October 2023

Flood Risk Assessment

4 London Road, Ampney Crucis, Cirencester, Gloucestershire. GL7 5RS

Hugh and Dawn Calvert

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Executive Summary

FPS Environmental ("FPS") on behalf of Hugh and Dawn Calvert ("the client"), have undertaken a Flood Risk Assessment ("FRA") to support a planning application at 4 London Road, Ampney Crucis, Cirencester, Gloucestershire. GL7 5RS ("the site"). The application is for the erection of a new dwelling at 4 London Road, replacement of an existing garage structure and associated works.

Fluvial flood risk is considered to be Very Low. The site is shown to be located in an area which borders a designated EA Main River and includes Flood Zones 3, 2 and 1. The new dwelling is proposed to be sited in Flood Zone 1 on the boundary with Flood Zone 2, on the Environment Agency risk maps (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).

The EA were unable to provide detailed flood model results for this site and the flood extents appear to have been mapped on a 5m grid. Based on comparison of the 1m LiDAR DTM and the topo survey against the 5m grid of EA flood model extent the following Flood Levels have been estimated: EA Flood Zone 2: 99.03m AOD and EA Flood Zone 3: 98.99m AOD.

The topographic survey shows that the land slopes north down towards the river, with existing and proposed dwelling footprints siting on the highest part of the site.

Surface Water flood risk is considered Very Low, Artificial Sources are considered to be Medium, Groundwater is considered to be Medium-High, with flood risk from tidal Negligible and Reservoirs Low.

In accordance with Annex 3 of the NPPF: Flood Risk and Coastal Change, the proposed change of use is considered to be a 'More Vulnerable' development.

Table 2 of the NPPF shows the Flood Risk Vulnerability and Flood Zone Compatibility. Table 3 indicates an Exception Test is not required for "More Vulnerable" development within Flood Zone 1.

Based on the data estimated from the Environment Agency (EA) Flood Zones, a minimum Finished Floor Level (FFL) of 99.33m AOD is recommended for the new dwelling on site, this is recommended, based on the following:

Finished Flood Level = 100yr Flood Level + 20% climate change adjustment* plus freeboard allowance

Finished Floor Level = 99.03m AOD + 0.3m

Finished Flood Level = 99.33m AOD

**In lieu of detailed EA Modelled Flood Levels for the 100yr + climate change event, the Flood Zone 2 estimated level of 99.03m AOD has been adopted as a conservative flood level estimate. This approach is consistent with the GCC SFRA approach which shows the SRFA Level 1 Flood Zone 3aCC following the same line as the SFRA Level 1 Flood Zone 2 on their online mapping tool.*

Flood resistance measures may be beneficial, as they would provide protection during extreme events should flood levels reach the dwelling. Flood resistance measures that could be considered up to 600mm from the local ground level.

There is a proposed increase in building footprint of 95m^2. Following the drainage hierarchy it is recommended that the capture and storage of rainwater on site is considered as part of the drainage design for the new dwelling. Subject to positive percolation testing (BRE365), the additional volume of water generated by the new dwelling (approx. 2.5m^3) could be infiltrated to ground by a suitable designed soakaway situated with Flood Zone 1.

No construction works are planned within 8m of the watercourse. A minimum 8m buffer will be maintained on site along the Main River Bank.

The client's aspirations can manage/mitigate flood risk as part of the design by locating the proposed dwelling in flood zone 1 on the higher ground, adopting an appropriate finished floor level (FFL 99.33m AOD) and implementing flood resistance and/or flood resilience measures.

This FRA has therefore demonstrated that the proposed development can be undertaken in-line with NPPF guidance, and that it is:

- Suitable in the location proposed;
- Unlikely to place additional persons at risk of flooding; and,
- Unlikely to increase flood risk elsewhere through the loss of floodplain storage, impedance of flood flows, or increase in surface water run-off.

1. Introduction

1.1 Authorisation & Context

FPS Environmental ("FPS") on behalf of Hugh and Dawn Calvert ("the client"), have undertaken a Flood Risk Assessment ("FRA") to support a planning application at 4 London Road, Ampney Crucis, Cirencester, Gloucestershire. GL7 5RS ("the site"). The application is for the erection of a new dwelling at 4 London Road, replacement of an existing garage structure and associated works.

1.2 Aims and Objectives

The overall aim is to demonstrate that the proposed development at the site is appropriate in the context of flood risk. The proposed site location plan and existing site layout are included within Appendix A for reference. FPS has undertaken this FRA in accordance with the most up to date local and national policies on development and flood risk by:

- Assessing whether the site is likely to be affected by flooding from different sources;
- Providing an assessment of the vulnerability of the proposed development and its suitability in relation to the identified flood risk;
- Providing an opinion in relation to the likely impacts of the proposed development on flooding and elsewhere; and,
- Where required, presenting flood risk mitigation measures necessary to ensure that the proposed development and occupants will be safe, whilst ensuring flood risk is not increased elsewhere.

1.3 Information Sources Used

To prepare this report, the following information sources and general guidance documents have been used:

- National Planning Policy Framework (NPPF), Flood Risk and Coastal Change Planning Practice Guidance;
- Strategic Flood Risk Assessment (SFRA L1) – Gloucestershire County Council, 2008;
- Cotswold District Council Strategic Flood Risk Assessment, May 2016, JBA;
- Gloucestershire County Council Preliminary Flood Risk Assessment, 2011 and addendum 2017 (GCC);
- COTSWOLD DISTRICT LOCAL PLAN 2011-2031 (Adopted 3 August 2018);

- Topographical survey – 2113/3 Existing Block Plan.pdf (May 2021);
- Existing / Proposed Layout Plan – 2105/1 Pans as existing / proposed.pdf (Rev D, Feb 2021);
- Proposed Layout Plan – 2113/1 Plans as proposed .pdf (Rev H, March 2021);
- Environment Agency (EA) Interactive Online Flood Mapping - Accessed October 2023;
- EA Surface Water Dataset – Accessed October 2023;
- 1m Resolution Light Detection and Ranging (LiDAR) Data – Downloaded October 2023; and,
- British Geological Survey Drift & Geology Maps - Accessed October 2023.

1.4 Report Limitations

This assessment of flood risk has looked to use the most accurate and up to date flood mapping for the location. The site boundary has been supplied by the client and the assessment of risk is based on this.

This report has been prepared with due care and diligence in accordance with industry best practice and guidance. The conclusions in this report are valid only to the extent that the information provided to FPS was accurate and complete at time of receipt.

1.5 Site Setting

The site is located at National Grid Reference (NGR): 406754 (E), 201720 (N)

The site covers an area of approximately 0.154 hectares (ha) and currently comprises a two-story detached dwelling with garden and garage, with associated car parking and driveway from London Road. The site is located in semi rural area.

Ampney Brook, an EA designated Main River, flows in an easterly direction approximately 35m North of the site. An un-named ordinary watercourse joins the Ampney Brook downstream of the site. This watercourse drain a smaller catchment originating north of the Pleydells area.

The site location can be seen in Appendix A and Drawings 01 and 02 for reference.

1.6 Topographic Mapping & Levels

A topographical survey was undertaken in May 2021. Freely available 1m resolution Light Detection and Ranging (LiDAR) data has also been downloaded for the site and local area to provide wider context to the ground levels within the vicinity of the site. An extract of the LiDAR data is provided on Drawing 03.

The topographic survey shows that the land slopes north down towards the river, with existing and proposed dwelling footprints siting on the highest part of the site.

The corresponding Ordnance Datum level has been taken from the topographic survey:

- Finished Floor Level of the existing property at 4 London Road: N/a;
- Ground Level at the front of the existing property at 4 London Road: 99.04 – 99.26m aOD;
- Ground Level at the rear of the existing property at 4 London Road: 99.01 – 99.08m aOD;
- London Road (highway) in front of the existing property at 4 London Road: 99.64m aOD;
- FFL of proposed dwelling: N/a;
- Ground Level at the front of proposed dwelling: 99.19 – 99.34m aOD;

- Ground Level at the rear of the proposed dwelling: 99.03 – 99.43maOD.

1.7 Local Hydrology

Ampney Brook, an EA designated Main River, flows in an easterly direction approximately 37m North of the proposed dwelling and borders the northern boundary of the site.

From a review of the Flood Estimation Handbook (FEH) web portal, the upstream catchment area of the Ampney Brook upstream of London Road is approximately 37.6km^2. The upstream catchment extends north and includes a mostly rural area including a number of farms including Merrillhill Farm, Abbey Home Farm and Ampney Sheephouse Farm, and some small residential areas including Calmsden and Chedworth Laines.

An un-named ordinary watercourse joins Ampney Brook downstream of the site. This watercourse drain a smaller catchment originating north of the Pleydells area.

1.8 Existing Drainage

Details of the existing drainage at the site are not known. It is considered likely that surface water run-off drains to either a soakaway(s), or outfalls into Ampney Brook or the public / highways drainage systems within the road.

Thames Water sewer asset plans have not been obtained as part of this FRA.

2. Flood Risk Evaluation

The following sections provide an evaluation of the risk posed by the key flood sources in relation to the property location. Consideration is given to the level of flood risk to the site as a whole, making use of existing flood mapping, high-level local strategic studies and available topographic information.

2.1 Fluvial Flood Risk

Fluvial flood risk originates from a watercourse of any size that may affect a property when the channel capacity is exceeded. This type of flooding often occurs following an extreme rainstorm event or a prolonged period of wet weather.

Tidal flood risk can affect the coastline as well as estuaries and rivers that are tidally influenced. Flood events often coincide with the tidal regime, high rainfall events or other natural phenomena, which can lead to water levels covering low-lying land or exceeding natural or man-made defences.

The watercourses within the vicinity of the site are not tidally influenced.

EA Mapping & Data

The EA Flood Map for Planning shows that the site is located in an area which borders a designated EA Main River and includes Flood Zones 3, 2 and 1.

The new dwelling is proposed to be sited in Flood Zone 1 on the boundary with Flood Zone 2, Flood Zone 1 is land assessed as having a chance of flooding less than 1 in 1,000 (0.1%) annual probability of flooding (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).

The topographic survey shows that the land slopes north down towards the river, with existing and proposed dwelling footprints siting on the highest part of the site.

A request for EA product 4 data was made, the EA response was:

We unfortunately do not have any detailed flood risk modelling in this location. We are sorry that we are therefore unable to provide modelled flood levels and extents for your site.

Based on comparison of the 1m LiDAR DTM against the 5m grid of EA flood model extent the following Flood Levels have been estimated:

EA Flood Zone 2: 99.03m AOD
EA Flood Zone 3: 98.99m AOD

The ground Level at the front and rear of proposed dwelling is between 99.19 – 99.34m aOD and 99.03 – 99.43maOD respectively.

The EA Flood Map for Planning can be seen in drawing 04.

Historic Flooding

Both the historic flood map, and recorded flood outline within open-source GIS datasets show the site to be located outside of areas that have historically flooded.

It must be noted that historic flooding datasets are not always complete or comprehensive and therefore the absence of historic flood records does not mean that a site has never flooded or is not at risk from flooding.

Fluvial flood risk is considered to be **Very Low.**

The site is shown to be located in an area of very low flood risk, Flood Zone 1 on the Environment Agency risk maps (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the development.

2.2 Tidal Flood Risk

Tidal flood risk can affect the coastline as well as estuaries and rivers that are tidally influenced. Flood events often coincide with the tidal regime, high rainfall events or other natural phenomena, which can lead to water levels covering low-lying land or exceeding natural or man-made defences.

The watercourses within the vicinity of the site are not tidally influenced. The site has an elevation greater than 96m aOD. Therefore, this source of flooding is not considered to pose a risk to the site.

Tidal flood risk is considered to be **Negligible** and no further consideration from this risk source is deemed necessary as part of this FRA.

2.3 Surface Water Flooding

Surface water flooding occurs when local drainage networks are overwhelmed during an extreme rainfall event, causing water to flow over the surface and follow gravity to the lowest point where it often pools. This flood source is increasingly becoming one of the major contributors of flood risk, due to changing weather patterns and increased extreme rainfall events occurring across the UK. This places

more pressure than ever on drainage systems, which are often overwhelmed during flash flood events, normally only designed to take between a 1 in 20 and a 1 in 30 return period event.

EA Risk of Flooding from Surface Water mapping can be seen on Drawings 05, 06 and 07, showing the flood extents and potential flood depths for the high risk, medium risk and low risk events. These are defined as follows:

- High risk: annual chance of flooding of greater than 3.3%;
- Medium risk: annual chance of flooding of between 1% and 3.3%;
- Low risk: annual chance of flooding of between 0.1% and 1%;
- Very Low risk: annual chance of flooding of less than 1%.

The EA Flood Risk from Surface Water map shows:

In the high-risk scenario, there is between 300 – 600mm of surface water estimated to accumulate at the rear of the garden, adjacent to Ampney Brook. The existing property, garage and proposed dwelling are all shown to be in areas which do not experience surface water flooding.

In the medium risk scenario, there is between 600 – 900mm of surface water estimated to accumulate at the rear of the garden, adjacent to Ampney Brook. The existing property, garage and proposed dwelling are all shown to be in areas which do not experience surface water flooding.

In the low-risk scenario, there is between 600 – 900mm of surface water estimated to accumulate at the rear of the garden, adjacent to Ampney Brook. Between 150 – 300mm of surface water estimated to accumulate adjacent to the existing garage. The existing property, and proposed dwelling are both shown to be in areas which do not experience surface water flooding.

Surface water flood risk is considered to be **Very Low.**

The Environment Agency Flood risk maps suggest that the chance of flooding from surface water is less than 1 in 1000yr or 0.1% **each year** AEP each year.

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the development.

2.4 Reservoir Failure

Assessment of risk of a reservoir failure may be interpreted as the extent of flooding that would occur, should any reservoir that has a capacity larger than 25,000m^3, suffer a catastrophic failure. Mapping of this nature is described by EA as a worst-case scenario, with a flood event of this type being extremely unlikely to occur.

The EA data suggests that the risk from reservoir flooding at this site is unlikely in this area.

Current legislation ensures that reservoirs are inspected regularly, and essential safety work is carried out as required. The likelihood of a failure event occurring is therefore considered to be very low.

The risk of flooding from reservoir failure is considered to be **Negligible**, and no further consideration from this risk source is deemed necessary as part of this FRA.

2.5 Groundwater Flooding

Flooding from a groundwater source often occurs during or following a period of prolonged wet weather within areas that are low lying underlain by permeable rocks (aquifers). When aquifers are at their maximum holding potential, flooding at surface level can occur from beneath the ground.

Groundwater as a sole flooding mechanism is often regarded as low risk, as it often relies on a coinciding rainfall, or flood event from an additional source to become a risk. The main contributory factor that will enhance the risk of groundwater flooding is prolonged periods of high rainfall, which result in the groundwater saturation level rising to the point where it reaches the surface.

Online BGS mapping shows the bedrock geology beneath the site comprises the Forest Marble Formation - Mudstone. Forest Marble Formation is designated as an Highly productive aquifer, classified as a Secondary A aquifer.

The BGS mapping indicates the presence of Alluvium - Clay, silt, sand and gravel. Sedimentary superficial deposit at the site.

"The Hydrological Map of the UK defines the bedrock as a *Highly Productive Aquifer.*
The Cranfield University online “Soilscapes” map identifies the soils below the site comprise Freely draining loamy, shallow lime-rich soils over chalk or limestone that drain to chalk or limestone groundwater.

There is no evidence to suggest the site has previously been affected by groundwater flooding.

The site is not located within a Groundwater Source Protection Zone (SPZ).

Shallow deposits such as those found along the corridor typically have good hydraulic connectivity with nearby watercourses, and therefore when water levels in the watercourse rise, the groundwater level within these deposits can also rise. In topographically lower areas, this can result in groundwater emerging at the surface. Groundwater flooding may only subside once the water table naturally lowers when levels in the watercourse decrease.

Overall, the risk of flooding from groundwater is considered to be **Medium-High.**

The online BGS mapping suggest that the site is a Highly Productive Aquifer.

While no evidence of flooding has been presented at site the Cranfield University online "Soilscapes" map identifies the soils below the site comprise Freely draining loamy, shallow lime-rich soils over chalk or limestone that drain to chalk or limestone groundwater.

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the proposed development.

2.6 Artificial Flood Sources

Flood risk from artificial sources would include the failure of man-made drainage or the water supply network. Although the likelihood of such an occurrence is highly unpredictable, it is recommended that any potential future development at the property takes into account the location of any existing below ground services, in order to avoid any inadvertent flooding taking place during the construction phase and in the future.

The 2016 SFRA states:

Thames Water has identified nine areas where properties were flooded internally by sewers in the 2007 event (Fairford, South Cerney, Ampney St Peter, Ampney St Mary, Upper and Lower Slaughter, Moreton-in-Marsh, Bourton-on-the-Water, Quenington). However, it recognises that there were many other areas where sewers caused flooding to gardens and open spaces.

Thames Water have not been contacted for records of historic sewer flooding as part of this FRA.

As the property is believed to be served by mains drainage systems, the risk of flooding from sewers and artificial sources is considered to be **Medium.**

Further considerations are made within Section 3 of this FRA to ensure that the risk remains at or below this level for the lifetime of the proposed development.

2.7 Summary

Table 1 provides a summary of the classification of risk to the site from all flood sources and indicates where further considerations are required in the context of the proposed development.

Table 1 – Flood Risk Summary

Risk Source	Overall Risk Classification	Additional Considerations
Fluvial	Very Low	See Section 3
Tidal	Negligible	None
Surface Water	Very Low	See Section 3
Reservoir Failure	Negligible	None
Groundwater	Medium-High	See Section 3
Artificial Flood Sources	Medium	See Section 3

3. Flood Risk in Planning Context

This report has so far evaluated all potential flood sources that may affect the site. The following sections describe the identified flood risks in the context of the proposed development and provide recommendations where required, for the mitigation or reduction of those risks to enable safe development.

The following policy details below are taken from Cotswold District Local Plan 2011-2031 (Adopted 3 August 2018):

Policy EN14 Managing Flood Risk

1. Development proposals must avoid areas at risk of flooding, in accordance with a risk-based sequential approach that takes account of all potential sources of flooding. Proposals should not increase the level of risk to the safety of occupiers of a site, the local community or the wider environment as a result of flooding.

2. Minimising flood risk and providing resilience to flooding will be achieved by:

a. applying the sequential test for assessment of applications for development in Flood Zones 2 or 3, applying the exception test where necessary and in that event requiring developers to demonstrate that both limbs of the exception test can be satisfied;

b. requiring a site specific flood risk assessment for:

i. proposals of one hectare or greater in Flood Zone 1;

ii. all proposals in Flood Zones 2 and 3; or

iii. proposals in an area in Flood Zone 1 that has critical drainage problems.

3. The design and layout of development proposals will take account of flood risk management and climate change and will include, unless demonstrably inappropriate, a Sustainable Drainage System (SuDS).

4. Developers will, where required, fund flood management and/or mitigation measures for the expected lifetime of the development including adequate provision for on-going maintenance.

3.1 Flood Risk Status and Development Viability

The EA Flood Map for Planning (Drawing 04) shows that the site is located within Flood Zone 1. Flood Zone 1 is land assessed as having less than 1 in 1,000 (0.1%) annual probability of flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).

Policy EN14 'Managing Flood Risk' states that development proposals must avoid areas at risk of flooding, in accordance with a risk-based sequential approach that takes account of all potential sources of flooding. It also requires design and layout of development proposals will take account of flood risk management. While the site comprises areas of Flood Zones 1, 2 and 3. The proposed new dwelling however is located

in Flood Zone 1.

In accordance with Annex 3 of the NPPF: Flood Risk and Coastal Change, the proposed change of use is considered to be a 'More Vulnerable' development.

Table 2 of the NPPF shows the Flood Risk Vulnerability and Flood Zone Compatibility. Table 3 indicates an Exception Test is not required for "More Vulnerable" development within Flood Zone 1.

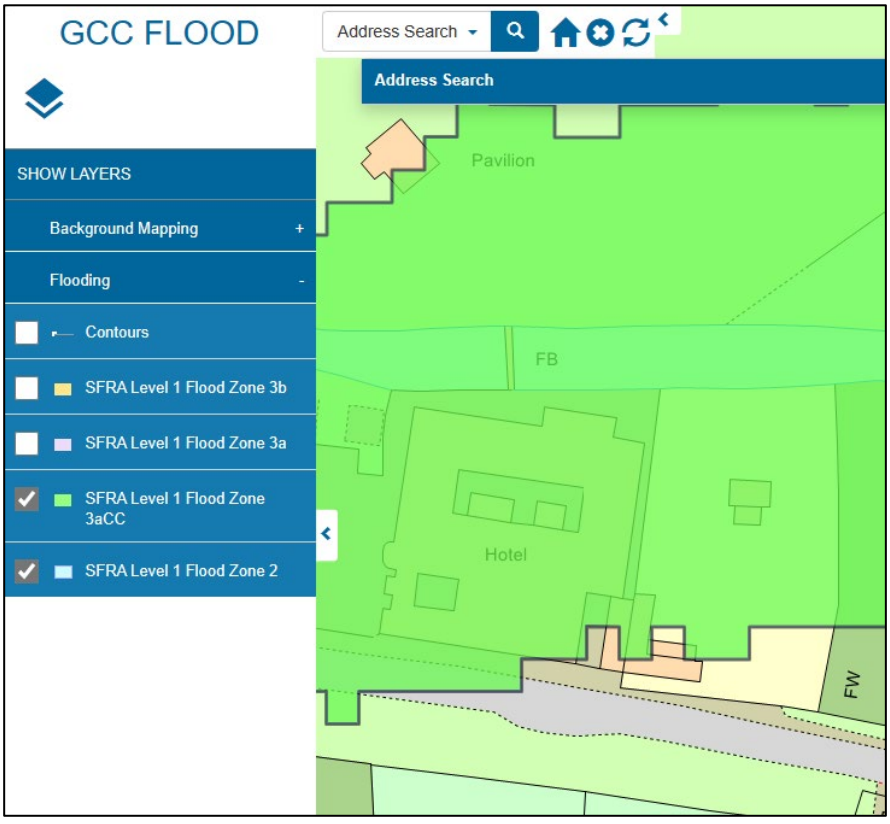
3.2 Design Principles for Development

The application is for the erection of a new dwelling at 4 London Road, replacement of an existing garage structure and associated works.

No construction works are planned within 8m of the watercourse.

It is recommended that a minimum Finished Floor Level (FFL) of the 100yr flood level plus an appropriate allowance for climate change plus freeboard is adopted.

In lieu of detailed EA Modelled Flood Levels for the 100yr + climate change event, the Flood Zone 2 estimated level of 99.03m AOD has been adopted as a conservative flood level estimate. This approach is consistent with the GCC SFRA approach which shows the SRFA Level 1 Flood Zone 3aCC following the same line as the SFRA Level 1 Flood Zone 2 on their online mapping tool.



Based on the data estimated from the Environment Agency (EA) Flood Zones, a minimum Finished Floor Level (FFL) of 99.33m AOD is recommended for the new dwellings on site, this is recommended, based on the following:

Finished Flood Level = 100yr Flood Level + 20% climate change adjustment* plus freeboard allowance

Finished Floor Level = 99.03m AOD + 0.3m

Finished Flood Level = 99.33m AOD

**In lieu of detailed EA Modelled Flood Levels for the 100yr + climate change event, the Flood Zone 2 estimated level of 99.03m AOD has been adopted as a conservative flood level estimate. This approach is consistent with the GCC SFRA approach which shows the SRFA Level 1 Flood Zone 3aCC following the same line as the SFRA Level 1 Flood Zone 2 on their online mapping tool.*

Access/Egress

The proposed Access and Egress to the site is via London Road to the South of the site.

During the 1 in 1000yr (0.1%) event, the EA Surface water flood mapping shows no flooding on London Road to the South of the existing or proposed dwellings.

Access and Egress to the site may be restricted during a flood event should London Road flood during a surface water flood event.

Flood Resistance Options

In all scenarios the proposed dwelling is shown to be in an area no affected by surface water flooding.

Flood resistance measures may be beneficial, as they would provide protection during extreme events should flood levels reach the dwelling. Flood resistance measures that could be considered up to 600mm from the local ground level, these include:

- **Flood Doors or Barriers:** Flood doors could be installed at external entrances. Alternatively, demountable barrier systems could be installed across doorway openings to prevent water ingress. If active measures are selected, then a suitable flood warning system would be useful to ensure deployment of these measures prior to a storm event.

- **Raised Floor Levels:** It is good practice to raise the ground floor above adjacent external ground levels to minimise the risk of water ingress should localised surface water flooding occur adjacent to the building. It is recommended that ground floor levels are set a minimum of 150mm above adjacent ground levels where practicable.

- **Air Bricks / Vents:** The current floor construction of the site is unknown. Should the site consist of a suspended floor (timber or beam and block), self-closing anti-flood air bricks can be provided to prevent water ingress into the floor void should low-level flooding ever occur adjacent to the site.

- **Masonry:** The occupier should keep external walls in good condition in order to minimise the potential for flood water to ingress through this point. Basic maintenance includes keeping masonry pointing in good order. Brickwork could be treated with a waterproofing cream to help reduce ingress and repointed with a waterproof additive.

Industry best practice recommends that the use of resistance measures should generally be limited to a nominal protection height of 600mm above Floor Level. This is because the structural integrity of the property may be compromised above this level, which also can increase the risk of cracks and leaks.

Flood Recoverability

Flood recoverability is where emphasis is placed upon making a site recoverable from a flooding event as quickly and economically as possible. Flood recoverable buildings are designed and constructed to reduce the impact of flood water entering the building so that no permanent damage is caused, structural integrity is maintained and drying and cleaning is easier. As part of the proposed renovation, there is an opportunity to consider flood recoverable measures within the internal fixtures and fittings proposed. As the surface water flood risk at the dwelling is considered to be high, such measures are considered critical.

Flood recoverable measures that could be adopted include:

- **Internal Walls:** Promoting the use of water-resistant plaster and plasterboard (horizontal application where possible).

- **Skirting boards:** There are various options available for skirting boards. Wooden skirting boards can be treated with sealants such as Yacht Varnish to improve their flood resistance, or alternative materials can be used such as Tricoya or Plastic. It is also possible to use a tiled upstand.

- **Wiring:** Raising of electrical sockets as far up the wall as reasonably practicable and avoiding low level junction boxes or fuse boards will reduce any water damage to these items;

- **Flooring:** The use of water-resistant flooring (such as concrete, tiles or stone), which would minimize the time and effort to clean away any flood water.

- **Raise Internal Apparatus:** Where possible, any internal apparatus that is not designed to resist water ingress should be raised (e.g., white goods); and,

- **Puddle Pump/Wet Vac:** To enable the efficient dewatering of the property in the event of water ingress, the provision of such items should be kept internally.

3.3 Surface Water Drainage Strategy

As part of the development design, it should be ensured that the proposals do not increase flooding elsewhere.

Cotswold's District Council requires a considered approach to sustainable drainage from the outset of the proposed development, including drainage management. This will include specialist input from the outset of the design and agreement of eventual ownership and management of the components involved.

Policy EN14 of the of the Cotswold District Local Plan 2011-2031 (Adopted 3 August 2018) states:

Historically, surface water drainage systems have been designed to remove surface water from a site as quickly as possible via underground pipes. This may potentially increase flooding problems downstream particularly in circumstances where flash-flooding may overwhelm the infrastructure. This method also does not contribute to the natural recharge of groundwater levels. Having regard to climate change and the requirements of legislation, a more sustainable approach to drainage is required to reduce flood risk, manage water quality and provide integrated amenity benefits. The aim should be to discharge surface water run-off as far up the following hierarchy as is practicable:

i. into the ground (infiltration)

ii. ii. to a surface water body

iii. iii. to a surface water sewer, highway drain, or another drainage system

iv. iv. to a combined sewer

SuDS may sometimes present a challenging solution. Where the challenge is insurmountable, suitable alternative approaches must be considered in consultation with the Lead Local Flood Authority (Gloucestershire County Council).

In line with Part H of the Building Regulations 2012 and National Planning Policy Framework (NPPF) guidance 2021, SuDS for the site will be designed following drainage hierarchy:

Part H of the Building Regulations, Drainage and Waste Disposal 2010, (2015 Edition, pg 39.)

Rainwater from a system provided pursuant to sub-paragraphs (1) or (2) shall discharge to one of the following, listed in order of priority:

(a) an adequate soakaway of some other adequate infiltration system; or where that is not reasonably practicable,

(b) a watercourse; or where that is not reasonably practicable,

(c) a sewer

Existing Drainage

Details of the existing drainage at the site are not known. It is considered likely that surface water run-off drains to either a soakaway(s), into Ampney Brook or outfalls into public / highways drainage systems within the road.

Foul water is expected to connect into the public sewer system.

Thames Water sewer asset plans have not been obtained as part of this FRA.

Drainage Areas

The application is for the erection of a new dwelling at 4 London Road, replacement of an existing garage structure and associated works.

The existing and proposed impermeable areas have been estimated using the site plans in Appendix A. The approximate impermeable areas are summarised in the table below.

Element	Existing Impermeable Area (m^2)	Proposed Impermeable Area (m^2)
Dwelling	95	190
Garage	40	40
Total Impermeable	135 (9% of site area)	230 (15% of site area)
Garden	1385 (91% of site area)	1250 (85% of site area)
Total site	**1520**	**1520**

Climate Change

The Environment Agency rainfall allowances indicate the anticipated changes to rainfall by management catchment. The Environment Agency uses rainfall allowances as benchmarks for the advice it gives as a statutory consultee for flood risk assessments and drainage designs.

Gloucestershire and the Vale Management Catchment peak rainfall allowances 3.3% Annual Exceedance Rainfall Event		
Time Period	**Central**	**Upper**
2050s	20%	35%
2070s	25%	35%

Gloucestershire and the Vale Management Catchment peak rainfall allowances 1% Annual Exceedance Rainfall Event		
Time Period	**Central**	**Upper**
2050s	20%	40%
2070s	25%	40%

The Environment Agency advise using '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125. Based on the EA data, the surface water calculations below apply a 40% climate change allowance.

Surface Water Drainage Strategy

A detailed surface water drainage design must be prepared to support the development proposals.

Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.

The surface water run-off rates from impermeable surfaces at the site have been estimated below using the Modified Rational Method. Supporting calculations are provided in Appendix C.

Storm Event	Existing Impermeable Run-off (l/s)	Post-Development Run-off (l/S)
1 in 1 year	1.1	1.9
1 in 2 year	1.4	2.4
1 in 30 year	2.7	4.6
1 in 100 year	3.6	6.1

The application is for the erection of a new dwelling at 4 London Road, replacement of an existing garage structure and associated works.

To ensure there are no detrimental flood risk impacts beyond the site as a result of the development, surface water run-off from the site should, at a minimum, be restricted to existing run-off rates.

InfoDrainage v2024.0 was used to calculate the volume of surface water generated from a number of design storms using FSR. The critical storm was found to the be the 15minute Winter storm event.

15 minute Winter Storm Event	Existing Impermeable Run-off (Volume m^3)	Attenuated Post-Development (Volume m^3)
1 in 1 year	0.771	1.317
1 in 2 year	0.996	1.698
1 in 30 year	1.887	3.210
1 in 100 year	2.436	4.149
1 in 100yr + 40% CC	3.411	5.811

Following the drainage hierarchy it is recommended that the capture and storage of rainwater on site is considered as part of the drainage design for the new dwelling. Subject to positive percolation testing, the additional volume of water generated by the new dwelling (approx. 2.5m^3) could be infiltrated to ground by a suitable designed soakaway situated with Flood Zone 1.

Although ground conditions may be favourable for infiltration drainage, percolation testing to BRE 365 standard should be undertaken in several locations across the site to determine the infiltration rate and to allow any proposed soakaway or infiltration features to be adequately sized.

All new infiltration features should be sized to accommodate surface water run-off from the impermeable areas at the site up to the 1 in 100 year storm event, allowing for a 40% increase in rainfall intensity predicted due to climate change.

Any new soakaways should be located withing Flood Zone 1, at least 5m from any building or foundation unless shallow infiltration features are proposed and a geotechnical assessment is completed to confirm that potential impacts on the building, such as subsidence, are unlikely to become an issue. Any soakaway should also be located at least 2m from any site boundary. If several soakaways are required, individual soakaways should be separated by at least 10m to prevent interaction and/or soil and rock dissolution and erosion.

Alternatively design options to create a green roof on the replacement garage could be explored which could considerably reduce the discharge of surface water from this site.

If percolation testing shows the site is not conducive to soakaway, surface water could look to be stored on site in oversized pipes or a tank and attenuated to discharge either to the local watercourse or into a surface water sewer at a limited rate.

Exceedance Design

A consideration of the effect of extreme rainfall events on the proposed drainage system is required in order to mitigate the effects of climate change.

Areas adjacent to the building should be landscaped such that any surcharged flows are directed away from the properties and retained within landscaped garden areas. These areas would then be allowed to infiltrate to ground.

3.4 Flood Awareness & Maintenance

It is important that all residents at the site have an awareness of flood risk at a local level, and that any necessary actions can be taken prior to flooding.

Flood Warnings & Alerts:

The site is directly adjacent to the following EA flood alert and EA flood warning areas:

Flood Warning Area: 061FWF04ACrucis (Ampney Brook from Ampney Crucis to Sheeppen Bridge)
Flood Alert Area: 061WAF04AmpneyBk (Ampney Brook from Barnsley Wood to Sheeppen Bridge)

The EA website currently states that they cannot provide warnings for this site. However, occupants could choose to contact the EA to enquire about signing up to nearby Flood Warnings and flood alerts which could provide an indication of when flooding may be experienced at and within the vicinity of the site. The occupants can register to the EA Flood Warning service through the following website:

https://www.gov.uk/sign-up-for-flood-warnings

Weather Alerts: The Met Office provide weather warnings when extreme weather is forecast. Their service includes warnings for rain and thunderstorms. Surface water flooding typically occurs during and following torrential and/or high intensity rainfall and therefore these warnings may provide an indication of when flooding could happen. The occupants can check the local weather forecast and register to receive weather warnings from the Met Office through the following website:

https://www.metoffice.gov.uk/weather/warnings-and-advice

Maintenance

Maintenance plans and schedules should be developed during the design phase.

Gutters, downpipes and gullies should be cleared and maintained regularly to ensure the system operates as required. This will reduce the likelihood of any blockages and subsequent increase in surface water risk during heavy rainfall events.

4. Conclusion

The site has been assessed for a variety of flood sources, and based upon detailed analysis, this FRA has identified that Fluvial flood risk is considered Very Low,

Surface Water flood risk is considered Very Low, Artificial Sources are considered to be Medium, Groundwater is considered to be Medium-High, with flood risk from tidal Negligible and Reservoirs Low.

In accordance with Annex 3 of the NPPF: Flood Risk and Coastal Change, the proposed change of use is considered to be a 'More Vulnerable' development.

Table 2 of the NPPF shows the Flood Risk Vulnerability and Flood Zone Compatibility. Table 3 indicates an Exception Test is not required for "More Vulnerable" development within Flood Zone 1.
The application is for the erection of a new dwelling at 4 London Road, replacement of an existing garage structure and associated works.

There is a proposed increase in building footprint of 95m^2. Following the drainage hierarchy it is recommended that the capture and storage of rainwater on site is considered as part of the drainage design for the new dwelling. Subject to positive percolation testing (BRE365), the additional volume of water generated by the new dwelling (approx. 2.5m^3) could be infiltrated to ground by a suitable designed soakaway situated with Flood Zone 1.

Although ground conditions may be favorable for infiltration drainage, percolation testing to BRE 365 standard should be undertaken in several locations across the site to determine the infiltration rate and to allow any proposed soakaway or infiltration features to be adequately sized.

All new infiltration features should be sized to accommodate surface water run-off from the impermeable areas at the site up to the 1 in 100 year storm event, allowing for a 40% increase in rainfall intensity predicted due to climate change.

No construction works are planned within 8m of the watercourse. A minimum 8m buffer will be maintained on site based on the existing building footprint extents.

Flood resistance measures may be beneficial, as they would provide protection during extreme events should flood levels reach the dwelling. Flood resistance measures that could be considered up to 600mm from the local ground level.

The client's aspirations can manage/mitigate flood risk as part of the design by locating the proposed dwelling in flood zone 1 on the higher ground, adopting an appropriate finished floor level (FFL 99.33m AOD) and implementing flood resistance and/or flood resilience measures.

This FRA has therefore demonstrated that the proposed development can be undertaken in-line with NPPF guidance, and that it is:

- Suitable in the location proposed;
- Unlikely to place additional persons at risk of flooding; and,
- Unlikely to increase flood risk elsewhere through the loss of floodplain storage, impedance of flood flows, or increase in surface water run-off.

Limitations of the report

This report has been prepared by FPS Environmental (FPS) solely for the benefit of Hugh and Dawn Calvert ("the Client") and has not been assigned to any other third parties. If reliance on this report was required by a third party, this could be arranged for an agreed fee. This report should not be used by the client in relation to any other matters not covered specifically by the scope of the report. If this report does not contain a signature in the Document Control window, then this is an uncontrolled electronic copy and should not be relied upon by the client or any other recipient, as FPS cannot give assurance on the source or content of the document. FPS has used all reasonable skill, care and diligence in the preparation of this report.

The Flood Risk Assessment report has been designed to satisfy planning requirements, as outlined in Section 1. It is a desktop review of information provided by the client and from selected private and public databases. It only includes a site investigation where specifically referenced. This report does not make a detailed site-specific assessment of the suitability of the existing drainage on the Site. If this is required, then a site survey should be considered. FPS accepts no responsibility for the accuracy or completeness of third-party data reviewed within this assessment.

This report is provided under FPS Environmental Ltd Standard Terms and Conditions.

Drawings

Legend

- Site Boundary
- Main River

Google Satellite

Scale @ A4: 1:500

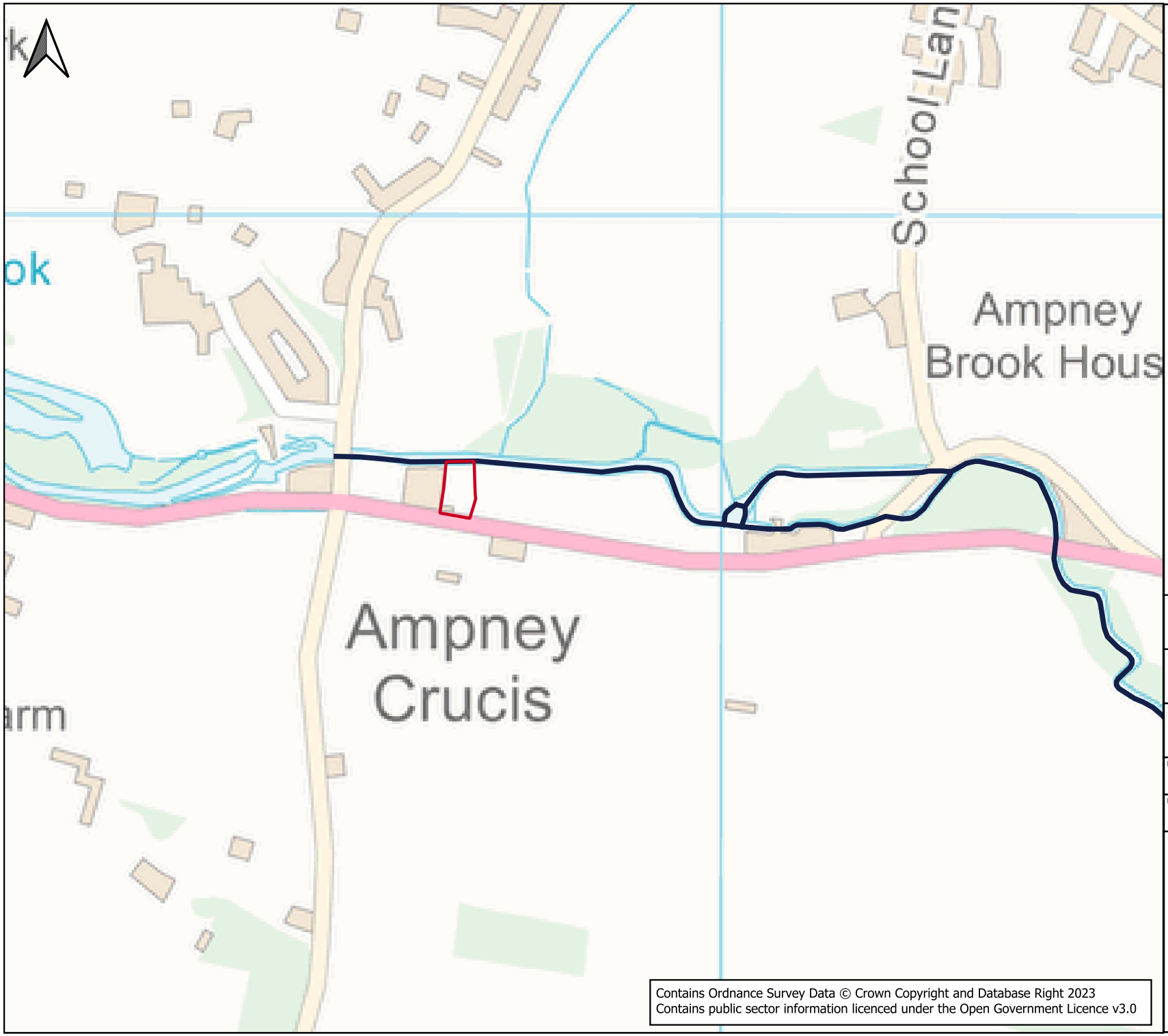
Drawing Title
Site Layout

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
01	08.11.23
Drawn By	**Approved By**
VV	RH

FPS environmental
www.fpsenvironmental.co.uk



Legend

- Site Boundary
- Main River
- Ordinary watercourse

Scale @ A4: 1:8,000

Drawing Title
Site Layout

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
02	08.11.23
Drawn By	**Approved By**
VV	RH

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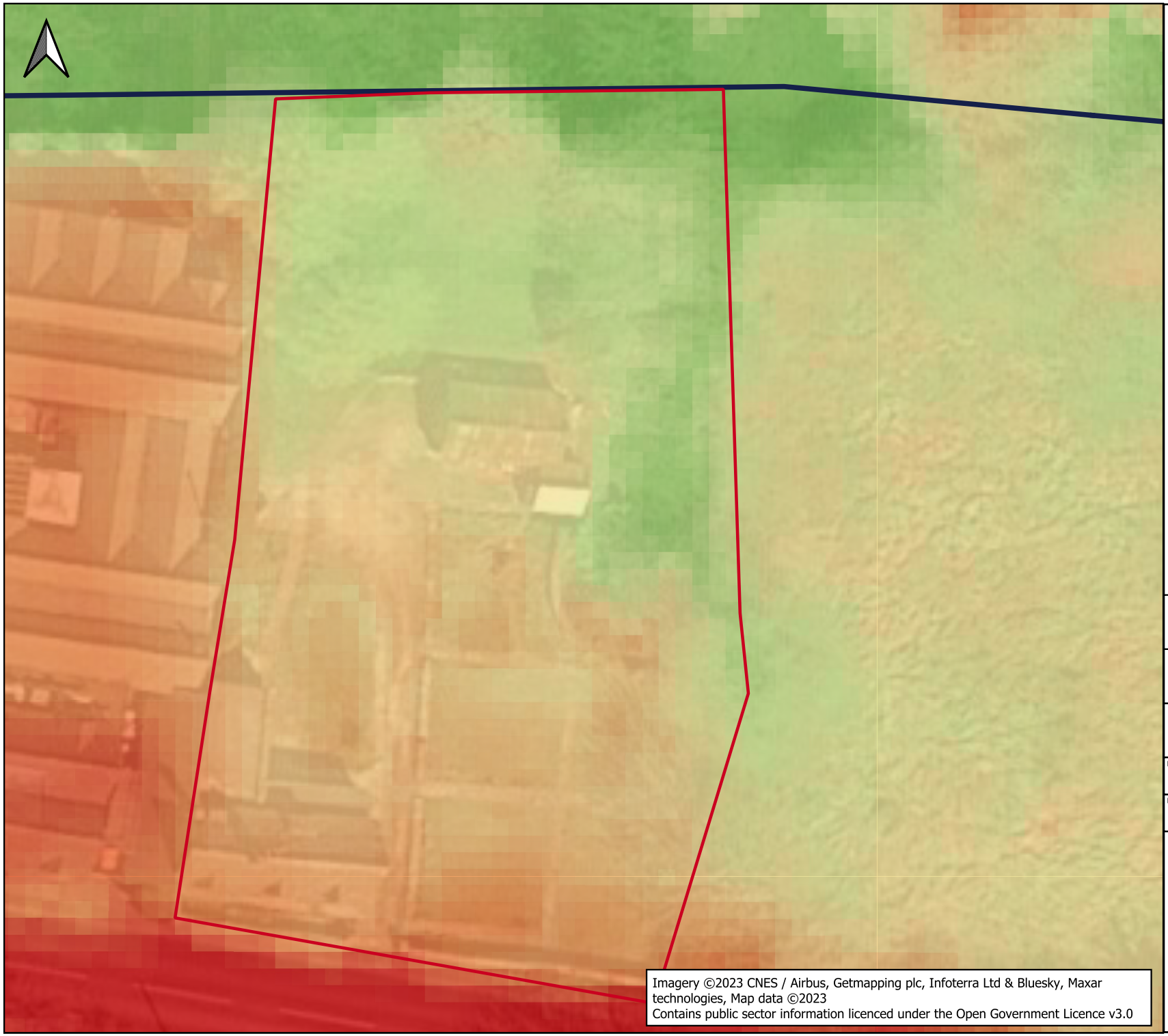

Legend

- Site Boundary
- Main River

TQ19se_DTM_1m

1m DTM LIDAR 2022 Dataset

m above Ordnance Datum

- 98.00
- 98.30
- 98.60
- 98.90
- 99.20
- 99.50

Scale @ A4: 1:500

Drawing Title
LIDAR Data

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
03	08.11.23
Drawn By	**Approved By**
VV	RH

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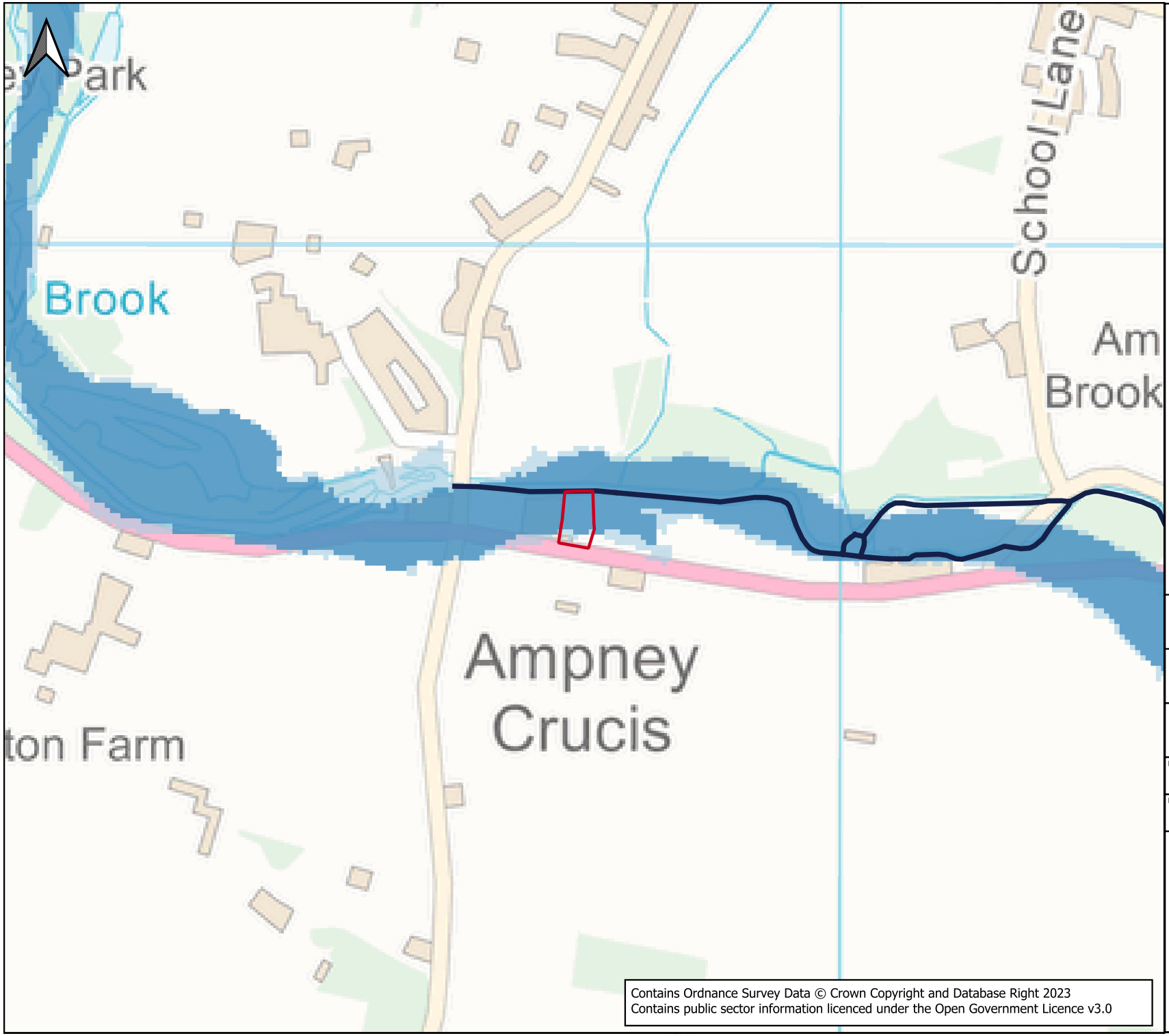

Legend

- Site Boundary
- Ordinary watercourse
- Main River
- Flood Zone 3
- Flood Zone 2

Scale @ A4: 1:8,000

Drawing Title
Environment Agency
Flood Map for Planning

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
04	08.11.23
Drawn By	**Approved By**
VV	RH

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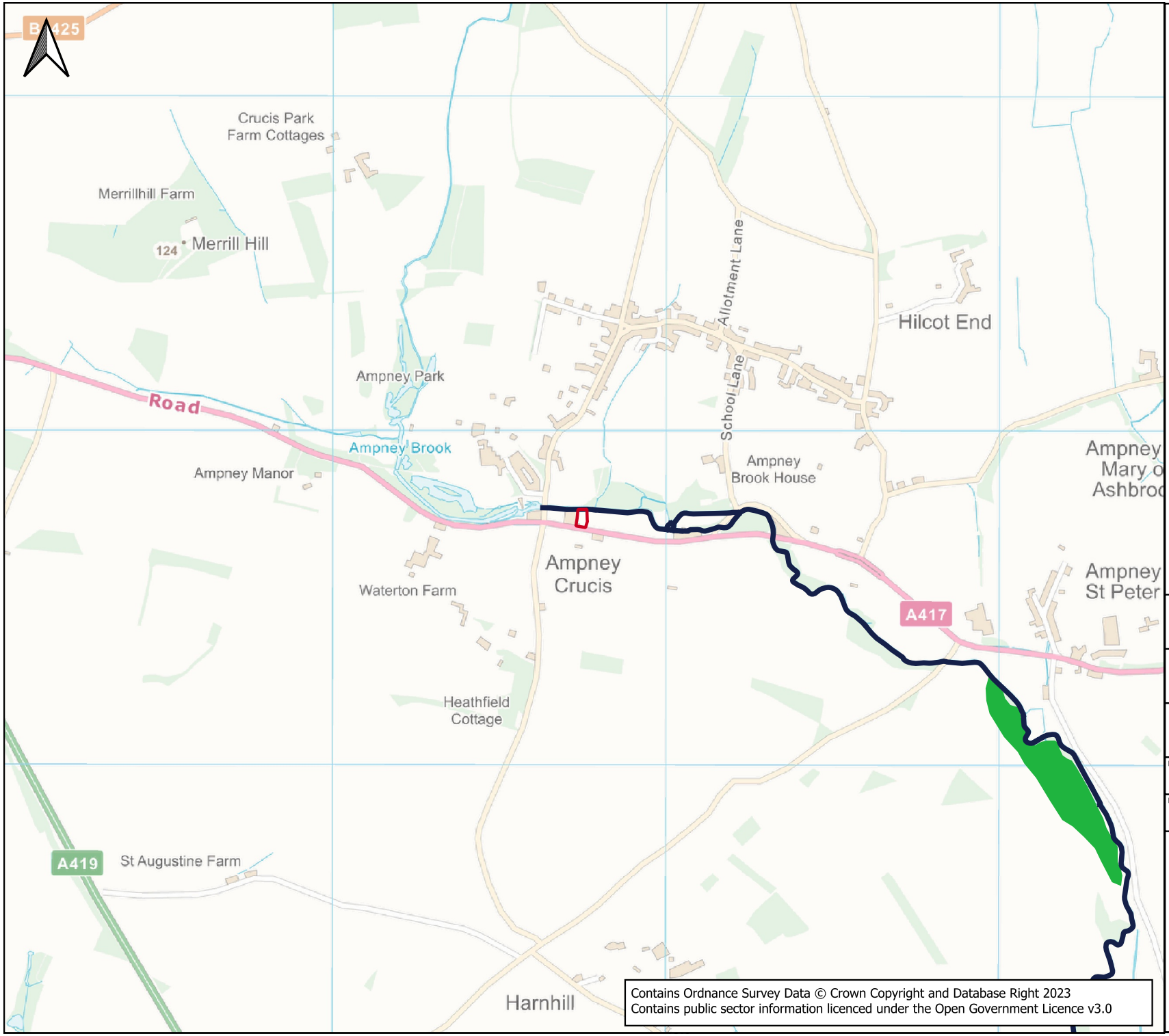

Legend

- Ordinary watercourse
- Main River
- Historic Flood Map

Scale @ A4: 1:25,000

Drawing Title
Environment Agency
Historic Flood Map

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
05	08.11.23
Drawn By	**Approved By**
VV	RH

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www.fpsenvironmental.co.uk

Legend

Site Boundary

Risk of Flooding from Surface Water 1 in 30yr

Depth (m)

- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20

Google Satellite

Scale @ A4: 1:500

Drawing Title
Risk of Flooding from Surface Water 1 in 30 year (3.3% AEP) Flood Depth

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
06	08.11.23
Drawn By	**Approved By**
VV	RH

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Legend

Site Boundary

Risk of Flooding from Surface Water 1 in 100yr

Depth (m)

- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20

Google Satellite

Scale @ A4: 1:500

Drawing Title
Risk of Flooding from Surface Water 1 in 100 year (1% AEP) Flood Depth

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
07	08.11.23
Drawn By	**Approved By**
VV	RH

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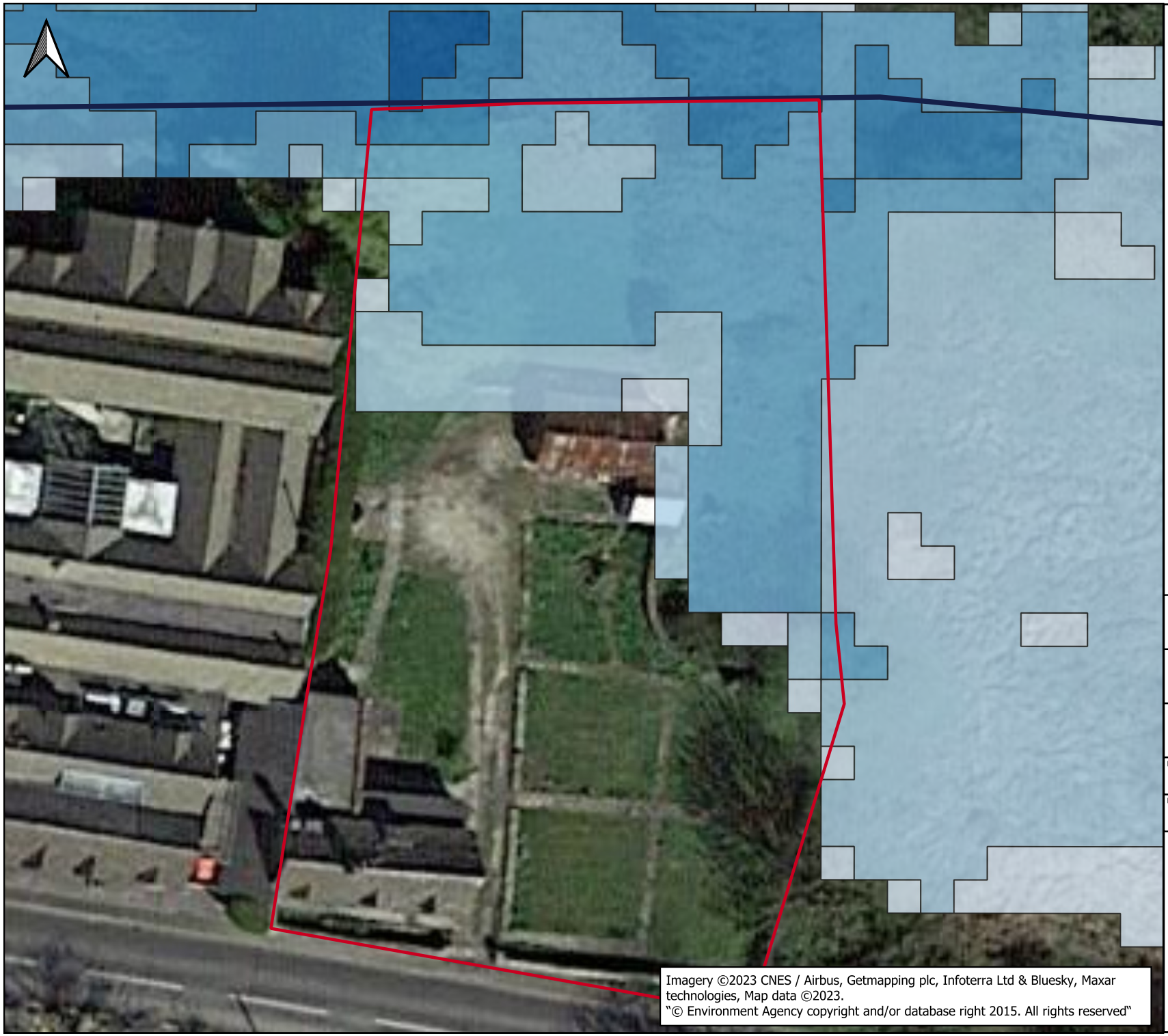

Legend

Site Boundary

Risk of Flooding from Surface Water 1 in 1000yr

Depth (m)

- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20

Google Satellite

Scale @ A4: 1:500

Drawing Title
Risk of Flooding from Surface Water 1 in 1000 year (0.1% AEP) Flood Depth

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
08	08.11.23
Drawn By	**Approved By**
VV	RH

FPS environmental

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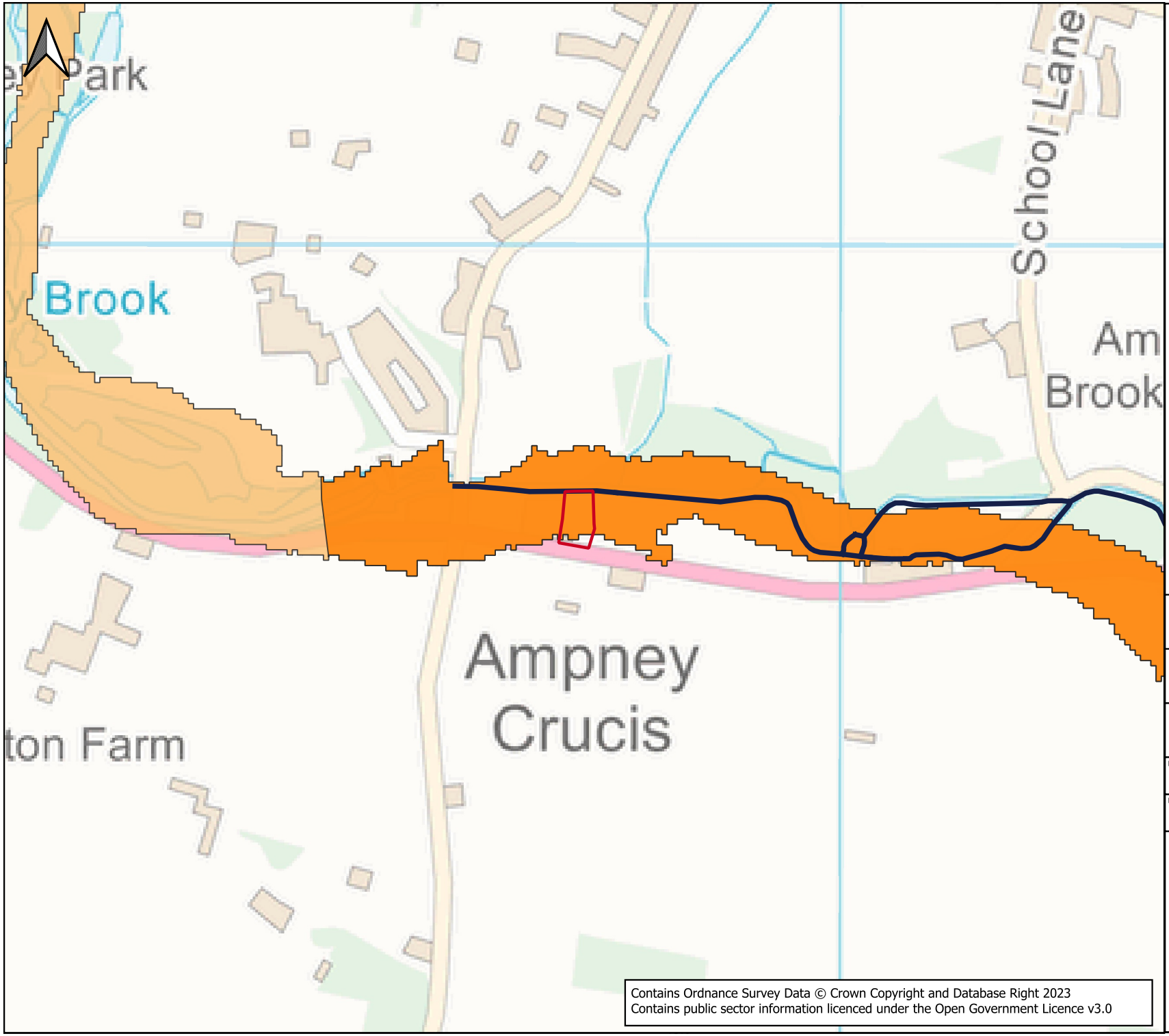

Legend

- Site Boundary
- Ordinary watercourse
- Main River
- Flood Alert Areas
- Flood Warning Areas

Scale @ A4: 1:8,000

Drawing Title
Environment Agency
Flood Alert & Warnings Areas

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
09	09.11.23
Drawn By	**Approved By**
VV	RH

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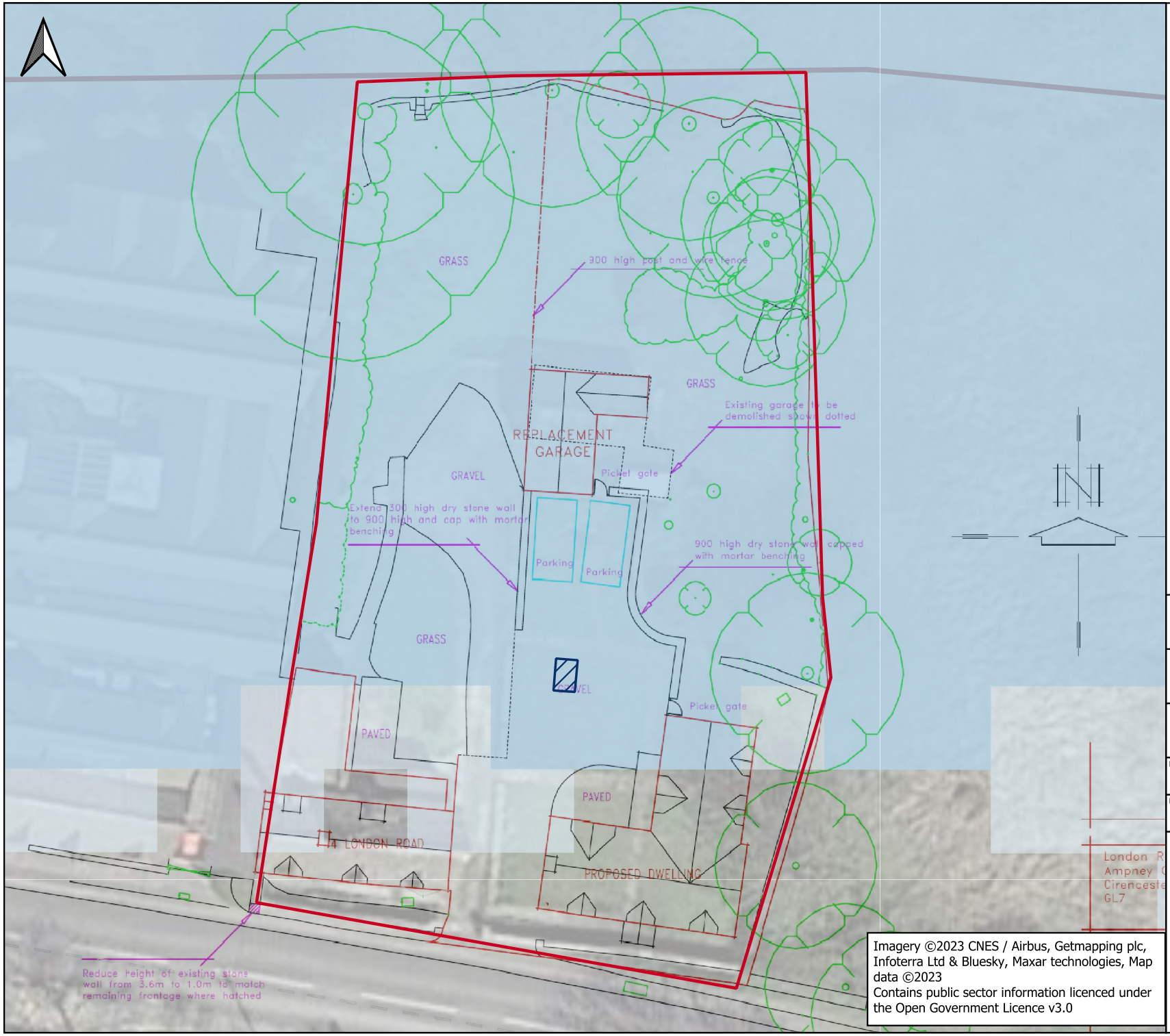

Legend

- Main River
- Site Boundary
- Flood Zone 3
- Flood Zone 2
- Soakaway
- Google Satellite

Note:
The ground Level of proposed soakaway is >9.03m AOD based on the detailed topographic survey. This ground level is above the estimated level of Flood Zone 2 (99.03m AOD).
The current EA flood map shows this as a flood risk area as it is based on a 5m grid.

Scale @ A4: 1:500

Drawing Title
Propsoed SuDS Layout

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
10	10.11.23
Drawn By	**Approved By**
VV	RH

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Legend

- Main River
- Site Boundary
- Flood Zone 3
- Flood Zone 2

Topographic Survey 2113-3.pdf

Google Satellite

Note:
Estimated level of Flood Zone 2: 99.03m AOD
Estimated level of Flood Zone 3: 98.99m AOD
The current EA flood map appears to be based on a 5m grid of topographic data.

Scale @ A4: 1:500

Drawing Title
EA Flood Levels and Topographic Survey

Project
4 London Road, Ampney Crucis. GL7 5RS

Client
Hugh and Dawn Calvert

Drawing No. & Revision	Date
11	10.11.23
Drawn By	**Approved By**
VV	RH

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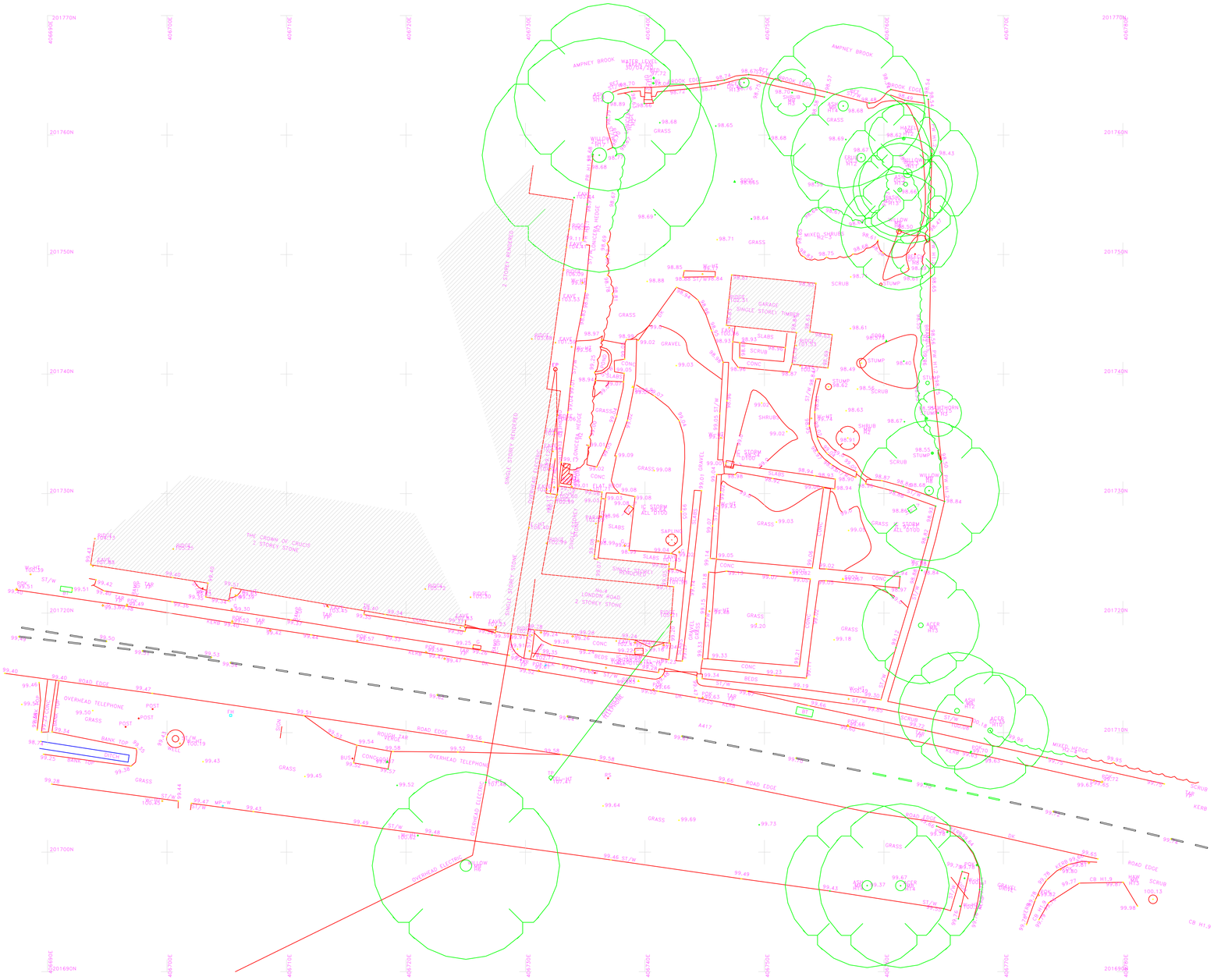
Appendices

Appendix A

Site Plans



1:200 5m 10m 15m 20m

2113/3— Existing block plan

London Road
Ampney Crucis
Cirencester
GL7

CLIENT: Mr H Calvert
SHEET NO: 2113/3
SCALE : 1:200
DATE : May 2021
REV :

Corinium Architectural Services
64 Queen Elizabeth Road
Cirencester, Glos,GL7 1DJ
Tel: 01285 65 85 65
E-Mail: Info@CoriniumAS.co.uk

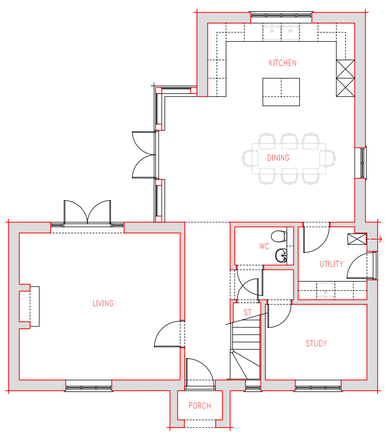
REV A: Content added/updated
REV B: First draft planning
REV C: Updated to feedback
REV D: Site plan/street scene updated
REV E: Parking updated
REV F: Parking updated
REV G: Screen wall to south west reduced

Proposed South

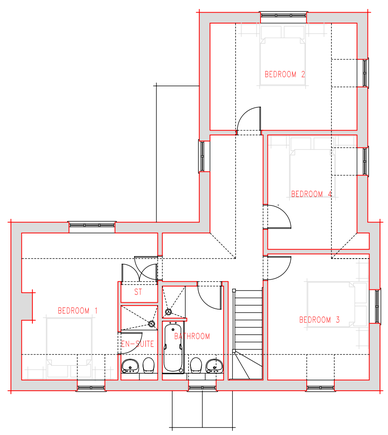
Proposed East

Proposed North

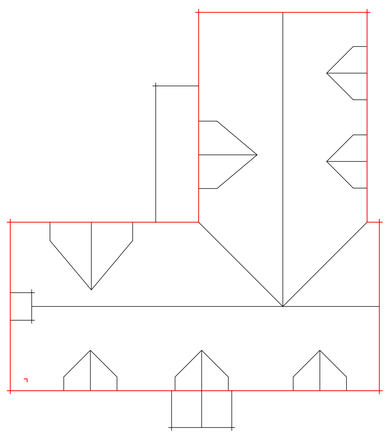
Proposed West



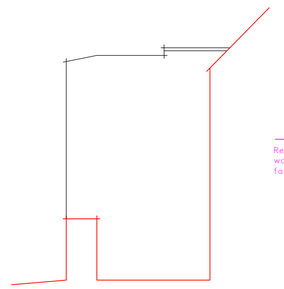
Proposed Ground Floor



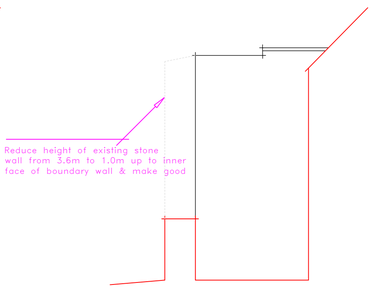
Proposed First Floor



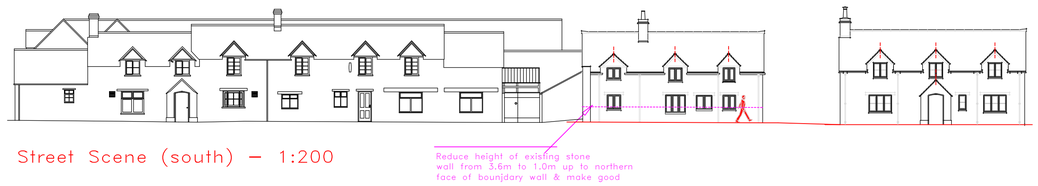
Proposed Roof Plan



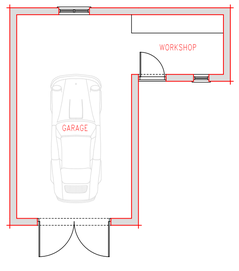
Existing East
Southern Boundary wall



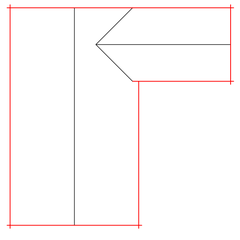
Proposed East
Southern Boundary wall



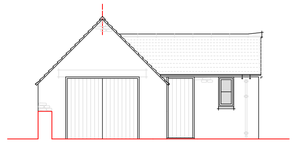
Street Scene (south) – 1:200



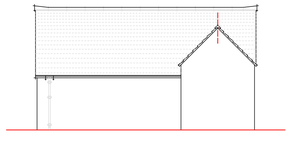
Garage
Floor Plan



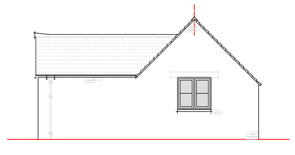
Garage
Roof Plan



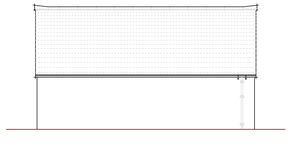
Garage South



Garage East



Garage North

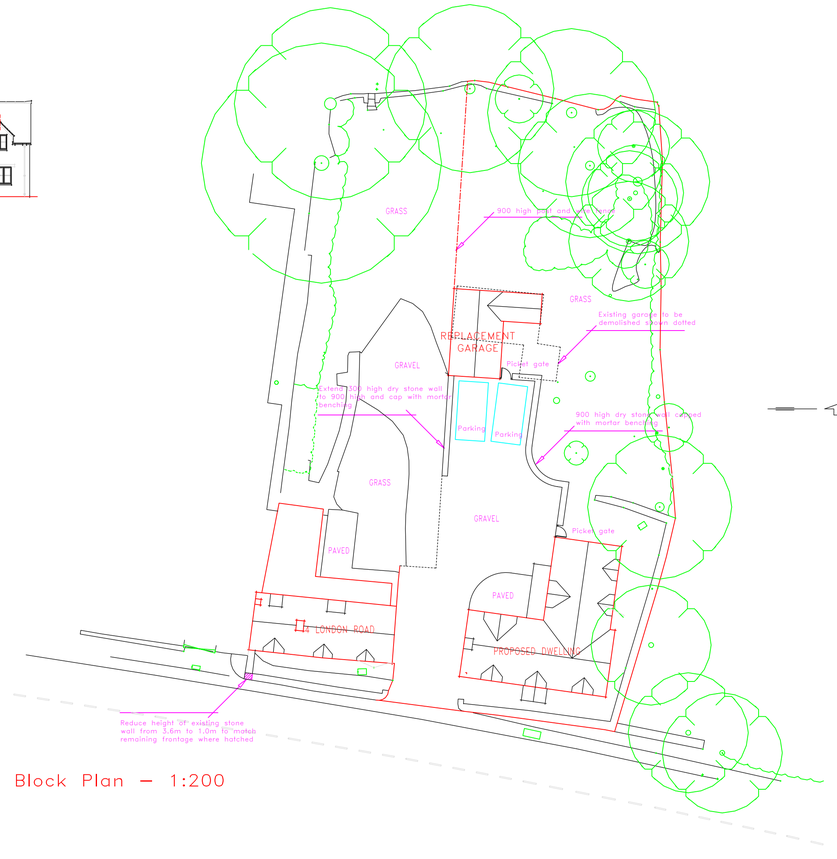


Garage West

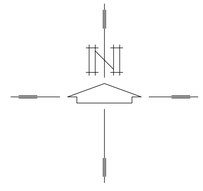
1:200 5m 10m 15m 20m

1:100 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m

1:50 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m



Block Plan – 1:200



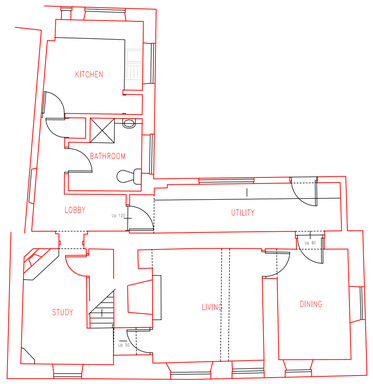
2113/1 – Plans as proposed

London Road
Ampney Crucis
Cirencester
GL7

CLIENT: Mr H Calvert
SHEET NO: 2113/1
SCALE : 1:100,1:200
DATE : Mar 2021
REV : H

Corinium Architectural Services
64 Queen Elizabeth Road
Cirencester, Glos.GL7 1DJ
Tel: 01285 65 85 65
E-Mail: Info@CoriniumAS.co.uk

REV A: Content added
REV B: Updated to feedback
REV C: First draft planning
REV D: Location plan corrected



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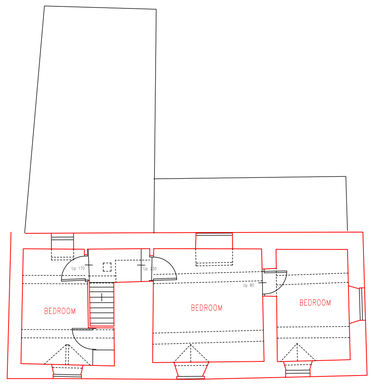
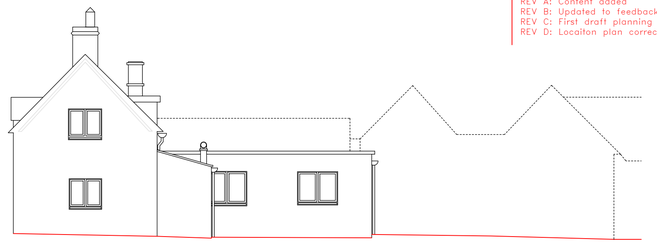


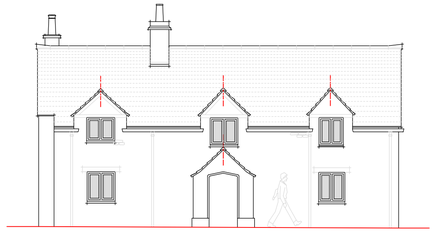
Existing Ground Floor

Existing South

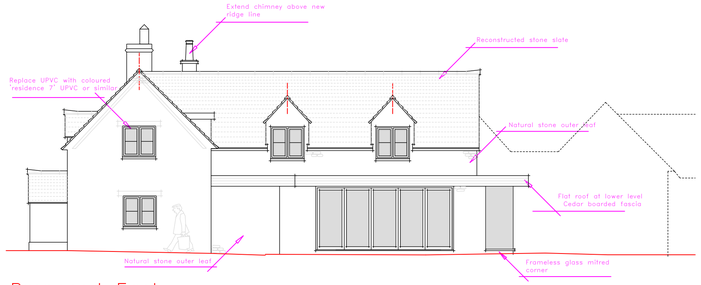


Existing East

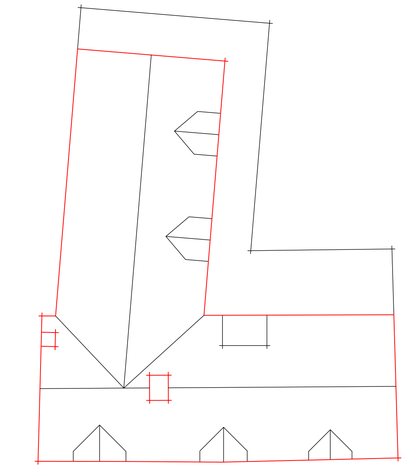
Existing North



Proposed South

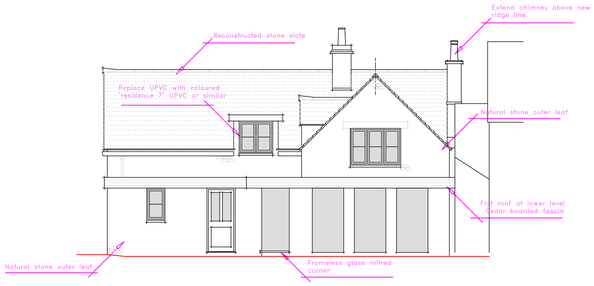


Proposed East



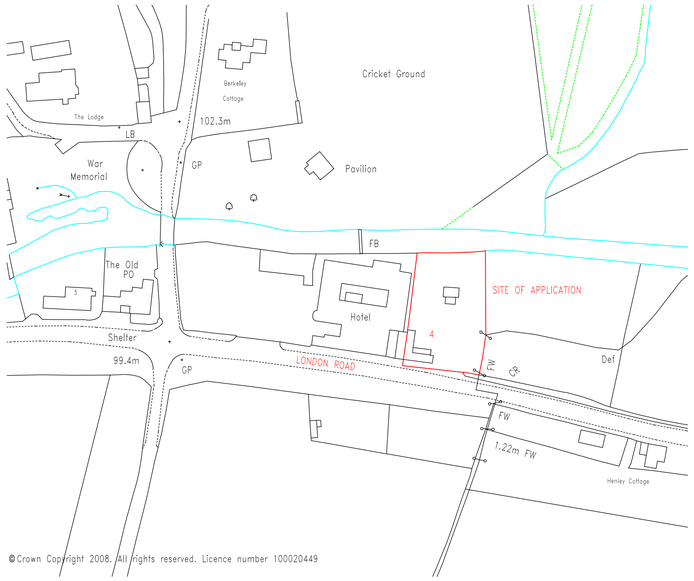
Proposed Ground Floor

Proposed First Floor

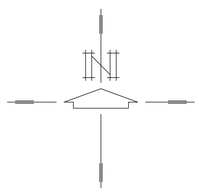


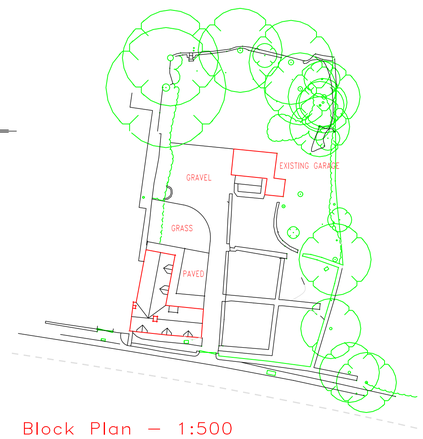
Proposed North

Proposed Roof Plan

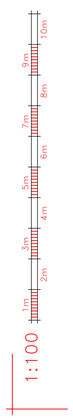


Location Plan – 1:1250





Block Plan – 1:500



1:100

2105/1 – Plans as existing/proposed

London Road
Ampney Crucis
Cirencester
GL7

CLIENT: Mr H Calvert
SHEET NO: 2105/1
SCALE : 1:100
DATE : Feb 2021
REV : D

Corinium Architectural Services
64 Queen Elizabeth Road
Cirencester, Glos.GL7 1DJ
Tel: 01285 65 85 65
E-Mail: Info@CoriniumAS.co.uk

Appendix B

Stakeholder Correspondence

creating a better place

Environment Agency

Cotswold District Council
Development Control
Council Offices Trinity Road
Cirencester
Gloucestershire
GL7 1PX

Our ref: WA/2021/129281/02-L01
Your ref: 21/01854/FUL

Date: 27 September 2022

Dear Sir/Madam

Erection of a new dwelling and detached garage

4 London Road, Ampney Crucis, Cirencester, Gloucestershire, GL7 5RS

Thank you for re-consulting us on the above application following the submission of additional information.

We have reviewed the email correspondence from Black Box Planning Ltd dated 26 July 2022.

A commitment to accept the removal of permitted development rights does not address our concerns with this development.

Please refer to our previous response of 15 September 2022 for detailed comments in relation to flood risk concerns.

The Flood Zones for Planning in this location were derived from national generalised modelling which does not take account of any locally relevant information. For this reason it is not suitable for use within a site specific Flood Risk Assessment (FRA). Therefore, in the absence of any site specific flood risk evidence, your Strategic Flood Risk Assessment identifies this location as Flood Zone 3b (functional floodplain) and residential use within this zone is not appropriate in accordance with paragraph 159 of the National Planning Policy Framework and Table 2 of Flood Risk and Coastal Change Planning Practice Guidance as it increases the risk of flooding to residents.

The development is also contrary to Local Plan Policy EN14 which stipulates that development should be avoided in areas of flood risk unless it passes the Sequential and Exception tests where they are applicable. Occupiers of a site must not be put at risk with design and layout taking account of climate change. The submitted FRA is currently insufficiently detailed in order to meet this policy requirement.

As advised in our previous response, the applicant will need to undertake a more suitable level of assessment to determine the expected extent of flood risk at this site if they wish to challenge the designation of the functional floodplain in this location and to establish whether the development can be made safe for its lifetime when considering future increases in flood levels as a result of climate change and whether the development will reduce or displace flood water storage now or in the future. Mitigation for the loss of any flood storage on site will need to be provided in the form of flood compensation. The FRA should be revised accordingly following the guidance on how to prepare a FRA which can be found at https://www.gov.uk/guidance/flood-risk-and-coastal-change and https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications

Closing comments
If you are minded to approve the application contrary to our objection, please contact us 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 a condition/conditions on any subsequent approval.

Should you require any additional information, or wish to discuss these matters further, please do not hesitate to contact me on the number below.

Yours faithfully

Miss Sarah Green
Sustainable Places - Planning Advisor

Direct dial 0208 474 9253
Direct e-mail planning_THM@environment-agency.gov.uk

End

From: Karen Terry
To: Victoria Venn
Subject: FW: COMPLETED THM323833 4 London Road - GL7 5RS
Date: 02 November 2023 15:47:33
Attachments: image001.png
image002.png
image003.png

From: Enquiries_THM <enquiries_THM@environment-agency.gov.uk>
Sent: Friday, September 8, 2023 12:02 PM
To: Karen Terry <Karen@fpsenvironmental.co.uk>
Subject: COMPLETED THM323833 4 London Road - GL7 5RS

Dear Karen,

Thank you for your email requesting Product 4 data.

Please accept my apologies for the delay in responding.

We unfortunately do not have any detailed flood risk modelling in this location. We are sorry that we are therefore unable to provide modelled flood levels and extents for your site.

You can access our flood map for planning on our website:

https://flood-map-for-planning.service.gov.uk/

You can find more information on the long term risk of flooding for this location on our website:

https://flood-warning-information.service.gov.uk/long-term-flood-risk

You can find recorded flood outlines for this location via the link below:

https://data.gov.uk/dataset/recorded-flood-outlines1

-
You can find out the risk of flooding from surface water for this location via the link below:

https://data.gov.uk/dataset/d5ca01ec-e535-4d3f-adc0-089b4f03687d/risk-of-flooding-from-surface-water-suitability

You may be interested in the following guidance / information publically available:

- 'Planning Practice Guidance' - provides information about planning considerations in areas at risk of flooding. https://www.gov.uk/government/collections/planning-practice-guidance
- 'Planning applications: assessing flood risk' - information about completing Flood Risk Assessments. https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications
- 'Site specific flood risk assessment: Checklist' – a checklist to help ensure you have considered all the relevant factors in your flood risk assessment. https://www.gov.uk/guidance/flood-risk-and-coastal-change#Site-Specific-Flood-Risk-Assessment-checklist-section

Please be aware that from 20th July 2021 the climate change allowances required in flood risk assessments have been updated. Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#contents for more information.

I hope that we have correctly interpreted your request. Please refer to our Open Government Licence for the permitted use of the supplied data: http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Please be aware that many of our datasets are now available online. Simply visit environment.data.gov.uk

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

Customers & Engagement Team **- Thames**

☎ **External: 0203 0259 804**
enquiries_THM@environment-agency.gov.uk
Environment Agency | Red Kite House, Howbery Park, Wallingford, OX10 8BD

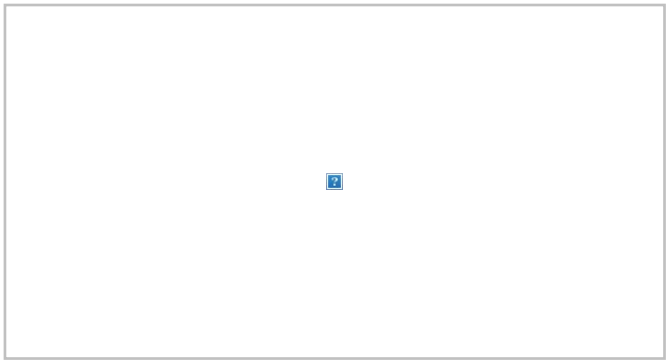
enquiries_THM@environment-agency.gov.uk
Environment Agency | Red Kite House, Howbery Park, Wallingford OX10 8BD

From: Karen Terry <Karen@fpsenvironmental.co.uk>
Sent: Monday, August 21, 2023 5:41 PM
To: Enquiries_THM <enquiries_THM@environment-agency.gov.uk>
Subject: 4 London Road - GL7 5RS

Hi
Can you please send me any product for data you have for this site please

Kind Regards

Karen



Karen Terry (She/Her)
Operations & Business Development Manager

FPS Environmental Ltd
Registered in England and Wales 12190733

Tel: 0115 9902001- Nottingham
Tel: 02080503194 – London
Mobile : 07478910184

Flood Protection | Flood Defences | Systems and Solutions

Appendix C

Drainage Calculations

Surface Water Run-off Rate Assessment

Project	4 London Road, GL7 5RS		
Scope	Existing Run-off Rates		
Client	Hugh and Dawn Calvert		
Initials	VV	**Date**	20/10/2023

FPS environmental

www.fpsenvironmental.co.uk

Calculation based on HR Wallingford 'Modified Rational Method'

Q=2.78CiA

Where:

- **Q** peak discharge rate (l/s)
- **C** dimensionless coefficient (mm/hr)
- **i** average rainfall intensity during specified storm (mm/hr)
- **A** contributing catchment area (ha)

M5-60min	18.5 mm
r	0.34

Impermeable Area	135.0 m^2
	0.01 ha

Storm Event	**Duration (D)** min	**Z1**	**M5-Dmin** mm	**Z2**	**M1-Dmin** mm	**i** mm/hr	**Impermeable Run-off** l/s	l/s/ha
1 in 1 year	15	0.63	11.66	0.64	7.46	29.8	**1.1**	82.9
1 in 2 year				0.81	9.44	37.8	**1.4**	105.0
1 in 30 year				1.54	17.95	71.8	**2.7**	199.6
1 in 100 year				2.03	23.66	94.6	**3.6**	263.1

			Z2			
Duration (D)	**Z1**	**M5**	**1 year**	**2 year**	**30 year**	**100 year**
5	0.38	5	0.620	0.790	1.427	1.790
10	0.54	10	0.610	0.790	1.490	1.910
15	0.63	15	0.620	0.800	1.527	1.990

Surface Water Run-off Rate Assessment			
Project	4 London Road, GL7 5RS		
Scope	Unattenuated Post-Development Run-off Rates		
Client	Hugh and Dawn Calvert		
Initials	VV	**Date**	20/10/2023

FPS environmental

www.fpsenvironmental.co.uk

Calculation based on HR Wallingford 'Modified Rational Method'

Q=2.78CiA

Where:

- **Q** peak discharge rate (l/s)
- **C** dimensionless coefficient (mm/hr)
- **i** average rainfall intensity during specified storm (mm/hr)
- **A** contributing catchment area (ha)

M5-60min	18.5 mm
r	0.34

Impermeable Area	230.0 m^2
	0.02 ha

Storm Event	**Duration (D)** min	**Z1**	**M5-Dmin** mm	**Z2**	**M1-Dmin** mm	**i** mm/hr	**Impermeable Run-off** l/s	l/s/ha
1 in 1 year	15	0.63	11.66	0.64	7.46	29.8	**1.9**	82.9
1 in 2 year				0.81	9.44	37.8	**2.4**	105.0
1 in 30 year				1.54	17.95	71.8	**4.6**	199.6
1 in 100 year				2.03	23.66	94.6	**6.1**	263.1

			Z2			
Duration (D)	**Z1**	**M5**	**1 year**	**2 year**	**30 year**	**100 year**
5	0.38	5	0.620	0.790	1.427	1.790
10	0.54	10	0.610	0.790	1.490	1.910
15	0.63	15	0.620	0.800	1.527	1.990

1 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	1.6	0.771

2 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	2.1	0.996

30 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	3.9	1.887

100 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	5.1	2.436

100 years: +40 %: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	7.1	3.411

1 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	2.7	1.317

2 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	3.5	1.698

30 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	6.7	3.210

100 years: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	8.7	4.149

100 years: +40 %: 15 mins: Winter

Phase	Max. Inflow (L/s)	Total Inflow Volume (m³)
Phase	12.1	5.811