FLOOD RISK ASSESSMENT
for Garage Construction
at Riverside Cottage, Wylye

Client – Mr Charles Vane Percy
Report Reference – JDS0001 Rev 1

Document Information Page

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Executive Summary

Creative Planning Limited on behalf of Mr Charles Vane Percy commissioned JCD Drainage Solutions to undertake a Flood Risk Assessment (FRA) to support a planning application for the construction of a garage at Riverside Cottage, Wylye, Wiltshire, BA12 0QU. The property is located approximately 15km north west of Sailsbury and approximately 15km south east of Warminster.

This flood risk assessment has considered numerous types of flooding, including coastal, fluvial and pluvial. This FRA has found that fluvial sources have the potential to cause a significant risk to the proposed development, if mitigation measures are not implemented. The flood map for planning published by the Environment Agency for fluvial flooding indicates that the area lies within Flood Zone 3.

This flood risk assessment has found that without fluvial flood mitigation measures, there is a potential for flooding within the proposed area of the garage construction to potentially impact the garage building. Any fixtures and fittings, or electrical components shall be set a minimum of 600mm above the predicted flood level for a 1% Annual Exceedance Probability (AEP) event with a 24% central climate change allowance on peak river flows. These shall be set at a minimum elevation of 74.144mAOD (metres above ordnance datum). Any fixtures or fittings that cannot be fixed above this level shall be designed to be mobile, so they can be easily moved if needed during a flood event and elevated above the predicted flood level for the 1% AEP event with climate change allowance. The building shall be designed, using materials (timber and concrete) that are easily cleaned, once the flood levels have receded. Finally the owners of Riverside Cottage shall sign up to Environment Agency Flood Warning for the area. Riverside Cottage is not in an area of increased flood risk from multiple minor extensions and therefore as the proposed building is <250m^2 this shall not increase the off-site flood risk in accordance with Environment Agency guidance. This report demonstrates that the proposed development shall not be at an unacceptable level of flood risk from fluvial sources, subject to the recommended flood mitigation measures being implemented.

The Environment Agency flood maps for surface water, show that the site is at very low risk from surface water flooding.

Other sources of flood risk such as groundwater flooding have been considered and there is no significant risk posed to the proposed development from these sources.

In compliance with the requirements of the National Planning Policy Framework, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Furthermore, the proposed development will not increase flood risk to the surrounding areas of site.

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1 INTRODUCTION

1.1 General

JCD Drainage Solutions were appointed by Creative Planning Limited on behalf of Charles Vane Percy to carry out a Flood Risk Assessment (FRA) to support a planning application, for the construction of a garage on a parcel of land at Riverside Cottage, Wylye, Warminster, Wiltshire, BA12 0QU (the proposed development). Appendix 1 shows details of the proposed development.

This FRA has been prepared to establish the suitability of the proposed development in relation to flooding. The assessment has been carried out in accordance with the National Planning Policy Framework (NPPF) and any accompanying guidance. The Environment Agency (EA) indicative flood map shows that the proposed development lies within Flood Zone 3.

For the purpose of this FRA, the proposed garage construction has been considered a minor development and has followed any advice contained within flood risk guidance for minor developments, due to the proposed floor area being less than 250m^2.

2 PLANNING POLICY AND GUIDANCE

2.1 National Planning Policy Framework (NPPF)

The NPPF sets out the Government's national polices on different aspects of land use planning in England in relation to flood risk.

The policy sets out the vulnerability to flooding of different land uses. It encourages developments to be located in areas of lower flood risk where ever possible and most importantly preventing increases in flood risk off site as a result of the proposed development. The guidance also states that flooding other than fluvial sources should be assessed when undertaking a Flood Risk Assessment.

The aim of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process and is appropriately addressed.

2.2 Environment Agency – Preparing a Flood Risk Assessment Standing Advice

The Environment Agency has produced guidance for preparing flood risk assessments. This document contains information and advice for minor developments, where the proposed development does not exceed 250m^2. This document presents the requirements that need to be incorporated into the minor development proposals to ensure that the property is resilient to any potential flood risk.

3 SITE DESCRIPTION

3.1 Location

Riverside Cottage is located in the village of Wylye in Wiltshire. The property is located approximately 15km north west of Sailsbury and approximately 15km south east of Warminster.

Access to proposed development is via a private access road which is located off High Street. The site falls under Wiltshire Council and forms part of the county of Wiltshire. Figure 1 below shows the site location in relation to the surrounding areas, along with the planning application boundary and proposed location for the garage construction.



Figure 1 - Site Location Plan (OpenStreet Map, 2024)
Data available under Open Database Licence - openstreetmap.org/copyright

4 SITE GEOLOGY

4.1 Geological Stratigraphy

The geological stratigraphy under the proposed development has been assessed as part of this Flood Risk Assessment (FRA), to determine the characteristics of the materials which underlie the site. To aid with this the British Geological Survey (BGS) maps have been studied for the area.

The BGS maps indicates that the area for the proposed garage construction at Riverside Cottage generally consists of both superficial and bedrock geology. The superficial deposits generally consist of alluvium deposits, comprising clay, sand and gravel. These deposits were formed between approximately 11.8 thousand years ago and the present day in the quaternary period.

The bedrock geology generally consists of sedimentary chalk bedrock from the Zig Zag Chalk Formation. This sedimentary bedrock was formed between approximately 100.5 million years ago and 93.9 million years ago in the Cretaceous period.

5 FLOOD ZONES

The Environment Agency have developed an interactive flood risk map, which maps areas of England into zones of flooding, these range from Flood Zone 1 (Low Probability) to Flood Zone 3b (Functional Flood Plain).

The flood risk map for the proposed development is shown on Figure 2 below. The flood risk map for planning, shows that the site is located in Flood Zone 3 (High Probability).

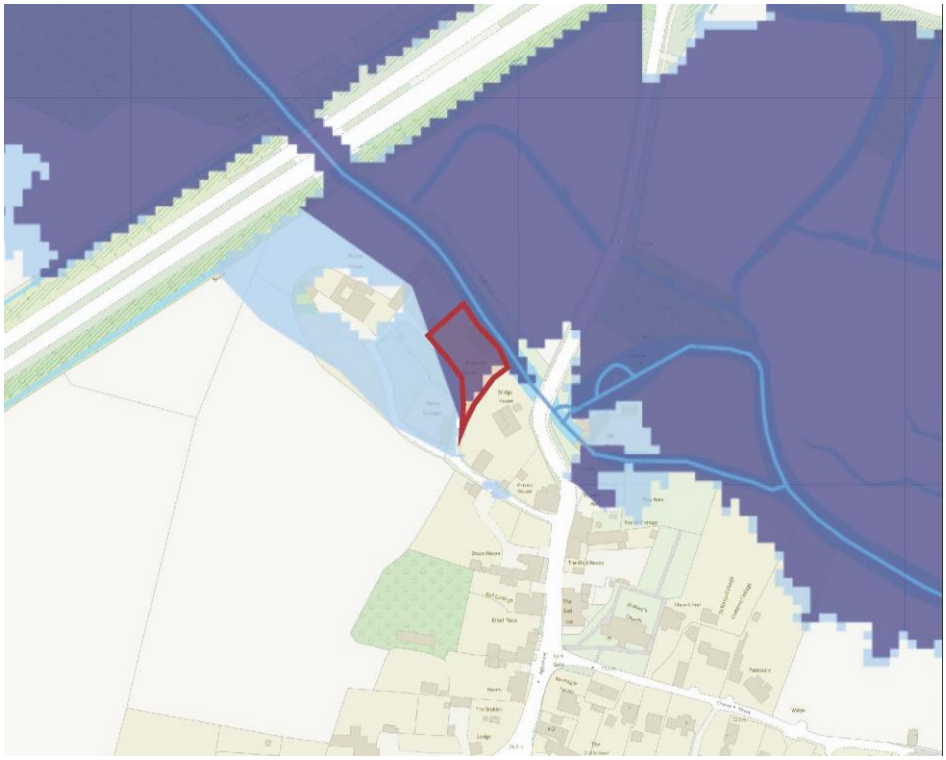


Figure 2 – Fluvial Flood Zone Map (Environment Agency, 2024)
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6 CLIMATE CHANGE

Climate change over the coming years may have a large impact on the intensity and frequency of flood events in the United Kingdom, resulting in an impact on the flood risk to infrastructure and developments. This effect has to be considered when undertaking a flood risk assessment.

The NPPF considers the effect of climate change and within this document gives precautionary value which should be applied depending on the proposed lifetime of development and the classification of development. These percentages increase the overall volumes depending on the parameter, to give a predicted volume for future years.

Table 1 below shows the percentage increase which should be applied to the different datasets to allow for climate change.

Table 1 – Percentage Increase for Climate Change Allowance

Parameter	2050s	2070s
Peak Rainfall Intensity (3.3% Annual Exceedance Rainfall Event, Central Allowance)	20%	25%
Peak Rainfall Intensity (3.3% Annual Exceedance Rainfall Event, Upper End Allowance)	35%	35%
Peak Rainfall Intensity (1% Annual Exceedance Rainfall Event, Central Allowance)	20%	25%
Peak Rainfall Intensity (1% Annual Exceedance Rainfall Event, Upper End Allowance)	40%	40%
	2020s	**2050s**	**2080s**
Peak River Flow (Central Allowance)	10%	9%	24%
Peak River Flow (Higher Central Allowance)	15%	17%	36%
Peak River Flow (Upper Allowance)	24%	36%	71%
	2000-2055	**2056-2125**	
Offshore Wind Speed	+5%	+10%	
Extreme Wave Height	+5%	+10%	

7 WATER FEATURES IN THE VINCINITY OF THE SITE

7.1 River Wylye

Directly to the north of the site, is the River Wylye, which is classified as a main river by the Environment Agency.

7.2 Historic Flooding

From the information, provided by the Environment Agency, it states that there was recorded flooding within the area in 2014. There is also recorded flooding, pre 2012, however the exact information for this is unknown.

The owner of Riverside Cottage has confirmed that the property has not previously flooded.

8 DEVELOPMENT PROPOSALS

The development proposals for Riverside Cottage include the construction of a 7.2m long x 6m wide garage building, to be constructed from timber, along with the construction of a porous driveway. The porous driveway has not been considered further in this flood risk assessment as this shall not increase the flood risk of the area due to this being permeable in nature.

9 POTENTIAL SOURCE AND IMPACT OF FLOODING

9.1 General

The flood risk associated with the proposals at Riverside Cottage have been assessed against the following types of flooding events;

- Coastal Flooding;
- Fluvial Flooding;
- Groundwater Flooding
- Pluvial Flooding

9.2 Coastal Flooding

The location of the proposed development is away from any coastal areas, therefore the proposed development shall not be at risk from any coastal flooding.

9.3 Fluvial Flooding

9.3.1 General

The proposed development is located in Flood Zone 3, which indicates that the development is at high risk from fluvial flooding. In probability terms, it has between a 1% and 3.3% chance of experiencing flooding each year. Figure 3 presented below shows the extent of the Flood Zone 3, with the location of the proposed garage construction shown in magenta and the planning boundary in red.

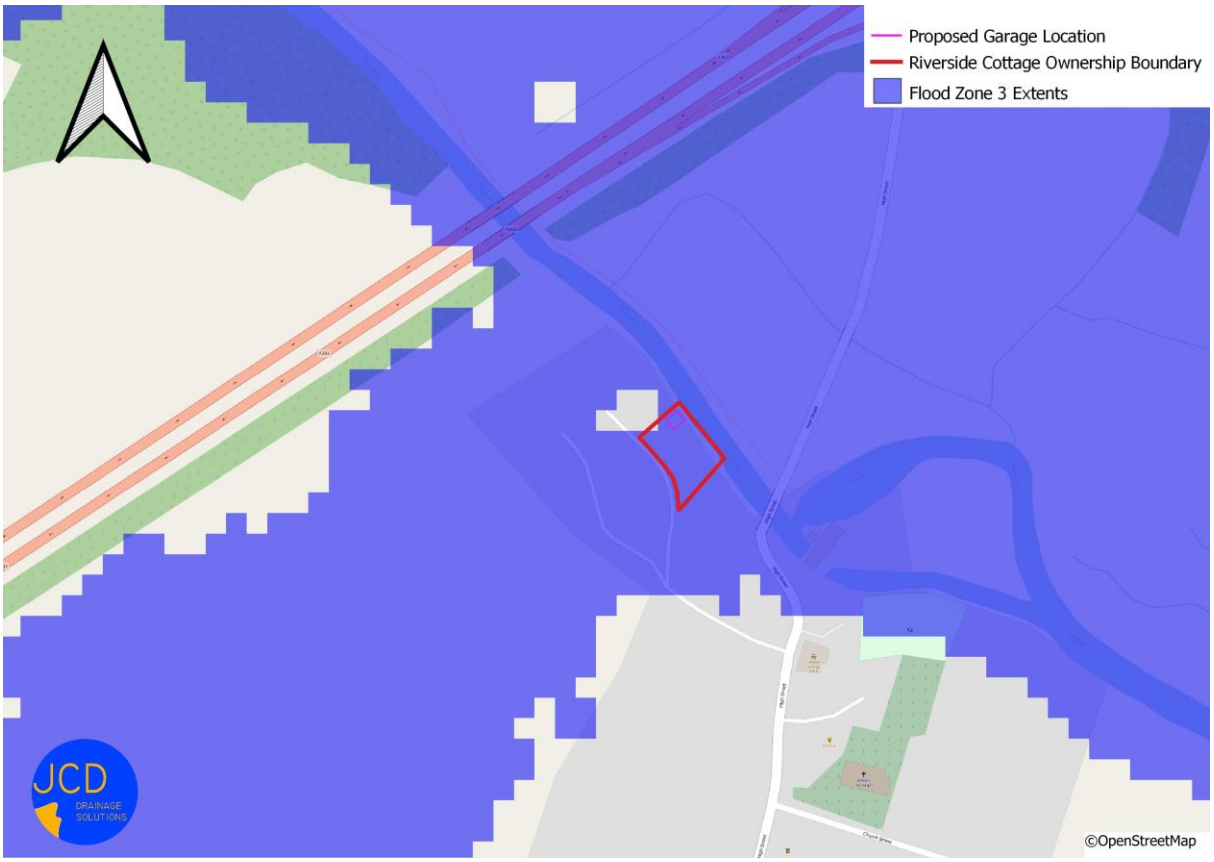


Figure 3 – Flood Zone 3 Map with Proposed Building Layout
(OpenStreet Map and Environment Agency, 2024)
Data available under Open Database Licence - openstreetmap.org/copyright
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Under the National Planning Policy Framework (NPPF) there are strict tests to protect people and property from flooding, which all local planning authorities are expected to follow when assessing planning applications. This ensures that developments are located in areas of lower flood risk where possible and if they are situated in areas of flood risk, they contain appropriate mitigation measures. Where this is not possible then the proposals shall not be permitted.

The NPPF sets out how to assess these risks via strict tests. Dependant on the type of development and the vulnerability classification within which it falls and the flood zone which the development is located within, two tests may need to be undertaken to ensure that the proposed development has been sufficiently assessed to ensure the development proposals outweigh the flood risk. The two tests are a Sequential Test and Exception Test. The aim of the sequential test is to steer new development to areas with the lowest flood risk. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding. If this is not possible then an exception test maybe required depending of the classification of development, to assess the developments sustainability and community benefit against the flood risk.

The proposal which planning permission is being sought after, includes the construction of a timber double garage which shall be used for storage. Annex 3 of the National Planning Policy Framework, has a set of flood risk vulnerability classifications for which proposed development are classified into. These comprise essential infrastructure, highly vulnerable, more vulnerable, less vulnerable and water-compatible developments. The proposal for the garage construction at Riverside Cottage, shall fall into the less vulnerable classification, as the garage shall not be a habitable building and shall generally be used for storage.

The flood risk and coastal change guidance on the GOV.uk website, specifies which flood risk vulnerability classifications, can be developed within each of the EA defined flood zones. Table 2 below illustrates that less vulnerable classification is acceptable to be built within flood zone 3 and an exception test is not required. It is worth noting that this table does not take into the account of the application of the sequential test which should be undertaken first to guide any development to lower flood risk.

Table 2 – Flood Risk Vulnerability and Flood Zone Compatibility

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	Exception Test Required	✓	✓	✓
Flood Zone 3a	Exception Test Required †	X	Exception Test Required	✓	✓
Flood Zone 3b	Exception Test Required *	X	X	X	✓ *

✓ Exception test is not required

X Development should not be permitted

† - In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage; and
- not impede water flows and not increase flood risk elsewhere.

In accordance with the Environment Agency guidance for minor developments, due to the location of the proposed garage construction being in an area where there are minimal dwellings the Local Planning Authority (LPA) have confirmed that the garage is not in an area of increased flood risk due to multiple minor extensions, therefore the off site flood risk is not increase and not assessed further in this report.

9.3.2 Sequential Test

As part of this FRA and in accordance with the latest Flood Risk and Climate Change guidance a sequential test has been applied, as the site lies in Flood Zone 3, to see if the proposal can be located into an area of lower flood risk.

The proposed garage construction shall be utilised by the owner of Riverside Cottage and therefore shall need to be located on land next the property. Also the location of the proposed garage construction is located on land that is owned by the owner of Riverside Cottage.

As a result of the above it is considered that the proposed location for the garage is the best in terms of the requirements and mitigation measures shall be included to minimise the flood risk.

9.3.3 Fluvial Flooding Levels

As part of this FRA, JCD Drainage Solutions contacted the Environment Agency (EA) to request the Product 4 detailed flood risk assessment data. The Environment Agency provided all available information they had for modelled flood levels for the area. Unfortunately the Environment Agency could only provide predicted flood depths rather than modelled flood levels. As the development is only considered a minor development, due to the floor area of the proposed garage construction being less than 250m^2, the predicted flood level for a 1% Annual Exceedance Probability (AEP) flood event has been determined from this information and freely available EA flood depth data and then converted into a predicted flood level by adding the predicted flood depth to the current ground levels determined from the latest LiDAR data.

The use of this data is considered appropriate for this FRA due to the nature of the development being a minor development, coupled with the fact it is classified as a less vulnerable development and the mitigation measures that shall be incorporated into the building. The building shall also not be habited and is a further reason why the use of this data is considered appropriate.

The data shows that for the 1% AEP fluvial flood event, the depth of predicted water shall be 0mm and for the 1% AEP fluvial flood event with an additional allowance of 20% for climate change, the predicted flood depth shall be 37mm. Calculating the difference between the two values and then dividing this by 20 gives the increase in depth for every 1%. This can then be used to adjust the value to account for the revised central allowance climate change value for peak river flows of 24%. The central allowance has been used in this calculation, in accordance with the flood risk guidance, as less vulnerable developments are advised to use the central allowance climate change factor.

Applying a 24% increase on the 0mm flooding depth for the 1% AEP event, gives a maximum flood depth of approximately 44mm. Correlating this with the terrain data for the site gives a maximum flood level of 73.544mAOD.

9.3.4 Fluvial Flooding Mitigation Measures

9.3.4.1 Finish Floor Level and Fixture and Fittings Levels

Given the proposed use of the garage, it is deemed that in order to raise the finished floor level, by 600mm above the predicted 1% AEP event with an additional allowance for climate change, a large amount of fill material would be required and this material would have to be imported to the proposed development. If the garage was built on a platform this would sit higher than any other building in the surrounding area and would potentially cause an impact to the visual aspect of the area.

Given the predicted flood depth in the area of the garage construction being relatively low (37mm), and the proposed use of the building, the risk from fluvial flooding is considered low. As a result of this the building shall be constructed at the current existing ground levels but shall incorporate flood resilience measures to minimise any potential impacts of flooding on the building.

Any items that are proposed in the building, for example any fixtures and fittings, or electrical features which could be damaged by flood waters shall be installed at a minimum level of 600mm above the existing ground levels. All fixtures and fittings shall be set at a minimum level of 74.144mAOD.

If these fixtures and fittings cannot be fixed at or above the level stated in the paragraph above these shall be designed to be mobile so that they can be easily moved if a flood warning for Riverside Cottage is received.

9.3.4.2 Flood Warnings

The owners of Riverside Cottage shall sign up to the EA Flood warning system so that a nominated person can receive alerts of flood warnings and then the owner can implement their flood plan to ensure that any valuables that could be damaged by flood waters can be removed from the garage and placed above the predicted 1% AEP with climate change flood level.

9.3.4.3 Building Materials

Any materials that are proposed for use within the building, both external and internal, should be materials which can easily be cleaned following a flood event once the flood waters have receded.

The garage is proposed to be constructed from timber panels and have a concrete floor. Both of these materials shall be easily cleanable after a flood event.

9.3.5 Overall Risk with Flood Mitigation Measures

Providing the mitigation measures presented in the paragraphs above are implemented the effects and risks from a fluvial flood event shall been minimised, and illustrates that the proposals are both safe and do not increase the flood risk to the downstream environment, therefore with the mitigation measures the risk from fluvial flooding is considered low.

9.4 Pluvial Flooding from Surface Water

Pluvial flooding risk is classed as the risk of flooding that may arise from surface water flow and overland flow that is generated from rainfall events.

Flooding from pluvial events may occur when there is an intense rainfall event which exceeds the capacity of the drainage system and/or ground infiltration rates.

The EA have developed a surface water flood risk map, which provides a general understanding of where pluvial flood waters are likely to affect the proposed development and the risk classification for the different areas. It can be seen from the surface water flood map that the site is at very low risk from surface water flooding. Figure 4 shows the Surface Water Flood Risk Map for the proposed development.

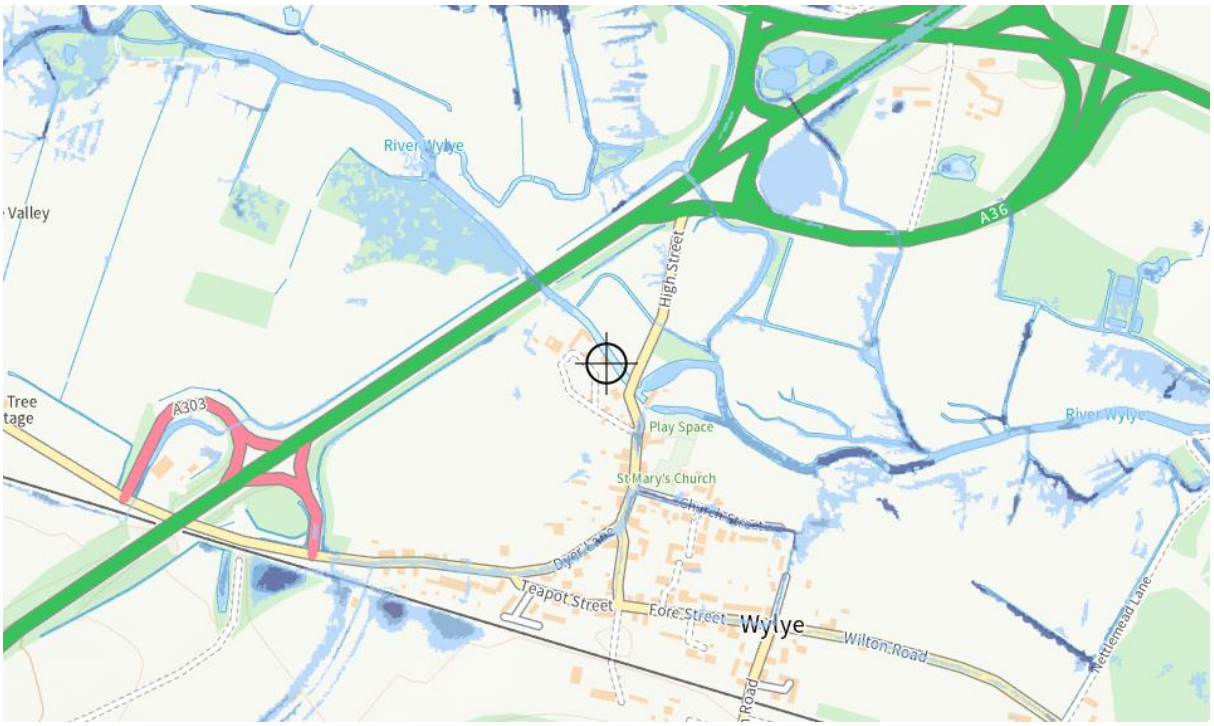


Figure 4 – Surface Water Flood Risk Map (Environment Agency, 2024)
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9.5 Groundwater Flooding

The British Geological Survey (BGS) holds records of historic borehole drilling and this information is freely available on their website. As part of this FRA a review of any historic boreholes in the vicinity of the proposed development were reviewed. In total there were records for 4 boreholes located to the north west of the proposed development. In the boreholes there were remarks about water strikes being encountered at 1.67m below the surface. Given the ground levels of the boreholes being approximately 73mAOD, this results in a groundwater level of approximately 71.33mAOD. This is approximately 2.17m below the proposed finished floor level of the garage, so there is a significant thickness of material between the water level and floor level. There shall be a concrete floor in the building which shall prevent any upward movement of water should groundwater levels rise significantly; therefore groundwater flooding is considered low.

10 CONCLUSIONS AND RECOMMENDATIONS

This flood risk assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated flood risk guidance. This FRA has been produced on behalf of Mr Charles Vane Percy to support a planning application in regard the proposal to construct a garage, to the side of Riverside Cottage, Wylye, Wiltshire, BA12 0QU.

This report demonstrates that the proposed development is at an acceptable level of flood risk where the suggested mitigation measures are implemented within the development. The identified risks are presented in Table 3 below along with the proposed mitigation measures. The table below shows the risk with no mitigation measures and the risk once the mitigation measures are imposed.

Table 3 - Summary of Flood Risk Assessment			
Type of Flood Risk Assessed	**Original Assessed Risk without Control Measures**	**Control Measure**	**Impact and Damage Risk from Flood Event with Control Measures**
Fluvial	High	The building is to be constructed where possible using materials that can easily be cleaned following a flood event; Any fixtures or fitting or electrical components shall be elevated a minimum of 600mm above the maximum flood depth level at a minimum level of 74.144mAOD; Any fixture and fittings that cannot be elevated about this level shall be mobile to ensure these can be easily removed if necessary; and The owner shall sign up to receive Environment Agency Flood Warnings for the area, to ensure there is time to implement the flood plan.	Low
Coastal	Low	None required	Low
Pluvial	Very Low	None Required	Very Low
Groundwater	Low	None required	Low

In compliance with the requirements of the National Planning Policy Framework, and subject to the mitigation measures proposed above, the development could proceed without being subject to significant impacts from a flood event given the classification of the proposed development. The development shall not increase the fluvial or pluvial flood risk to the surrounding area due to the proposal only being minor in size (<250m^2).

11 REFERENCES

Communities and Local Government (2016); *National Planning Policy Framework*

Environment Agency (2016); *Flood risk assessments: climate change allowances;* published on https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances; Updated 27 May 2022

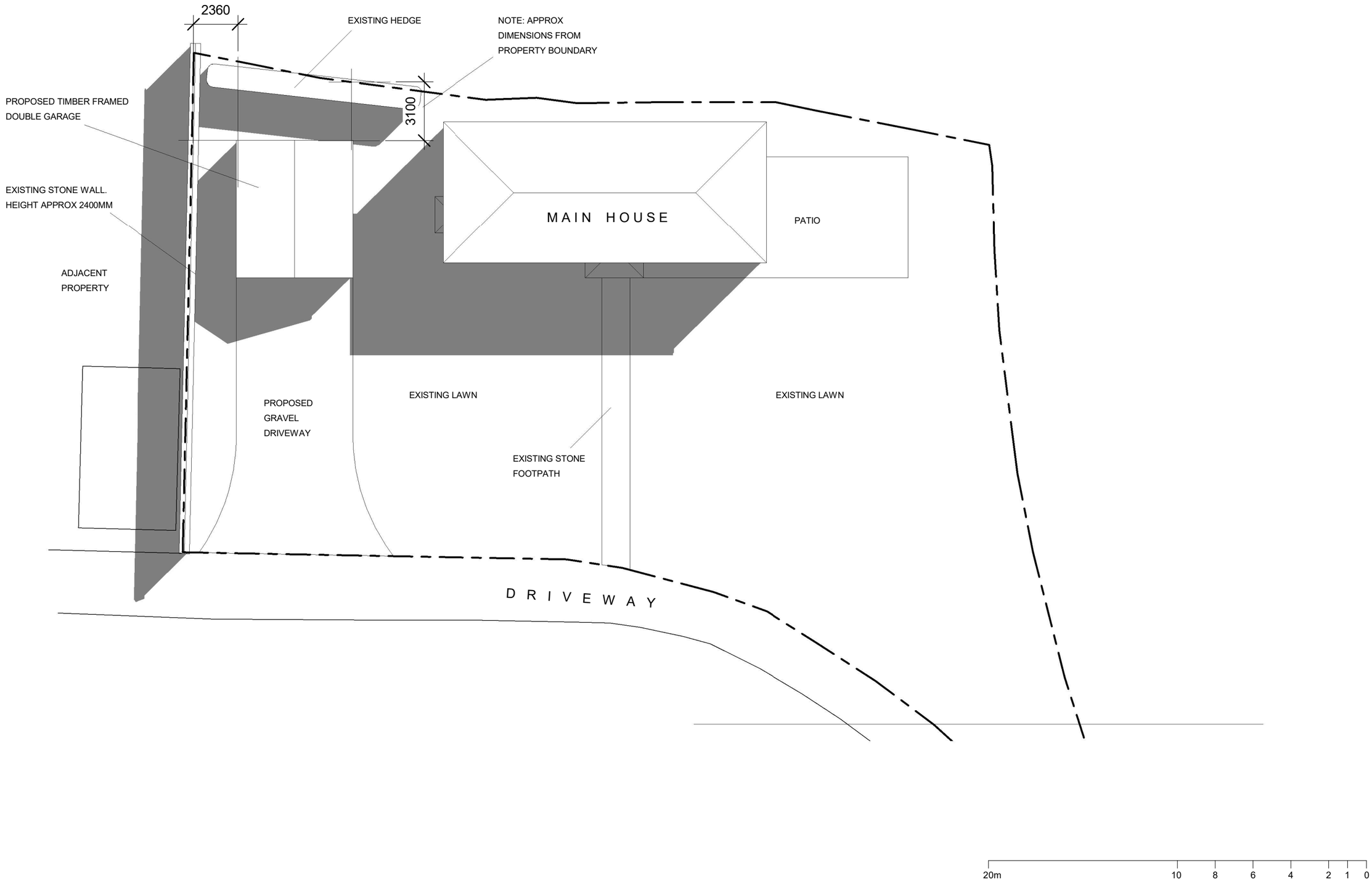
Environment Agency (2012); *Preparing a flood risk assessment: standing advice;* published on https://www.gov.uk/guidance/flood-risk-assessment-standing-advice; Updated 8 February 2022

Environment Agency (2024); *Flood Map for Planning*

OpenStreet Maps (2024); *openstreetmap.org/copyright*

Appendix 1

Proposed Development Drawings



PLANNING BY DESIGN
FROM CONCEPT TO COMPLETION

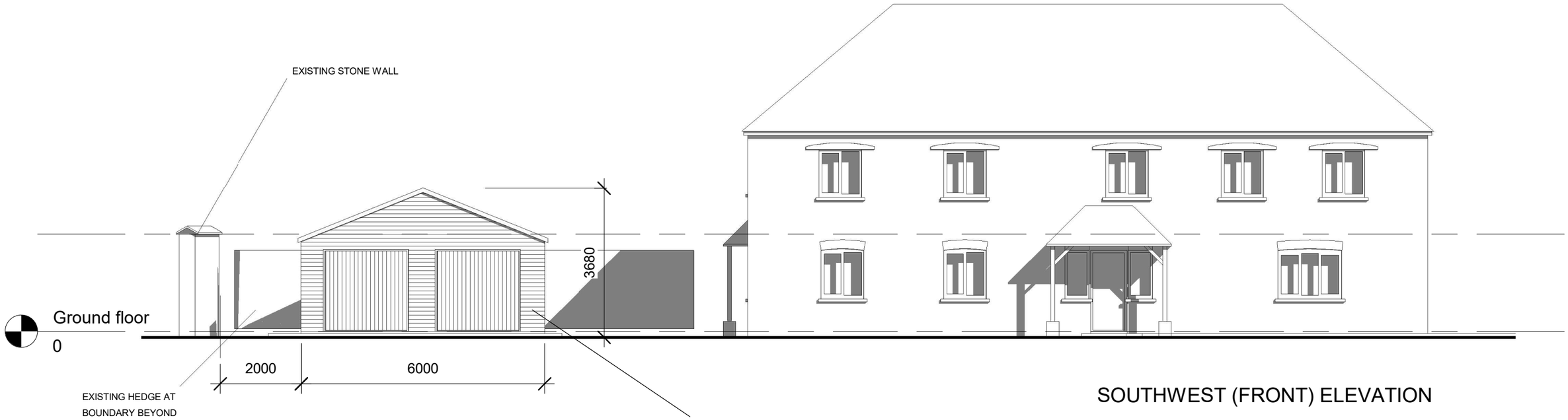
ALL DIMENSIONS TO BE VERIFIED ON SITE
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Rev

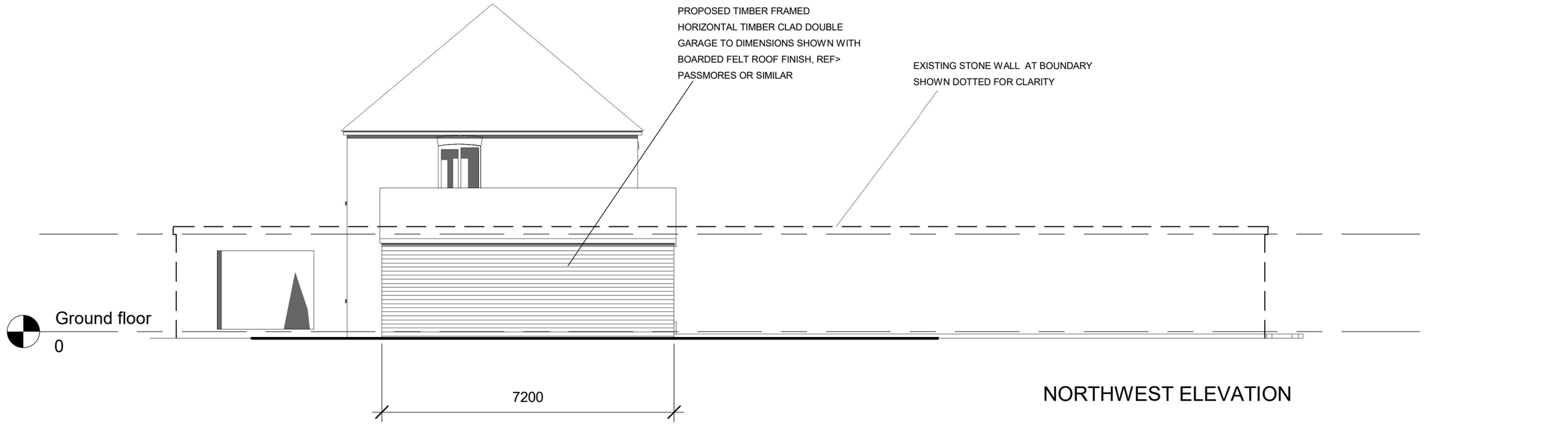
Riverside Cottage
BA12 0QU

PROPOSED SITE PLAN

Date	20.10.2023	Scale @ A3 1:200	No. 06
By	JL		
Drwg ref:	RiversideCottageProposedSitePlanV2		



SOUTHWEST (FRONT) ELEVATION



NORTHWEST ELEVATION

10m 5 4 3 2 1 0

PLANNING BY DESIGN
FROM CONCEPT TO COMPLETION

ALL DIMENSIONS TO BE VERIFIED ON SITE
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Rev

Riverside Cottage
BA12 0QU

PROPOSED SOUTHWEST (FRONT) & NORTHWEST ELEVATIONS

Date	20.10.2023	Scale @ A3 1:100	No. 07
By	JL		
Drwg ref:	RiversideCottageProposedSouthwestAndNorthwestElevationsV1		