

400 Longwater Avenue, Green Park

Flood Risk Assessment

On behalf of: **Green Park Reading No. 1 LLP**

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Executive Summary

This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA) to support a planning application for the proposed new office development at 400 Longwater Avenue in Green Park, Reading.

The FRA is in accordance with the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG).

The site is shown on the Environment Agency (EA) Flood Zones map as lying partly within Flood Zone 2 of the Longwater Flood Relief Channel, defined as follows:

Flood Zone 2 'Medium Probability' - land assessed as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding

The western part of the site lies in the following zone:

Flood Zone 1 'Low Probability' - land assessed as having a less than 1 in 1000 (0.1%) annual probability of river flooding [no shading]

The flood levels from the EA hydraulic modelling of the area confirm that the site lies outside the modelled 1 in 100 annual probability floodplain (and confirms the Flood Zone classifications as above).

The site lies within the defined boundary of the Green Park Flood Management Scheme.

In considering the proposals, the following key aspects have been addressed:-

- Vulnerability to flooding from all sources.
- Protection of users of the new development.
- No increased flood risk to third parties as a result of the development.

Flood risk will be appropriately mitigated through measures including:

- Elevation of ground floor levels in accordance with EA requirements (i.e. minimum 300mm above the 1 in 100 annual probability plus allowance for climate change flood level);
- Continuous safe access arrangements; and,
- Appropriate management of surface water to ensure there is no increase in surface water runoff from the site.

The FRA confirms that the proposals are safe, they do not increase flood risk and they do not detrimentally affect third parties, in accordance with the objectives of the NPPF.

1 Introduction

1.1 Scope of Flood Risk Assessment

- 1.1.1 This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA), on behalf of our client, Green Park Reading No. 1 LLP, to support a planning application for the proposed new office development at 400 Longwater Avenue in Green Park, Reading RG2 6GP.
- 1.1.2 The FRA focuses on assessing the practical flood risk issues at the site as follows:
- Identification of all the potential sources of flooding at the site from all sources (i.e. fluvial, pluvial, groundwater, surface water);
 - Assessment of the existing flood risk at the site and the potential impact of the proposals;
 - Consideration of the flood risk implications, taking into account the potential allowance for climate change over the lifetime of the development, and the identification of the measures to mitigate flood risk.
- 1.1.3 PBA has undertaken this FRA using experienced flood risk management staff chartered with the Institution of Civil Engineers (ICE) and the Chartered Institution of Water and Environmental Management (CIWEM). PBA has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering.

1.2 Policy Context

- 1.2.1 This FRA has been prepared in accordance with the relevant national, regional and local planning policy and statutory authority guidance as follows:
- National policy regarding flood risk as contained within the '**National Planning Policy Framework**' (NPPF) dated March 2012, issued by Communities and Local Government and the accompanying online '**Planning Practice Guidance**';
 - Regional policy contained within the Reading Borough Local Development Framework '**Core Strategy**' (Adopted January 2008, with alteration adopted January 2015) with specific reference to Policy '**CS35: Flooding**' which states:

"Planning permission will not be permitted for development in an area identified as being at high risk of flooding, where development would reduce the capacity of the flood plain to store floodwater, impede the flow of floodwater or in any way increase the risks to life and property arising from flooding."
 - The **RBC Strategic Flood Risk Assessment (SFRA)**, released in March 2009;
 - The **RBC Preliminary Flood Risk Assessment (PFRA)**, released in June 2011.

1.3 Vulnerability and the NPPF Sequential Test

- 1.3.1 The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas.
- 1.3.2 The NPPF PPG Table 2 confirms the 'Flood risk vulnerability classification' of a site, depending upon the proposed land usage. This classification is subsequently applied to Table 3 to determine whether:

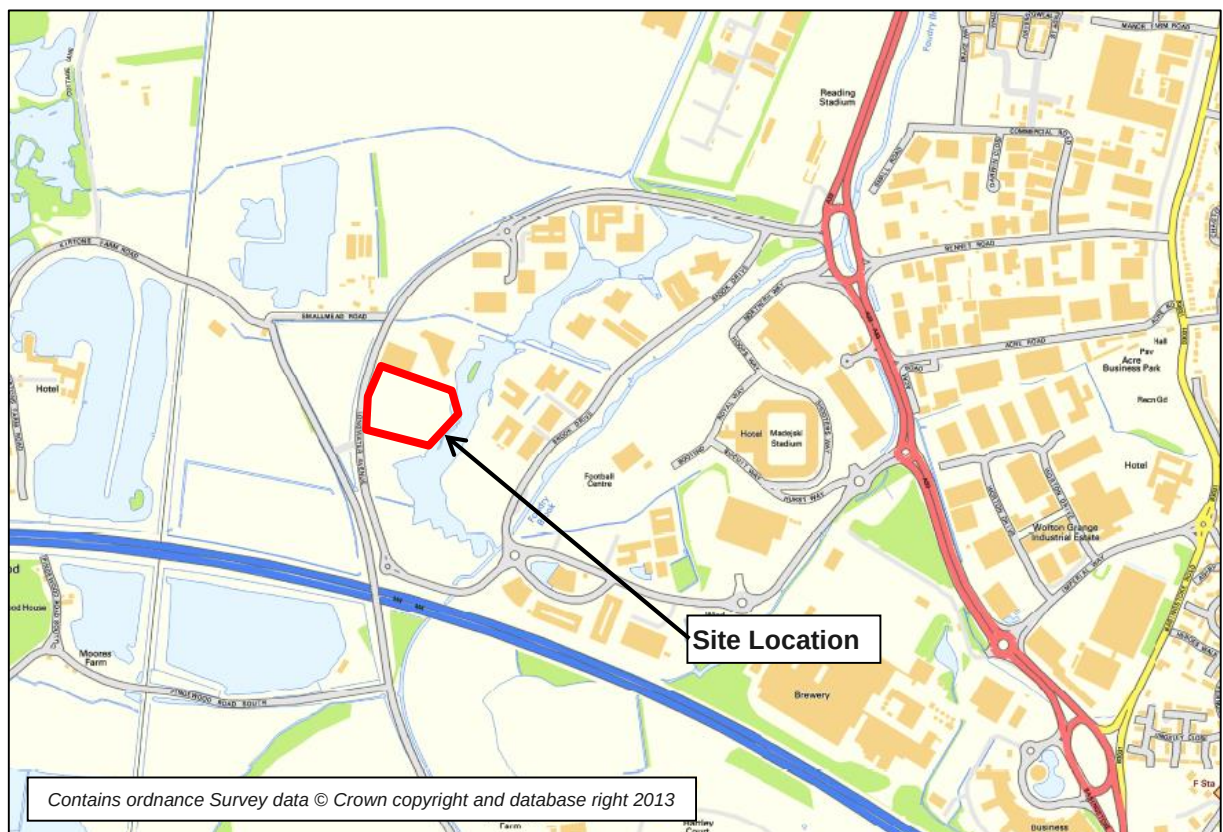
- The proposed development is suitable for the flood zone in which it is located, and;
 - Whether an Exception Test is required for the proposed development.
- 1.3.3 The proposed office use is classed as 'less vulnerable' development, which is considered acceptable in Flood Zones 1, 2 and in Flood Zone 3a.
- 1.3.4 Development principles for the site has been accepted within the 'Green Park Flood Management Strategy'; see Appendix D.
- 1.3.5 In conclusion, the provided information confirms that the proposed development is appropriate, in flood risk terms.

2 Existing Site and Proposals

2.1 Site Description

- 2.1.1 Green Park is an existing commercial business park situated to the south of Reading. It lies to the north of the M4 Motorway and west of the A33 Reading Relief Road. Construction on Phases 1 and 2 of the Green Park development commenced in 1995 and continues today, with the development set to provide 2.25M ft² of commercial office and retail space within the area already consented.
- 2.1.2 The site is located at No. 400 Longwater Avenue, on the west side of the Longwater Flood Relief Channel (postcode RG2 6GP, approximate OS grid reference 470,020m E, 169,820m N – see **Figure 2.1**).

Figure 2.1: Site Location Plan



2.2 Proposed Development

- 2.2.1 The applicant is seeking planning permission for an office development consisting of two 5-storey buildings, with the proposed buildings on the eastern side of the site and vehicle parking to the west and south (including two multi-level car parks).
- 2.2.2 Details of the proposals by Robert Partington Architects are provided in Appendix B.

2.3 Topography

- 2.3.1 A topographic survey of the area was undertaken by Longdin and Browning in 2008 and is included in Appendix A.

- 2.3.2 The survey indicates ground levels over the main development platform of the site between 39.4m AOD and 39.6m AOD, with an isolated low area at 39.1m AOD adjacent to the main bund of soil, on the eastern side of the site.
- 2.3.3 The ground levels drop steeply down the bank on the east side of the site, to a minimum level of 38.3m AOD within the site boundary. The highest levels are recorded are a number of mounds of soil over the site where levels rise up to 42.6m AOD.

2.4 Watercourses and Flood Defences

- 2.4.1 The site lies on the western bank of Green Park Lake, through which is conveyed the **Longwater Flood Relief Channel**. This forms part of the wider Green Park Flood Management Scheme which diverts flows from the Foudry Brook (to reduce the associated fluvial flood risk) via a fixed crest flow control weir and discharges them to a new connection into the River Kennet at Fobney.
- 2.4.2 The **Foudry Brook** lies approximately 350 metres to the east of the site, flowing north-east alongside Brook Drive and then running north parallel to the A33 to its confluence with the **River Kennet**, south of the Rose Kiln Lane crossing.
- 2.4.3 The River Kennet continues north alongside the A33 and through central Reading to outfall into the River Thames to the east of the town centre.

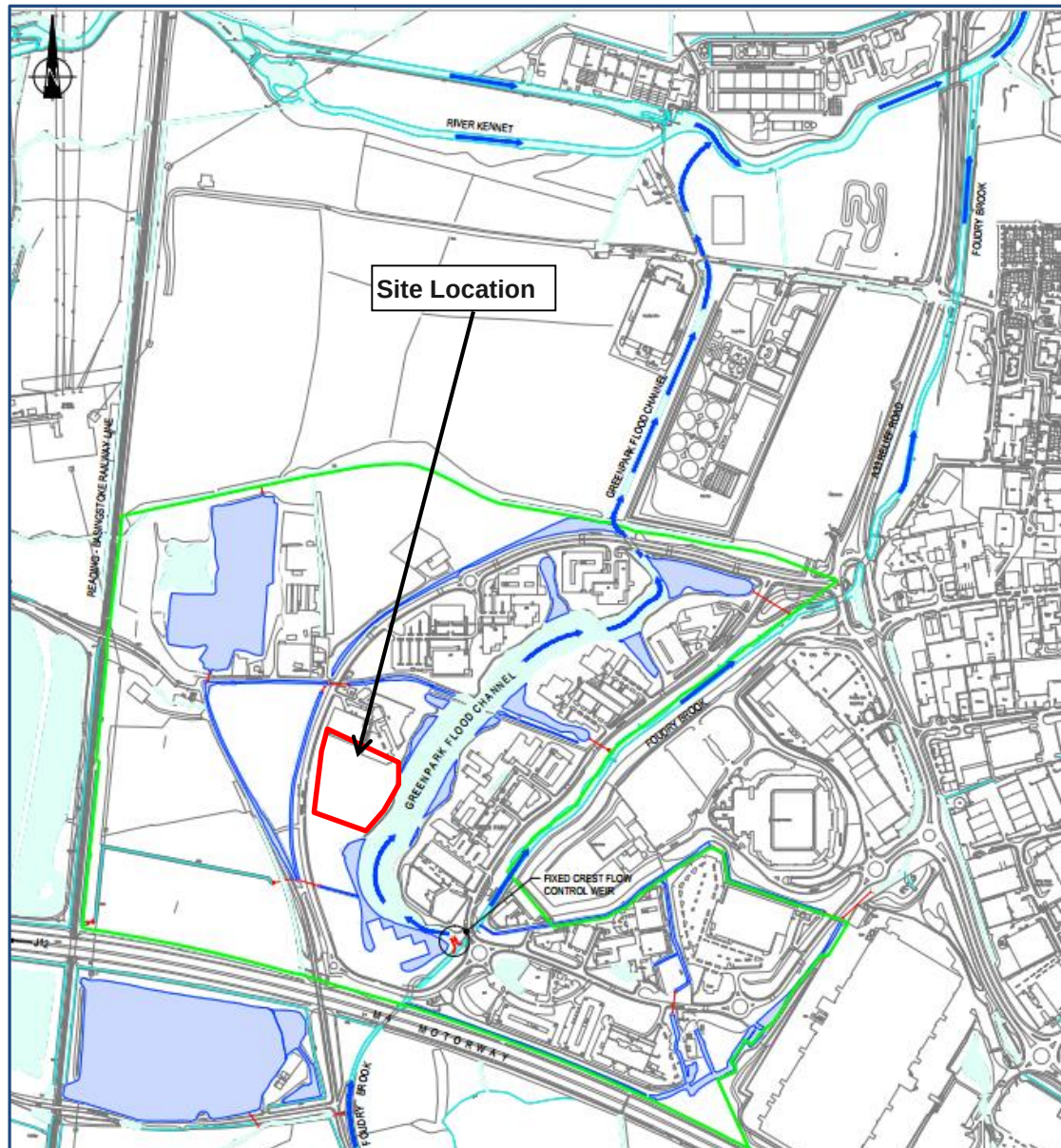
Figure 2.2: View South-West across Longwater Flood Relief Channel (Green Park Lake)



- 2.4.4 In order to facilitate the development of all the Green Park Phases, and alleviate an existing flooding problem in South Reading, a Flood Management Scheme was devised in the 1980's with the Rivers Division of the then Thames Water Authority (as predecessors of the EA) and RBC.
- 2.4.5 The Scheme, which has been implemented during the first two phases of Green Park, removed a previous bottleneck - caused by the raised landfill sites spanning the floodplain to the north of Green Park, on the Foudry Brook catchment - by constructing a new flood relief channel to the River Kennet, of which Longwater Flood Relief Channel is part.
- 2.4.6 The basis of this agreement is detailed within the report "*Foudry Brook – Flood Storage Proposals*" by Lewin, Fryer and Partners dated September 1985 relating to the development

areas of what are now known as Green Park Phases 1, 2 and 3. A copy of the report is included in Appendix D, together with a copy of “Foudry Brook Proposed Relief Channel – Brief Explanation of Scheme” by PBA.

Figure 2.3: Overview of Green Park Flood Management Scheme



- 2.4.7 As a consequence of the completion of the scheme so far, and in accordance with the aspirations of Thames Water Authority and RBC at the time, flood levels in this area of South Reading have been lowered, providing relief to properties with historic flooding problems. During the intervening years since the construction of the Flood Relief Channel, a period of betterment over that designed for has been experienced. This is because, effectively, the flood compensation for the ground raising was constructed in advance of the wider Green Park development.
- 2.4.8 As part of the scheme, there is a historic requirement dating back to the inception of Green Park to safeguard the provision of 16ha of land reserved at or above the 37.8m AOD contour within the defined scheme boundary, for dedicated flood storage and conveyance within the development.

- 2.4.9 As part of this requirement, the established development platform is set outside this 'historic' 1 in 2 annual probability floodplain (i.e. above the 37.8m AOD contour), and any encroachment into this zone requires ground remodelling elsewhere within the scheme boundary to maintain the 16ha of floodplain storage. This requirement also ensures the landscaped edges of Longwater are maintained.
- 2.4.10 In conclusion, the scheme was agreed with the predecessors to the EA and comprised the following elements:
- A flood channel taking flood flows from the Foudry Brook, via a fixed crest flow control weir and passing them to a new connection into the River Kennet at Fobney.
 - Provision of 16Ha of land reserved for dedicated flood storage within the development to agreed criteria in respect of area and level.
 - Building platforms to be raised out of the (1 in 200 annual probability) floodplain to accommodate the Green Park development.
- 2.4.11 Section 108 of the Reading Borough Council SFRA states:

"The Environment Agency Flood Map only indicates the presence of flood defences within Reading Borough in the Green Park area off the A33. It is understood that this represents a flood storage area rather than formal raised defences."

2.5 Planning Background

- 2.5.1 The Green Park site has a planning background which dates back to the 1980's. There have been numerous previous consents for development on the wider site that acknowledge that the implemented Flood Management Scheme allows development of the entire Green Park scheme.
- 2.5.2 Most notably these include the Green Park Village and Station Interchange schemes which were granted planning permission in December 2007, 2008, 2010, 2011 and 2015 by RBC and West Berkshire District Council (WBDC).
- 2.5.3 Consent was first granted for these schemes in 2007 (planning application for Ref: 07/01108/FUL) by RBC and WBDC in January 2008 (Ref: 07/02570/COMIND). A new application was submitted to RBC to accommodate amendments to the station infrastructure (Ref No: 10/01905/FUL), whilst an extension of time application was submitted to WBDC as the station platforms and concourse remained the same as the previous permission (Ref: 10/02603/XCOMIN). The planning applications were granted in December 2010 and January 2011 respectively. Most recently in May 2015 RBC approved a new consent for the railway station, interchange and multi-storey car park (Ref:141944/REG 3).

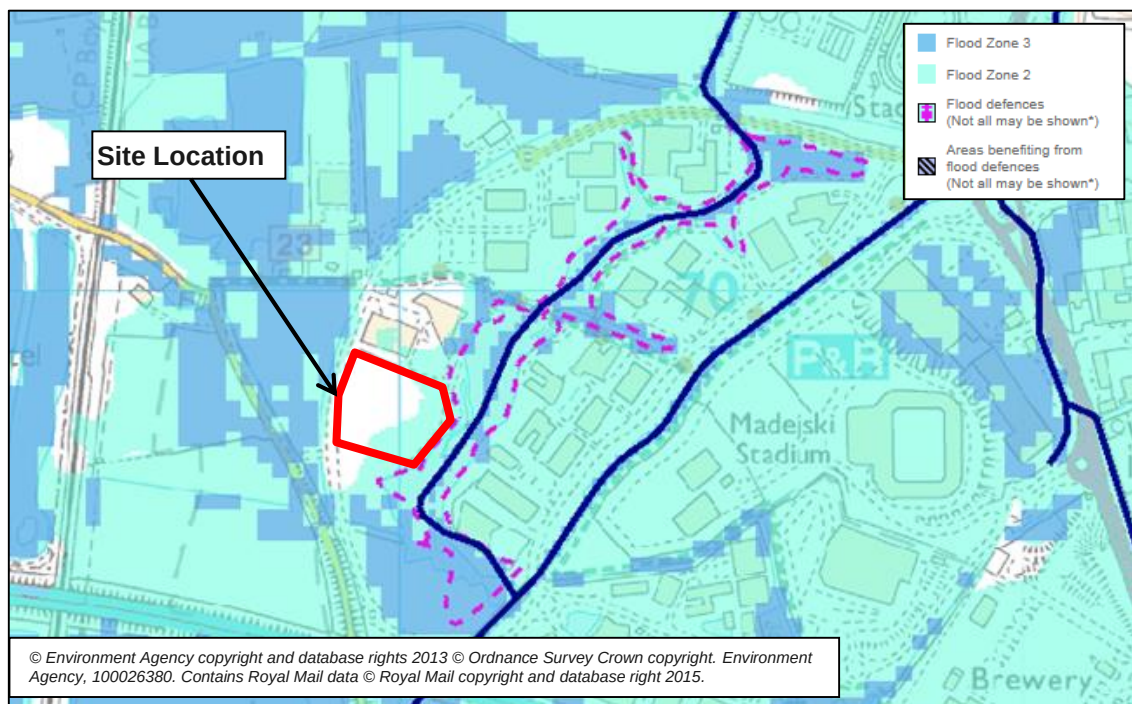
3 Flood Risk

3.1 EA Flood Maps

Flood Zone Map

- 3.1.1 The first phase in identifying whether a site is potentially at risk of flooding is to consult the EA's Flood Zone maps, available on the EA's website. This provides an initial indication of the extent of the Flood Zones, which is refined by the use of more detailed site-specific level survey and modelled flood levels.

Figure 3.1: EA Flood Zone Map



- 3.1.2 This indicates that the eastern part of the site lies in the following zone:

Flood Zone 2 'Medium Probability' - land assessed as having between a 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding [light blue shading]

- 3.1.3 The western part of the site lies in the following zone:

Flood Zone 1 'Low Probability' - land assessed as having a less than 1 in 1000 (0.1%) annual probability of river flooding [no shading]

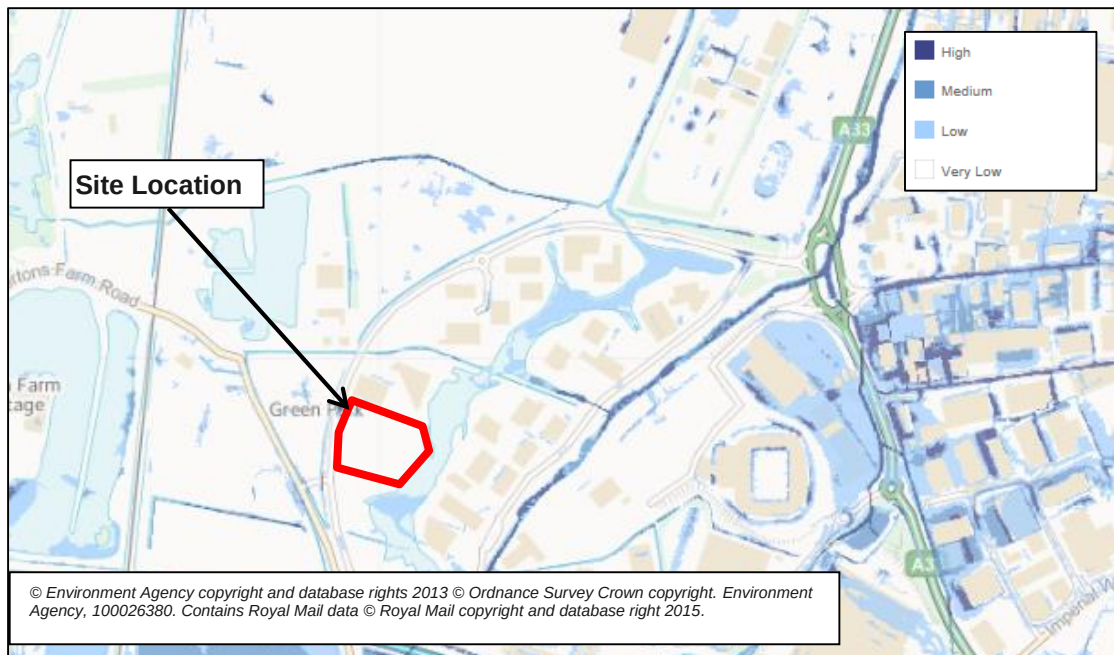
- 3.1.4 It is important to note that whilst areas of the wider Green Park developable site are shown as falling within Flood Zone 3 'High Probability', these areas have not yet been filled to the levels agreed in the Flood Management Scheme, which would move the site into, at worst, Flood Zone 2 (see Section 2.4).

EA Flood Risk from Surface Water

- 3.1.5 The EA 'Surface Water Flood Risk Map' shows where areas could be potentially susceptible to surface water flooding in an extreme rainfall event. The current 'Updated Flood Map for Surface

Water' ('uFMfSW') was released in 2013 and is the third iteration of a national scale surface water modelling exercise (following previous releases in 2008 and 2010).

Figure 3.2: EA Flood Map for Surface Water



- 3.1.6 **Figure 3.2** indicates that the site and surrounding area is at 'Very Low' (less than 1 in 1000 annual probability) chance of flooding from surface water.

EA Flood Risk from Reservoirs Map

- 3.1.7 The EA provide maps showing the risk of flooding in the event of a breach from reservoirs, based only on large reservoirs (over 25,000 cubic metres of water).
- 3.1.8 Whilst the Longwater Flood Relief Channel provides a significant flood storage capability for the area, this is provided at ground level with the surrounding plots of land elevated in general to above the 1 in 200 annual probability flood level. As such, the site is not at risk of flooding from a breach, as verified by the EA mapping (which shows no potential breach flood extent in the area).
- 3.1.9 This is reiterated in Section 139 of the Reading SFRA, which states (with reference to flood storage areas at Green Park and the Oracle):

"..these are flood storage areas that are situated at ground level, and are connected directly to the adjacent main river. Any 'failure' of these structures will result in them draining into the river, and there will be no risk to life and/or property."

- 3.1.10 It should be emphasised that the risk of flooding from reservoir breach is very small in any case; the EA are the enforcement authority for the Reservoirs Act (1975) and all large raised reservoirs are inspected and supervised by reservoir panel engineers (in this case, the Longwater Flood Relief Channel is also a 'main river' watercourse).

3.2 Reading Strategic Flood Risk Assessment

- 3.2.1 The RBC Strategic Flood Risk Assessment (SFRA) was released in March 2009 to support RBC's Local Development Framework (LDF). The SFRA was prepared to establish the flood

risk to the area, including the potential impact of flood defence failure and the implications of climate change.

3.2.2 An overview of relevant flood risk information for the site is discussed below and copies of the referenced maps are included in Appendix D.

- **SFRA Figure 2 ‘Historical River Flooding’** shows the areas impacted by flooding in the flood event of 2003. This indicates broad areas of flooding along the River Kennet floodplain and to the south of Reading, over the Green Park area. However, the accuracy of this flood outline is suspect, given the significant ground raising that has occurred around Green Park to elevate plots above the 1 in 200 annual probability flood level;
- **SFRA Figure 6 ‘Character Area South Flood Zone Map’** provides an overview of the flood risk information for South Reading. This reconfirms the site classification as Flood Zone 2/Flood Zone 1 (as per the current EA map in Figure 3.1). It indicates there are no records of flooding in the Green Park area from any recorded sources – i.e. fluvial, highways, groundwater, sewer);
- **SFRA Figure 11 ‘Character Area South Flood Depth’** provides an indication of maximum flood depth over the Borough in a severe fluvial flood event. This indicates the Green Park area around the Flood Relief Channel is largely unaffected by flooding. The site is indicated as outside the area impacted.

3.3 Reading Preliminary Flood Risk Assessment

3.3.1 Reading Borough Council is defined as a ‘Lead Local Flood Authority’ (‘LLFA’) under the Floods and Water Management Act 2009. The first step of the Flood Risk Regulations is for LLFAs to produce a ‘Preliminary Flood Risk Assessment’ (‘PFRA’), providing a high level overview of flood risk from all sources within a local area, including consideration of surface water, groundwater, ordinary watercourses and canals.

3.3.2 A PFRA was prepared for RBC and was released in June 2011. An overview of relevant flood risk information for the site is discussed below and copies of the referenced maps are included in Appendix D.

- **PFRA Figure 5.3** shows the areas susceptible to surface water flooding. This indicates that the Green Park area is not susceptible to such flooding, and accordingly the site is located outside the areas at risk (see extract in **Figure 3.3**). It should be noted that the surface water flood map referenced in the SFRA has been superseded by the updated mapping discussed in Section 3.1 of the FRA.

Figure 3.3: Extract of PFRA Figure 5.3 – Areas Susceptible to Surface Water Flooding

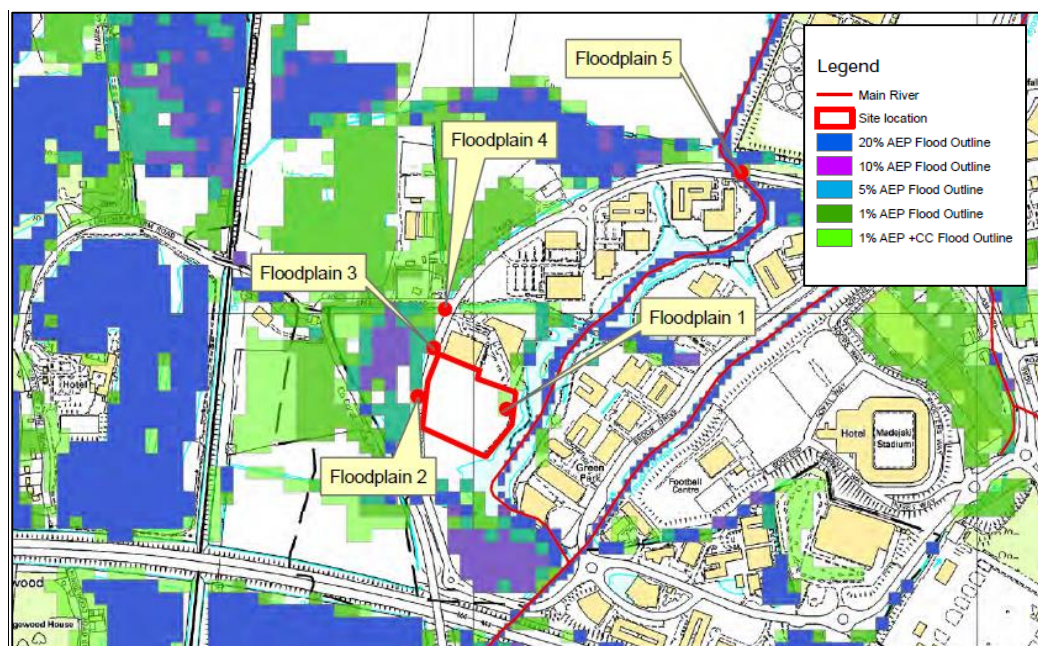


- **PFRA Figure 5.4** shows that the site is located within an area that has a high susceptibility (greater than 75%) of groundwater flooding. It is noted that this is based on a relatively coarse analysis (**ratings** are provided per 1 kilometre square area) and the elevation of the Green Park plots above the 1 in 200 annual probability fluvial flood level would indicate the risk of groundwater flooding to the site is negligible.

3.4 EA Modelled Flood Data

- 3.4.1 The EA have provided modelled flood data for the area from their River Kennet (Tyle Mill to Thames Confluence) 2007 model; see copy of Product 4 data in Appendix C.
- 3.4.2 The modelled flood extents in the vicinity of the site are shown in Figure 3.3.

Figure 3.4: EA Modelled Flood Extents



- 3.4.3 The modelled flood levels at the site are as detailed in Table 3.1.

Table 3.1: EA Modelled Flood Levels

Flood Event (Annual Probability)	Modelled Flood Level (m AOD)
1 in 20 (5%)	38.68
1 in 100 (1%)	38.87
1 in 100 plus allowance for climate change	39.10

3.4.4 Comparison between the topographic survey and the above modelled flood levels indicates the following:

- The main development platform, is typically at least 500mm above the current 1 in 100 annual probability flood level, which is contained within the banks of the Longwater Flood Relief Channel;
- The development platform is, in general, 300mm above the reference 1 in 100 annual probability plus allowance for climate change flood level, although isolated low spots (around the base of the mound on the east side of the site) are below this level, typically by less than 100mm.

3.4.5 This confirms that the proposed development site falls, at worst, within Flood Zone 2 'Medium Probability' with higher areas likely to be in Flood Zone 1 'Low Probability' (in the absence of a modelled 1 in 1000 (0.1%) annual probability flood level it is not possible to define the extent of these zones over the site).

3.4.6 The implications of the flood extents over the site are considered in the mitigations measures for the proposed development, discussed in Section 4.

3.5 Impact of Climate Change

3.5.1 In considering flood risk to the site, it is necessary to fully consider the potential impacts of climate change for the lifetime of the development within the mitigation measures.

3.5.2 The EA's '*Climate Change Allowance for Planners*' guidance (which supports the NPPF) provides contingency allowances for potential sea level rise in Table 1, and for potential increases in peak river flow and rainfall intensity in Table 2.

3.5.3 In accordance with the above guidance, the potential for increased flood probability as the result of possible climate change has been taken into account in the consideration of mitigation measures over the lifetime of the development through a +20% allowance for increases in peak river flow and a +20% allowance for peak rainfall intensity (i.e. surface water drainage). The proposed office development is conservatively considered to have a 100-year design life.

3.5.4 In February 2016 the EA released new guidance on the application of climate change allowances in flood risk assessments: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>. The guidance acknowledges that there is a temporary transition period during which the previous climate change allowances would be acceptable where "*development plans or proposals are well advanced*", which is considered to be the case in this instance. Notwithstanding this, the new guidance has been considered within the FRA and the proposed scheme is considered in accordance with the requirements as follows:

Table 3.2: Comparison of Climate Change Guidance Requirements

Criterion	Recommended Allowance for Climate Change		Comment
	Previous Allowance (<i>'Climate Change Allowance for Planners'</i> , Sept 13)	New Allowance (<i>'FRAs: Climate Change Allowances'</i> , Feb 16)	
Peak Rainfall Intensity	+20% (to 2085) +30% (to 2115)	+20% (Central estimate to 2115) +40% (Upper end estimate to 2115)	+30% allowance applied to surface water drainage arrangements, which provides a conservative approach to 'Less Vulnerable' development
Peak River Flow	+20% (to 2115)	+15% (to 2069) +25% (to 2115) (Central estimate – applies for Less Vulnerable development in Flood Zone 2, Thames River Basin)	Site lies within Green Park Flood Management Scheme. Development set significant freeboard above flood level with +20% climate change to allow for uncertainty.

3.5.5 The above summary confirms that due to the particular form of development – i.e. 'Less Vulnerable' office development in Flood Zone 2 within the Green Park Flood Management Scheme – and the inherently conservative approach already adopted in the proposed mitigation arrangements, the changes to climate change guidance does not have an impact on the proposals.

4 Mitigation Measures

4.1 Ground Floor Levels

- 4.1.1 Standard requirements for ground floor levels of new development are set out in BS8533:2011 'Assessing and Managing Flood Risk in New Development – Code of Practice'. This recommends floor levels are set a minimum of 300mm above the modelled 1 in 100 annual probability plus allowance for climate change flood level.
- 4.1.2 Based on the EA-modelled 1 in 100 annual probability plus allowance for climate change level of 39.10m AOD, this results in a minimum ground floor level of 39.40m AOD.
- 4.1.3 The proposed ground floor level, at 40.25m AOD, is over 1 metre above the reference climate change flood level and significantly in excess of standard requirements.
- 4.1.4 It is also recommended that floor levels incorporate a suitable freeboard above surrounding ground level, to mitigate against the risk of surface water flooding in an extreme storm event.

4.2 Floodplain Storage

- 4.2.1 Any new development located in the vicinity of a watercourse should be constructed such that it does not detrimentally impact on flow routes or reduce the available floodplain storage over a site; either of which could potentially cause an increase in flood levels on-site or elsewhere. This is considered up to the benchmark of the 1 in 100 annual probability plus allowance for climate change fluvial floodplain.
- 4.2.2 The proposed development lies within the area covered by the Green Park Flood Management Scheme. Ground levels over the plot are typically above 39.4m AOD, and crucially do not drop below the 37.8m AOD contour - so will not encroach into the land reserved for dedicated floodplain storage within the Scheme (see **Section 2.4**).
- 4.2.3 In conclusion, the proposed development will not detrimentally impact on floodplain storage or flood flow routes.

4.3 Safe Access Arrangements

- 4.3.1 As both the development and the wider access route via Longwater Avenue lie outside the EA-modelled 1 in 100 annual probability plus allowance for climate change floodplain, continuous safe access will be available to the development.
- 4.3.2 It should be noted that as an office development there is no sleeping accommodation within the building, and if the area became at risk of flooding the building would be vacated and secured in advance of any potential flooding impacts.

5 Surface Water Drainage

5.1 Existing Surface Water Drainage Arrangements

- 5.1.1 Surface water runoff from the Green Park site drains into a series of interconnected ditches conveying water across the site into the flood storage areas.
- 5.1.2 The existing site consists of engineered fill which naturally drains via percolation into the underlying alluvium and river terrace deposits. If the ground is saturated, the general topography of the site falls to the west, towards the Longwater Flood Relief Channel and surface water would discharge to the watercourse accordingly.
- 5.1.3 It was previously agreed with the EA and their predecessors that the increased runoff from development should be directly discharged into the Longwater Flood Relief Channel and its connected watercourses without attenuation (on the basis that the site is situated towards the downstream reaches of the Kennet catchment, so this approach would ensure the development run-off would not coincide with the peak fluvial flows resulting from the same storm event. However, since the publication of PPS25 (now superseded by the NPPF) the EA has reconsidered this approach and the drainage requirements for new development now seek to attenuate flow to greenfield runoff rates.
- 5.1.4 Therefore proposed development plots are to be responsible for the attenuation and treatment of surface water runoff within their own plot boundary prior to discharge to either the ditch network or Longwater Flood Relief Channel.

5.2 Planning Policy Requirements

- 5.2.1 As of April 2015, the Lead Local Flood Authority (LLFA) has become the statutory consultee for surface water management on planning applications for 'major development'. As the LLFA, RBC are therefore responsible for the approval of surface water drainage systems within such development.
- 5.2.2 The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites, and recommends that priority is given to the use of Sustainable Drainage Systems (SuDS) in new development, this being complementary to the control of development within the floodplain.
- 5.2.3 As the intention of SuDS is to mimic the natural drainage regime of the undeveloped site, the NPPF PPG states the following (consistent with the Building Regulations H3 hierarchy):

...the aim should be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration),*
- to a surface water body,*
- to a surface water sewer, highway drain or another drainage system,*
- to a combined sewer*

- 5.2.4 The proposed surface water drainage strategy will be submitted to RBC as a standalone drawing and accompanying Technical Note with calculations, based around an on-site attenuation strategy with controlled discharge to Longwater.

6 Residual Risk

- 6.1.1 It is difficult to completely guard against flooding since extreme events greater than the design standard event are always possible, however, it is practicable to minimise the risk by allowing a substantial freeboard (safety margin) and by using suitable construction and management techniques.
- 6.1.2 The proposed development is located within Flood Zone 2 'Medium Probability' and Flood Zone 1 'Low Probability'. The detailed EA modelling confirms the site lies outside the modelled 1 in 100 annual probability plus allowance for climate change fluvial floodplain.
- 6.1.3 This FRA has been prepared in accordance with the NPPF and Local Planning Policy. The proposed flood management (including ground floor level recommendations) and surface water management strategies are based on the relevant British Standards (BS8533), the standing advice provided by the EA or based on common practice.
- 6.1.4 Ground floor levels will be set in excess of the required minimum 300mm above the modelled 1 in 100 annual probability plus allowance for climate change flood levels and incorporate a suitable freeboard above surrounding ground level, to mitigate against the risk of surface water flooding in an extreme storm event.
- 6.1.5 Continuous safe access is available, and the elevation of the plot above the 37.8m AOD contour ensures the development does not encroach into the land reserved for dedicated floodplain storage within the Green Park Flood Management Scheme.
- 6.1.6 As such, the residual risk is considered to be low.

7 Conclusion

- 7.1.1 This Flood Risk Assessment (FRA) has been prepared by Peter Brett Associates LLP (PBA) to support a planning application for a proposed new office development at 400 Longwater Avenue in Green Park, Reading.
- 7.1.2 This FRA concludes that:
- The site lies mainly in Flood Zone 1 'Low Probability', with the eastern side of the site adjacent to Longwater Flood Relief Channel in Flood Zone 2 'Medium Probability' or river flooding.
 - The main development area, at approximately 39.4m AOD, is 500mm above the Environment Agency (EA) modelled current 1 in 100 annual probability flood level and 300mm above the 1 in 100 annual probability plus allowance for climate change flood level.
 - The proposed mitigation strategy demonstrates the development is safe through a number of measures as follows:
 - Ground floor levels set over 1 metre above the EA-modelled 1 in 100 annual probability plus allowance for climate change flood level, in excess of standard EA requirements;
 - Provision of continuous safe access for the development;
 - Construction outside the 'historic' 1 in 2 annual probability floodplain 37.8m AOD contour, thus ensuring no impact on the land reserved for dedicated floodplain storage within the Flood Management Scheme;
 - A surface water drainage strategy based around on-site attenuation with controlled discharge to Longwater that demonstrates no increase in peak runoff from the existing greenfield rates, considered up to the 1 in 100-year plus 20% allowance for climate change rainfall event.
- 7.1.3 The proposed office use is classed as 'less vulnerable' development, which is considered acceptable in Flood Zones 1, 2 and in Flood Zone 3a. The principle of development over the site has been accepted within the Green Park Flood Management Strategy and established through previous planning approvals across the area.
- 7.1.4 An application for Flood Defence Consent (FDC) to be made in due course to the EA for any works within 8m of the bank of the Longwater Flood Relief Channel, to demonstrate any new development does not have a detrimental impact on flood risk.
- 7.1.5 In conclusion, the future occupants and users of the proposed development will be safe from flooding and there will be no detrimental impact on third parties. The proposal complies with the National Planning Policy Framework (NPPF) and local planning policy with respect to flood risk and is an appropriate development at this location.

Appendix A : Topographic Survey

- Longdin & Browning Drawing 5904_01

Appendix B : Development Proposals

- Drawing 15011 A_PL_003 rev. 01 'Site Plan – Proposed Layout' by Robin Partington & Partners drawings

Appendix C : EA Data & Correspondence

- EA Product 4 data (ref: WT11948)
 - EA Flood Zone Map
 - Flood defence information
 - Modelled flood extents
 - Modelled flood levels
 - Historic flood maps

Appendix D : Other Information

- Green Park Flood Management Strategy: Foudry Brook – Flood Storage Proposals by Lewin Fryer and Partners. 1985.
- 'Foudry Brook : Proposed New Channel – M4 to River Kennet' by PBA, 1984