



Land Between Lodge Road and Tape Lane, Hurst, Wokingham, RG10 0EG

Proof of Evidence – Flood Risk and Drainage

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On behalf of Mactaggart and Mickel Strategic Land

Section 78 Appeal against refusal of planning permission by Wokingham Borough Council for the:

Outline application for the proposed erection of up to 99 no. dwellings, green infrastructure, open space, pedestrian and cycle links, recreational facilities and other associated infrastructure and access points on Lodge Road and Tape Lane with required improvements. (All matters reserved except for means of access).

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1.0 Introduction

Qualifications and Experience

- 1.1 I am Ian Walton. I am a Chartered Civil Engineer and a Member of the Institution of Civil Engineers and of the British Hydrological Society. I hold a Master's degree in Hydrology for Environmental Management awarded by Imperial College, London and a BSc (Hons) in Engineering Science awarded by University of Exeter.
- 1.2 I have over 40 years of post-graduate experience as a Consulting Civil Engineer. I worked for John Taylor and Sons as a Public Health Engineer in the United Kingdom and the Middle East from 1983 to 1987. I joined Halcrow in 1987 and worked as a Tunnelling Engineer on a site in East London for a period of 18 months before joining Bureau Veritas (formerly Weeks Consulting) in 1989 where I managed the Civil Engineering and Flood Risk Departments within the company as an Associate, rising to Associate Director, over a period of some 20 years.
- 1.3 I joined SLR Consulting Limited in January 2013 as a Technical Director in the Hydrology and Hydrogeology Team
- 1.4 Over the last 25 years, I have specialised in the field of hydrology and currently provide technical advice on the quantification and assessment of flood risk, the management of flood risk and the impact of development on the water environment, including from surface water runoff. I am regularly engaged to provide expert evidence on flood risk and drainage matters at appeal hearings and public inquiries.
- 1.5 I have worked across the Built Environment, Waste Management, Industry, Mining and Energy Sectors principally supporting Client's planning and permit applications.
- 1.6 I confirm that the opinions expressed in this Proof of Evidence (Proof) are my professional opinions.
- 1.7 The evidence which I have prepared and provide for this appeal is true and I confirm that the opinions expressed are my true and professional opinions.



2.0 Scope of Evidence

- 2.1 I am instructed by Mactaggart and Mickel Strategic Land (the Appellants) to address the reason in respect of flood risk cited by Wokingham Borough Council (the Council) for refusing to grant planning permission for the:

'Outline application for the proposed erection of up to 99 no. dwellings, green infrastructure, open space, pedestrian and cycle links, recreational facilities and other associated infrastructure and access points on Lodge Road and Tape Lane with required improvements. (All matters reserved except for means of access).'

on land between Lodge Road and Tape Lane, Hurst, Wokingham (the Appeal Site).

- 2.2 The Council cites eleven reasons for refusal of planning permission, the fifth of which relates to flood risk:

'In the absence of a satisfactory Flood Risk Assessment and the Environment Agency objection, the proposed development has failed to demonstrate it would have an acceptable flooding and drainage impact contrary to Core Strategy policy CP1 and CP3, MDD Local Plan Policy CC09 and CC10 and Section 14 of the NPPF'.

- 2.3 A copy of the decision letter is provided in Core Documents (CD) 1.1.
- 2.4 I understand that the Council's fifth reason for refusal was informed by the Environment Agency's (the Agency) letter of objection dated 29 October 2024 reference WA/2024/131683/01-L01. A copy of the Agency's letter of objection is provided in CD 9.1.
- 2.5 In my Proof, I will address the fifth reason for refusal and the reasons set out in the Agency's letter that supported their objection.



3.0 Background

Planning Application

- 3.1 An outline application for planning permission was made to the Council on 8 August 2025 reference 242067 with all matters reserved except for access. The application was for the proposed erection of up to 99 no. dwellings, green infrastructure, open space, pedestrian and cycle links, recreational facilities and other associated infrastructure and access points on Lodge Road and Tape Lane with required improvements.
- 3.2 The application was supported by a Flood Risk Assessment and Drainage Strategy reference 432.010035.00001 dated 19th July 2024 Revision P02 (FRA Rev P02).
- 3.3 A copy of the FRA Rev P02 is provided in CD 9.2.
- 3.4 The Agency objected to the planning application in their letter of 29 October 2024 reference WA/2024/131683/01-L01 (CD 9.1) stating the following reasons for their objection:

The submitted FRA (ref. Flood Risk Assessment and Drainage Strategy, Land East of Lodge Road, Hurst, MacTaggart and Mickel Strategic Land, SLR Consulting Ltd, project no. 432.010035.00001, 19th July 2024, revision P02) does not comply with the requirements for site-specific flood risk assessments, as set out in paragraphs 20 to 21 of the Flood Risk and Coastal Change planning practice guidance and its site-specific flood risk assessment checklist. This proposal also fails to comply with the Wokingham Borough Council Level 1 Strategic Flood Risk Assessment, May 2023. The FRA does not therefore adequately assess the flood risks posed by the development.

In particular, the FRA fails to:

- *Provide a design flood level for the 1% Annual Exceedance Probability flood extent plus an appropriate allowance for climate change (1%AEP+CC), therefore it is unclear what impact the development may have on flood risk, and whether or not the development would be safe for its lifetime.*
- *Take the impacts of climate change on fluvial flood risk into account.*
- *Demonstrate that finished floor levels will be set above the 1% annual exceedance probability (AEP) flood level with an appropriate allowance for climate change.*
- *Demonstrate that the development would not adversely impact floodplain storage.*
- *Demonstrate that the requirement for a buffer strip of at least 8m to the main river has been met.*
- *Consider the impact of the proposed new crossing over the main river.*



3.5 A number of informatives were provided in the letter advising that:

- the Appeal Site was shown to be in Flood Zone 1 because there was no flood mapping available, rather than no flood risk, and that they would expect an application of this scale to be supported with detailed hydraulic modelling;
- an appropriate climate change allowance to be used in a flood risk assessment (FRA);
- the FRA should demonstrate that a buffer of at least 8m to any river designated as a 'main river' is provided across the site;
- the impact on the proposed crossing of the main river by the access road should be fully assessed; and
- a Flood Risk Activity Permit would be required for any works within 8m of the main river.

3.6 On this last point, the Agency advised that:

'as submitted (my emphasis) it is unlikely that a permit would be granted. The applicant would need to demonstrate that the proposed works will not adversely impact on flood risk or the watercourse'

3.7 No response to the Agency was made to address the reasons for their objection before the application was determined.

3.8 I note that WBC Drainage were consulted on the application and in their internal Memorandum dated 30 August 2024 confirmed that having reviewed the FRA Rev P02 they had no objection to the proposed drainage strategy subject to seven conditions. A copy of the internal Memorandum is provided in CD 9.3.

Appellants' Statement of Case

3.9 Section 8.10 to 8.15 of the Appellants' Statement of Case summarise the meeting held with the Agency on 17 March 2025 to discuss their reasons for objecting to the application and to agree a methodology for addressing their concerns through the development of a hydraulic model.

3.10 It was agreed in the meeting that the model, hydrology and validation reports, along with an updated FRA addressing each point in term would be submitted to the Agency for full review. Following the full review and subject to the relevant information being suitable, the Agency confirmed that they would remove their objection prior to the Inquiry.

The Council's Statement of Case

3.11 In response to the Appellants' Appeal, the Council prepared a Statement of Case dated June 2025, a copy of which is provided in CD 2.2.

3.12 Section 10, *Main Issue 6: Impact on Flooding and Drainage* sets out the Council's case on this matter.



3.13 The Council confirms that following determination of the application, revised flood mapping published by the Agency in early 2025 shows that the proposed access is in Flood Zones 2 and 3.

3.14 The Council then summarises the Agency's reasons for objecting to the application:

- *No design flood level provided for the 1% Annual Exceedance Probability (AEP) event with climate change allowance.*
- *Failure to assess the impact of climate change on fluvial flood risk.*
- *No confirmation of safe finished floor levels above the design flood level.*
- *Lack of demonstration of no adverse impact on floodplain storage.*
- *No assessment that the required buffer strip (minimum 8m required) from the adjacent main river (Hatchgate Ditches) has been met.*
- *No assessment of the proposed river crossing's flood risk impact.*
- *Lack of detailed modelling of the watercourse.*

3.15 However, I note that these reasons differ slightly from those set out in the Agency's letter of 29 October 2024 and their Statement of Case but do reflect a number of informatives.

The Agency's Statement of Case

3.16 A copy of the Agency's Statement of Case is provided at CD 2.3.

3.17 The Agency advise that parts of the Appeal Site are now shown to be in Flood Zone 2 and acknowledge that this is a change from when the application was submitted due to the update to the flood mapping. However, they repeat the informative from their consultation response that the flood risk to the site is not fully understood as there is no available hydraulic modelling.

3.18 The wording that I quote verbatim at paragraph 3.4 from the letter of objection is repeated in the Statement of Case.

3.19 It is acknowledged that the Agency have received detailed modelling files from the Appellants that are under review by their evidence and risk team and that the Agency undertake to provide a more detailed response once the review has been completed.



4.0 Updated Flood Risk Assessment and Drainage Strategy

Hydraulic Model

- 4.1 As set out in the Appellants' Statement of Case, the Agency agreed that they would review their objection to the application subject to a review of a hydraulic model developed to evaluate the flood risk to the Appeal Site.
- 4.2 SLR was commissioned to develop a hydraulic model that was submitted to the Agency for review on 25 April 2025 together with an updated Flood Risk Assessment and Drainage Strategy reference 432.010035.00001 dated 15th April 2024 Revision P03 (FRA Rev P03) to reflect the result of the modelling. A Flood Risk Modelling Report Revision 01 describing the construction of the hydraulic model was enclosed at Appendix C1 of FRA Rev P03.
- 4.3 However, the Agency did not receive the link to the file download, and it was resent on 15 May 2025. Subsequently, the Agency requested a formal separate hydrology report prepared in their standard format.
- 4.4 A revised package of information that included several minor amendments was sent to the Agency on 5 June 2025 for their formal review. The information submitted comprised:
- Flood Risk Assessment and Drainage Strategy revision 04 (FRA Rev 04) (A copy is provided at CD 9.4)
 - Flood Risk Modelling Report Revision 02 (enclosed at Appendix C to FRA Rev 04)
 - Hurst Flood Estimation Report (enclosed at Appendix D to FRA Rev 04)

A copy of the covering email is provided at CD 9.5. Please note that the digital model files have not been provided in the Core Documents.

- 4.5 The Agency provided the results of their review of the hydraulic model and hydrology report under cover of their email of 27 June 2025. A copy of the email is provided at CD 9.6 and the formal review documents for the Flood Risk Modelling Report and Hurst Flood Estimation Report are provided at CD 9.7 and CD 9.8 respectively.
- 4.6 As set out in the email of 27 June 2025, the Agency found the hydraulic model '*unfit for purpose*'. I address this below.
- 4.7 However, the Agency in their email of 27 June 2025 also stated that:

'We are happy with all other aspects of the flood risk assessment so the submission of an acceptable model will allow us to remove our objection and suggest conditions'



Update to the Hydraulic Model

4.8 The Agency's hydraulic review methodology is based around a Red / Amber / Green system (RAG) and is summarised in Table 4-1 below.

Table 4-1: Agency's RAG Review System

Rating	Description	Minimum expected response	Maximum expected response	Planning Response
OK	Good practice	No minimum	No maximum	No Objection
Green	Negligible impact on the results that is unlikely to change the outcome of the study. Consider for future studies. Taking action to address issues would be expected and some issues may be addressed coincidentally by work on others	Acknowledge the comment in the spreadsheet and update the limitation section of the report	Actions done to address the issue identified	No Objection
Amber	Potential impact on the results that may change the outcome of the study. Follow recommendation. Taking action to address issues should be undertaken, some issues may be addressed coincidentally by work on others	Comments justifying the approach taken and update the limitation section of the report	Actions done to address the issue identified	Consider objecting to the application based on comments highlighted in this category.
Red	Has an impact on the results that may significantly change the outcome of the study. Must do. If no action is taken the response must clearly demonstrate why the issue raised is not relevant and the approach employed is justified backed up with evidence. If issues highlighted red are ignored, then submissions should always be sent back	Comments thoroughly justifying approach from applicant based on evidence and update the limitation section of the report if action is not addressed	Actions done to address the issue identified	Application to be objected if comments are highlighted in this category

4.9 A summary of the review completed by the Agency provided at CD 9.7 and 9.8 is set out in Table 4-2 below.



Table 4-2: Summary of Agency Review.

RAG Rating	Flood Risk Modelling Report	Hurst Flood Estimation Report
Green issues	4	10
Amber issues	27	12
Red issues	4	15

4.10 I have reviewed the issues raised by the Agency and summarise the actions required to address them in Table 4-3 below.

Table 4-3: Summary of model review actions

RAG Rating	Action to resolve model review issues			
	No action	Provide missing data	Update reporting	Update model
Flood Risk Modelling Report				
Green issues			3	1
Amber issues		6	14	7
Red issues		1		3
Hurst Flood Estimation Report				
Green issues	1		9	
Amber issues	1		8	1
Red issue			5	10

4.11 Each of these issues has been reviewed and addressed by the SLR Modelling Team and the following files and documents were submitted to the Agency for their second review on 7 July 2024:

- Updated hydraulic model (V008);
- Flood Risk Modelling Report Revision 03 provided at CD 9.9;
- Hurst Flood Estimation Report provided at CD 9.10; and
- Missing survey data requested provided at CD 9.11

4.12 A copy of the covering email is provided at CD 9.12.

4.13 Again, digital model files have not been included in the Core Documents.

4.14 As I note at paragraph 4.7, the Agency had previously confirmed that they were ‘happy with all other aspects of the flood risk assessment’.

4.15 Enclosed at Annex A to my proof, is a summary of the issues raised by the Agency, the actions they require, SLR’s technical response to each issue and, to assist the Inquiry, my high-level summary of the issues and the actions required to address them.

4.16 It is my opinion that the issues raised by the Agency have been satisfactorily addressed by the 11 July 2025 submission. However, the Agency’s formal 2nd review



will not be available until after the submission of my proof and I therefore reserve the right to provide further commentary on any outstanding issues should they arise.

Flood Risk Assessment

- 4.17 To reflect the updated hydraulic model, the Flood Risk Assessment and Drainage Strategy was revised to revision P05 (FRA Rev P05) and submitted to the Council and PINS under cover of *Technical Memorandum, Flood Risk Information Reference and Summary v04* dated 11 July 2025 a copy of which is provided at CD 9.13.
- 4.18 The purpose of the Technical Memorandum was to provide a schedule of the current relevant information relating to the flood risk to the Appeal Site, an update on the hydraulic model submitted to the Agency for further review on 7 July 2025 and a summary of the flood risk to the Appeal Site.
- 4.19 Two plans, Appendix J-1 and Appendix J-2, were enclosed with the Technical Memorandum that provide a comparison of the modelled fluvial and pluvial flood envelopes with those shown by Agency mapping. Copies of these plans are provided at CD 9.14.
- 4.20 Section 5 of the FRA Rev 05 provided at CD9.15 provides a review of the flood risk to the Appeal Site from fluvial, pluvial and groundwater sources. Whilst it is concluded that the overall flood risk to the Appeal Site is 'Low', paragraph 173 of the National Planning Policy Framework (NPPF) requires the sequential test is to be applied to the development.
- 4.21 It is a moot point that based on the proportion of the Appeal Site at risk of pluvial flooding the Council's *Sequential and Exception test* dated September 2024 would not require the sequential test to be applied, as it is triggered in any event by the fluvial flood risk. A copy of the document is provided at CD 9.16.
- 4.22 I deal with the sequential test and the application of the exception test that follows in Section 5.0.



5.0 Sequential and Exception Tests

Sequential Test

- 5.1 As I discuss at paragraph 4.20, the Appeal Site is at risk of fluvial flooding and the NPPF requires that the sequential test is applied to the development.
- 5.2 Evidence on the application of the sequential test to the Appeal Site will be presented on behalf of the Appellants by others as this is largely a planning matter. However, at the time of completing my Proof, I am advised that it is likely that the application of the sequential test will fail.

Exception Test

- 5.3 Whether or not the sequential test is passed, I have considered the application of the exception test to the Appeal Site. As set out at Section 3.2 of the FRA Rev P05, the flood risk vulnerability classification of the proposed residential development would be ‘*more vulnerable*’ and with reference to *Table 2: Flood risk vulnerability and flood zone ‘incompatibility’* of the Planning Practice Guidance (PPG), the exception test should be applied.
- 5.4 Paragraph 178 of the NPPF requires that to pass the exception test it should be demonstrated that:
- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and*
 - b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*
- 5.5 Part a) of the exception test is again largely a planning matter and evidence will be presented on behalf of the Appellant to demonstrate how this is passed. I will therefore address Part b) of the test.

Exception Test – Surface Water (Pluvial) Flooding

the development will be safe for its lifetime taking account of the vulnerability of its users

- 5.6 The flood risk from surface water flooding is considered at Section 5.4.2 of FRA Rev P05 (CD 9.15). As shown by FRA Rev P05 Figures 5-4, 5-5 and 5-6, the flooding is limited to isolated locally low-lying areas where rainfall will naturally pond during a storm, rather than overland flow paths across the Appeal Site.
- 5.7 Therefore, where these isolated areas are within parts of the Appeal Site that are to be developed, the incident rainfall will be captured and managed by the proposed sustainable drainage strategy set out at Section 7.0 in FRA Rev P05.



without increasing flood risk elsewhere

- 5.8 The proposed surface water drainage strategy set out at Section 7.0 of FRA Rev P05 describes how for all storm events up to and including the 1% (1 in 100) AEP storm event allowing for the impact of climate change, runoff from the Appeal Site will be attenuated to that of the undeveloped site for the 100% (1 in 1) storm event.

where possible, will reduce flood risk overall

- 5.9 This will result in a reduction in surface water runoff from the Appeal Site for all storm events greater than the 100% (1 in 1) AEP storm event and therefore will reduce the flood risk overall.

Conclusion

- 5.10 I therefore consider that in respect of surface water (pluvial) flooding, the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere and will reduce flood risk overall.

Exception Test – Groundwater Flooding

the development will be safe for its lifetime taking account of the vulnerability of its users

- 5.11 The risk of flooding from groundwater is addressed at Section 4.1.5 of FRA Rev P05. The Appendix A Map C3 of the *Wokingham Borough Council Level 1 Strategic Flood Risk Assessment, Final Report* (SFRA) dated May 2023 provided at CD9.17 shows that the Appeal Site is at risk of groundwater flooding.
- 5.12 I have been provided with a copy of the Phase 1 Desk Study and Phase 2 Ground Investigation reference 26519 dated 7 March 2023 that was prepared by Hydrock (the Hydrock Report) to identify and evaluate geotechnical and geo-environmental site constraints. A copy of the Hydrock Report is provided as CD 9.18.
- 5.13 The executive summary of the Hydrock Report confirms that subsequent to the completion of the site investigation groundwater levels were measured at between 0.1m and 1.3m below ground level.
- 5.14 It is clear therefore that there is a risk of groundwater emergence during periods of prolonged rainfall. However, any such emergency will follow the general slope of the Appeal Site to the south west toward the main river and section of open watercourse.
- 5.15 Groundwater flooding will therefore only occur within locally low-lying areas in a very similar manner to the risk of surface water flooding I discuss above. These locally low-lying areas that are potentially prone to groundwater (and surface water flooding) will be addressed as part of the sustainable drainage strategy.

without increasing flood risk elsewhere

- 5.16 The Hydrock Report confirms that the near surface groundwater body in the Kempton Park Gravel Member is 'perched' on the underlying lower permeability Lambeth Group. The site investigation confirms that thickness of the Kempton Park Gravel Member varies between 1.9m and 3.2m thick, with an average thickness of 2.47m.



- 5.17 The proposed development will reduce the direct groundwater recharge by directing surface water runoff to main river, rather than allowing it to infiltrate to ground. Therefore, in my opinion the proposed development will reduce the risk of groundwater flooding, albeit the reduction is unlikely to be significant given the extent of the Kempton Park Gravel Member in the vicinity of the Appeal Site.
- 5.18 Another potential effect of the development would be to obstruct near surface groundwater flow through the construction of below ground building foundations and the like. This could potentially increase groundwater levels up groundwater gradient of the Appeal Site. However, given that the existing groundwater gradient is likely to be very shallow following the local topography, the depth and relatively high permeability of the Kempton Park Gravel Member and the proposed density of development, it is my opinion that the effect is likely to be negligible.
- 5.19 Therefore, in my opinion, the proposed development is unlikely to have a significant impact on the groundwater regime underlying the Appeal Site and hence the groundwater flood risk elsewhere.

where possible, will reduce flood risk overall

- 5.20 As I discuss above, I do not consider that the proposed development will have a significant impact on the groundwater regime underlying the Appeal Site and as such will not reduce the groundwater flood risk overall.

Conclusion

- 5.21 I therefore consider that in respect of groundwater flooding, the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere.

Exception Test – Fluvial Flooding

the development will be safe for its lifetime taking account of the vulnerability of its users

- 5.22 Paragraph 002 of the Flood risk and coastal change section of the PPG defines the 'design flood' as the river flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year) plus an appropriate allowance for climate change. In my experience, it is generally held that the safety of a development should be considered in the context of the design flood.
- 5.23 The extent of the design flood is shown by Figure 5-1 in FRA Rev P05 (CD 9.15) and reproduced as Appendix H-2 in the Flood Risk Modelling Report Revision 03 (CD 9.9). I have enclosed a copy of figure Appendix H-2 at Annex B for ease of reference.
- 5.24 Paragraph 005 of the PPG Flood risk and coastal change section of the PPG requires that when assessing the safety implications of flood risk for development proposed in a planning application, the following should be considered:
- the characteristics of a possible flood event, including residual risks from flood risk management infrastructure e.g. the type and source of flooding and frequency, depth, velocity, speed of onset and duration;



- the safety of people within a building if it floods and also the safety of people around a building and in adjacent areas, including people who are less mobile or who have a physical impairment. This includes the ability of residents and users to safely access and exit a building during a design flood and to evacuate before an extreme flood (0.1% annual probability of flooding with allowance for climate change);
- the structural safety of buildings: and
- the impact of a flood on the essential services provided to or from a development.

Characteristics of the flood event.

5.25 The characteristics of the design flood are set out in the Flood Risk Modelling Report Revision 03 (CD 9.9) and are summarised in Table 5-1 for the area of the Appeal Site at risk of flooding shown by figure Appendix H-2 enclosed at Annex B.

Table 5-1: Summary of Design Flood Characteristics

Flood Metric (Design Flood)	Characteristic
Type and source of flooding	Fluvial flooding from Main River
Frequency	Less than 1% annual probability
Depth	0.05m
Velocity	0.004 ms ⁻¹
Speed of onset	Flooding of the Appeal Site starts 7.5 hours after the start of the rainfall event and reaches a peak at 12.5 hours
Duration	The duration of flooding from the onset until it recedes from the Appeal Site is 11.5 hours

The safety of people within a building

5.26 It is clear from figure Appendix H-2 that the extent of the design flood is limited to the internal road network within the Appeal Site. There is one property shown by the illustrative masterplan that is immediately adjacent to the design flood envelope.

5.27 Paragraph 8.2.5 of the SFRA (CD9.17) states that:

‘the EA advises that minimum finished floor levels should be set 300mm above the 1% AEP plus climate change peak flood level, where the appropriate new climate change allowances have been used. An additional allowance may be required because of risks relating to blockages to the channel, culvert or bridge and should be considered as part of an FRA.’

5.28 Section 3.5 of the Flood Risk Modelling Report Revision 03 addresses the freeboard that should be provided above the design flood level to cater for uncertainty in the hydraulic model. The analysis concludes that the modelling has a ‘3 star Confidence rating’ and as such a minimum 0.6m freeboard should be provided, i.e. finished floor levels should be set a minimum of 0.6m above the design flood level.



5.29 The maximum design flood level within the Appeal Site is 37.53mAOD and therefore in my opinion the minimum finished floor level of the dwellings should be set at **38.13mAOD**.

5.30 For comparison, and to address the ‘additional allowance’ point in the SFRA, Table 5-2 provides a summary of the modelled outputs in comparison to the recommended freeboard allowance.

Table 5-2: Modelled Outputs vs Freeboard

Model Scenario	Flood Level (mAOD)	Freeboard (m)
Baseline Modelling		
1% AEP plus 46% Climate Change Allowance (design flood)	37.53	0.60
0.1% AEP	37.59	0.54
0.1% AEP plus 46% Climate Change Allowance (extreme flood)	37.67	0.46
Sensitivity Analysis on Design Flood		
50% culvert blockage	37.64	0.49
75% culvert blockage	37.65	0.48
20% increase in roughness	37.53	0.60
0.3m surcharge on downstream boundary (culvert)	37.53	0.60
0.6m surcharge on downstream boundary (culvert)	37.56	0.57

5.31 I therefore conclude that by adopting a 0.6m freeboard allowance, the occupants of the buildings would not be at significant risk, i.e. they would be safe during times of flood.

The ability of residents and users to safely access and exit a building during a design flood and to evacuate before an extreme flood (0.1% annual probability of flooding with allowance for climate change)

5.32 With reference to Table 4 of the Supplementary note on Flood Hazard Ratings and Thresholds for Development Planning and Control Purpose - Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1, based on the depth of flooding and the velocity of the floodwaters predicted by the hydraulic model for the design flood (summarised in Table 5-1), the maximum ‘Flood Hazard Rating’ is 0.53 which results in a ‘Hazard to People Classification’ of ‘Very low hazard – Caution’. A copy of this document is provided at CD 9.19.

5.33 Whilst the *Flood Hazard Rating* increases for the extreme flood, the ‘*Flood Hazard Rating*’ is less than 0.75 and as such the ‘*Hazard to People Classification*’ remains ‘*Very low hazard – Caution*’ albeit over a wider area within the Appeal Site.

5.34 The ‘*Flood Hazard Rating*’ and maximum flood depths for the extreme flood is shown by figure Appendix H-12 and H-13 respectively enclosed at Annex C.

5.35 Whilst a number of the dwellings shown on the illustrative masterplan are shown to be within the extreme flood envelope, as shown by Table 5-2, the floor levels are set well



above the extreme flood level. The areas of built development within the Appeal Site that are at risk of flooding during an extreme flood are therefore confined to the internal access roads.

5.36 The maximum depth of flooding along the internal access road during the extreme flood is 0.165m and the maximum velocity is 0.12ms^{-1} . It is my understanding that emergency service vehicles can readily traverse floodwaters of this depth and velocity along with the majority of motor vehicles. The maximum depth and velocity of floodwaters along the internal access road during the design flood is 0.05m and 0.004ms^{-1} respectively as set out in Table 5-1.

5.37 I therefore conclude that residents and users of the proposed development would be able to safely access and exit a building during a design flood and to evacuate before an extreme flood. It is clear from Table 5-1 above that the onset of flooding occurs slowly.

The structural safety of buildings

5.38 As the finished floor level of the buildings will be a minimum of 0.60m above the design flood level and 0.46m above the extreme flood level, I conclude that there will be no issue with the structural safety of buildings.

the impact of a flood on the essential services provided to or from a development

5.39 Essential services to a development might include:

- Electrical supply;
- Gas supply;
- Water supply; and
- Telecoms

5.40 These services are normally installed in below ground ducting, or directly in the ground. My understanding is that ducting is not sealed against the ingress of water and therefore under normal operating conditions, it can be expected that the ducting, and hence the service, will be inundated from time to time.

5.41 Therefore, in my opinion, the limited depth and duration of flooding predicted by the hydraulic modelling for the design flood would have no greater impact on the essential services that experienced under their normal operating conditions.

5.42 The only exception might be if there are to be above ground service cabinets for telecoms or sub-station for the electricity supply, in which case they should be set above the design flood level.

without increasing flood risk elsewhere

5.43 In my experience, when considering the impact on the flood risk elsewhere through the displacement of floodwaters or obstruction of flood flows, the impact is assessed against the design flood.



- 5.44 As shown by figure Appendix H-2 enclosed at Annex B, the part of the Appeal Site at risk of flooding during the design flood is confined to the internal road network. The dwellings with raised finished floor levels are beyond the design flood envelope.
- 5.45 Therefore, provided there is no land raising within design flood envelope without suitable compensation elsewhere, the proposed development would not increase the flood risk elsewhere by virtue of the reduction in floodplain storage or the obstruction of flood flows.

where possible, will reduce flood risk overall

- 5.46 In my opinion, the proposed development will not reduce the fluvial flood risk overall.

Exception Test Conclusions

- 5.47 To conclude, in my opinion the proposed development passes the exception test as it:
- will be safe for its lifetime taking account of the vulnerability of its users;
 - will not increasing flood risk elsewhere; and
 - will reduce flood risk overall.



6.0 Fifth Reason for Refusal

6.1 The Council's fifth reason for refusal states:

'In the absence of a satisfactory Flood Risk Assessment and the Environment Agency objection, the proposed development has failed to demonstrate it would have an acceptable flooding and drainage impact contrary to Core Strategy policy CP1 and CP3, MDD Local Plan Policy CC09 and CC10 and Section 14 of the NPPF'.

6.2 I have set out below my consideration of the reason for refusal.

The absence of a satisfactory Flood Risk Assessment and the Environment Agency objection

6.3 I discuss at paragraph 4.7 that the Agency has confirmed that with the submission of an acceptable model they will remove their objection.

6.4 I discuss the update to the hydraulic model at Section 4.0 and anticipate that the information submitted for the Agency's second review should enable them to remove their objection.

6.5 I therefore anticipate this part of the reason for refusal has been resolved.

Core Strategy Policy CP1

6.6 Paragraph 9) of CP1 states that planning permission will be granted for development proposals that avoid increasing (and where possible reduce) risks from all forms of flooding (including from groundwater)

6.7 As I set out in Section 5.0, as the exception test is passed and the proposed sustainable drainage strategy will reduce the flood risk from surface water flooding, I conclude that the provisions of Policy CP1 are met.

6.8 I have not considered paragraph 4) of CP1 as drainage was not a reason for refusal.

Core Strategy Policy CP3

6.9 Paragraph b) of CP3 states that planning permission will be granted for development proposals that provide a functional, accessible, safe, secure and adaptable scheme.

6.10 In the context of flood risk, as I set out in Section 5.0, the exception test is passed and therefore, I conclude that the provisions of Policy CP3 are met as the development will be safe.

Managing Development Delivery Local Plan Policy CC09

6.11 Policy CC09 in effect mirrors the requirements of the NPPF sequential and exception tests, albeit a previous version.



- 6.12 The FRA Rev P05 and Section 5.0 of this Proof address Parts 1 and 2 of the Policy that in my opinion are met.
- 6.13 As I discuss at Section 5.2, I understand the application of the sequential test is likely to fail and therefore Part 3 of the Policy is unlikely to be met.
- 6.14 Part 4a) of the Policy is being addressed by others. Part 4b) is addressed at Section 5.0 of this Proof and I do not consider that Part 4c) of the policy is required given the flood risk to the Appeal Site.
- 6.15 Part 5 of the Policy is met by the FRA Rev P05.
- 6.16 In conclusion, it is my opinion that it is only Part 3 of the Policy that is unlikely to be met by the proposed development.

Managing Development Delivery Local Plan Policy CC10

- 6.17 Policy CC10 relates to sustainable drainage. I note that as there was no objection to the proposed development on the grounds of drainage as I discuss at paragraph 3.8.
- 6.18 In the absence of an objection to the application on the grounds of drainage, I conclude that the development meets Policy CC10.

Section 14 of the NPPF

- 6.19 The key policies set out in Section 14 of the NPPF in so far as they relate to flood risk are the application of the sequential and exception tests.
- 6.20 I address these at Section 5.0 and consider that the proposed development meets the exception test.
- 6.21 As I discuss at Section 5.2, I understand the application of the sequential test is likely to fail.
- 6.22 I conclude the proposed development only partially meets the requirements of Section 14 of the NPPF.

Conclusion

- 6.23 If as I am advised the application of the sequential test is likely to fail, then it is my opinion that apart from part of Policy CC09 and part Section 14 of the NPPF, the reasons stated for refusing the planning application in the fifth reason for refusal have been addressed.



7.0 Environment Agency Reasons for Objection

Introduction

- 7.1 I have considered below the Agency's reasons for refusal set out in their letter of objection dated 29 October 2024 reference WA/2024/131683/01-L01.
- 7.2 As I discuss at paragraph 4.7, the Agency has confirmed that they are happy with all other aspects of the flood risk assessment so the submission of an acceptable model will allow them to remove their objection and suggest conditions. Nevertheless, for completeness, I have addressed below the reasons for objection to the application.

Reasons for Objection

Provide a design flood level for the 1% Annual Exceedance Probability flood extent plus an appropriate allowance for climate change (1%AEP+CC), therefore it is unclear what impact the development may have on flood risk, and whether or not the development would be safe for its lifetime.

- 7.3 This information has been provided through the submission of the updated hydraulic model. The impact the development may have on flood risk, and whether or not the development would be safe for its lifetime, has been addressed through the application of the exception test that I discuss at Section 5.0.

Take the impacts of climate change on fluvial flood risk into account

- 7.4 This has been addressed through the resubmission of the hydraulic model that I discuss at Section 4.0

Demonstrate that finished floor levels will be set above the 1% annual exceedance probability (AEP) flood level with an appropriate allowance for climate change

- 7.5 This has been addressed through the application of the exception test that I discuss at Section 5.0

Demonstrate that the development would not adversely impact floodplain storage

- 7.6 This has been addressed through the application of the exception test that I discuss at Section 5.0

Demonstrate that the requirement for a buffer strip of at least 8m to the main river has been met

- 7.7 This has been addressed by ensuring there is no development proposed within 8m of the main river apart from the proposed development access as shown by Drawing 409.010068.00001-SLR-HDG-500-01 Rev P01 enclosed at Appendix A5 of FRA Rev P05.

Consider the impact of the proposed new crossing over the main river

- 7.8 The Agency's 'Informative - Advice to the applicant' states that:



‘The applicant may require a Flood Risk Activity Permit (FRAP) to undertake the proposed works as the main river [Hatchgate Ditches] runs adjacent to the site. As submitted, it is unlikely that a permit would be granted. The applicant would need to demonstrate that the proposed works will not adversely impact on flood risk or the watercourse.’

- 7.9 Following a recent survey of the main river that is culverted as it runs alongside the Appeal Site, it has been established that there is approximately 0.85m of cover to the crown of the culvert. The survey did not locate any chambers on the main river within the Appeal Site.
- 7.10 Based on this survey, an indicative detail has been prepared that shows how the access road could cross the line of the culvert without adversely impacting upon it. A copy of the Drawing No. 010068-SLR-HDG-XXX-SK-CD-001 Rev P01 is enclosed at Annex D.
- 7.11 As I discuss in the preceding sections of my proof, neither the proposed crossing of the culvert, nor the wider development proposals would have an adverse impact on the flood risk.
- 7.12 In my opinion, I see no reason why the Agency would withhold a permit for the crossing of the watercourse in the manner shown by the drawing enclosed at Annex D.

Conclusion

- 7.13 I anticipate that subject to the Agency being satisfied with the submitted update to the hydraulic model, they will remove their objection to the application.



8.0 Statements of Case

The Council

8.1 Section 10, *Main Issue 6: Impact on Flooding and Drainage* of the Council's Statement of Case sets out their case on this matter.

8.2 The Council confirms that following determination of the application, revised flood mapping published by the Environment Agency in early 2025 shows that the proposed access is in Flood Zones 2 and 3.

8.3 The Council then summarises and relies on the Agency's reasons for objecting to the application. I address these in turn below.

No design flood level provided for the 1% Annual Exceedance Probability (AEP) event with climate change allowance.

8.4 This has been provided with the updated hydraulic model submitted to the Agency.

Failure to assess the impact of climate change on fluvial flood risk.

8.5 This has been assessed as part of the updated hydraulic model submitted to the Agency.

No confirmation of safe finished floor levels above the design flood level.

8.6 This has been addressed through the application of the exception test that I discuss at Section 5.0

Lack of demonstration of no adverse impact on floodplain storage.

8.7 This has been addressed through the application of the exception test that I discuss at Section 5.0

No assessment that the required buffer strip (minimum 8m required) from the adjacent main river (Hatchgate Ditches) has been met.

8.8 Verification that an 8m buffer strip has been provided is shown by Drawing 409.010068.00001-SLR-HDG-500-01 Rev P01 enclosed at Appendix A5 of FRA Rev P05.

No assessment of the proposed river crossing's flood risk impact.

8.9 I address this at Section 7.0.

Lack of detailed modelling of the watercourse

8.10 A detailed hydraulic model has been provided to the Agency for their second review. I anticipate that the Agency will be satisfied with the submitted update to the hydraulic model and remove their objection to the planning application.



Environment Agency

- 8.11 The Agency's statement of case repeats the reasons for objection from their letter of objection that I have addressed at Section 7.0.

Conclusion

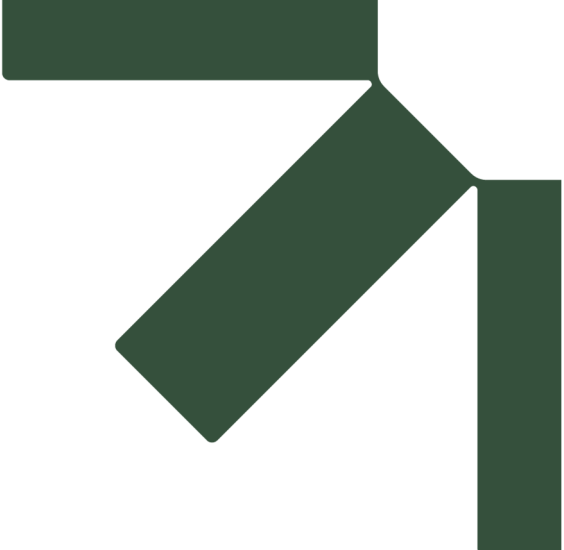
- 8.12 I consider that I have addressed the matters raised by both the Council and the Agency in their Statements of Case.



9.0 Summary and Conclusions

- 9.1 The Agency has confirmed that the submission of an acceptable model will allow them to remove their objection to the planning application. I anticipate that the Agency will be satisfied with the submitted update to the hydraulic model and will remove their objection.
- 9.2 There is no objection to the planning application on drainage grounds.
- 9.3 The updated hydraulic modelling shows that only a small part of the Appeal Site is at risk of fluvial flooding, however, my analysis confirms despite the risk of flooding from this and other sources, the exception test can be met.
- 9.4 The Appeal Site is at risk of pluvial (surface water) flooding, however, this is only in isolated areas where there are locally low-lying areas of land. The flood risk from these areas can be managed as part of the sustainable drainage strategy for the development.
- 9.5 The risk of fluvial flooding to the Appeal Site requires that a sequential test is required and this is being prepared on behalf of the Appellants by others, however, I am advised that this is likely to fail.
- 9.6 Therefore, in my opinion the proposed development is fully compliant with the parts of Core Strategy Policies CP1 and CP3 and Local Plan Policy CC10 that relate to flood risk, and only partially compliant Local Plan Policy CC10 and Section 14 of the NPPF.





Annex A Summary of the issues raised by the Agency Environment in the 1st review

**Land Between Lodge Road and Tape Lane, Hurst,
Wokingham, RG10 0EG**

Ian Walton Bsc (Hons) MSc DIC MICE CEng

**Section 78 Appeal against refusal of planning permission by Wokingham
Borough Council.**

SLR Project No.: 432.010035.00001

PINS Reference: APP/X0360/W/25/3364304

28 July 2025

Annex A

Hydrology 1st Review

Item No.	Environment Agency Review				SLR Response			
	Item Checked	Guidance Note	RAG 1	1st Review Comments	1st Review Actions	1st Review Response	Non Technical Summary	Action required
2.2.1	Does the method statement include maps showing the catchment and key locations and hydrological features?	●Include a map of the catchment in here, at a minimum showing the river network, catchment boundary and gauging stations, and appropriately labelled / referenced in a legend. Additional information which could be included is the model extent or locations of unusual / interesting features, for example. Think about the background mapping being used – scale and colour / greyscale – think about if the reader could easily identify locations from the background mapping. ●Include more than one map if that would assist in presenting the information, consider including maps using satellite imagery as background if that would better show key catchment features, and consider including photographs if they would help understanding of features identified in the 'Description' section. For permeable catchments, consider including a hydrogeological map showing groundwater equipotential lines. ●Remember to give all figures a number and title and refer to them in the text. ●Consider changing the page orientation to landscape and the page size to A3 if necessary or including maps as a separate digital appendix	Green	Yes, pattern of catchment delineation indicates a precise watershed tool has been used with southern end then manually adjusted. Central 'main' drainage ditch shown. Mapping shows this extends south and overland flow pathways indicate that southern part of the catchment may actually flow west directly into the another watercourse rather than north towards the site. Approach is however conservative.	Report section 5.2 states that, 'peak flows have been applied to the hydraulic model as a 2D source area upstream of the 1D channel.' The location of this 2D source area, understood to be used in some but not all events, should be shown on the map. See also 3.1.1 and 9.2.4.	The model inflow location (2D SA) is now shown on Figure 2.3 and reference made.	Location of 2D source area inflows to be shown on the drawings. This has been addressed	Update reporting
2.2.2	Does the method statement describe the catchment and its hydrological features, including how runoff is generated during flood events and any unusual features that might affect the flood hydrology.	●Think about how runoff will be generated and what features are going to affect runoff from the contributing catchment reaching the watercourse. Include: ●Topography ●Climate ●Geology ●Soils ●Land use ●Any unusual features (e.g., reservoirs, historic mining) that may affect the flood hydrology. ●In some cases, it may be useful to include reference to things such as amount of modelled reach that is culverted but remember that this is not a hydraulic modelling report and detail on hydraulic features, such as weir and culvert sizes, is not required.	Green	A general description of the catchment and flow mechanisms is provided. Use of FEH point descriptors in some respects is appropriate given likely variation in descriptors of surrounding local catchments.	No comment	N/A		No action
3.2.4	Has BFIHOST19 been used in preference to BFIHOST? Have values been checked against other soil or geological data? Has BFI been derived from local data?	●BFIHOST19 should be used in the ReFH2 calculations, since the current release (ReFH2.3) was calibrated using BFIHOST19, and also in the FEH Statistical method, since this has been found to improve the results. ●Soil association maps can be used to check BFIHOST values, especially if significant changes have been made to catchment boundaries. Any changes made must be recorded fully so that they can be checked and are reproducible. ●If using other BFIHOST data, explain what has been used, why, and how it has been derived.	Green	BFIHOST19 at site is reported.	Ideally, the cause of the historic surface water flooding at the site would be investigated in more detail, including with a soil survey or at least soil maps check.	A fuller description of the underlying soils and geology and how this relates to the adopted BFIHOST value is made.	A more comprehensive description of the underlying soils and geology has been provided. A discussion on the historic incidence of surface water flooding and how this likely relates to flooding being exacerbated by high ground water levels is included. Justification for the adopted BFIHOST value has been included and is supported by the underlying soil and geology information.	Update reporting
7.2.1	What methods were used to estimate model parameters? Have model parameters been listed? If flow estimation points are at or near a gauging station, have model parameters been estimated from observed data?	●List parameters for all site codes, including intervening areas and sub-catchments. ●Include a brief summary of what methods will be used at which subject sites. See Section 4.3 of the Flood Estimation Guidelines. ●More than one method may be tested at each site. Include all methods tested, even those ultimately rejected. ●See the Flood Estimation Guidelines for recommended approaches for modelling urbanised catchments. You only need to provide the urban area, TP urban scaling factor, IF, IRF and DS parameters if modelling as urbanised. ●ReFH2 treats BR (baseflow recharge) as a state variable rather than a parameter, setting it automatically in order to conserve volume. The values of BR vary with return period and so are not reported here.	Green	URBEXT2000 values is approximately correct (see Notes tab). The BR and routing model Tp values need to be provided as these vary depending on the catchment AREA used.	Provide all parameters used in calculations.	All parameters required by the EA template are now reported where relevant.	Confirmation of the parameters used in the hydrology model required. This has been addressed	Update reporting
9.4.1	Are checks on results included?	●See Section 3.5 of the Flood Estimation Guidelines. ●These checks are important as a way of ensuring that everything has been considered and that the results are sensible. ●All relevant sections should be completed for every study. Where sections are not relevant (where there are no flow gauges or previous studies, for example) a comment should be added to this effect rather than leaving a blank space.	Green	Checks on calculated flows undertaken (referenced in Hydraulic Modelling report). This may need to be revised following additional/updates to method have been made.	Update report if necessary following updates to methods.	Reporting has been fully revised following comments.	Reporting to be updated to reflect update to method of estimating flows. This has been addressed	Update reporting
9.4.2	Have the 1% and 0.1% AEP growth factors been derived and sense-checked? If the 1% AEP growth factor is outside the typical range, has a justification been provided?	●What is the range of 1% AEP (100-year) growth factors? Is this realistic? ●What is the range of ratios for the 0.1% AEP (1000-year) over 1% AEP (100-year) flow? ●What reasons are there for variations in ratios between sites?	Green	Yes, but there is no commentary over whether this is considered appropriate and if so the acceptable range and source of this. This may need to be updated following any updated to the method.	Update report if necessary following updates to methods.	Reporting has been fully revised following comments.	Reporting to be updated to reflect update to method of estimating flows. This has been addressed	Update reporting
9.4.3	Has the specific discharge (l/s/ha) been derived, and are variations between locations explained?	●What specific discharge (flow in l/s/ha) do the results equate to? Can you explain variations in specific discharges between different locations across the study area?	Green	Yes, but there is no commentary over whether this is considered appropriate and if so the acceptable range and source of this. This may need to be updated following any updated to the method.	Update report if necessary following updates to methods.	Reporting has been fully revised following comments.	Reporting to be updated to reflect update to method of estimating flows. This has been addressed	Update reporting
9.4.5	Have the design flows been checked for spatial consistency, e.g. at confluences and along reaches?	●This will not be relevant for a study where there is only a single flow estimation point. ●See Section 6.1 of the Flood Estimation Guidelines. FEH methods are intended for application at individual sites and may not give spatially consistent results if applied to multiple sites along a river system. ●You should particularly check for consistency between upstream and downstream points and at confluences.	Green	Yes, good commentary, though this may need to be updated following any updated to the method.	Update report if necessary following updates to methods.	Reporting has been fully revised following comments.	Reporting to be updated to reflect update to method of estimating flows. This has been addressed	Update reporting
9.5.3	Are the limitations acknowledged and specific to the study?	●See Section 5.3 of the Flood Estimation Guidelines. ●This could include applying methods outside of the range of catchment characteristics or return periods for which they were developed.	Green	Report acknowledges absence of local gauged data but also states a lack of flood records, when these exist for the site.	Update limitation around historic data.	As stated a fuller discussion of the available historic flood information and the limitations to its usefulness is now included.	Reporting to be updated to reflect the availability and usefulness of the historic data. This has been addressed	Update reporting

Annex A

Hydrology 1st Review

Item No.	Environment Agency Review			SLR Response				
	Item Checked	Guidance Note	RAG 1	1st Review Comments	1st Review Actions	1st Review Response	Non Technical Summary	Action required
9.5.4	Does the report comment on uncertainty in the design flows?	- See Section 5.4 of the Flood Estimation Guidelines. - Uncertainties in the peak flow estimates should always be quantified if it is possible to do so for the method applied. - Note that the confidence limits given in the Flood Estimation Guidelines assume that the AMAX flows follow a generalised logistic distribution. If you have fitted a different distribution, these confidence limits will not be applicable. - Complete the table with flows from the uncertainty analysis. The default is the 95th percentile upper and lower bounds, but other estimates may need to be provided depending on the requirements of the study.	Green	The report states that 'the development of a suitable approach was outside the scope of this project', but is needed to understand whether a reliable flood estimation calculation is produced. It is noted that "As described in Section 5.4 of the Flood Estimation Guidelines, it is difficult to quantify uncertainty from the ReFH2 rainfall-runoff model at this stage," whilst this is true for the model uncertainty can be associated with other aspects including catchment boundary etc.	Provide comments on other sources of uncertainty, this doesn't need to necessarily be linked to confidence intervals.	Section revised and uncertainty is now discussed further. An attempt is made to indicatively quantify the uncertainty in the ReFH2 results and the assumptions etc. are now stated in the revised reporting.	Reporting to be updated to reflect sources of uncertainty associated with the estimation of flows. This has been addressed	Update reporting
1.1.1	Does the report include a summary at the start that covers: - Catchment location - Purpose of study and complexity - Key catchment features - Flooding mechanisms - Gauging stations - Final choice of method - Key limitations and uncertainties	- This section provides a summary of the key information contained within the detailed assessment in the following sections. - The aim is to enable quick and easy identification of the type of assessment undertaken. This should assist in identifying an appropriate reviewer and the ability to compare different studies more easily. - Keep the text to one or two sentences for each point.	Amber	The watercourse along the western site boundary is a 'Main River' and the EA have specifically requested that this is modelled. The report does acknowledge the risk of flooding from surface water at the site and historical flooding records (see Figure 1) but states that these are 'associated with the watercourse, and as such is treated as fluvial'. These areas are however hydraulically isolated from watercourses maximum extents. It is understood that the hydraulic modelling report includes separate fluvial and pluvial scenarios but this is not made clear in this FER and the separate methodologies and inputs used for each are not explained. The final choice of method only states 'ReFH2 flows', with no mentioned of baseflow or rainfall applied. The latter parts of the report do include rainfall results but there is no explanation of how the baseflow has been generated and applied. Report states 'key limitation/uncertainty' that there is not detailed info regarding flooding. There are however areas of NaFRA2 2m flood risk from surface water and rivers as well as historic flooding areas for comparison, though this may be handled within the hydraulic modelling report.	The FER needs to stand alone from the hydraulic modelling report, explaining the scenarios the hydrology used in each separately. This needs to include reference to baseflow methodology (it is not clear whether a peak baseflow or full hydrograph have been used) and whether this is different for different events.	The calculation record has been fully updated to explicitly state that the modelling scenarios are independent of one another and are assessed separately. Incidents of historic flooding are now explicitly discussed including the limitations to their usefulness. As now mentioned in the reporting, the evidence would suggest that the flooding shown is attributed to high ground water levels following above average rainfall.	Clarification required of the hydrology scenarios used for both the fluvial and pluvial model. This has been addressed	Update reporting
2.1.1	Does the method statement include an overview of the project, its scope and hydrological complexity?	- The content and level of detail provided in this section will depend on the scope of the study. The following should be included as a minimum: - Purpose of study - Peak flows or hydrographs? - Design events for which flow estimates are to be made (AEP %) - Climate change allowances with reference to relevant guidance - Potential number of locations for flow estimation - The purpose of the document - What is the complexity of the study – simple, routine, moderate, difficult, very difficult? - What does the client's scope specify for inclusion in the study, e.g., review of existing studies, rating reviews / updates, simple / detailed flood history review, ReFH model parameter estimation, joint probability? - Include a reference to any modelling reports which this flood estimation calculation record supports.	Amber	Section states that the site is in Flood Zone 1 but report Figure 2 shows red line boundary extends up and over ditch along west (see Figure 2). A low risk of flooding from surface water is also stated. NaFRA2 risk of flooding from surface water clearly shows areas of medium and high risk across the site from this source. The report also states that areas at risk of flooding from surface water are 'associated with the unnamed tributary' but some are shown to be isolated in the centre of the site, offset from the watercourse. It is stated that peak flow, net rainfall and accompanying hydrographs/ hyetographs are required however, the use of these needs further justification and explanation as to how they will be used in the model.	Quoted risk of flooding from surface water should be reviewed in light of NaFRA2 mapping. This has been available since Jan 2025. Update the report on the purpose of the outputs (peak flow and net rainfall).	Description of flood risk has been reviewed against NaFRA2 mapping and revised accordingly. The inputs derived by the hydrological assessment and how they will be used in the study is explicitly stated for clarity.	Reporting did not reflect the most recent Environment Agency mapping. This has been addressed.	Update reporting
2.3.8	Has other relevant data been sought and presented in the report? Has data quality been reviewed? Have any flood alleviation schemes been carried out or other significant catchment changes which could affect the relevance of older data?	- Check flow gaugings / spot flow gaugings are only required if you are reviewing a rating - Historical flood data: a chronology and interpretation of the flood history should be included in the appendix or in an additional report (add references). The detail included will depend on requirements in the project scope. If there is a flow gauge within the study reach (or close by), consider if the historical flood data could be used to extend the systematic gauge record (see FEH Local guidance for more information). - Potential evaporation data may be required if the ReFH Calibration Utility is being used. - Other data or information could include groundwater, tides, channel widths, low flow statistics, sewer network data, or any other data used in your analysis. Add extra rows to the table if needed.	Amber	Environment Agency Historic Flood Map extents highlighted but attribute data missing. 'EA Recorded Flood Outlines' polygon anecdotal attribute data highlights potential source and date, which it may be possible to infer a return period from with further investigation. It may be possible to use this for calibration/verification purposes.	Include 'EA Recorded Flood Outlines' anecdotal data and investigate return period for event. How do modelled results compare?	The historic flood information has been reviewed for its suitability, the surface water extent shown is likely exacerbated by high ground water levels (typical of the catchment based on soilscape description). As such it does not represent a 'good' event to adopt to validate model results. A fuller description of the available information is provided	Reporting did not compare the modelled results and the EA Recorded Flood Outline. The report has been updated to confirm that the recorded outlines are not considered a suitable comparison as the flood extent reflects a different flood mechanism (i.e. groundwater induced). This has been addressed.	Update reporting
7.3.3	What design events are listed for lumped catchments? Are the choices suitable?	- Storm durations detailed here should be the values for the individual catchments. Lumped flows should be generated using the storm duration relevant to each lumped catchment. - A summer storm should be used if the catchment is heavily urbanised (URBEXT2000 between 0.15 and 0.3) AND highly permeable (BFIHOST19-0.65). - Cini and BFO values only need to be listed if amended from default values. - This section can be deleted if ReFH2 is not being applied for lumped catchments.	Amber	Report Section 1.2 mentions a total of 10 events (excluding CC events) while Report Section 2.1 only mentions 5, including 2x CC events: a 0.1% + CC event (not normally required) as well as 1% + CC event. Text suggested a combined direct rainfall and fluvial point inflow approach will only be used for these two and the 3.3% event, suggesting others not.	Clarify which events are being run and why. See Section 9.3.4 regarding actual climate change allowances.	Text revised throughout to more clearly state what events and what CC allowances are applied.	Clarification required of the flood events that has been run together with justification. The climate change allowances were also revised. This has been addressed	Update model
7.3.5	Has storm duration testing been undertaken using the hydraulic model?	If storm duration testing using the hydraulic model is being undertaken add details of the results, for example, which duration(s) has been selected and why, what the process will be in terms of presenting model results if more than one duration is selected.	Amber	A realistic range of storm durations and seasonality needs to be undertaken to find those critical to the subject site or sites.	Undertake storm duration and seasonality testing. See Section 9.3.3.	The design net rainfall is derived based on the EA standards for RoSWF mapping and reference to the EA standards is now made. The 1, 3, 6 & 12 hour durations have been modelled to determine the worst case flooding. For the fluvial ReFH2 estimates we have determined the critical storm duration for the return periods assessed and this is now reported.	Additional sensitivity testing required for model inflows. This has been addressed	Update model
7.4.2	Are the final flood estimates from the ReFH2 method reported?	- Add or remove columns as needed to change the return periods to those used in this study. - Results only need to be provided here for lumped catchments, for comparison to other methods. Results for distributed catchments can be provided digitally but must still be provided to allow for checking. - If you have modelled a catchment as urban, make sure you record the urbanised flows rather than the as-rural flows.	Amber	If methods are revised/added, this may need to be updated.	Update if methods are revised/added.	Reporting is revised throughout.	Reporting to be updated to reflect revised methodology used to estimate flows. This has been addressed.	Update reporting
9.2.2	Does the report explain how hydrograph shapes or volumes have been derived?	N/A	Amber	There is some ambiguity about the use of peak or full timeseries rainfall and flows. This aspect needs greater clarification in the report text.	Clarify peak/full timeseries report text references throughout	Text revised, total rainfall now reported as more meaningful	Reporting to be updated to report total net rainfall rather than peak rainfall. This has been addressed.	Update reporting

Annex A

Hydrology 1st Review

Item No.	Environment Agency Review				SLR Response			
	Item Checked	Guidance Note	RAG 1	1st Review Comments	1st Review Actions	1st Review Response	Non Technical Summary	Action required
9.3.1	Have the final peak flow results been provided for all flow estimation points and design events?	●Include subcatchment and intervening catchment flows here or in digital files, to allow checking of the hydraulic model. ●If scaling factors have been used in a distributed model, provide full details of the original and final flows below or in the appendix.	Amber	A table is included with Peak Flows, but it is not clear whether these are used and if so why when they are based on the same direct rainfall model catchment.	Clarify and justify model setup.	Reporting revised to make explicitly clear.	Reporting to be updated to explicitly state how the modelled scenarios have been undertaken. This has been addressed.	Update reporting
9.3.3	If appropriate, what design storms have been applied in the hydraulic model?	●Use this section if appropriate to record the ReFH1 or ReFH2 design storm parameters applied in the hydraulic model, if they are different to those recorded in the ReFH1 and ReFH2 sections of this report. ●You must apply a uniform storm duration and areal reduction factor across all subcatchments. Refer to the Flood Estimation Guidelines Section 6.1. This may result in a number of different design storms being modelled to give critical results at different locations in the catchment. List all details below.	Amber	The recommended 3.25hr duration has been used, however as per item 7.3.5 storm duration testing is advised.	See Section 7.3.5.	Storm duration testing has now been undertaken and reported within the revised calculation record.	Additional sensitivity testing required for model inflows. This has been addressed	Update model
10.1.1	Are input data, output data and profile files available to provide evidence of calculations?	●If you are submitting work commissioned by the Environment Agency or for review by the Environment Agency, you should be prepared to submit as digital files your input data, output data and project files (where these exist) from the software you have used in the flood estimation. Refer to Section 8.1 of the Flood Estimation Guidelines. ●Use this section to list the files you are submitting, if relevant.	Amber	Digital files have been provided, but may need to be re-created in light of required changes.	Provide digital files if necessary to convey updated justification.	Reference to digital files is now removed. These will be provided if required.	Reference to these files removed from the report. Updated digital files have been provided alongside the revised reporting to support updated flood flow estimates.	Update reporting
10.1.2	Do the digital files use the same input data and parameters, and give the same results, as listed in the report?	N/A	Amber	No comment	See Section 3.2.3.	As above	Provide digital files to support updated flood flow estimates. Reference to these files removed from the report	Update reporting
10.2.1	Is other supporting information included as needed, complete and accurate?	●Include any additional information which best sits here rather than in the section text, for example, flood peak series, details of historical flood events, rating reviews, pooling groups, or details of flood event analysis. Include important information in the section text, for example, comparison of growth curves, or results of flood event analysis.	Amber	Requirement for additional information is pending receipt of confirmed/revised method and updated report and digital files.	No comment			No action
2.5.1	Are FEH methods appropriate?	●FEH methods may not be appropriate, e.g., for extremely heavily urbanised or complex catchments). Explain your decision.	Red	The EA National Hydrology team confirm (by email 18/06/25) that, 'The plot scale can be used to generate peak flows but is more generally used to estimate pre-development greenfield runoff rates for the plot scale (e.g. a field). For the catchment scale, even for small catchments, it is commonly better to use catchment scale equations'.	Correct plot scale methodology, reporting on Tp and BL values (for 0.23km2 original and 0.5km2 that are then used after area has been lowered back to catchment). Undertake FEH small catchments approach using an appropriate FEH catchment that includes the site (see Figure 6), detailing the method and parameters used. Compare results of two methods, justify one over the other and present final results. This may need to happen in light of tests in the hydraulic model to determine which is more appropriate (see Section 9.4.9).	Results have been derived based on catchment application of the ReFH2 model and by the FEH Statistical method adopting the small catchment procedures. Whilst the resulting flows are in broad agreement, the more precautionary estimates derived by the ReFH2 approach are adopted	Suitability of the method of estimation flood flows questioned. A comparison of the two recognised methodologies has been completed and the more conservative values adopted as a precautionary approach. This has been addressed.	Update model
2.5.2	Is an initial choice of method(s) included with adequate reasons? Have unusual catchment features been considered and choices of methods justified?	●See Section 3 of the Flood Estimation Guidelines. ●Think about: ●the type of problem ●the type of catchment ●the type of data available ●Which methods are appropriate? If more than one method is appropriate will all be applied, and the results compared before a final decision is made? Will non-stationary methods be applied? Will different storm durations need to be considered / tested?	Red	Where the hydraulic model involves both a direct rainfall and fluvial point inflow (via a small 2D area at the top of a watercourse) there may be double counting of flows if these are not just baseflow. The report clearly states 'Both peak flows and rainfalls are required to be estimated for input into the hydraulic model'.	Clarify how there is no double counting due to direct rainfall use with fluvial high flows or adjust reporting if only fluvial baseflows are being used in conjunction with rainfall? If the latter, are event specific baseflow timeseries being paired with the corresponding rainfall events? Are full timeseries or peak flows/rainfall being applied?	Reporting is revised in light of review comments. It is explicitly stated that the two model scenarios are undertaken independent of one another	The question of double counting of inflows raised where direct rainfall and fluvial inputs are used. Confirmed that there is no double counting. This has been addressed	Update reporting
3.2.2	Have FEH catchment boundaries been checked against high resolution LIDAR, sewer network, and OS data and refined where appropriate? If catchment area has been changed, have catchment descriptors been adjusted appropriately?	●Add maps if needed to aid explanation of any changes.	Red	Yes, LIDAR mapped with clear colour ramp in Report Figure 3. Study makes good use of precise GIS catchment delineation tools to downstream end of site. It is unclear if tests have been undertaken to confirm this is realistic however. EA overland flow pathways (Figure 5) indicate the southern section of the ditch towards Sawpit Road may in fact drain south and west towards the ditches/watercourses west of the B3030 and not drain north along the ditch forming the western site boundary. The main river map also shows connectivity to a larger catchment to the south. This could have significant implications on the catchment area and needs further investigation.	Investigate possibility of the exchange of flows with the larger catchment to the south. Provide review of small scale flow mechanisms from an initial run to confirm the setup (inc. overall catchment area) is correct. See Section 9.5.1 also.	The catchment boundary has been reviewed and revised. The catchment boundary now adopted has been determined by extensive investigations including the EA Overland Flowpaths and associated catchments, OS mapping (present day and historic) and a flow tracing algorithm in QGIS.	Review of catchment boundary required. Boundary revised following further investigation. This has been addressed	Update model
3.2.3	Does the calculation record state whether URBEXT1990 or URBEXT2000 has been used? Has the correct value been identified for the method(s) to be applied? Have the URBEXT values been updated to the current year or revised using the URBANS0k method if a discrepancy between the FEH urbanisation layer and current OS mapping has been identified?	●Explain the source of URBEXT used in the analysis (e.g., URBEXT1990, URBEXT2000, manually derived using URBANS0k). URBEXT1990 should only be used in ReFH1. ●If URBEXT values need to be substantially revised due to development or catchment boundary changes, see the URBANS0k method in Section 2.3 of the Flood Estimation Guidelines. ●Default URBEXT1990 and URBEXT2000 values should always be updated to the current year. Explain what method has been used (e.g., CPRE formula, manual derivation) and where (e.g., edited catchment descriptor files, updated within WinFAP software, updated within ReFH2 software).	Red	The report states that given the use of point descriptors, URBEXT2000 has been calculated using UKCEH Land Cover Map for 2023(4) and aerial imagery. Though this is likely approach is likely to be more accurate, there is no cross check against OS 1:50k mapping, which the EA FEG explicitly require. Any update should undertaken following confirmation of Section 3.2.2.	Confirm urban extent against OS 1:50k mapping.	Following revisions to the catchment boundary the URBEXT value was reviewed and revised. The reported value is now based on OS 50k mapping as per FEH guidance. This is highlighted in the report by way of a figure and also within the text. All adopted values used in the calculation have now been reported.	Review of urbanisation of catchment required following update of catchment boundary. This has been addressed	Update model
3.2.5	How have other catchment descriptors been checked and revised? How have catchment descriptors for sub-catchments been derived (particularly FARL, DPLBAR and URBEXT)?	●Refer to Section 2.3 of the Flood Estimation Guidelines for suggestions on how to check and amend catchment descriptors. ●Any changes made must be recorded fully so that they can be checked and are reproducible. ●Include before and after tables if appropriate.	Red	Only point descriptors checked. Catchment descriptors will need reviewing for FEH small catchments approach.	See above actions on point descriptors. Review catchment descriptors.	FEH CDs obtained for DS catchment and have been reviewed with regards to their appropriateness for the subject catchment. Where revisions have been made these are now clearly documented and justified.	Review of the catchment descriptors required that inform the flow estimates. Hydrology model adjusted as appropriate. This has been addressed	Update model
7.1.1	What is the purpose of applying this method? Has the method been avoided for large catchments?	●Include a brief summary of the reasons, specific to this study, for applying the method.	Red	The purpose of the study to model a particular source(s) of flooding as well as how base or peak fluvial flows are being used in conjunction with rainfall within in FEH method(s) needs to be clarified.	See Sections 1.1.1, 2.5.1 and 2.5.2.	As stated the text is now revised to explicitly state that the two scenarios are modelled separately.	Clarification of the two models run to inform the study, i.e. pluvial and fluvial. This has been addressed	Update reporting

Annex A

Hydrology 1st Review

Item No.	Environment Agency Review				SLR Response			
	Item Checked	Guidance Note	RAG 1	1st Review Comments	1st Review Actions	1st Review Response	Non Technical Summary	Action required
7.1.2	Are rural and urban sub-divisions used?	•This section can be deleted if the catchment is essentially rural. •If the catchment is urban: •Did you calculate paved areas using a method other than from URTEXT using the standard equations? •Did you allow for transfer of water via sewers across the topographic catchment boundary? •If yes to either of these questions provide details which give sufficient information to understand the process applied and any assumptions made. It may be useful to include a map of sub-catchments here, if not provided earlier in the report.	Red	Yes. An assessment of urban extent has been made, but this does not follow specific FEH guidelines and may be subject to change following a revision to the catchment area.	See Section 3.2.2 and 3.2.3	Urban proportion of catchment recalculated and the values used in the calculation reported within the body of text.	Review of the catchment descriptors required that inform the flow estimates. Hydrology model adjusted as appropriate. This has been addressed.	Update model
7.4.1	Has the final choice of design inputs and model parameters been recorded? Are the choices suitable?	•Record your final choices of method for model parameters and design inputs. You may have multiple choices of methods for lumped and distributed modelling.	Red	Final design inputs chosen but not clearly documented.	See 2.5.1	Text revised throughout including justifications for the chosen final design inputs.	Suitability of the method of estimation flood flows questioned. A comparison of the two recognised methodologies has been completed and the more conservative values adopted as a precautionary approach. This has been addressed.	Update model
8.3.1	Was direct rainfall modelling? If so, are full calculation details reported including model parameters and design events?	•Direct rainfall modelling may be favoured in circumstances where flooding is generated mainly by overland run-off, for example in urbanised areas where surfaces are mostly impermeable. •Refer to Section 6.2 of the Flood Estimation Guidelines for further guidance on direct rainfall modelling.	Red	Yes, this is a direct rainfall model. Some detail on the method used is missing, areas of it are questionable and further sensitivity testing is required to confirm the approach is acceptable.	See main issues to address in Sections 2.5.1 and 2.5.2 (methods used), 3.2.2 (catchment), 9.3.4 (Climate Change) and 9.4.9 (sensitivity checks).	Text revised throughout to address review comments.	Clarification of the method used for the direct rainfall model required. This has been addressed	Update reporting
9.1.1	Are peak flows from different methods compared?	•Compare peak flows from preferred methods at key sites for selected return periods / AEP events.	Red	Peak flow methods have not been compared since only ReFH2 has been applied. However following the update to item 7.1.1, it would be advised to compare the peak flow outputs of those methods and what is undertaken in this study to determine if further modelling is required.	FEH small catchments approach needs to be compared to the plot scale approach taken (once this has been updated if necessary).	FEH small catchments approach undertaken and reporting revised	Suitability of the method of estimation flood flows questioned. A comparison of the two recognised methodologies has been completed and the more conservative values adopted as a precautionary approach. This has been addressed.	Update model
9.2.1	Is the choice of method justified by discussing the type of problem, the type of catchment and the type of data?	•Include reference to type of study, nature of catchment and type of data available. •If different methods are chosen for different site codes or return periods, explain why.	Red	The catchment to the site is a very small addition to the site area itself, but the ReFH2 plot scale approach is not intended for fluvial flow estimation from a catchment to a watercourse. It may be that in this case it is appropriate, but comparison with the standard FEH small catchments approach, with review of parameters and justification of a final choice between the two is needed.	See 9.1.1	Catchment application of ReFH2 applied and compared against FEH statistical (small catchment procedures)	Suitability of the method of estimation flood flows questioned. A comparison of the two recognised methodologies has been completed and the more conservative values adopted as a precautionary approach. This has been addressed.	Update model
9.2.4	How will the flows be applied to the hydraulic model?	•For example, will model inflows be adjusted to achieve a match with lumped flow estimates, or will the model be allowed to route inflows?	Red	Direct rainfall across a 2D rainfall polygon and peak flows have been applied to the hydraulic model as a 2D source area upstream of the 1D channel.	The fluvial flows application point needs to be confirmed and justified. See also 2.2.1 and 3.1.1	Text revised, Figure also revised to now show inflow location.	Location of 2D source area inflows to be shown on the drawings and the report updated. This has been addressed	Update reporting
9.3.4	What climate change allowances have been applied and how?	•Refer to online guidance on climate change allowances for flood risk assessments and projects. •Provide information on: •What climate change allowances have been applied, e.g., rainfall and/or flow allowances, source of data, river basin, epoch, and percentiles. •How the climate change allowances have been applied, e.g., applied to rainfall / flow hydrographs within the hydraulic modelling software using scaling factors. •For non-stationary methods, refer to the practitioner guidance available on the FCERM R&D web page and provide full details and justification for the approach chosen.	Red	The fluvial and surface water Climate Change allowances for the Loddon and tributaries Management Catchment are provided in Figure 3 and 4. NafRA2 now includes 3.3% + CC event mapping and equivalent detailed model events should be run. The 40% CC allowance used in ReFH2 for peak rainfall has been incorrectly also applied to fluvial flows (high flow or baseflow) within ReFH2. The 1% CC allowance has been applied to the 0.1% AEP event.	Explain purpose for each modelled event. Calculate and run 3.3% + CC event. Scale fluvial flow results from ReFH2 up using fluvial CC allowance and external to ReFH2. Confirm agreement with EA that it is appropriate to use 1% event CC allowance for the 0.1% event also.	CC allowances reviewed +46% applied to fluvial estimates and +40 % to the 1% & 0.1% AEP rainfall as no allowance is reported for the 0.1% event this is a pragmatic approach The 3.3% CC is now reported and modelled.	Review of climate change allowances adopted required and the scenarios modelled. This has been addressed	Update model
9.4.9	Have the hydraulic model results been checked against lumped flow estimates?	•Are flows generated by the hydraulic model consistent with those estimated from a lumped catchment FEH estimate at locations within the model reach? •Have any scaling factors been applied to reconcile model results to the preferred flow estimates?	Red	No comparison of modelled outflows with the flow estimates have been made. Given the small nature of the catchment and the fact that the flows in the fluvial model are lumped into a single inflow it would be beneficial.	Compare the modelled outflows and flow estimate and explain any significant differences.	Checks on estimated flows vs model flows has been undertaken and the results are shown to be sensible / consistent.	Comparison of the modelled outflows with the flow estimates required. This has been addressed	Update reporting
9.5.1	Are assumptions, limitations and uncertainty reported?	•Careful thought should be put into identifying the specific assumptions and limitations applicable to the design peak flow estimates (and design hydrographs). •Assessing and reporting on the uncertainty in the estimates is also very important. •These sections should be completed for every study and never left blank.	Red	The report states (Report Section 1.1) that 'Analysis of the uncertainty of the rainfall-runoff peak flow estimates was not possible within the scope of this study'. See item 9.5.4 for more details.	Provide summary of results of tests on domain extent, model run times and to confirm overland flow is achievable across the 2D domain to confirm the current hydrology is appropriate in the context of the hydraulic model setup.	For the ReFH2 method storm duration testing has been undertaken and reported. We maintain that attempting to quantify uncertainty within ReFH2 is unrealistic within the scope and budget of the current study. Whilst an approach is discussed by Dixon et al (2017) whereby model parameters and initial conditions are altered to undertake sensitivity testing; there is no published definitive method for undertaking this. As a pragmatic approach, uncertainty in results is inferred from confidence intervals developed for the FEH Stat method. It is acknowledged that this is not a standard approach to quantifying uncertainty but rather a means of providing indicative uncertainty	Summary of sensitivity testing results required and confirmation that the hydrology is appropriate to the model set up. This has been addressed	Update model

Annex A

Hydraulic Model 1st Review

Item No.	Environment Agency Review				SLR Response		
	Item Checked	RAG 1	1st Review Comments	1st Actions for model developer	1st Model developer response (07/07/2025)	Non Technical Summary	Action Required
1.1	What model approach has been adopted? Is it appropriate? HEC-RAS: if it is only a steady state model - is it appropriate or is unsteady flow required?	Green	1D/2D Estry/TUFLOW new model build of Unnamed Watercourse. Yes, it is appropriate. TUFLOW HPC solution scheme. VER= 2023-03-AC-iSP-w64 has been used. The Using Modelling for Flood Risk Assessments guidance (www.gov.uk/guidance/using-modelling-for-flood-risk-assessments) states that applicants should "build and run models in the latest versions of software, or provide robust justification and testing if this is not possible" and "it's your responsibility to check the suitability of an existing model for your development".	Please note that TUFLOW version used is not the latest versions. Therefore, the latest software version is recommended to be used for the next submission or robust justification and testing provided, which demonstrates that the results are not impacted by the software versions used.	Agreed. Updated to latest version of TUFLOW Classic/HPC (2025.1.0).	Model had not been run with the most recent version of the software. This has been addressed	Update model
14.1	Have any comments, errors and warnings generated during the model run, been assessed and resolved as required?	Green	The modelling report hasn't assessed and discussed the 1D checks and warnings. Nevertheless, after checking the messages within the tsf files, they have no impact on the model results.	Please discuss the 1D checks, and warnings messages in the modelling report.	4no. - CHECK 2099 - Ignored repeat application of boundary to 2D cell. BC Type = HX. This check can occur frequently when a boundary line (HX) registers a cell twice. A review of the HX line was undertaken and the schematisation is suitable. 1no. CHECK 2118 - Lowered SX ZC Zpt by 0.00m to 1D node bed level. - reviewed schematisation is it is deemed suitable 6no CHECK 2370 - Ignoring coincident point found in Z Shape SGS layer. This denotes duplicate vertices, points were review and are suitable 8no CHECK 3519 - Using MIN or GULLY option in SGS model. reviewed locations and all suitable representation 10no - WARNING 2073 - Object ignored. Only Points, Lines, PolyLines & Regions used. GIS Object = Null Shape. review and no impacts to the model schematisation / representation. 1no WARNING 2118 - Lowered SX ZC Zpt by 0.47m to 1D node bed level. This is use to the use of a 'Z' flag. This has been reviewed, and the schematisation is suitable.	The model outputs a list of checks and warnings during the model run. These were not reviewed in the model report. This has been addressed.	Update reporting
14.7	Have any comments, errors and warnings generated during the model run, been assessed and resolved as required?	Green	The modelling report hasn't assessed and discussed the 2D checks and warnings. Nevertheless, after checking the messages within the tsf files, they have no impact on the model results.	Please discuss the 2D checks, and warnings messages in the modelling report.	4no. - CHECK 2099 - Ignored repeat application of boundary to 2D cell. BC Type = HX. This check can occur frequently when a boundary line (HX) registers a cell twice. A review of the HX line was undertaken and the schematisation is suitable. 1no. CHECK 2118 - Lowered SX ZC Zpt by 0.00m to 1D node bed level. - reviewed schematisation is it is deemed suitable 6no CHECK 2370 - Ignoring coincident point found in Z Shape SGS layer. This denotes duplicate vertices, points were review and are suitable 8no CHECK 3519 - Using MIN or GULLY option in SGS model. reviewed locations and all suitable representation 10no - WARNING 2073 - Object ignored. Only Points, Lines, PolyLines & Regions used. GIS Object = Null Shape. review and no impacts to the model schematisation / representation. 1no WARNING 2118 - Lowered SX ZC Zpt by 0.47m to 1D node bed level. This is use to the use of a 'Z' flag. This has been reviewed, and the schematisation is suitable.	The model outputs a list of checks and warnings during the model run. These were not reviewed in the model report. This has been addressed.	Update reporting
14.10	HPC Models Only - Do the appropriate HPC output files show any indication of instability? If so, has this been investigated and resolved where appropriate?	Green	Yes, the HPC output files don't show an indication of instability (see Figure 13). However, the modelling report has not discussed or commented any of the HPC output files	Please discuss in the modelling report the appropriate HPC output files.	HPC outputs are included in the updated reporting.	Modelling report did not review some of the model output files. This has been addressed.	Update reporting
1.2	What model version are you reviewing?	Amber	The provided model log states that the latest Version is 006. However, the latest version files submitted for the review is 007. This is very confusing. Therefore, the reviewer assumed that the version to be reviewed is 007.	Please confirm the model version to be reviewed.	Noted. Latest model version is 020.	There was a discrepancy between the model log provided and the model sent for review. This has been addressed.	Update reporting
1.4	Does the vertical chainage (upstream to downstream) in the model approximately match chainage based on survey or base mapping?	Amber	This item couldn't be checked as the survey data have not been provided.	Please provide the survey data so this item could be checked.	Survey provided.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Provide missing data
1.9	Is model reporting sufficient to understand the scope of the project, how the model has been built and the quality of the modelling?	Amber	No, the model reporting is not sufficient. This has been outlined throughout this model review.	Please revisit the model report and clarify the items outlined throughout this model review.	Noted and updated.	Lack of detail in the reporting. This has been addressed	Update reporting
3.3	Do the cross sections and bed profiles look reasonable?	Amber	This item couldn't be checked as the survey data have not been provided.	Please provide the survey data so this item could be checked.	Survey provided.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Provide missing data
3.6	What method has been used to estimate roughness? What values have been used for the floodplain (if 1D only model) and channel? Are these appropriate?	Amber	Fixed roughness values of 0.04 have been used throughout the model 1D channel. It is not clear in the modelling report what method has been used to estimate roughness within 1D channel. Additionally, no 1D channel topographic survey or photographs have been provided. Therefore, the assigned roughness values couldn't be checked. Section 2.2.5 in the modelling report discusses the 2D domain roughness only, not the 1D channel roughness.	Please discuss in the modelling report the method used to estimate roughness as well as what roughness values have been applied in the 1D channel. Additionally, please provide 1D channel survey/ photographs in order to check the assigned roughness values against the survey/photographs for the 1D channel.	Survey provided. Further discussed in hydraulic modelling report. Appendix A of the modell reporting includes the site photographs. An additional site visit was completed to provide photographic evidence to justify the Manning's roughness adopted. Based on the site visit observations, the channel bed consists of short grass and a value of 0.03 was selected based on this information.	Justification required for the choice of roughness values adopted in the model. This has been addressed.	Update reporting

Annex A

Hydraulic Model 1st Review

Item No.	Environment Agency Review				SLR Response		
	Item Checked	RAG 1	1st Review Comments	1st Actions for model developer	1st Model developer response (07/07/2025)	Non Technical Summary	Action Required
4.3	How is the downstream boundary(s) applied? Have appropriate locations been chosen for the downstream model extents?	Amber	It was assumed as stated in Section 2.2.3 in the modelling report that water outflows from the 1D domain through the northernmost culvert (CULVERT_SEC1) via a Head/Time (HT) downstream boundary (1d_bc), with an elevation set 3.35m lower than the invert level downstream opening of the culvert which represents a free-flowing, pipe-size-controlled outlet (see Figure 2-1 in the modelling report). It is not discussed in the modelling report why the 3.35m lower than the downstream culvert invert level has been chosen (see Figure 15)	Please discuss in the modelling report how the outlet HT boundary of 33m has been chosen.	Update to slope boundary. 2D slope=0.002 (m/m) Further topographic information is been supplied to improve the downstream boundary representation. The culvert (CULVERT_SEC1) has an invert level of 35.88mAOD at the downstream end. This has been updated in the model and is used to inform the downstream HT boundary with the HT set at 35.88mAOD. The survey information has been included and is discussed in the hydraulic modelling report.	More detail required to justify the downstream boundary that lets water out of the model. Further information on the northern end of the culvert was subsequently obtained and the model updated accordingly. This has been addressed	Update model
5.1	Are all structures represented (inc. movable structures)? If not, have explanations for structures not modelled been given in the reporting?	Amber	Three culverts have been represented within the model 1D domain as stated in Section 2.2.2 of the modelling report. However, the topo survey has not been provided in order to check if all the structures have been represented.	Please provide.	Survey provided.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Provide missing data
5.2	Are invert levels correct compared to survey data?	Amber	This item couldn't be checked as the survey data have not been provided.	Please provide the survey data so this item could be checked.	Survey provided.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Provide missing data
5.4	Where structures bypass or overtop, have spills been represented correctly to reflect this?	Amber	This item couldn't be checked as the survey data have not been provided.	Please provide the survey data so this item could be checked.	Survey provided.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Provide missing data
5.6	Have appropriate roughness values been used?	Amber	This item couldn't be checked as the survey data along with structures photographs have not been provided.	Please provide the survey data along with the structures photographs so this item could be checked.	Survey provided.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Provide missing data
6.5	Are bank crests accurately represented?	Amber	It is not clear how the bank crests are represented. Furthermore, the survey data have not been provided. However, discrepancies have been found at the 1D channel top of bank and the 2D xc (see Figure 6). Therefore, this might have an impact on the modelling results.	Please review how the bank crests have been represented throughout the model. Moreover, please provide the survey data so this item could be checked.	Survey provided. The model has been updated to include a ZSH layer to represent the top of bank. This is based on topographic survey information.	The original topographic survey upon which part of the model was based was not provided for review. In addition the representation of the open channel banks has been improved. This has been addressed	Update model
6.6	Are raised defences/embankments accurately represented?	Amber	See item 6.5.	See item 6.5.	Survey provided. The model has been updated to include a ZSH layer to represent the top of bank. This is based on topographic survey information.	The original topographic survey upon which part of the model was based was not provided for review. In addition the representation of the open channel banks has been improved. This has been addressed	Update model
7.1	Have any 2D boundaries been used in the model and if so are these schematised correctly?	Amber	Downstream HQ boundary has been applied in the model. However, it is not clearly defined how the slope has been calculated. Moreover, the location of the QT inflow 2d_sa layer boundary is not justified in detail in the modelling report. The location is neither at the upstream part of the represented ditch in 2D nor at the upstream part of the 1D channel (see Figure 2).	Please provide more details in the modelling report of how the HQ boundary's slope has been calculated. Additionally more explanation regarding the location chosen of the QT inflow 2d_sa layer boundary is required.	The 2d_SA layer has been removed from the model. The QT location has been altered to snap to the edge of the 2D code at the upstream end of the model (2d_code_HURST_FLU_010_R). It is a 2D_bc as the 1D element of the model does not start until further downstream. There is also 1D QT inflow as in intermediate inflow to represent the hydrology catchment delineation. The HQ boundary slope (0.002) has been calculated using the UDAR data starting 80m upstream of the edge of the 2D code. It should be noted that the HQ is only required for the fluvial 0.1% AEP event plus CC - all other events do not reach the HQ boundary.	More detail required to justify the upstream and downstream models boundary that let water in and out of the model. Model boundaries have been revised. This has been addressed	Update model
7.3	For direct rainfall modelling how has the input rainfall been applied?	Amber	For the pluvial model (Direct rainfall), the input rainfall has been applied as hyetographs across the entire 2D domain via 2D rainfall polygon layer (2d_rf). However, the modelling report has not stated how the hyetographs have been generated. Furthermore, the modelling report has not explained how losses to evapotranspiration and infiltration have been estimated and removed from the model when applying direct rainfall (see Chapter 6.2 in EA's flood estimation guidelines here https://www.gov.uk/government/publications/flood-estimation-guidelines).	Please review and give detailed explanation of how the direct rainfall and the losses have been applied.	The hyetographs have been generated from ReFH2. Given the mixed rural and urban components comprising the subject catchment, variable losses are applied to the rainfall directly within ReFH2. The hyetographs used for the modelling inputs are based on ReFH2 net rainfall outputs. This is an accepted approach that is documented within the EA Flood Estimation Guidelines and is adopted due to the need to simplify the methodology of applying the losses over the catchment.	More detail required on the application of rainfall to the model. This has been addressed	Update reporting
13.1	What time step has been used for the 1D model? Is it appropriate?	Amber	1D time step is 1s. As per the cell size of 1 m, the time step of 1s is not appropriate and might have an impact on the results.	Please review 1D time step or justify it in the modelling report.	The TUFLOW model uses the HPC solver and by default, the software uses adaptive timestepping to progress through the simulation. The timestep command is used as an initial condition only. The 1D timestep, for initial conditions, has been adjusted to 0.25 (1/4 2d cell size). The max timestep has been set to 1sec.	Query on the timestep used in the model. However, the model adjusts timestep automatically. Initial model timesteps we adjusted and timestep thresholds applied.	Update model
13.4	What time step has been used for the 2D model? Is it appropriate?	Amber	2D time step is 1s. As per the cell size of 1 m, the time step of 1s is not appropriate and might have an impact on the results.	Please review 2D time step or justify it in the modelling report.	The TUFLOW model uses the HPC solver and by default, the software uses adaptive timestepping to progress through the simulation. The timestep command is used as an initial condition only. The 1D timestep, for initial conditions, has been adjusted to 0.25 (1/4 2d cell size). The max timestep has been set to 1sec.	Query on the timestep used in the model. However, the model adjusts timestep automatically. Initial model timesteps we adjusted and timestep thresholds applied.	Update model
13.5	Have initial water levels been applied and are these appropriate for the scenario being run?	Amber	Initial water levels have been applied in the pluvial model. However, it is not stated in the modelling report how the initial water levels have been chosen in order for this item to be checked.	Please comment in the modelling report how the initial water levels have been chosen. So this item could be checked.	Initial water levels have been removed.	Query on sue of initial water levels in the pluvial model. These have been removed. This has been addressed	Update model

Annex A

Hydraulic Model 1st Review

Item No.	Environment Agency Review				SLR Response		
	Item Checked	RAG 1	1st Review Comments	1st Actions for model developer	1st Model developer response (07/07/2025)	Non Technical Summary	Action Required
15.1	Have calibration/verification runs been completed based on locally gauged and recorded data?	Amber	No calibration or verification runs have been conducted.	Please discuss in the reports the attempts to find previous event data to calibrate the model, any historic information available, comparison with other studies and reasons for any differences.	A review of the EA recorded flood outlines was undertaken (https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1). There are two polygons noted in the dataset. Recorded_Flood_outlines.6979 and Recorded_Flood_outlines.6980 Outline 6979/ 6980 is December 2002 to Jan 2003. The comments for both state that ' Looks More Like Waterlogging Than Fluvial' Therefore has been excluded as a suitable fluvial or pluvial source for calibration or verification as the flood source type is 'other'. A review of the Wokingham Section 19 Flood Investigation Draft Report March 2024 was completed there are no references to flood to the proposed site nor the roads adject to the site. (https://www.hurstplan.uk/docs/Section_19%20Flood%20Report%20Hurst%202023%20by%20JBA.pdf)	Available historic flooding information has been reviewed. The only information available does not relate to river or surface water flooding and there was not considered appropriate for use. This has been addressed	Update reporting
15.2	Are the simulated hydrograph peaks reasonably similar to the recorded peaks? Is the shape of the simulated hydrograph and therefore the volume suitably similar?	Amber	See 15.1.	See 15.1.	No suitable data has been identified	Available historic flooding information has been reviewed. The only information available does not relate to river or surface water flooding and there was not considered appropriate for use. This has been addressed	Update reporting
15.3	Are simulated floodplain extents similar to recorded extents? Are flow routes similar?	Amber	See 15.1.	See 15.1.	No suitable data has been identified	Available historic flooding information has been reviewed. The only information available does not relate to river or surface water flooding and there was not considered appropriate for use. This has been addressed	Update reporting
15.4	Has suitable effort been made to attempt and improve calibration. Have attempted changes been documented with a quantification of impact?	Amber	See 15.1.	See 15.1.	No suitable data has been identified	Available historic flooding information has been reviewed. The only information available does not relate to river or surface water flooding and there was not considered appropriate for use. This has been addressed	Update reporting
15.5	Is there good reconciliation between estimates at flow estimation points and the model for given exceedance probabilities?	Amber	No reconciliation performed or described.	Please justify accordingly.	Due to the presence of several structures along the watercourse that are having a significant hydraulic effect, which limits the ability to undertake a flow reconciliation - particular for higher return periods where the hydraulics are controlling the downstream flows. Reviewing the 1% AEP event, there is a close match between the model inflow(0.129m3/s and flow in cross section MC02 (0.120m3/s). For the 1% AEP plus CC and the 0.1% AEP event the inflow and observed flow at cross section MC02 (upstream end of the proposed site) are within 2%. For the 0.1% plus CC the model flow is 12% lower due to the presence of the hydraulic controls within the watercourse.	The report has been updated to address reconciliation of flows. This has been addressed	Update reporting
15.6	Where calibration is not possible due to data availability, have checks been made against other recorded data (wrack marks, flood extents, photographs etc.) and how do these compare?	Amber	Section 3.3 of the modelling report details the comparison between the modelling results and the Environment Agency (EA) historical flood map dataset. Discrepancies exist between the fluvial modelling results and the EA historical outlines, particularly in the northeastern part of the site (refer to Figure 3-3 in the modeling report). These discrepancies are not well justified or discussed in the report. Additionally, the pluvial model was compared with the available EA Risk of Flooding from Surface Water maps, revealing discrepancies within the site. The justification provided in the report is insufficient. These discrepancies may be related to comments raised by the reviewer during this review. Furthermore, comparison has been conducted by the reviewer between the NaFRA2 0.1% AEP Risk from Surface Water and the 0.1% AEP pluvial results with 100% culvert blockage (see Figure 16). This comparison shows as well discrepancies within the site. Therefore, these need to be justified and discussed in the modelling report.	Please discuss and justify in the modelling report the discrepancies between the modelling results and the EA data.	A review of the EA recorded flood outlines was undertaken (https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1). There are two polygons noted in the dataset. Recorded_Flood_outlines.6979 and Recorded_Flood_outlines.6980 Outline 6979/ 6980 is December 2002 to Jan 2003. The comments for both state that ' Looks More Like Waterlogging Than Fluvial' Therefore has been excluded at a suitable fluvial or pluvial source for calibration or verification as the flood source type is 'other'. This comparison has been updated in the modelling report. We have reviewed against the updated EA flood mapping (March 2025) for both fluvial and pluvial flooding and this is documented in the report. The EA have acknowledged that there is no detailed flood modelling in this location. The discrepancies in the flood mapping are related to the additional detail the site-specific modelling has incorporated in terms of hydraulic structures, watercourse definition and site specific hydrology. The EA mapping does not appear to show any representation of the existing culvert under lodge road the EA mapping shows the water flowing north to lodge road. Notwithstanding the discrepancies, there is generally a reasonable representation between the EA flood map for planning with the modelling and Flood Zone 3 are in close agreement. For Flood Zone 2, the site specific model extent is slightly greater than the EA mapping however, the depth of flooding in the areas outwith the EA food zone 2 mapping is less than 100mm in depth.	Justification required for the discrepancy between historic flood maps and model results. This has been addressed	Update reporting

Annex A

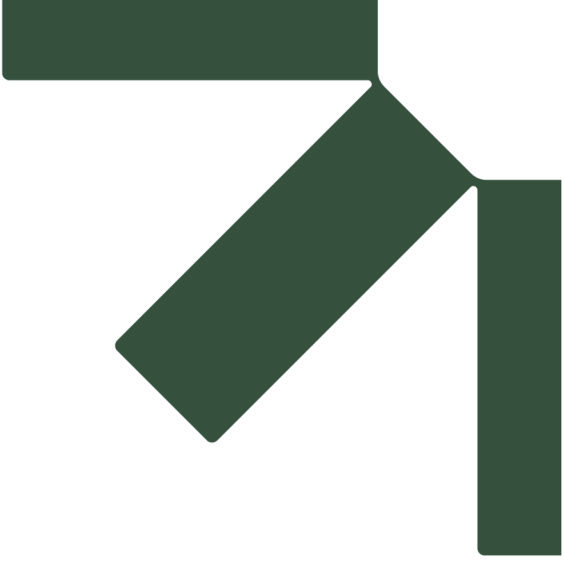
Hydraulic Model 1st Review

Item No.	Environment Agency Review				SLR Response		
	Item Checked	RAG 1	1st Review Comments	1st Actions for model developer	1st Model developer response (07/07/2025)	Non Technical Summary	Action Required
15.7	If no recorded or historic data is available, are the simulated flood outputs similar or very different from past modelling in the area? If there is a large difference, does it seem sensible?	Amber	See 15.6.	See 15.6.	A review of the EA recorded flood outlines was undertaken (https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1). There are two polygons noted in the dataset. Recorded_Flood_outlines.6979 and Recorded_Flood_outlines.6980 Outline 6979/ 6980 is December 2002 to Jan 2003. The comments for both state that 'Loos More Like Waterlogging Than Fluvial' Therefore has been excluded at a suitable fluvial or pluvial source for calibration or verification as the flood source type is 'other'. This comparison has been updated in the modelling report. We have reviewed against the updated EA flood mapping (March 2025) for both fluvial and pluvial flooding and this is documented in the report. The EA have acknowledged that there is no detailed flood modelling in this location. The discrepancies in the flood mapping are related to the additional detail the site-specific modelling has incorporated in terms of hydraulic structures, watercourse definition and site specific hydrology. The EA mapping does not appear to show any representation of the existing culvert under lodge road the EA mapping shows the water flowing north to lodge road. Notwithstanding the discrepancies, there is generally a reasonable representation between the EA flood map for planning with the modelling and Flood Zone 3 are in close agreement. For Flood Zone 2, the site specific model extent is slightly greater than the EA mapping however, the depth of flooding in the areas outwith the EA food zone 2 mapping is less than 100mm in depth.	Justification required for the discrepancy between historic flood maps and model results. This has been addressed	Update reporting
15.8	Have appropriate model parameters been chosen for sensitivity testing? Typical tests include: ■ Sensitivity to roughness $\pm 20\%$ (Manning's "n" both in 1D and 2D) ■ Sensitivity to flows $\pm 20\%$ (From central estimate) ■ Sensitivity to downstream boundary ■ Key structure blockage(s)	Amber	No, only the sensitivity analysis of the key structures blockage have been conducted.	Please provide the full sensitivity testing analysis for the model parameters such as the roughness, inflow and the downstream boundary	Sensitivity testing for flow ($\pm 20\%$), roughness ($\pm 20\%$), downstream boundary and blockage are all included in the modelling package and updated reporting.	Additional information on sensitivity testing required. This has been addressed	Update reporting
15.9	Do the results of the tests show the models to be particularly sensitive to certain parameters?	Amber	Section 3.2.2 of the modelling report states that the model is largely sensitive to the blockage of the key structures.	Please provide the full sensitivity testing analysis for the model parameters such as the roughness, inflow and the downstream boundary for this item to be checked.	Sensitivity testing for flow, roughness, downstream boundary and blockage are all included in the modelling package and updated reporting.	Additional information on sensitivity testing required. This has been addressed	Update reporting
100.1	The modelled flood extents have been checked against the historic EA outlines data.	Amber	Section 3.3 of the modelling report details the comparison between the modelling results and the Environment Agency (EA) historical flood map dataset. Discrepancies exist between the fluvial modelling results and the EA historical outlines, particularly in the northeastern part of the site (refer to Figure 3-3 in the modeling report). These discrepancies are not well justified or discussed in the report. Additionally, the pluvial model was compared with the available EA Risk of Flooding from Surface Water maps, revealing discrepancies within the site. The justification provided in the report is insufficiently described. These discrepancies may be related to comments raised by the reviewer during this review. Furthermore, comparison has been conducted by the reviewer between the NaFRA2 0.1% AEP Risk from Surface Water and the 0.1% AEP pluvial results with 100% culvert blockage (see Figure 16). This comparison shows as well discrepancies within the site. Therefore, these need to be justified and discussed in the modelling report.	Please discuss and justify in the modelling report the discrepancies between the modelling results and the EA data.	A review of the EA recorded flood outlines was undertaken (https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1). There are two polygons noted in the dataset. Recorded_Flood_outlines.6979 and Recorded_Flood_outlines.6980 Outline 6979/ 6980 is December 2002 to Jan 2003. The comments for both state that 'Loos More Like Waterlogging Than Fluvial' Therefore has been excluded at a suitable fluvial or pluvial source for calibration or verification as the flood source type is 'other'. This comparison has been updated in the modelling report. We have reviewed against the updated EA flood mapping (March 2025) for both fluvial and pluvial flooding and this is documented in the report. The EA have acknowledged that there is no detailed flood modelling in this location. The discrepancies in the flood mapping are related to the additional detail the site-specific modelling has incorporated in terms of hydraulic structures, watercourse definition and site specific hydrology. The EA mapping does not appear to show any representation of the existing culvert under lodge road the EA mapping shows the water flowing north to lodge road. Notwithstanding the discrepancies, there is generally a reasonable representation between the EA flood map for planning with the modelling and Flood Zone 3 are in close agreement. For Flood Zone 2, the site specific model extent is slightly greater than the EA mapping however, the depth of flooding in the areas outwith the EA food zone 2 mapping is less than 100mm in depth.	Justification required for the discrepancy between historic flood maps and model results. This has been addressed	Update reporting
1.5	Does the model run?	Red	Initially the model has not run due to the error of the location directory of the cross sections CSV files couldn't be found. The directory set in the layer 1d_xs_HURST_CS_002_L.shp is not correct (See Figure 8). The reviewer had to correct the directory in the layer 1d_xs_HURST_CS_002_L.shp to make it run. It has run successfully by Arcadis using TUFLOW V 2025.0.2-ISP w64- HPC solution Scheme. This is fine for this review. However, please make sure this is amended for the next submission.	Please amend the error in the 1d_xs_HURST_CS_002_L.shp layer for the next submission.	The cross sections have been changed from SLR server location to relative path. As such, the reviewer should not have this issue anymore.	There was an issue running the model due to the path names in the model files. This has been addressed	Update model

Annex A

Hydraulic Model 1st Review

Item No.	Environment Agency Review				SLR Response		
	Item Checked	RAG 1	1st Review Comments	1st Actions for model developer	1st Model developer response (07/07/2025)	Non Technical Summary	Action Required
1.6	Have all additional project files been provided to enable a review (i.e. model report, survey etc.)?	Red	The survey data have not been provided. Please make sure you provide the survey data for the next submission. Moreover, the provided model log states that the latest Version is 006. However, the latest version files submitted for the review is 007. This is very confusing. Therefore, the reviewer assumed that the version to be reviewed is 007.		Survey provided. Latest model version is 020.	The original topographic survey upon which part of the model was based was not provided for review. This has been addressed	Data not supplied
2.2	Are climate change runs aligned with current guidance?	Red	No, the climate change runs do not align with EA current guidance https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow (see Figure1).Therefore this will have an impact on the modelling results.	Please re run the climate change runs tin line with EA current guidance.	Noted and updated in version 020. Peak River Climate Change = 46% Peak Rainfall Climate Change = 40%	Incorrect climate change allowances used in model. This has been addressed	Update model
4.2	How have the inflows boundaries been applied?	Red	For the fluvial model, the climate change allowance inflows applied into the model is not aligned with the latest EA guidance (see Item 2.2). Moreover, the location of the QT inflow boundary is not justified in detail in the modelling report. The location is neither at the upstream part of the represented ditch in 2D nor at the upstream part of the 1D channel (see Figure 2). For the pluvial model, the modelling report has not explained how losses to evapotranspiration and infiltration have been estimated and removed from the model when applying direct rainfall (see Chapter 6.2 in EA's flood estimation guidelines here https://www.gov.uk/government/publications/flood-estimation-guidelines).	Please review the peak river inflows climate change allowance applied into the model as per the latest EA guidance. Moreover, review and justify in the modelling report the location of the inflow boundary along with the detailed description of how the losses have been incorporated in the model.	Noted and updated in version 020. Peak River Climate Change = 46% Peak Rainfall Climate Change = 40% Rainfall losses have been removed in the hydrology (using ReFH2) and net rainfall applied to the TUFLOW model. QT inflow boundary adjusted to snap to the code layer as well as 1no QT inflow as in intermediate inflow to represent the hydrology catchment delineation. Report updated to provide more detail.	Incorrect climate change allowances used in model. This has been addressed	Update model



Annex B Figure Appendix H-2

**Land Between Lodge Road and Tape Lane, Hurst,
Wokingham, RG10 0EG**

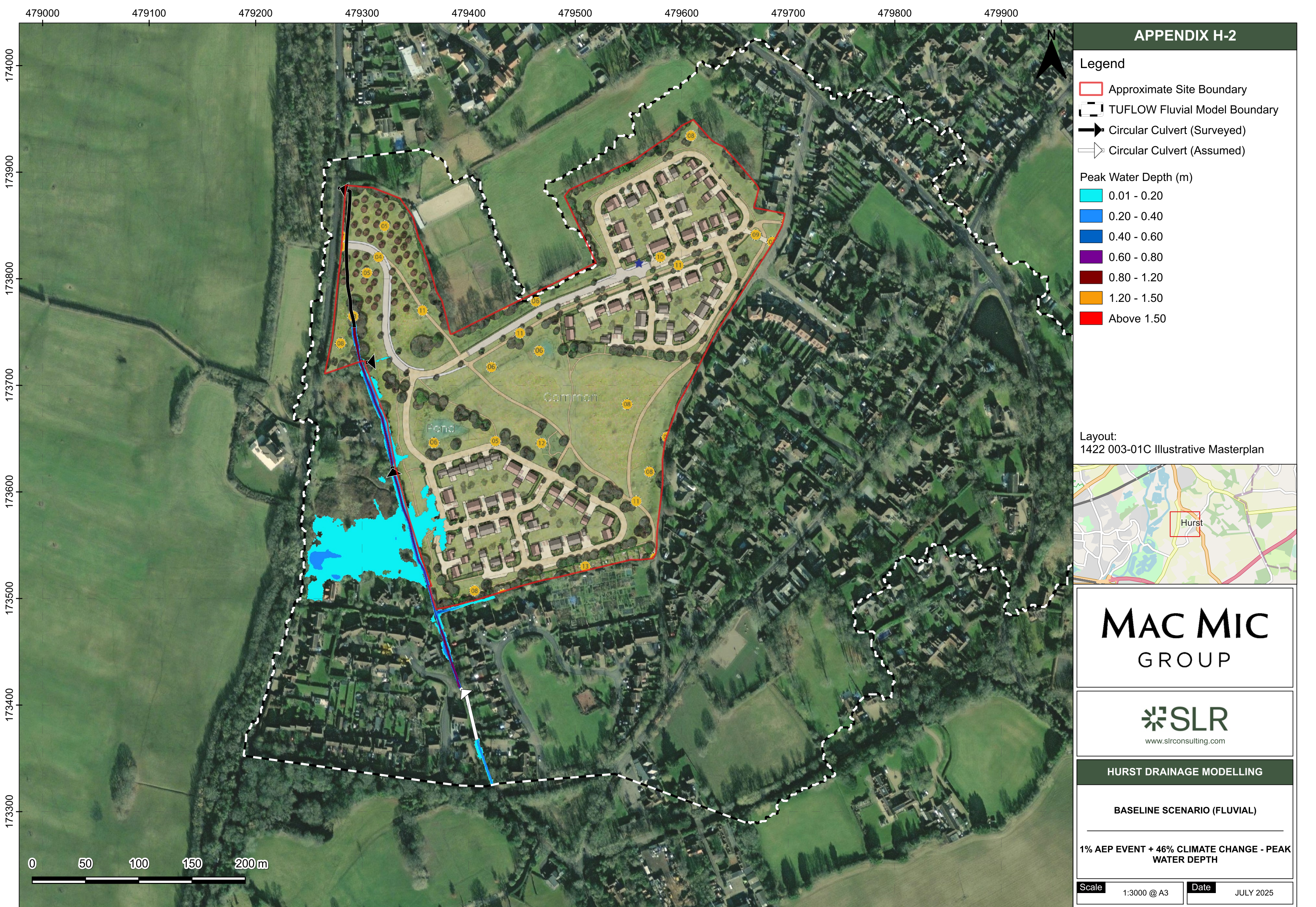
Ian Walton Bsc (Hons) MSc DIC MICE CEng

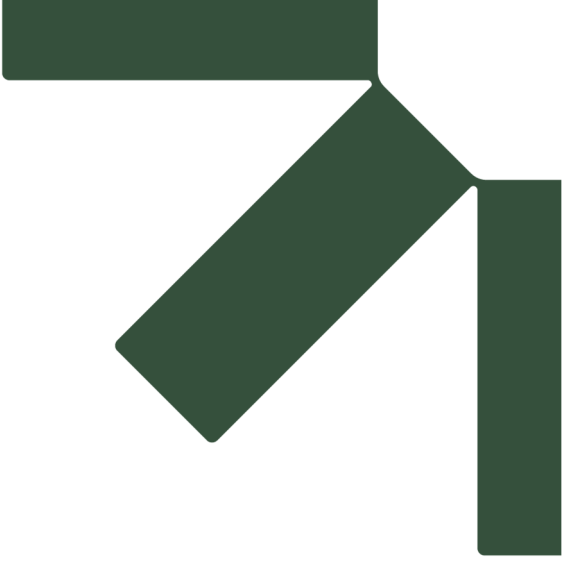
**Section 78 Appeal against refusal of planning permission by Wokingham
Borough Council.**

SLR Project No.: 432.010035.00001

PINS Reference: APP/X0360/W/25/3364304

28 July 2025





Annex C Figures Appendix H-12 and H-13

**Land Between Lodge Road and Tape Lane, Hurst,
Wokingham, RG10 0EG**

Ian Walton Bsc (Hons) MSc DIC MICE CEng

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28 July 2025





APPENDIX H-12

Legend

- Approximate Site Boundary
- TUFLOW Fluvial Model Boundary
- Circular Culvert (Surveyed)
- Circular Culvert (Assumed)

Peak Flood Hazard Rating

- ≤ 0.75
- 0.75 - 1.25
- 1.25 - 2.00
- > 2.00

Layout:
1422 003-01C Illustrative Masterplan



MAC MIC
GROUP



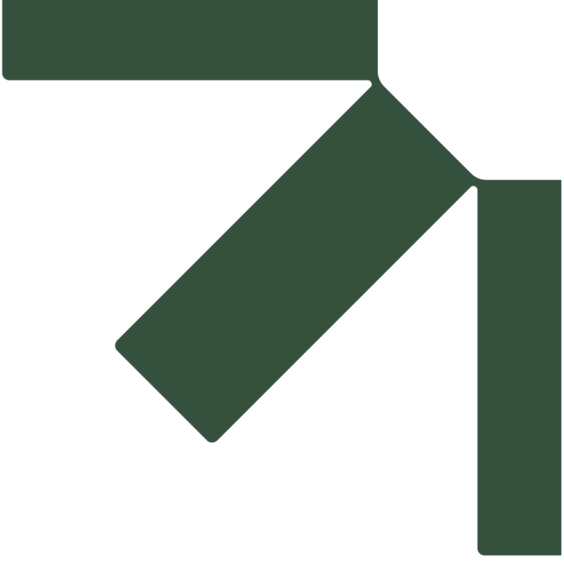
HURST DRAINAGE MODELLING

BASELINE SCENARIO (FLUVIAL)

0.1% AEP EVENT + 46% CLIMATE CHANGE -
PEAK FLOOD HAZARD RATING

Scale 1:3000 @ A3

Date JULY 2025



Annex D Drawing No. 010068- SLR-HDG-XXX-SK-CD- 001 Rev P01

**Land Between Lodge Road and Tape Lane, Hurst,
Wokingham, RG10 0EG**

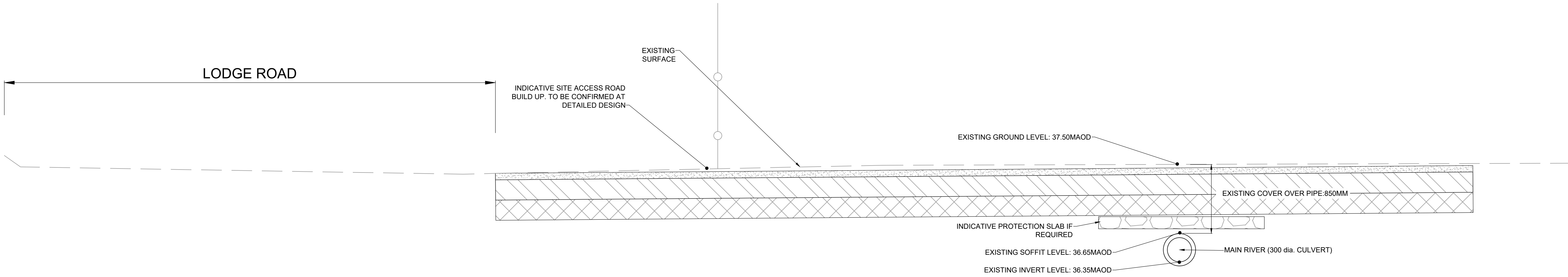
Ian Walton Bsc (Hons) MSc DIC MICE CEng

**Section 78 Appeal against refusal of planning permission by Wokingham
Borough Council.**

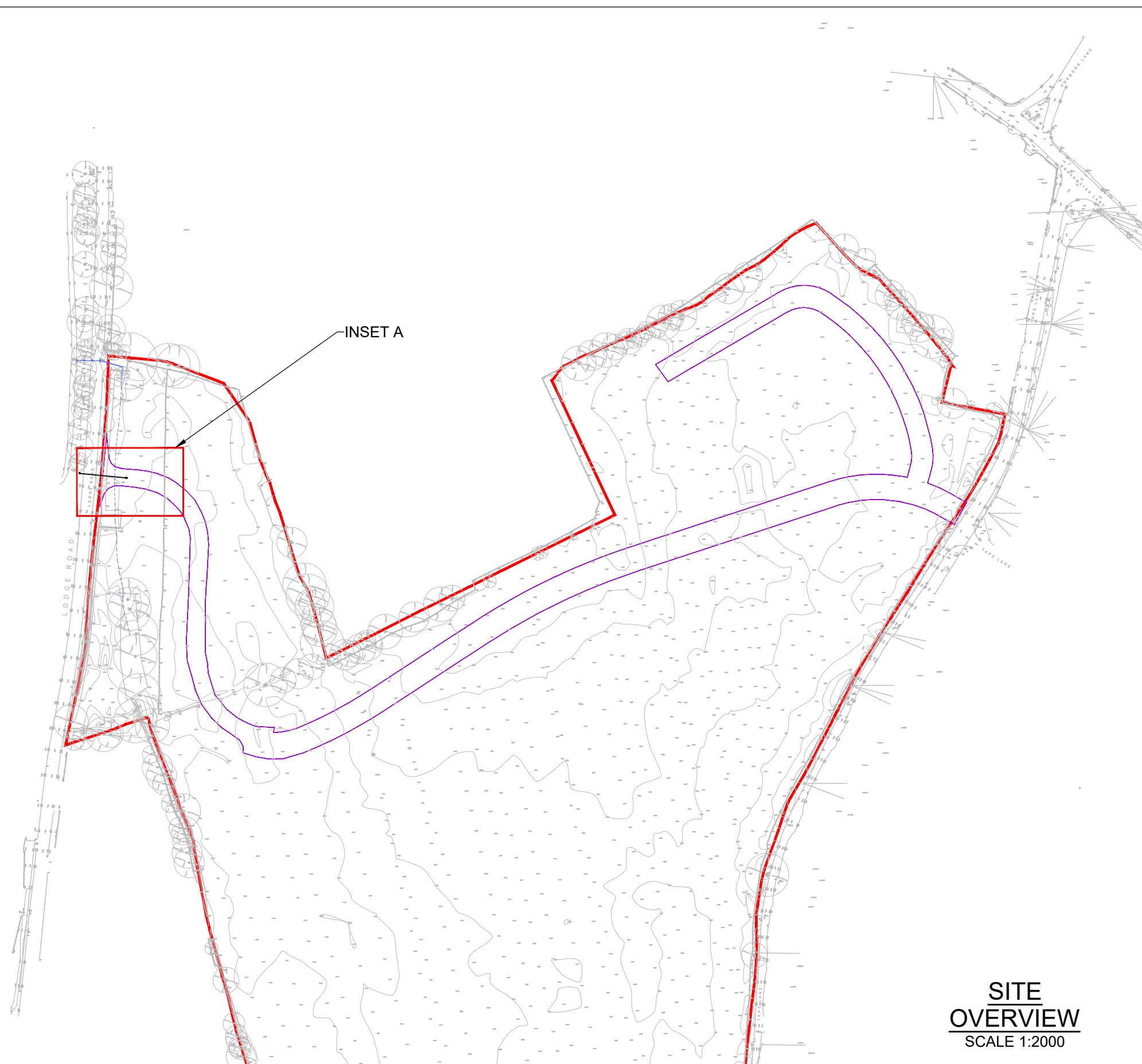
SLR Project No.: 432.010035.00001

PINS Reference: APP/X0360/W/25/3364304

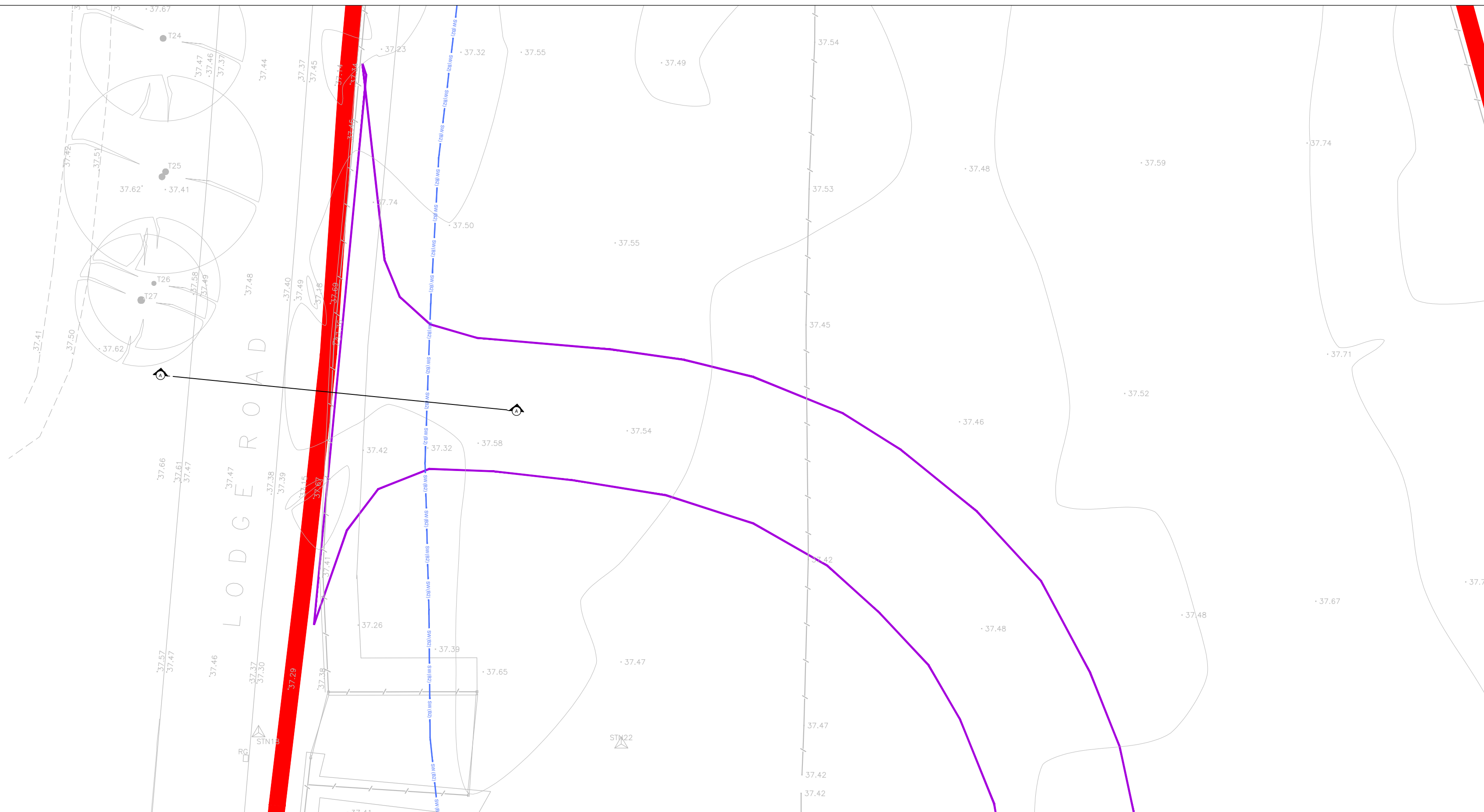
28 July 2025



SECTION A-A
SCALE 1:25



INSET A
SCALE 1:200

[illegible]



Making Sustainability Happen