Flood Warning and Evacuation Plan

Prepared for:
Dan Maitland

November 2024

Location:
8-10 Gratwicke Road
Worthing
BN11 4BH

Our reference:
93289-Maitland-GratwickRd-FWEP-v1.1



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Document Issue Record

Project:	Flood Warning and Evacuation Plan
Client:	Dan Maitland
Location:	8-10 Gratwicke Road, Worthing, BN11 4BH
Application:	Change Of Use Of Existing Mixed Used Building (Retail And 2 No. Residential Properties) To 2 No. Dwellings
Our reference:	93289-Maitland-GratwickRd -FWEP
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1. Introduction

Unda Consulting Limited have been appointed by Dan Maitland (hereinafter referred to as "the applicant") to undertake a Flood Warning and Evacuation Plan in support of the residential development at the site 8-10 Gratwicke Road, Worthing, BN11 4BH (hereinafter referred to as "the site"). The purpose of the study is to support a planning application for the proposed development.

The plan has been informed in part by the Flood Risk Assessment report carried out for planning by Unda Consulting Ltd. Those seeking a more technical appraisal of the flood risk posed to this site should consult the Flood Risk Assessment.

1.1 Document Control:

This plan is owned, maintained and updated by the householder whether or not the template was provided by or on behalf of the applicant.

It is recommended that the plan is reviewed:

- On first occupation;
- Every 3 years thereafter;
- As a result of lessons learnt;
- Following change of ownership or occupation and/or modification of the premises; or
- Following change to the Flood Warning process.

1.2 Instructions to Applicant:

You are required to provide a copy of this report to property owners and occupiers to encourage them to complete the Flood Warning & Evacuation Plan; providing necessary supporting material that should include everything under Flood Risk below.

1.3 Instructions to Site Owners:

In all owners and occupiers are encouraged to complete a FWEP as soon as possible after occupation.

1.4 Objectives:

The objectives of this plan are:

- To encourage owners and occupiers to sign up to Flood Warnings Direct and Weather Warnings;
- To ensure owners and occupiers are aware of any residual flood risk;
- That preventative measures are identified to further reduce risk;

- To ensure that owners and occupiers receive the necessary flood warnings;
- That owners and occupiers respond to flood warnings appropriately; and
- That owners and occupiers establish procedures to effect a timely evacuation and place of refuge.

1.5 Information about Flood Risk:

Developing a flood response plan is predicated on an understanding of the historical and residual risk, this can be obtained from:

- Historical Flood data (sources of risk), can be obtained from;
    - The applicant
    - Environment Agency
    - Local Authority
- A Flood Risk map, obtained from;
    - The applicant
    - Environment Agency
- Estimated Flood Depth; and frequency / probability; and
- Soft measures to mitigate flood risk.

All of this information is contained within the Flood Risk Assessment Report.

2. Location and Geography

2.1 Site Location and Usage:

The planning application is for the Change Of Use Of Existing Mixed Used Building (Retail And 2 No. Residential Properties) To 2 No. Dwellings.

The existing site is a shop at ground floor level, with two residential maisonettes over the ground, first and second floors. Number 10a is currently a kitchen and 8a is a reception space at ground floor level. The proposed planning application is for Conversion to 2-houses with no sleeping accommodation on the ground floor.

The existing site comprises of two residential units, and the proposed site comprises two residential units. As such, there will be no introduction of additional residential units to the site.



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

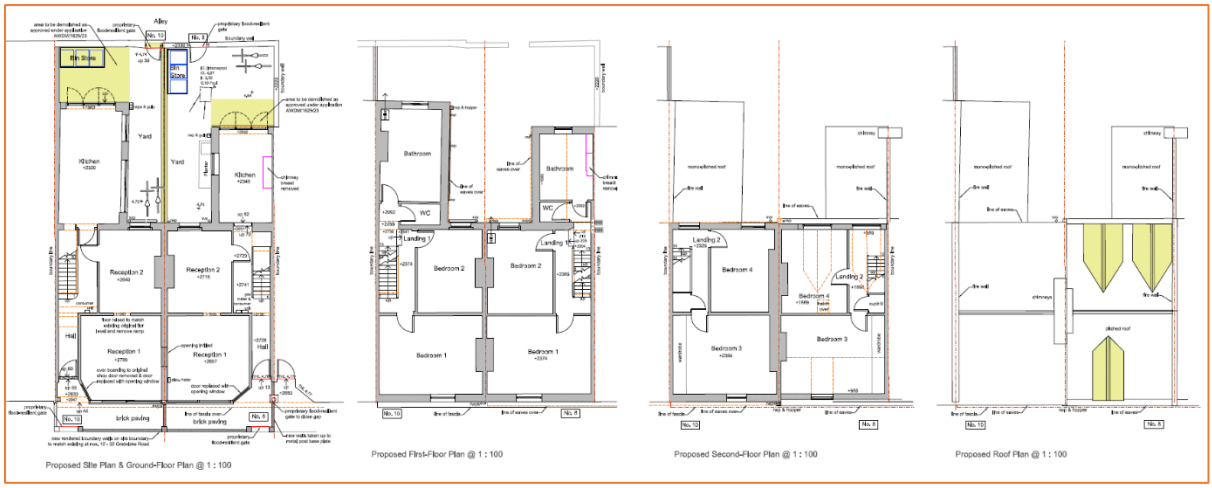


Figure 2: Proposed Floor Plans (Source: Finola Brady Architectural Services)

2.2 Site Topography

A topographical site survey has been undertaken by The Survey House in September 2023.

The survey shows a threshold entry level to the ground floor of 4.76mAOD at the entrance to the flat on Gratwicke Road to the front of the site and 4.70mAOD at the rear of the site – to the Yard.

As such, the finished ground floor level is at least 4.70mAOD.

Topographic levels along Gratwicke Road adjacent to the site are shown to be 4.68mAOD to 4.77mAOD, with topographic levels in the rear courtyard of the site shown to be 4.67mAOD to 4.76mAOD.

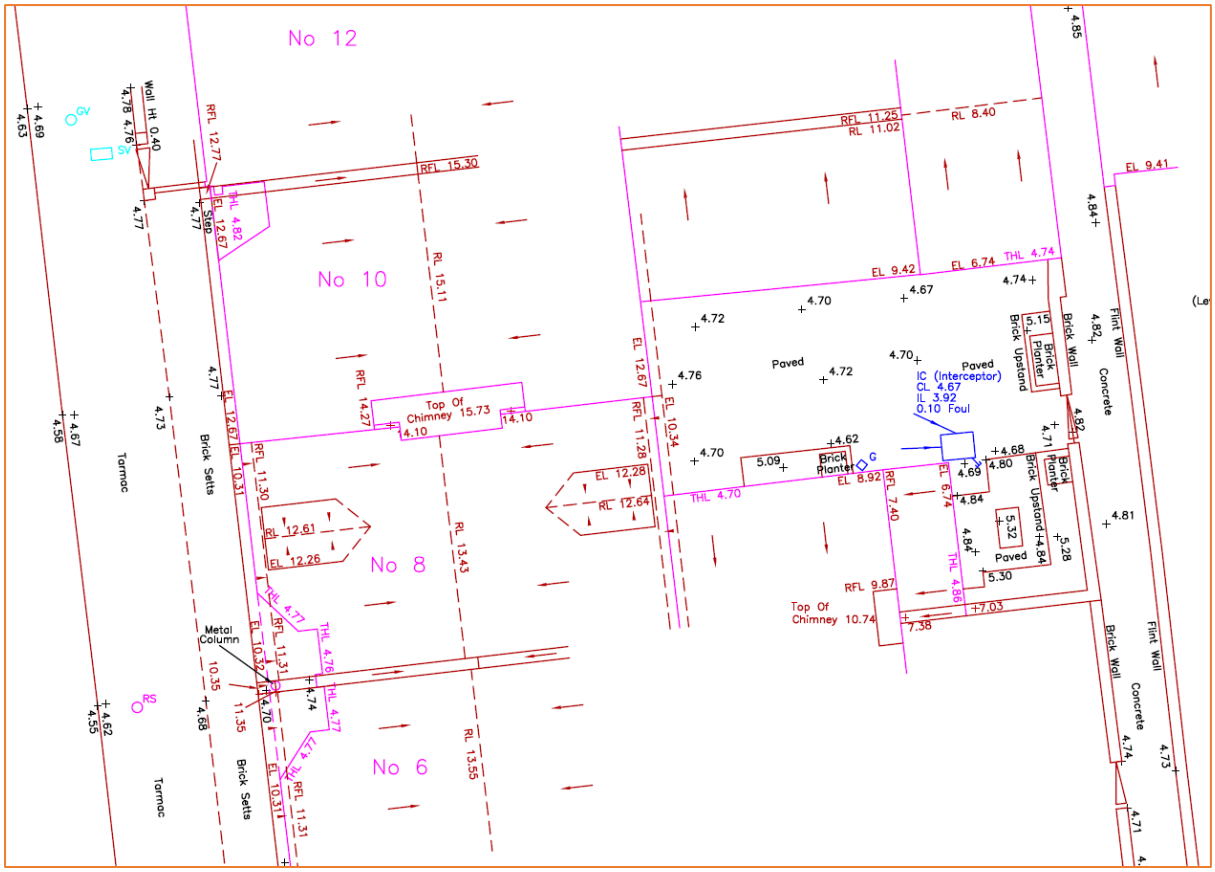


Figure 3: Extract from topographical site survey (Source: The Survey House)

3. Summary of Flood Risk

3.1 Environment Agency 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.

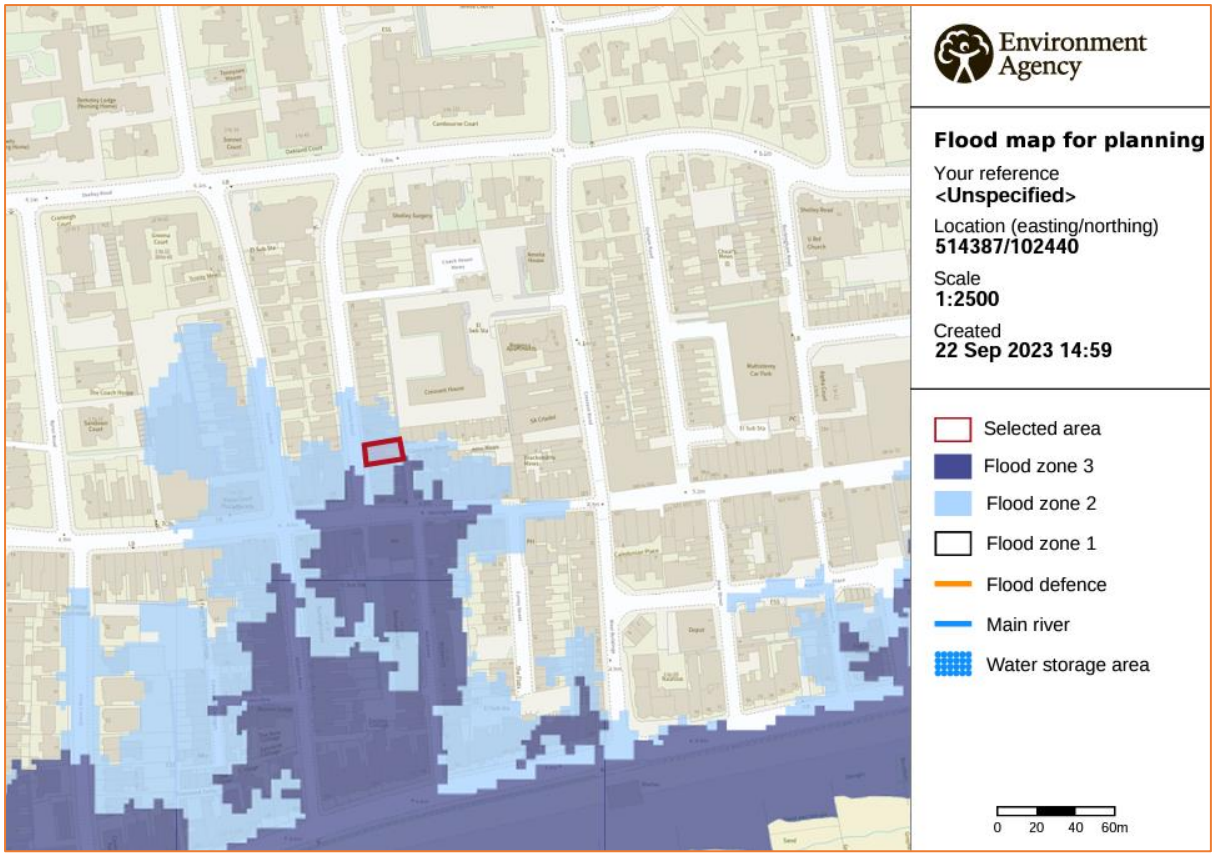


Figure 4: Environment Agency Flood Map for Planning (Rivers and Sea) (Source: EA)

The site is located partially within Flood Zones 3, 2 and 1 (High, Medium and Low Probability), which means it is defined as land having between a greater than 1 in 200 and less than 1 in 1000 annual probability of tidal flooding.

The risk would appear to be predominantly tidal and originate from the English Channel.

Closer inspection of the EA Flood Zones at the site shows that the site is located entirely within Flood Zone 2, and entirely outside of Flood Zone 3.

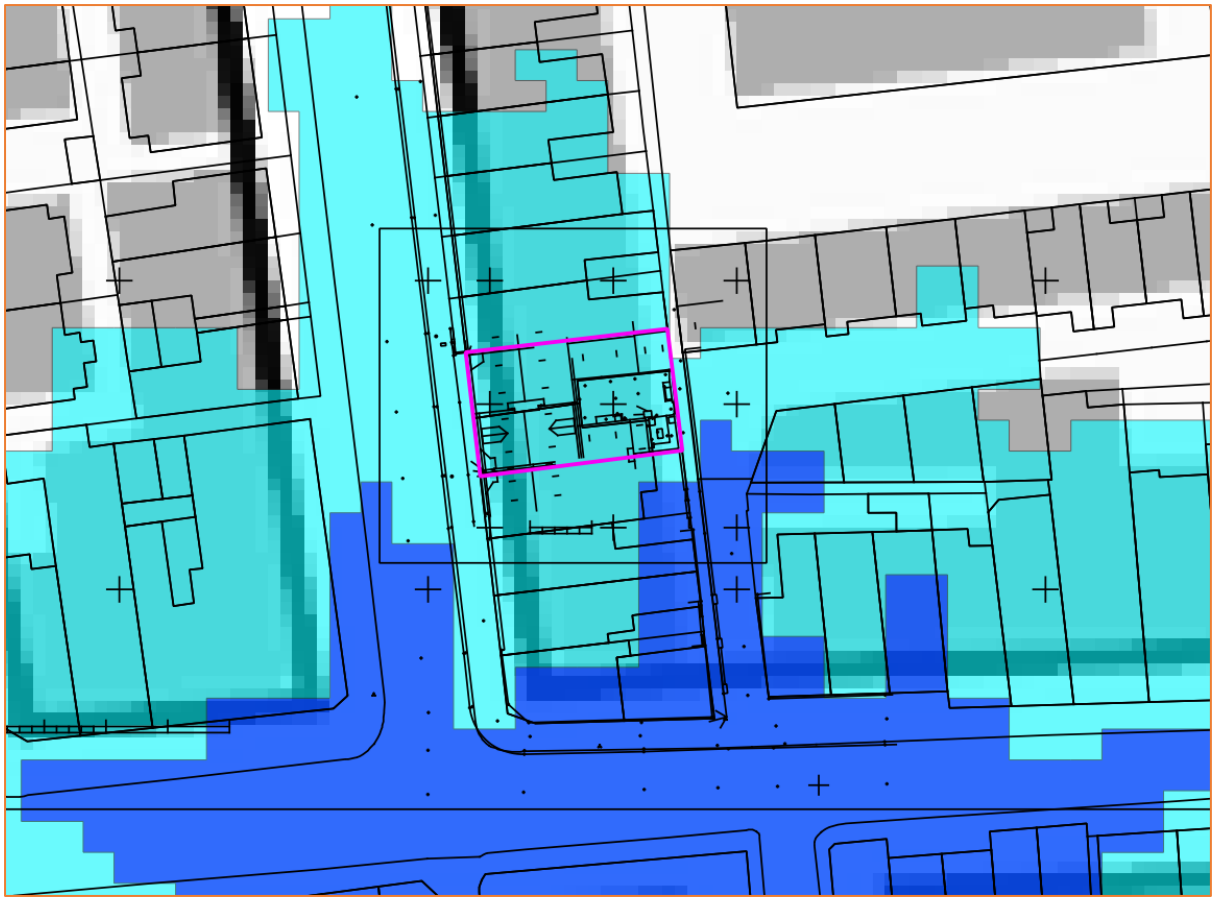


Figure 5: Environment Agency Flood Zones 2 and 3 (light and dark blue respectively) overlain onto the site (Source: EA, OS)

3.2 Tidal (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 75,000km2.

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.

3.2.1 Modelled flood levels and events (tidal):

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

	1:200yr	1:1000yr	1:200yr 2115
Undefended Modelled flood level	Outside	Outside	5.24mAOD
Defended Modelled flood level	Outside	4.83mAOD	5.00mAOD

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

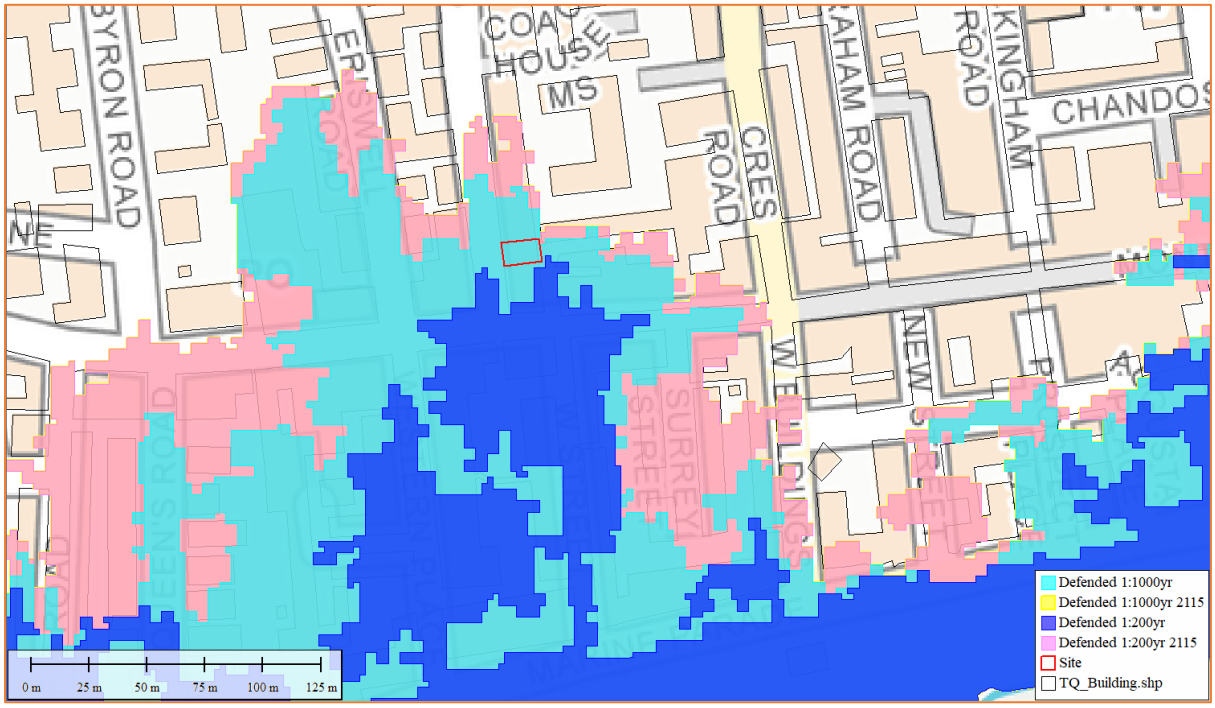


Figure 6: Modelled defended flood extents (Source: EA)

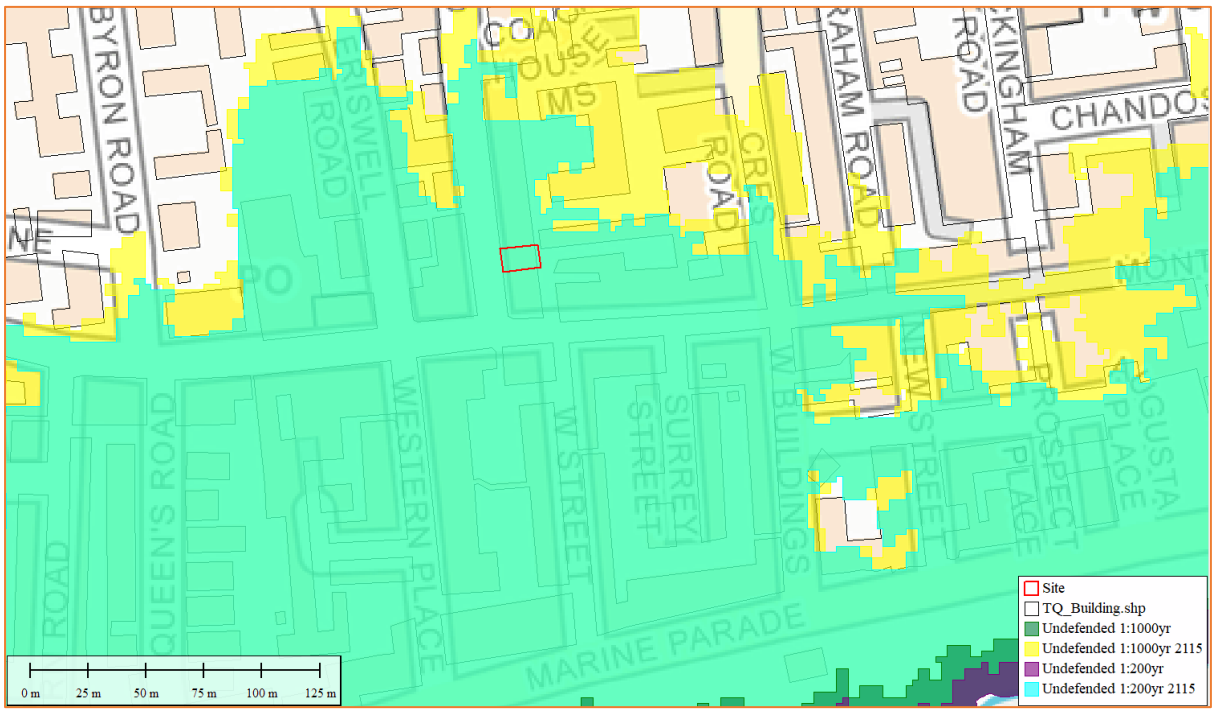


Figure 7: Modelled undefended flood extents (Source: EA)

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 in 2115.

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

The site is located partially within Flood Zones 2 and 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 'Flood risk assessments: climate change allowances' guidance for the South East 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 defended 1:200 year and 1:1000 year flood levels at the present day are 4.53mAOD and 4.83mAOD respectively. As such, the defended flood levels will be used for this assessment.

	2125 Higher Central	**2125 Upper End**
1:200 year	5.67mAOD	6.05mAOD
1:1000 year	5.97mAOD	6.35mAOD

Table 5: Modelled defended climate change flood levels

Comparison of the defended 1:200 year Higher Central and Upper End flood levels (5.67mAOD and 6.05mAOD respectively) with the topographic finished ground floor level of 4.70mAOD, shows that the floor level is 0.97m below the 1:200 year Higher Central and 1.35m below the 1:200 year Upper End flood levels.

Based on the plans provided however, all sleeping accommodation will be located at first floor level and above. All sleeping accommodation will therefore be above the modelled 1:200 year Upper End flood level, and above the modelled 1:1000 year Upper End flood level.

In addition, internal access is provided from the ground floor to provide safe refuge at first floor level, which is shown to be 2.92m above ground floor level (and therefore 7.62mAOD).

3.2.2 Flood defences:

A flood defence or EA Asset is any man-made or natural feature – such as a raised defence, retaining structure, channel, pumping station or culvert – that performs a flood defence or land drainage 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 natural raised shingle beach over sand which are heavily groyned and feature sea walls at the rear. In recent times the beach has been steepened which has placed pressure on the 3,610m length seawalls.

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.

3.3.3 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.

Flood defences act to defend the site from direct inundation, but there is residual risk from each (failure) and overtopping (exceedance) of flood defences.

The Adur and Worthing seafront is heavily protected by a series of coastal defences in the form of a sand and shingle beach and groynes. These assets are maintained by Adur and Worthing District Councils.

Wave overtopping is one of the principal mechanisms of flooding for the coastal frontage. Allowing for wave-overtopping increases the extent of flooding.

3.2.4 Historical flood records:

The EA has provided information to suggest that flooding has occurring the surrounding area including the overtopping of sea defences in 1980, and local drainage and surface water issues in 1960's. However none of these historical recorded events have appeared to have affected the site.

The site is not shown to be within the historic recorded flood outlines in the Adur and Worthing SFRA (2024), or within the WSCC Recorded Incidents.

3.3 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

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 "Low" to "Medium" risk of flooding from surface water.

The 1:1000 year surface water event has been used as an analogue for the 1:100 year +45% climate change event as this has not been modelled. Flood depths are shown to be 0.30 to 0.60m for the 1:1000 year event.

It should be noted however that Proprietary flood resilient gates will be installed at the front and the rear of the site.

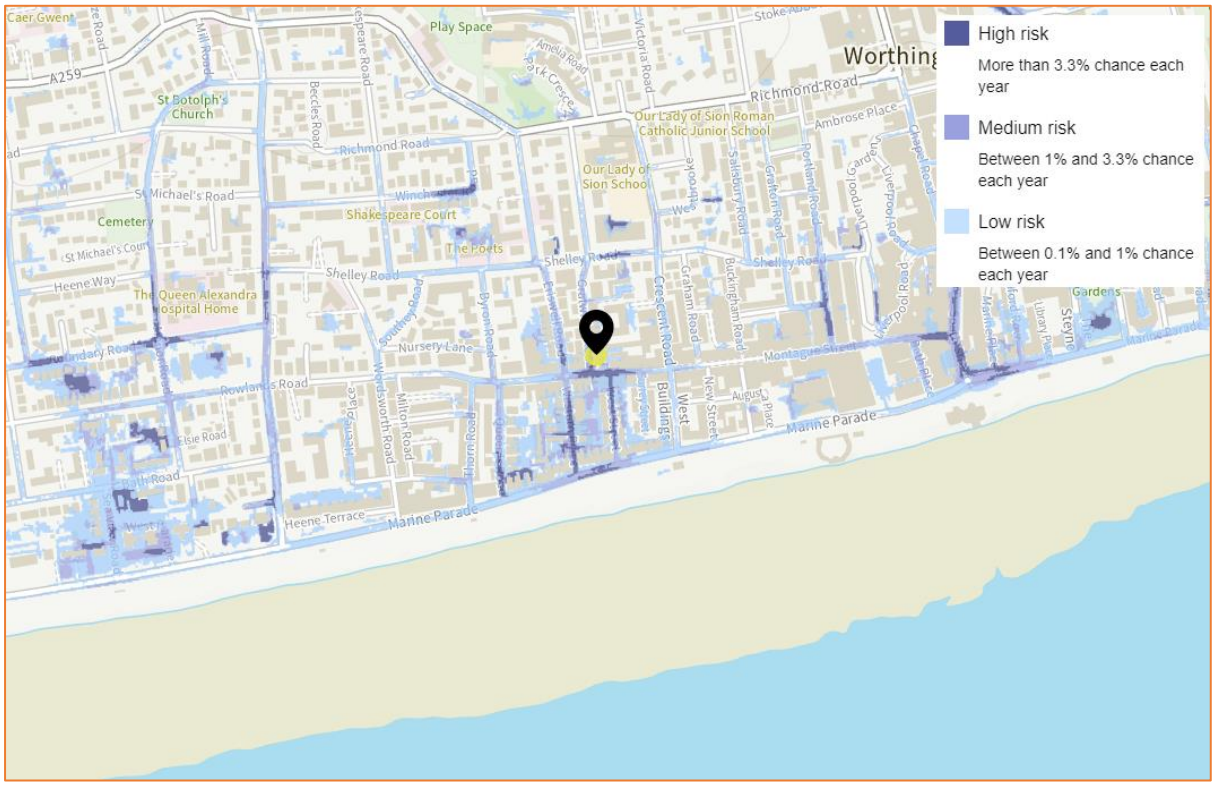


Figure 8: Extract from Environment Agency Surface Water Flood Extent Map (Source: EA)



Figure 9: Environment Agency Risk of Flooding from Surface Water flood depths for 1:1000 year event (Source: EA)

3.4 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.

No further information has been provided to suggest that the site has flooded from groundwater flooding previously.

3.5 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 information has been provided to suggest that the site has flooded from sewer surcharge flooding previously.

3.6 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 located 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.

3.7 Physical Design Measures

The application is for the change of use of the existing building. It is not possible to raise floor levels above the existing floor level. The applicant has confirmed that internal access to provide safe refuge at first floor level is provided as part of the development, and all sleeping accommodation is located at first floor level and above.

To help protect against flooding during extreme events, the applicant has agreed to implement flood resistant design measures into the proposal, in consultation with the Local Authority building control department. These measures can include the following:

- using flood resistant materials that have low permeability to at least 600mm above ground level;
- making sure any doors, windows or other openings are flood resistant to at least 600mm above ground level;
- using flood resilient materials (for example lime plaster) to at least 600mm above ground level;
- by raising all sensitive electrical equipment, wiring and sockets to at least 600mm above ground level;
- making it easy for water to drain away after flooding such as installing a sump and a pump;
- making sure there is access to all spaces to enable drying and cleaning;
- ensuring that soil pipes are protected from back-flow such as by using non-return valves.

A flood proof door should be installed for external ground floor level doors, or demountable flood defence barrier to defend lower ground level doorways and low windows if a flood door is not practical or other planning constraints prevent it.

Proprietary flood resilient gates will be installed at the front and the rear of the site.

3.8 FD2320 analysis of flood escape route:

The flood hazard along an escape route can be calculated using flood depth, flood velocity and an associated debris factor using the FD2320 analysis.

To calculate a hazard rating using FD2320 along the escape route, both flood depth and flood velocity are required.

While the flood hazard from tidal and surface water flooding is discussed separately in this section, it should be noted that the proposed escape route is the same regardless of the flood source.

3.8.1 Tidal

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 in 2115.

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

The proposed escape route is to exit the site and travel north along the alley to reach Coach House Mews, then west along Coach House Mews to reach Gratwicke Road, and continue north along Gratwicke Road.

As can be seen, the escape route exceeds the Low Hazard category for approximately 50m to the north of the site. The escape route is shown to have a maximum flood hazard of “Danger for Some”.

As such, a safe escape route within the “Low Hazard” category cannot be provided during the tidal 1:200yr 2115 flood event.

As such, this Flood Evacuation Plan prepared by Unda Consulting to demonstrate to any potential owners and occupiers of the proposed development what action to take in the event of a flood event.

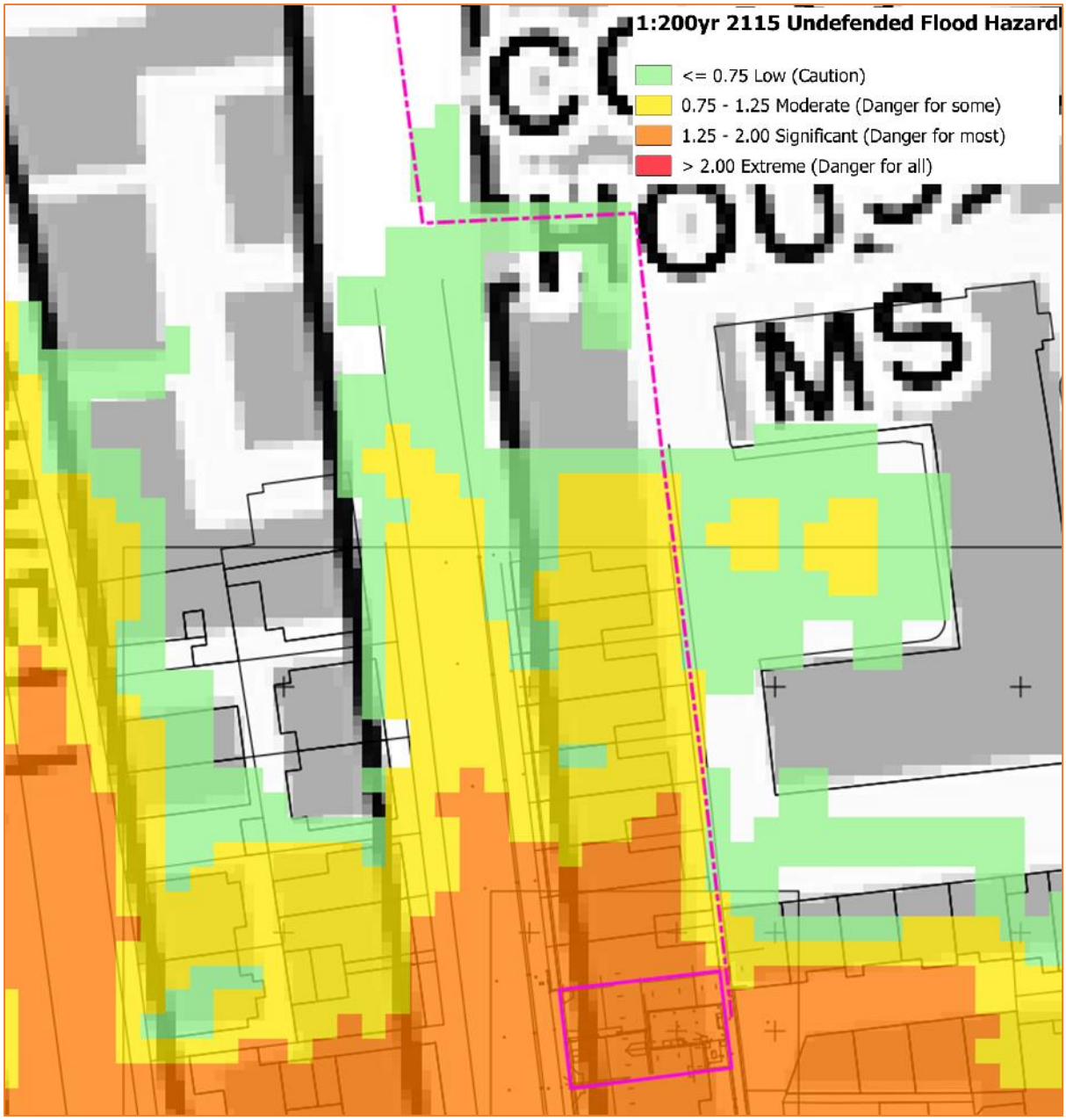


Figure 10: Modelled tidal 1:200 year 2115 flood hazards (Source: OS/ EA)

3.8.2 Surface Water

The EA Risk of Flooding from Surface Water Map suggests that the site lies in an area of "Low" to "Medium" risk of flooding from surface water.

The 1:1000 year surface water event has been used as an analogue for the 1:100 year +45% climate change event as this has not been modelled. Flood depths are shown to be 0.30 to 0.60m for the 1:1000 year event.

It should be noted however that Proprietary flood resilient gates will be installed at the front and the rear of the site.

The proposed escape route is to exit the site and travel north along the alley to reach Coach House Mews, then west along Coach House Mews to reach Gratwicke Road, and continue north along Gratwicke Road.



Figure 11: Modelled surface water 1:1000 year (1:100yr + CC) flood hazards (Source: OS/ EA)

As can be seen, the escape route exceeds the Low Hazard at numerous small points along the route. The escape route is shown to have a maximum flood hazard of "Danger for Some".

As such, a safe escape route within the "Low Hazard" category cannot be provided during the tidal 1:200yr 2115 flood event.

As such, this Flood Evacuation Plan prepared by Unda Consulting to demonstrate to any potential owners and occupiers of the proposed development what action to take in the event of a flood event.

4. Dangers of Floodwater

There can be significant risks from slip and trip hazards beneath the water as well as from diseases and other contaminants which will be in the water in both urban and rural environments. Vehicles can quickly become unstable in moving water - 30cm of water moving at only 6mph is enough to float the average family saloon. If you fall over in 15cm of water moving at only 6mph you are unlikely to be able to stand up again

4.1 To enter or not?

Don't enter flood water that is moving or more than 10cm (4 inches) deep.

Consider entering flood water - i.e. to protect your own property or to help others, only if:

- water is no more than 10cm deep
- water is not moving
- there is hard surface underneath - tarmac/concrete but not grass
- you can see the surface beneath the water

Keep a careful watch for hazards such as:

- raised drain covers
- open manholes
- kerbstones
- any other trip/fall hazard

and, bear in mind that water levels can change quickly and dramatically.

4.2 Cars:

If you get advance warning of flooding, it's best to move your car to higher ground to reduce the risk of costly damage or the hassle of an insurance claim.

- Only drive through water if you know that it's not too deep - generally this would mean no more than halfway up your wheels.
- Don't try driving through fast-moving water, such as at a flooded bridge approach – your car could easily be swept away.
- If you're driving and become stuck in flood water, it's generally best to stay in the car and telephone for help rather than try to get out - unless the water is shallow, stationary and you can see the ground beneath the water.
- If you return to find your car standing in flood water it's best to leave it and telephone for help or wait for the flood water to subside, rather than try to get to it and move it - unless the water is shallow, stationary and you can see the ground beneath the water.

Flood water, particularly sea water, can play havoc with vehicle electrics causing intermittent or erratic operation of lights and wipers for example. Sometimes the consequences can be more dangerous, and we've seen cases where all the airbags have deployed suddenly and without warning some time after a vehicle was recovered. If flood water has reached floor height or got inside the vehicle it's best to telephone for help before attempting to recover it.

4.3 Health risks:

Urban flood water can carry dangerous bacteria that could cause disease, particularly if drains/sewers have back-washed!

In rural areas contamination is more likely to come from agricultural chemicals and animal waste.

It's safest to assume that water is contaminated even if there's not obvious evidence such as floating or suspended sewage, oil slicks etc.

If you do enter (shallow and still) flood water it's best to wear protection such as wellington boots and to keep your hands out of the water. Wash and clean up carefully afterwards.

4.4 Floodwater facts:

- The majority of drowning deaths in the UK occur within only 3m of a safe point
- 2/3 of those who die in flood-related accidents are considered to be good swimmers
- 32% of flood-related deaths are by drowning in a vehicle
- After 20 minutes in water at 12C the temperature of the deep muscle of your forearm would drop from 37 ºC to 27ºC, leading to a 30% reduction in muscle strength.
- In water 1m deep (waist high), flows of 1m/s become challenging and by 1.8m/s (4mph) everyone will be washed off their feet.
- If the speed of the flood water doubles the force it exerts on you/your car is quadrupled
- Just 15cm of fast flowing water can knock you off your feet and be enough for you to be unable to regain your footing.
- 60cm of standing water will float your car
- Just 30cm of flowing water could be enough to move the average family car
- Just an egg cupful of water in the combustion chamber could be enough to wreck an engine
- Flood water can be contaminated and carry diseases
- Culverts are dangerous when flooded – the siphon effect of culverts can drag in pets, children and even fully grown adults.

5. Environment Agency Flood Information Service:

The site lies in an Environment Agency Flood Warning Area. The EA issue flood warnings to specific areas when flooding is expected. All owners and occupiers should register online with the free Environment Agency Flood Information Service at https://flood-warning-information.service.gov.uk/ to receive flood warnings by phone, text or email.



Figure 12: Extract from the Environment Agency Flood Warning Areas Map (Source: EA)

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 owners and occupiers registers online with the free Environment Agency Floodline Warnings/Alert Direct service at https://www.gov.uk/sign-up-for-flood-warnings to receive flood warnings by phone, text or email.

The site falls within the Flood Warning Area Code 0695WAC407, for Rustington, Worthing and Lancing (quickdial 316036).

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

Flood Warning	Flood Alert	Flood Warning	Severe Flood Warning	Warning no longer in force
				
What it means?	Flooding is possible. Be prepared.	Flooding is expected. Immediate action required.	Severe flooding. Danger to life.	No further flooding is currently expected in your area.
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.	When a Severe Flood Warning, Flood Warning or Flood Alert is no longer in force.
How It's issued	Environment Agency website and Flood Warnings Direct service, based upon weather and river conditions	Environment Agency website and Flood Warnings Direct service, based upon weather and river conditions	Environment Agency website and Flood Warnings Direct service, based upon weather and river conditions	Environment Agency website and local TV/radio stations and news bulletins
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 before leaving the property. Put flood protection equipment in place. Consider moving vehicles parked at ground level to a higher level or area outside of the Flood Zone. Contact the Council to find out whether evacuation is considered necessary, and if so, where they are providing for evacuees.	Stay in a safe place with a means of escape. Be ready should you need to evacuate. Co-operate with the emergency services. Call 999 if you are in immediate danger.	If evacuation has occurred, check with the Council that it is safe to return to the property/building. Be careful as flood water may still be around for a few days and could be contaminated. If there has been flooding to the property contact your landlord / management company for advice (if applicable), take photographs of any damage and contact your insurance company. If you need to make an insurance claim do not throw anything away until the insurance company says so.

Table 6: Flood Warnings

The Environment Agency also provide a flood forecast for the next 5 days. Daily forecasts of flood risk on the EA website www.environment-agency.gov.uk These are updated more

frequently for higher flood risk situations. Maps will how one of four levels of risk for each county:

- Green = very low risk of flooding
- Yellow = low risk of flooding
- Amber = medium risk of flooding
- Red = high risk of flooding

5.1 Actions to be taken in response to flood warnings

This Flood Warning and Evacuation Plan will be overridden by any advice given by competent authorised staff including the Emergency Services or Local Authority responders on the ground in the event of a serious flood event.

- On receipt of a **FLOOD ALERT**, the owners and occupiers of the property should:
    - Monitor the situation via local media (TV/radio stations) and the Environment Agency website;
    - Make themselves aware of local river / tide levels and forecasts;
    - Prepare to act on your Flood Warning and Evacuation Plan.
    - Prepare a flood kit of essentials and have it ready if needed.
    - Prepare to evacuate if necessary.
    - Contact Floodline on 0345 988 1188 for further information.
- On receipt of a **FLOOD WARNING**, the owners and occupiers of the property should:
    - Follow advice to “go in, stay in, and tune in”;
    - Move valuables and pets to the to a higher or safe place (above modelled flood levels);
    - Locate keys to lock windows and tools to switch off gas and electricity supplies in the event evacuation is required;
    - Move all vehicles to an area outside of the potential flood;
    - Be prepared to follow instruction form the Emergency Services.
    - Put flood-protection equipment in place.
    - Contact the Council to find out whether evacuation is considered necessary, and if so, where they are providing for evacuees.
    - If evacuation is required, switch off the gas and electricity supply before leaving the property (if safe to do so).
    - Contact Floodline on 0345 988 1188 for further information.
- On receipt of a **SEVERE FLOOD WARNING**, the owners and occupiers of the property should:
    - Remain attentive to local media forecasts and news bulletins;
    - Stay in a safe place with a means of escape.
    - Be ready to evacuate the property.
    - Cooperate with the emergency services.

  - Call 999 if you are in immediate danger.
  - Instructions to evacuate are normally given by the Emergency Services, but owners and occupiers must monitor conditions and evacuate if conditions put them at risk, using the procedure and route detailed below and in the "**Flood Evacuation**" section.

- On receipt of **WARNING NO LONGER IN FORCE**, the owners and occupiers of the property should:
  - If evacuation has occurred, check with the Council that it is safe to return to the property/building.
  - Be careful as flood water may still be around for a few days and could be contaminated.
  - If there has been flooding to the property contact your landlord/management company for advice (if applicable), take photographs of any damage and contact your insurance company. If you need to make an insurance claim do not throw anything away until the insurance company says so.

6. Met Office Weather Warnings:

As the UK's official weather service, the Met Office is responsible for issuing weather warnings, which warn of impacts caused by severe weather. The Met Office provide warnings up to seven days ahead for rain, thunderstorms, wind, snow, lightning, ice and fog.

Met Office weather warnings are available in a number of ways, which make it easy to get the very latest information wherever you are. These include the Met Office app and website, social media, email alerts, TV, radio and RSS.

It is recommended that the owners and occupiers sign up to the National Severe Weather Warning Service. More information can be found here: https://www.metoffice.gov.uk/weather/guides/warnings.

The Met Office issues weather warnings, through the National Severe Weather Warning Service, when severe weather has the potential to bring impacts to the UK. These warnings are given a colour (yellow, amber or red) depending on a combination of both the impact the weather may have and the likelihood of those impacts occurring.

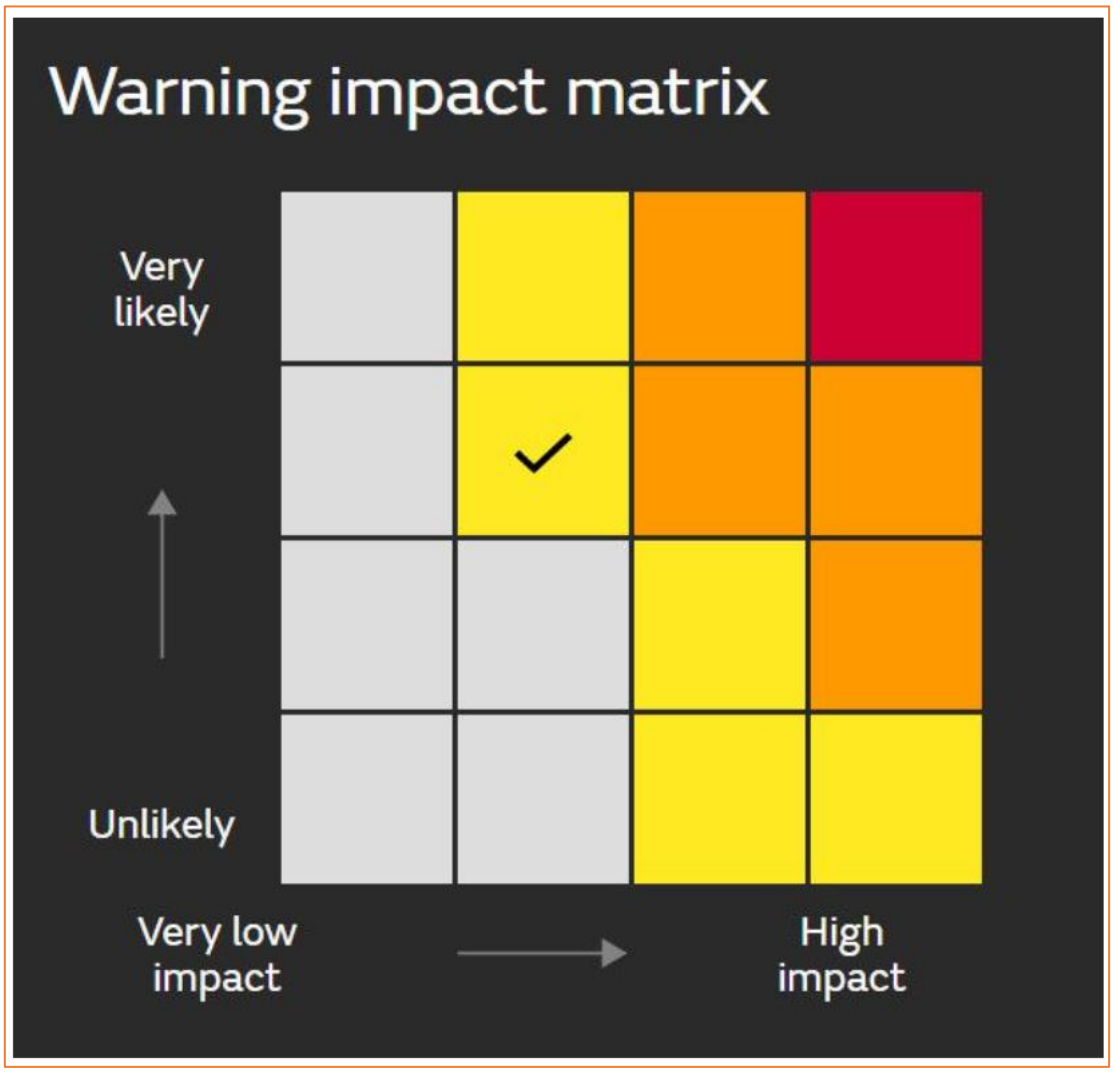


Figure 13: Met Office Weather Warning Impact Matrix (Source: Met Office)

Yellow Warning: Yellow warnings can be issued for a range of weather situations. Many are issued when it is likely that the weather will cause some low level impacts, including some disruption to travel in a few places. Many people may be able to continue with their daily routine, but there will be some that will be directly impacted and so it is important to assess if you could be affected. Other yellow warnings are issued when the weather could bring much more severe impacts to the majority of people but the certainty of those impacts occurring is much lower. It is important to read the content of yellow warnings to determine which weather situation is being covered by the yellow warning.

Amber Warning: There is an increased likelihood of impacts from severe weather, which could potentially disrupt your plans. This means there is the possibility of travel delays, road and rail closures, power cuts and the potential risk to life and property. You should think about changing your plans and taking action to protect yourself and your property. You may want to consider the impact of the weather on your family and your community and whether there is anything you need to do ahead of the severe weather to minimise the impact.

Red Warning: Dangerous weather is expected and, if you haven't already done so, you should take action now to keep yourself and others safe from the impact of the severe weather. It is very likely that there will be a risk to life, with substantial disruption to travel, energy supplies and possibly widespread damage to property and infrastructure. You should avoid travelling, where possible, and follow the advice of the emergency services and local authorities.

7. Flood Evacuation Plan

The decision to evacuate or take shelter in your property is ultimately for you to make having due regard to the advice/warnings and instructions of the Council and the emergency services. Where possible you should make arrangements with family or friends for shelter.

The decision to evacuate must be made to allow sufficient time to conduct the evacuation before flooding occurs. Flood waters contain hidden dangers and will impede if not prevent a safe evacuation.

Where evacuation is not a feasible option, or has been delayed, you should stay within the property; taking with you any important documents, bottled water, essential medicines and food sufficient to support you until rescue (see information related to Flood Kit). Comparison of modelled flood levels with finished floor levels has shown that the ground floor provides safe refuge above modelled flood levels.

You should not assume that the emergency services will be able to assist you with the evacuation; their focus will be directed to those in greatest need.

6.1 When to Leave your Property:

It is recommended that owners and occupiers do not attempt to evacuate if flooding of the site has already commenced. They should seek immediate refuge within their property, call 999, and await further instruction.

It is likely that sufficient warning of tidal flooding would be available prior to a flood event to allow evacuation of the site.

Tidal flooding from storm surges is well understood and tidal storm surges are monitored and predicted. As such, it is unlikely that the site would flood unexpectedly without sufficient flood warning for evacuation.

The tidal cycles generally dictate 6 hours between the peak and trough of the tidal cycle, and as such after a likely maximum of 6 hours water will be able to drain from the site. The duration of any tidal flooding would be likely to be limited to a period of a few hours around high water.

Flood warning notices will be erected around the site to inform owners and occupiers of the risk of flooding, and the flood warning and evacuation measures. On receipt of a Flood Warning, contact the Council to find out whether evacuation is considered necessary, and if so, where they are providing for evacuees (i.e. where is the nearest rest centre to be directed to).

Given the tidal cycle, it would be reasonable to expect at least 6 hours forecast of a significant tide level, although the actual tide and wave condition will be determined closer to the time of high tide.

As such, it is considered to be unlikely that tidal flooding of the property would occur without flood warning.

In the event of surface water flooding, the 1:1000 year surface water event has been used as an analogue for the 1:100 year +45% climate change event as this has not been modelled. Flood depths are shown to be 0.30 to 0.60m for the 1:1000 year event.

It should be noted however that Proprietary flood resilient gates will be installed at the front and the rear of the site.

As such, given the flashy (short duration) nature of surface water flooding, it is considered likely that the whole development will be protected from flooding for at least a 1:100 year plus climate change surface water event which could results in a maximum surface water flood depth of 0.30 to 0.60m.

6.2 Evacuation Routes:

If it is decided to evacuate upon receipt of a flood warning, **and no floodwaters are present within the site or on the roadways or alleyways outside**, leave the property to the rear (east) and follow the agreed evacuation route – north along the alley to reach Coach House Mews, then west along Coach House Mews to reach Gratwicke Road, and continue north along Gratwicke Road. Once evacuated, owners and occupiers should report to the local police that they have done so, and are no longer on site.

This route is shown to be entirely outside of areas of “Extreme” and “Significant” flood hazard for both the 1:200 year tidal flood event in 2115, and for the 1:100 year plus climate change surface water event (1:1000 year analogue). After approximately 50m from the site, the escape route is shown to be entirely outside of areas of “Moderate” flood hazard, and at “Low” flood hazard for both modelled flood events for the remaining 240m of the escape route.

In line with the Adur and Worthing Council Emergency Plan a temporary place of shelter / accommodation can be sought at one of the designated Emergency Rest Centres. Further details can be obtained from:

- Obtaining a location from the list of Council Emergency Rest Centres
- Or contact the Adur and Worthing Emergency Management Team

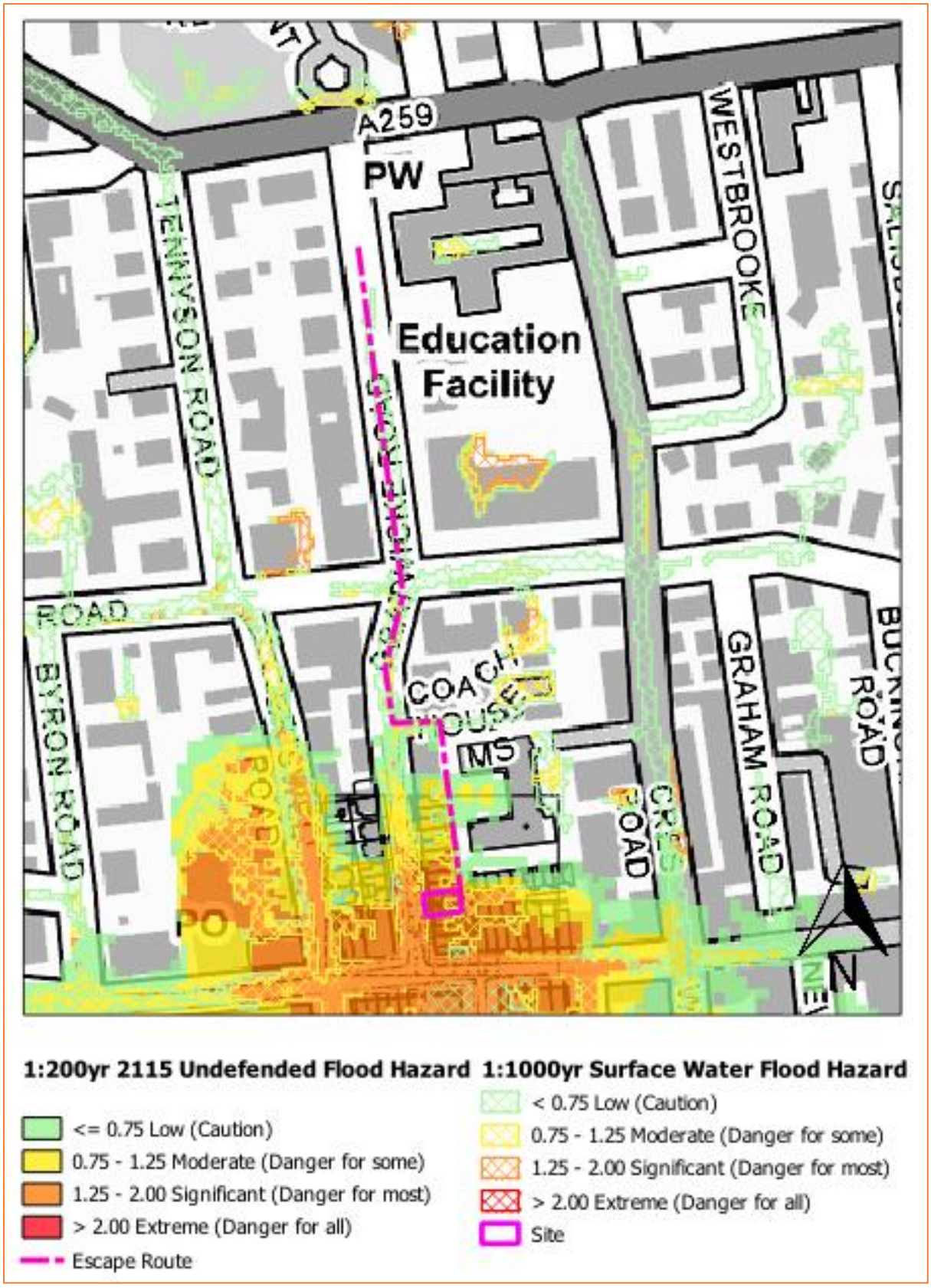


Figure 14: Evacuation route, showing flood hazard for both the 1:200 year tidal flood event in 2115, and for the 1:100 year plus climate change surface water event (1:1000 year analogue (Source: EA)

6.3 Safe Refuge within your Property:

It is recommended that owners and occupiers do not attempt to evacuate if flooding of the site has already commenced. They should seek immediate refuge within their property, call 999, and await further instruction.

Comparison of the defended 1:200 year Higher Central and Upper End flood levels (5.67mAOD and 6.05mAOD respectively) with the topographic finished ground floor level of 4.70mAOD, shows that the floor level is 0.97m below the 1:200 year Higher Central and 1.35m below the 1:200 year Upper End flood levels.

Based on the plans provided however, all sleeping accommodation will be located at first floor level and above. All sleeping accommodation will therefore be above the modelled 1:200 year Upper End flood level, and above the modelled 1:1000 year Upper End flood level.

In addition, internal access is provided from the ground floor to provide safe refuge at first floor level, which is shown to be 2.92m above ground floor level (and therefore 7.62mAOD).

The 1:1000 year surface water event has been used as an analogue for the 1:100 year +45% climate change event as this has not been modelled. Flood depths are shown to be 0.30 to 0.60m for the 1:1000 year event. Proprietary flood resilient gates will be installed at the front and the rear of the site.

As such, the first floor provides safe refuge.

The tidal cycles generally dictate 6 hours between the peak and trough of the tidal cycle, and as such after a likely maximum of 6 hours water will be able to drain from the site. The duration of any tidal flooding would be likely to be limited to a period of a few hours around high water.

A flood kit or ‘grab bag’ of essential items is kept onsite to support the expected duration of sheltering in the refuge and/or evacuation.

To help protect against flooding during extreme events, the applicant has agreed to implement flood resistant design measures into the development where possible and practical.

6.4 Role of the emergency services, local authority, Environment Agency and Utility Companies:

The response to a major flood event will involve a number of organisations working together at a local level, including the emergency services, local authority (the council), the Environment Agency and utility companies. The Sussex Resilience Forum brings together emergency services, councils, utilities and other essential public and voluntary services to work in partnership to support the local community during incidents and emergencies.

8. Flood Kit

The successful implementation of any plan is dependent on all owners and occupiers being familiar with its content and to have rehearsed, where possible, the procedures contained within it. Rehearsing the plan can be made fun and educational for younger members of the family.

Resilience is achieved when individuals and communities cooperate to prepare for, respond to and recovery from emergencies. This begins with engagement with neighbours, understanding your community and culminates in a collective approach to management of risk.

There are many ways in which owners and occupiers may prepare for the potential of a flood event. The Environment Agency recommends that you create a kit of essential items and keep it to hand.

- Important documents - such as passport and insurance certificates. Some documents are expensive to replace. Having these in your kit will keep them safe and to hand.

- Torch - in case it floods at night and your power is affected.

- Radio - a wind-up or battery radio will help you monitor local news and weather broadcasts for the latest flooding situation.

- Batteries - have spare batteries available to power your torch or radio.

- Blankets or warm clothing - it may be cold and you could be without power for some time.

- First aid kit - keep a first aid kit to hand in case of minor injuries. Put any prescription medication in your kit so that you have easy access to it.

- Bottled water - flood water can contain sewage, chemicals and animal waste. Drinking bottle water will keep you hydrated and make sure your water hasn't been contaminated by the flood water

.

- Tinned food - you don't know how long the flood will last. Have tinned and non-perishable food available for you to eat.

- Personal items - some items are irreplaceable. Put items of personal value such as photos, family videos or treasured mementos in your flood kit so that they are safe.

- Mobile phone - keep a fully charged mobile with you so that you can contact people in an emergency or call for help. If your phone has Internet access you can use it to check on the latest flood situation.

- Waterproof clothing - keep wellies and rubber gloves available should you need to enter the flood water.

In a flood, you may not have time to find these essential items so it's important to prepare in advance.

Completing a flood plan – in light of the information in this plan - will help you decide what practical actions to take before and during a flood, which will help reduce the damage flooding could cause. A copy of the Environment Agency's personal flood plan is included in this document.

8. Recovery and Re-occupation

If your property is subjected to flooding, and you have evacuated, you may not be allowed to return to your property until it has been declared safe to do so. Your insurance company will provide further guidance and support.

In the event that you did not evacuate it is possible that you will now be encouraged to do so, insurance companies may insist upon it in order to ensure your protection and to effect necessary repairs.

8.1 If you have insurance:

If you have not done so ring your insurance company immediately - they will send a loss adjuster as soon as they can (usually in a day or so).

Try to 'stop' and make a plan. e.g. photograph everything – structure, appliances, furniture and contents, watermarks etc. If you have lost your camera in the floodwater, use a cheap disposable one. If you've got a video camera use that too. If you or your family have had to move out or need to leave the area, make realistic decisions based upon the fact many buildings will take six months to dry and become habitable – this is not a two week problem!

You may have to live in your property while the loss adjuster arrives and tells you what will happen. In the meantime, make a list of what has been damaged and keep it somewhere safe.

Recover valuables, keepsakes etc and put them somewhere safe. Use rubber gloves when you are handing them and put them in bags or boxes in a safe place.

Your insurance company via your loss adjusters will arrange for a professional cleaning company to come and undertake all of the work in the following section or if the damage is severe appoint a 'strip out' contractor to remove flood damaged walls and floors plus damaged goods.

8.2 No flood insurance?

Local supplies of disinfectant, brushes, driers, generators, pumps, builders and tradesmen will run out very fast. Make a full list of emergency cleaning items to get ahead of the game by arranging for someone to collect these for you from perhaps well outside the local area.

8.3 What should I do first when the floodwater has gone?

When the flood water subsides, it is vital to clear standing water as quickly as possible. Bricks and concrete floors soak up water relatively slowly, but conversely take months to dry out if they have been left standing in water for a long period (one inch per month). Fast action at this stage will save months of drying time later. (Very deep water however should be cleared by max. one third each day).

Get everything that is wet out of the property. Never try to vac-dry carpets where the underlay or flooring below is wet. Carpets are likely to be contaminated (just before removing them put some gloves on and cut up a small section for the loss adjuster to see).

All drying has to be done by exposing the bottom layer of the structure. Laminate floors must be taken up. Traditional floorboards should be lifted in a limited pattern to allow pumping and or ventilation of the sub floor. The boards and joists will usually dry satisfactorily. Chipboard floors may recover, but if immersed in water for several days, they will swell badly and never recover and are very unsafe to walk on when wet. If they need to be scrapped, then remove them immediately to aid ventilation to the joists and sub-ground below.

If scrubbing with disinfectant is needed, this is the next job. It is pointless to dry concrete floors and then introduce more water in cleaning at a later date. Disinfect very thoroughly; otherwise, the smell will forever linger. Disinfectant will kill mould that may form as soon as 'wet areas' change to 'damp areas'. Mould and mildew are more dangerous to health than commonly perceived.

If kitchen units are wrecked (which is highly likely), then these should also be dismantled. Staircases will usually dry out but need ventilation to the underside if possible. Doors will vary in construction but once twisted will not often straighten. Removing doors will help ventilation.

8.4 Drying - ventilation, ventilation and more ventilation.

In fine weather open windows and doors to create a draft of air through the building. Incoming air will evaporate damp from surfaces and take the moisture out of the building.

Heating the building at the same time will speed the process. Hot air electric heaters are excellent since they produce moisture free heat. Propane Gas space heaters are frowned upon by many experts as the gas produces a little moisture and in the wrong hands they could be a fire risk. In my own experience they are very effective but one must appreciate fast track drying can cause cracking of plaster, twisting of door etc.

Dehumidifiers work on the principle of extracting water from the humid air of a damp building; the building must be sealed with all windows and doors closed otherwise you are effectively 'drying the outside world'. Ideally a large hire-shop dehumidifier (3ft x 2ft x 2ft) is needed in each room to be dried. The water must be collected into a five gallon barrel and not an open bucket. Dehumidifiers are slow in action and in my view best employed after much heat and ventilation drying has first been achieved.

Note, a concrete floor is truly ‘dry’ when a 1 m^2 polythene sheet left on the floor overnight does not have condensation under it the following morning. Whilst a building can be occupied before this point, tiles or vinyl should not be laid until this test is passed. When windows start to show less condensation, drying is effective.

8.5 Insurance

Do not wait; do not see this as an insurance 'opportunity'. Insurance Loss Adjusters will be inundated and cannot get to everyone first. They are professionals who are generally keen to help honest people. They like claimants who do everything reasonable to mitigate their own loss.

Communicate clearly and clarify what terms of reference the Insurance Company feels is reasonable. If you ‘try it on’ expect a long and stressful process. In general, you will eventually get what you are due.

9.Key Contacts

9.1 Emergency Services

- Police 999
- Fire & Rescue Service 999
- Ambulance Service 999
- Fire and Rescue Service (West Sussex): 01243 786211
- Sussex Police: 01273 470101
- NHS Direct 111

9.2 Environment Agency

- Floodline (24-Hour) 0345 988 1188
- Registering online at: www.gov.uk/sign-up-for-flood-warnings
- Upon dialling the Floodline number the caller should press 1 when directed and dial 316036 (Rustington, Worthing and Lancing quickdial).

9.3 Adur and Worthing Emergency Planning

- Office hours: 01903 239999
- Out of office hours: 07713 889 128

9.4 Utilities

- UK Power Networks (power cut) call 105
- National Gas Emergency Service (gas leak) 0800 111 999
- South East Water (supply) 0333 000 0365
- Southern Water (sewerage) 0333 303 0368

These numbers should be regularly checked for validity.

10 Monitoring and review of the plan

This plan is owned, maintained and updated by the owners and occupiers whether or not the template was provided by or on behalf of the applicant.

It is recommended that the plan is reviewed:

- On first occupation;
- Every 3 years thereafter;
- As a result of lessons learnt;
- Following change of ownership or modification of the premises; or
- Following change to the Flood Warning process.

Version	Date	Amended by	Company / Organisation
v1.0	November 2024	Mrs Emma Jeffery	Unda Consulting
v1.1	November 2024	Mrs Emma Jeffery	Unda Consulting

Appendix

- Personal Flood Plan

Personal flood plan

Name

Environment Agency

Are you signed up to receive flood warnings? ☐
If not call Floodline on 0345 988 1188 to see if your area receives free flood warnings.

Let us know when you've completed your flood plan by calling Floodline on **0345 988 1188.** This will help us learn more about how people are preparing for flooding.

General contact list	Company name	Contact name	Telephone
Floodline	Environment Agency		0345 988 1188
Electricity provider			
Gas provider			
Water company			
Telephone provider			
Insurance company and policy number			
Local council			
Local radio station			
Travel/weather info			

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Who can help/who can you help?

Relationship	Name	Contact details	How can they/you help?
Relative			
Friend or neighbour			

Be prepared for flooding. Act now

Personal flood plan

What can I do NOW?

Environment Agency

- Put important documents out of flood risk and protect in polythene ☐
- Check your insurance covers you for flooding ☐
- Look at the best way of stopping floodwater entering your property ☐
- Make a flood plan and prepare a flood kit ☐
- Find out where you can get sandbags ☐
- Identify who can help you/ who you can help ☐
- Identify what you would need to take with you if you had to leave your home ☐
- Understand the flood warning codes ☐

What can you do if a flood is expected in your area?

Actions	Location
Home	
• Move furniture and electrical items to safety	
• Put flood boards, polythene and sandbags in place	
• Make a list now of what you can move away from the risk	
• Turn off electricity, water and gas supplies	
• Roll up carpets and rugs	
• Unless you have time to remove them hang curtains over rods	
• Move sentimental items to safety	
• Put important documents in polythene bags and move to safety	
Garden and outside	
• Move your car out of the flood risk area	
• Move any large or loose items or weigh them down	
Business	
• Move important documents, computers and stock	
• Alert staff and request their help	
• Farmers move animals and livestock to safety	
Evacuation - Prepare a flood kit in advance	
• Inform your family or friends that you may need to leave your home	
• Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons	

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at **www.bluepages.org.uk**

Be prepared for flooding. Act now

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