Consulting Civil Engineers

Flood Evacuation Management Plan

24 Marine Place, Worthing, BN11 3DN

Rev -

Reference C2751

Date **21.02.2024**

REVISION

Revision	**Status**	**Description**	**Date**	**Issued**	**Checked**
-	Final v1	Issued for Approval	21.02.2024	RH	CS

1 FEMP CONTEXT

1.1 The following is Flood Evacuation Management Plan (FEMP) for the development for 24 Marine Place, Worthing, BN11 3DN (see site location map, Figure 1).

1.2 This FEMP is required to accompany the developments operational and management policies as part of the development consent and should be made available to all occupants.

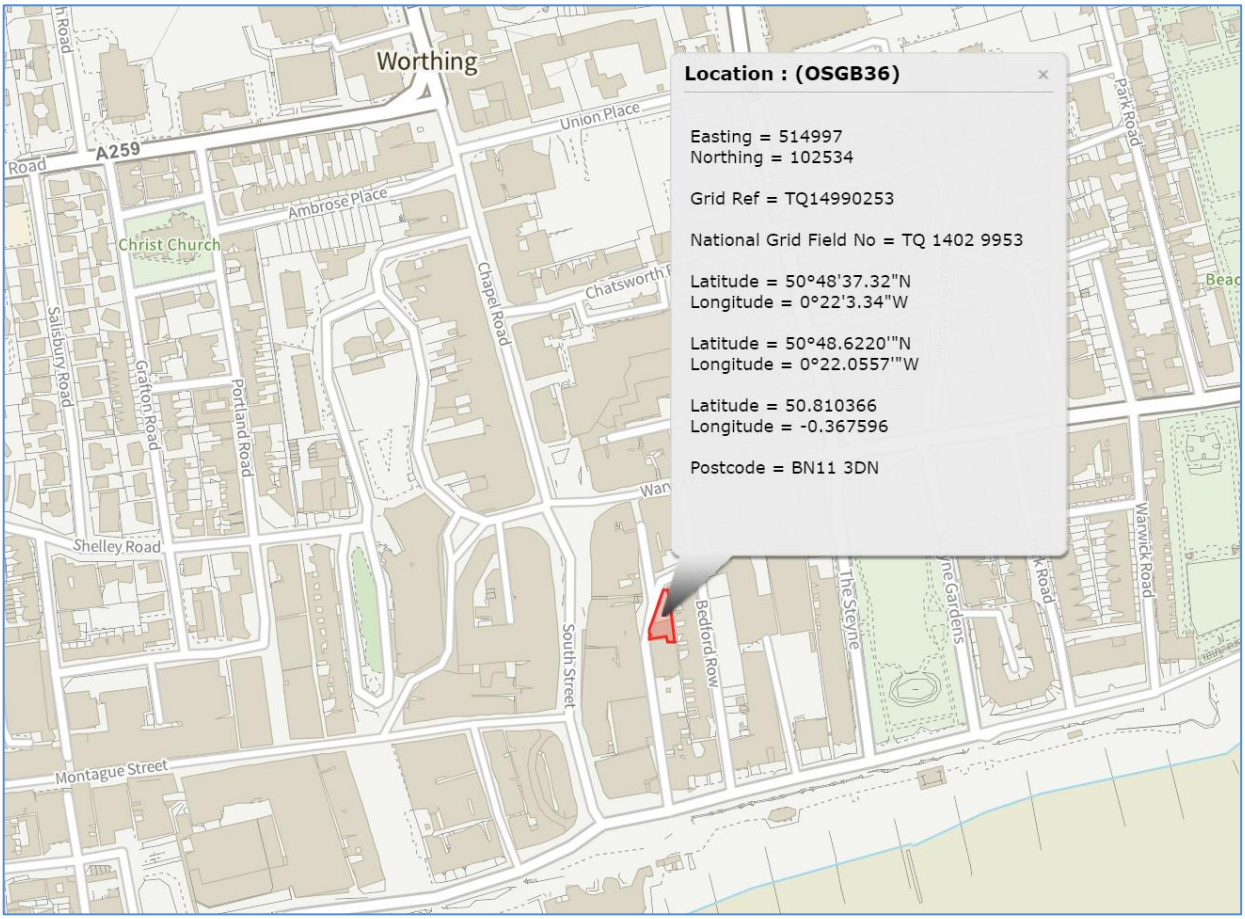

Figure 1 - Site Location Plan (site bordered red) Source: Magic Maps

1.3 This FEMP has relied upon publicly available information and data provided from the EA (where relevant). The interpretation of this data has been undertaken with the understanding of its accuracy and to a detail deemed suitable for this development type, location, and relevant flood risk.

DEVELOPMENT PROPOSALS

1.4 The development will deliver 5no. one bed flats and studios to provide affordable rented accommodation. All units will be accessed off the existing entrance into the building off Marine Place. The ground floor will provide 2no. units with the first floor providing the further 3no. units. In order to convert the building, minor changes are proposed to the external facades of the building.

1.5 The proposals will provide 2no. parking spaces and associated cycle and refuse storage. The northern parcel of the site will be relandscaped.

1.6 This FEMP should be read in conjunction with the associated Flood Risk Assessment (reference: C2751_FRA_24 Marine Place, Worthing) for full context and reference.

SITE DESCRIPTION

1.7 The site is situated on the eastern side of Marine Place, which is north of Marine Parade in the town centre.

1.8 The application site comprises an end of terrace building which has been historically extended. The front façade has flint, render and brick detailing with arched windows. The gabled roof has been disrupted by a series of flat roof additions on the northern and eastern side of the building. There is a small parking court on the northern parcel of the site, closer to the junction with Ford Walk.

1.9 To the west of the application site are four storey buildings of Bedford Place.

RIVERS AND WATERCOURSES.

1.10 The nearest EA main river is the Teville Stream, located approximately 2km to the east.

1.11 The English Channel is located approximately 150m to the south of the site.

TOPOGRAPHY

1.12 The existing building has an elevated ground floor level, with 3 steps leading off of Marine Place to the ground floor level. Based on LIDAR data and site information, it is estimated that the building has a raised FFL of c.450mm above the adjacent road level of 5.25mAOD, this places the FFL at approximately 5.7mAOD. This estimate of the existing FFL is based on site information and available LIDAR data.

FLOOD DEFENCES

1.13 The Environment Agency releases a range of flood asset information as Open Data through their AIMS Defence (Spatial Flood Defences) GIS mapping. They are the only comprehensive and up-to-date group of datasets in England that show flood defences currently owned, managed, or inspected by the EA.

1.14 EA AIMS Defence data (2022) shows that there are no formal defences owned or maintained by the Environment Agency in the area of this site/property. The SFRA also does not show any formal defences immediately along the coastal frontage close to the site.

2 SOURCES OF FLOOD RISK

2.1 The following section provides context to the **primary** sources flood risk to the site and their impact in relation to flooding and their impact on users in a flood event.

2.2 Table 1 below is a summary of the risk profile from the assessed sources of flood risk (as presented in the associated FRA).

Table 1 - Summarising sources of flooding that affect the site up to the DFE. Critical flood source shaded red

SOURCE OF FLOODING	FLOOD RISK TO SITE	FLOOD RISK AFFECTING THE SITE
Fluvial	Very Low	No
Tidal/Sea	High	Yes. Although, the ground floor FFL is elevated to place the internal uses above the DFL, protecting the uses against tidal flood risk in the DFE.
Surface Water	Very Low	No, the site is elevated above the overland flow path within East Street, and therefore is unlikely to be affected by all modelled surface water flood events.
Reservoir	Very Low	No
Groundwater	Very Low	No
Sewers and Drainage	Very Low	No

2.3 Based on the FRA, the primary source of flood risk affecting the site is from tidal sources. Flood risk from river flooding and surface water flooding is considered to be very low.

2.4 Figure 2 shows the expected extreme sea level flood extents at the end of the developments design life (100 years) and shows the predicted tidal flood extents based on this Design Flood Level (DFL). The building has a raised ground floor level, circa 450mm above the adjacent road level at 5.25mAOD, this places the FFL at approximately 5.7mAOD. Based on this estimate, the existing ground floor of the building is shown to be located above the DFL and therefore would place the proposed residential uses above the Design Flood Event (DFE) and at relatively low risk of flooding from tidal events.

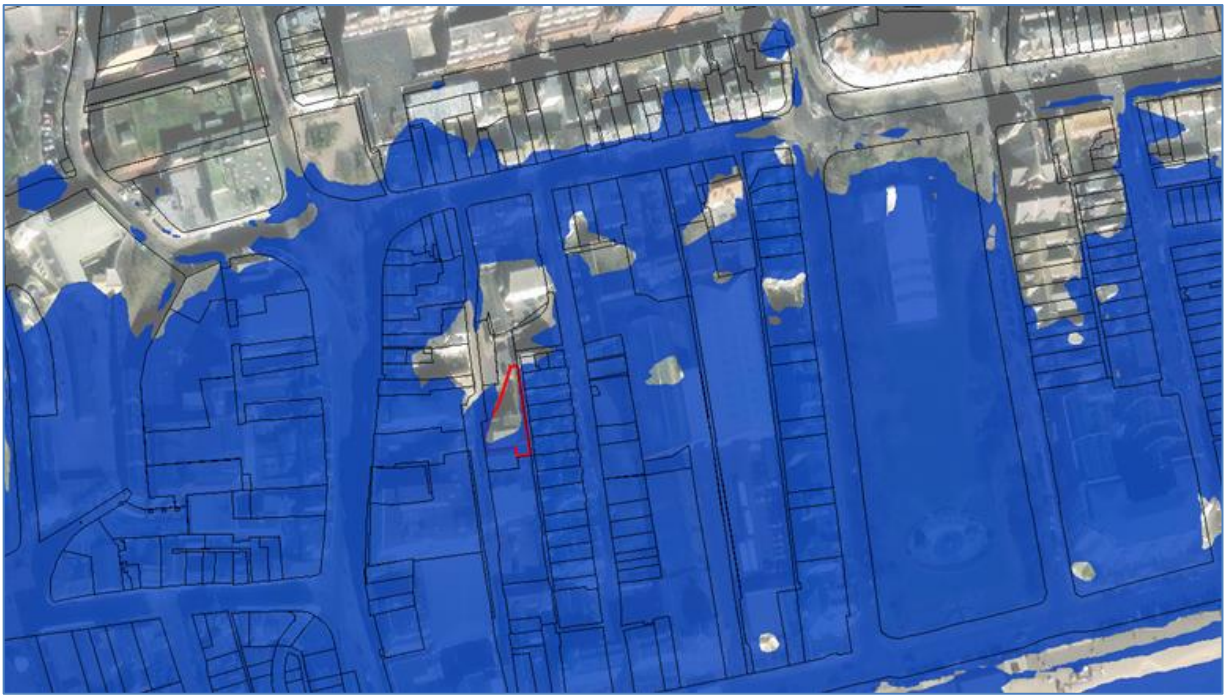

Figure 2 – Mapping showing the extents of the calculated 2123 0.5% AEP DFE extreme sea level rise to 5.51mAOD. Site bordered red, dark blue shading indicating flood extents.

3 FLOOD EVACUATION PLAN

ANALYSIS TO DETERMINE IF SAFE ACCESS AND EGRESS IS AVAILABLE

3.1 In order for an access/egress route to be acceptable under the NPPF, the combination of flood depths, velocities and debris must be analysed.

3.2 As part of this investigation to assess safe access and egress communication with the EA has been sought to obtain both climate change and velocity data. Dialogue has now confirmed that the EA do not have any climate change velocity data for this site in relation to tidal inundation.

3.3 In the absence of velocity data, the analysis will be conducted through comparison of the modelled flood levels against site topographic levels.

3.4 As discussed in Section 2, the calculated 1 in 200 year flood level for the site is 5.51mAOD. The surrounding ground levels average 5.25mAOD, with AN approximate flood depth immediately surrounding the site of 300mm or less.

3.5 The site is located within an EA Flood Alert and Flood Warning area (see Figure 3) and as such it is recommended that the site owner(s) and occupants sign up to this service. Appropriate use of this service should allow for prior evacuation/closer of the site to take place before depths along the proposed evacuation route exceed 25cm and allow for site users to reach a place of safe refuge in Flood Zone 1.

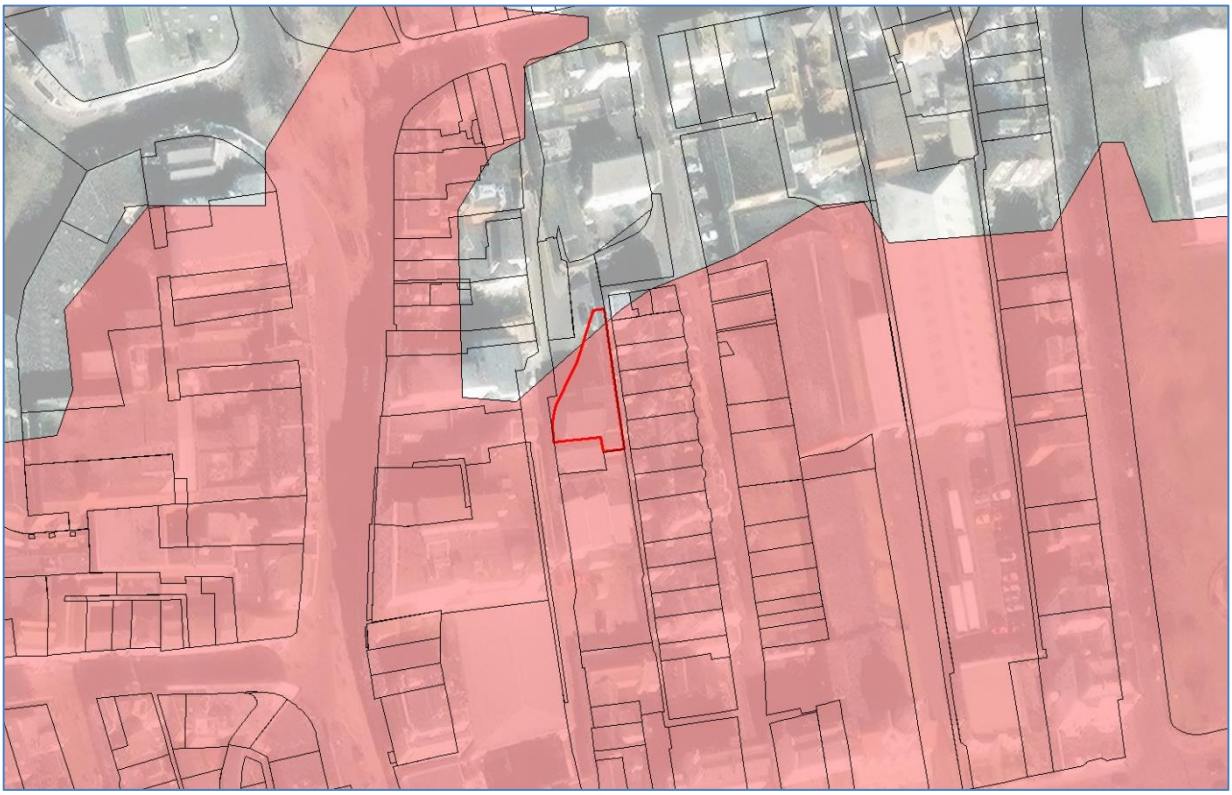

Figure 3 - EA Flood Warning and Flood Alert Areas (pink shaded area denotes flood alert zone) (Source: EA)

3.6 The Environment Agency usually issues a flood alert between 2 and 12 hours before flooding. Flood alerts are usually issued during waking hours where possible. However, in tidally affected locations, flood alerts can be given up to 72 hours before hand, as tidal surges are much easier to predict than river flooding.

3.7 The Environment Agency usually issues a flood warning 30 minutes to 2 hours before flooding.

FLOOD EVACUATION ROUTE

3.8 In the event of a flood alert is received, and evacuation is deemed both necessary and SAFE, it is advised to:

1) Progress towards the sites entrance leading onto Marine Place;

2) From there, occupants should be directed north along Marine Place, towards Warwick Street;

3) When occupants reach Warwick Street, occupants should proceed west towards Liverpool Road.

4) When occupants reach Liverpool Road, they will be located in Flood Zone 1 and an area of very low risk of flooding from all sources. If required, users can continue north and west up Liverpool Road and wait within Montague Quarter Car Park.

3.9 Figure 3 below and Appendix 1 shows the proposed evacuation route from the site.

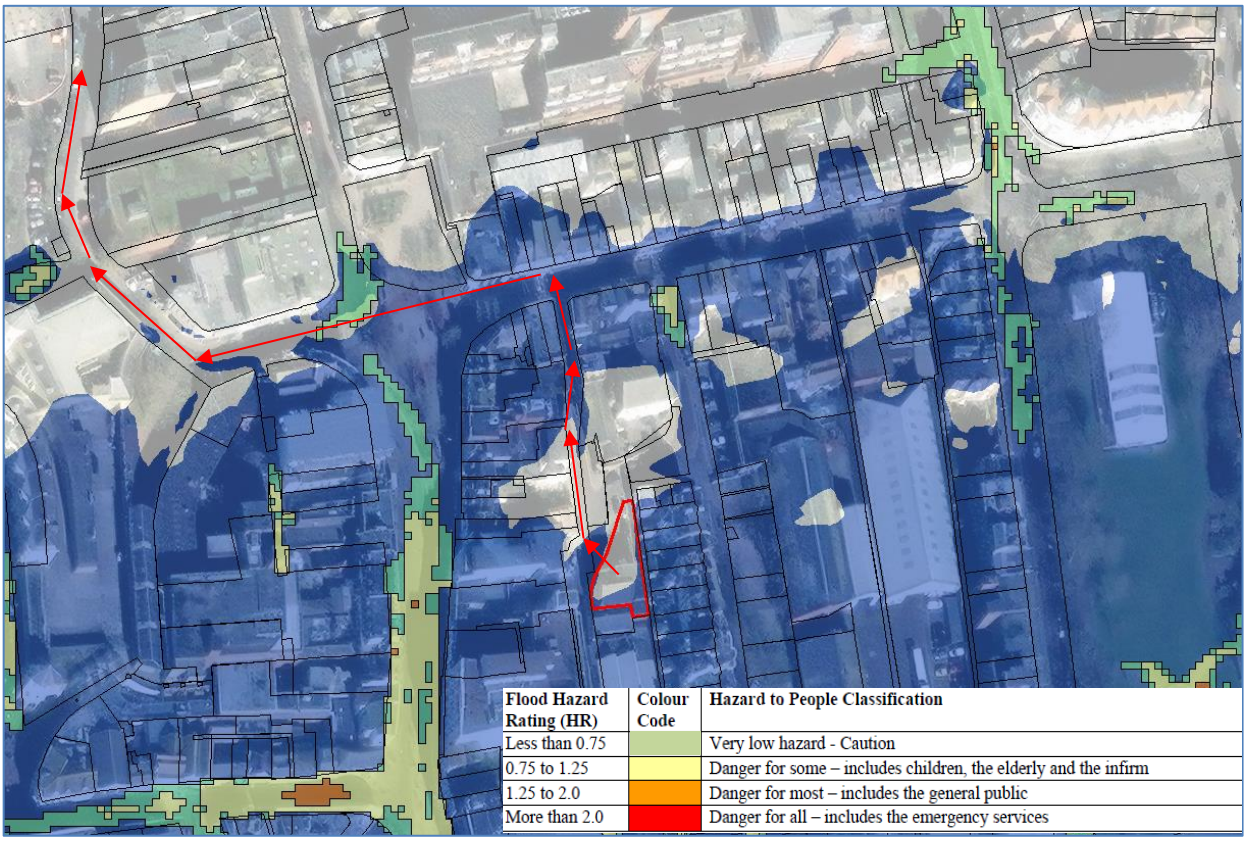

Figure 4 - Proposed Flood Evacuation Route (red arrows show flood evacuation route to Sports Facility located wholly in Flood Zone 1).

SAFE REFUGE ON SITE

3.10 If in the worst-case scenario, flooding has begun and depths appear to be greater than 25cm at the site and along the proposed evacuation route, it is advised that occupants seek refuge within the building (which is shown to have a ground flood FFL above the DFE.

FLOOD HAZARD PREVENTION

3.11 It is recommended that signs explaining EA Flood Warning Service and the proposed Flood Emergency Procedure be issued to site management and occupants to ensure all regular occupants are aware of the emergency procedures.

WARNING PROCEDURES

3.12 This section contains information on the types of flood warning available to site owners and occupants, as well as suggested actions in the event of these warnings being enacted.

3.13 The EA operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information.

3.14 The site owner(s) will be required to register for this service. It is advised that all residents/occupants and also register for this service, as site owner(s) may not be on site at the time of a flood event. It is the responsibility of the site owner to make this service available to all users.

3.15 Further information can be found on www.environment-agency.gov.uk/floodline and https://www.iow.gov.uk/keep-the-island-safe/severe-weather/flooding/. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax, or pager.

3.16 It is the responsibility of the site owner(s) to keep the evacuation routes and areas of safe refuge known to all occupants.

3.17 Upon receipt of a flood warning, and following liaison and agreement with the Emergency Services, the site should be evacuated.

3.18 All occupants should be advised not to return to the site until the site is deemed to be safe for return by the Emergency Services / EA. If flood waters have receded the site can be accessed provided it is safe to do so.

3.19 Site owners will be responsible for informing future occupants and site owners of the risk posed from flooding.

3.20 The Flood Emergency (Evacuation) Plan, as well as details of the proposed evacuation route should be communicated to all current and future site owners and occupants through deeds. All occupants should be provided with a hard copy of the document.

3.21 The Flood Emergency (Evacuation) Plan should be reviewed annually, in light of the most recent and best available data. Site owners should make regular checks and send regular reminders to occupants of the Flood Emergency and Evacuation Procedures to ensure they are fully aware of the protocols and procedures required in the event of a flood event.

3.22 As flood hazard is a combination of the depth and velocity of floodwater, evacuees should not enter floodwater unless:

- **Emergency Services are present as part of an assisted / supervised evacuation; or**
- **Depths do not exceed 25cm**

3.23 Obstacles below the water can present a significant hazard that may not be immediately obvious – collapsed manhole covers, debris, vegetation etc. can trap a person or cause serious injury when submerged. Additionally, shallow fast-moving water can knock a physically fit grown man over.

EVACUATION PROCEDURE

3.24 It is the property owner's responsibility to liaise with the Emergency Services in relation to the decision to evacuate all occupants.

3.25 The Emergency Services will become the lead agencies in respect to the flood incident. Emergency Services will lead on the decision to evacuate and any subsequent evacuation of the development. The site owner(s) will be responsible for making contact with all occupants and site users as required during an evacuation event.

3.26 If the decision to evacuate has been made, occupants should leave the site and follow the agreed evacuation route to an area located above of the calculated 1:200 year flood extent. The proposed evacuation route lead those seeking refuge to Flood Zone 1.

3.27 Once the decision to evacuate has been made, it is the site owner's responsibility to make contact with occupants as required during an evacuation event. If any occupants cannot or will not evacuate the Emergency Services are required to be informed immediately.

3.28 The residents should continue to liaise with the Emergency Services and Emergency Planners throughout the evacuation procedure and will report to them once the evacuation has been successful so as to avoid unnecessary strain on the resources of the Emergency Services.

3.29 If feasible, occupants should inform supervisors, close relatives, and friends of their safe evacuation, this will also help avoid unnecessary strain on the resources of the Emergency Services.

3.30 As flood hazard is a combination of the depth and velocity of floodwater, evacuees should **not** enter floodwater unless:

- Emergency Services are present as part of an assisted / supervised evacuation,
- **or if the depths are below 25cm before evacuating.**

3.31 The Emergency Services, including but not limited to the Police and the Fire Brigade will be the lead agencies in respect of flood evacuation.

3.32 Evacuees should ensure that their chosen action and route is suitable to all members of their party (i.e. the elderly, very young, or disabled).

SAFE REFUGE PROCEDURES

3.33 Analysis has shown safe access / egress would likely be possible onto Warwick Street and then towards Liverpool Road, with flood depths likely to be less than 400mm and of low flood velocity (less than 0.1m/s). Evacuation through flood depths of less than 400mm with low velocity is typical considered 'Danger for Some' and suitable for all but the most vulnerable (i.e. elderly, children and infirm).

3.34 However, it is advised that occupants should not seek to proceed through flood waters if perceived to be deeper than 250mm (25cm) (unless directed by emergency services), and instead should seek safe refuge within the building.

3.35 To facilitate making an informed decision during a flooding event, it is recommended that the site owners/ occupants sign up to the EA flood alert service and monitor weather reports as per the guidance below and aforementioned.

Three day flood risk forecast	**What it means** • Be aware. Think ahead. Keep any eye on the weather situation **When it's used** • Daily forecasts of flood risk on the EA website www.environment-agency.gov.uk These are updated more frequently for higher flood risk situations **Triggers** • Information updated daily on the Environment Agency website • The information includes the current and forecast situation and how this is likely to affect each county in England and Wales over the next three days **Impacts on the ground** Maps will how one of four levels of risk for each county: • Green = no risk of flooding • Yellow = low risk of flooding • Amber = medium risk of flooding • Red = high risk of flooding **Advice to the public / media** • Check forecast on the EA website • Remain aware of the impending weather conditions for your area

	Advice to operations organisations • The three-day forecast is the public facing version fo the Flood Guidance Statement that Category 1 and 2 responders receive • Advice for organisations varies depending on the level of flood risk and is provided on the Flood Guidance Statement issued by the Flood Forecasting Centre. •
	**What it means** • Flooding is possible • Be prepared **When it's used** • Two hours to two days in advance of flooding **Triggers** • Forecasts that indicate flooding from rivers may be likely. • Forecast intense rainfall for rivers that respond very rapidly. • Forecasts of high tides, surges, or high winds. **Impact on the ground** • Flooding of fields, recreation land and car parks • Flooding of minor roads • Flooding of farmland • Spray or wave overtopping on the coast **Advice to the public / media** • Be prepared to act on your flood plan • Prepare a flood kit of essential items • Avoid walking, cycling, or driving through flood water • Farmers should consider moving livestock and equipment away from areas likely to flood • Call Floodline on 0845 988 1188 for up-to-date flooding information • Monitor local water levels on the Environment Agency website www.environment-agency.gov.uk **Advice to operational organisations** • Check your flood response plans to see how your organisation needs to respond • Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information • Dial into Flood Advisory Service teleconferences • Advise the public to call Floodline on 0845 988 1188 • Please report any flooding in your area to your local Environment Agency office
	**What it means** • Flooding is expected • Immediate action required **When its used** • Half an hour to one day in advance of flooding **Triggers** • High tides, surges coupled with strong winds • Heavy rainfall forecast to cause flash flooding of rivers • Forecast flooding from rivers

	Impact on the ground • Flooding of homes and businesses • Flooding of rail infrastructure • Flooding of roads with major impacts • Significant waves and spray on the coast • Extensive flood plain inundations (including caravan parks or campsites) • Flooding of major tourist / recreational attractions Advice to the public / media • Protect yourself, your family and help others • 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 • If you are caught in a flash flood, get to higher ground • Call Floodline on 0845 988 1188 for up-to-date information Advice to operational organisations • Check flood response plans for actions required at this stage • Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information • Advise the public to call Floodline on 0845 988 1188 • Please report any flooding in your area to your local Environment Agency office
	What it means • Severe flooding • Danger to life When it's used • When flooding poses a significant risk to life or significant disruption to communities Triggers • Actual flooding where the conditions pose a significant risk to life and / or widespread disruption to communities • On site observations from flooded locations • A breach in defences or failure of a barrier that is likely to cause significant risk to life • Discussions with partners Impact on the ground • Deep and fast flowing water • Debris in the water causing danger • Potential or observed collapse of buildings an structures • Communities isolated by flood waters • Critical infrastructure for communities disabled • Large number of evacuees • Military support Advice to the public / media • 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 • Call Floodline on 0845 98801188 for up to date flooding information Advice to operational organisations • Check flood response plans for actions required at this stage

	• Advise the public to put their safety first and to be ready to evacuate should the authorities decide its needed • Develop clear messages for local communities and the public

Warning no longer in force	What it means
	• No further is currently expected for your area.
	
	When it's used
	• When a flood warning or severe flood warning is no longer in force
	
	Triggers
	• Risk of flooding has passed
	• River or sea have dropped back below severe flood warning for flood warning levels
	• No further flooding is expected
	• Professional judgment and discussions with partners agree that a severe flood warning status is no longer needed
	
	Impact on the ground
	• No new impacts expected from flooding, however there still may be:
	  • Standing water following flooding
	  • Flooded properties
	  • Flooding or damaged infrastructure
	
	Advice to the public / media
	• Be careful. Flood water may still be around for several days and could be contaminated
	• If you've been flooded, ring your insurance company as soon as possible
	
	Advice to operational organisations
	• Recovery phase will have started
	• Advise the public to call Floodline on 0845 988 1188 for advice on what to do if they have been affected by flooding

3.36 **It is the occupants continued responsibility to liaise with the Emergency Services with regards to the best course of action.**

3.37 Once it has been deemed safe for the site to be evacuated, site owners will follow the flood evacuation protocol with regards to communicating decisions and actions occupants, and ensuring all site users follow instruction.

3.38 It would be expected that as the lead agency for a flood incident the Emergency Services would initiate evacuation of the site once flood waters had receded to a safe level. Site owners will be responsible for making contact with occupants as required during an evacuation event.

PREPARATION PRIOR TO FLOOD EVENT

3.39 There are many ways in which a site owners / occupant may prepare for the potential of a flood event. The Environment Agency recommends that users create a kit of essential items and keep it to hand. It is advised that:

- 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.

- 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.

3.40 In a flood, there may be limited time to find these essential items so it's important to prepare in advance. Completing an individual 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.

ADVICE AND INFORMATION FOR SITE OWNER

3.41 Occupants should be adequately informed of the Flood Emergency (Evacuation) Plan. This should include:

- Information concerning the warning and evacuation procedure;
- A list of useful telephone numbers and websites;
- A copy of the evacuation route;
- Application forms to register with the EA's Floodline Warnings Direct Service (if the property has been removed from this automatic service).

3.42 The occupants should aim to co-ordinate any Flood Emergency (Evacuation) Plans with neighbouring and nearby sites to minimise confusion.

3.43 Further information can be found on www.environment-agency.gov.uk/floodline. It is advised that:

On receipt of a FLOOD ALERT, the individual property owners and occupiers should:

⇒ Monitor the situation via local media;
⇒ Make themselves aware of forecast local weather conditions;
⇒ Alert both current visitors, and those scheduled to arrive, of the situation;
⇒ Prepare to evacuate if necessary.

On receipt of a FLOOD WARNING, the individual property owners and occupiers should:

⇒ Follow advice to "go in, stay in, and tune in";
⇒ Move all vehicles to an area outside of the potential flood extent, if safe to do so;
⇒ Alert scheduled visitors that they should seek alternative accommodation;
⇒ Be prepared to follow instruction from the Emergency Services.

On receipt of a SEVERE FLOOD WARNING, the individual property owners and occupiers should:

⇒ Follow advice to "go in, stay in, and tune in";
⇒ Remain attentive to local media forecasts and news bulletins;
⇒ Do not evacuate unless instructed to do so by the Emergency Services;

3.44 Upon receipt of a Flood Warning, site users are advised to evacuate the site to a designated place of safe refuge within Flood Zone 1 if deemed safe to do so. A potential location could be the Montague Quarter Car Park to the north west.

ADDITIONAL WARNINGS IN CASE OF EVACUATION

3.45 Floodwater may be contaminated, especially by untreated sewage. Contamination remains after the floodwater has gone and can be hazardous unless simple procedures are followed. Wear rubber boots and gloves in and around the affected property. Wash all cuts and cover with waterproof plasters. Anyone receiving a puncture wound during flood recovery should have a doctor determine whether a tetanus booster is necessary. Small children, pregnant women and people with health problems should avoid floodwater and flooded areas until the clean-up is complete. If you do feel unwell or if you accidentally ingest (swallow) mud or contaminated water and you become ill, you should consult your doctor and tell them your house was flooded.

3.46 Floodwater can damage buildings severely, particularly if it has been flowing quickly, is over 1m deep or has been in a property for a long time. Before entering property that has been flooded, the building should be checked for signs of damage.

3.47 Be careful when moving any debris that may have been carried onto your property or the surrounding area. Avoid heavy objects (e.g. trees) that may be unstable and could suddenly move and trap or crush you. Do not attempt to move anything yourself that cannot be lifted comfortably.

3.48 Be careful when moving in and around property that has been flooded. Standing water and mud can hide holes, damage to structures and sharp objects. This could include uncovered manholes and drains or roads and paths, as well as broken bottles or glass. Be aware of cuts from standing or falling onto hidden hazards and slippery sediment.

3.49 Do not approach any structure that may be unsafe.

3.50 Do not approach any fast-flowing water or deep standing water. If you enter swiftly flowing water, you risk drowning, regardless of your ability to swim. Shallow standing water can be dangerous for small children. Do not rely on cars or other vehicles to protect you from floodwaters. If you have to enter floodwater, in all cases move slowly and carefully, make sure you are wearing strong footwear and use a stick to check that you are not about to step into a hole or onto a sharp object. If driving in floods is unavoidable, do so with extreme caution. 6 inches depth of fast flowing water can sweep a 4x4 vehicle off a road.

3.51 Turn off the electricity supply to the property until a qualified electrician or utility company has checked out the electrics. Use extreme caution in dealing with electricity. Ensure that all switches, sockets and appliances are checked prior to use, especially if they have been in contact with floodwater. Once all electrical safety checks have been made, make sure that you use a circuit breaker with any electrical equipment that you may use in, or to clean, or repair your property. Watch out for any fallen power lines and do not approach them - be aware that there is always a potential electric shock hazard.

3.52 Turn off the gas supply to appliances that have been flooded (or where their vents/flues may have been affected).

APPENDIX 1 - SITE EVACUATION PLAN

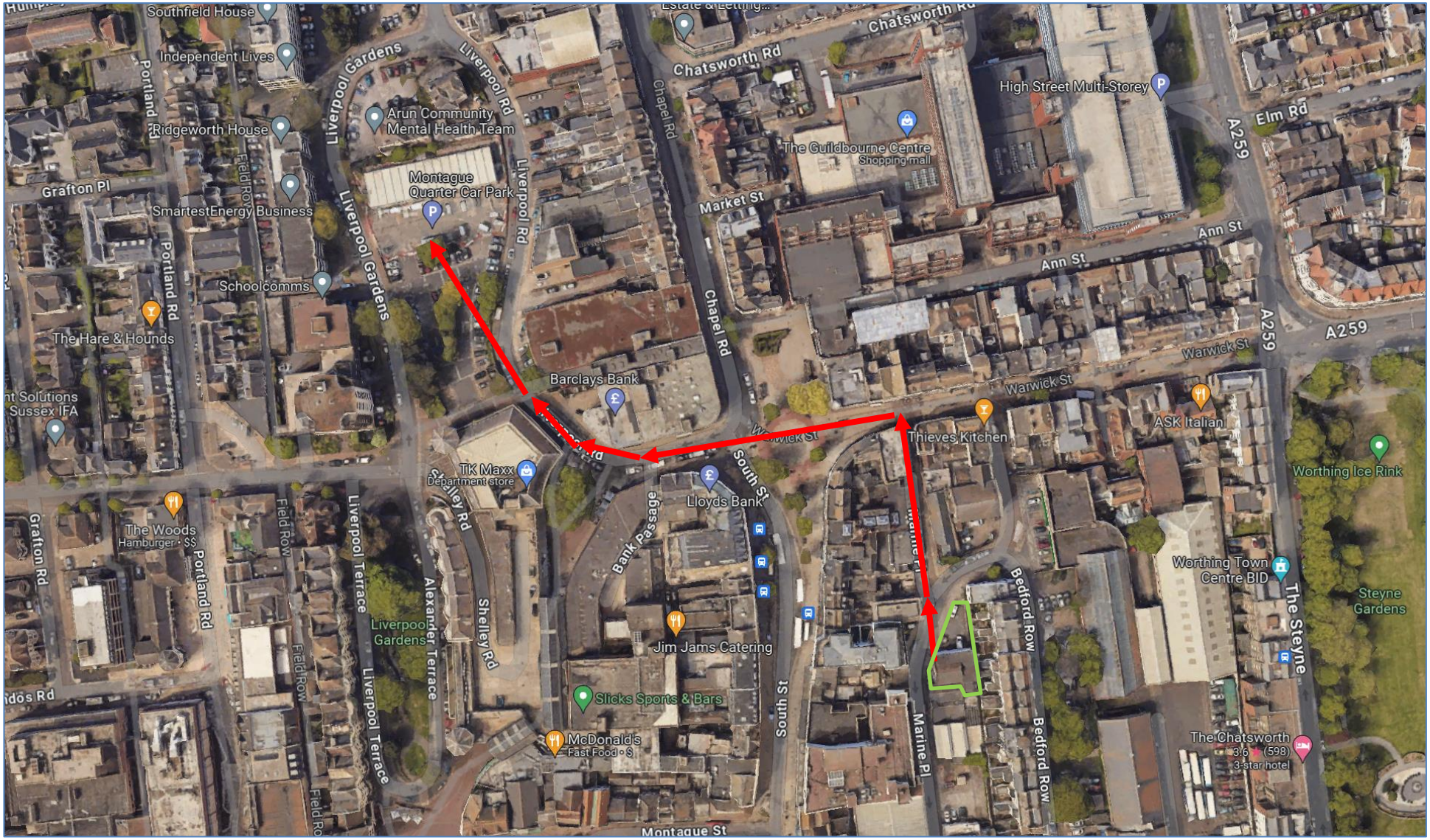

Figure 5 - Site evacuation plan. Green border denotes site boundary, red arrows denote evacuation route. (source Google Maps)