

MONSON

Structural Engineering
Roads & Car Parks
Traffic & Flood Risk Assessments
Water & Drainage Engineering
Technical Audits & Assessments

**Barkham Road,
Barkham,
Berkshire,
RG41 4TJ**

Land North of Barkham Road

Flood Risk Assessment

Issue	B
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1.00 Introduction

- 1.01 Monson Engineering have been instructed to prepare a Flood Risk Assessment to support a planning application to the Wokingham Borough Council.
- 1.02 The application is in relation to the construction of a residential dwelling on a greenfield site located midway between Barkham and Arborfield.
- 1.03 The total development site boundary area, comprising the existing dense woodland, totals 0.5ha.
- 1.04 The nearest site address is Barkham Road, Barkham, Wokingham, RG41 4TJ, and the approximate National Grid Reference of the site is SU 77552 66957 (477552 Easting, 166957 Northing).
- 1.05 The location of the site, as well as a layout of the site, can be found in **Appendix A**.

2.00 Flood Risk Policy

- 2.01 Planning law requires that planning permission applications be assessed in accordance with the objectives outlined in the National Planning Policy Framework (NPPF).
- 2.02 The overall objective of the NPPF is to set guidelines for sustainable development in a way that meets the current needs of the community without compromising future generations' avenues to achieve the same.
- 2.03 With specific regard to flood risk, applicants are required to demonstrate consideration of all potential sources of flooding, together with the future impacts of climate change, with the aim of minimising risk to people and property. The NPPF sets out the following objectives:
- *Applying the sequential test and, where necessary, the exception test;*
 - *Safeguarding land that is required, or likely to be required, for current or future flood management;*

- *Using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, including the use of natural flood management techniques where practicable; and*
- *Seeking opportunities to relocate development to more sustainable locations where climate change is expected to increase flood risk over time. Apply the sequential test and then, if necessary, the exception test as set out below;*
- *Safeguarding land from development that is required, or likely to be required for, for current or future flood management;*
- *Using opportunities provided by new developments and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of integrated approach to flood risk management); and*
- *Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.*

2.04 The Planning Practice Guidance (PPG) for Flood Risk and Coastal Change states that:

“Where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design, and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the sequential test need not be applied.”

2.05 The above paragraph is given within the PPG as a direct reference to paragraph 175 of the NPPF.

3.00 Existing Site

3.01 Topographical information obtained from Scalgo mapping indicates that the site is relatively flat, with levels varying from approximately 49.5m AOD at the southern end of the site to approximately 47.5m AOD toward the north.

- 3.02 The site is bounded by Barkham Road to the south of the site with Barkham Brook sited at the northern boundary. The site sits in a sparsely populated residential area partway between Barkham and Arborfield Green. The wider catchment generally consists of farmland with the occasional cluster of residential properties.
- 3.03 The site itself is a densely populated cluster of woodland with no previous development history. The site will therefore be considered to be greenfield. A proposed site plan is included in **Appendix A**
- 3.04 The main site of the proposal is in the northeast corner of the development site boundary.

4.00 Flood Risk

- 4.01 This flood risk assessment will primarily consult the Wokingham Borough Council Strategic Flood Risk Assessment (SFRA) and flood mapping provided by the Environment Agency. The sources of flood risk to be reviewed in this document will be:

- Flooding from sewers
- Flooding from artificial sources
- Groundwater flooding
- Flooding from rivers and seas (fluvial)
- Surface water flooding (pluvial)

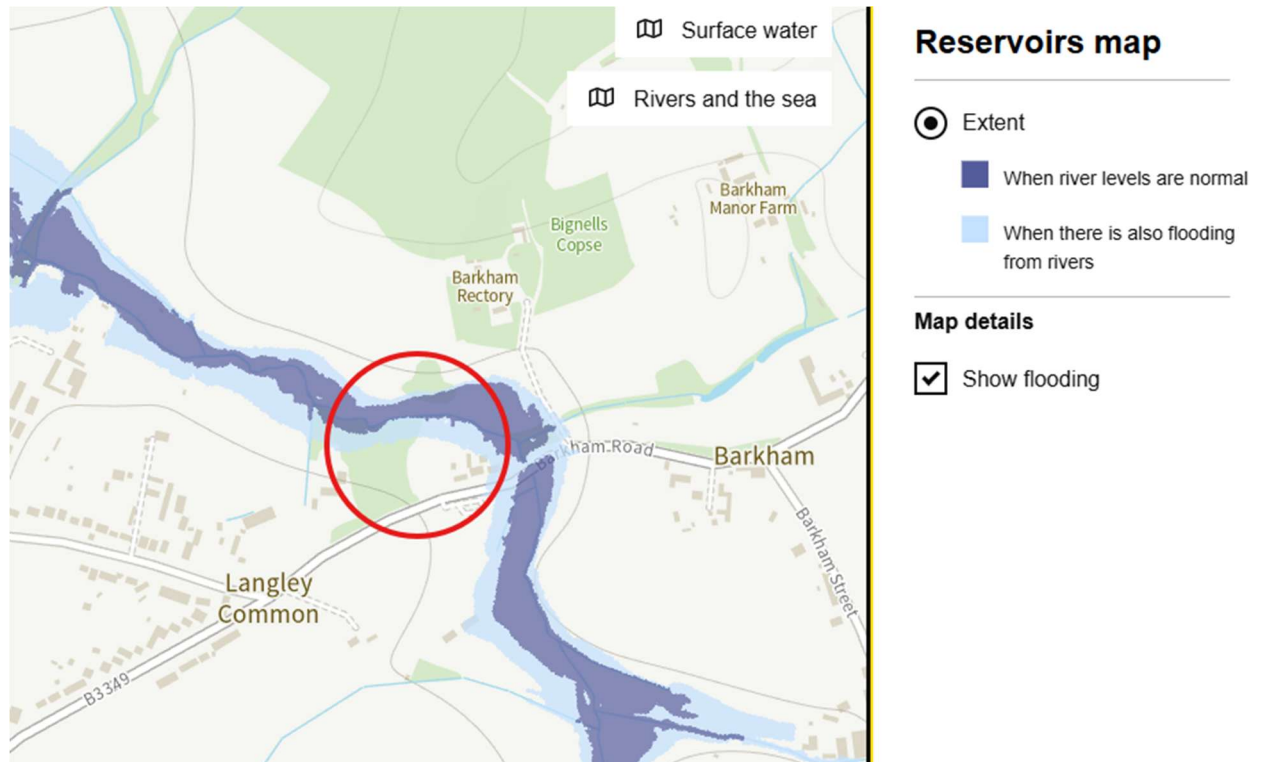
Flooding from sewers

- 4.02 Flooding from sewers is defined as flooding resulting from exceedance of sewer capacity and/or blockage preventing the normal operation of the sewer system.
- 4.03 The risk of flooding from sewers is considered negligible as the site is remote from any significant public drainage infrastructure and would therefore not reasonably be expected to experience flooding associated with sewer surcharge or failure.

Flooding from artificial sources

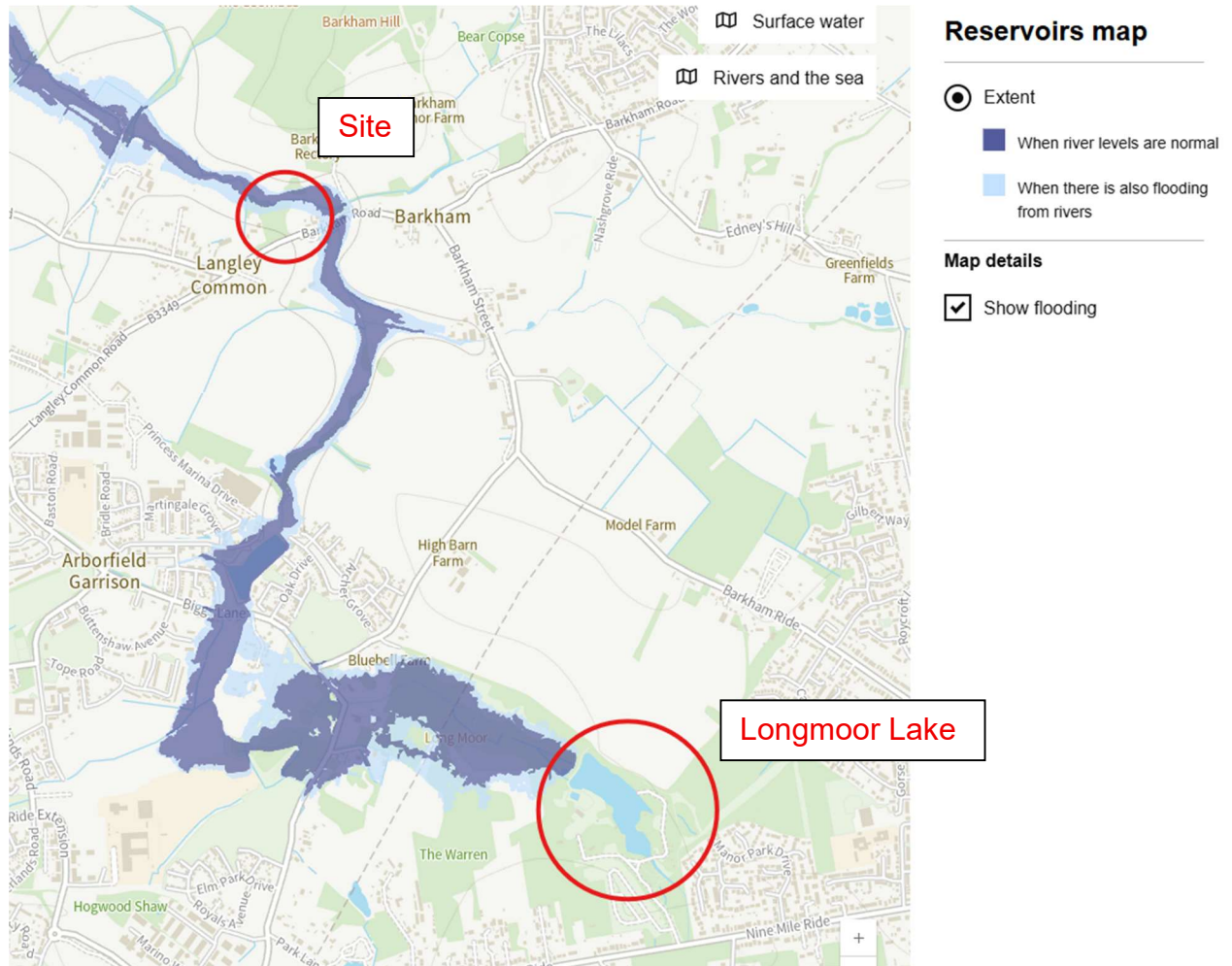
4.04 Flooding from artificial sources refers to flooding arising from the overtopping or failure of artificial water bodies such as reservoirs or dams.

4.05 The EA flood map referenced is included below:



Flood risk mapping – check-long-term-flood-risk.service.gov.uk

4.06 A wider examination of the mapping indicates that the flood risk to the site originates at Longmoor Lake as shown below:



Flood risk mapping – check-long-term-flood-risk.service.gov.uk

- 4.07 A review of a news release issued by Wokingham Borough Council (Issue No. 93/21, dated 9th April 2021) confirms that the dam spillway was subject to significant improvements with the express purpose of better management of flooding during heavy rainfall.
- 4.08 While the site remains at risk of flooding from a failure of the spillway at Longmoor Lake, the records indicate that the condition of the spillway/dam is closely monitored by Wokingham Borough council.
- 4.09 Considering the points above, it can be surmised that the council's adherence to the **Reservoir Act 1975** can be relied upon to mitigate the risk of flooding from Longmoor Lake. Specifically, the act requires the council to continually maintain the retaining structure

(spillway) and also to sufficiently alert the affected public of imminent or occurring failure of said structure.

- 4.10 A review of the WBC SFRA also confirms that Barkham Brook is a main river and is also within the WBC Flood Alert Areas. The SFRA main river and flood alert mapping has been included in **Appendix B**.
- 4.11 In summary, there is evidence that the source of potential flooding is a well monitored and maintained structure that falls within Wokingham Borough Council's maintenance network. Therefore the risk of flooding from reservoirs is appropriately mitigated.

Groundwater flooding

- 4.12 Ground water flooding occurs when subterranean features such as water tables or aquifers are inundated with excess water (either after periods of heavy rainfall or due to seasonal fluctuations) so that the underground water level rises to the point of flooding at the surface level.
- 4.13 The WBC SFRA includes groundwater flood risk mapping that indicates that the site is at very low risk of flooding. The SFRA groundwater flood risk map has been included in **Appendix C**.

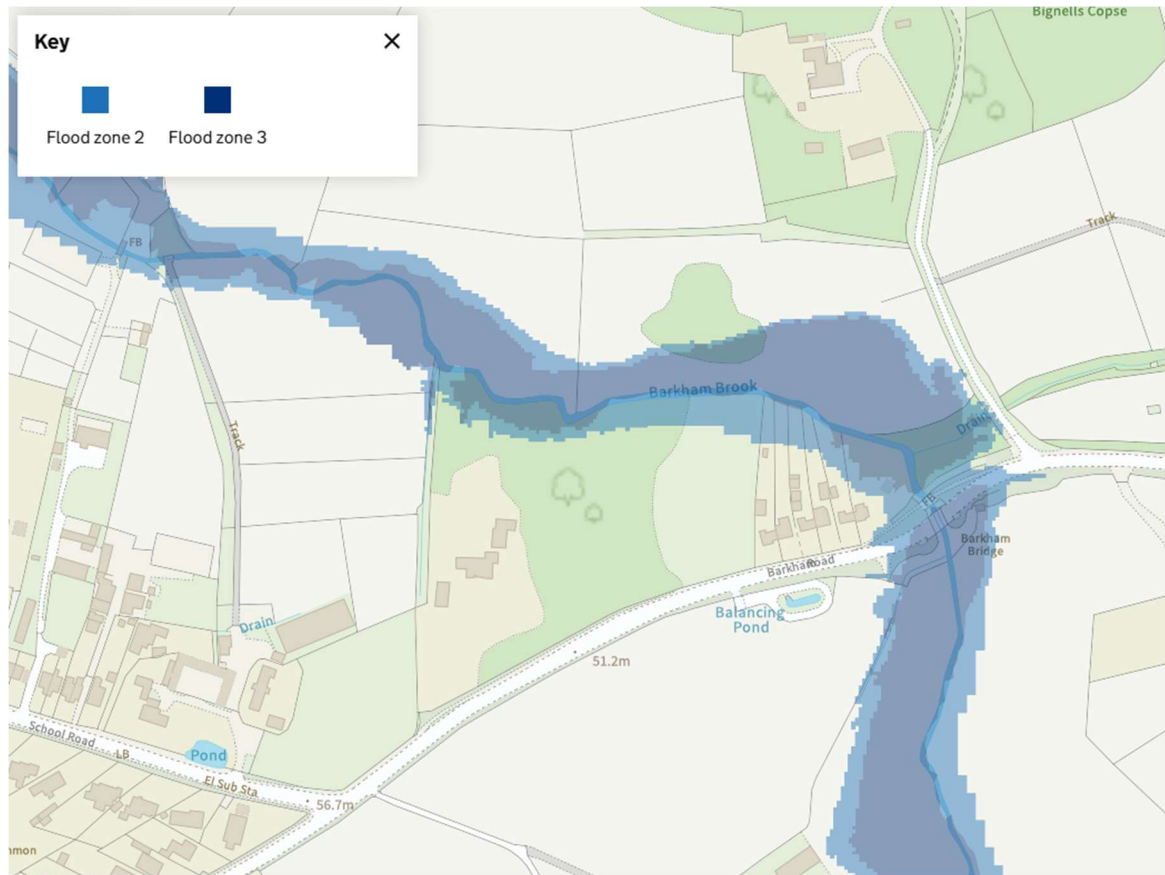
Flooding from Rivers and Seas

- 4.14 Flooding from seas specifically occurs due to tidal rhythms of sea levels which periodically rise and expand beyond their average plan area, while flooding from rivers occurs from changes to the volume of watercourses resulting from an influx of surface water after periods of heavy rainfall.
- 4.15 The chances of flooding from these sources are understood in terms of Flood Zones which indicate the probability of flooding in specific areas. The definition of each flood zone is outlined in an excerpt from the government Flood Risk and Coastal Change guidance below:

<i>Flood Zone</i>	<i>Definition</i>
<i>Zone 1 Low Probability</i>	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)
<i>Zone 2 Medium Probability</i>	Land having between 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Flood Map)
<i>Zone 3a High Probability</i>	Land having between 1% or greater annual probability of river flooding; or land having between a 0.5% or greater annual probability of sea flooding. (Land shown in light blue on the Flood Map)
<i>Zone 3b The Functional Floodplain</i>	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of function floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Function floodplain will normally comprise: • Land having 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • Land that is designated to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

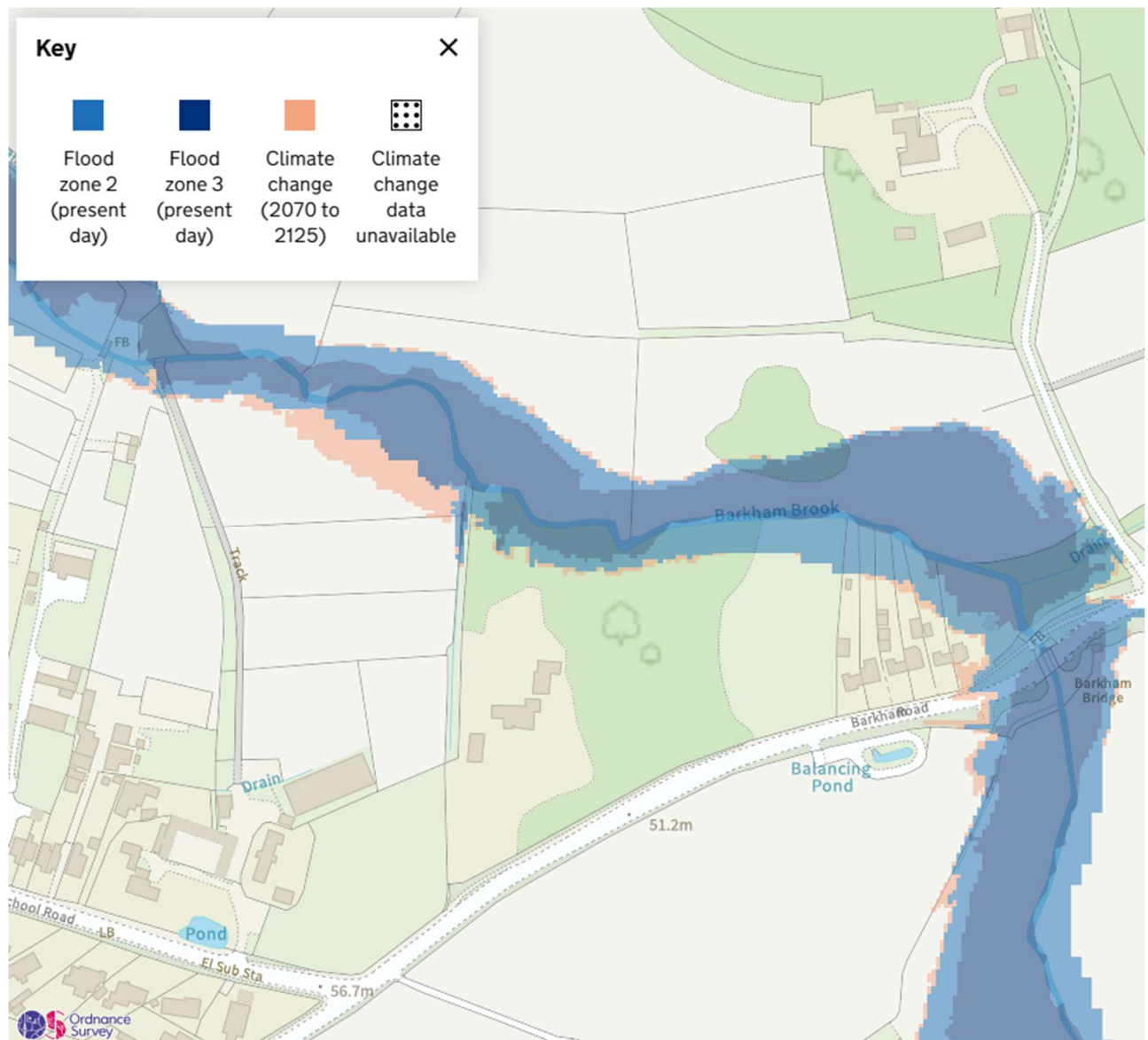
Table1: Flood Zones – Flood Risk and Coastal Change

4.16 The aforementioned Flood Zone mapping obtained from the Environment Agency website is given below:



Flood risk mapping – food-map-for-planning.service.gov.uk

- 4.17 As indicated above, part of the site falls within Flood Zones 2 and 3, meaning that the site is subject to moderate to high risk of fluvial flooding.
- 4.18 A further map showing anticipated flood risk in the period from 2070 to 2125 is shown below:



Fluvial Flood risk mapping – check-long-term-flood-risk.service.gov.uk

- 4.19 The mapping indicates that the balance of flood risk will not change significantly when future impacts of climate change are considered.
- 4.20 Product 4 data were requested from the Environment Agency. They instead supplied us with Product 5, 6, and 7 data stating the following reasons for the substitution:

“Your request for a Product 4 falls under the exemption in provision 6(1)(a) and (b) of the Environmental Information Regulations 2004 which states that

‘.....6.-(1) Where an applicant requests that the information be made available in a particular form or format, a public authority shall make it so available, unless-

- (a) It is reasonable for it to make the information available and easily accessible to the applicant in another form or format; or
- (b) the information is already publicly available and easily accessible to the applicant in another form or format.....'

On this occasion we are not providing the information in the Product 4 format for the following reasons:

Complying with the preference would incur a significant cost, which the public authority [The Environment Agency] cannot pass on to the requester;

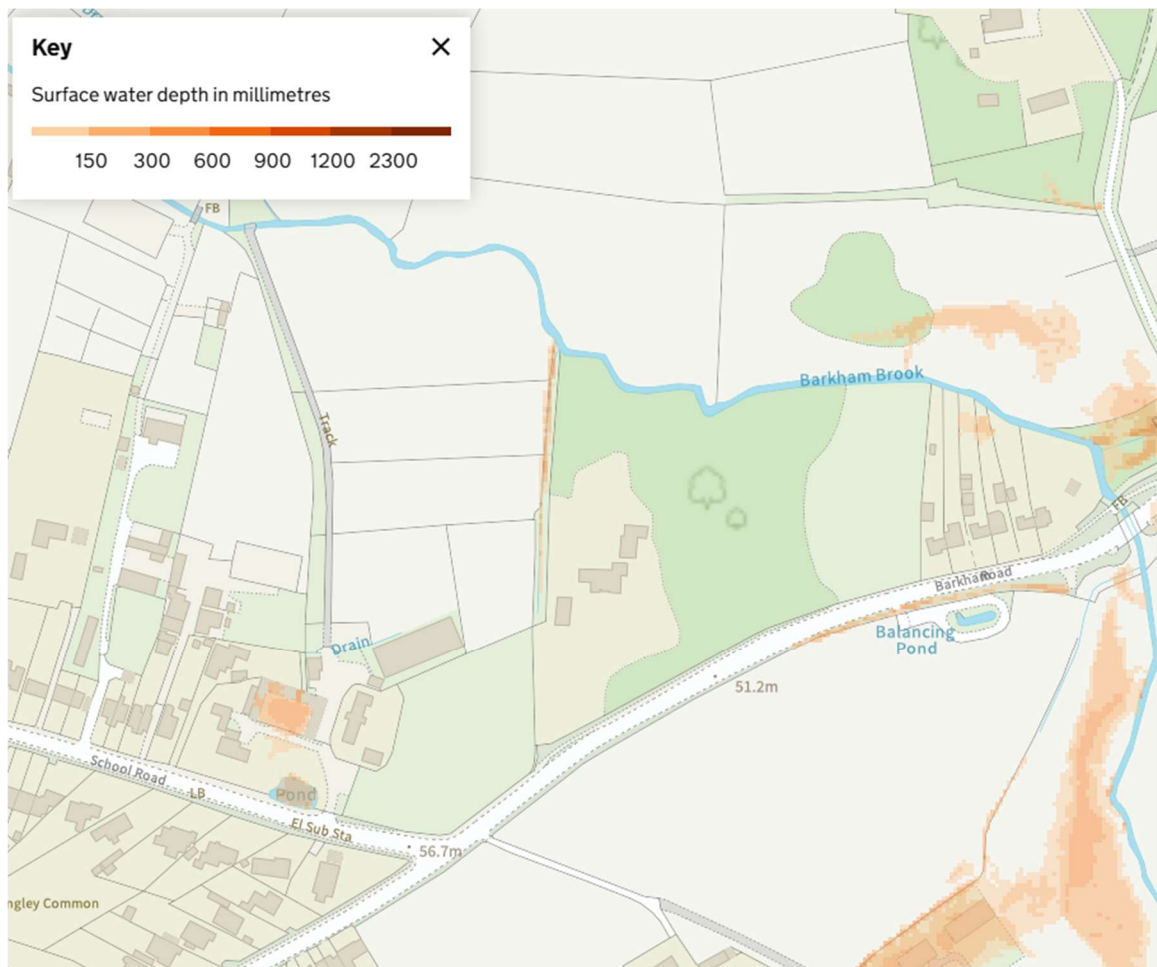
Using a Product 5/6/7 allows us to make the information available at a lower cost; and

The impact on the available resources of the public authority [The Environment Agency], of supplying a Product 5/6/7, is therefore much less."

- 4.21 The findings of the data were that the flood level during the 1 in 100 year event, with an allowance for climate change, was **47.24m A.O.D.**
- 4.22 The actual extent of flooding is shown to be largely contained within the southern bank of Barkham Brook. The extent of the flooding in this event is illustrated in **Appendix E**.

Surface water (Pluvial)

- 4.23 Surface water flooding occurs when, during periods of intense rainfall, the resultant surface water cannot soak into the ground fast enough. In the case of built-up areas with some degree of impermeable area, it occurs when the respective drainage infrastructure is not able to convey the surface water fast enough, or due to a lack of capacity or a failure of the system due to damage or blockage.
- 4.24 The Environment Agency mapping shows that the site is not subject to any risk of surface water flooding. The mapping is included below:



Surface water flood risk map— food-map-for-planning.service.gov.uk

Historic flooding

- 4.25 The records provided within the SFRA have shown that there is no historic flooding associated with the site. The records of historic flood events taken from the SFRA is provided in **Appendix D**.

Assessment

- 4.26 Based on the information available at the time of writing, the risk of flooding from the following sources is considered to be low or negligible:

- Flooding from sewers;

- Groundwater flooding;
- Surface water flooding (pluvial)

- 4.27 The principal sources of flood risk affecting the site are flooding from artificial sources which has been found to originate from Longmoor Lake, and fluvial flooding from Barkham Brook to the north.
- 4.28 For flooding from artificial sources, we have found that the condition of Longmoor Lake is closely monitored by WBC and is included within the Flood Alert Service network. It has therefore been concluded that flood risk from this source is sufficiently managed.
- 4.29 In terms of fluvial flooding, Product 4 Data compiled by the Environment Agency has been requested specifically to identify the critical flood level and offer advice on the required finished floor level to keep the proposed property safe from any potential flood events. We have found that flood risk to the proposed property can be sufficiently mitigated following consultation of the Environment Agency flood data.

Off-site impacts

- 4.30 The site will seek to produce a fully compliant SuDS design to capture all overland flows and discharge run off in keeping with the guidance set out in the National Standards for Sustainable Drainage Systems. There is therefore no foreseen offsite impact associated with the intentions of this scheme's design.

Residual risk

- 4.31 There is a potential risk of failure of the drainage system due to an unforeseen failure of the SuDS design.
- 4.32 To prevent the potential of this failure, a SuDS maintenance schedule will be issued together with the SuDS strategy to advise the end users on how to monitor and maintain the system and avert any such events.
- 4.33 Additionally, the topography of the site would direct any exceedance flows away from all adjacent dwellings. As these events are likely to be transient and would (in terms of probability) occur in times other than during critical rainfall events, there will not be any significant or persistent increase in flood off-site.

Flood warning systems

- 4.34 It is advised that the end users should sign up to the Environment Agency's Flood Warning Service which is put in place to warn affected properties of anticipated flooding. The registration and service is free and found at the website <https://www.gov.uk/sign-up-for-flood-warnings> or by telephone on 0345 988 1188. Wokingham Borough Council's website has confirmed that this service will enlist the end user to the Flood Alert services described herein.

5.00 Sequential test

- 5.01 With specific regard to the sequential test, paragraph 175 of the NPPF states the following:

"The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk)."

The above assessment has found that there is adequate scope to sufficiently mitigate all identified sources of flood risk so that the sequential test will not be required.

6.00 Conclusions

- 6.01 This report has been prepared in support of a planning application relating to the construction of a single residential dwelling.
- 6.02 The site of the proposal is an undeveloped cluster of woodland found on the outskirts of Barkham.
- 6.03 This Flood Risk Assessment has been prepared with reference to the National Planning Policy Framework, the Flood Risk and Coastal Change Planning Practice Guidance, and CIRIA C790.
- 6.04 The principal sources of flood risk affecting the site are flooding from artificial sources and pluvial flooding.
- 6.05 This report has found that the source of potential flooding from an artificial source stems from Longmoor Lake, which is closely monitored and maintained by WBC. It was therefore concluded that the efficiency of this maintenance is sufficient to mitigate the flood risk.
- 6.06 Product 6 information supplied by the Environment Agency was reviewed to determine the flood level during the 1in100yr + cc event. A flood level of 47.24m A.O.D. was observed. The flood level was observed to be largely confined to the bank of Barkham Brook as illustrated in **Appendix E**.
- 6.07 A fully compliant SuDS scheme is to be designed in keeping with the National Standards for SuDS. A SuDS maintenance schedule is to be compiled to mitigate the risk of blockage and overtopping of the proposed SuDS design.
- 6.08 The maintenance schedule will be put in place to mitigate the residual risk of a failure of the system to discharge surface water as intended. It is surmised that it in all probability, an overtopping of the system is more likely to occur outside of the context of a significant storm event. Therefore any overland flows, which will be directed to Barkham Brook to the north owing to the site's natural topography, will not increase flood risk elsewhere.
- 6.09 It has been recommended that the end users of the property sign up to the Environment Agency's Flood Warning Service to be notified of any imminent or occurring flood events.

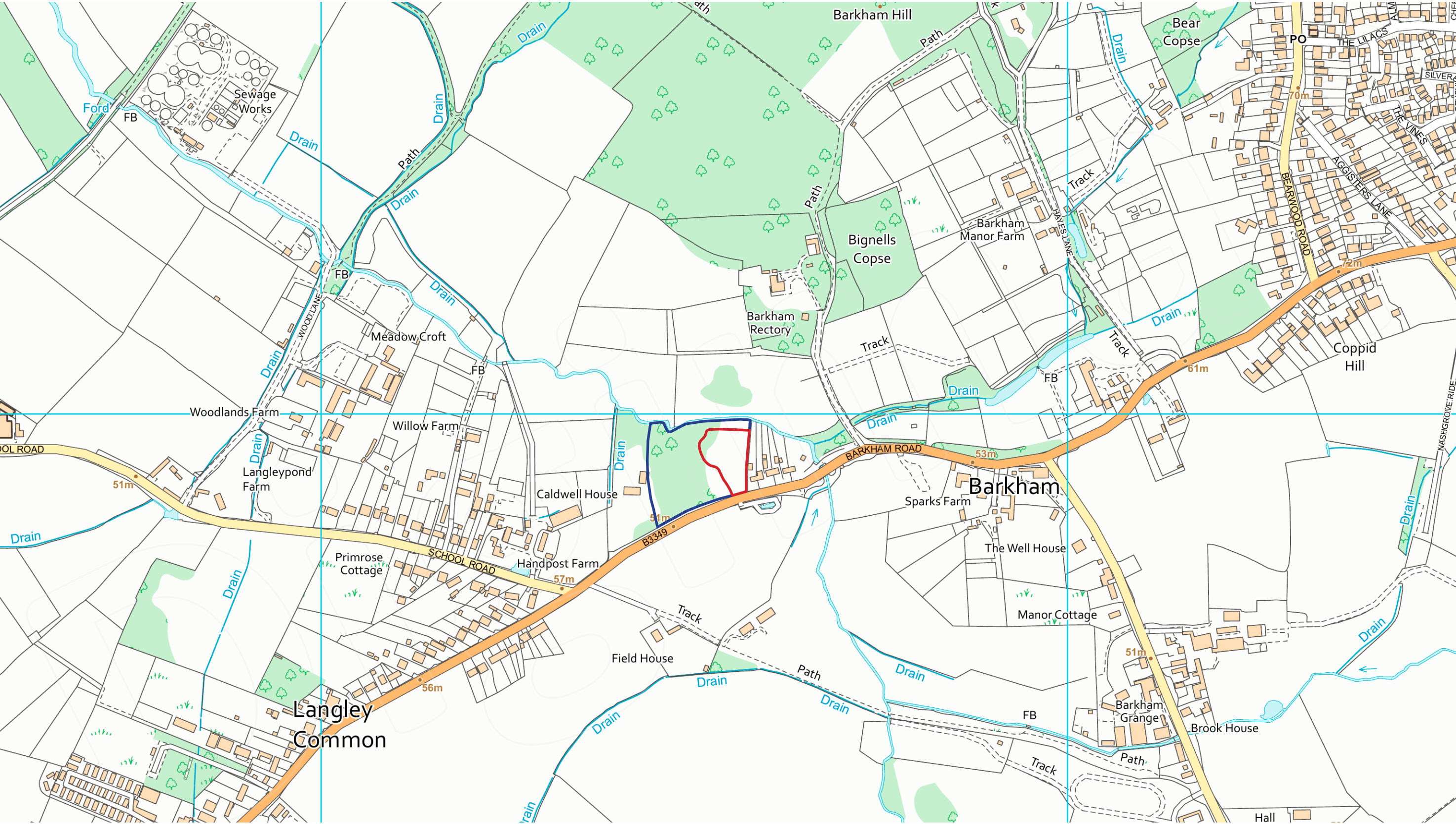
- 6.10 All found sources of flooding were found to be sufficiently mitigated, which therefore negates the requirement for a sequential test.

Appendices

Appendix A – Site Location Plan and Development Proposals

SITE LOCATION PLAN

LAND NORTH OF BARKHAM ROAD, WOKINGHAM, RG41 4TJ



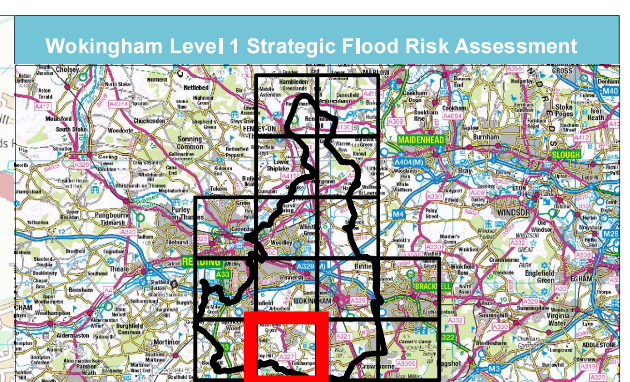
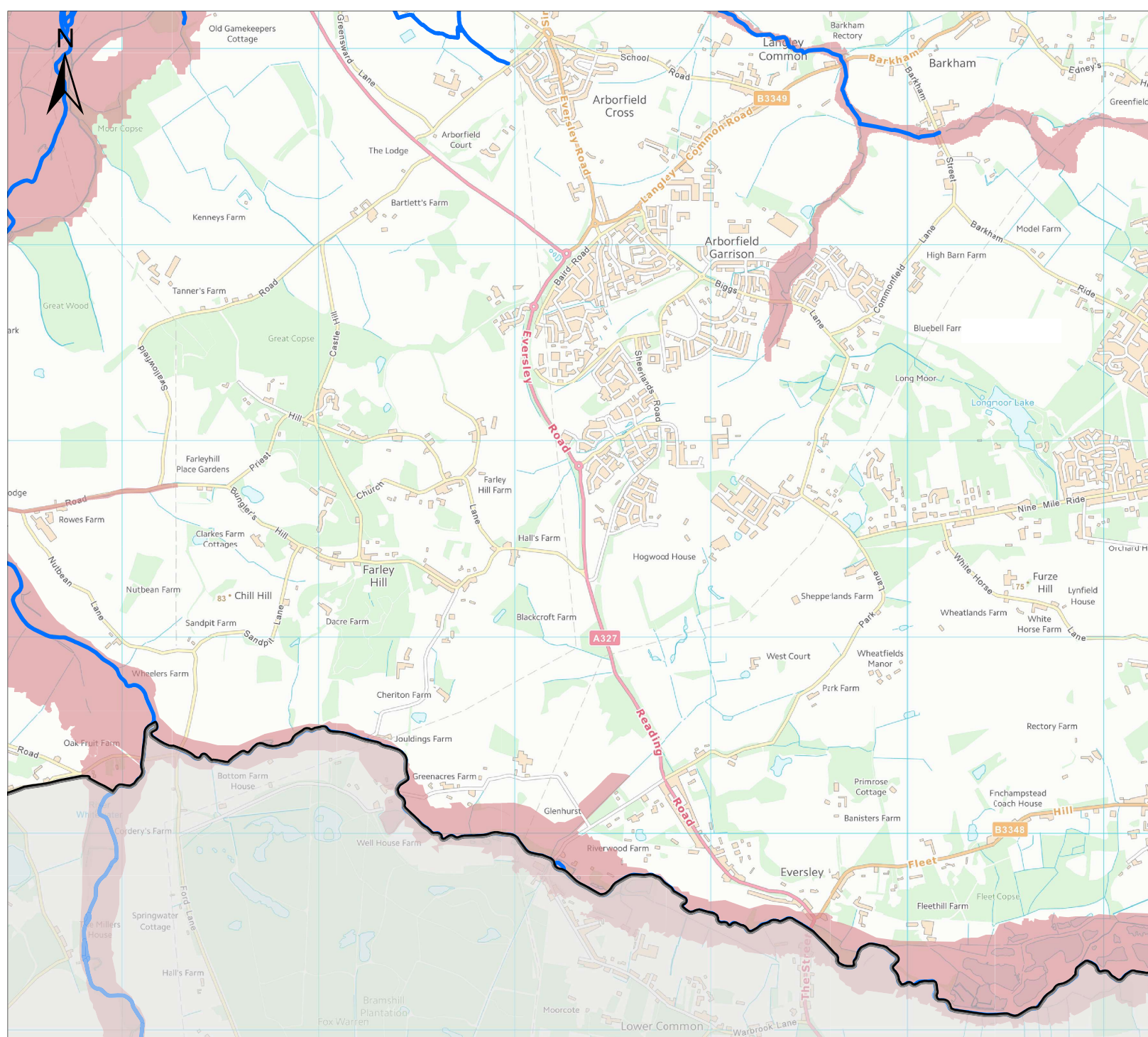
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- APPLICATION SITE BOUNDARY
- AREA UNDER APPLICANT OWNERSHIP

7.2 PROPOSED LANDSCAPE STRATEGY



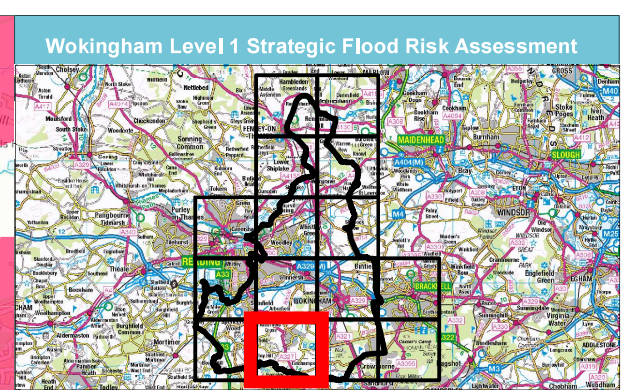
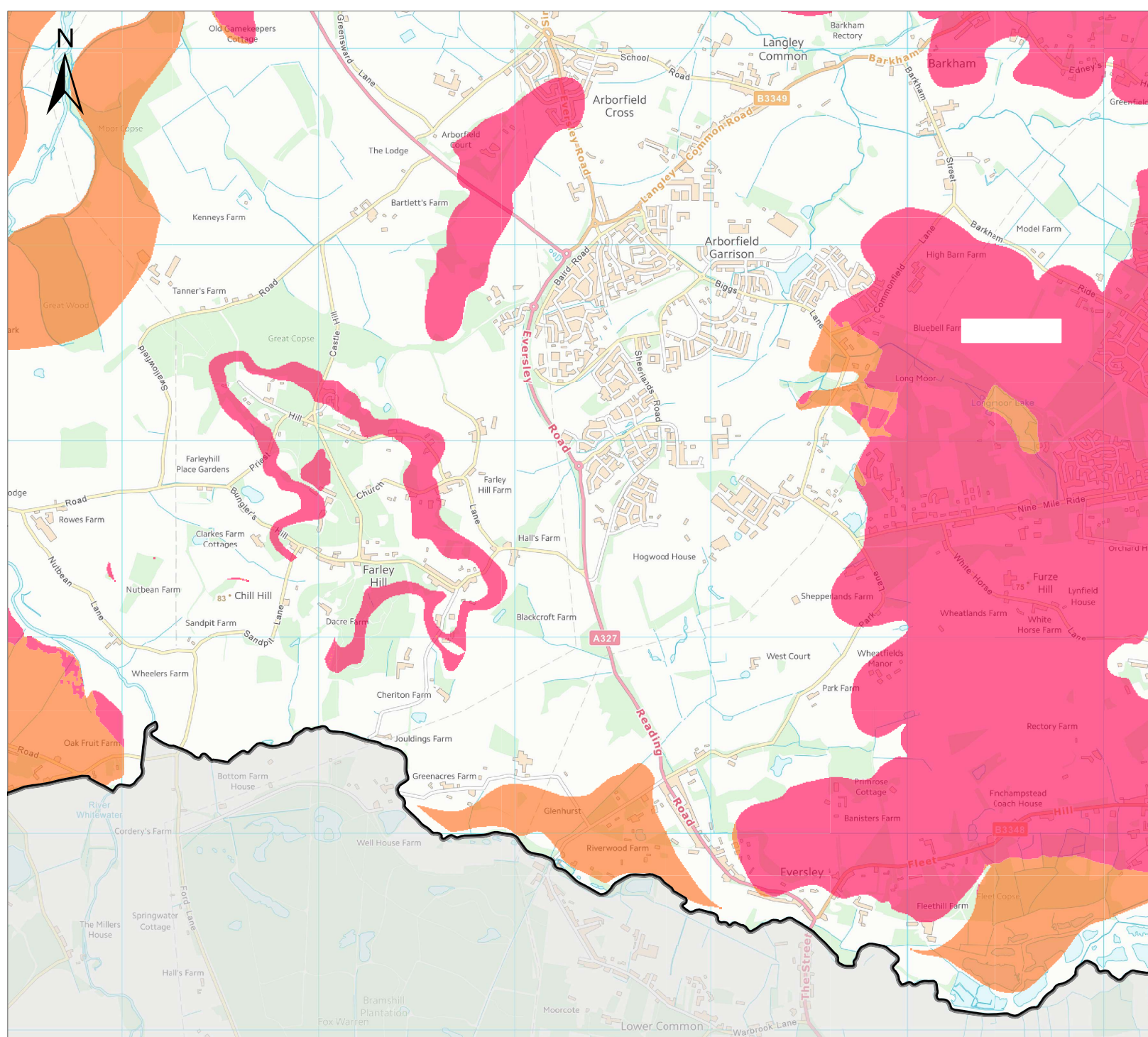
Appendix B – SFRA Main River and Flood Alert Mapping



Legend
 Wokingham Borough Council boundary
Watercourses
 Main Rivers
 All Watercourses
Fluvial Flood Zones
 Indicative Flood Zone 3b
 Flood Zone 3b
 Flood Zone 3a
 Flood Zone 2
Fluvial Flood Extent with Climate Change
1% AEP with Central Climate Change allowance
 1% AEP with Central Climate Change allowance
1% AEP with Higher Central Climate Change allowance
 1% AEP with Higher Central Climate Change allowance
Arborfield Fluvial Flood Extent with Climate Change
 1% plus 25% Climate Change
 1% plus 40% Climate Change
Risk of Flooding from Surface Water
Surface Water Extent
 3.3% AEP
 1% AEP
 0.1% AEP
Surface Water Extent plus climate change
 3.3% AEP plus 35% Climate Change
 1% AEP plus 40% Climate Change

Risk of Groundwater Flooding
EA Areas Susceptible to Groundwater Flooding
 < 25%
 >= 25% < 50%
 >= 50% < 75%
 >= 75%
JBA Groundwater Emergence Map (5m Resolution)
Depth below ground surface
 Less than 0.025m below surface
 Between 0.025m - 0.5m below surface
 Between 0.5m - 5m below surface
 At least 5m below surface
 No risk
Risk of Flooding from Reservoirs
 Wet Day
 Dry Day
Flood Defences
 Demountable Defence
 Embankment
 Wall
 Natural High Ground
Flood Mitigation
 Flood Alert Areas
 Flood Warning Areas
Flood History
 EA Historic Flood map

Appendix C – SFRA Groundwater flood risk Mapping



Legend

Wokingham Borough Council boundary

Watercourses

Main Rivers
 All Watercourses

Fluvial Flood Zones

Indicative Flood Zone 3b
 Flood Zone 3b
 Flood Zone 3a
 Flood Zone 2

Fluvial Flood Extent with Climate Change

1% AEP with Central Climate Change allowance
 1% AEP with Higher Central Climate Change allowance

Arborfield Fluvial Flood Extent with Climate Change

1% plus 25% Climate Change
 1% plus 40% Climate Change

Risk of Flooding from Surface Water

Surface Water Extent

3.3% AEP
 1% AEP
 0.1% AEP

Surface Water Extent plus climate change

3.3% AEP plus 35% Climate Change
 1% AEP plus 40% Climate Change

Risk of Groundwater Flooding

EA Areas Susceptible to Groundwater Flooding

< 25%
 >= 25% < 50%
 >= 50% < 75%
 >= 75%

JBA Groundwater Emergence Map (5m Resolution)

Depth below ground surface

Less than 0.025m below surface
 Between 0.025m - 0.5m below surface
 Between 0.5m - 5m below surface
 At least 5m below surface
 No risk

Risk of Flooding from Reservoirs

Wet Day
 Dry Day

Flood Defences

Demountable Defence
 Embankment
 Wall
 Natural High Ground

Flood Mitigation

Flood Alert Areas
 Flood Warning Areas

Flood History

EA Historic Flood map

Appendix D – SFRA Historic Flood records

Appendix E – Summary of flood risk in Wokingham Borough

The table below summarises the areas where there are notable flood risks within Wokingham Borough. For this summary the borough has been delineated into eight character areas, taking into account Parish boundaries, socioeconomic factors, and the characteristics of the area. Further information on the Wokingham Borough character areas can be found in Section 5.10 of the main report.

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
Character Area 1: Remenham and Wargrave	This area is largely rural and located in the north of the Borough. The River Thames runs along the western and northern borders of the area. There is fluvial flood risk along the western and northern borders of the character area, following the route of the River Thames. Significant proportions of this are in Flood Zone 3a and 3b, including the west of Wargrave and around Aston and Remenham. This is confirmed by Thames model outputs, which in general, follow the extent of Flood Zone 3a. There is no fluvial flood risk shown for the eastern side of	The EA AIMS dataset shows a series of natural high ground defences along the western and northern borders of the area along the River Thames and its tributaries. Natural high ground also surrounds Wargrave Marsh to the west of the character area.	Surface water flood risk follows the topography of the area. In general, most surface water flow paths route water south-west across the character area from Knowl Hill on the eastern border. A major flow path from Knowl Hill flows westerly through the centre of Wargrave to the River Thames. Other areas at risk include Hare Hatch, which lies in another flow path off Knowl Hill, the Great Western railway line, and Star Works. There are fewer areas at risk from surface water in the north of the character area. Small flow paths route water downhill into the Thames on the northern border. There are also small, isolated areas of surface water ponding which may suggest localised flood risk.	The AStGWF dataset shows areas greater than 50% susceptibility along the western and northern borders of the character area following the route of the River Thames. The JBA groundwater emergence map mirrors this, with groundwater levels less than 0.5m below the surface along the western and northern borders. Based on the ROFSW dataset, it is likely any groundwater that emerges in Character Area 1 will flow south to north along the western border, then east along the northern border, following the route of the River Thames. This is a risk to urban centres such as Wargrave.	There are no reservoir flood extents which impact the area during the 'Dry Day' scenario. The following reservoirs impact the character area in the 'wet day' scenario. Farmoor (No.1 & No.2) - The flood extents follow the path of the River Thames in a northerly direction along the western border of the area and then across the northern border of the area.	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: - March 1947 – Fluvial flooding due to channel capacity exceedance of the River Thames along the western and northern borders of the area. - November 1974 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western and northern borders of the area. - January 2003 – Fluvial flooding due to channel capacity exceedance of the River Thames along the western and northern borders of the area. - July 2007 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western. 2007 – Flooding due to surface water run-off in numerous locations within the character area - Winter 2013/14 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western and northern borders of the area. 2013 – Flooding due to surface water run-off in numerous locations within the character area 2015 - Flooding due to surface water run-off in the north of the character area - The LLFA historic flood points also show other isolated incidents of surface water flooding in the character area.

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
	the character area.					There are no recorded incidences of sewer flooding in this character area.
Character Area 2: Twyford, Charvil, and Ruscombe	This area is in the north of the Borough. It is rural in most places, with a few large villages central to the character area. There is fluvial flood risk along the western border of the character area, following the route of the River Thames. Furthermore, the River Loddon, a large tributary of the River Thames, flows south to north through the centre of the character area between Charvil and Twyford. This is confirmed by model outputs of the River Loddon. Smaller tributaries of the Loddon also present fluvial flood risk to the south east.	The EA AIMS dataset shows high ground defences along the River Thames on the western border of the character area. An additional network of natural high ground defences, through the centre of the character area, follow the banks of Old River until it discharges into the River Thames.	Surface water flow paths follow the topography of the land, flowing south-west through Ruscombe and Twyford from Knowl Hill. The RoFSW map shows a network of footpaths and bridgeways in the east of the character area susceptible to surface water flooding, as do areas of Sonning Golf Club to the south. There are also a significant number of small, isolated, areas of surface water ponding, which may suggest localised flood risk.	The AStGWF dataset shows areas greater than 50% susceptibility through the west and centre of the character area, following the route of the River Loddon and surrounding its confluence with the River Thames. There is an additional area of >50% susceptibility to groundwater flooding to the east along Waltham Road. The JBA groundwater emergence map mirrors this, with groundwater levels less than 0.5m below the surface along the western border following the River Thames, and through the centre of the character area following the River Loddon. This is a risk to areas such as Charvil village and the north of Ruscombe. The ROFSW suggests that groundwater emergence along the Loddon is likely to flow along the route of the river, as well as north-east towards Hare Hatch. It also	The following reservoirs impact the character area in the 'dry day' scenario. - Bearwood Lake – This reservoir enters the character area from the south, inundating Loddon Nature Reserve. - Southlake - The northern flow path of this reservoir enters the character area from the south, inundating Loddon Nature Reserve. - Queen's Mere - The northern flow path of this reservoir enters the character area from the south inundating Loddon Nature Reserve. The following reservoirs impact the character area in the 'wet day' scenario. - Farmoor No.1 and No.2 - The flood extents follow the path of the River Thames in a northerly direction along the western border and then across the northern border of the area. - Bearwood Lake – Situated in Character area 7, the reservoirs' northern flow path flows north, entering the character area from the south, forking, and inundating Loddon Nature Reserve to the west, and rural land to the east. - Southlake – The northern flow path of this reservoir enters the character area from the south, forking, and inundating Loddon Nature Reserve to the west, and rural land to the east.	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: - March 1947 – Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area. - November 1974 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area, and the River Loddon through the centre of the character area and to the east. - August 1977 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area. - December 1981 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the east of the character area. - December 2000 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area, and the River Loddon through the centre of the character area and to the east 2000 – Flooding due to surface water in the south of the catchment area. - January 2003 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area, and the River Loddon through the centre of the character area and to the east - July 2007 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area, and the River



Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
				shows that emergence along Waltham Road is likely to flow south to the eastern border of the character area.	- Maiden Erlegh Lake - The northern flow path of this reservoir enters the character area from the south, forking, and inundating Loddon Nature Reserve to the west, and rural land to the east. - Queen's Mere - The northern flow path of this reservoir enters the character area from the south, forking, and inundating Loddon Nature Reserve to the west, and rural land to the east.	Loddon through the centre of the character area and to the east 2007 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the western side. - Winter 2013/14 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area. 2013 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the western side 2017 - Flooding due to surface water run-off in numerous locations in the south of the character area. - The LLFA historic flood points also show other isolated incidents of surface water flooding in the character area. - There are 182 recorded incidences of sewer flooding in this character area, mostly centred around the urban centre of Twyford.
Character Area 3: Woodley and Earley	Character area 3 is entirely urban, with Woodley to the north, and Earley and Lower Early to the south. The River Thames presents fluvial flood risk along the north-western border of the area. Moreover, the River Loddon, and tributaries such as Emm	The EA AIMS dataset shows natural high ground along the banks of the Loddon on the eastern border of the character area, as well as its associated tributaries.	Surface water flow paths the topography of the land, flowing east from the western border where there is an area of high elevation. The south-east of the character area suffers from flood risk around the River Loddon and the M4 motorway as it is particularly low lying land. Much of the road network in the residential area at this location is also	The AStGWF dataset shows areas greater than 50% susceptibility across the eastern side of the character area propagating out from the River Loddon. The north western corner of the character area, which borders the River Thames, is also greater than 50% susceptible to groundwater flooding. The JBA groundwater emergence map suggests that the majority of the left	The following reservoirs impact the character area in the 'dry day' scenario. - Southlake – This reservoir is situated in the centre of the character area and flows east, before diverging to flow north and south along the eastern border. - Maiden Erlegh Lake - This reservoir is situated in the south of the character area and flows east, before diverging to flow north and south along the eastern border. - Bearwood Lake - Situated in Character area 7, the reservoirs' northern flow path flows north along the length of the eastern border of this character area.	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: - March 1947 – Fluvial flooding due to channel capacity exceedance of the River Thames along the northern borders of the area, and the River Loddon on the eastern border. - November 1974 - Fluvial flooding due to channel capacity exceedance of the River Thames along the western borders of the area, and the River Loddon through the centre of the character area and to the east. - August 1977 - Fluvial flooding due to channel capacity exceedance of the River Thames along the northern borders of the area.

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
	Brook, flow the length of the eastern border posing further flood risk to the area. Much of the immediate land on the left and right banks of the Loddon lie in Flood Zone 3a and 3b.		shown to be susceptible to surface water flooding, again because it is low lying. There are also small, isolated, areas of surface water ponding, which may suggest localised flood risk.	bank of the Loddon has groundwater emergence levels less than 0.5m from the surface. Much of this covers the urban centres of Woodley and Lower Early. The north western corner of the character area, around the River Thames, also has groundwater emergence within 0.5m of the surface. The ROFSW map shows that groundwater emerging in Woodley and Lower Early is likely to flow along the path of the River Loddon, north along the eastern border of the character area. In addition, groundwater emerging in the north western corner is likely to flow north east following the path of the River Thames.	- Longmoor Lake - The northern flow path of this reservoir flows along the western border of this character area. - Black Swan Lake Dinton Pastures – The northern flow path of this reservoir flows along the western border of this character area. The following reservoirs impact the character area in the 'wet day' scenario. - Farmoor No.1 and No.2 - The flood extents follow the path of the River Thames in a northerly direction along the western border of the area and then across the northern border of the area. - Bearwood Lake – Situated in Character area 7, the reservoirs' northern flow path flows north along the length of the eastern border of this character area - Southlake – This reservoir is situated in the centre of the character area and flows east, before diverging to flow north and south along the eastern border. - Maiden Erlegh Lake - This reservoir is situated in the south of the character area and flows east, before diverging to flow north and south along the eastern border. - Queen's Mere – The flow path from this reservoir splits prior to the eastern border of this character area and flows both north and south along the border. - Tundry Pond – The flow path of this reservoir flows north-east along the length of the eastern border of the character area. - White Knights Lake – This flood extent extends north into Reading,	- December 1981 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the east of the character area. - February 1991 – Fluvial flooding of the River Loddon along the eastern border due to channel capacity exceedance - December 2000 - Fluvial flooding due to channel capacity exceedance of the River Thames along the northern borders of the area, and the River Loddon through the centre of the character area and to the east. - January 2003 - Fluvial flooding due to channel capacity exceedance of the River Thames along the northern borders of the area, and the River Loddon along the eastern border of the character area. - July 2007 - Fluvial flooding due to channel capacity exceedance of the River Thames along the northern of the area, and the River Loddon through the centre of the character area and to the east 2007 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the western side. - Winter 2013/14 - Fluvial flooding due to channel capacity exceedance of the River Thames along the northern borders of the area. 2009 – Isolated incidents of surface water flooding in Earley to the south-west of the area. 2013 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the western side - The LLFA historic flood points also show other isolated incidents of

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
					posing a risk to the north-west border of the character area. - Wellington Country Park Lake – The flood extent follows the eastern border of the character area. - Longmoor Lake - The northern flow path of this reservoir flows along the western border of this character area. - Bramshill House Pond – The flood extent follows the eastern border of the character area	surface water flooding in the character area. There are 860 recorded incidences of sewer flooding in this character area, and are widely spread throughout the urban centres.
Character Area 4: Hurst	This area is largely rural, with the small village of Hurst to the north. The River Loddon flows the length of the eastern and northern borders and presents a significant fluvial flood risk. Much of the route of the Loddon lies in Flood Zone 3a and 3b. A tributary of the Loddon, Emm Brook, flows through Dinton Pastures Country Park to the south east posing further flood risk.	The EA AIMS dataset shows natural high ground along the banks of the Loddon on the western border of the character area. Further high ground along Emm Brook borders Dinton Pastures Country Park, and a network of high ground follows a significant portion the field drainage network in the area.	Surface water flow paths follow the topography of the land, with a significant flow path flowing south-east to north, following the route of a small watercourse from areas of higher elevation. A further flow path from the south joins this main route, before flowing through the north of Hurst. There are also small, isolated, areas of surface water ponding, which may suggest localised flood risk.	The ASGWF shows the entire western side of character area 4 has a susceptibility to groundwater flooding of greater than 50%. The JBA groundwater emergence map shows that, again, the western side of the character area is particularly susceptible, with emergence levels below 0.5m from the surface. This impacts the village of Hurst. The ROFSW suggests than any surface water emerging from the areas detailed above is likely to flow north along the route of the River Loddon, or along Davis Street/Lodge Road in Hurst.	The following reservoirs impact the character area in the 'dry day' scenario. - Bearwood Lake - Situated in Character area 7, the reservoir's northern flow path flows north along the length of the western border of this character area. - Queen's Mere – The flow path from this reservoir inundates Dinton Pastures Country Park in the south-west corner of the character area. - Black Swan Lake Dinton Pastures – This reservoir is located in the west of the character area and flows both north and south, inundating Dinton Pastures Country Park The following reservoirs impact the character area in the 'wet day' scenario. - Bearwood Lake – Situated in Character area 7, the reservoir's northern flow path flows north along the length of the western border of this character area. - Southlake – The northern flow path of this reservoir flows along the length of the western border of this character area	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: - March 1947 – Fluvial flooding due to channel capacity exceedance of the River Loddon on the western border, and Emm Brook to the north-east of the character area. - November 1974 - Fluvial flooding due to channel capacity exceedance of the River Loddon along the western border, and an inland watercourse to the north-east of the character area. - December 1981 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the west of the character area, and an inland watercourse to the north-east of the character area. - February 1991 – Fluvial flooding of the River Loddon along the western border due to channel capacity exceedance, and Emm Brook to the north-east of the character area. - January 2003 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the west of the character area, and an inland watercourse to the north-east of the character area.



Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
					• Maiden Erlegh Lake - The northern flow path of this reservoir flows along the length of the western border of this character area • Queen's Mere - The northern flow path of this reservoir flows along the length of the western border of this character area • Tundry Pond - The flow path of this reservoir flows north-east along the length of the western border of the character area. • Bramshill House Pond - The flood extent follows the north-west border of the character area • Wellington Country Park Lake - The flood extent follows the north-west border of the character area	• 2000 - Flooding due to surface water in the south of the catchment area. • 2007 - Flooding due to surface water run-off in numerous locations within the character area, mostly centred in the north. • July 2007 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the west of the character area, and an inland watercourse to the north-east of the character area. • 2008 - Surface water flooding in the north and west of the character area. • 2013 - Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the western side • The LLFA historic flood points also show other isolated incidents of surface water flooding in the character area. • There are 32 incidences of sewer flooding in this character area, mainly clustered around Hurst, but also along major highways.
Character Area 5: Wokingham, Emmbrook, and Winnersh	This area is largely urban, with the town of Wokingham located to the east, and Winnersh to the north-west. Fluvial flood risk originates from the River Loddon and associated drainage networks that run along the north west	The EA AIMS dataset shows high ground follows the River Loddon along the north-west border of the character area. Furthermore, a mixture of engineered and natural high ground defences on the banks of	Surface water flow paths follow the topography of the land, and primarily follows the route of Emm Brook and its tributaries. They flow through residential areas such as Emmbrook and Wokingham. Significant areas of Winnersh in the north-west of the character area are low lying, and also at	The ASGWF shows that the north western border of the character area has a greater than 50% susceptibility of groundwater flooding. This follows the River Loddon and impacts the north of Winnersh. The JBA groundwater emergence map suggests that this area of Winnersh also has emergence levels within 0.5m of the surface. In addition to	The following reservoirs impact the character area in the 'dry day' scenario. • Bearwood Lake - Situated in Character area 7, the reservoirs' northern flow path flows north along the length of the western border of this character area. • Queen's Mere - The primary flow path of the reservoir flows from the south-east border, north-west through the centre of Wokingham to the northern border. The following reservoirs impact the character area in the 'wet day' scenario.	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: • March 1947 - Fluvial flooding due to channel capacity exceedance of the River Loddon on the western border, and Emm Brook to the north-east of the character area. • November 1974 - Fluvial flooding due to channel capacity exceedance of the River Loddon along the western border, and Emm Brook to the north-east of the character area. • December 1981 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the west of the character area, and Emm Brook

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
	border of the character area. Much of the immediate land on the left and right banks of the Loddon lie in Flood Zone 3a and 3b. Emm Brook, another tributary of the Loddon flows south-east to north-west through Wokingham, and along the northern border.	Emm Brook split the character area from south to north.	risk of surface water flooding. There are also small, isolated, areas of surface water ponding, which may suggest localised flood risk.	this, parts of Wokingham and the southern and western borders of the character area also have emergence levels within 0.5m of the surface. The ROFSW suggests that any water emerging in this character area is likely to flow north west following Emm Brook, to its confluence with the River Loddon. At this confluence, it will then flow north.	- Bearwood Lake – Situated in Character area 7, the reservoirs' northern flow path flows north-east along the length of the western border of this character area. - Southlake – The southern flow path of this reservoir flows along the length of the western border of this character area. - Maiden Erlegh Lake - The southern flow path of this reservoir flows along the length of the western border of this character area. - Queen's Mere – The primary flow path of the reservoir flows from the south-east border, north-west through the centre of Wokingham to the northern border. - Tundry Pond – The flow path of this reservoir flows north-east along the length of the western border of the character area. - Bramshill House Pond – The flood extent follows the north-west border of the character area - Wellington Country Park Lake – The flood extent follows the north-west border of the character area	to the north-east of the character area. - February 1991 – Fluvial flooding of the River Loddon along the western border due to channel capacity exceedance, and Emm Brook to the north-east of the character area. - January 2003 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the west of the character area, and Emm Brook to the north-east of the character area. 2000 – Flooding due to surface water in the south of the catchment area. 2007 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred in the north. - July 2007 - Fluvial flooding due to channel capacity exceedance of the River Loddon to the west of the character area, and Emm Brook to the north-east of the character area. 2008 – Surface water flooding in the north and west of the character area. 2013 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the western side - The LLFA historic flood points also show other isolated incidents of surface water flooding in the character area. - There are 237 recorded incidences of sewer flooding in this character area, mostly clustered around the urban centre of Winnersh.
Character Area 6: Shinfield, Spencers Wood, and	This character area is largely rural, with a series of small settlements in the north.	The EA AIMS dataset shows natural high ground defences run either side of	Surface water flow paths the topography of the land, and primarily follows the route of the watercourses in the	The ASGWf suggests that all land surrounding the River Loddon on the north east border and through the centre of	The following reservoirs impact the character area in the 'dry day' scenario. Bearwood Lake - Situated in Character area 7, the reservoirs'	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: September 1968 - Fluvial flooding of the River Loddon on the eastern border, and Blackwater River to the

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
Swallowfield	The north-western border is subject to fluvial flood risk from both Foudry Brook and the River Kennet. Foudry Brook flows south to north through the west of the area, discharging into the River Kennet outside of the Borough. Flood mapping shows that the River Whitewater and the River Blackwater, both tributaries of Broadwater Stream, present fluvial flood risk to south-east border of the area. Broadwater Stream then flows south to north through the character area where it discharges into the River Loddon near Swallowfield. The River Loddon presents further flood risk as it flows from	Foudry Brook in the west of the character area. The River Loddon also has natural high ground defences which run along the south western border, then west to east across the character area, and then along the north eastern border. Broadwater Stream, a tributary of the River Loddon, also has high ground defences.	area. This includes Foudry Brook through Grazeley, and the River Loddon. Small tributaries flow down the southern and western hillsides of Chill Hill to join the route of the River Blackwater, as well as down the sides of hills to the south-west of the character area. There are also small, isolated, areas of surface water ponding, which may suggest localised flood risk.	the character area to the southern border has greater than 50% susceptibility to groundwater flooding. In addition, the north west of the character area around Foudry Brook also has a greater than 50% susceptibility to groundwater flooding. The JBA groundwater emergence map reflects this, with groundwater levels within 0.5m of the surface along the River Loddon, impacting urban centres such as Spencers Wood and Shinfield. The map also suggests groundwater emergence within 0.5m of the surface around Foudry Brook, posing risk to Grazeley. Additional areas susceptible to groundwater emergence are along the south east border around Farley Hill. The ROFSW suggests that any groundwater emerging around the Loddon is likely to flow north east along the route of the River Loddon. Groundwater emerging at Farley Hill is likely to also follow	southern flow path flows across the north-east border. - Bramshill House Pond – The flood extent from the reservoir enters the character area on the southern border and flows north through Swallowfield before flowing north-east along the eastern border. - Wellington Country Park Lake - The flood extent from the reservoir enters the character area on the southern border and flows north through Swallowfield before flowing north-east along the eastern border. The following reservoirs impact the character area in the 'wet day' scenario. - Bearwood Lake – Situated in Character area 7, the southern flow path flows south-west, along the north-east border and into the character area. The path then splits, flowing south-west to the south-west border, and south east through Swallowfield. - Tundry Pond – The flow path of this reservoir flows north-east along the length of the eastern border of the character area. - Longmoor Lake – The southern flow path of this reservoir impacts the northern border of the character area. - Decoy Pond – The flood extent of this reservoir enters the character area from the western border and extends north into Grazeley. - Dogmersfield Park Lake – The flow extent enters the character area on the southern border, flowing east along the River Blackwater, and north following the River Loddon.	south-east due to channel capacity exceedance. - June 1971 – Fluvial flooding of Foudry Brook in the north-west due to channel capacity exceedance. - November 1974 - Fluvial flooding of the River Loddon on the eastern border, and Blackwater River to the south-east due to channel capacity exceedance. - February 1990 – Fluvial flooding of the River Loddon on the eastern border, and Blackwater River to the south-east due to channel capacity exceedance. - February 1991 – Fluvial flooding of the River Loddon along the western border, and Blackwater River to the south-east due to channel capacity exceedance due to channel capacity exceedance. - September 1992 – Fluvial flooding of Foudry Brook in the north-west due to channel capacity exceedance. 2000 – Flooding due to surface water in the north of the catchment area. - January 2003 - Fluvial flooding of Foudry Brook in the north-west due to channel capacity exceedance. - July 2007 - Fluvial flooding due to channel capacity exceedance of the River Loddon along the western border. 2007 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred in the north. 2013 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred on the north-west. - The LLFA historic flood points also show other isolated incidents of

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
	the south-east border, north, along the eastern border of the character area. Much of the immediate land on the left and right banks of the Loddon lie in Flood Zone 3a and 3b.			this flow path. Groundwater emerging in the north west of the area is likely to flow north along the route of Foudry Brook.	- Bramshill House Pond – The flood extent from the reservoir enters the character area on the southern border and flows north through Swallowfield before flowing north-east along the eastern border. - Wellington Country Park Lake - The flood extent from the reservoir enters the character area on the southern border and flows north through Swallowfield before flowing north-east along the eastern border.	surface water flooding in the character area. There are 280 recorded incidences of sewer flooding in this character area, clustered around the urban centres of Shinfield, Spencers Wood, Three Mile Cross, Swallowfield, and Riseley.
Character Area 7: Arborfield, Arborfield Green, and Barkham	Largely rural, flood maps show that this area is subject to flood risk from the River Loddon along the length of the western border. Much of the immediate land on the left and right banks of the Loddon lie in Flood Zone 3a and 3b. A small tributary of the Loddon, Barkham Brook, flows south-east to north-west through the character area and also presents flood risk. The River Arborfield also extends through the centre of the character area, but modelled	The EA AIMS dataset shows that Barkham Brook, a tributary of the River Loddon, flows south-east to north-west through the character area with natural high ground defences. Moreover, it has a small embankment through Rounds Copse. Barkham Brook also has a small walled defence near Mole Road in the north of the character area. There are other natural	Surface water flow paths follow the topography of the land, and primarily follows the route of the watercourses in the area. Small inland watercourses flow north through Arborfield Green and south through Barkham on the western border, converging at Barkham Brook. The main surface water flow path in this character area follows this brook north-west until it discharges into the River Loddon on the northern border. A further flow path in the character area poses a risk around Moor Copse in the south-west of the character area, as water runs off the	The ASGWF shows the north western border of the character area as having a greater than 50% susceptibility to groundwater flooding, mainly along the route of the River Loddon. The JBA groundwater emergence map suggests that isolated areas along the north west border experience groundwater emergence within 0.5m of the surface. Additional areas with groundwater emergence below 0.5m of the surface include along the eastern border around Barkham and the east of Arborfield Green. A final area shown on the JBA emergence map extends from the southern border to Arborfield in the	The following reservoirs impact the character area in the 'dry day' scenario. - Bearwood Lake – Situated in the north of the character area, the primary flow path from this reservoir flows north-west before diverging at the north-west border. A smaller flow path flows south around Gravelpit Hill. - Longmoor Lake – the primary flow path of this reservoir flows from south-east to north-west through the centre of the character area, posing a risk to Arborfield Green. The following reservoirs impact the character area in the 'wet day' scenario. - Bearwood Lake – Situated in the north of the character area, the primary flow path from this reservoir flows north-west before diverging at the north-west border. A smaller flow path flows south around Gravelpit Hill. - Tundry Pond – The flow path of this reservoir flows north-east along the length of the western border of the character area. - Longmoor Lake – the primary flow path of this reservoir flows from	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: - February 1990 – Fluvial flooding of the River Loddon on the western border. - February 1991 – Fluvial flooding of the River Loddon on the western border. - July 2007 - Fluvial flooding of the River Loddon on the western border. 2007 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred around Arborfield. 2013 – Flooding due to surface water run-off in numerous locations within the character area, mostly centred around Arborfield. 2015 – Flooding due to surface water run-off in numerous locations within the character area, mostly to the east of Arborfield. - The LLFA historic flood points also show other isolated incidents of surface water flooding in the character area. - There are 130 recorded incidences of sewer flooding in this character area, mostly clustered around the urban

Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
	flood extents do not place any urban centres within Flood Zones 3a or 3b.	high ground defences along small drainage ditches in the west of the character area.	hillside and into the River Loddon. There are also small, isolated, areas of surface water ponding, which may suggest localised flood risk.	centre of the character area. The ROFSW suggests that any emergence occurring in the west of the character area is likely to flow north along the route of the River Loddon. Furthermore, emergence in the east of the area is likely to follow the route of Barkham Brook, north west until it's confluence with the Loddon. Emergence around Arborfield however, could flow both east, to Barkham Brook, or west to the Loddon.	south-east to north-west through the centre of the character area, posing a risk to Arborfield Green. - Bramshill House Pond – The flood extent follows the north-west border of the character area - Wellington Country Park Lake – The flood extent follows the north-west border of the character area	centres of Arborfield, Arborfield Green, and Barkham.
Character Area 8: Finchampstead and Crowthorne	This character area has a mixture of rural and urban landcover, with settlements to the north and east. The River Blackwater presents fluvial flood risk along the length of the southern border of the character area. Furthermore, Emm Brook, and one of its tributaries poses flood risk in the	THE EA AIMS dataset details natural high grounds along the southern border of the character area along the River Blackwater.	Surface water flow paths follow the topography of the land, with numerous flow paths down the northern, eastern, and western slopes of the hill on the south-eastern border. Many of these follow existing flow paths for small inland watercourses. Emm Brook is also a major flow route for surface water in the north of the character area. There are also small, isolated, areas of surface water ponding, which may	The ASGWf shows that only small areas on the southern border west of Finchampstead along the River Blackwater, and a small area on the eastern border are greater than 50% susceptible to groundwater flooding. The JBA groundwater emergence map, however, suggests that the majority of the character area experiences groundwater emergence levels of within 0.5m of the surface. This is a risk to urban centres such	The following reservoirs impact the character area in the 'dry day' scenario. - Queen's Mere – Located in the north of the character area, the flow path of this reservoir flows north-west to the northern border near Wokingham. - Longmoor Lake – Situated in the north-west of the character area, this lake flood extent flows north to the border. - Sandhurst Lower - The flow path of these reservoirs flows east to west along the southern border of the character area. The following reservoirs impact the character area in the 'wet day' scenario. - Queen's Mere – Located in the north of the character area, the flow path of this reservoir flows	Historic flood mapping, EA recorded flood outlines, and LLFA historic flood points suggest the following: - March 1947 – Fluvial flooding due to channel capacity exceedance of the River Blackwater along the southern border. - September 1968 – Fluvial flooding due to channel capacity exceedance of the River Blackwater along the southern border. - February 1990 - Fluvial flooding due to channel capacity exceedance of the River Blackwater along the southern border. 2000 – Flooding due to surface water in the east of the catchment area in Crowthorne. - July 2007 - Fluvial flooding due to channel capacity exceedance of the River Blackwater along the southern border.



Character Area	Fluvial flood risk	Existing defences	Surface water flood risk	Susceptibility to Groundwater flood risk	Reservoir inundation risks	Historic, recorded flood events
	north-east of the character area.		suggest localised flood risk.	as Finchampstead and Crowthorne. The ROFSW suggests that areas of emergence along the River Blackwater will flow west along the route of the River Blackwater. Emergence in the wider character area is likely to flow towards either Barkham Brook or Emm Brook depending on the topography of the surrounding land.	north-west to the northern border near Wokingham. - Longmoor Lake – Situated in the north-west of the character area, this lake flood extent flows north to the border. - Hawley Lake – The flow path of this reservoir flows east to west along the southern border of the character area. - Sandhurst (Upper & Lower) - The flow paths of these reservoirs flow east to west along the southern border of the character area.	2007 – Flooding due to surface water run-off in the west of the area, mostly centred around Crowthorne. 2013 – Flooding due to surface water run-off in the west of the area, mostly centred around Crowthorne. - The LLFA historic flood points also show other isolated incidents of surface water flooding in the character area. - There are 47 recorded incidences of sewer flooding in this character area, mostly clustered around the urban centres of Finchampstead and Buckler's Park.

Appendix E – Exceedance Flow Paths



- Notes:**
1. Do not scale from this drawing. If in doubt ask.
 2. Dimensions are in millimetres unless noted otherwise.
 3. These drawings shall be read in conjunction with the Architect's drawings.
 4. Setting out is to be in accordance with Architect's drawings.
 5. Underground drainage:-

Drains to be 100mm diameter Hepworth Plastidrain or equivalent PVC-U pipes to BS EN 1401 unless noted otherwise.

150mm diameter Hepworth Plastidrain or equivalent PVC-U plain end slotted pipes to BS EN 1401 where noted.

100mm diameter Hepworth Plastidrain or equivalent PVC-U plain end slotted pipes to BS EN 1401 where noted.
 6. Foul drains to fall at minimum 1:60 & surface water drains to fall at 1:100 unless noted otherwise or where invert levels are not indicated.
 7. External drains with less than 600 cover (900 in driveway) to have special protection.
 8. Drains alongside buildings and below formation level to have concrete bed and surround up to formation level.
 9. Where drains pass through wall lines, provide precast concrete lintels over (lintel length to be pipe diameter + 50mm clearance either side + min 150mm bearing each end). Clearance around pipe to be filled with a compressible filler.
 10. All underground drains to be laid with min. 150mm granular bed and surround, unless noted above.
 11. For exact locations of svp's, ss's, rwp's, etc. refer to Architect's drawings.
 12. All RWP's to discharge into roddable trapped access gullies unless noted otherwise.
 13. All Internal Drainage to be in cast iron and provided with roddable access points.

Key:

- Proposed foul water drain
- Foul water PPIC
- Proposed foul water treatment plant
- Proposed soil vent pipe
- Proposed surface water drainage
- Surface water PPIC
- Proposed filter drain
- Water butt overflow
- Proposed waterbutt
- Proposed rainwater harvesting tank
- Non-return valve
- Proposed feature pond
- Proposed permeable pavement
- Proposed surface water pump
- Proposed feature pond overflow outlet
- Proposed outfall headwall
- Overflow source
- Overland flow path
- Extent of Flooding 1in100yr + cc Event

- Notes:**
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT MONSON DRAWINGS AND SPECIFICATIONS. ANY DISCREPANCIES TO BE REPORTED TO MONSON PRIOR TO ANY FABRICATION OR WORK COMMENCING ON SITE.
 2. DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
 3. ALL DIMENSIONS IN MILLIMETRES, ALL LEVELS IN METRES.

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B	TH	08/07/2026	Product 6 Data reviewed
A	TH	08/07/2026	Original Issue
Issue	By	Date	Amendments

MONSON

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Original Drawing:	Prepared	TH	Approved	MW
Origin:	Crowborough		Size	A1
Current Issue:	Preliminary	MW	Date	08/07/2026
Drawing Status:	PRELIMINARY			

Description:
Exceedance Flow paths

Scale:	Dwg No:	Issue:
1:1000	26191/C/D/011	B

ISSUE SHEET

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