



THE GRANARY, 1A PATRICK ROAD

Reading

FLOOD RISK ASSESSMENT

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Control Sheet

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1 INTRODUCTION

1.1 Background

1.1.1 Calibro has been appointed by *Elegant PPM Limited* to undertake a Flood Risk Assessment (FRA) for proposed development at The Granary, 1a Patrick Road, Reading. A Class MA PD Application is being made for conversion of existing offices into two flats.

1.1.2 Footnote 63 of the NPPF states that a site-specific FRA will be required for proposals:

- a) that are greater than 1 hectare in area within Flood Zone 1;
- b) that are located in Flood Zones 2 and 3;
- c) in an area within Flood Zone 1 which has critical drainage problems;
- d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment (SFRA) as being at flood risk now or in the future;
- e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

1.1.3 The site is shown to fall within Flood Zones 2 and 3 and therefore an FRA is required.

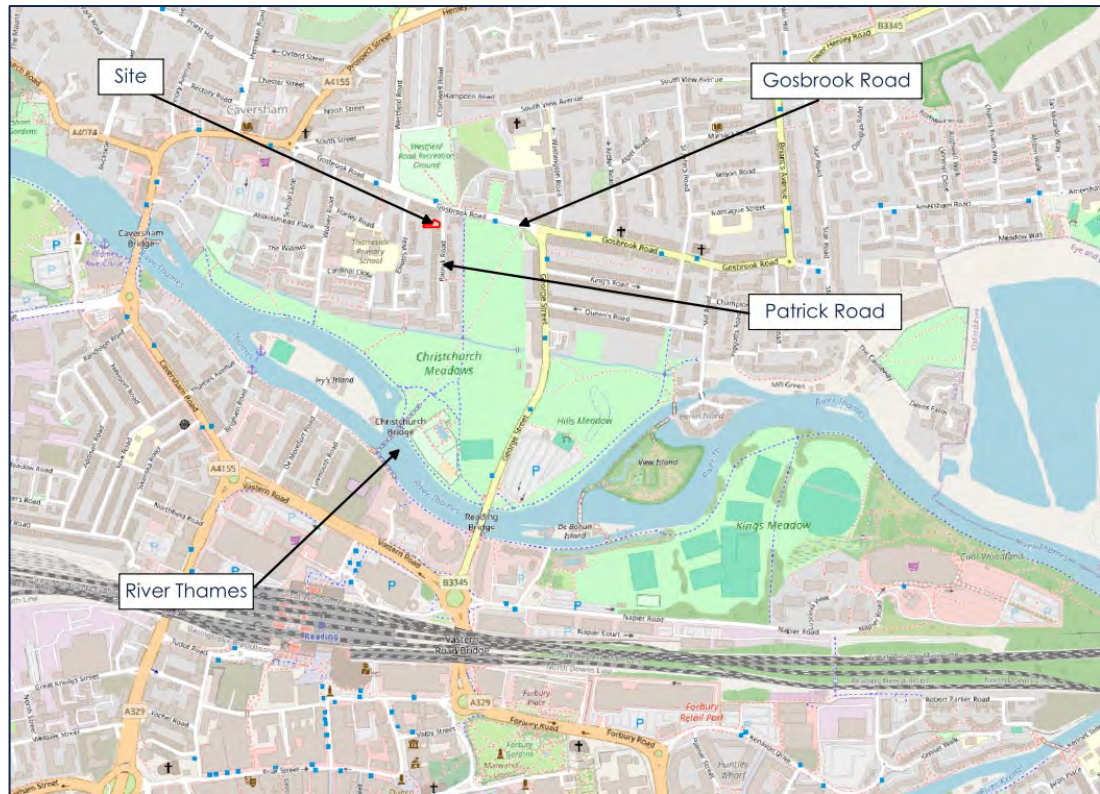
1.1.4 This assessment considers the risks of all types of flooding to the site and the impact of climate change.

2 SITE DESCRIPTION AND PROPOSALS

2.1 Site Description

- 2.1.1 The site is an existing building and yard at The Granary, 1a Patrick Road, Caversham, Reading. The centre of the site is at grid reference 471710, 174630 and the postcode is RG4 8DD. It is located just to the south of the junction of Patrick Road and Gosbrook Road in the residential area of Caversham, Reading.
- 2.1.2 Topographic survey was undertaken by Developers Land Surveys in August 2014 and is included in Appendix A. It records the yard as falling in a generally easterly direction. The maximum and minimum external ground levels are 38.36mAOD and 37.95mAOD respectively. A level of 37.89mAOD is recorded approximately at the transition between the yard and footway.
- 2.1.3 The internal floor levels on the ground floor are 38.40mAOD. This level was set in agreement with the Environment Agency. It was specified in the Flood Risk Assessment for the extension of an existing office building in 2013 (Reading BC planning ref: 13/00099/FUL). This provided 250mm of freeboard above the then design (1 in 100 year plus climate change) event. The works were completed in 2014.
- 2.1.4 The site comprises made ground. British Geology Survey data records superficial deposits of 'Langley Silt Member - Clay and silt' and Bedrock of 'Seaford Chalk Formation and Newhaven Chalk Formation – Chalk' underlying the site.
- 2.1.5 The River Thames is located approximately 300m to the south of the site. The River Kennet is approximately 1.2km to the south.
- 2.1.6 The site location and watercourses are shown in Figure 2-1.

Figure 2-1 Site Context



2.2 Site Proposals

- 2.2.1 A Class MA prior approval application is being submitted for conversion of offices to two flats. Site proposals are included elsewhere in the submission.

2.3 Flood Zone Compatibility

- 2.3.1 Table 2 of the PPG defines which types of development are acceptable in each Flood Zone and is reproduced in Table 2-1.

Table 2-1 Flood risk vulnerability and flood zone 'incompatibility'

Flood Zone	Flood Risk Vulnerability				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	✓	✓	✓	✓	✓
2	✓	Exception Test Required	✓	✓	✓
3a	Exception Test Required	✗	Exception Test Required	✓	✓
3b	Exception Test Required	✗	✗	✗	✓

2.3.2 The proposed development is for 'More Vulnerable' development which is acceptable in all but Flood Zone 3b. The building floor levels are above the 1 in 1,000 year flood so the proposals can reasonably be considered to be within Flood Zone 1.

2.3.3 As set out in the Flood Risk and Coastal Change Planning Practice Guidance (PPG), change of use applications are not normally subject to the Sequential Test or Exception Test and the acceptability of the development will depend on whether the development and its users will be safe over the development's lifetime (Paragraph: 014 Reference ID: 7-014-20220825).

2.4 Drainage Considerations

2.4.1 The *Reading Borough Local Plan (2019)* Policy EN18 states that

"All major developments must incorporate sustainable drainage systems (SuDS) as appropriate and in line with the Government's Technical Standards⁶⁴. Smaller schemes are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site."

2.4.2 The proposals do not constitute a major development.

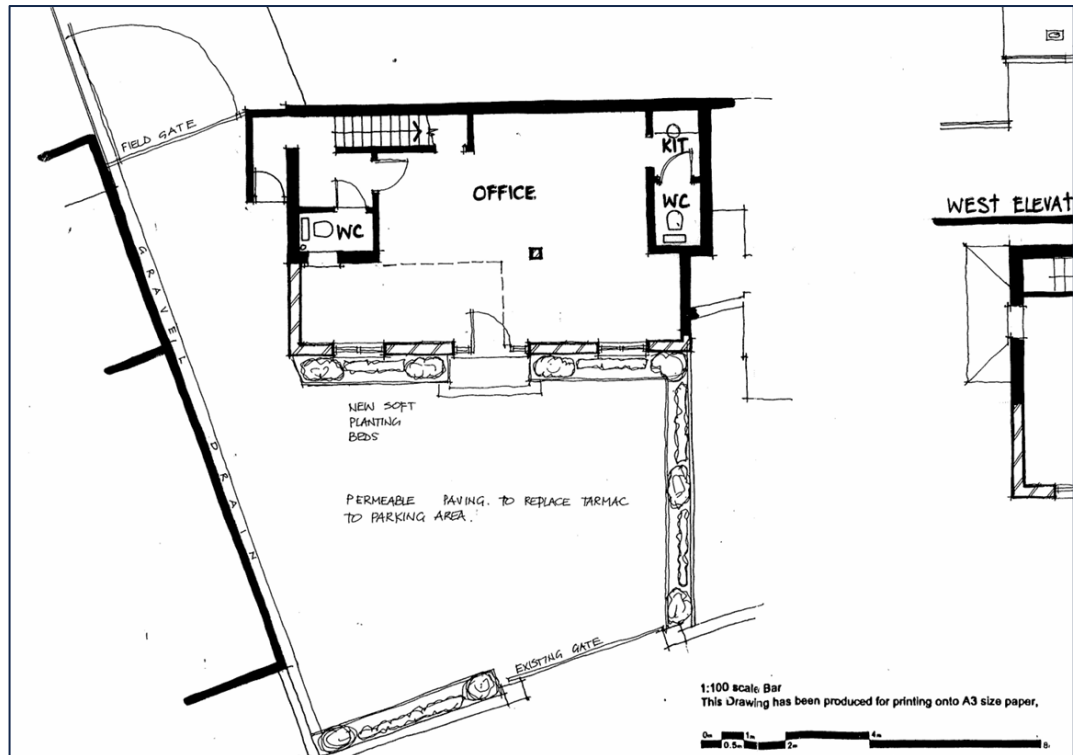
2.4.3 The *Reading Borough Local Plan Adopted 2019 Pre-submission Draft Partial Update November 2024* includes proposed changes to this policy as shown in Figure 2-2

Figure 2-2 Excerpt from Policy EN18 of the draft partial update of Reading Borough Local Plan

All ~~major developments~~⁸⁹ development must incorporate sustainable drainage systems (SuDS) ~~as appropriate and in line with the Government's Technical Standards~~⁹⁰ unless this is not viable or feasible. ~~Smaller schemes are encouraged to incorporate SuDS, where possible~~. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. ~~Wherever possible~~, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. ~~All new developments in areas of flood risk should give priority to SuDS~~. Surface water must not drain to the foul sewer, as this is a major cause of sewer flooding.

- 2.4.4 There will be no external changes and no change to the site drainage. The site already benefits from a SuDS scheme which was implemented as part of the planning application PL/13/0068 which was approved in 2013.
- 2.4.5 The submission which was used to discharge condition 5 of the planning permission shows that the existing tarmacadam drive was replaced with permeable paving and landscaped beds were installed at the front of the property as shown in Figure 2-3.
- 2.4.6 The permeable paving was formed from Marshall 60mm permeable blocks laid on 50mm of 2-6mm clean limestone chippings laid on 300mm of 40-60mm clean limestone. It is therefore not feasible to provide further improvement to runoff rates, and no further works would be necessary under the draft policy, if even it is intended to cover change of use applications.

Figure 2-3 Excerpt from consented scheme



3 FLOOD RISK

3.1 National Planning Policy Framework (NPPF)

3.1.1 In accordance with the NPPF, this FRA considers all sources of flooding including:

- a) Tidal Flooding – from the sea;
- b) Fluvial Flooding – from rivers and streams;
- c) Surface Water Flooding – from intense rainfall events;
- d) Groundwater flooding – from elevated groundwater levels or springs;
- e) Flooding from sewers – from existing sewer systems; and
- f) Artificial sources – from reservoirs, canals etc.

3.2 Historical Flooding

3.2.1 The Environment Agency Recorded Flood Outlines dataset includes records of the following flood events associated with the River Thames through Reading:

- August 1977
- Spring 1947
- July 2007
- December 2000
- Winter 2013/2014
- December /January 2003
- Winter 2002/2003

3.2.2 The attributed source of these events are fluvial flooding with the exception of 1947 (local drainage/surface water) and Winter 2013/2014 (other).

3.2.3 The only event which is shown to have partially affected the site is the 1947 event (Figure 3-1). The Winter 2012/2043 event is recorded as having flooded Christchurch Meadows to the east of the site. It is approximately 1m lower than the site itself. None of the other events resulted in flooding near the site.

Figure 3-1 Recorded Flood Outlines



3.3 Flood Zones

- 3.3.1 The Flood Zones are based on the assessed probability of the site flooding from rivers and the sea, ignoring the presence of flood defences. The flood zone classifications from the Flood Risk and Coastal Change Planning Practice Guidance (PPG) are presented in Table 3-1 below.

Table 3-1 EA Flood Zone Classification

Flood Zone	Risk	Fluvial Flooding Annual Chance	Tidal Flooding Annual Chance
1	Low	≤ 1 in 1,000	
2	Medium	Between 1 in 1,000 and 1 in 100	Between 1 in 1,000 and 1 in 200
3	High	≥ 1 in 100	≥ 1 in 200
3b	Functional Floodplain	Land where water has to flow or be stored in times of flood. This is defined in the relevant SFRA.	

- 3.3.2 The Flood Map for Planning classifies the site as Flood Zones 2 and 3. The Flood Map for Planning Flood Zones are presented in Figure 3-2.

Figure 3-2 Flood Zones



3.4 Thames Pangbourne to Sonning Modelling Study

3.4.1 Data from the Thames Pangbourne to Sonning Modelling Study (2019) was provided by the Environment Agency on 21st April 2026. The following levels were extracted from the undefended scenario peak flood level grids at the location of the proposed dwellings:

- 1 in 100 year – 37.88mAOD
- 1 in 100 year +25% - 38.172mAOD
- 1 in 100 year +35% - 38.250mAOD
- 1 in 1,000 year – 38.30mAOD

3.4.2 The Internal floor levels of 38.4mAOD are above the 1 in 1,000 year flood level and therefore should be classified as Flood Zone 1 at **low risk** of flooding.

3.4.3 National policy requires that development is safe from flooding over its lifetime by considering the design event flood. The site falls with the 'Thames and South Chilterns' catchment. The central estimate of climate change (commensurate with residential 'more vulnerable' development in Flood Zone 2 or 3) to the 2080s (2070-2125) is +31%.

- 3.4.4 The 1 in 100 year +31% level is estimated to be **38.219mAOD** assuming a linear relationship between flow and level between the +25% and +35% events. The existing floor levels are 0.18m above this.
- 3.4.5 Given the limited change in flood level resulting from a 10% increase in flows (0.08m between the +25% and +35% scenarios) this freeboard is considered to be sufficient to account for uncertainty. The floor level is also 0.1m above the predicted extreme 1 in 1,000 year flood level.
- 3.4.6 It would be disproportionate and unnecessary to the nature of the development to raise the floor by 0.07m to replicate the freeboard previously agreed with the EA
- 3.4.7 The building is considered to be safe from flooding over the next 100 years (the assumed lifetime of residential development) and no specific mitigation is necessary for the building. The safety of site users is discussed in Section 3.9.

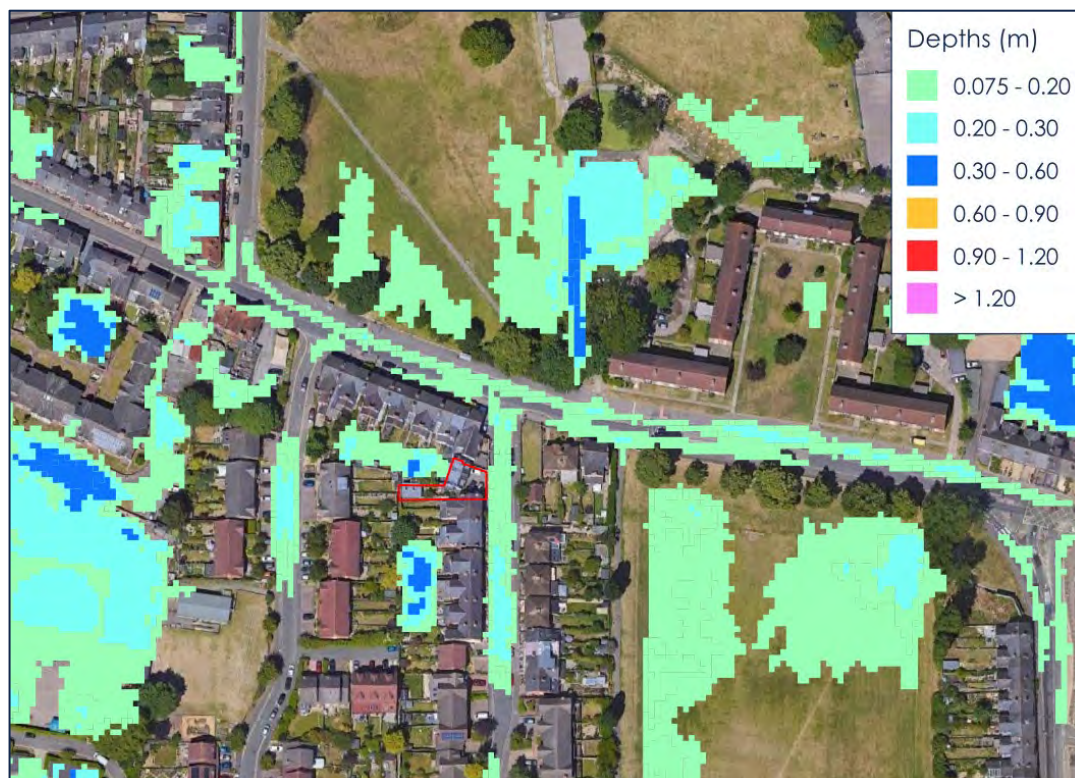
3.5 Surface Water Flooding

- 3.5.1 The January 2025 Risk of Flooding from Surface Water (RoFSW) mapping indicates areas where water would tend to flow and accumulate during extreme rainfall events. The mapping is derived by simulating a 1 in 30, 1 in 100 and 1 in 1,000 year rainfall event to define areas at high, medium and low risk of surface water flooding respectively. The mapping is derived by simulation of these rainfall events over a digital terrain model (DTM). The dataset includes predictions for the present day and for the future by applying an uplift of 20% to account for the projected impacts of climate change.
- 3.5.2 During the future 1 in 100 year event no flooding of the site is predicted (see Figure 3-3). Minor flooding is predicted to Patrick Road at the frontage of the site to depths of up to 0.20m. The footway is 0.15m higher than the highway so any flooding on the footway during the design (future 1 in 100 year) event would be minimal.
- 3.5.3 During the future 1 in 1,000 year event no flooding of the site is predicted (see Figure 3-4). Minor flooding is predicted to the Patrick Road. Depths are generally below 0.20m.
- 3.5.4 The site itself is at **Very Low** risk of surface water flooding both now and in the future. Flooding of the local road network will not present a significant impediment to access and egress during a design event flood.

Figure 3-3 RoFSW Future 1 in 100 year Depths



Figure 3-4 RoFSW Future 1 in 1,000 year Depths



3.6 Groundwater Flooding

- 3.6.1 Although the underlying geology is water bearing, the clay, silt drift deposits and overlying made ground will prevent the emergence of significant volumes of groundwater. In the event that groundwater did rise above the surface, it is extremely unlikely that it would reach levels higher than those predicted by the model of the River Thames, particularly given its proximity.
- 3.6.2 The risk of flooding from groundwater is assessed as being **Low**.

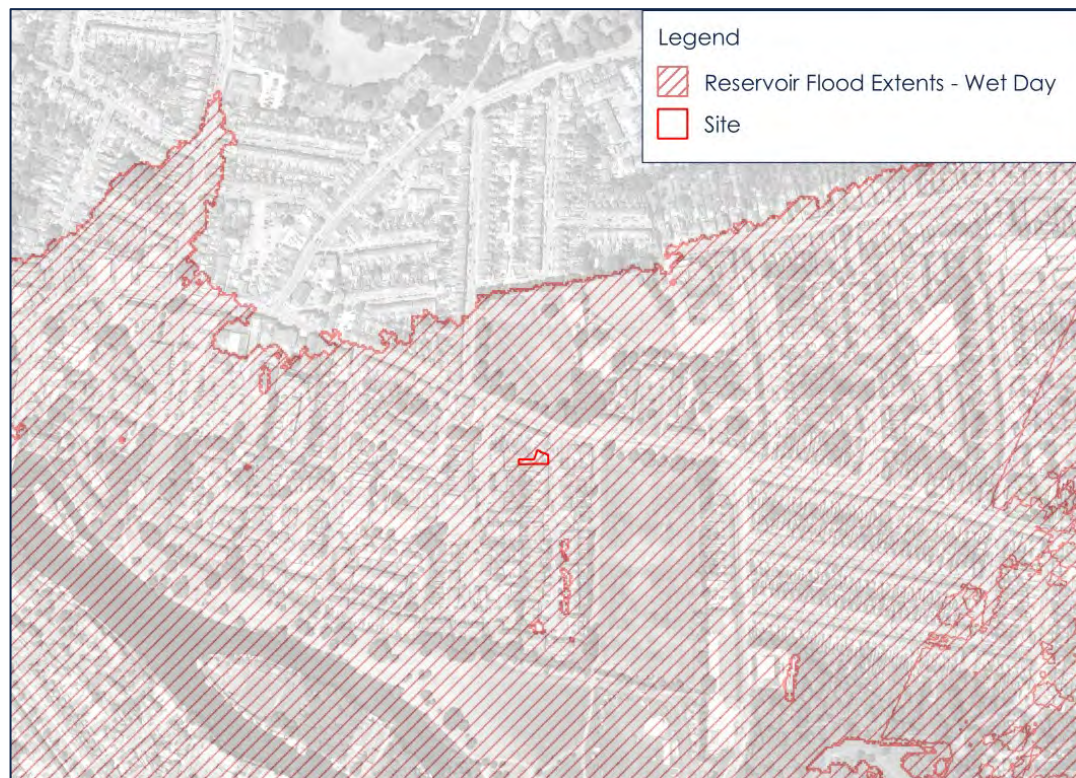
3.7 Flooding from Sewers

- 3.7.1 Given the internal floor levels are raised above the surrounding land and the property is not shown to be at risk from surface water, the risk of sewer flooding is also considered to be **Low**.

3.8 Flooding from Artificial Sources

- 3.8.1 Mapping data from the Environment Agency shows the results of analysis of the predicted impacts if a reservoir failure occurred on either a 'wet day', with local rivers experiencing an extreme flood, or 'dry day', with local rivers at normal levels.
- 3.8.2 The data shows the site, along with vast swathes of Reading, to be at risk of flooding should there be a catastrophic reservoir breach during a wet day (Figure 3-5).

Figure 3-5 Reservoir Flood Extents



- 3.8.3 All reservoirs which are represented in the reservoir flooding dataset fall under the requirements set out in the Reservoirs Act 1975. This act makes it a legal requirement to appoint a Supervising Engineer to produce an annual report and for the operator to address any issues raised therein. Since the introduction of the Reservoir Act, there have been no catastrophic failures of reservoirs. Consequently, it is considered that the probability of failure is very low and that the risk of flooding from reservoirs is **Very Low**.

3.9 Access and Escape

Policy

- 3.9.1 The Flood Risk and Coastal Change Planning Practice Guidance states that:

“Access routes should allow occupants to safely access and exit their dwellings in design flood conditions. Vehicular access to allow the emergency services to safely reach the development during design flood conditions will also normally be required in addition to the requirements of the building regulations.”

- 3.9.2 Policy EN18 in the Reading Borough Local Plan (both the adopted and consultation draft partial update versions) require *“safe access and egress in the event of a flood”*.

- 3.9.3 The Reading Borough Council Strategic Flood Risk Assessment includes the following relevant text:

“Where flood risk is significant and access may be compromised in extreme events, a comprehensive Emergency Flood Plan must be provided to help manage any residual risk.”

and

“Another consideration to ensure that development is safe is whether adequate flood warnings would be available to people using the development. An emergency plan will be needed wherever emergency flood response is an important component of making development safe. Emergency plans will need to take account of the impacts of climate change on escape routes. Residual risk mitigation measures may also include the provision of a safe refuge above the extreme (0.1% with climate change AEP) residual risk flood levels with a freeboard.”

- 3.9.4 Obviously the preference is for dry access, however this will not always be possible for the duration of a flood event. A design event flood on the River Thames would constitute a major incident in Reading with large parts of central Reading flooding. This is reflected by RBC Local Plan which states:

“The nature of Reading means that there are a significant number of sites in need of regeneration, generally containing vacant, derelict, low density or poor quality buildings, within areas of medium or high flood risk. Where the redevelopment of previously developed land at risk of flooding provides significant regeneration

benefits, this will need to be considered in the context of the sequential and, if applicable, exceptions test.”

- 3.9.5 This text, which is retained unmodified in partial update, implies that large scale development will be brought forward which will either need to be evacuated in advance of a flood or act as a place of safe refuge.

Modelled Hazard

- 3.9.6 During a future 1 in 100 year +35% event, the flats would be elevated above the flood level and provide a place of safe refuge. However, parts of the local road network are predicted to flood. This section considers the risk associated with the access in terms of peak hazard and the progression of a future flood event (time of inundation, rate of rise etc.) with reference to the latest model outputs.
- 3.9.7 As clarified in the ‘Supplementary note on flood hazard ratings and thresholds for development planning and control purpose’¹, The recommended approach to assessing Hazards to People is using the formula presented in FD2320/TR2.

$$\text{Flood Hazard Rating} = ((v + 0.5) * D) + DF$$

Where:

v = velocity (m/s)
 D = depth (m)
 DF = debris factor

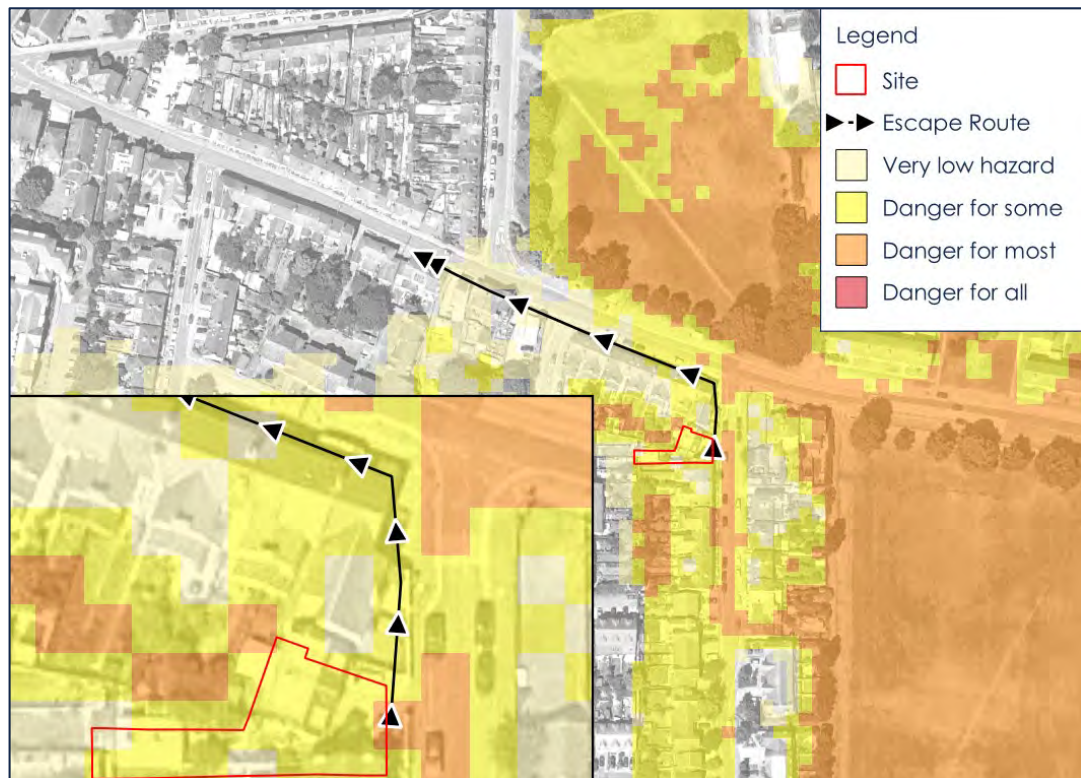
Where “a precautionary approach has been adopted and a debris factor of 0.5 has been used for depths below and equal to 0.25 m and a debris factor of 1.0 has been used for depths above 0.25 m.”

- 3.9.8 The resulting Hazard Rating is classified as follows:
- <0.75 Low - Caution
 - 0.75-1.25 Moderate – Danger for some (i.e. children)
 - 1.25 -2.0 Significant Hazard – Danger for most
 - >2.0 Extreme Hazard – Danger for all
- 3.9.9 The model outputs include hazard ratings using the Tuflow outputs type ‘ZUK0’. The Tuflow Manual states that this uses the equation reported in FD2321. The ZUK2 output uses the appropriate FD2320 formula, but this was not specified as an output in the model simulations and so is not available for review. Nonetheless these outputs provide a reasonable starting point and these outputs are discussed below.
- 3.9.10 At the peak of the event, the hazard level predicted by the model during the 1 in 100 year +25% event is generally no higher than ‘Danger for some’. However, there

¹https://assets.publishing.service.gov.uk/media/602bbdcfe90e070561b31432/Explanatory_note_for_FD2320_and_FD2321_project_record.pdf

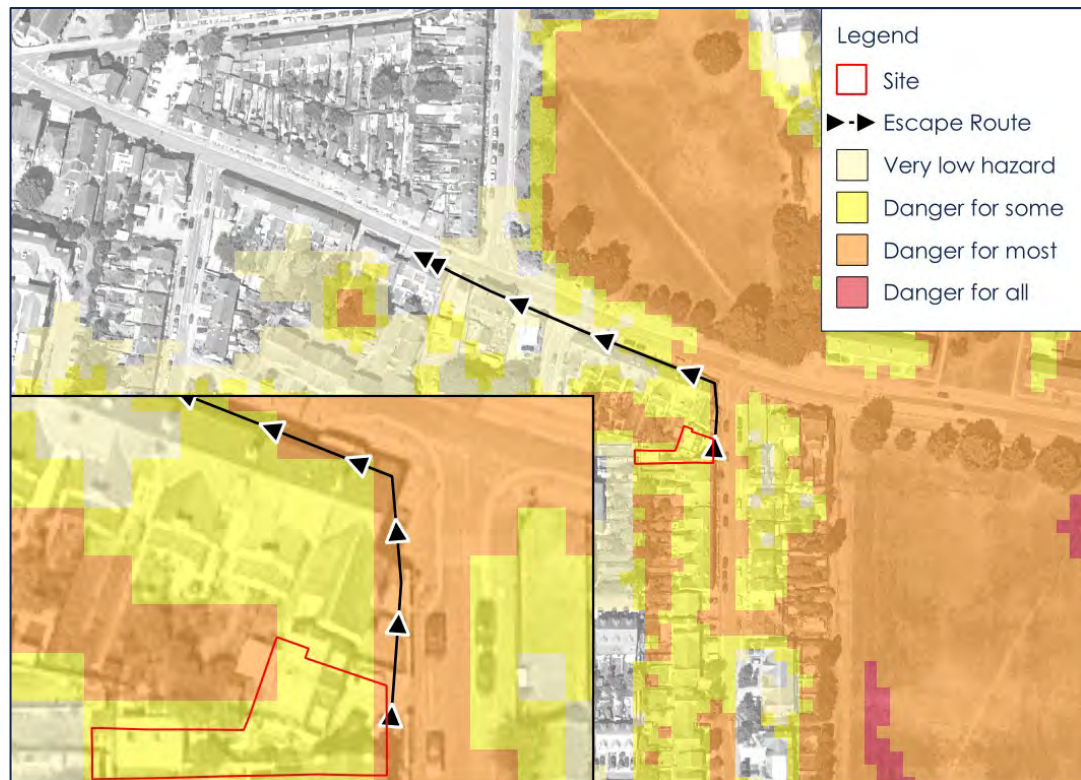
are some cells on Patrick Road and one which has its northern extent in line with the centre of the property gateway which are defined as 'Danger for most'.

Figure 3-6 1 in 100 year +25% Modelled Hazard



3.9.11 In the 1 in 100 year +35% event, which is in excess of the design event flood, the area defined as 'Danger for most' increases to encompass the portion of the access/escape route on Patrick Road. However, these outputs are not sufficiently granular to accurately represent the topographic levels along the footway.

Figure 3-7 1 in 100 year +35% Modelled Hazard



3.9.12 As stated in the model report provided with the model results (*Reading and Caversham Flood Alleviation Scheme - Environment Agency Baseline Modelling Report – Final 2021*) and shown in Figure 4.1 of that report, in this area, the model has a horizontal resolution of 10m (a 10m square grid). Some of the model topography has been defined using “*elevations at an approximate 10m grid*”. As shown in Figure 3.4 and 3.5 of that report the survey does not include the site of the proposed access/escape route.

3.9.13 As the model topography is represented on a 10m grid, it does not accurately capture the change in levels between gardens, the footway and the highway. Patrick Road is approximately 12m wide from back of footway to back of footway.

Site Specific Assessment

3.9.14 In order to provide a more accurate assessment, the hazard has been derived where the model 1 in 100 year +35% outputs classify it as ‘Danger for most’. This is from the site entrance to just beyond the Patrick Road/Gosbrook Road junction as shown in Figure 3-8.

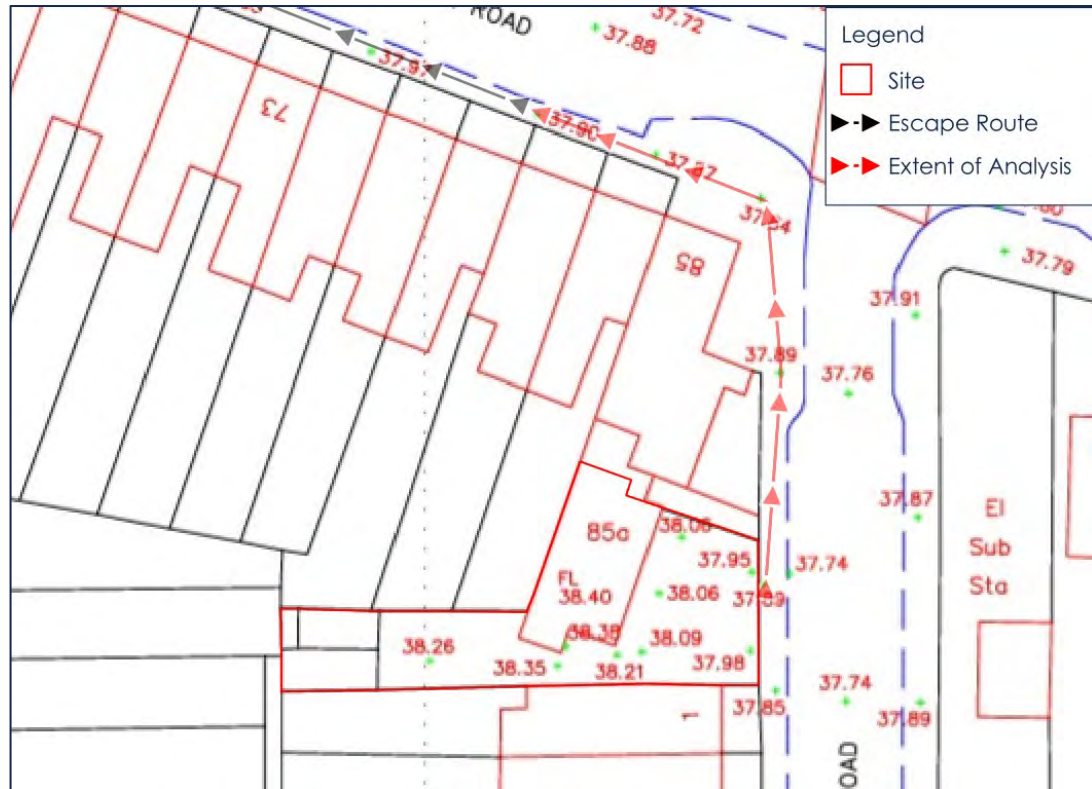
The map displays the site boundary in red, with an escape route marked by black arrows and the extent of analysis marked by red arrows. The site is situated near a road and a substation. Elevation points are marked with green dots and numerical values. The map also shows surrounding land parcels and a railway line.

Legend

- Site (Red outline)
- Escape Route (Black arrows)
- Extent of Analysis (Red arrows)

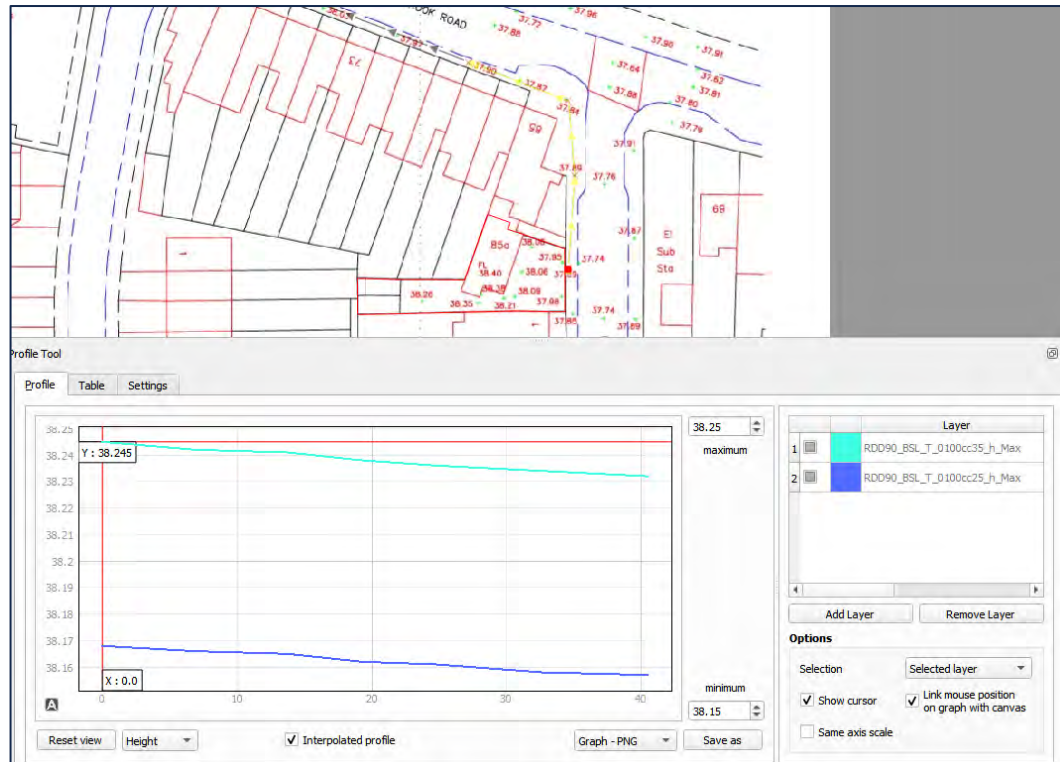
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Figure 3-9 Surveyed Ground Levels



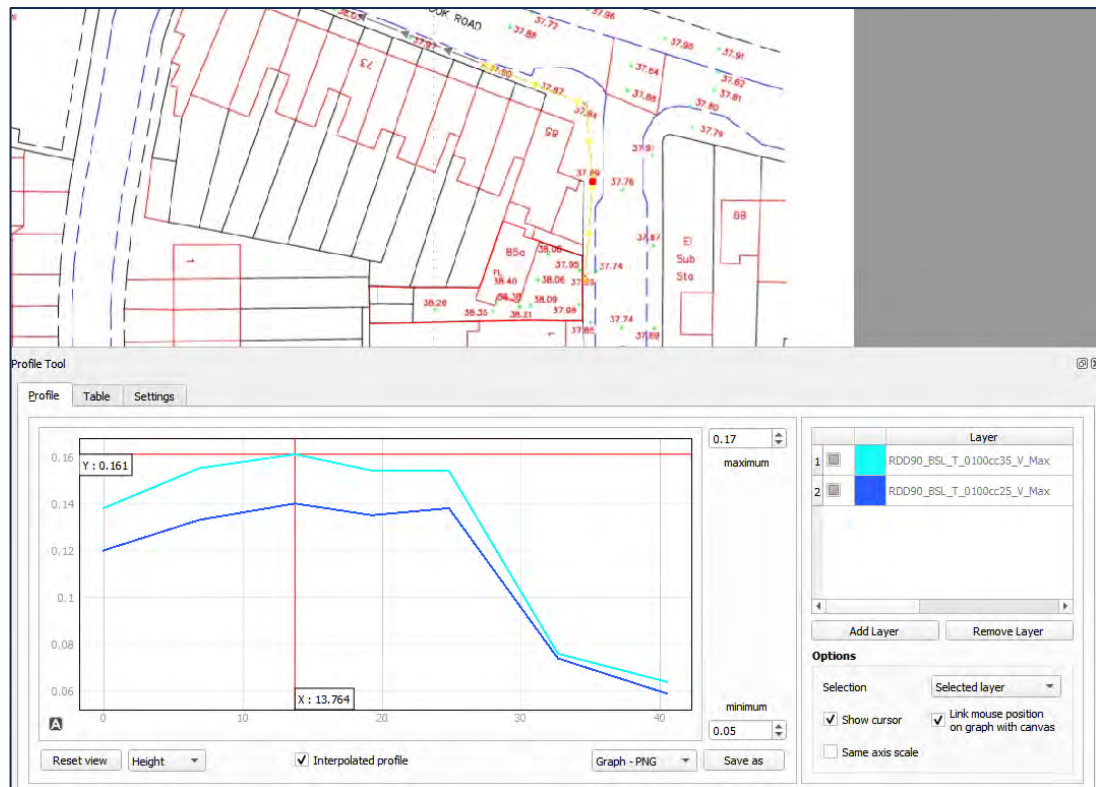
- 3.9.18 Peak flood levels along this part of the route drop from the access to the property to the Patrick Road/Gosbrook Road junction and then continue to drop to the west. As shown in Figure 3-10, in the 100 year +25% event, peak flood levels vary between 38.168mAOD and 38.157mAOD. In the 1 in 100 year +35% event they vary between 38.232mAOD and 38.245mAOD.

Figure 3-10 Peak modelled water levels



3.9.19 Peak velocities along this part of the route increase to the footway to the east of 65 Gosbrook Road and then drop beyond this point. As shown in Figure 3-11, in the 100 year +25% event, peak flood velocities vary between 0.141m/s and 0.059m/s. In the 1 in 100 year +35% event they vary between 0.161m/s and 0.064m/s.

Figure 3-11 Peak modelled velocities



3.9.20 The hazard for each of the five recorded ground levels along this route has been calculated using model outputs from the 1 in 100 year +35% event, which is a worse case than the design (1 in 100 year +31%) flood. As shown in Table 3-2 the calculated hazard classification for each of these locations is 'Moderate - Danger For Some'.

3.9.21 The highest hazard rating is on the footway adjacent to the property. Hazard ratings reduce slightly to the junction with Gosbrook Road and then more significantly decrease beyond that. The greatest depth of 0.405m is predicted at the junction.

Table 3-2 Hazard Classification using 1 in 100 year +35% peak modelled values

Easting	Northing	Ground Level	Velocity (m/s)	Flood Level	Depth	Debris Factor	Hazard Rating	Classification
471707.2	174658.8	37.9	0.161	38.241	0.341	1	1.135	Moderate
471714.8	174656.3	37.87	0.154	38.236	0.366	1	1.133	Moderate
471721.6	174653.5	37.84	0.138	38.245	0.405	1	1.125	Moderate
471722.7	174642.2	37.89	0.076	38.234	0.344	1	1.064	Moderate
471721.7	174628.6	37.89	0.064	38.232	0.342	1	1.054	Moderate

3.9.22 Taking a precautionary approach by assuming that the velocities remain at their peak value as the water levels drop, the hazard classification for all of these locations will drop to the lowest category of 'Low-Caution' once depths fall below 0.25m (at which point the debris factor drops from 1 to 0.5 as demonstrated in Table 3-3).

Table 3-3 Threshold depth for Low hazard classification

Easting	Northing	Ground Level	Velocity (m/s)	Flood Level	Depth	Debris Factor	Hazard Rating	Classification
471707.2	174658.8	37.9	0.161	38.149	0.249	0.5	0.621	Low
471714.8	174656.3	37.87	0.154	38.119	0.249	0.5	0.615	Low
471721.6	174653.5	37.84	0.138	38.089	0.249	0.5	0.603	Low
471722.7	174642.2	37.89	0.076	38.139	0.249	0.5	0.557	Low
471721.7	174628.6	37.89	0.064	38.139	0.249	0.5	0.548	Low

3.9.23 As the location at the junction has the lowest ground level and the highest depth, this will be the area which will flood first and will be classified as 'Moderate' for the longest duration. Flooding at this location has been considered in more detail.

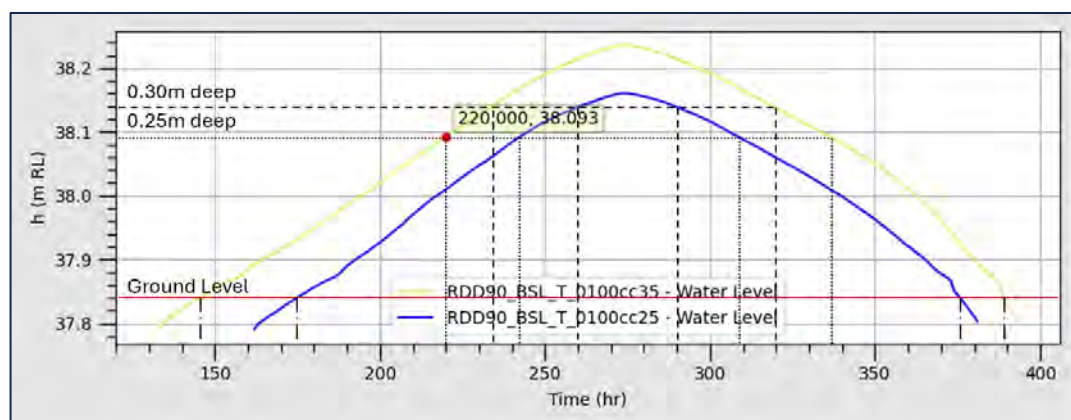
3.9.24 Time series outputs for the flood level during both the 1 in 100 year +25% and the 1 in 100 year +35% event were extracted from the .XMDF outputs provided in the model

package. Assuming a linear relationship between flow and level, and flow and flood duration between the 1 in 100 year +25% and 1 in 100 year +35% the key parameters are presented in Table 3-4 and Figure 3-12

Table 3-4 Key Flooding Parameter for escape route

Parameter	100yr +25% event	100yr +35% event	100yr +31% event
Peak Level (mAOD)	38.168	38.245	38.214
Peak Depth (m)	0.328	0.405	0.374
Onset of flooding (hrs)	145	175	163
Duration of moderate hazard (hrs)	70 (240-310)	125 (220-345)	103
Duration above 0.3m Depth (hrs)	40 (250-290)	75 (245-320)	61

Figure 3-12 Modelled Flood Levels 1 in 100 year +25% (blue) and +35% (green)



- 3.9.25 The duration of flooding of moderate hazard (depths over 0.25m) during the 1 in 100 year +31% design event is estimated to be 103 hours, just over 4 days. This would not preclude access/escape on foot by most people. The peak depth is 0.374m.
- 3.9.26 The peak depth along the highway will be approximately 0.1m higher. This would not preclude access by emergency services should they be required during this period.
- 3.9.27 The duration of flooding over 0.3m is estimated to be 61 hours, just over 2.5 days. 0.3m is a commonly used depth threshold for the limit of safe access. Given the velocities are very low, consistently significantly below 0.2m, safe access would be possible for people without mobility impairments during these conditions.

- 3.9.28 The rate of rise during the flooding is fairly consistently approximately 3.5mm/hr (which equates to or 0.06mm/min or 84mm/day. This rate of rise is essentially negligible.
- 3.9.29 Flooding commences in earnest approximately 14 hours into the 1 in 100 year +35% event simulation (Figure 3-13). 41 hours into the simulation there is significant flooding and flooding of the southern part of the Christchurch Meadows floods (Figure 3-14). 48 hours into the simulation the playing fields to the north of Christchurch Meadows become flooded (Figure 3-15). 118 hours into the simulation Gosbrook Road and Patrick Road alongside the pedestrian access are still dry (Figure 3-16).
- 3.9.30 There would be sufficient warning before flooding even commenced. The site is within the 'River Thames at Reading and Caversham including the Portman Road and Richfield Avenue industrial estates, Caversham Road area of Reading and the Lower Caversham area' flood warning area. The River Thames in Reading has a catchment area of 4,600km². Extreme flood events will be preceded by exceptional, widespread, heavy rainfall over long durations. There will also be a significant delay in this water then reaching Reading. A flood event that could affect the access would be predictable days in advance.
- 3.9.31 The systems that underpin this and other flood warning areas on the River Thames are essential to the safety of residents in the Thames Catchment. Failure of this system is practically inconceivable. It would represent a catastrophic failure of the government, the EA and Reading Borough Council to perform its duties. Even in this scenario there will be days of time to prepare for shallow flooding to the property access.
- 3.9.32 As demonstrated from the model outputs presented above, there is a delay of over 4 days between the commencement of flooding in the area and flooding of the access itself, even in an extreme 1 in 100 year flood in the next century. This would allow ample time for residents to prepare for minor flooding on the access/escape route.

Figure 3-13 1 in 100 year Flood Depths at 14 hours

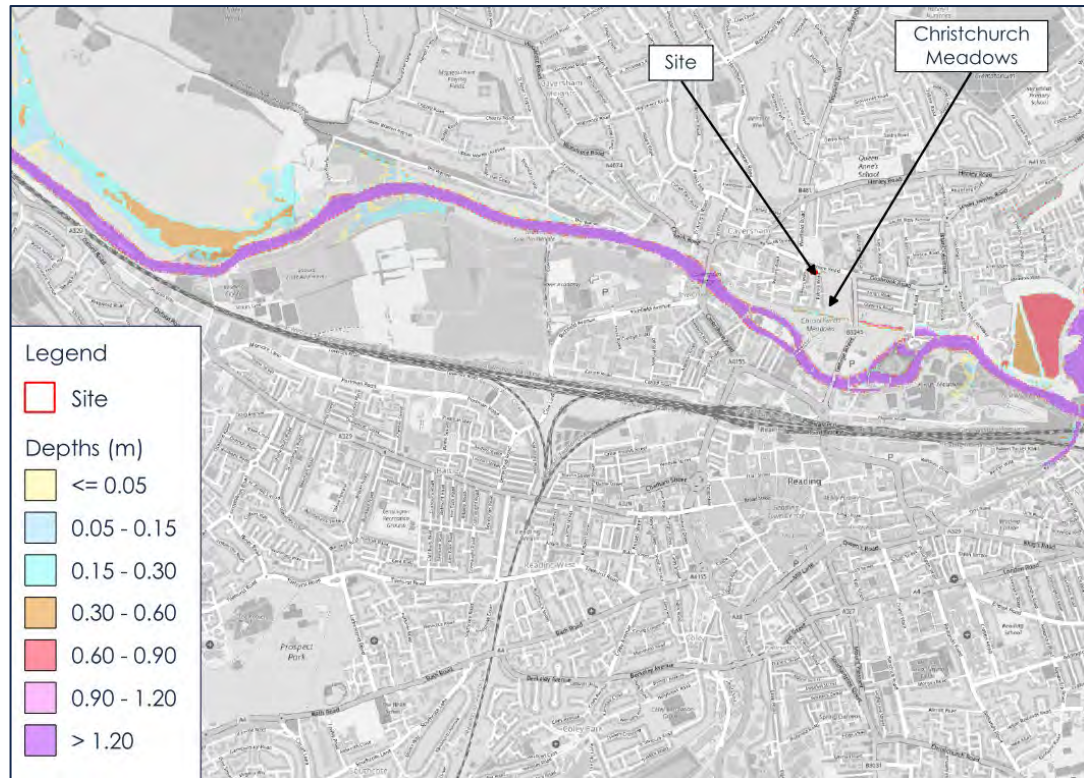


Figure 3-14 1 in 100 year Flood Depths at 41 hours

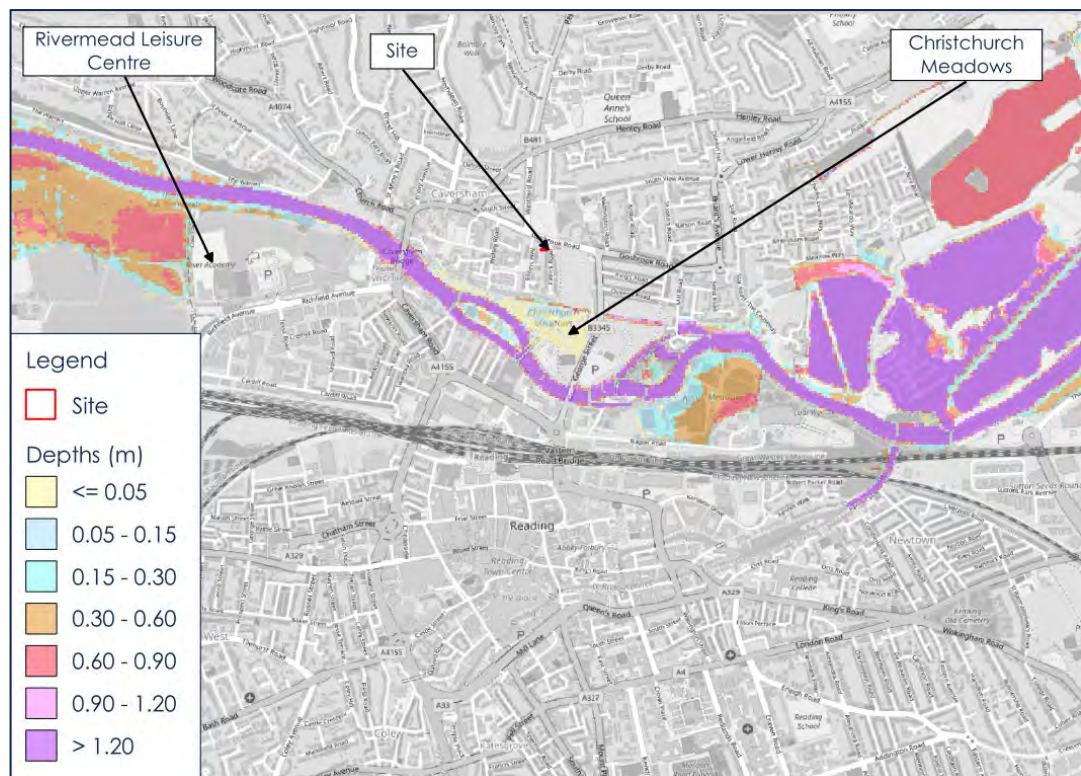


Figure 3-15 1 in 100 year Flood Depths at 48 hours

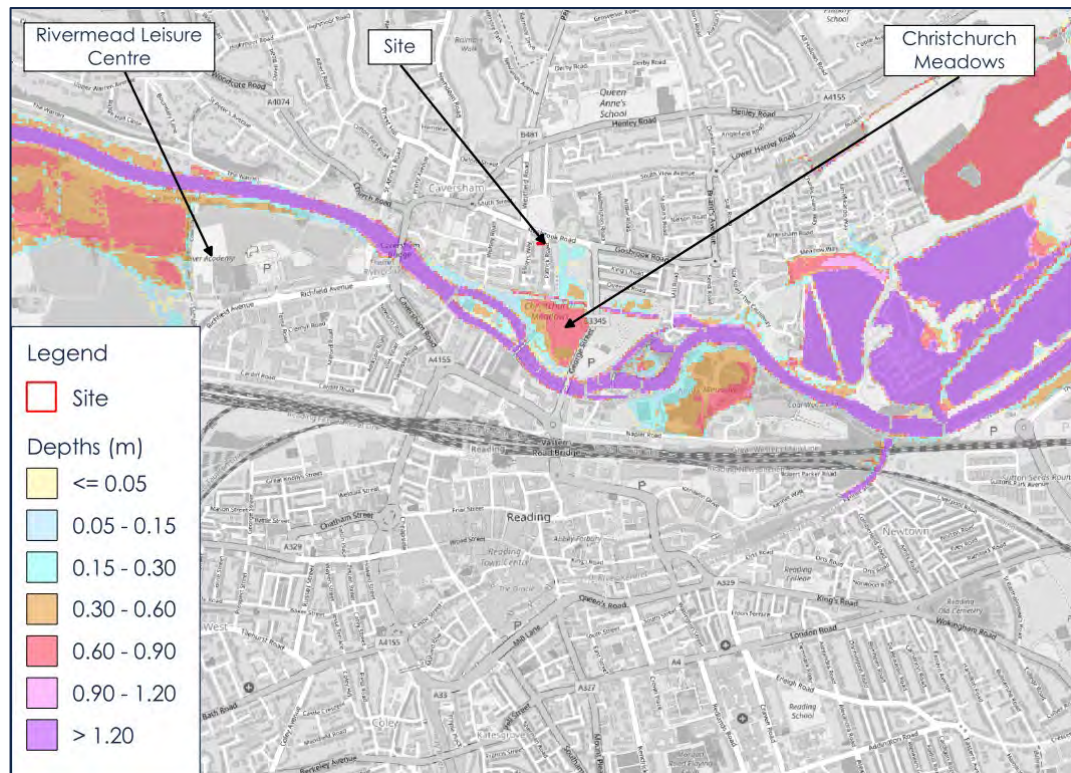
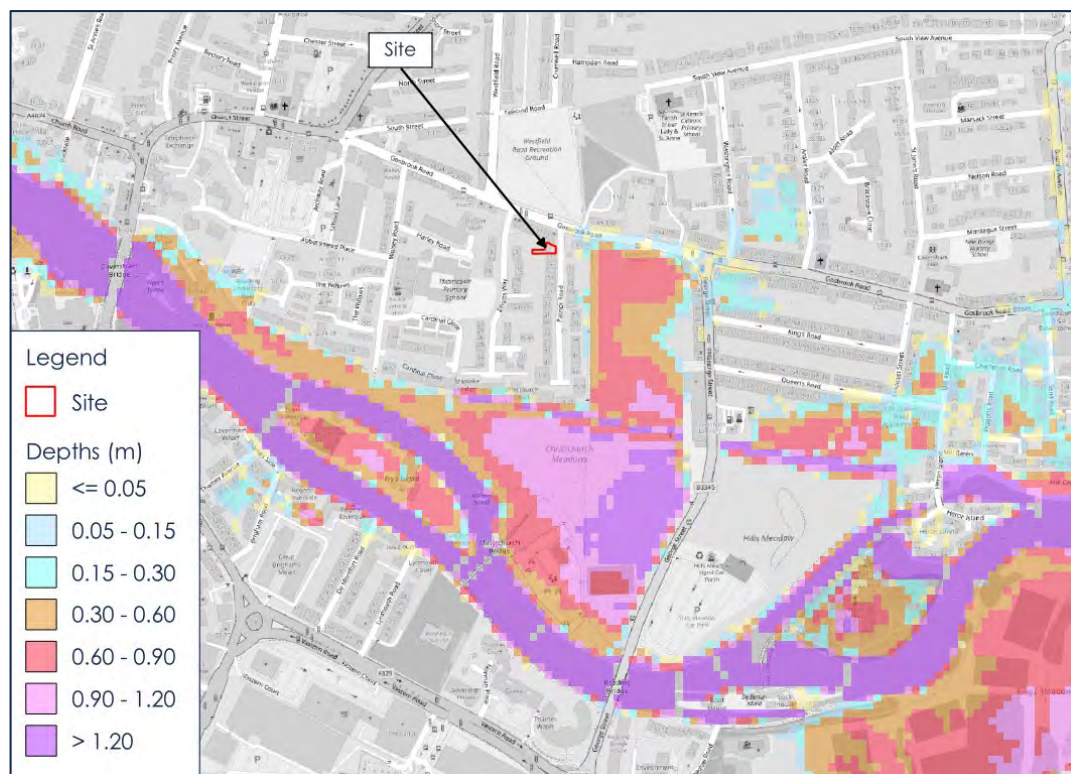


Figure 3-16 1 in 100 year Flood Depths at 118 hours



Flood Emergency Management

- 3.9.33 It is recommended that a Flood Emergency Management Plan be put in place to mitigate the risk of an extreme flood event prior to occupation.
- 3.9.34 On the basis of the site specific analysis carried out using the latest model data and topographic survey, it is concluded that a stay-put policy is appropriate. The flats would meet all the requirements of a place of safe refuge. Whilst there is no specific policy on this matter, the SFRA implies that safe refuge during future 1 in 100 year flood would be an acceptable mitigation strategy.
- 3.9.35 It would be necessary to provide information about the escape route and likely warning times and duration of inundation in order to ensure future occupants safety.
- 3.9.36 In addition to Environment Agency Flood Warnings, staying put could also be triggered by appropriate messages or instructions from the Emergency Services or Reading Borough Council.
- 3.9.37 Given the extreme weather circumstances required to generate a severe fluvial flood event from the River Thames, there would likely be additional warning of impending flooding problems through the Met Office, local news and social media channels significantly in advance of the event. It is recommended that site operators 'follow' the Met Office, Environment Agency and Reading Borough Council social media accounts to stay alert to the potential for flooding to occur.
- 3.9.38 Even if there were a complete failure of any warning system, there would be sufficient time to prepare for a flood. The playing fields immediately to the east of the Patrick Road become inundated 3 days before the access/escape route becomes wet.
- 3.9.39 Even during a predicted 1 in 100 year event in 2115 (accounting for climate change), the peak depths on the proposed access/escape route would not exceed 0.374m, which is approximately the height of a standard wellington boot.
- 3.9.40 The peak velocity in this event is 0.16m/s, which is very low and would not entrain significant debris nor provide sufficient force to unbalance the majority of people.
- 3.9.41 The rate of rise of flooding is just 3.5mm/hr, so there is no risk of people getting trapped in or by floodwaters.
- 3.9.42 The flooding along the road would not preclude access by emergency or most delivery vehicles should they be required during a flood event.
- 3.9.43 The period during which people would be advised to stay put would be less than periods recently mandated by the government during the Covid19 pandemic.
- 3.9.44 This access is considered to meet the requirements set out in the PPG, Policy EN18 of the Reading Borough Local Plan (both the adopted and consultation draft partial update versions) and the relevant parts of the SFRA.

- 3.9.45 There would be significant advance warning of flooding and safe access and escape would be possible.
- 3.9.46 Should it be the preference of the local authority, there would be sufficient time to evacuate in advance of a flood.
- 3.9.47 For either approach there should be no additional burden on the emergency services.

4 SUMMARY AND CONCLUSIONS

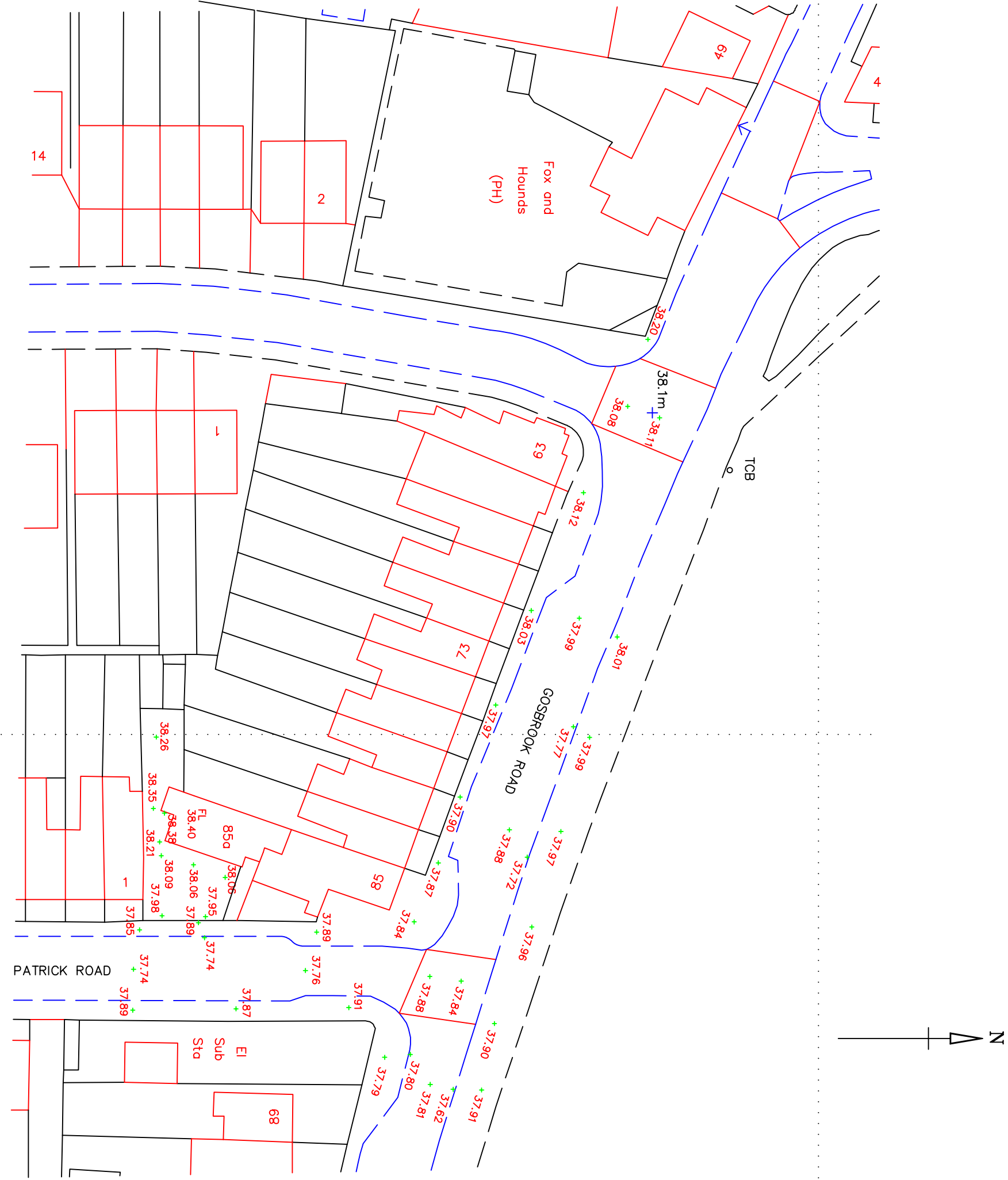
- 4.1.1 The site is shown by the Flood Map for Planning to fall within Flood Zones 2 and 3. A site-specific assessment of the risk to the site has been carried out with reference to the latest model data provided by the Environment Agency on 21st March 2026
- 4.1.2 This work concludes that the building is above the 1 in 1,000 year flood level and is effectively in Flood Zone 1. The site is not considered to be at significant risk from any other source of flooding.
- 4.1.3 The proposals are for a Change of Use and consequently the Sequential Test and Exception Tests are not a planning consideration.
- 4.1.4 The design (1 in 100 year +31%) event flood level has been calculated to be 38.219mAOD. The existing floor levels are at 38.40mAOD which provides 0.18m of freeboard. This is considered sufficient to account for uncertainty given the small difference in flood level between the 1 in 100 year +25% and the 1 in 100 year +35% event. The flats are therefore considered to be safe over their lifetime.
- 4.1.5 In a future 1 in 100 year event, flooding of part of the access/escape route to the site is predicted to be classified as 'Moderate: Dangerous for some (i.e. children)'.
- 4.1.6 However, even in the peak of a future 1 in 100 year event, the hazards would not present a significant risk to non-disabled adults and certainly would not preclude access by emergency services should it be required.
- 4.1.7 A detailed analysis of the flooding parameters concludes that
- There would be days of advance warning of a flood
 - The peak depth on the escape route would be 0.374m and the hazard would be low
 - The peak velocity is 0.16m/s and is unlikely to entrain significant debris
 - The rate of rise of floodwater is negligible and would not present a risk of site users being trapped by or in floodwaters.
- 4.1.8 It is therefore concluded that the proposals meet the national and local policy requirements for safe access/escape.
- 4.1.9 It is recommended that a Flood Emergency Management Plan is produced with a default 'stay put' policy to ensure the occupants are safe from flooding over the development's lifetime. However, there would be sufficient advance warning to evacuate this site if required by Reading Borough Council.

- 4.1.10 The proposed change of use from offices to residential is considered to be policy compliant with regards to flood risk. The development and its users will be safe from flooding and the proposals would not result in an increase in flood risk elsewhere.
- 4.1.11 The site already benefits from a SuDS system which was installed as part of a consented development in 2013. No further improvements in this regard are considered necessary or feasible.

APPENDICES

APPENDIX A

Topographic Survey



Notes

- 1. Levels in metres relative to OSBM situated on Fox & Hounds Public House, value 38.75m.
- 2. Levels based on OS digital mapping.

Key

Revisions	
REV	DATE

Project
85A GOSBROOK ROAD
CAVERSHAM

Job
LEVEL SURVEY

For
Elegant Homes Reading Ltd
7 Academy Court
36B Church Street, Caversham
Reading, Berkshire RG4 8AU

By
Developers Land Surveys

17 Bolton Crescent
Windsor
Berkshire SL4 3JH
Tel: 01753 851477

Scale
1:500

Date
August 2014

Drawn
WHD

Checked
CGF

Rev.
1160/2



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