

Thames Drive, Charvil

Wokingham

Flood Risk Assessment

September 2025

Project Information	
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Client:	Alex Bailes
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Document History		
Revision	Date	Comment
01	13/08/2024	First issue
02	28/10/2024	Second issue
03	17/09/2025	Third issue – Updated with latest site plans

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This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

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Introduction

Waterco has been commissioned to undertake a Flood Risk Assessment in relation to a proposed residential development at the Chilterns, Thames Drive, Charvil, Wokingham, RG10 9TP.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified risk. This report has been prepared in accordance with the guidance contained in the National Planning Policy Framework (NPPF) and the National Planning Practice Guidance (NPPG): Flood Risk and Coastal Change.

Existing Conditions

The site covers an area of approximately 4,080m² and is located at National Grid Reference (NGR): 476762, 177214. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed September 2025) shows that the site comprises an existing residential property (Chilterns) with associated access, outbuildings and gardens. The site is bordered by agricultural land to the north and east, residential properties to the south and the River Thames to the west. Access to the site is provided from Thames Drive to the south-east.

Local Topography

A topographical survey has been undertaken by Bury Associates in 2021. The topographical survey shows that the site is relatively flat with levels varying from 34.85 metres Above Ordnance Datum (m AOD) in the north to 34.21m AOD in the east. The existing dwelling has a ground floor level of approximately 35.42m AOD

Topographic levels to m AOD have also been derived from a 1m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR data generally corroborates with the topographical survey.

Topographical information is provided as Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) shows that the site is underlain by superficial deposits of Alluvium, generally comprising clay, silt, sand and gravel. The superficial deposits are identified as being underlain by the Seaford Chalk formation and Newhaven Chalk formation.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

The closest historical BGS borehole record (BGS reference: SU77NE277) is located approximately 150m south-west of the site. The borehole record is included in Appendix C together with a borehole location plan. The borehole record identifies:

- Soil, clay, stone, and brick (fill) from ground level to 0.5 metres below ground level (m.bgl);
- Firm sandy brown clay from 0.5m.bgl to 2m.bgl;
- Brown sands and mixed sized gravels from 2m.bgl to 6m.bgl;
- Chalk and flints from 6m.bgl to 10m.bgl.

Groundwater was encountered at 2m.bgl.

The EA's 'Source Protection Zones' data, viewed from MAGIC's online mapping [accessed September 2025], indicates that the site is located within Zone 3 (Total Catchment) of a Groundwater Source Protection Zone, defined as '*the total area needed to support the abstraction or discharge from the protected groundwater source.*'

The Cranfield University 'Soilscapes' map [accessed September 2025] indicates that the site is underlain by '*loamy and clayey floodplain soils with naturally high groundwater*'.

Development Proposals

The proposed development is for the replacement of an existing dwelling and outbuilding with a new dwelling, annexe and attached carport. Proposed development plans are included in Appendix D.

The existing building and outbuildings cover a footprint of 321.7m². The proposed building footprint (including the annex and car port structure) covers 321.01m². The development will result in an overall reduction in building footprint by 0.69m². Building footprints are shown on drawing 333(PL) 700 in Appendix D.

Flood Zone Classification & Policy Context

The EA 'Flood Map for Planning', included in Appendix E, shows that the site is located within Flood Zone 3 – an area considered to be at flood risk with a 1% (1 in 100) or greater annual probability of fluvial flooding. The Flood Zone classification has not altered following EA flood mapping updates in 2025.

In accordance with Annex 3 of the NPPF, residential developments are considered to be 'more vulnerable'. Table 2 of the NPPG: Flood Risk and Coastal Change, states that the Exception Test must be satisfied for 'more vulnerable' development within Flood Zone 3.

For the Exception Test to be passed it should be demonstrated that:

1. the development would provide wider sustainability benefits to the community that outweigh flood risk, and

2. 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.

This report details the flood risk to the site and the mitigation measures which could be carried out to ensure that the development will be safe for its lifetime without increasing flood risk elsewhere.

Local Policy

The Wokingham Borough Council 'Adopted Core Strategy Development Plan Document' (January 2010) contains the following policy relating to flood risk:

'CP1 – Sustainable development:

Planning permission will be granted for development proposals that:

- 1) *Maintain or enhance the high quality of the environment;*
- 2) *Minimise the emission of pollutants into the wider environment;*
- 3) *Limit any adverse effects on water quality (including ground water);*
- 4) *Ensure the provision of adequate drainage;*
- 5) *Minimise the consumption and use of resources and provide for recycling;*
- 6) *Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;*
- 7) *Avoid areas of best and most versatile agricultural land;*
- 8) *Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;*
- 9) *Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);*
- 10) *Provide attractive, functional, accessible, safe, secure and adaptable schemes;*
- 11) *Demonstrate how they support opportunities for reducing the need to travel, particularly by private car in line with CP6; and*
- 12) *Contribute towards the goal of reaching zero-carbon developments as soon as possible by:*
 - a) *Including appropriate on-site renewable energy features; and*
 - b) *Minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.'*

The Wokingham Borough Council 'Managing Development Delivery Document (Local Plan) – adopted February 2014, contains the following policy relating to flood risk:

'Policy CC09: Development and Flood Risk (from all sources)

- 1. All sources of flood risk, including historic flooding, must be taken into account at all stages and to the appropriate degree at all levels in the planning application process to avoid inappropriate development in areas at risk of flooding. Proposals must be consistent with the guidance in paragraphs 99-104 of the National Planning Policy Framework (NPPF); the Technical Guidance to the NPPF and demonstrate how they have used the Strategic Flood Risk Assessment (SFRA) to determine the suitability of the proposal.*
- 2. Development proposals in Flood Zones 2 or 3 must take into account the vulnerability of proposed development.*
- 3. Development must be guided to areas of lowest flood risk by applying the sequential approach taking into account flooding from all sources and shall ensure flood risk is not worsened for the application site and elsewhere, and ideally that betterment of existing conditions is achieved. The sequential test will not be required if at least one of the following applies:*
 - a) Replacement of an existing single residential property. However, the replacement property should, where possible, be located on the part of the site at lowest risk*
 - b) Conversions and change of use unless it involves a change to a more vulnerable class*
 - c) Minor development, as defined in footnote 10 of the Technical Guidance Note to the NPPF.*
- 4. In exceptional circumstances, new development in areas of flood risk will be supported where it can be demonstrated that:*
 - a) The development provides wider sustainability benefits to the community that outweigh flood risk*
 - b) The development will:*
 - i. Be safe for its lifetime, taking account of the vulnerability of its users*
 - ii. Not increase flood risk in any form elsewhere and, where possible, will reduce flood risk overall*
 - iii. Incorporate flood resilient and resistant measures into the design*
 - c) Appropriate evacuation and flood response procedures are in place to manage the residual risk associated with an extreme flood event.*
- 5. Where required, suitable and appropriately detailed flood risk information will need to accompany a planning application. A Flood Risk Assessment (FRA) is required for:*
 - a) All proposals in areas of known historic flooding from all sources*

- b) *Where there is evidence of a risk from all sources of flooding identified in the Strategic Flood Risk Assessment*
- c) *Those proposals set out in footnote 20 to paragraph 103 of the NPPF.'*

The Wokingham Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) (May 2023) and the Wokingham Borough Council Preliminary Flood Risk Assessment (PFRA) (2011, and its 2017 addendum) have been reviewed and inform this report.

Consultation

A full planning application was submitted in May 2024. In their statutory response to the planning application (Appendix F), which included a previous FRA undertaken by others, the EA have stated that:

The site lies within Flood Zone 3b – Functional Floodplain, defined by the Planning Practice Guidance to the National Planning Policy Framework (NPPF) as having a high probability of flooding. Voids are proposed to mitigate for an increase in built footprint within the 1% annual exceedance probability (AEP) flood extent with an appropriate allowance for climate change. Voids are not an appropriate form of mitigation in accordance with paragraph 049 of the Planning Practice Guidance which states stilts and voids ‘should not normally be relied upon for compensating for any loss of floodplain storage’. This is because voids do not allow water to freely flow through them. They have limited capacity; it is difficult to stop them being used for storing belongings or other materials and voids can get silted up and/or blocked.

Voids can still be used in the design to help prevent flood risk to the dwelling. However, any increase in build footprint cannot be mitigated using voids. In this instance the applicant has not clearly stated the increase in built footprint. But any additional size in built footprint has to be compensated for through level for level compensation. The footprint of the existing building will not need to be included in the compensation scheme only the buildings increase in footprint.

Overcoming our objection

Any increase in built footprint or raising of ground levels should be compensated up to the 1% AEP plus an appropriate allowance for climate change flood level. Level for level floodplain compensation is the preferred method of mitigation and should be considered within the FRA.

Level for level floodplain compensation is the matching of floodplain storage volumes lost with new floodplain storage volume gained through the reduction of ground levels. We recommend that level for level floodplain storage calculations are provided in a table that sets out the change in volumes across the site using 100mm or 200mm slices (dependent on site specific considerations), stating the losses and gains for each slice. It will need to be demonstrated that there would be no net loss in storage volume for any slice. The location of the changes in floodplain storage should also be clearly identified in a plan or drawing that demonstrates the scheme would be hydraulically connected for each slice.

Excavation of the proposed floodplain compensation scheme should be completed prior to the construction of development to ensure floodplain capacity is maintained.

If level for level compensation is unachievable then the applicant should amend the development to ensure that there will be no increase in flood risk elsewhere (for example by reducing built footprint or amount of land raising proposed).'

Further EA correspondence dated 18th October 2024, included in Appendix F, states:

'The proposed dwelling footprint is larger than the existing by 24.16m² with a volume of 29.4m³. Previously voids have been proposed to compensate for the flood storage lost. The FRA dated 13 August 2024 has proposed compensation in the form of ground level modifications within the red line boundary.

The site is located in functional floodplain (Wokingham 2023 SFRA defines functional floodplain is modelled 3.3%). We hold detailed modelling from Thames (Sonning to Hurley) 2019 and the site is wholly within the floodplain. In order to provide level for level compensation, the site needs land outside of 1% annual exceedance probability (AEP) plus appropriate allowance for climate change flood extent, which this site does not have. The appropriate climate change allowance level is assessed at 35.34mAOD. The FRA proposes to replace the volume lost between 34.7 and 34.5mAOD.

However, the FRA does not demonstrate the applicant can offset the volume lost (on a level for level basis) beyond 34.7mAOD. They are not able to compensate across the higher order flood events above 34.7mAOD. Level for level compensation must be provided from the existing ground level up to the appropriate climate change level. Volume for volume compensation will not compensate for the all flood events up to and including the 1% AEP plus appropriate allowance for climate change. Generally, volume for volume compensation will provide an increase in storage for smaller events but not for larger events.

Paragraph 049 of the Planning Practice Guidance Flood and Coastal change states...'Development or the cumulative impacts of development may result in an increase in flood risk elsewhere as a result of impacts such as the loss of floodplain storage, the deflection or constriction of flood flow routes...Where flood storage from any source of flooding is to be lost as a result of development, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided....Whilst the use of stilts and voids below buildings may be an appropriate approach to mitigating flood risk to the buildings themselves, such techniques should not normally be relied upon for compensating for any loss of floodplain storage. This is because voids do not allow water to freely flow through them, trash screens get blocked, voids get silted up, they have limited capacity, and it is difficult to stop them being used for storing belongings or other materials.'

We do appreciate and recognise the efforts to offset on a volumetric basis but this does not compensate for storage lost in higher order events and therefore could increase flood risk elsewhere which is contrary to paragraph 173 of the NPPF.

Overcoming our objection

From the topographical survey provided, level for level compensation is not possible to achieve on this site,

therefore we recommend the applicant does not increase the built footprint beyond existing footprint.'

Sources of Flooding and Probability

Fluvial

The nearest watercourse is the River Thames which is located immediately west of the site. The River Thames flows north-east in this location. Other watercourses in the area include St Patrick's Stream which is located approximately 145m east of the site. St Patricks Stream flows north-east and joins the River Loddon approximately 1km north-east of the site. The River Loddon joins the River Thames approximately 1.8km north-east of the site.

The development site is located in an area which benefits from flood defences in the form of natural high ground. Fluvial flooding could occur if the River Thames overtopped its banks during or defences following an extreme rainfall event.

The EA 'Historic Flood Risk' map (Appendix E) shows that the site is within a historical fluvial flood extent.

EA Modelled Data

Modelled output data for the River Thames has been obtained from the EA in July 2024. The modelled outputs are taken from the EA Thames (Sonning to Hurley) 2022 model and include flood depth, water level, velocity and hazard mapping. Modelled outputs are included in Appendix G.

As shown in Figure 1, during the 3.33% Annual Exceedance Probability (AEP) event, the majority of the site is estimated to flood. A maximum flood level of 34.79m AOD is estimated. Flood depths reach up to 0.54m in the eastern extent of the site.

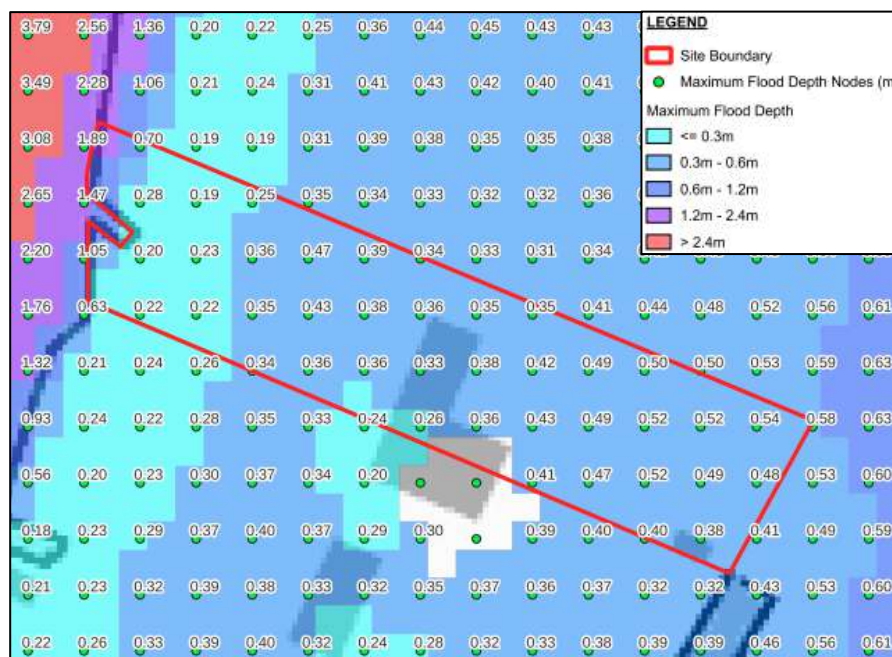


Figure 1 – 3.3% AEP Event – Flood Depths (m)

As shown in Figure 2, during the 1% AEP event, the entire site is estimated to flood. A maximum flood level of 34.98m AOD is estimated in the western extent of the site. Flood depths of up to 0.75m are estimated in the eastern extent of the site.

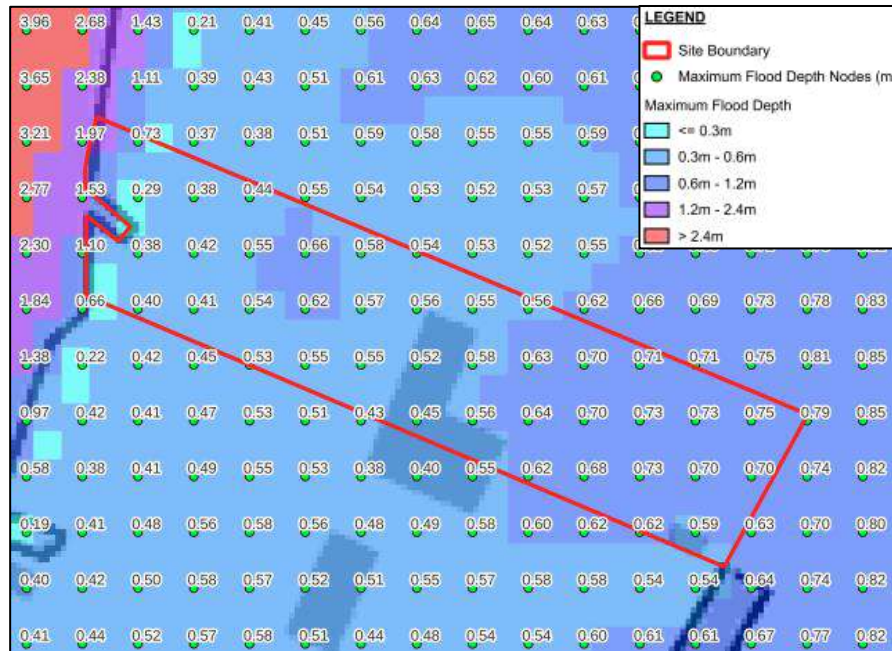


Figure 2 – 1% AEP Event – Flood Depths (m)

As shown in Figure 3, during the 1% AEP plus 35% climate change (CC) event, the site is estimated to flood. A maximum flood level of 35.34m AOD is estimated. Flood depths vary from 0.95m in the location of the existing building to 1.13m in the eastern extent of the site.

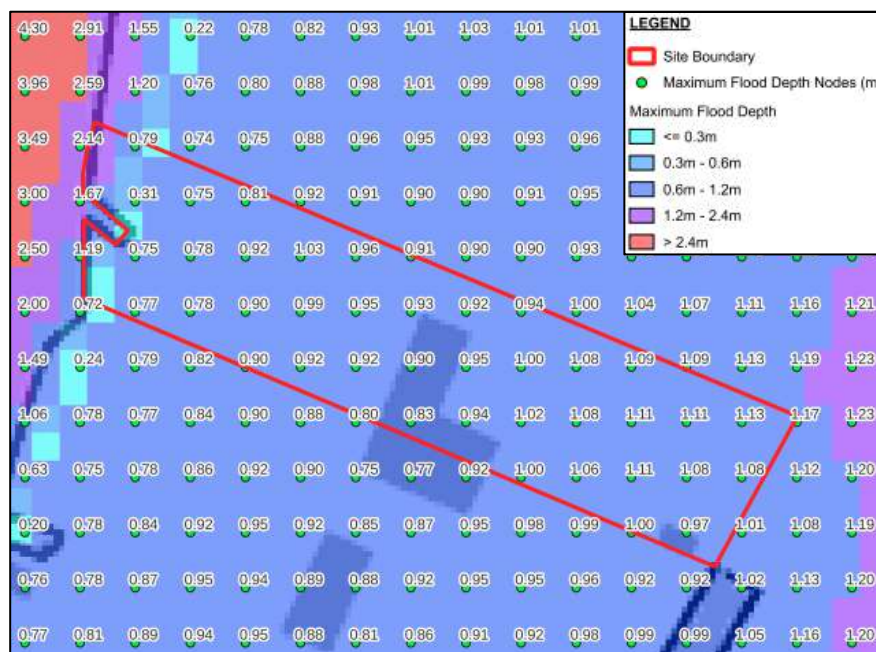


Figure 3 – 1% AEP + 35% CC Event – Flood Depths (m)

As shown in Figure 4, during the 0.1% AEP event, the site is estimated to flood. A maximum flood level of

35.43m AOD is estimated. Flood depths vary from 1.04m in the location of the existing building to 1.22m in the eastern extent of the site.

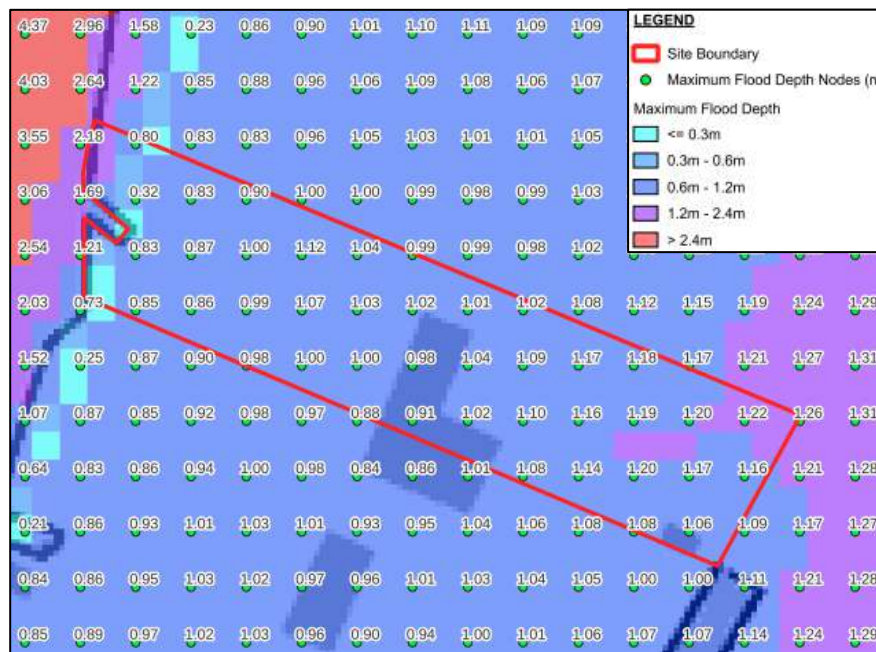


Figure 4 – 0.1% AEP Event – Flood Depth (m)

It can be concluded that the site is at risk of fluvial flooding. Flood depths reach up to 0.95m in the location of the existing building during the 1% AEP plus 35% CC event.

In accordance with the EA 'Flood risk assessment: climate change allowances' guidance, a 31% climate change allowance is applicable for this area. In absence of modelled data to assess 31% climate change, a conservative 35% climate change allowance has been used.

Tidal

The site is situated at a minimum of 34.21m AOD and is significantly above sea level. Therefore, the risk of tidal flooding is very low.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The EA 'Flood Risk from Surface Water' map (Appendix E) indicates that the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding.

There are no distinct flow routes in the area which would direct any potential surface water flooding towards the site.

The PFRA 'Historical flooding incidents from local sources of flooding' map (Appendix H) shows that there are no records of surface water flooding at or near to the site.

It can therefore be concluded that the risk of surface water flooding is very low.

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

Public sewer records have been obtained from Thames Water and are included within Appendix I. The Thames Water sewer records show that there are no public sewers within the vicinity of the site.

There are no records of sewer flooding at or near to the site and it can therefore be concluded that the risk of sewer flooding is very low.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

As mentioned above, the site is underlain by superficial deposits of Alluvium, generally comprising clay, silt, sand and gravel. The superficial deposits are identified as being underlain by the Seaford Chalk formation and the Newhaven Chalk formation. A BGS borehole record located 150m south-west of the site records groundwater at 2m.bgl.

The Wokingham Borough Council Local Flood Risk Management Strategy 'Areas Susceptible to Groundwater Flooding' map (Appendix J) shows that the site is located in an area with a greater than 75% susceptibility to groundwater flooding.

There are no records of groundwater flooding at or near to the site. No basement levels are proposed and it can therefore be concluded that the risk of groundwater flooding is low, however a high water table may be present in times of prolonged high water levels in the River Thames.

Artificial Sources

There are no canals located in the immediate vicinity of the site. The EA 'Flood Risk from Reservoirs' map (Appendix E) shows that the site is at risk from a failure of the following reservoirs:

Table 1 - EA Flooding from Reservoirs

Name	Location	Owner
Farmoor No. 1	E - 444500 N - 206800	Thames Water
Farmoor No. 2	E - 444500 N - 206000	Thames Water
Sheeplands Farm	E - 478802 N - 177504	WR Bennett (Berkshire) Limited

The EA state that reservoir flooding is extremely unlikely to happen. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensure that reservoirs are inspected regularly, and essential safety work is carried out. It can therefore be concluded that the risk of flooding from artificial sources is very low.

Summary of Potential Flooding

It can be concluded that fluvial flooding is the main potential source of flood risk to the site. A flood level of 35.34m AOD is estimated during the 1% AEP plus 35% CC event. The associated risk has been used to inform mitigation design.

Mitigation

The site is identified at risk of fluvial flooding with a flood level of 35.34m AOD during the 1% AEP plus 35% CC event. A flood level of 35.43m AOD is estimated during the 0.1% AEP event.

It is proposed to set ground floor levels at a minimum of 36.2m AOD. This will ensure that the building will be flood free internally during the 1% AEP plus 35% CC event, allowing a freeboard of 860mm. The building will also be flood free internally during the 0.1% AEP event.

Whilst the ground floor and internal areas of the building will be flood free, the following flood resistance and resilience measures could be applied where practical:

- Set the level of any electronic control units and sockets i.e. for the car port, at or above 35.94m AOD (600mm above the 1% AEP plus 35% CC flood level).
- Use flood resilient construction techniques i.e. engineering bricks up to a height of 35.94m AOD.

Flood Warnings and Evacuation

Flood Warnings cover this area. Residents should register to receive Flood Warnings. Flood Warnings is a free service that provides prior warning of a fluvial flood event.

The site owner should prepare a flood plan to inform residents of the flood risk and to provide advice on what to do in the event of a flood. The flood plan should include details of a safe evacuation route to be used upon receipt of a Flood Warning and prior to flooding occurring. A flood evacuation route plan is included as Appendix K.

Where no flood warning is received, and prior evacuation has not been possible, it is considered acceptable for site users to remain within the building which will be raised above flood levels. Residents should not evacuate the building into flood water unless instructed to do so otherwise by the emergency services.

Impact on Flood Risk Elsewhere

The existing building and outbuildings cover a footprint of 321.7m². The proposed building footprint (including the annex and car port structure) covers 321.01m². The development will result in an overall reduction in building footprint by 0.69m². Building footprints are shown on drawing 333(PL) 700 in Appendix D.

The reduction in building footprint will ensure that the proposed development does not remove flood storage space from the floodplain and does not increase flood risk elsewhere.

Exception Test

The NPPF advises that the Exception Test must be passed for 'more vulnerable' development in Flood Zone 3. For the Exception Test to be passed it must be demonstrated that:

- A. the development would provide wider sustainability benefits to the community that outweigh 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.

With reference to point (a) above, the proposed development will improve upon the existing condition with regard to sustainability and flood resilience. Sustainability measures are detailed in the Hoban Design Ltd 'Design and Access Statement'. As a replacement dwelling, the development maintains housing supply in the community.

With reference to point (b) above, the flood risk to the site will be managed by raising ground floor levels to a minimum of 36.2m AOD. This will ensure that the building will be flood free internally during the 1% AEP plus 35% CC event, allowing a freeboard of 860mm. The reduction in building footprint will ensure the

proposed development does not increase flood risk elsewhere.

Conclusions

The proposed development is for the replacement of an existing dwelling and outbuilding with a new dwelling, annexe and attached carport.

The Environment Agency 'Flood Map for Planning' (accessed September 2025) shows that the site is located within Flood Zone 3 – an area considered to be at flood risk with a 1% (1 in 100) or greater annual probability of fluvial flooding.

Fluvial flooding from the River Thames is the main potential source of flood risk to the site. Modelled outputs for the River Thames have been obtained from the EA to inform the assessment of flood risk.

The EA modelling shows that a maximum flood level of 35.34m AOD is estimated during the 1% AEP plus 35% CC event with flood depths up to 1.13m. A maximum flood level of 35.43m AOD is estimated during the 0.1% AEP event with flood depths up to 1.22m.

It is proposed to set ground floor levels at a minimum of 36.2m AOD. This will ensure that the building will be flood free internally during the 1% AEP plus 35% CC event, allowing a freeboard of 860mm. This will also ensure that the building is flood free during the 0.1% AEP event.

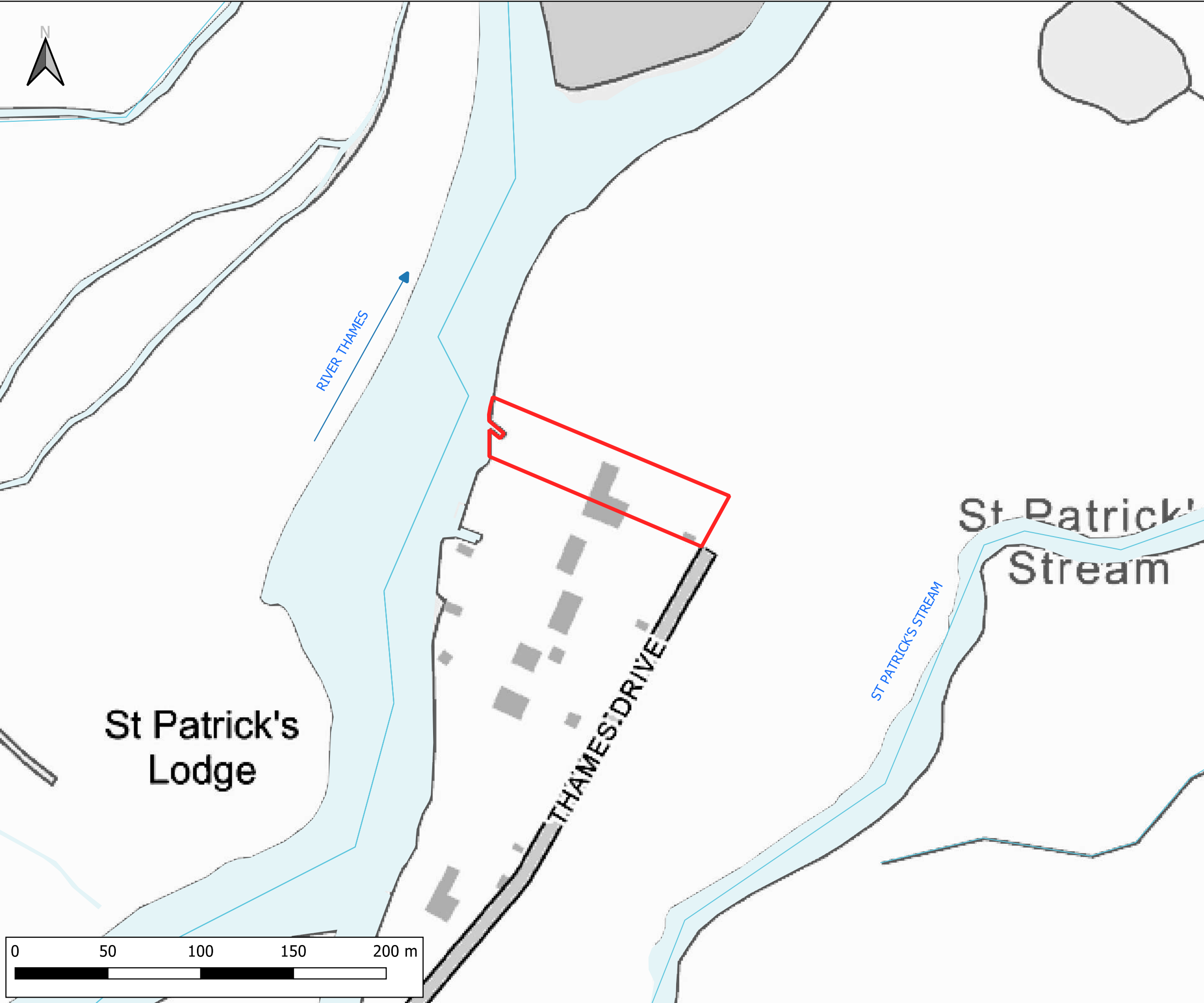
The existing building and outbuildings cover a footprint of 321.7m². The proposed building footprint (including the annex and car port structure) covers 321.01m². The development will result in an overall reduction in building footprint by 0.69m². The reduction in building footprint will ensure that the proposed development does not remove flood storage space from the floodplain and does not increase flood risk elsewhere.

Overall, in addition to other wider sustainability improvements stated previously, the proposals provide additional flood storage volume, and the development will be safe for its lifetime. The NPPF Exception Test is therefore considered to be passed.

Recommendations

1. Submit this Flood Risk Assessment to the Planning Authority in support of the Planning Application.

Appendix A Location Plan & Aerial Image



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Watercourses
- Waterbodies

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

Location Plan

PLOT STATUS:		DATE:	
FINAL		12-08-2024	

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:2000

PLOT NAME:	REVISION:
16086_Location_Plan	-



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

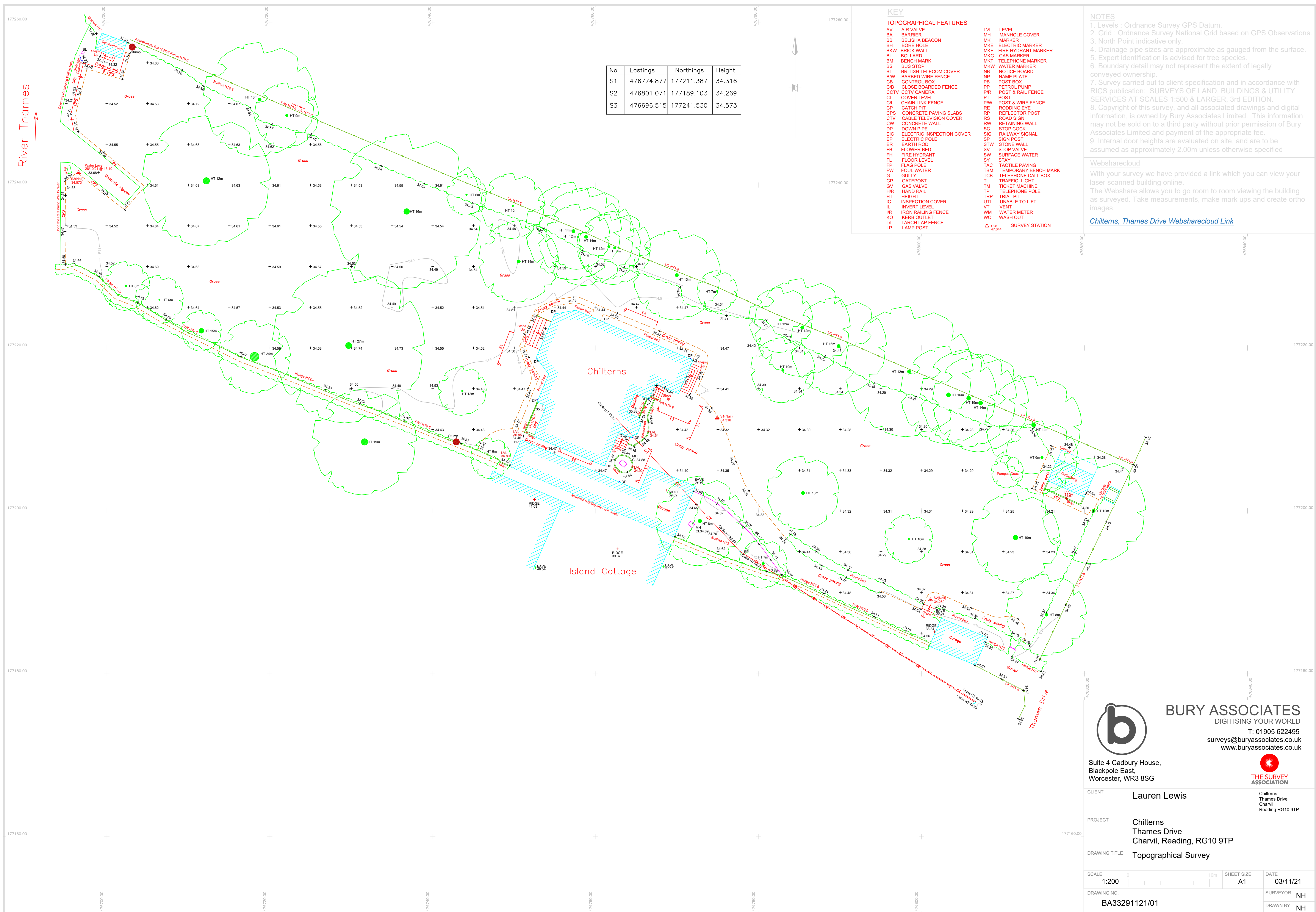
Aerial Plan

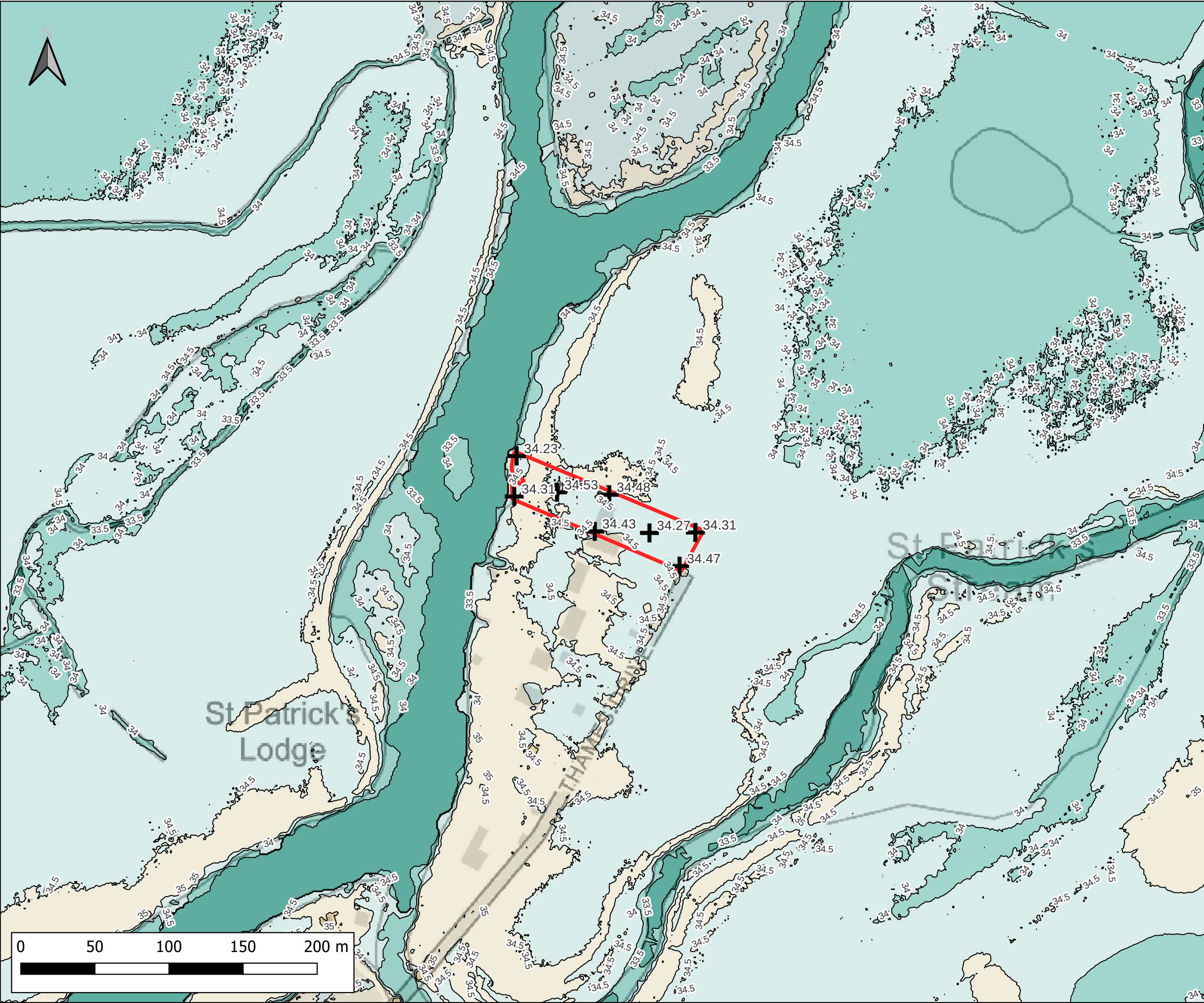
PLOT STATUS:		DATE:	
FINAL		12-08-2024	

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:2000

PLOT NAME:	REVISION:
16086_Aerial_Plan	-

Appendix B Topographical Information





Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

Site Boundary

0.5m contour

Site Levels (m AOD)

Ground Elevations (m AOD)

<= 33.5

33.5 - 34.0

34.0 - 34.5

34.5 - 35.0

35.0 - 35.5

> 35.5

CLIENT:

Alex Bailes

waterco
www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

LiDAR Plan
1m Resolution
Data from Environment Agency

PLOT STATUS:		DATE:	
FINAL		12-08-2024	
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
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PLOT NAME:			REVISION:
16086_LiDAR_Plan			-

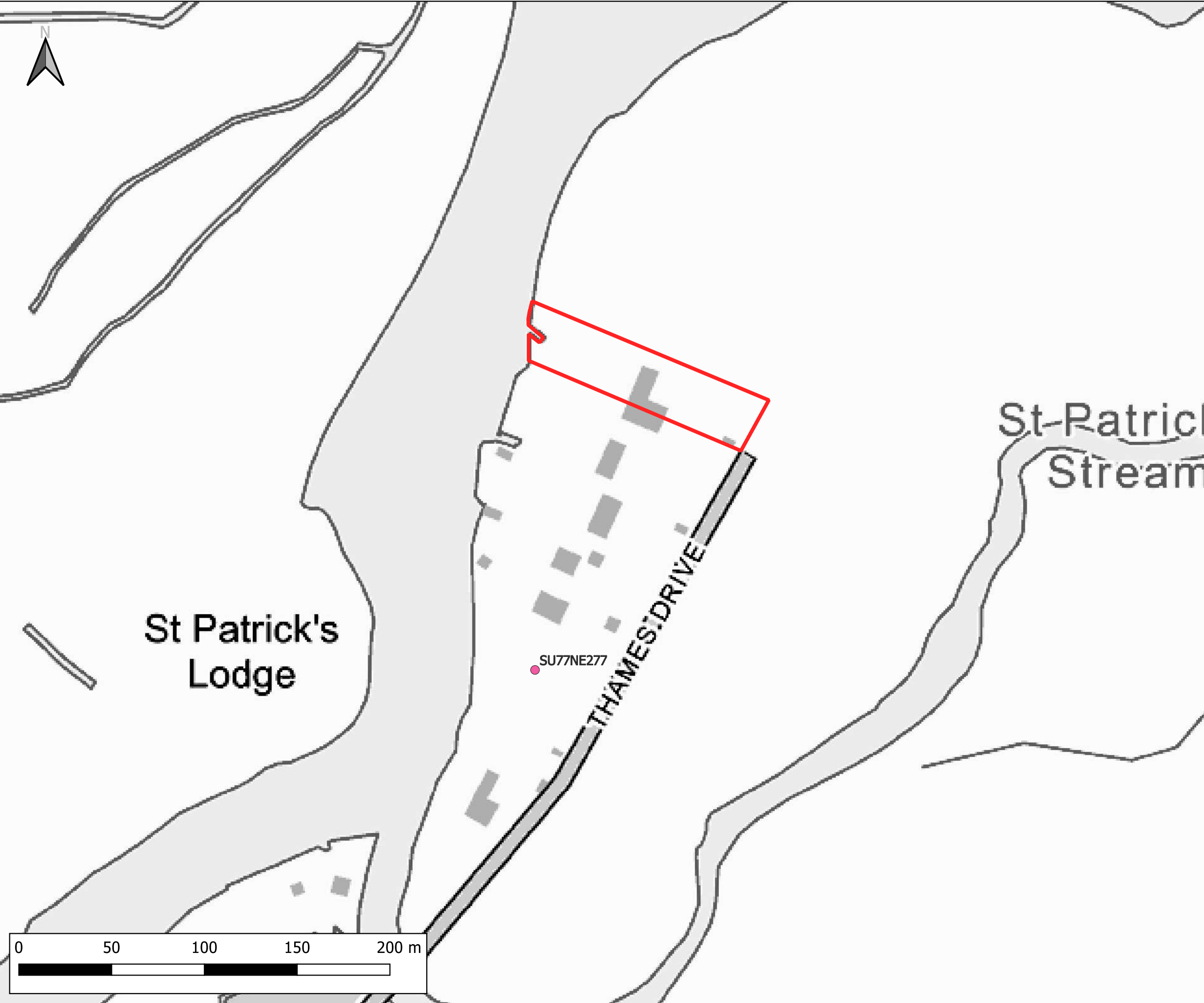
Appendix C BGS Borehole Record & Location Plan



Sheet No. 1 of 1

[illegible]

M	D	E	B	W	U100		SPT	
100								
					UT	Ally	SPT Hammer No	
					ent			



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- BGS Borehole Location

CLIENT:
Alex Bailes

www.waterco.co.uk

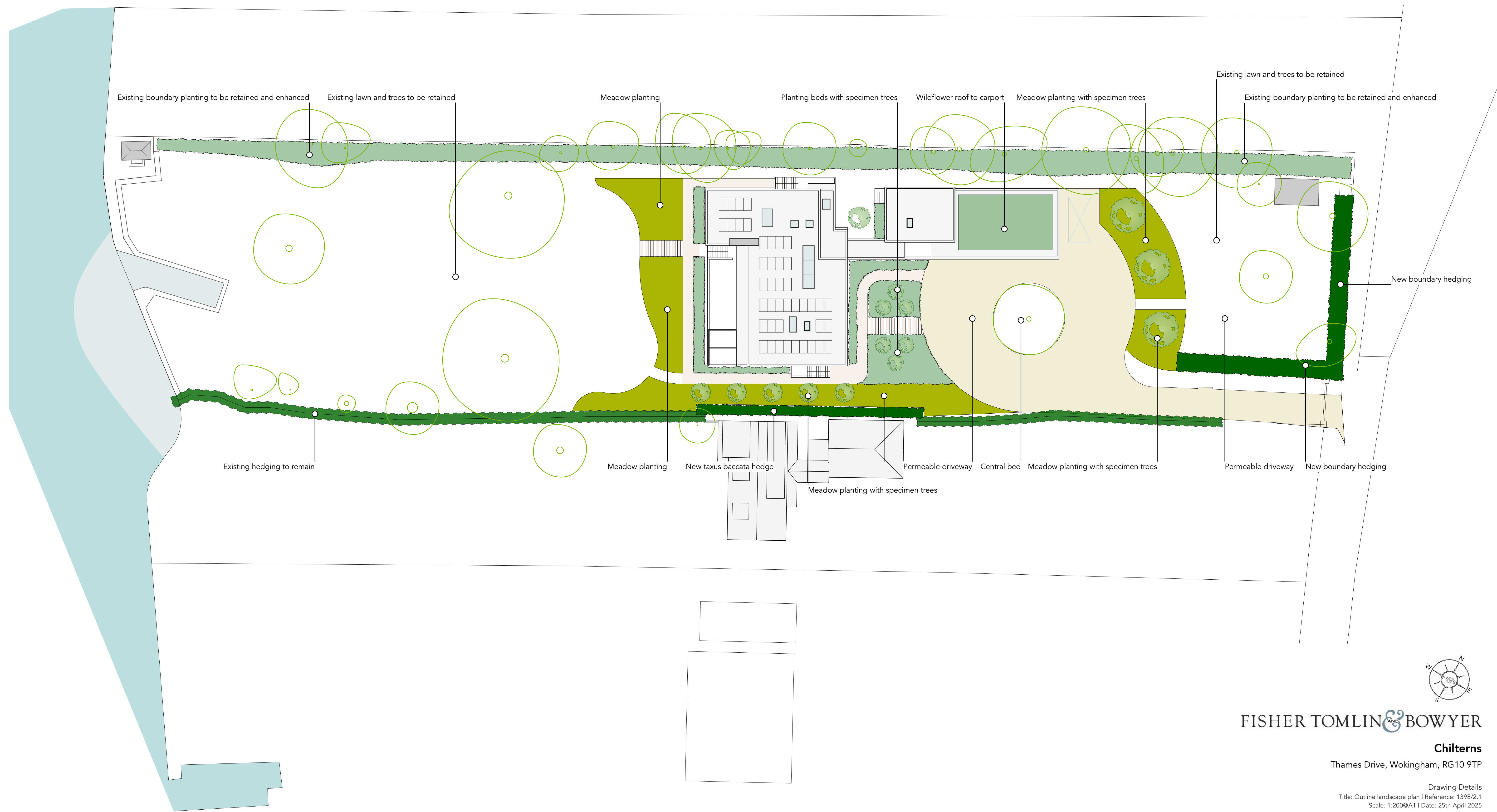
SCHEME:
Thames Drive, Charvil

PLOT TITLE:
Historical BGS Borehole Location Plan
Data from British Geological Survey (BGS)

PLOT STATUS: FINAL		DATE: 12-08-2024
DRAWN: AM	CHECKED: AW	APPROVED: MW
PLOT SCALE AT A3: 1:2000		

PLOT NAME: 16086_BGS_Borehole_Location_Plan	REVISION: -
--	----------------

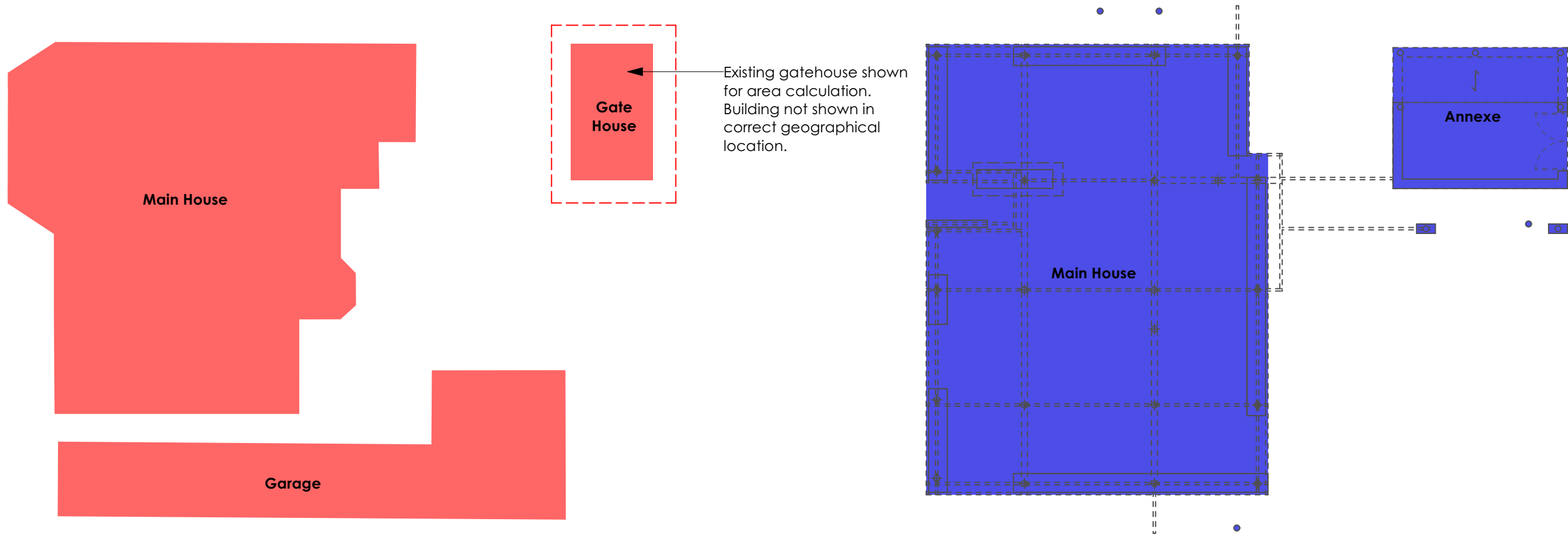
Appendix D Proposed Development Plans





This drawing is the copyright of Hoban Design Ltd.
Do not scale off this drawing.
Report any discrepancies to the architect.
All dimensions are in millimetres unless shown otherwise.

Built Footprint Analysis
EXISTING AND PROPOSED BUILDING FOOTPRINTS
WITHIN THE FLOOD ZONE



1 | **Area of Existing Building**
1:200 @ A3

EXISTING BUILDING - AREA OF RED HATCH - 321.70 m2

321.70 - 321.01 = -0.69 m sq

Therefore, the proposed building creates a total footprint decrease of 0.7 m2 within the flood zone.

2 | **Area of Proposed Building**
1:200 @ A3

PROPOSED BUILDING - AREA OF BLUE HATCH - 321.01 m2

DRAFT

status:
Planning Application

rev.	details	date
-	Issued For Planning	- XX.07.2025

client:
Lauren Lewis & Alex Bailes

project:
**Chilterns, Thames Drive,
Wokingham, RG10 9TP**

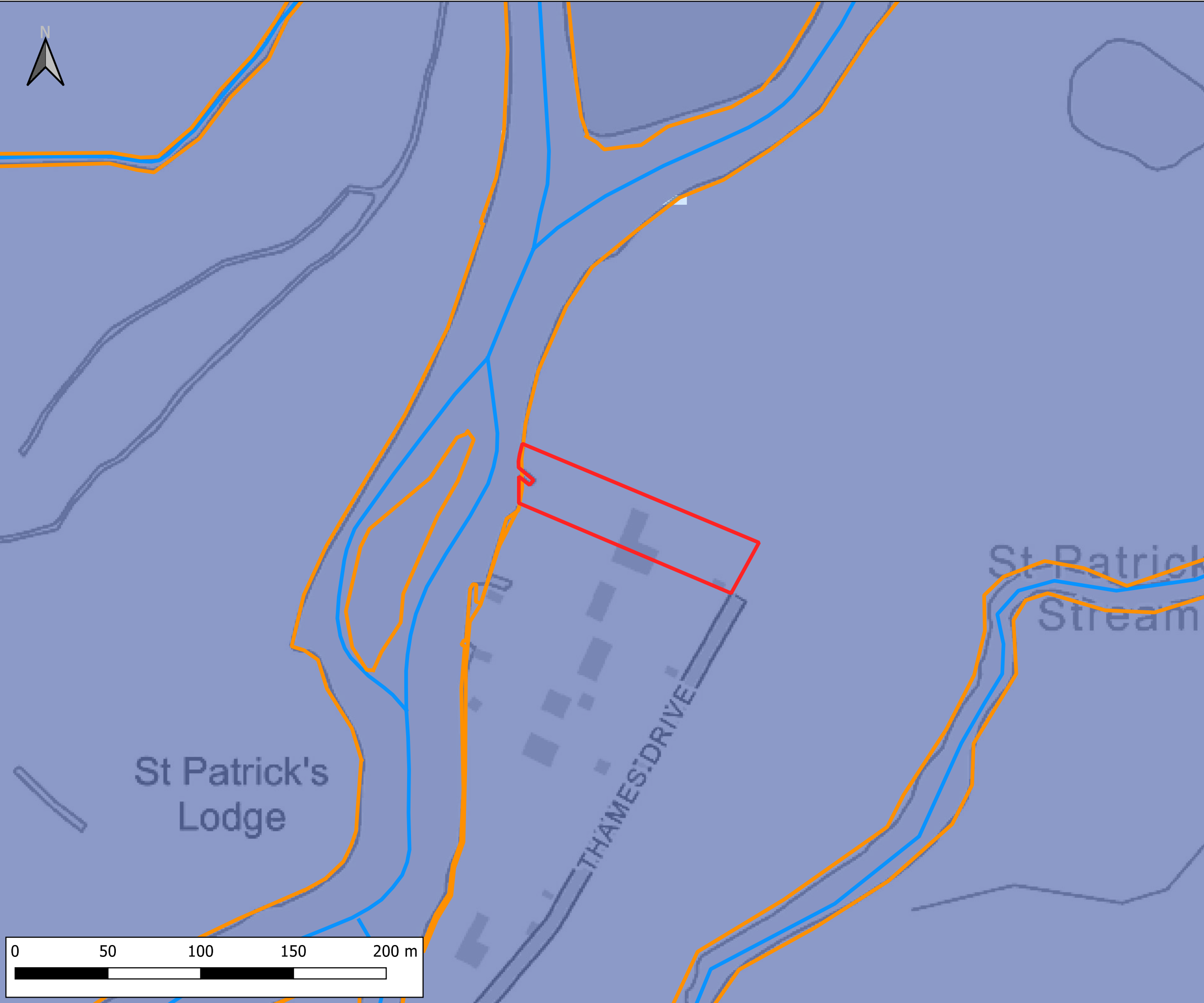
drawing:
Built Footprint Analysis

drawing number:
333 (PL) 700

drawing scale:
1:200 @ A3

date: **25.04.2025**
drawn by: **GS**

Appendix E EA Flood Maps



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Flood Zone 1
- Flood Zone 2
- Flood Zone 3
- Main Rivers
- Flood Defences

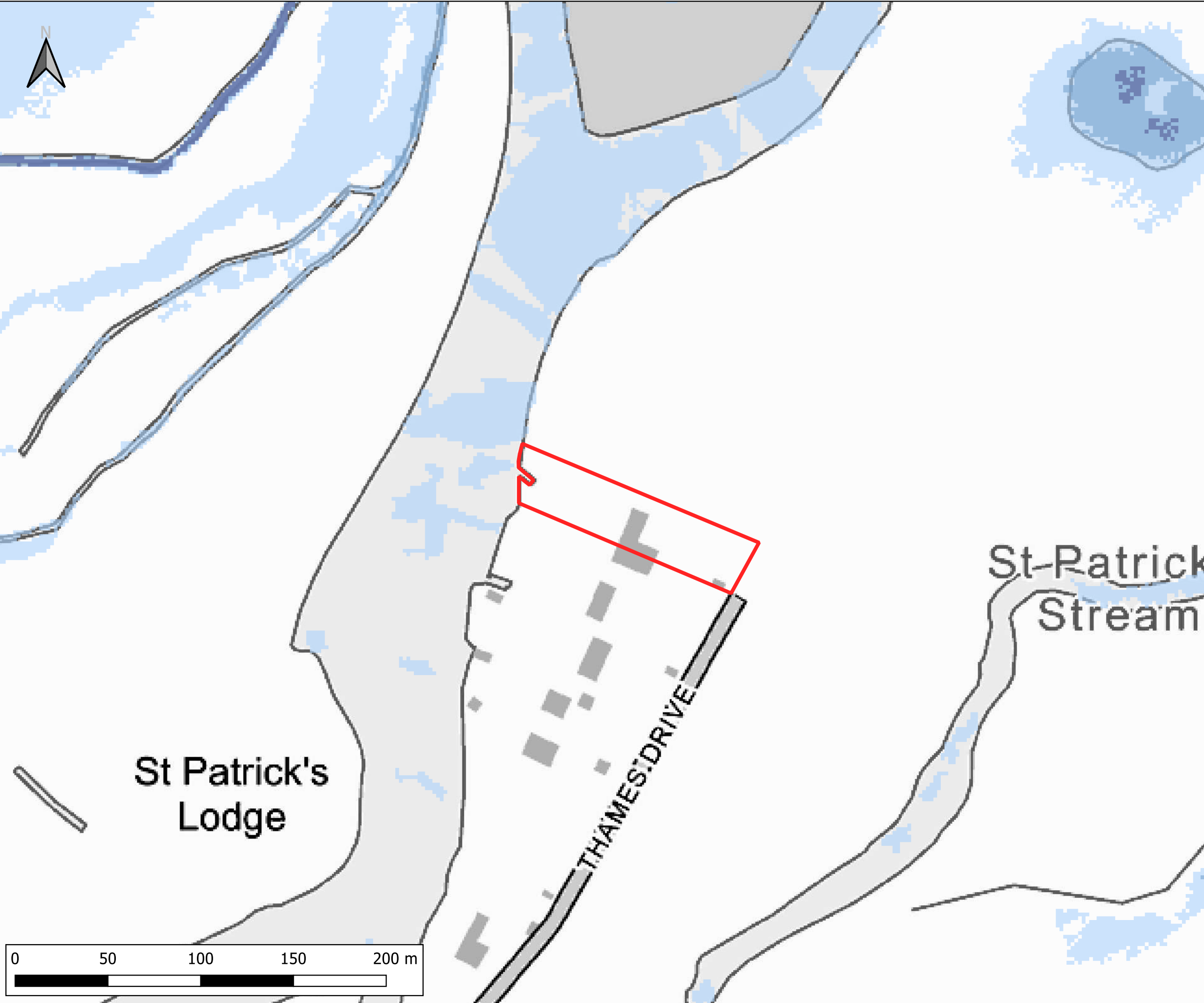
CLIENT:
Alex Bailes

waterco
www.waterco.co.uk

SCHEME:
Thames Drive, Charvil

PLOT TITLE:
EA Flood Map for Planning
Data accessed August 2024

PLOT STATUS: FINAL		DATE: 12-08-2024	
DRAWN: AM	CHECKED: AW	APPROVED: MW	PLOT SCALE AT A3: 1:2000
PLOT NAME: 16086_EA_FMP			REVISION: -



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- High
- Medium
- Low

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

EA Flood Risk from Surface Water
Data accessed August 2024

PLOT STATUS:		DATE:	
FINAL		12-08-2024	

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:2000

PLOT NAME:	REVISION:
16086_EA_Flood_Risk_from_Surface_Water	-



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

-  Site Boundary
-  When river levels are normal
-  When there is also flooding from rivers



CLIENT:

Alex Bailes



SCHEME:

Thames Drive, Charvil

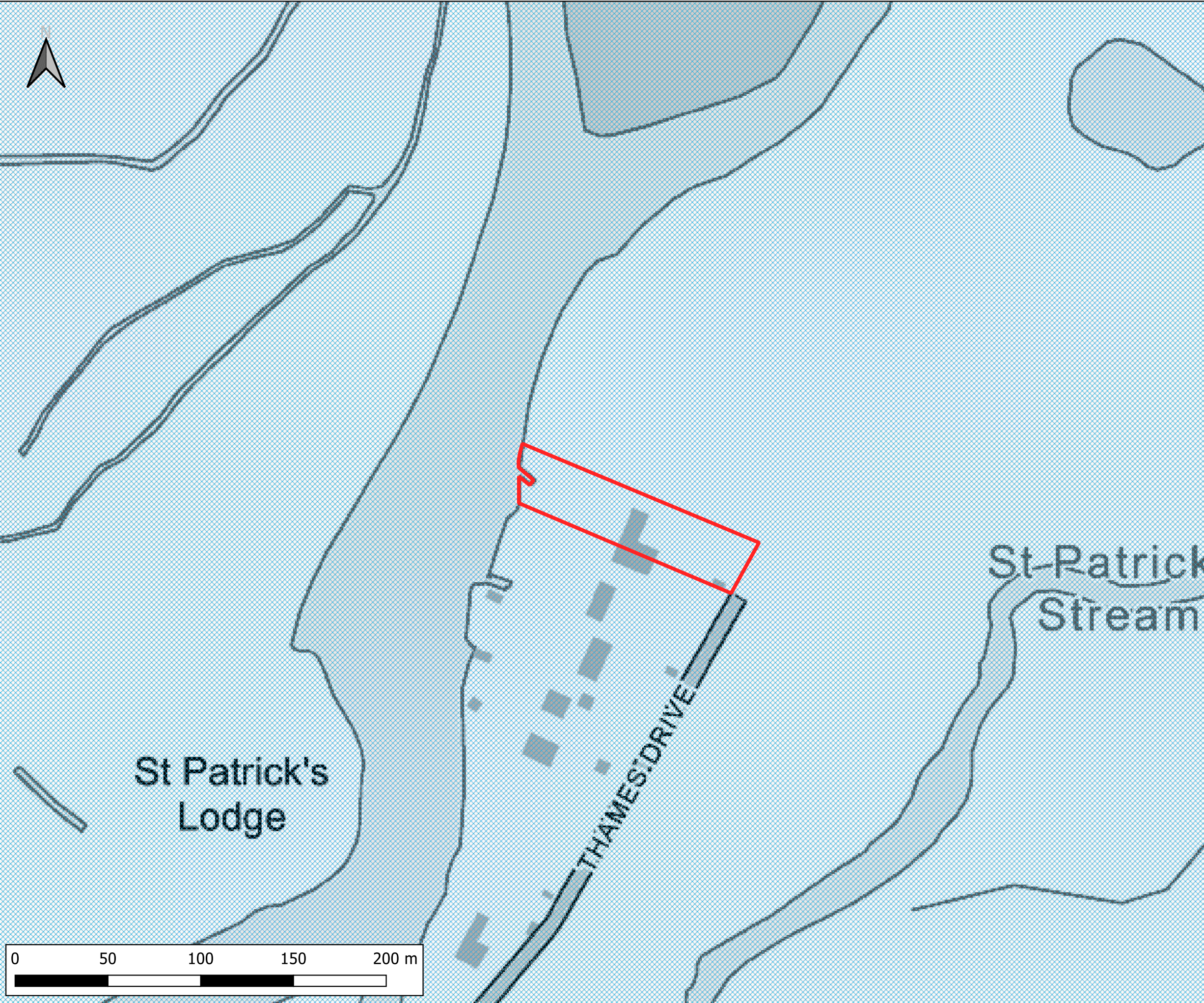
PLOT TITLE:

EA Flood Risk from Reservoirs
Data accessed August 2024

PLOT STATUS:	FINAL	DATE:	12-08-2024
--------------	-------	-------	------------

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:2000

PLOT NAME:	REVISION:
16086_EA_Flood_Risk_from_Reservoirs	-



Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise
2) The Historic Flood Map is a GIS layer showing the maximum extent of individual Recorded Flood Outlines from river, the sea and groundwater springs that meet a set criteria. It shows areas of land that have previously been subject to flooding in England. This excludes flooding from surface water, except in areas where it is impossible to determine whether the source is fluvial or surface water but the dominant source is fluvial.
3) If an area is not covered by the Historic Flood Map it does not mean that the area has never flooded, only that the EA do not currently have records of flooding in this area that meet the criteria for inclusion.
4) The Historic Flood Map takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It will include flood extents that may have been affected by overtopping, breaches or blockages.

LEGEND

- Site Boundary
- Historic Flood Map



CLIENT:				Alex Bailes			
				 www.waterco.co.uk			
SCHEME:				Thames Drive, Charvil			
PLOT TITLE:				EA Historic Flood Risk Data accessed August 2024			
PLOT STATUS:			FINAL		DATE:		12-08-2024
DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:				
AM	AW	MW	1:2000				
PLOT NAME:					REVISION:		
16086_EA_Historic_Flood_Risk					-		

Appendix F EA Correspondence

Wokingham Borough Council
Development Control
PO Box 157
Wokingham
Berkshire
RG40 1WR

Our ref: WA/2024/131247/02-L01
Your ref: 232977
Date: 04 July 2024

Dear Sir/Madam

Full Application For The Proposed Erection Of 1no. Two Storey Dwelling With Annexe And Attached Two Bay Carport Following Demolition Of Existing Dwelling And Garage.

Chilterns, Thames Drive, Charvil, Wokingham, RG10 9TP

Thank you for re-consulting us on the above application on 17 May 2024, following the submission of additional flood risk information, and thank you for agreeing an additional timeframe for the provision of our comments.

We have reviewed the following documents with regards to our planning remit:

- Flood Risk Assessment dated May 2024, prepared by Innervision Design Ltd.
- Displacement Design Diagram Slice 1 – 4, dated 29.04.2023, prepared by Hoban Design.
- Displacement Calculations dated 29.04.2023, prepared by Hoban Design.

Environment Agency position

The additional information does not address our earlier concerns. We therefore **maintain our objection** set out in our response dated 19 April 2024. We recommend that planning permission should be refused on this basis.

Reasons

The site lies within Flood Zone 3b – Functional Floodplain, defined by the Planning Practice Guidance to the National Planning Policy Framework (NPPF) as having a high probability of flooding. Voids are proposed to mitigate for an increase in built footprint within the 1% annual exceedance probability (AEP) flood extent with an appropriate allowance for climate change. Voids are not an appropriate form of mitigation in accordance with paragraph 049 of the Planning Practice Guidance which states stilts

Did you know that in the UK, 6.6 million tonnes of household food waste a year is thrown away? Almost three quarters of that is food which could have been eaten. Do your bit to avoid domestic food waste to fight climate change! www.lovefoodhatewaste.com www.wrap.org.uk

and voids 'should not normally be relied upon for compensating for any loss of floodplain storage'. This is because voids do not allow water to freely flow through them. They have limited capacity; it is difficult to stop them being used for storing belongings or other materials and voids can get silted up and/or blocked.

Voids can still be used in the design to help prevent flood risk to the dwelling. However, any increase in built footprint cannot be mitigated using voids. In this instance the applicant has not clearly stated the increase in built footprint. But any additional size in built footprint has to be compensated for through level for level compensation. The footprint of the existing building will not need to be included in the compensation scheme only the buildings increase in footprint.

Overcoming our objection

Any increase in built footprint or raising of ground levels should be compensated up to the 1% AEP plus an appropriate allowance for climate change flood level. Level for level floodplain compensation is the preferred method of mitigation and should be considered within the FRA.

Level for level floodplain compensation is the matching of floodplain storage volumes lost with new floodplain storage volume gained through the reduction of ground levels. We recommend that level for level floodplain storage calculations are provided in a table that sets out the change in volumes across the site using 100mm or 200mm slices (dependent on site specific considerations), stating the losses and gains for each slice. It will need to be demonstrated that there would be no net loss in storage volume for any slice. The location of the changes in floodplain storage should also be clearly identified in a plan or drawing that demonstrates the scheme would be hydraulically connected for each slice.

Excavation of the proposed floodplain compensation scheme should be completed prior to the construction of development to ensure floodplain capacity is maintained.

If level for level compensation is unachievable then the applicant should amend the development to ensure that there will be no increase in flood risk elsewhere (for example by reducing built footprint or amount of land raising proposed).

Other Consents – advice to applicant

As you are aware we also have a regulatory role in issuing legally required consents, permits or licences for various activities. We have not assessed whether consent will be required under our regulatory role and therefore this letter does not indicate that permission will be given by the Environment Agency as a regulatory body.

The applicant should contact 03708 506 506 or consult our website to establish if consent will be required for the works they are proposing. Please see <http://www.environment-agency.gov.uk/business/topics/permitting/default.aspx>

Final Comments

Thank you again for consulting us on this application. Our comments are based on the best available data and the information as presented to us.

If you are minded to approve this planning application, contrary to our advice please contact us prior to doing so, to explain why material considerations outweigh our objection. This will allow us to make further representations. Should our objection be removed, it is likely we will recommend the inclusion of condition(s) on any subsequent approval.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact me. Please quote our reference number in any future correspondence.

Yours faithfully

Miss Chloe Alma-Daykin
Planning Advisor

Direct dial 0203 025 9872

E-mail Planning_THM@environment-agency.gov.uk

Wokingham Borough Council
Development Control
PO Box 157
Wokingham
Berkshire
RG40 1WR

Our ref: WA/2024/131247/03-L01
Your ref: 232977
Date: 18 October 2024

Dear Sir/Madam

Full Application For The Proposed Erection Of 1no. Two Storey Dwelling With Annexe And Attached Two Bay Carport Following Demolition Of Existing Dwelling And Garage.

Chilterns, Thames Drive, Charvil, Wokingham, RG10 9TP

Thank you for re-consulting us on the above application on 27 August 2024, following the submission of the flood risk assessment for Thames Drive, Charvil, Wokingham dated 13 August 2024, ref 16086-FRA-01 rev 01, and thank you for agreeing an additional timeframe for the provision of our comments.

Environment Agency position

The additional information does not address our earlier concerns. We therefore **maintain our objection** set out in our response dated 04 July 2024. We recommend that planning permission should be refused on this basis.

Reasons

The proposed dwelling footprint is larger than the existing by 24.16m² with a volume of 29.4m³. Previously voids have been proposed to compensate for the flood storage lost. The FRA dated 13 August 2024 has proposed compensation in the form of ground level modifications within the red line boundary.

The site is located in functional floodplain (Wokingham 2023 SFRA defines functional floodplain is modelled 3.3%). We hold detailed modelling from Thames (Sonning to Hurley) 2019 and the site is wholly within the floodplain. In order to provide level for level compensation, the site needs land outside of 1% annual exceedance probability (AEP) plus appropriate allowance for climate change flood extent, which this site does

not have. The appropriate climate change allowance level is assessed at 35.34mAOD. The FRA proposes to replace the volume lost between 34.7 and 34.5mAOD.

However, the FRA does not demonstrate the applicant can offset the volume lost (on a level for level basis) beyond 34.7mAOD. They are not able to compensate across the higher order flood events above 34.7mAOD. Level for level compensation must be provided from the existing ground level up to the appropriate climate change level. Volume for volume compensation will not compensate for the all flood events up to and including the 1% AEP plus appropriate allowance for climate change. Generally, volume for volume compensation will provide an increase in storage for smaller events but not for larger events.

Paragraph 049 of the Planning Practice Guidance Flood and Coastal change states... 'Development or the cumulative impacts of development may result in an increase in flood risk elsewhere as a result of impacts such as the loss of floodplain storage, the deflection or constriction of flood flow routes...Where flood storage from any source of flooding is to be lost as a result of development, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided....Whilst the use of stilts and voids below buildings may be an appropriate approach to mitigating flood risk to the buildings themselves, such techniques should not normally be relied upon for compensating for any loss of floodplain storage. This is because voids do not allow water to freely flow through them, trash screens get blocked, voids get silted up, they have limited capacity, and it is difficult to stop them being used for storing belongings or other materials.'

We do appreciate and recognise the efforts to offset on a volumetric basis but this does not compensate for storage lost in higher order events and therefore could increase flood risk elsewhere which is contrary to paragraph 173 of the NPPF.

Overcoming our objection

From the topographical survey provided, level for level compensation is not possible to achieve on this site, therefore we recommend the applicant does not increase the built footprint beyond existing footprint.

Other Consents – advice to applicant

As you are aware we also have a regulatory role in issuing legally required consents, permits or licences for various activities. We have not assessed whether consent will be required under our regulatory role and therefore this letter does not indicate that permission will be given by the Environment Agency as a regulatory body.

The applicant should contact 03708 506 506 or consult our website to establish if consent will be required for the works they are proposing. Please see <http://www.environment-agency.gov.uk/business/topics/permitting/default.aspx>

Final Comments

Thank you again for consulting us on this application. Our comments are based on the best available data and the information as presented to us.

If you are minded to approve this planning application, contrary to our advice please contact us prior to doing so, to explain why material considerations outweigh our objection. This will allow us to make further representations. Should our objection be removed, it is likely we will recommend the inclusion of condition(s) on any subsequent approval.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact me. Please quote our reference number in any future correspondence.

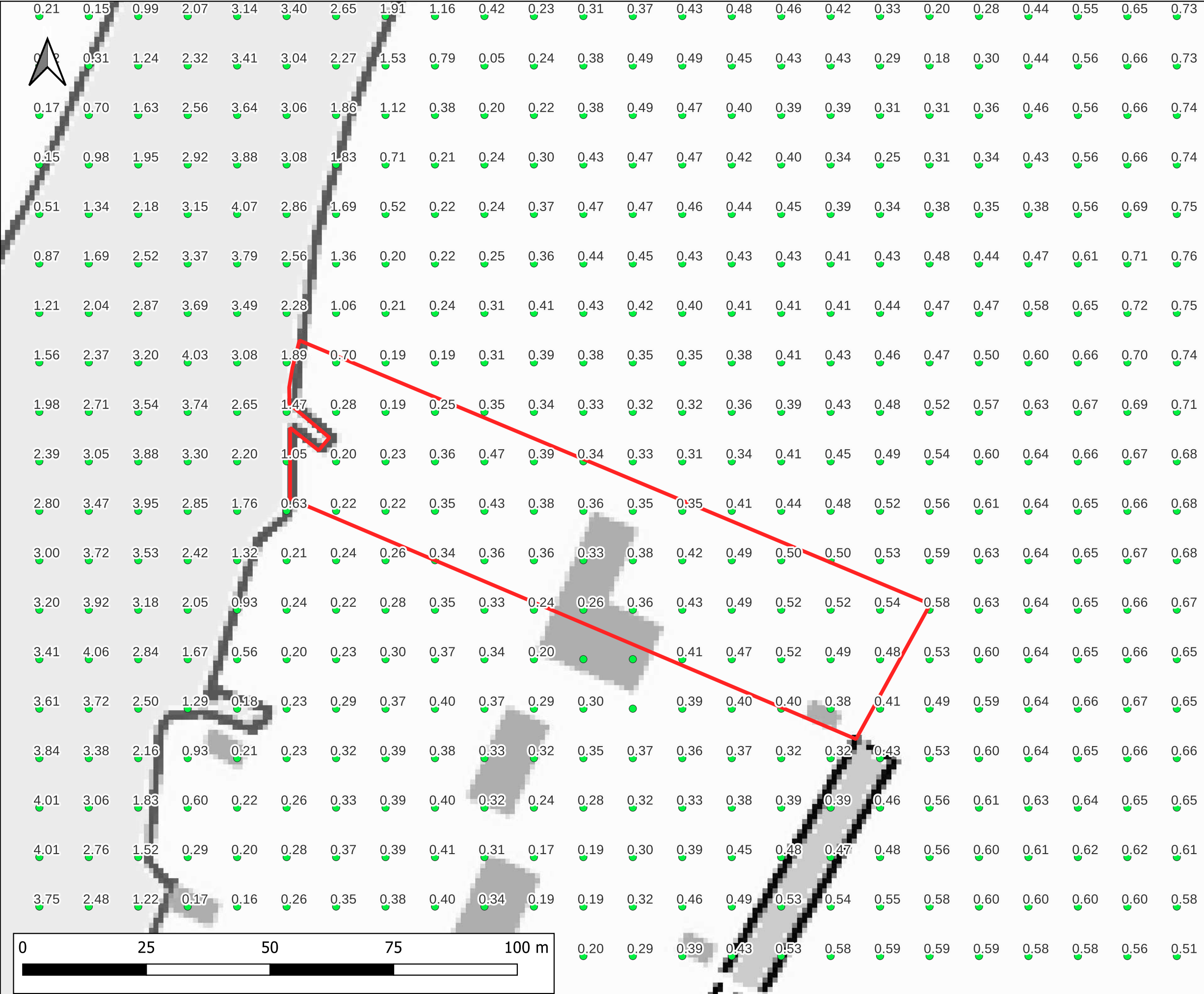
Yours faithfully

Miss Chloe Alma-Daykin
Planning Advisor

Direct dial 0203 025 9872

E-mail Planning_THM@environment-agency.gov.uk

Appendix G Modelled Outputs



Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

● Maximum Flood Depth Nodes (m)

Maximum Flood Depth

<= 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

MAXIMUM FLOOD DEPTH
THAMES (SONNING TO HURELY)
3.33% AEP FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:

FINAL

DATE:

12-08-2024

DRAWN:

AM

CHECKED:

AW

APPROVED:

MW

PLOT SCALE AT A3:

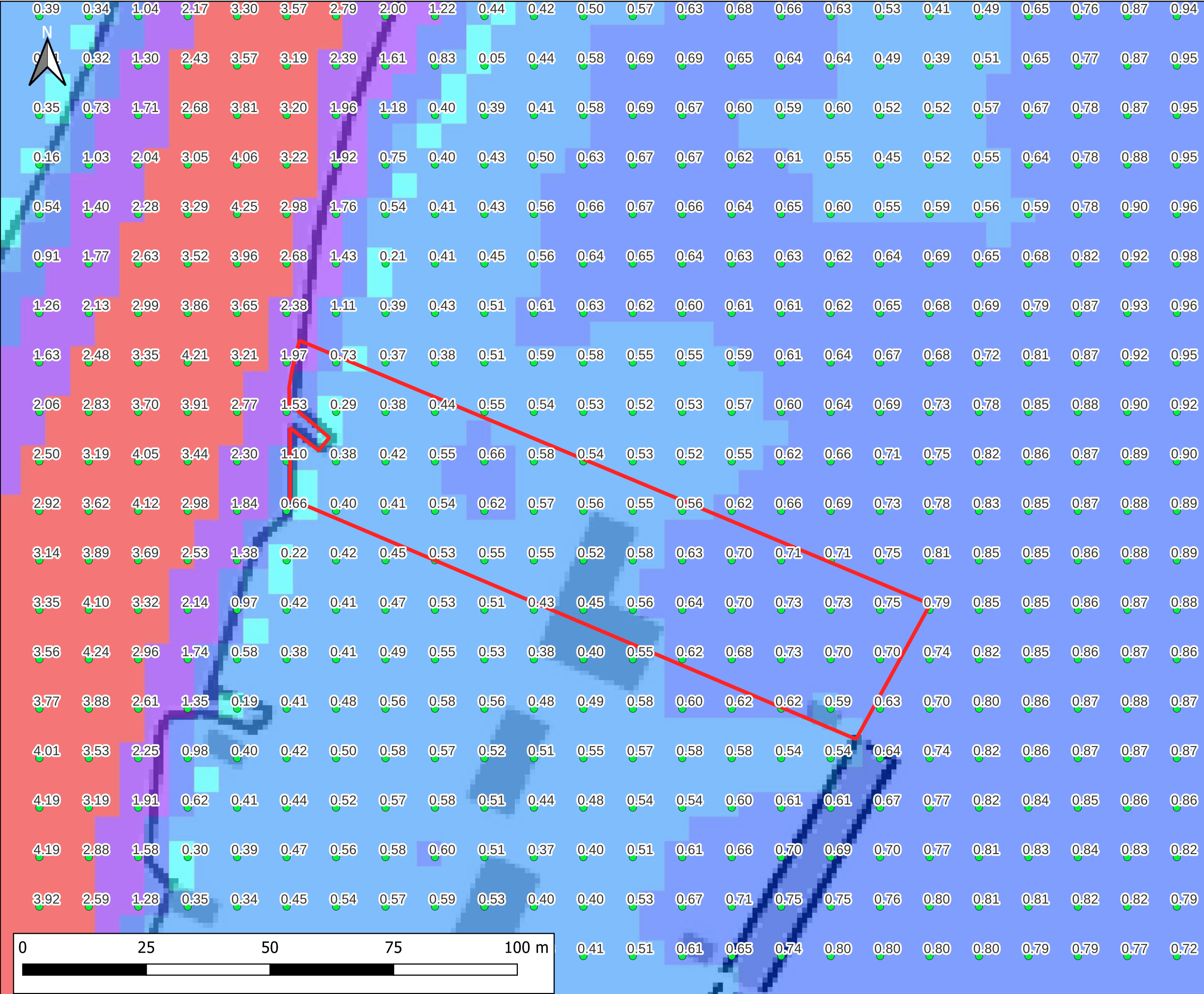
1:750

PLOT NAME:

16086_Q30_dMax

REVISION:

-



Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

Maximum Flood Depth Nodes (m)

Maximum Flood Depth

<= 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

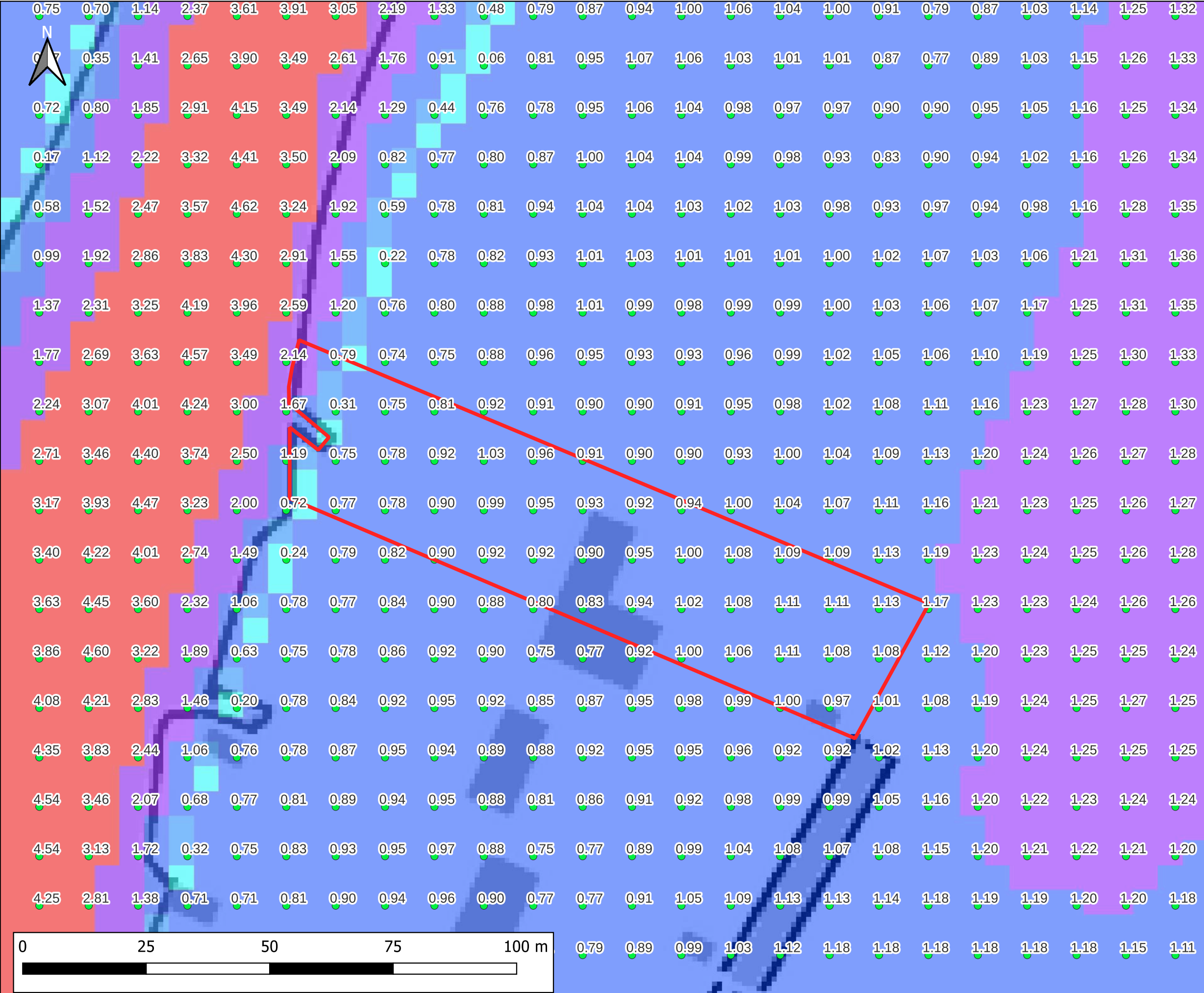
PLOT TITLE:

MAXIMUM FLOOD DEPTH
THAMES (SONNING TO HURELY)
1% AEP FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:		FINAL		DATE:	12-08-2024
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DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:	
AM	AW	MW	1:750	

PLOT NAME:				16086_Q100_dMax		REVISION:
						-



Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

Maximum Flood Depth Nodes (m)

Maximum Flood Depth

≤ 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

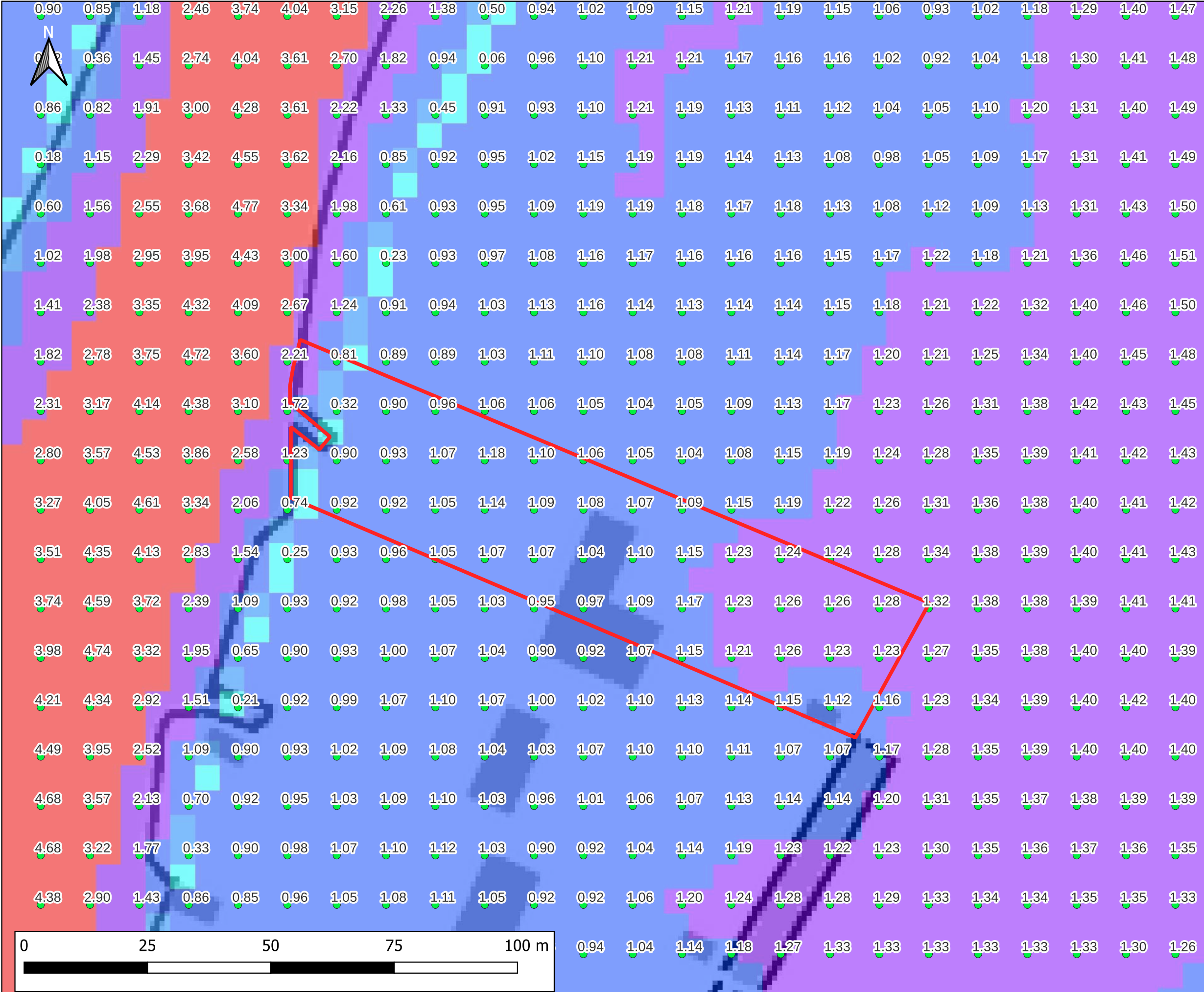
PLOT TITLE:

MAXIMUM FLOOD DEPTH
THAMES (SONNING TO HURELY)
1% AEP PLUS 35% CLIMATE CHANGE FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:			DATE:
FINAL			12-08-2024

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:750

PLOT NAME:	REVISION:
16086_Q100CC_dMax	-



Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

Maximum Flood Depth Nodes (m)

Maximum Flood Depth

≤ 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

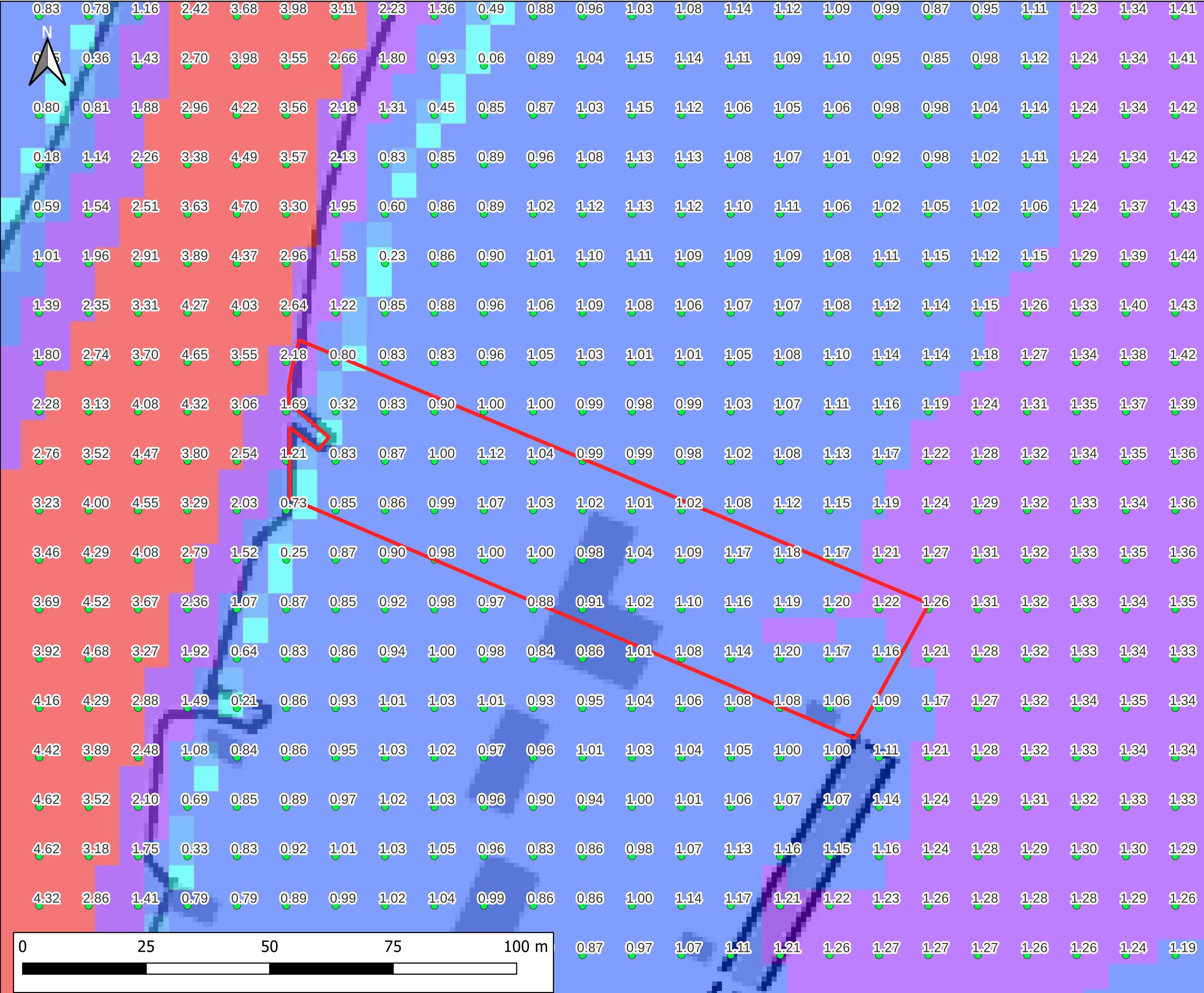
PLOT TITLE:

MAXIMUM FLOOD DEPTH
THAMES (SONNING TO HURELY)
0.5% AEP PLUS 35% CLIMATE CHANGE FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:			DATE:
FINAL			12-08-2024

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:750

PLOT NAME:	REVISION:
16086_Q200CC_dMax	-



Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

Maximum Flood Depth Nodes (m)

Maximum Flood Depth

≤ 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

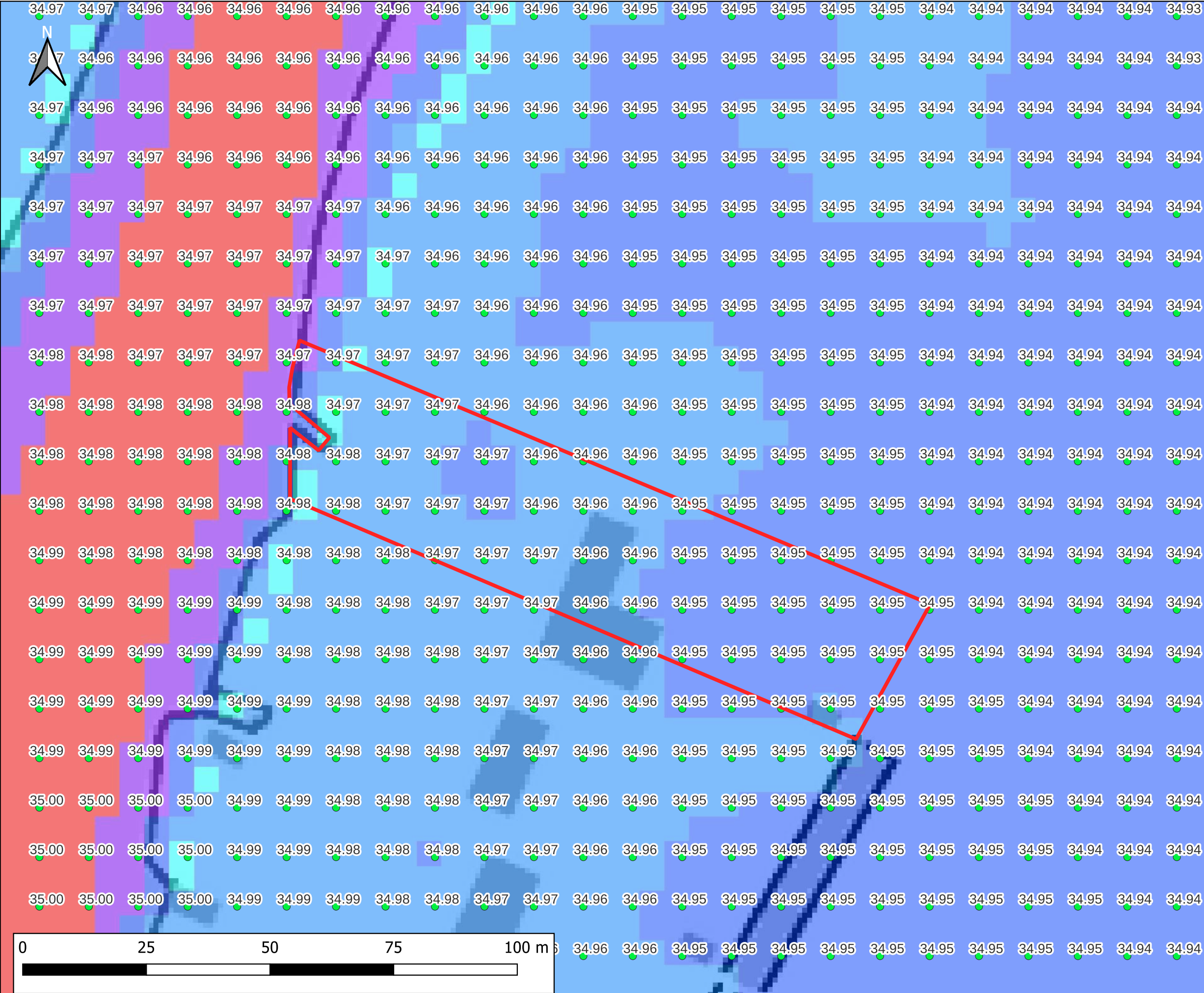
MAXIMUM FLOOD DEPTH
THAMES (SONNING TO HURELY)
0.1% AEP FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:			DATE:
FINAL			12-08-2024

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:750

PLOT NAME:	REVISION:
16086_Q1000_dMax	-





Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

● Maximum Water Level (m AOD)

Maximum Flood Depth

≤ 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

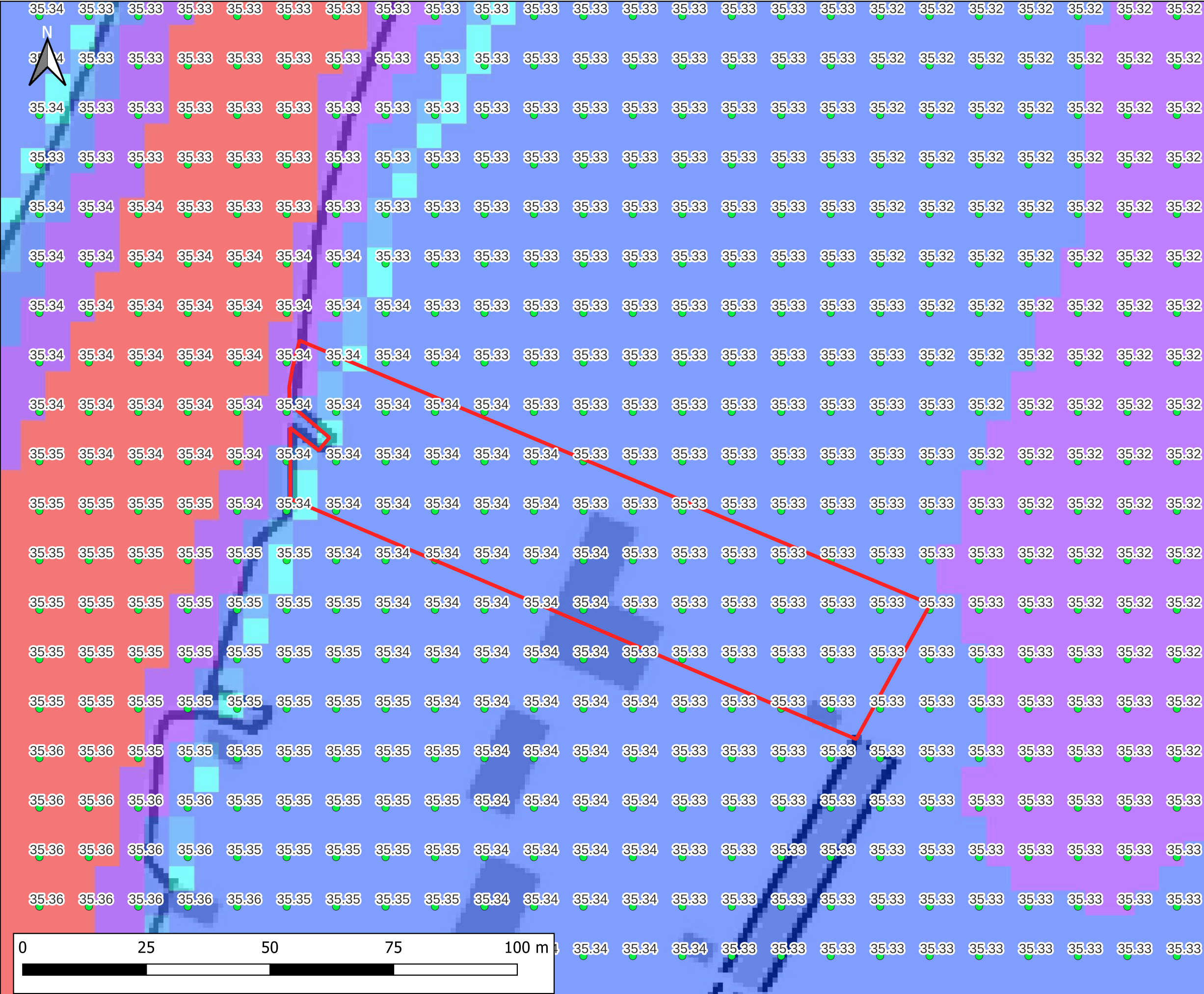
PLOT TITLE:

MAXIMUM FLOOD HEIGHT
THAMES (SONNING TO HURLEY)
1% AEP FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:			DATE:
FINAL			12-08-2024

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:750

PLOT NAME:	REVISION:
16086_Q100_hMax	-



Notes:

1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise.

2) Modelled Outputs taken from the Thames (Sonning to Hurley) 2022 model

LEGEND

Site Boundary

Maximum Water Level (m AOD)

Maximum Flood Depth

≤ 0.3m

0.3m - 0.6m

0.6m - 1.2m

1.2m - 2.4m

> 2.4m

CLIENT:

Alex Bailes

www.waterco.co.uk

SCHEME:

Thames Drive, Charvil

PLOT TITLE:

MAXIMUM FLOOD HEIGHT
THAMES (SONNING TO HURELY)
1% AEP PLUS 35% CLIMATE CHANGE FLUVIAL EVENT
UNDEFENDED

PLOT STATUS:			DATE:
FINAL			12-08-2024

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	MW	1:750

PLOT NAME:	REVISION:
16086_Q100CC_hMax	-