

Flood Risk Assessment

Title	Wharfedale Road, Winnersh
Client	P&DG
Location	310 Wharfedale Road, Winnersh, Wokingham, RG41 5TP
Project number	24-0369
BIM reference	WRWW-BSP-XX-XX-T-W-0001-P01_Flood_Risk_Assessment
Date	07 AUG 2024

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Authorisation Sheet & Revisions Record

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Rev:	Issue Date:	Description:	Prepared:	Checked:	Authorised:
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Executive Summary

Introduction	BSP Consulting has been commissioned by P&DG to undertake a Flood Risk Assessment for a liquid nitrogen tank unit and two AHU units at 310 Wharfedale Road, Winnersh, Wokingham, RG41 5TP. This Flood Risk Assessment has been prepared in accordance with the Technical Guidance to the National Planning Policy Framework.
Existing Site Conditions	The site currently comprises a concrete HGV loading and car parking area. The site is relatively flat with a gentle slope to the north, with levels varying between 39.35m AOD in the south-west down to 39.15m AOD in the north-east.
Development Description and Planning Context	The proposals are for a liquid nitrogen tank and AHU units adjacent to the existing industrial unit. In accordance with the NPPF, the project falls under the less vulnerable category in terms of flood risk.
Definition of Flood Hazard	The main sources of fluvial flood risk locally are the River Loddon and Emm Brook located to the north-west and north-east of the proposed development site. Given their relative distance, they are not deemed to pose a significant risk to the site. There is also an unnamed watercourse to the south, but this is also deemed not to pose a risk.
Probability (Rivers/fluvial)	The EA Risk of Flooding from Rivers and Sea mapping indicates that the proposed development site falls within Flood Zone 2 and has between a 1 in 100 and 1 in 1000 annual probability of flooding from fluvial sources. However, the EA flood maps are based on an historic hydraulic modelling study from 2009. Updated mapping accompanying the local SFRA for Wokingham shows that the site actually falls within Flood Zone 1 (less than 1 in 1000-year probability of flooding). This mapping is derived from updated hydraulic modelling studies of the River Loddon and Emm Brook and has been given preference to inform the update to local planning policy.
Climate Change	The implications of climate change of up to 20% have been considered in this assessment and mitigation measures have been determined accordingly.
Development Proposals	The technical guidance to the NPPF states that developments of a less vulnerable category such as the proposed use are appropriate within Flood Zone 1, without the need for a formal Sequential Test.
Flood Risk Management Measures	Due to potential residual flood risk from surface water sources, flood risk management measures will be required as outlined in the recommendations section below.

Off-Site Impacts	The proposed development will not see any significant increase in the impermeable surface area in comparison to the existing conditions. It is anticipated that any runoff generated on-site will continue to utilise the existing surface water drainage network. The site lies outside of the area at risk of flooding in a 1 in 30-year flood event therefore the site will not encroach into the functional floodplain.
Residual Risks	The investigations carried out as part of this flood risk assessment and flood risk management measures proposed have demonstrated that the development will be safe, without increasing flood risk elsewhere.
Recommendations	• It is recommended that the proposed liquid nitrogen tank is set on an elevated concrete plinth to ensure that it is raised above any potential surface water flooding risk. This should be elevated to no lower than 39.20mAOD. • The proposed development will continue to drain surface water runoff as per the current drainage arrangement and, as such, will not significantly increase flood risk elsewhere. • The existing site management should continue to be registered to the Environment Agency's Flood Warning Service to receive flood warnings and continue to follow any existing evacuation plans that are in place.

1.0 Introduction

1.1 Terms of Reference

- 1.1.1 BSP Consulting has been commissioned by P&DG to undertake a Flood Risk Assessment to support the installation of a new liquid nitrogen tank and AHU units adjacent to an existing industrial unit at 310 Wharfedale Road, Winnersh, Wokingham, RG41 5TP.
- 1.1.2 This Flood Risk Assessment has been prepared in accordance with the Department for Communities and Local Government (DCLG) Planning Practice Guidance website section on 'Flood Risk and Coastal Change' and the Site-Specific Flood Risk Assessment Checklist.
- 1.1.3 This report has been produced on behalf of the Client, P&DG, and no responsibility is accepted to any third party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of BSP Consulting. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

1.2 Legislation & Guidance

National Planning Policy Framework

- 1.2.1 The National Planning Policy Framework (NPPF) was published on 27 March 2012, with the latest update published in December 2023.
- 1.2.2 Planning Practice Guidance to the NPPF regarding Flood Risk and Coastal Change has been published and this site-specific Flood Risk Assessment is written in compliance with this guidance.
- 1.2.3 The NPPF, and supporting technical guidance, can be downloaded free of charge from the internet at the following link:

<http://www.communities.gov.uk/publications/planningandbuilding/nppf>

Flood & Water Management Act

- 1.2.4 The Flood & Water Management Act (F&WMA) was passed in 2010 and aims to reduce the flood risk associated with extreme weather, compounded by climate change. This act established the EA as responsible for flood risk related to Main Rivers. In this instance, Wokingham Borough Council (WBC), as Lead Local Flood Authority (LLFA), are responsible for local sources of flood risk (that being from ordinary watercourses, surface water run-off and groundwater). As Local Planning Authority, WBC also has due regard for drainage and flood risk in accordance with local and national guidance and responses from statutory consultees.

2.0 Background Information

2.1 Site Details

2.1.1 Figure 2.1 below indicates the location of the site. A range of sources have been used to assess the local topography, local watercourses and current site use.



Figure 2.1 Wharfedale Road, Winnersh
 – Site Location Plan

- 2.1.2 The proposed development site occupies an area of approximately 0.005 hectares and is located in the south-west corner of an existing industrial unit at 310 Wharfedale Road, Winnersh, southeast of Reading, centred on OSNGR 477792E, 171431N.
- 2.1.3 The proposed nitrogen tanks and AHU units are to be located within the current lorry parking and loading bay area, and are bounded by the industrial unit to the east, Williamson Close to the south and south-east, commercial and light industrial units to the west, and the existing access onto Wharfedale Road to the north.
- 2.1.4 The site currently comprises a concrete paved HGV loading yard area. A topographical survey of the proposed location for the tank and AHU units, as well as the adjacent yard area, existing access points off Wharfedale Road and Williamson Close, and the western side of the existing industrial unit was

undertaken by Intersect Surveys in July 2024. A copy of which is provided within **Appendix A** for reference.

- 2.1.5 Across the yard area, levels are relatively flat with a gentle slope from the access points from the north and south towards the centre of the yard, and down towards the loading bays on the western façade of the existing industrial unit. In the location of the proposed nitrogen tanks, levels are shown to vary between 39.35m AOD in the south-west corner down to 39.15m AOD in the north-east.

Table 2.1: Overall Catchment Context and Local Watercourse Classifications

Classification	Name	Description
Main Rivers	River Loddon	An EA Main River located approximately 620m to the north-west, at its closest point to the site. It runs south to north along the eastern side of Reading, and goes onto join the Thames at Wargrave.
	Emm Brook	An EA Main River located approximately 590m to the north-east, and a tributary of the River Loddon,
Ordinary Watercourses	Unnamed Watercourse 'A'	There is a minor unnamed watercourse which runs to the south of Williamson Close, and flows west towards Reading Road. The available mapping indicates that it is a tributary of the River Loddon.
Manmade Watercourses	N/A	There are no manmade watercourses within the vicinity of the site.

- 2.1.6 The locations of the above watercourses are indicated on Figure 2.1 above.

2.2 Approach to the Assessment

- 2.2.1 A Product 4 (detailed flood risk) data request was made to the Environment Agency (EA), regarding the availability of any modelled flood level and extent data for the site and the surrounding area. A copy of the dataset response from the EA containing modelled flood and historic flooding is provided in **Appendix B** for reference.
- 2.2.2 This study has been supplemented by additional information contained on the British Geological Society (BGS) website, the DEFRA MagicMap website and the Cranfield Soil and Agrifood Institute Soilscales website.

- 2.2.3 This assessment seeks to draw together the relevant data information from these sources and to collate this with the findings of our investigations and discussions to assess the flood risk and drainage strategy for this site.

3.0 Flood Risk Assessment

3.1 Development Description and Planning Context

- 3.1.1 Development proposals are for a new liquid nitrogen tank with associated evaporators and AHU units at the existing 310 Wharfedale Road. The tank will be located within an enclosed area, situated on a reinforced concrete plinth, surrounded by fencing with a main access gate on the western side, with two secondary gates on the northern and southern enclosure boundary. There will also be a connection pipe between the tank and a new chemical store unit to the north-east, with the two AHU (heat pumps) units located to the east. The proposed site plan is included in **Appendix C**.
- 3.1.2 The local area benefits from a local Strategic Flood Risk Assessment (SFRA). This assessment is the Level 1 SFRA, dated May 2023, which was produced to inform the update to local planning policies. The SFRA was accompanied by updated flood mapping which was based off the Environment Agency's Flood Map for Planning, and the latest available hydraulic modelling data for the watercourses in the local area. The updated mapping, see **Appendix D**, shows that the site actually falls within Flood Zone 1.
- 3.1.3 In accordance with the NPPF, the proposed site use falls under the **less vulnerable** category in terms of flood risk.
- #### 3.2 Sequential and Exception Tests
- 3.2.1 The Sequential Test is designed to steer development towards areas of lower flood risk and is required to be completed for developments within Flood Zones 2 and 3. As the site is within an wider industrial and commercial use development, and the proposals will not increase the vulnerability of the site, it can therefore be seen as sequentially preferable and deemed to have passed the Sequential Test.
- 3.2.2 The Exception Test is designed to require evidence of how flood risk will be managed on the proposed development site, ensuring that it is safe for its lifetime and will not increase flood risk elsewhere. Table 3.1 overleaf illustrates whether developments, based on their vulnerability classification, are permitted within each Flood Zone and whether the Exception Test is required. The NPPF states that developments of the less vulnerable category are suitable within Flood Zone 1 without the requirement of an Exception Test, as is the case with this site.

Table 3.1: Flood Risk Vulnerability and Flood Zone Compatibility (Source: NPPF)

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

3.3 Definition of Flood Hazard

3.3.1 The potential sources of flooding in the vicinity of the site are as detailed below:

Historic Flooding

3.3.2 The Environment Agency's Historic Flood Map indicates that the development site has not flooded previously. The dataset shows the maximum extent of all individual recorded flood outlines that have occurred as a result of flooding from rivers, the sea and groundwater sources since records began 1946. The dataset does not account for flooding from other sources, such as sewer flooding or surface water flooding, nor is it exhaustive as it may not include all previous flooding incidents and does not provide information regarding event dates. However, the dataset does provide an insight into the potential for flooding from nearby sources.

Fluvial Flood Risk

3.3.3 The EA Risk of Flooding from Rivers and Sea mapping, shown below in Figure 3.2, indicates that the proposed development site falls within Flood Zone 2, and has between a 1 in 100 and 1 in 1000 annual probability of flooding from fluvial sources.

3.3.4 A more detailed review of the Environment Agency datasets, see **Appendix B**, shows that the proposed location for the tank and AHU units only marginally falls within Flood Zone 2, which defined as the extent of the most extreme flood (1 in 1000 year) event.

3.3.5 The dataset stated that these flood extents are derived from the 2009 Lower Loddon Detailed Flood Mapping study, which was originally built in 2007 but used updated hydrology and was subsequently re-run. The model is a 1D-2D ESTRY-TUFLOW model that covers the lower sections of the River Loddon and its tributaries, including the Emm Brook, and was simulated for a range of return periods. Although it

was noted that the extreme flooding events up to 1 in 1000 year were only simulated on the main River Loddon model and not the local tributaries.

3.3.6 As such, it is assumed that the fluvial flooding extents shown on the EA Flood Map for Planning, see Figure 3.1 below, are solely attributed to the River Loddon to north-west of the site.

3.3.7 As part of the EA response, modelled flood levels for a range of return periods up to the 1 in 1000-year (0.1%) flood event at a specific location within the site were provided. However, flooding was shown to have only occurred during the 0.1% event, with a level of 39.18m AOD. Based on the available topographic survey, see **Appendix A**, this would result in slight encroachment of flood water into the north-east corner of the site.

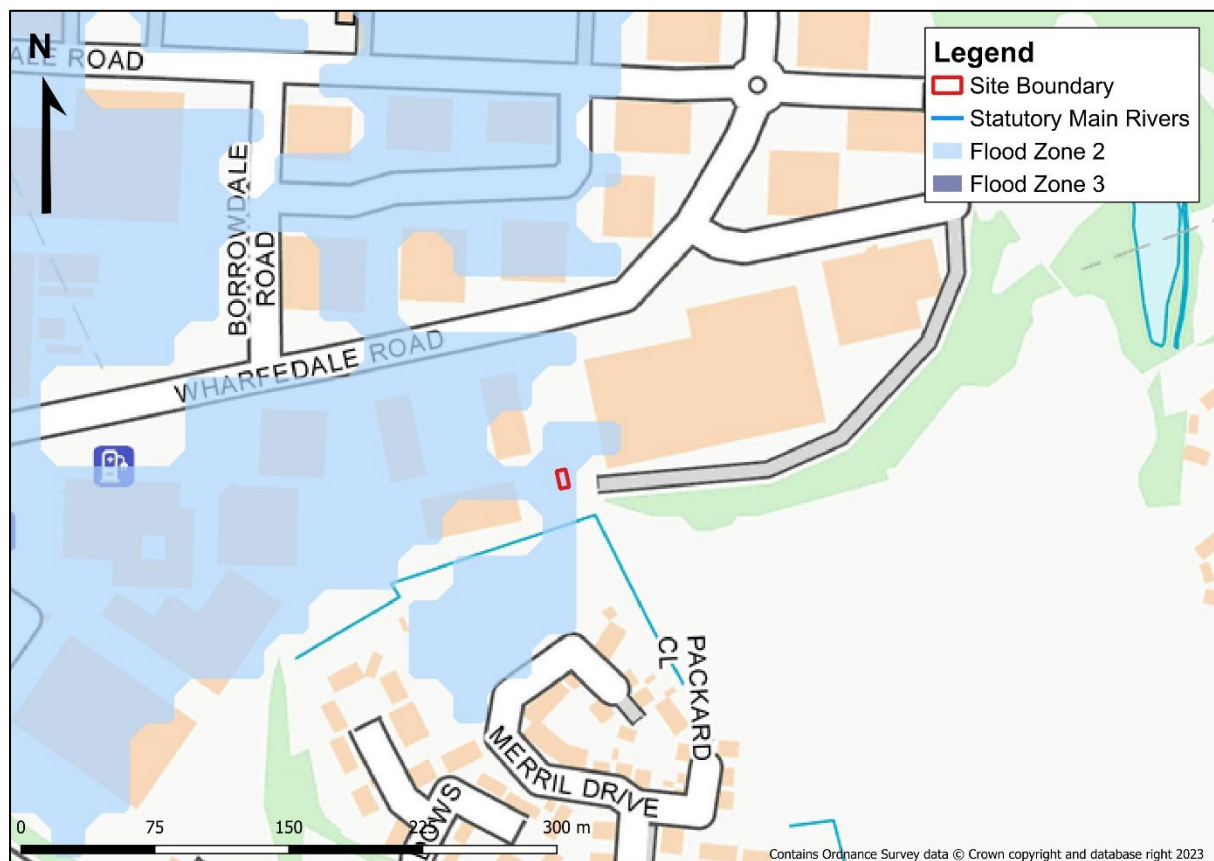


Figure 3.1 Wharfedale Road, Winnersh
 - Risk of Flood from Rivers and Sea (Source: EA)

3.3.8 However, as previously discussed, the local SFRA is accompanied by updated flood mapping for the local area which instead shows the site to be within Flood Zone 1.

3.3.9 In the associated notes to the SFRA mapping, it is stated that fluvial flood zone extents match the Flood Map for Planning in areas where the latest modelled flooding data has been incorporated. The exceptions being the River Loddon model in which the hydrological inputs were updated and was re-simulated as

part of the SFRA study. In addition to Emm Brook, in which a separate detailed hydraulic model was constructed, and the updated flood extents were also used to inform the SFRA maps. In these instances, the modelled flood extents were used in preference to the Flood Map for Planning.

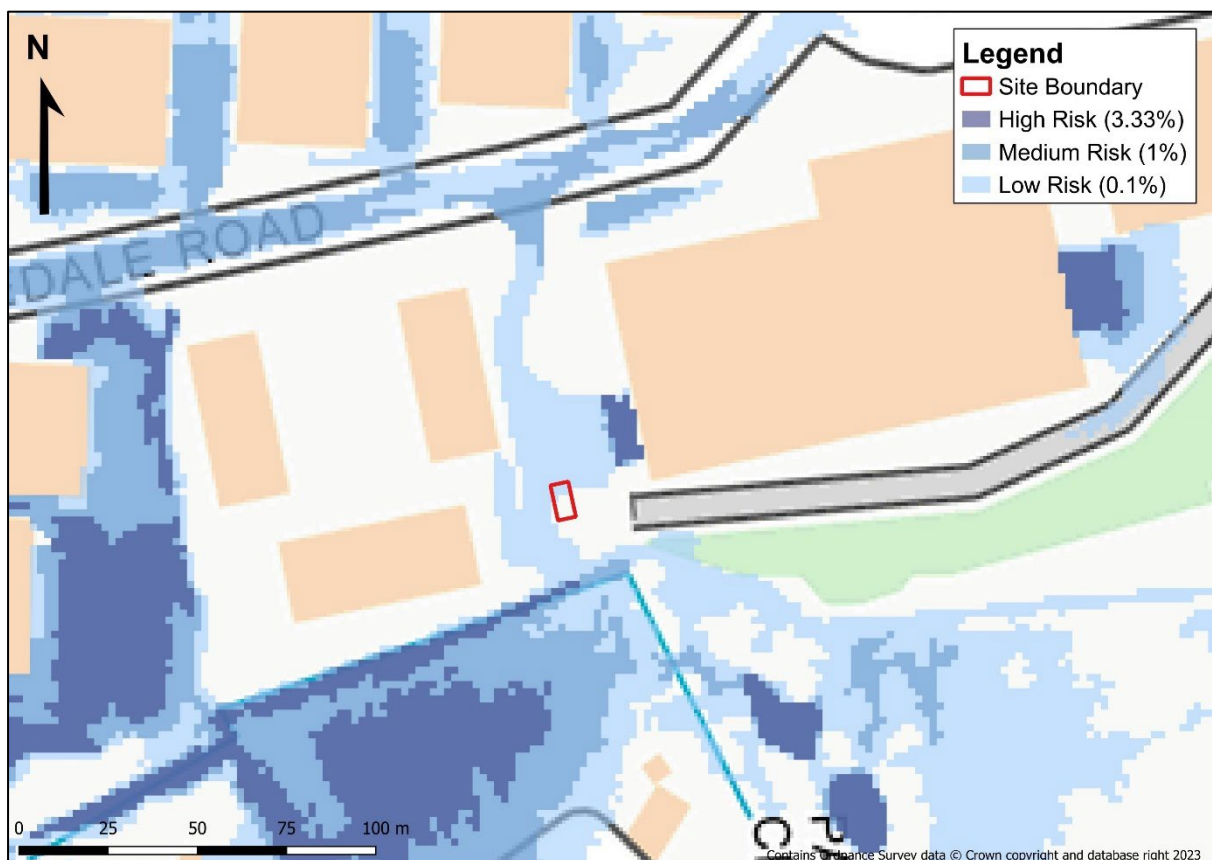
- 3.3.10 Given this, it is deemed that the site actually falls within Flood Zone 1 and is not at risk of flooding from fluvial sources.

Tidal Flood Risk

- 3.3.11 The site is not located within a tidally influenced area, therefore, the residual risk to the site is deemed to be minimal.

Surface Water Flood Risk

- 3.3.12 The EA publish mapping which shows the route of surface water runoff across the ground surface following an intense rainfall event. Figure 3.2 below shows an extract of the Risk of Flooding from Surface Water mapping, which indicates that the southern portion of the site has a very low risk (<0.1% AEP) of surface water flooding. Whilst the northern portion of the site, where elevations are slightly lower, has a low risk (0.1%) of surface water flooding.



*Figure 3.2 Wharfedale Road, Winnersh
 – Risk of Flooding from Surface Water (Source: EA)*

- 3.3.13 A review of the detailed mapping shows that this is attributed to an overland flow path that runs north to south through the existing yard area towards the ordinary watercourse to the south. There is also a localised area of ponding in the loading bay area, where levels are set below the surrounding yard area.
- 3.3.14 The overall risk of surface water flooding to the site is considered to be low. Runoff generated by the concrete yard area is assumed to be captured by the existing gully network along Williamson Close and throughout the yard and conveyed off-site by the private surface water drainage system serving the existing industrial unit. In the unlikely event that the existing drainage network becomes blocked, then it is assumed that runoff will preferentially be conveyed to the ordinary watercourse to the south, or the any localised topographic low point, as per the surface water flood mapping (see Figure 3.2).

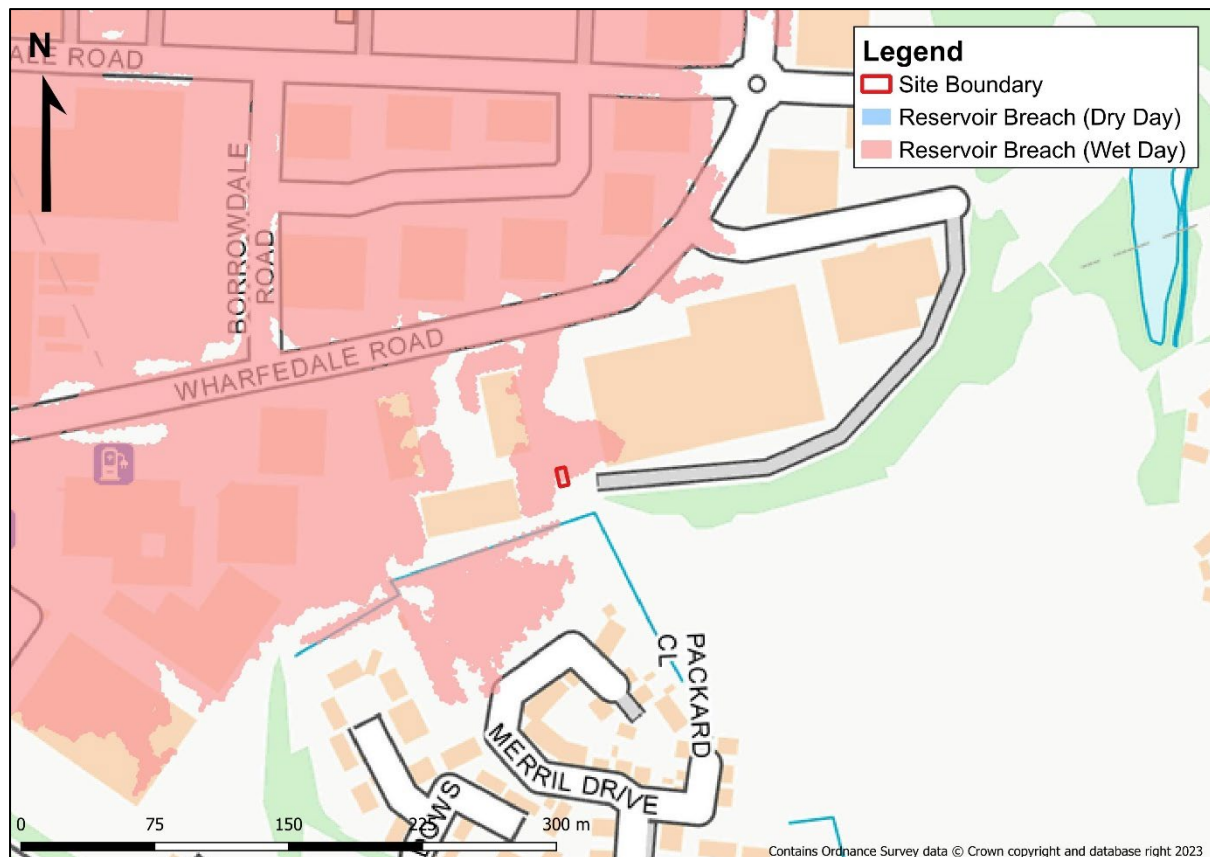
Flood Risk from Ground Water

- 3.3.15 The British Geological Survey's Geology of Britain mapping indicates that the site is situated upon bedrock geology consisting of London Clay Formation – Clay, Silt and Sand, and superficial deposits consisting of River Terrace Deposits, 2 – Sand and Gravel. London Clay Formation is generally classed as a bedrock with no groundwater present.
- 3.3.16 The local SFRA includes mapping of areas that are susceptible to groundwater flooding on a 1km² grid scale. This mapping indicates that the site location is has a very high (>75%) susceptibility to groundwater flooding; a copy of the map is provided in **Appendix D**. However, this mapping is indicative in nature, and the heightened groundwater flooding risk shown is likely to be heavily influenced by the River Loddon, and a series of large artificial lake features to the north, and not necessarily reflective of the underlying ground conditions on-site.
- 3.3.17 Based on the available information from the above sources, there is considered to be a low overall risk of flooding from groundwater sources.

Flood Risk from Sewers and Infrastructure

- 3.3.18 The local sewers are operated and maintained by Thames Water (TW). The local SFRA includes a register of all the historic sewer flooding incidents known to have occurred across Wokingham since 2000, by postcode area. For the postcode which covers the site and surrounding area, it is noted that there has been a total of 223 flooding incidents in total, the majority having a occurred prior to 2019 and there being no incidents recorded in 2022. It should be noted that the register does not provide specific information on where and when each of the incidents of sewer flooding occurred. So, it can be assumed that overall, the site has a minimal risk of sewer flooding issues.
- 3.3.19 Figure 3.3 below shows the predicted maximum flood extents in the unlikely event that all upstream large, raised reservoirs and dams simultaneously fail and release the water they hold; both on a 'dry day', if

reservoir flooding were to occur when river levels are at normal levels, and on a 'wet day', should reservoir breach occur if a river is already experiencing an extreme natural flood. It is highly unlikely that a flood of this magnitude will occur but provides a credible worst-case scenario which can be used to inform emergency planning; it is unlikely that any actual flood would be this large. This mapping indicates that in both scenarios the site is at risk of flooding from reservoirs, but only during a 'wet day' scenario. Due to the extremely low probability of such an event occurring, the site can be seen as having a low risk of flooding from reservoir breaches.



*Figure 3.3 Wharfedale Road, Winnersh
 – Risk of Flooding from Reservoirs (Source: EA)*

3.3.20 The site is not in close proximity to any manmade watercourses such as canals or wet process industrial works. There are a series of manmade lake features approximately 430m to north, over the A329 (M), however, in the unlikely event these were to breach, it is anticipated that any flood water would be conveyed downstream and not directly impact the site.

3.3.21 The existing sewers and infrastructure flood risk source can therefore be discounted as a significant source of flood risk to the site.

3.4 Climate Change

3.4.1 Climate change is recognised as a factor for consideration in terms of its effects on flood risk. In line with the latest update to the planning practice guidance in the NPPF on Flood Risk and Coastal Change, it is assumed that the proposed development will have a minimum lifespan of 20 years. As such, to assess the effects of climate change, the 2050s epoch has been assessed for peak rainfall intensity.

3.4.2 Guidance from the EA advises that the central allowances for both the 1 in 30-year (3.3% AEP) and 1 in 100-year (1% AEP) events should be assessed. In this instance, peak rainfall intensity for less vulnerable development types within the Loddon and tributaries Management Catchment is estimated to increase by 20% for both the 3.3% AEP event and 1% AEP events. Therefore, it is recommended that the central allowance of 20% is applied to design rainfall intensity to allow for the potential implications of climate change.

3.5 Detailed Development Proposals

3.5.1 The proposed development and vulnerability classification are discussed in Section 3.1 above.

3.5.2 The technical guidance to the NPPF states that developments of a less vulnerable category such as the proposed liquid nitrogen tank and AHU units area deemed to be appropriate within Flood Zone 1, without being subject to the application of the Sequential Test.

4.0 Flood Risk Management & Drainage Strategy

4.1 Surface Water Flood Risk Mitigation

- 4.1.1 The development proposals are for a new liquid nitrogen tank and AHU units. The tank will be located within an enclosed area, situated on a reinforced concrete plinth, surrounded by fencing with a main and two secondary access gates. The two AHU units will be located to the east within a grassed verge area.
- 4.1.2 As shown in the available topographic survey (see **Appendix A**), on-site levels are shown to gently slope from south to north. To reduce any potential impact of surface water flooding it is recommended that the concrete plinth that the nitrogen tank is laid on is set at an even grade that is no lower than **39.20m AOD**. This also ensures the tank is above the EA modelled 0.1% AEP flood height, despite newer modelling suggesting a flood level of this height would not occur on-site.
- 4.1.3 As both the tank and AHU units are to replace existing positively drained areas, any surface water runoff generated will continue to be collected and conveyed by the gully network within the existing yard area and Williamson Close, and therefore not significantly change the current drainage regime.

4.2 Safe Access & Egress

- 4.2.1 The site lies within a flood warning area, as indicated below in Figure 4.1. As the proposed development will not introduce any additional people to the site, site users are advised to evacuate in accordance with any pre-existing plan for the wider site.

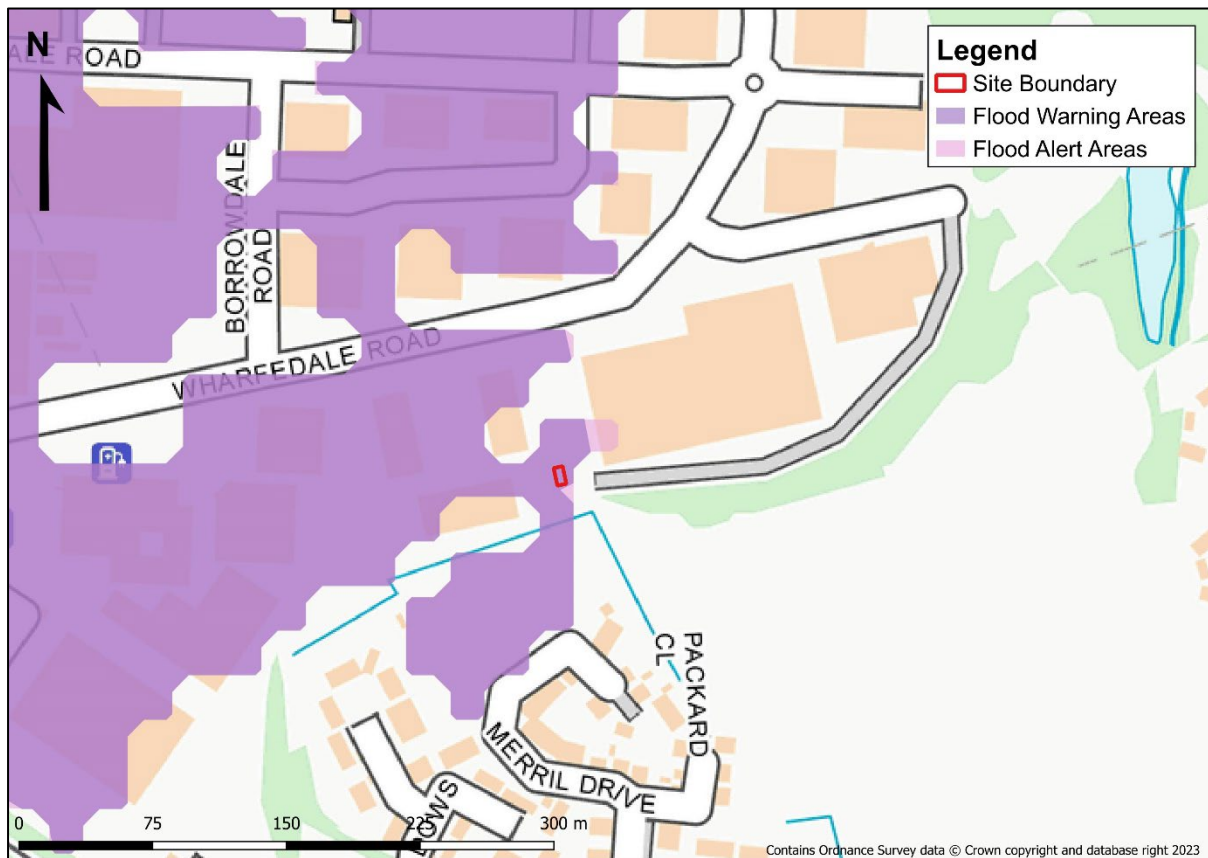


Figure 4.1- Wharfedale Road, Winnersh
 – Risk of Flooding from Reservoirs (Source: EA)

5.0 Off-Site Impacts

- 5.1.1 The proposed development will not significantly increase the volume of surface water runoff generated on-site, so is not anticipated to increase flooding adjacent to or downstream of the site for the anticipated lifetime of the development.
- 5.1.2 In addition, the site lies outside of the area at risk of flooding in a 1 in 30-year flood event therefore the site will not encroach into the functional floodplain.

6.0 Residual Risks

- 6.1.1 The investigations carried out as part of this flood risk assessment and flood risk management measures proposed have demonstrated that the development will be safe, without increasing flood risk elsewhere.

7.0 Recommendations

The following recommendations are made to ensure flood risk at this site is minimised:

- It is recommended that the proposed liquid nitrogen tank is set on an elevated concrete plinth to ensure that it is raised above any potential surface water flooding risk. This should be elevated to no lower than **39.20mAOD**.
- The proposed development will continue to drain surface water runoff as per the current drainage arrangement and, as such, will not significantly increase flood risk elsewhere.
- The existing site management should continue to be registered to the Environment Agency's Flood Warning Service to receive flood warnings and continue to follow any existing evacuation plans that are in place.

Disclaimer

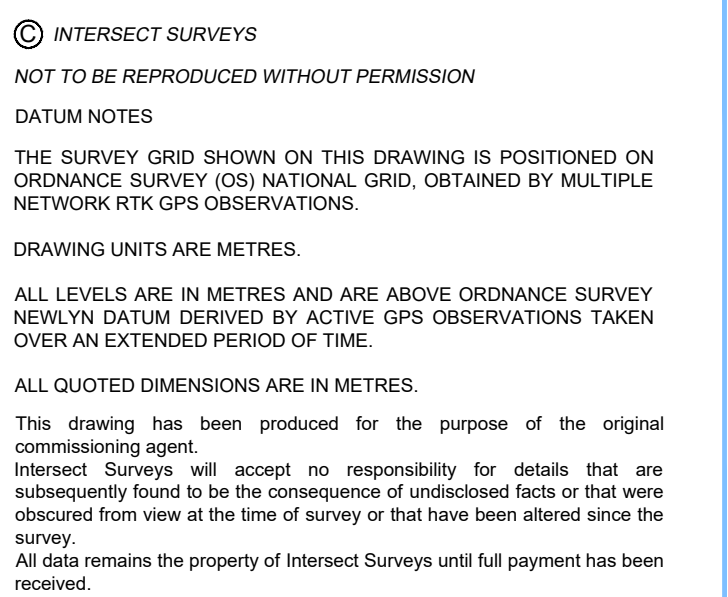
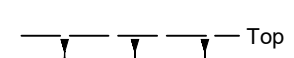
We would note that all comments made in this report are based on the sources stated in Section 1.1. This report and its recommendations are intended for the use of P&DG for the above site only.

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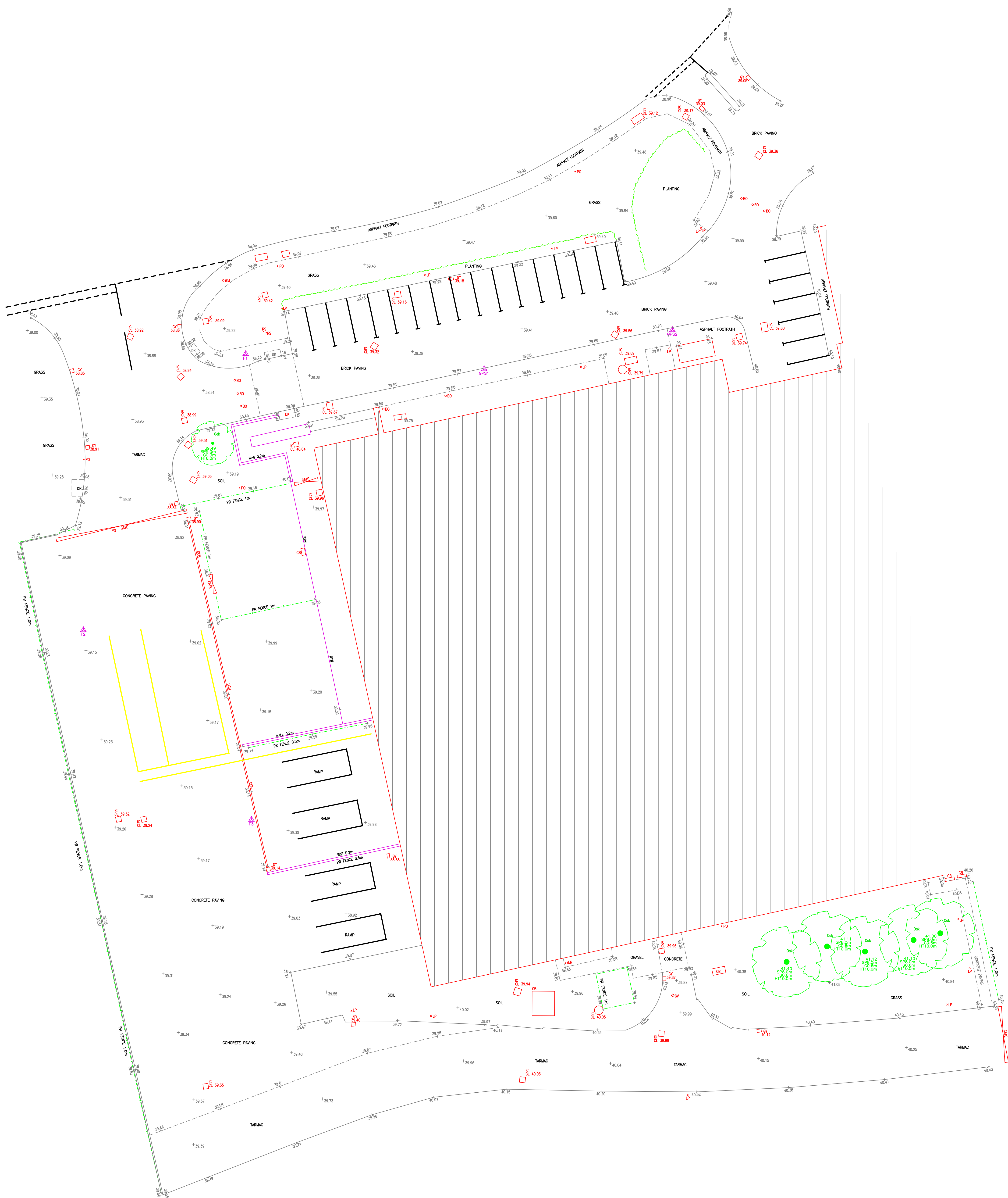


Appendix A

Topographical Survey

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BANKS
OVERHEAD CABLES
EDGE OF VEGETATION
GATE
SURVEY STATION
O.S BENCH MARK



Revision	Description	Date
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Drawing Status:

INFORMATION



T: 0208 399 3851 M: 07535 236 812
www.intersectsurveys.co.uk

Client: MORGAN LOVELL

Project:
WESTERN ROAD

Title: TOPOGRAPHICAL SURVEY

Drawn	A L O	Surveyed:	A S	Date	III '24
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Drawing Number	Revision
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Appendix B

Environment Agency Flood Datasets

Product 4 (Detailed Flood Risk) for 310 Wharfedale Rd, Winnersh, Wokingham RG41 5TP

Our Ref: THM364720

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;

Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

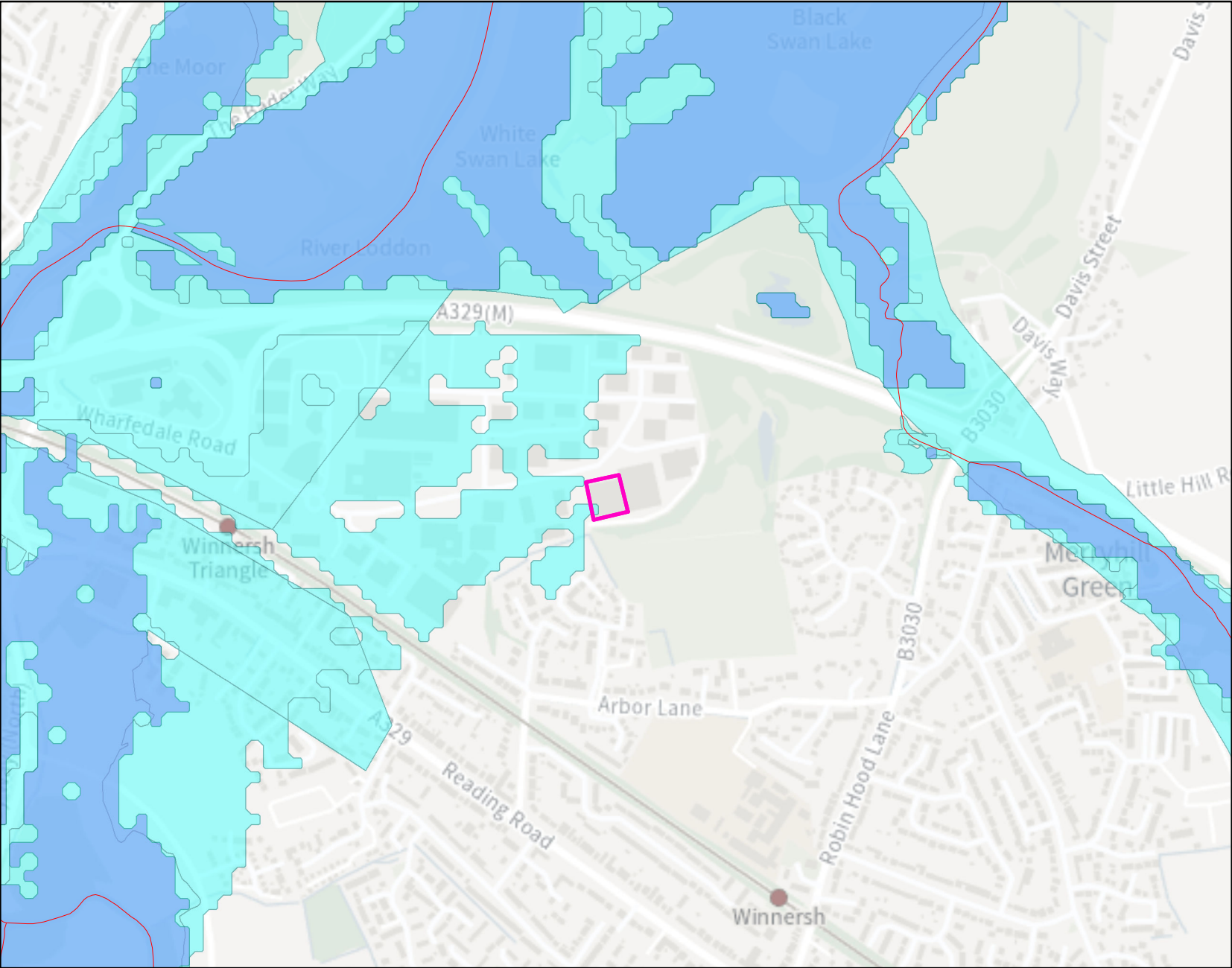
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Detailed flood map for planning centred on 310 Wharfedale Rd, Winnersh, RG41 5TP

Created on 24/06/24 REF: THM364720



 Environment Agency

Kilometres

0

0.25

0.5

Legend

Statutory Main Rivers

Site

Flood Map - Flood defences

Flood Map - Flood Storage Areas

Flooding from rivers or sea (FZ3)

Extent of extreme flood (FZ2)

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year

- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Defence information

Defence Location: No defences on Main River

Description: This location is not currently protected by any formal defences and we do not currently have any flood alleviation works planned for the area. However we continue to maintain certain watercourses and the schedule of these can be found on our internet pages.

Model information

THM364720

Model: Loddon (Lower) 2009

Description: The information provided is taken from the Lower Loddon Detailed Flood Risk Mapping study which was completed in January 2009. This model is a 1D-2D model using ESTRY-TUFLOW. The model was originally built in 2007 but the hydrology was updated and model rerun in 2009. The model was re-run for more return periods on the main Loddon than on some of the tributaries.

River Channel Model: ESTRY 1D model of Lower Loddon, Old Loddon, St. Patricks Stream, River Thames (from Sonning to Marsh Lock), Twyford Brook, Billingbear Brook and Emm Brook (from Toutley Bridge to Loddon), Barkham Brook, Ashridge Stream, Waterloo Road Stream and Upper Emm Brook (from Nine Mile Ride to Toutley Bridge)

Model design runs (Main River Loddon):

1 in 5 / 20% Annual Exceedance Probability (AEP); 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP; 1 in 1000 / 0.1% AEP; and 1 in 100+20% / 1% AEP plus 20% increase in flows

Mapped outputs (main River Loddon):

1 in 5 / 20% AEP; 1 in 20 / 5% AEP; 1 in 50 / 2% AEP; 1 in 100 / 1% AEP, 1 in 100+20% / 1% AEP plus 20% increase in flows, and 1 in 1000 / 0.1% AEP

Model design runs (tributaries – Emm Brook (Wokingham), Emm Brook (Upstream), Ashridge Stream, Waterloo Road Stream, Barkham Brook):

1 in 5 / 20% Annual Exceedance Probability (AEP); 1 in 20 / 5% AEP; 1 in 100 / 1% AEP; and 1 in 100+20% / 1% AEP plus 20% increase in flows

Mapped outputs (tributaries):

1 in 5 / 20% AEP; 1 in 20 / 5% AEP, 1 in 100 / 1% AEP and 1 in 100+20% / 1% AEP plus 20% increase in flows

Model accuracy:

Levels $\pm$ 250mm

Modelled in-channel flood flows and levels

THM364720

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

				Flood Levels (mAOD)										
Node label	Model	Easting	Northing	20% AEP	5% AEP	3.3% AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
06324LO_MN_Emm.032.1	Loddon (Lower) 2009	478437	171555	39.08	39.72		39.86	0.00	0.00	39.97	0.00	0.00	0.00	40.14
06324LO_MN_Emm.028.1	Loddon (Lower) 2009	478352	171674	38.84	39.17		39.22	0.00	0.00	39.27	0.00	0.00	0.00	39.33
06324LO_MN_Lod1.106.1	Loddon (Lower) 2009	477360	171887	37.84	38.16		38.30	0.00	0.00	38.40	0.00	0.00	0.00	38.62
06324LO_MN_Lod1.107.1	Loddon (Lower) 2009	477248	171859	37.88	38.21		38.35	0.00	0.00	38.45	0.00	0.00	0.00	38.68

				Flood Flows (m3/s)										
Node label	Model	Easting	Northing	20% AEP	5% AEP	3.3% AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
06324LO_MN_Emm.032.1	Loddon (Lower) 2009	478437	171555	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06324LO_MN_Emm.028.1	Loddon (Lower) 2009	478352	171674	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06324LO_MN_Lod1.106.1	Loddon (Lower) 2009	477360	171887	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06324LO_MN_Lod1.107.1	Loddon (Lower) 2009	477248	171859	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.

Modelled floodplain flood levels

THM364720

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)										
				20% AEP	5% AEP	3.3 AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
Floodplain 1	Loddon (Lower) 2009	477,812	171,445	No Data	No Data		No Data			No Data				39.18

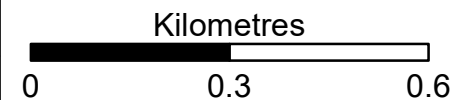
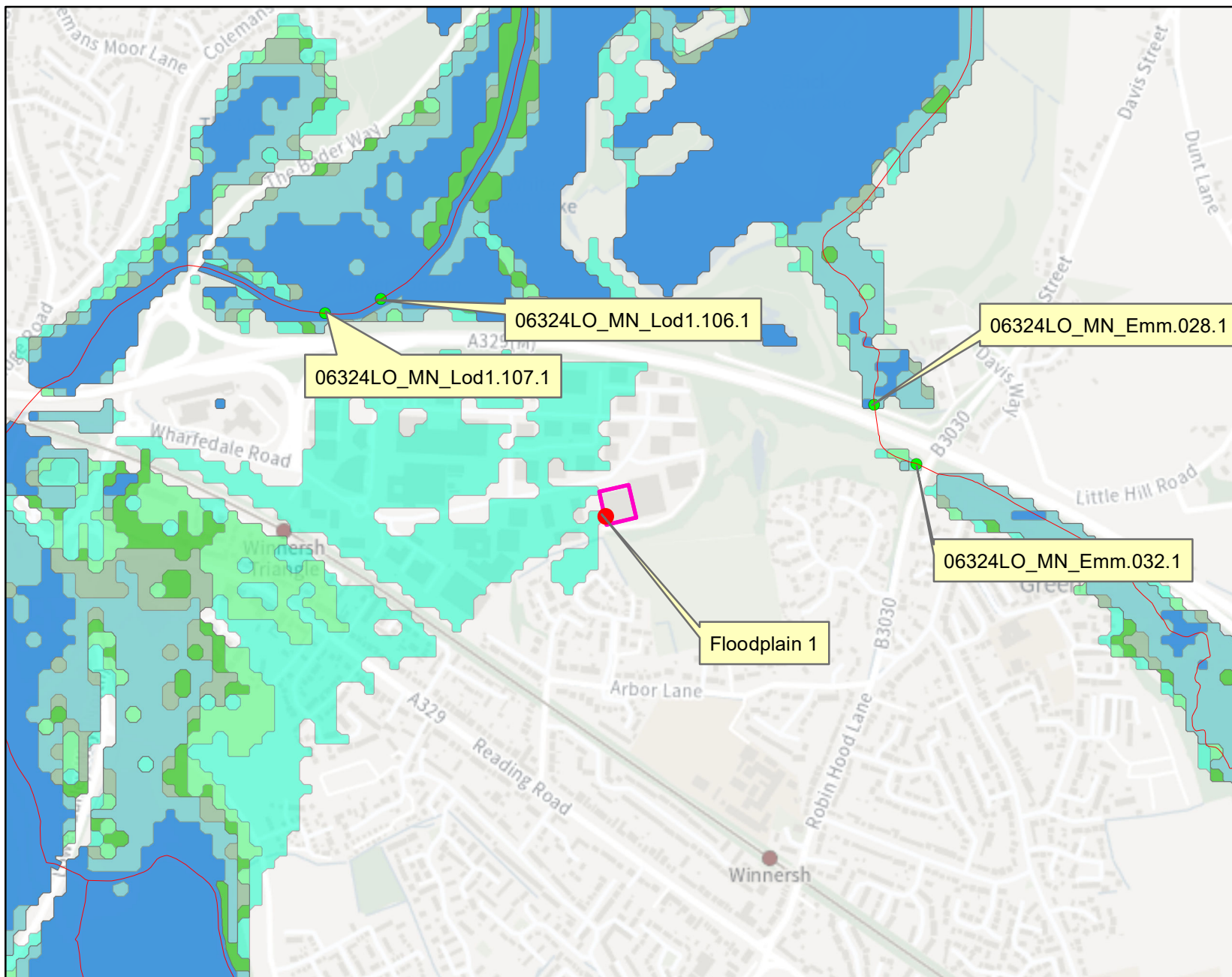
This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Detailed FRA map centred on 310 Wharfedale Rd, Winnersh, RG41 5TP

Created on 24/06/24 REF: THM364720



Legend

- Statutory Main Rivers
- Site
- Nodes
- 20% AEP flood extent
- 5% AEP flood extent
- 2% AEP flood extent
- 1% AEP flood extent
- 1%+20% AEP flood extent
- 0.1% AEP flood extent

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Historic flood data

THM364720

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

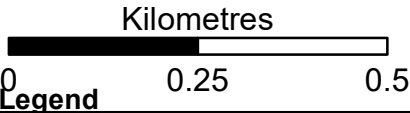
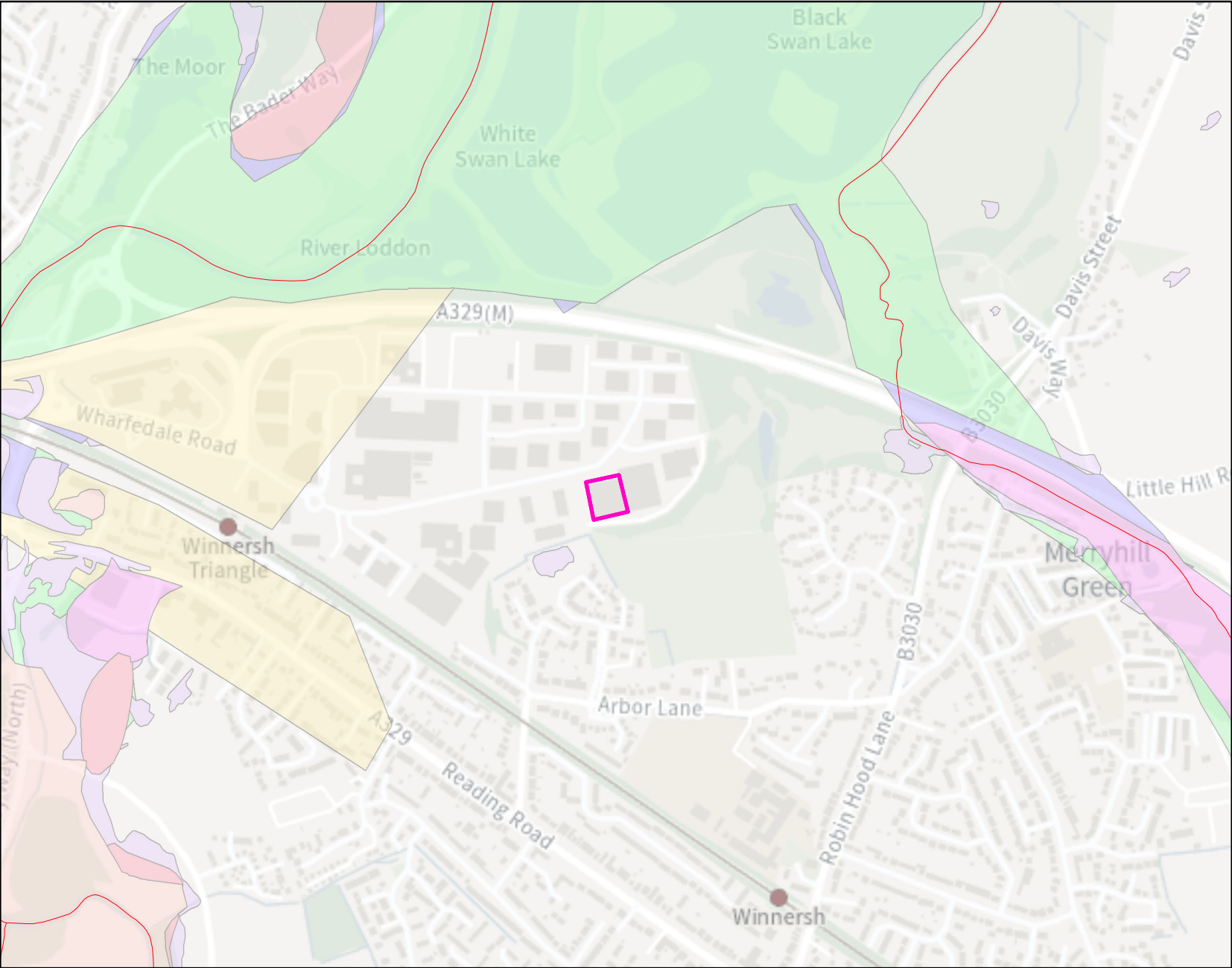
Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
No Historic Information					

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

Historic flood map centred on 310 Wharfedale Rd, Winnersh, RG41 5TP

Created on 24/06/24 REF: THM364720



Legend

- Statutory Main Rivers
- Site
- 1947
- 1968
- 1974
- 1981
- 1990
- 1991
- 2007
- 2009

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Project Number: 24-0369
Project Title: Wharfedale Road, Winnersh
Location: 310 Wharfedale Road, Winnersh, Wokingham, RG41 5TP
BSP Document Ref: WRWW-BSP-XX-XX-T-W-0001-P01_Flood_Risk_Assessment



Appendix C

Proposed Site Plan



CRC
Clean Room Construction Ltd
Units K1/K2, Temple Court
Knight Road, Strood,
Rochester, Kent ME2 2LT, UK
Phone: +44(0)1634 298111 Fax: +44(0)1634 284
E-mail: clean@crc-uk.co.uk Web: www.crc-uk.co.uk
Incorporated in England. Registered No. 11738
Registered Office as above
Directors: S.D. Lawton, J.B. Isard, R.T. Rowland



Project:

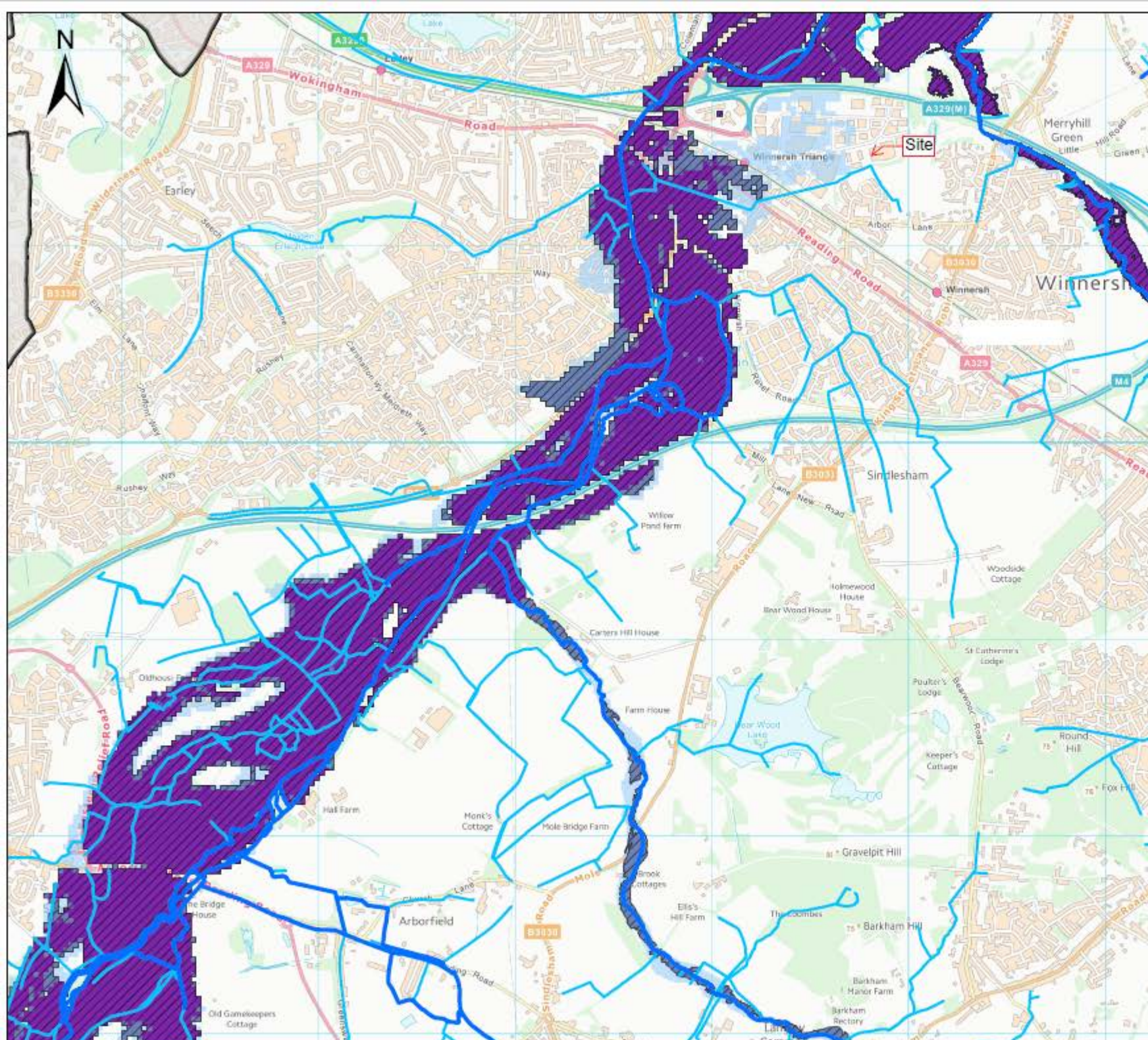
Originally Drawn By	AC	Drawing Signed Off By	SL
		Signed Off Date	07/10/24
Drawing Number:			Scale @ A0:
15804-SK1			1 : 10

Project Number: 24-0369
Project Title: Wharfedale Road, Winnersh
Location: 310 Wharfedale Road, Winnersh, Wokingham, RG41 5TP
BSP Document Ref: WRWW-BSP-XX-XX-T-W-0001-P01_Flood_Risk_Assessment



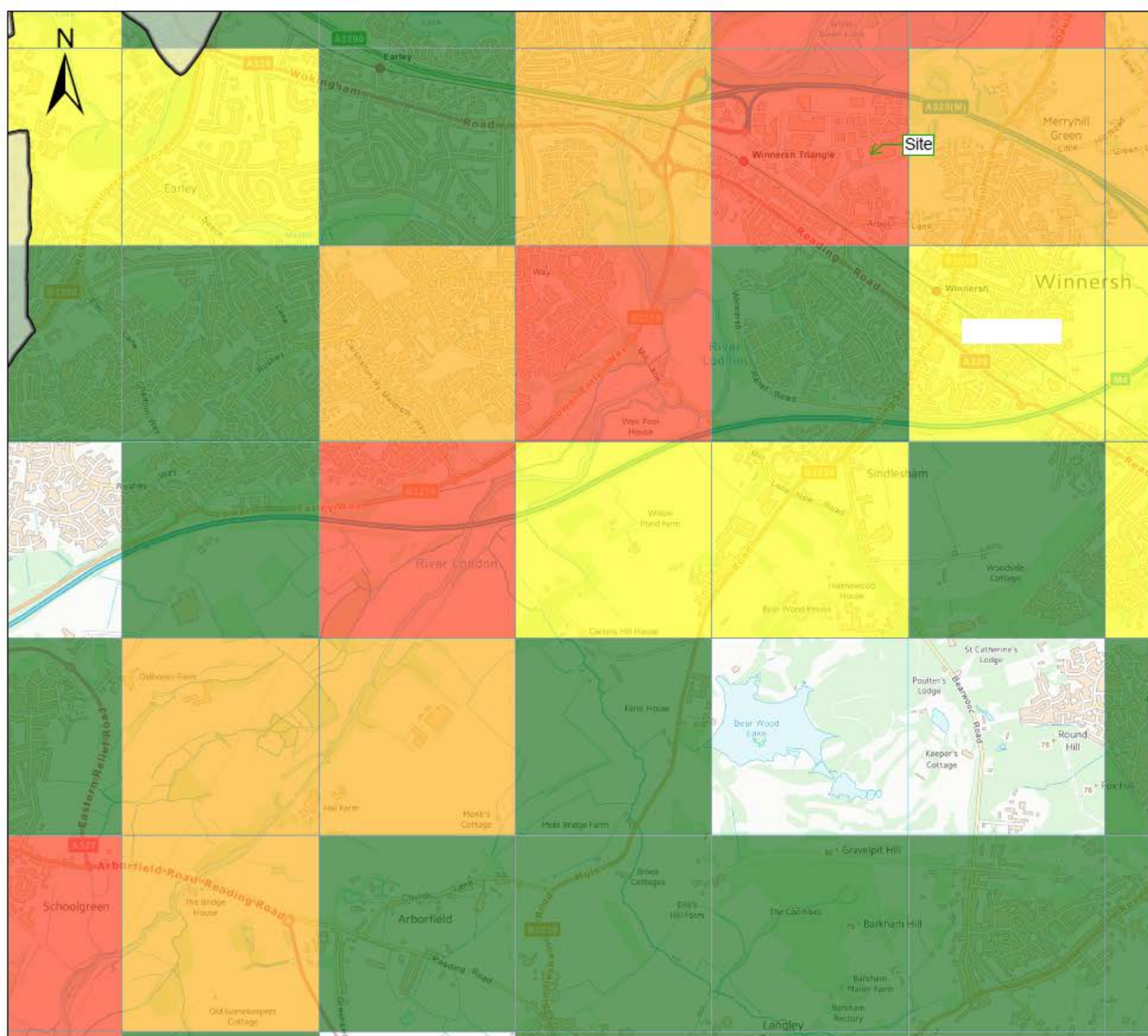
Appendix D

Wokingham Level 1 SFRA Flood Datasets



Legend

	Wokingham Borough Council boundary
	Main Rivers
	All Watercourses
	Indicative Flood Zone 3b
	Flood Zone 3b
	Flood Zone 3a
	Flood Zone 2
	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
	Surface Water Extent 1% AEP
	Surface Water Extent 0.1% AEP
	Surface Water Extent plus climate change 3.3% AEP plus 35% Climate Change
	Surface Water Extent plus climate change 1% AEP plus 40% Climate Change
	Risk of Groundwater Flooding EA Areas Susceptible to Groundwater Flooding < 25%
	Risk of Groundwater Flooding EA Areas Susceptible to Groundwater Flooding >= 25% < 50%
	Risk of Groundwater Flooding EA Areas Susceptible to Groundwater Flooding >= 50% < 75%
	Risk of Groundwater Flooding EA Areas Susceptible to Groundwater Flooding >= 75%
	JBA Groundwater Emergence Map (5m Resolution) Depth below ground surface Less than 0.025m below surface
	JBA Groundwater Emergence Map (5m Resolution) Depth below ground surface Between 0.025m - 0.5m below surface
	JBA Groundwater Emergence Map (5m Resolution) Depth below ground surface Between 0.5m - 5m below surface
	JBA Groundwater Emergence Map (5m Resolution) Depth below ground surface At least 5m below surface
	JBA Groundwater Emergence Map (5m Resolution) Depth below ground surface No risk
	Risk of Flooding from Reservoirs Wet Day
	Risk of Flooding from Reservoirs Dry Day
	Flood Defences Demountable Defence
	Flood Defences Embankment
	Flood Defences Wall
	Flood Defences Natural High Ground
	Flood Mitigation Flood Alert Areas
	Flood Mitigation Flood Warning Areas
	Flood History EA Historic Flood map



Legend

Wokingham Borough Council boundary

Watercourses

Main Rivers

All Watercourses

Indicative Flood Zone 3b

Flood Zone 3b

Flood Zone 3a

Flood Zone 2

1% AEP with Central Climate Change allowance

1% AEP with Higher Central Climate Change allowance

1% plus 25% Climate Change

1% plus 40% Climate Change

3.3% AEP

1% AEP

0.1% AEP

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

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Page: D2

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Notes

Please see the accompanying user guide of the SFRA report for further guidance on the sources of data included within the map. This map should be opened using Adobe Acrobat Reader.



Nottingham

12 Oxford Street
Nottingham
NG1 5BG

0345 413 4000

Derby

5 Pride Point Drive
Pride Park
Derby
DE24 8BX

0345 413 4000

Leicester

Floor 4
24 De Montfort St
Leicester
LE1 7GB

0345 413 4000

Sheffield

Smithy Wood House
Smithy Wood Cres
Sheffield
S8 0NU

0345 413 4000

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