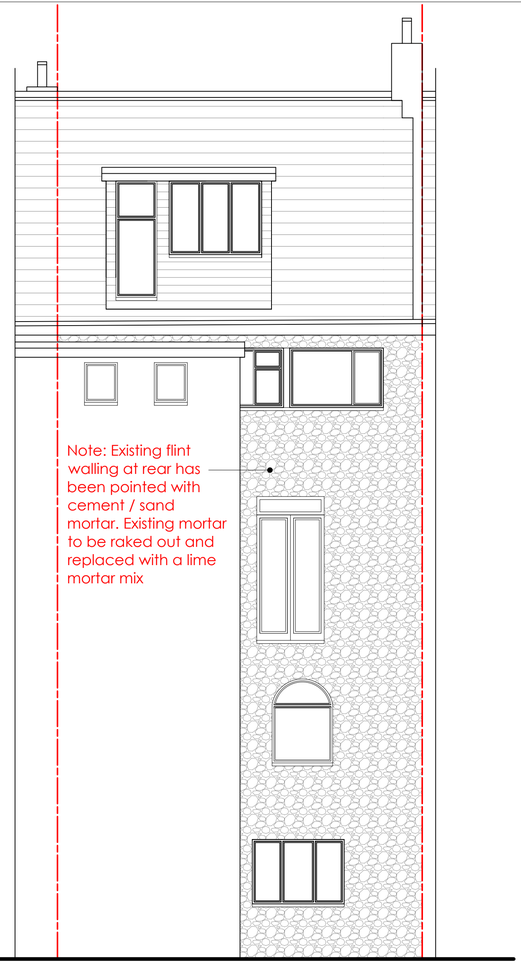
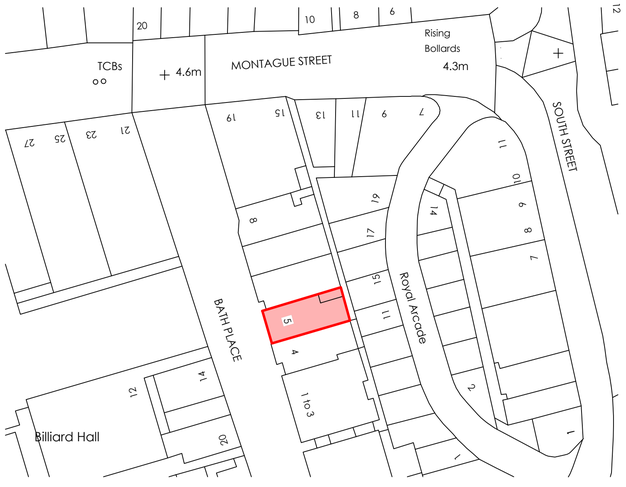
REVISIONS:

A. Planning revisions 7th June 2023



PROPOSED EAST ELEVATION 1:50



SITE PLAN 1:500



PROPOSED RESIDENTIAL FLOORS

EXISTING COMMERCIAL FLOORS

PROPOSED SECTION 1:50

REVISIONS:

A. Planning revisions 7th June 2023

Scale Bars:

1:1250

1:500

1:200

1:100

1:50

1:10

1:5

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Client:

Address of Works: 5 Bath Place, Worthing, West Sussex, BN11 3BA

Drawing Title: Proposed Flat Conversion PLANNING & BUILDING REGS

Paper Size:	A1	Date:	March 2023

Job Number:	Drawing Number:	Revision:
WG-263	02	A - 07/06/23

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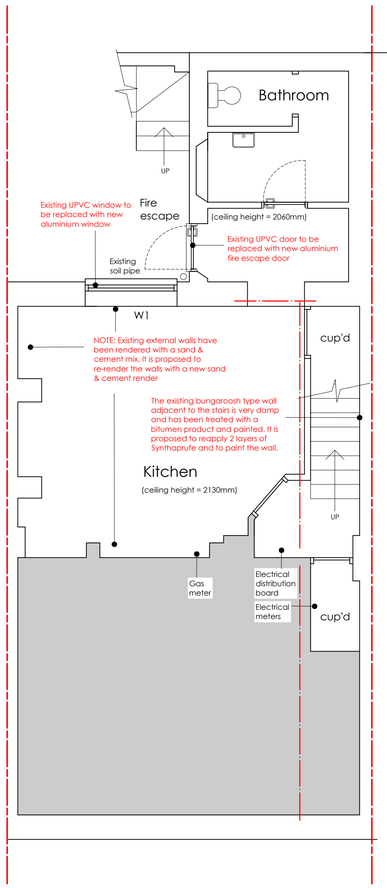
Revision	Date	Amendment



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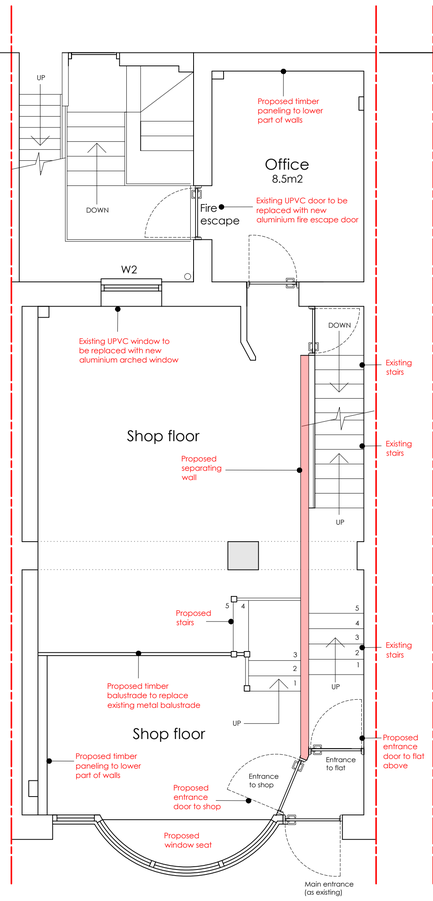

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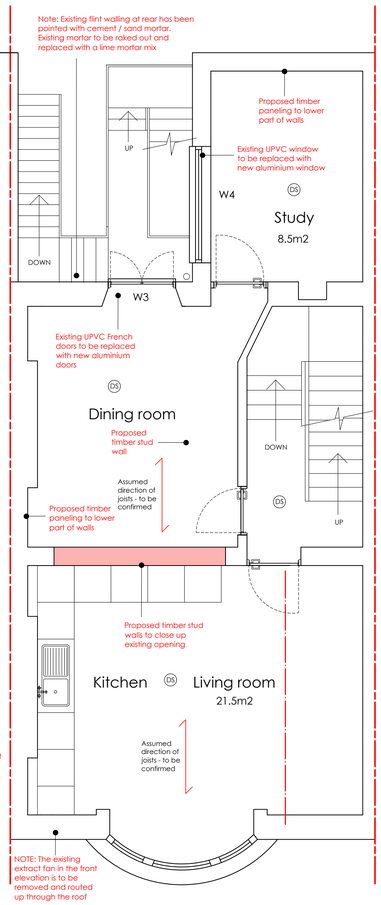

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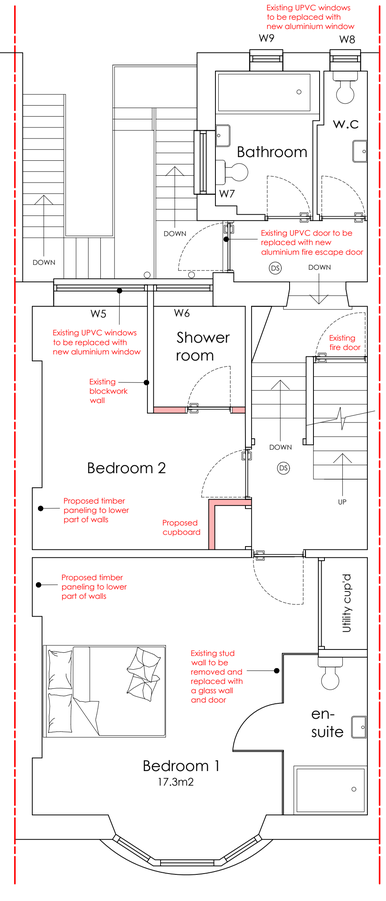

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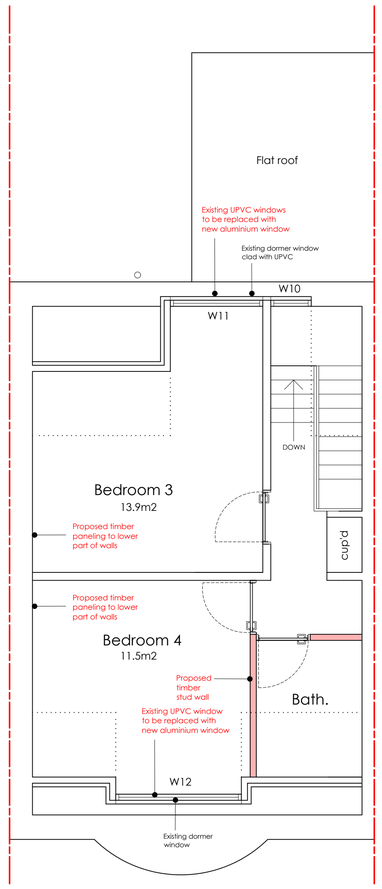
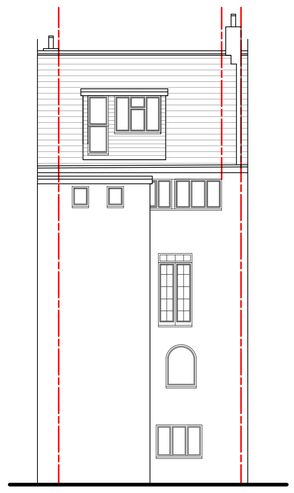


PROPOSED THIRD FLOOR PLAN 1:50



EXISTING WEST ELEVATION 1:100



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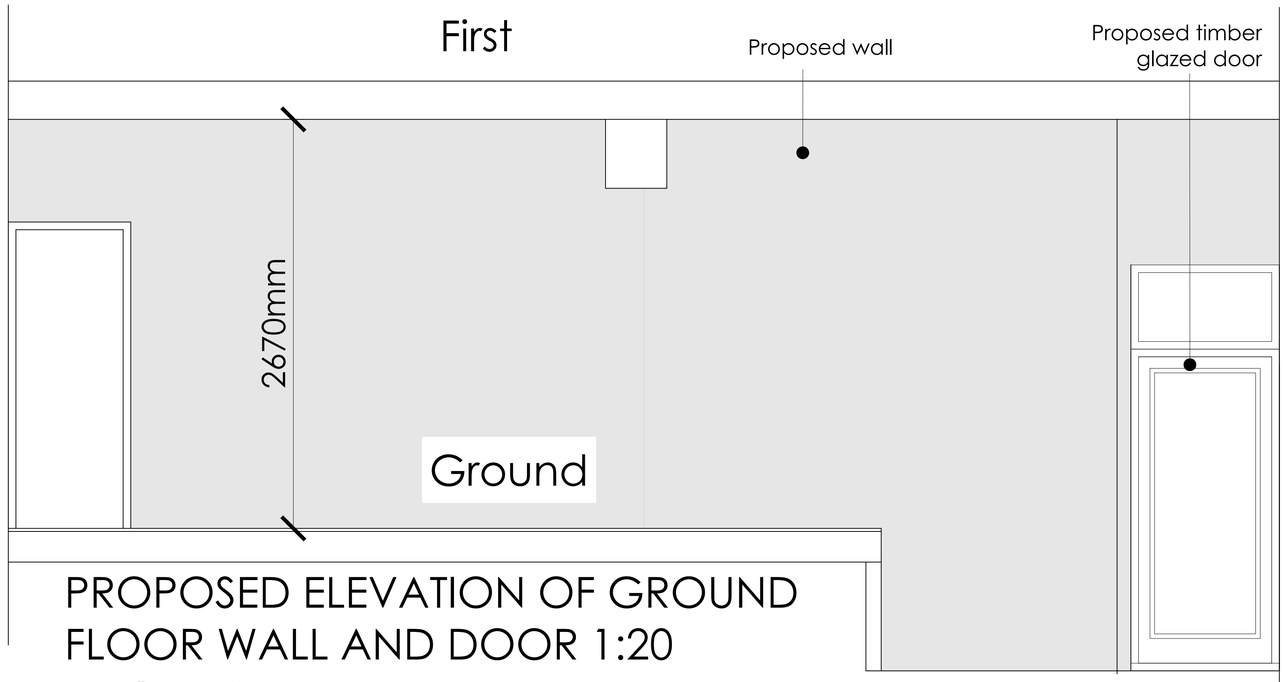

PROPOSED ELEVATION OF GROUND FLOOR WALL AND DOOR 1:20

1:20

REVISIONS:

A. Planning revisions 7th June 2023
B. Planning revisions 6th July 2023

Scale Bars:

1:1250
1:500
1:200
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1:50 (0m 1m 2m)
1:10 (0 200 400)
1:5

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PLANNING & BUILDING REGS

Paper Size:	Date:
A1	March 2023

Job Number:	Drawing Number:	Revision:
WG-263	03	B - 06/07/23

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Revision	Date	Amendment

Flood map for planning

Your reference	Location (easting/northing)	Created
93236	**514896/102423**	**1 Aug 2023 11:42**

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.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

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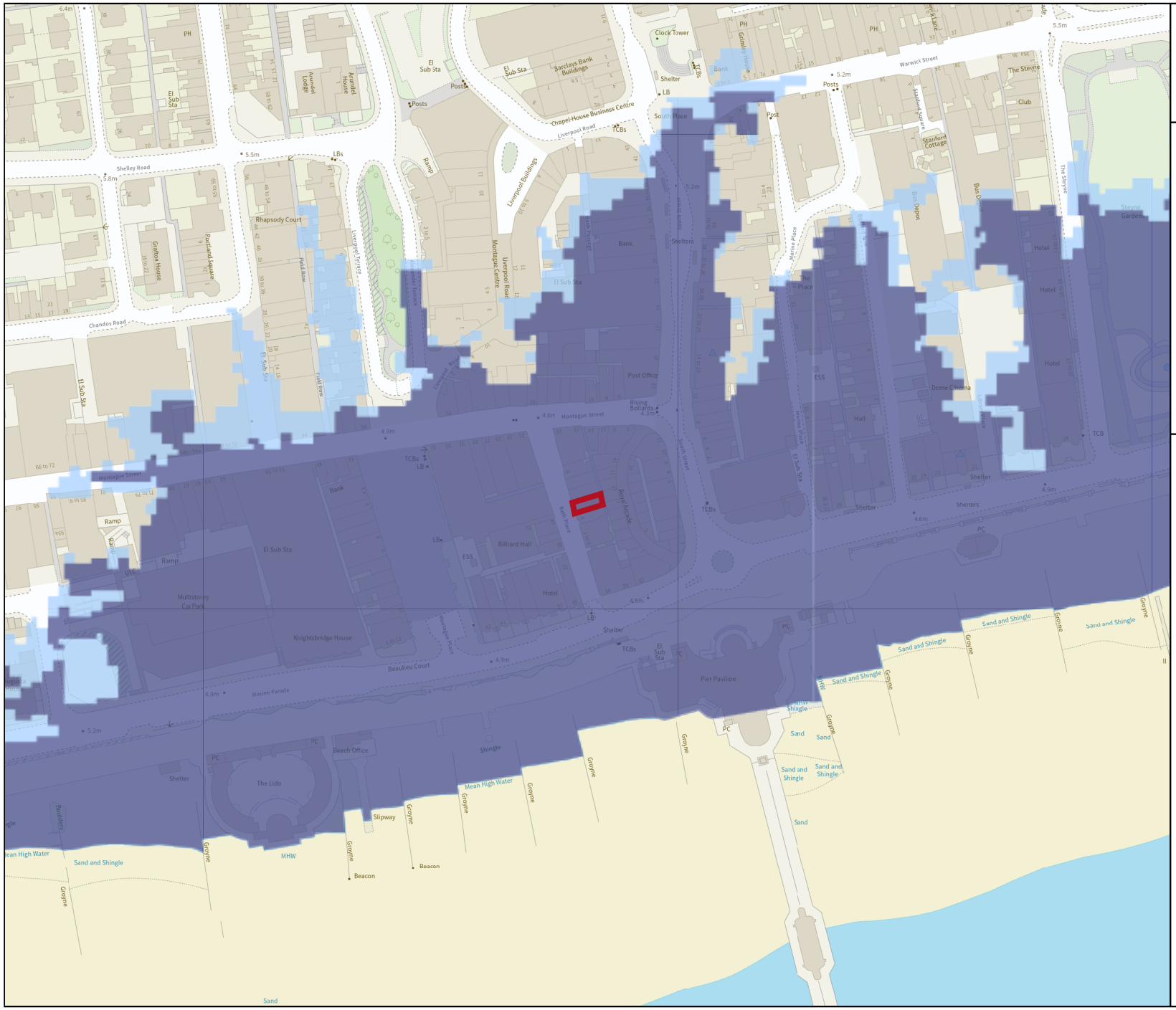

Environment Agency

Flood map for planning

Your reference
93236

Location (easting/northing)
514896/102423

Scale
1:2500

Created
1 Aug 2023 11:42

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m

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