

AMBI³ENTAL

ENVIRONMENTAL ASSESSMENT

Flood Risk Assessment 6314

4 Pensfolds Place,
Arundel,
West Sussex,
BN18 9SA

Ambiental Environmental Assessment
Sussex Innovation Centre,
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Prepared for: John and Catherine Bradley

Reference: 6314

Site Location: 4 Pensfolds Place, Arundel, West Sussex, BN18 9SA

Proposed Development: It is understood that the development is for the construction of a single-storey rear and two-storey front extension to provide greater habitable space to the existing dwelling.

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1. Summary

- 1.1 Ambiental Environmental Assessment has been appointed by John and Catherine Bradley to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at 4 Pensfolds Place, Arundel, West Sussex, BN18 9SA.
- 1.2 There is an existing residential dwelling on site. It is understood that the development is for the construction of a single-storey rear and two-storey front extension to provide greater habitable space to the existing dwelling.
- 1.3 The proposal is considered a 'Minor Development' under the NPPF as it is for a household development with a footprint of less than 250m². The proposals will have Finished Floor Levels no lower than those of the existing building and will not result in a new residential unit on site.
- 1.4 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zones 1,2, and 3. The proposed development is an extension of the existing residential dwelling, which is considered "More Vulnerable" under the NPPF. As such, the flood risk vulnerability will remain the same post-development.
- 1.5 A summary of flood risk is provided in the table below:

Source	Summary of flood risk	Recommended flood resilience and mitigation measures
Fluvial	The site is in Flood Zone 1, 2 and 3, according to the EA's online Flood Map for Planning. Ambiental received site-specific modelled flood outputs from the Environment Agency, for fluvial and tidal flood risk. The site is not affected by the modelled 1:20-year, 1:100-year, 1:1,000-year and 1:100-year +CC fluvial defended flood events. Access to the site is affected by flooding in the 1:20-year fluvial defended event. The risk of fluvial flooding to the site is considered low.	Site users should sign up to the EA Flood Warning Service, if they haven't done so already.
Tidal	The EA flood data shows that the site boundary is unaffected by flooding in the 1:20-year, 1:200-year and 1:1,000-year events. However, the site lies within the 1:200-year (2110) flood extent. Pensfolds Place is also affected by flooding in the 1:200-year (2110) flood event.	Site users should sign up to the EA Flood Warning Service, if they haven't done so already.
Surface	The EA Long-Term Surface Water Flood Risk map shows the main access road to the site, Pensfolds Place, is at high risk of surface water flooding. This could affect access/egress routes to and from the site. The site itself is at very low risk of pluvial flooding.	Site users should be informed on potential flood risks to area, if not already.

Groundwater	The British Geological Survey Susceptibility to Groundwater Flooding dataset indicates that the site is in an area identified as ' <i>Potential for groundwater flooding to occur at surface</i> '. This is considered to be high risk.	Recommended mitigation measures to prevent potential ingress of groundwater into proposed extensions.
Sewer	Based on records of sewer flooding incidences provided in the Arun District Council SFRA, the local area has been affected by sewer flooding in the past. There is no indication that the site itself has been affected by sewer flooding in the past.	Non-return valves to be fitted.

- 1.6 To mitigate against potential flood risk, the proposed extension should incorporate flood resilience measures in line with current best practice for construction within an area at risk of flooding, CLG 2007 'Improving the Flood Performance of New Buildings. These measures are detailed in Section 7 of the report.
- 1.7 Finished Floor Levels of the extensions will be set no lower than existing ground levels of the residential dwelling, in line with the EA Standing Advice for Minor Developments.
- 1.8 It is also recommended that residents sign up to the EA Flood Warning Service, if they have not done so already.
- 1.9 In summary:
- The proposed development is for a 'Minor Development' and extensions to the existing residential dwelling on site;
 - The site is in Flood Zone 1, 2 and 3, according to the EA Flood Map for Planning;
 - Access to the site via Pensfolds Place is at high risk of flooding from fluvial and pluvial sources. Thus, residents should sign up to the EA Flood Warning Service and be informed of flood risk, if they are not already;
 - The proposed extension should incorporate flood resilience measures, in line with current best practice for construction of buildings in high flood risk areas;
 - Finished Floor Levels of the proposed extension will be set no lower than those of the existing dwelling, in line with the EA's Standing Advice for Minor Developments.

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
Development Type:	Residential dwelling	Construction of a single-storey rear and two-storey front extension to provide greater habitable space to the existing dwelling. Considered a 'Minor Development' under the NPPF.
Number of Bedrooms:	4	6
EA Vulnerability Classification:	More vulnerable	More vulnerable
Ground Floor Level:	Topographic levels within the redline site boundary are between approx. 3.0m AOD and 3.4m AOD (EA 2m LIDAR dataset).	Finished Floor Levels of proposed extension will be set no lower than those of the existing dwelling, in line with EA Standing Advice for Minor Developments.
Level of Sleeping Accommodation:	1 st floor level	1 st floor level
Impermeable Surface Area:	Built footprint of existing dwelling is approx. 80m ²	Built footprint of dwelling post-development is approx. 100m ² . This is an increase in built footprint of approx. 20m ²
Surface Water Drainage:	N/A	Discharge via existing drainage infrastructure
Site Size:	Approx. 270m ²	Approx. 270m ²
Risk to Development	Summary	Comment
EA Flood Zone:	Flood Zones 1, 2 and 3	River Arun
Flood Source:	Fluvial and Tidal	
1:20-Year Fluvial and Tidal Defended Flood Event	Site not affected by flooding	
1:100 Year Fluvial and 1:200-year Tidal Defended Flood Event	Site not affected by flooding	
1:1000 Year Fluvial and Tidal Defended Flood Level	Site not affected by flooding	Ambiental have received modelled flood outputs from the Environment Agency for the site, taken from the Lower Tidal River Arun Strategy Study (LTRAS) (completed by Atkins in 2010). This model does not account for the latest climate change allowances.
1:100 Year Fluvial Flood Level & Climate Change	Site not affected by flooding	
1:200-year (2110) tidal flood event	4.40m AOD on site	
Recorded Flood Events in Area:	No	
Recorded Flood Events at Site:	No	EA historic flood records
SFRA Available:	Yes	Arun District Council SFRA (2016)
Management Measures	Summary	Comment
Ground floor level above extreme flood levels:	N/A	FFLs of proposed extension will be same as those of existing dwelling.
Safe Access/Egress Route:	Yes	See Section 7
Flood Resilient Design:	Yes	See Section
Site Drainage Plan:	Yes	Discharge surface water runoff via existing drainage system
Flood Warning & Evacuation Plan:	Yes	EA Flood Warning Service Area
Offsite Impacts	Summary	Comment
Displacement of floodwater:	No	Proposal is for minor development, so should not displace floodwaters.
Increase in surface run-off generation:	Negligible	Proposal is for minor development and runoff will be discharge via existing drainage. Any increase in surface water runoff considered negligible.
Impact on hydraulic performance of channels:	None	Development should not affect any watercourses.

Table 1 Summary of flood risks, impacts and proposed flood mitigation measures.

N/A¹ not required for this assessment; N/A² data not available.

2. Development Description and Site Area

Proposed Development and Location

- 2.1 The proposed development is located at 4 Pensfolds Place, Arundel, West Sussex, BN18 9SA (Figures 1 and 2).
- 2.2 There is an existing residential dwelling on site. It is understood that the development is for the construction of a single-storey rear and two-storey front extension to provide greater habitable space to the existing dwelling. Plans of the proposed development are included in Appendix 1.
- 2.3 Under the Flood Risk and Coastal Change Planning Practice Guidance (PPG), a 'Minor Development' is defined as a:

'Householder development: For example; sheds, garages, games rooms etc within the curtilage of the existing dwelling, in addition to physical extensions to the existing dwelling itself. This definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling e.g. subdivision of houses into flats.'
- 2.4 This proposal is for a rear and front extension to the existing dwelling, so is considered a 'Minor Development' under the National Planning Policy Framework (NPPF).
- 2.5 Topographic levels within the redline site boundary are between approximately 2.8mAOD and 3.4mAOD, according to the EA's 2m DTM LiDAR dataset. LiDAR data provides a representation of the terrain, with features such as buildings and vegetation removed. The site topography is relatively flat, and slopes downwards at the southern and eastern boundaries, towards Pensfolds Place. Figure 3 shows 0.1m interval contour lines of the site topography, using the EA's 2m DTM LiDAR dataset. The approximate footprints of the existing dwelling and proposed extensions are also shown in this map using site layout plans provided by the client.

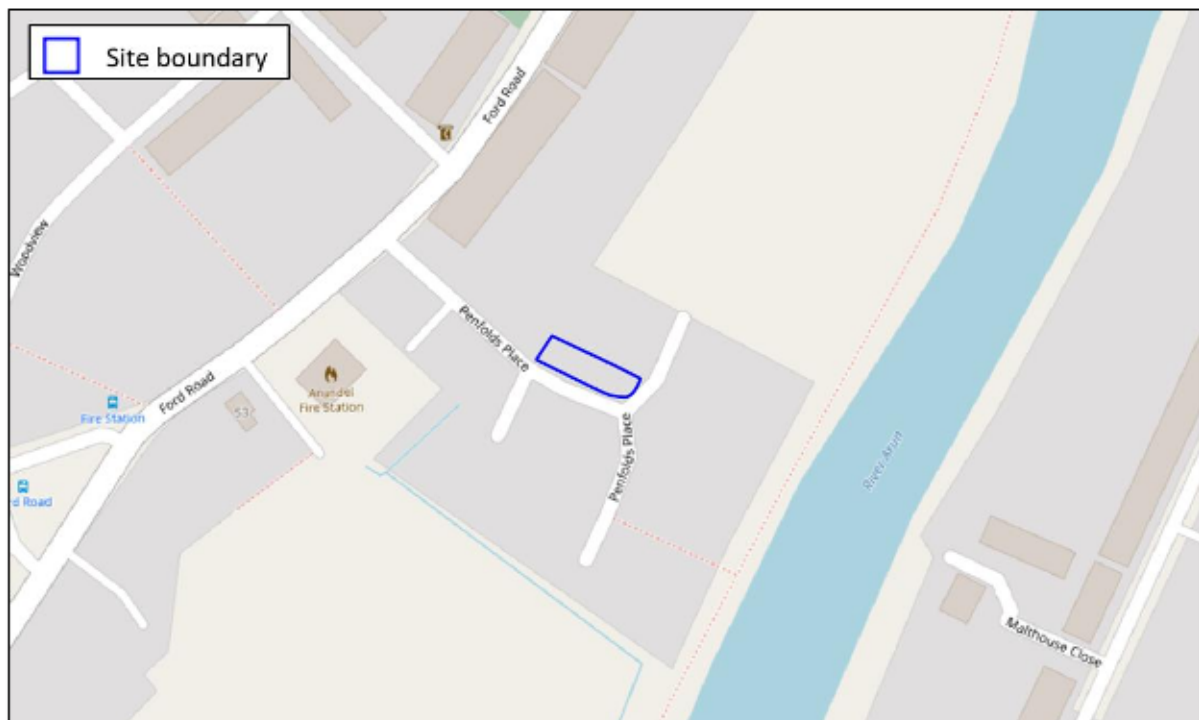


Figure 1 Location Map, identifying the location of the site (Source: OpenStreet Map)



Figure 2: Aerial Imagery, indicating location of site (Source: GoogleMaps)

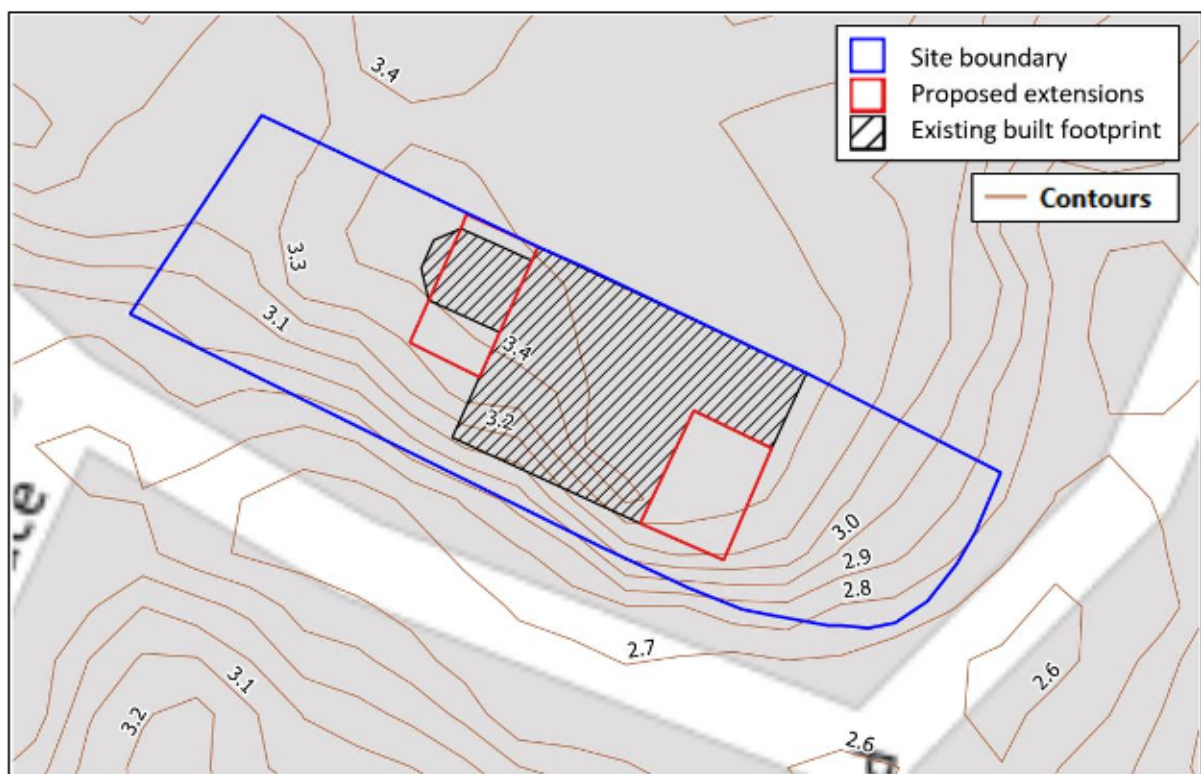


Figure 3: Contour lines with 0.1m intervals at site of proposed development, using EA's 2m LiDAR (Source: EA)

Vulnerability Classification

- 2.6 The online EA Flood Map for Planning shows that the site is in Flood Zone 1, 2 and 3, so is in an area of low, medium and high risk of flooding.
- 2.7 The EA Flood Zones are defined as follows:

- Flood Zone 1: areas have a low probability of less than 1 in 1,000 (<0.1%) of flooding from rivers, seas or tidal estuaries in any year;
- Flood Zone 2: areas have a medium probability of between 1 in 100 and 1 in 1,000 (0.1% to 1%) of flooding from rivers, and between 1 in 200 and 1 in 1,000 (0.1% to 0.5%) of flooding from seas or tidal estuaries in any year;
- Flood Zone 3: areas have a high probability of greater than 1 in 100 (>1%) of flooding from rivers and greater than 200 (>0.5%) of flooding from seas or tidal estuaries in any year.

2.8 Under Table 2 of the Flood Risk and Coastal Change Planning Practice Guidance and the principles of the National Planning Policy Framework (NPPF), the existing site could be considered as 'More Vulnerable' (residential). Given that the proposed development is for a minor extension to the existing residential property, the NPPF flood risk vulnerability of the site should not change post-development.

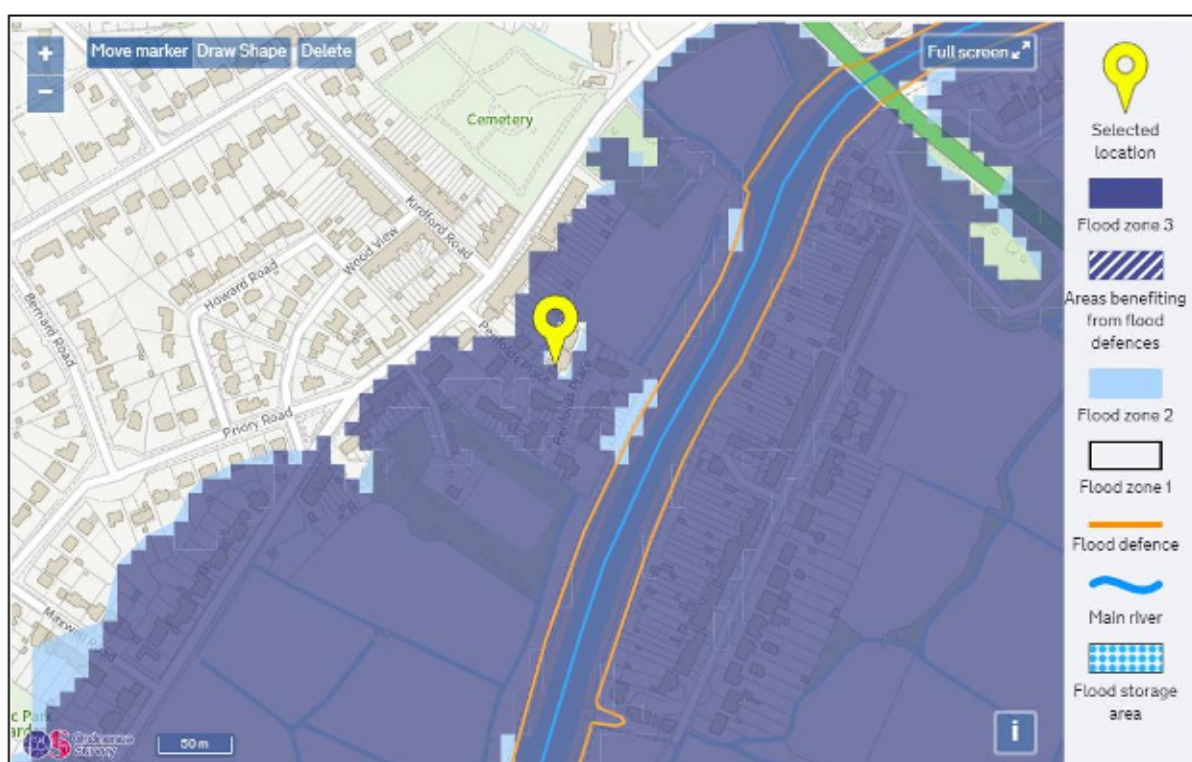


Figure 4: EA Flood Map for Planning, indicating location of site (Source: EA)

Geology

- 2.9 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is part of the Lambeth Group, which comprises of clay, silt and sand (Source: BGS). The superficial deposits underneath this area are Raised Marine Deposits, comprising of clay, silt, sand and gravel.
- 2.10 DEFRA's MagicMap Aquifer Designation Maps demonstrate that the aquifers beneath the site are Principal and Secondary 'A' for bedrock geology (see Figure 5) and Secondary 'A' for superficial deposits (see Figure 6). A Principal aquifer is highly permeable, supporting water supply and/or river base flow on a strategic scale. A Secondary 'A' aquifer is permeable, supporting water supplies at a local scale and may contribute to base flow of rivers.
- 2.11 Using DEFRA's online Magic Map, it is demonstrated that the site is not within an EA groundwater Source Protection Zone, as shown in Figure 7.

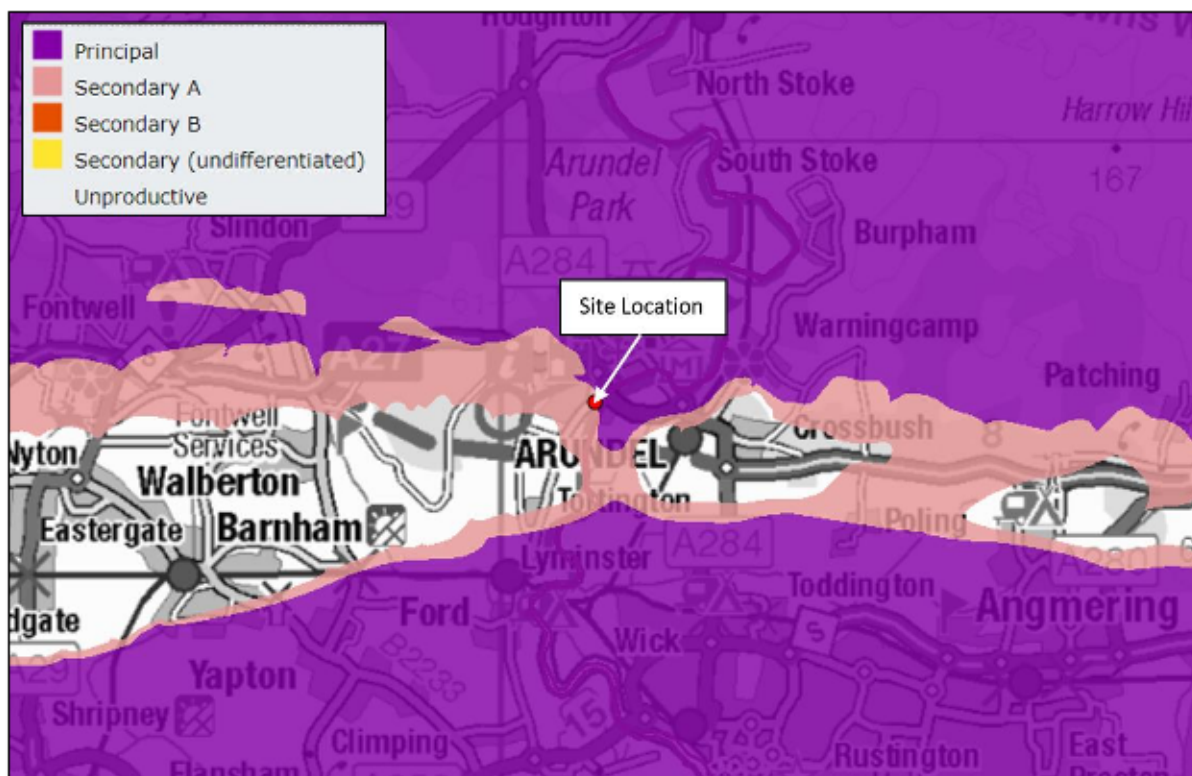


Figure 5: Aquifer Designation Map for Bedrock Geology, indicating the site location (Source: MagicMap)

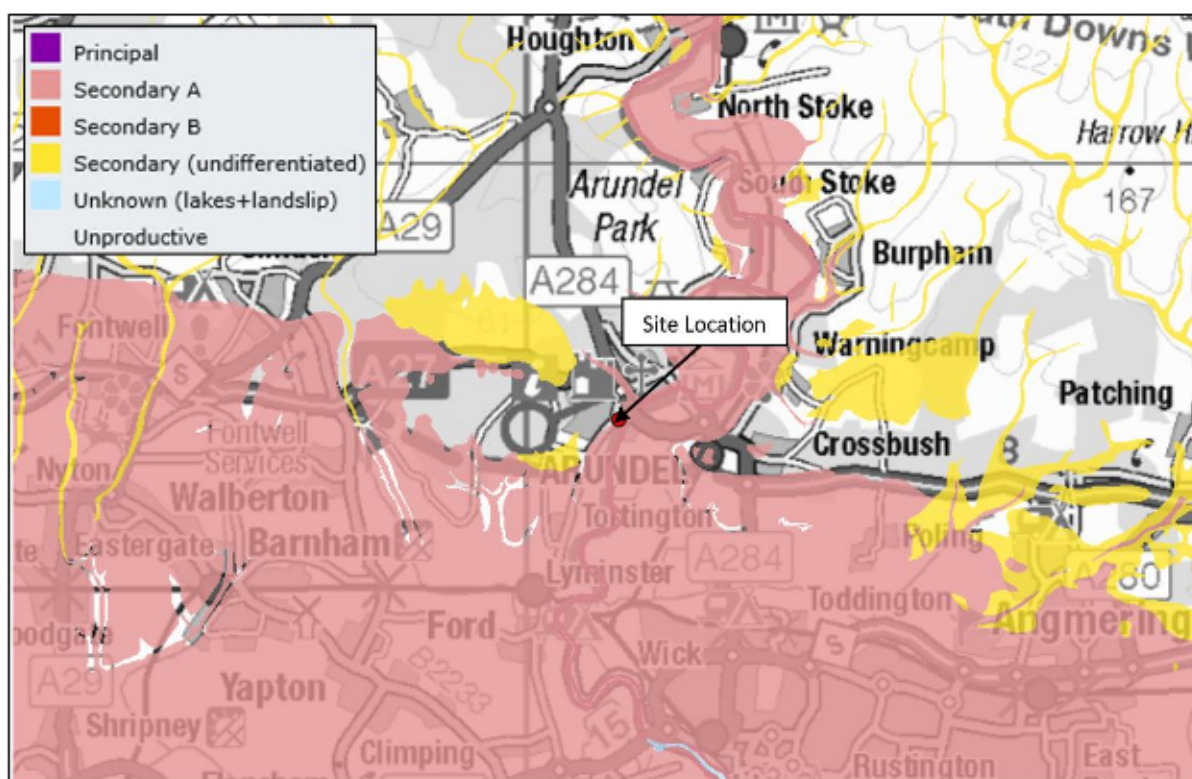


Figure 6: Aquifer Designation Map for Superficial Deposits, indicating the site location (Source: MagicMap)

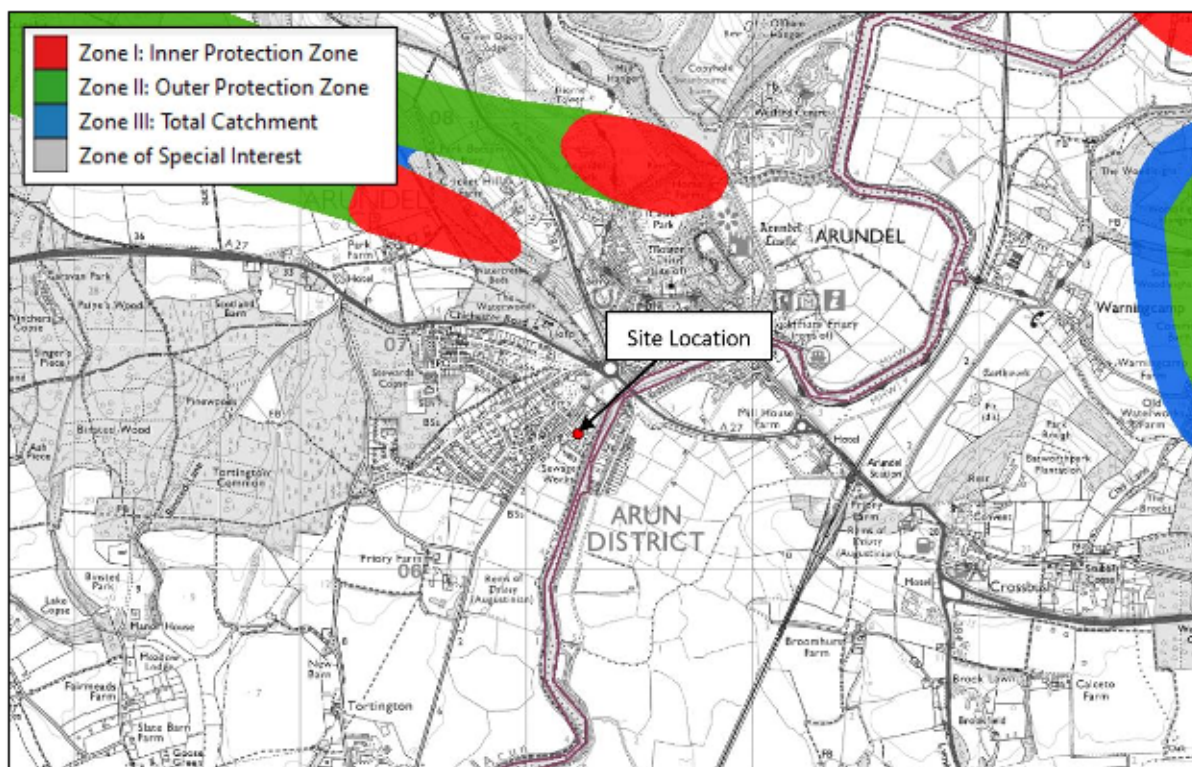


Figure 7: Groundwater Source Protection Zones, indicating location of site (Source: MagicMap)

3. Sequential Test/Exception Test

- 3.1 Under the Flood Risk and Coastal Change Planning Practice Guidance, all new planning applications should undergo a *Sequential Test*. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.
- 3.2 The Flood Risk and Coastal Change Planning Practice Guidance *Flood Risk Vulnerability and Flood Zone 'Compatibility' Table* is reproduced below;

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

Table 2 Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF.

Please note: ✓ means development is appropriate; ✗ means the development should not be permitted.

- 3.3 The proposed extension is 'More Vulnerable' under Table 3 of the Flood Risk and Coastal Change Planning Policy Guidance (PPG) and the National Planning Policy Framework (NPPF). The site is located in Flood Zone 1, 2 and 3 according to the EA Flood Map for Planning. As such, the proposed development may normally require the application of an Exception Test.
- 3.4 The proposed development is for a minor extension to the existing property, so could be considered as a 'Minor Development' under the National Planning Policy Framework (NPPF).
- 3.5 The revised NPPF states that:

*"Applications for some **minor developments** and changes of use **should not be subject to the sequential or exception tests** but should still meet the requirements for the site-specific flood risk assessments."*

(Source: NPPF)

- 3.6 Therefore, the proposed development should not be subject to the Sequential Test or the Exception Test.
- 3.7 As the site and proposed development are located within Flood Zone 2 and 3, the planning application submitted by the client is required to be accompanied by an FRA which shows the development can be achieved in a sustainable manner, with an overall reduction of flood risk to the site and the surrounding area.

4. Site Flood Hazards

Sources of Flooding

- 4.1 The proposed development is located within Flood Zones 1, 2 and 3 (low, medium and high risk of flooding) and is considered to be 'More Vulnerable' according to NPPF guidelines. Table 3 summarises the potential sources of flooding to the site:

Source	Description
Fluvial	Flood Zone 1, 2 and 3 Low risk: Site is outside 1:20-year, 1:100-year, 1:100-year +CC and 1:1,000-year defended scenarios
Tidal	Flood Zone 1, 2 and 3 Moderate risk: Site is unaffected by flooding in the 1:20-year, 1:200-year and 1:1,000-year tidal (defended) flood events; affected by flooding in 1:200-year +CC defended scenario.
Surface	High risk on Pensfolds Place; Very low risk on site
Groundwater	'Potential for groundwater flooding to occur at surface'
Sewer	Properties in the local area have been affected by sewer flooding

Table 3 Summary of flood sources.

Fluvial and Tidal

- 4.2 With reference to the EA Flood Map for Planning, the proposed extension is in Flood Zone 1, 2 and 3 (low, medium and high risk of flooding).
- 4.3 The River Arun, an EA Main River, is located approximately 60m south-east of the site boundary.
- 4.4 The Environment Agency have provided modelled flood outputs for the site, taken from the Lower Tidal River Arun Strategy Study (LTRAS), which was completed by Atkins in 2010. This model does not account for the Environment Agency's latest climate change allowances. The impact of climate change on flood risk at the site is discussed in Section 5.
- 4.5 There are existing flood defences near the site on the River Arun, according to information provided by the EA. The EA has stated, however, that the site itself does not benefit from any formal raised defences (see EA data in Appendix 2).
- 4.6 Modelled outputs have been provided for both the defended and undefended scenarios. Given that there are flood defences near the site which provide some benefit to the surrounding area in terms of mitigating flood risk, the defended outputs have been used to assess flood risk at the site, for both fluvial and tidal sources.

Fluvial Defended

- 4.7 The Environment Agency have provided a map showing modelled flood outlines for fluvial defended scenarios at the site. An extract of this map is shown in Figure 8 below and the EA data is included in Appendix 2. The return periods shown are as follows:

- 5% AEP – 1 in 20-year event;
- 1% AEP – 1 in 100-year event;
- 1% AEP plus climate change – 1 in 100-year plus climate change;
- 0.1% AEP – 1 in 1,000-year event.

4.8 As shown in Figure 8, the site boundary is shown to be unaffected by flooding in the 5% AEP (1:20-year), 1% AEP (1:100-year) and 1% AEP plus climate change (1:100-year +CC) modelled flood events in the defended scenario. The modelled flood outline for the 5% AEP (1:20-year) event encroaches the site from the east.

4.9 From reviewing the plans provided by the client, it is understood that the main access to the site is via Pensfolds Place, via the eastern entrance. The entrance to the site is shown to be affected by flooding in the 5% (1:20-year) flood extents. This could affect access and egress to and from the site.

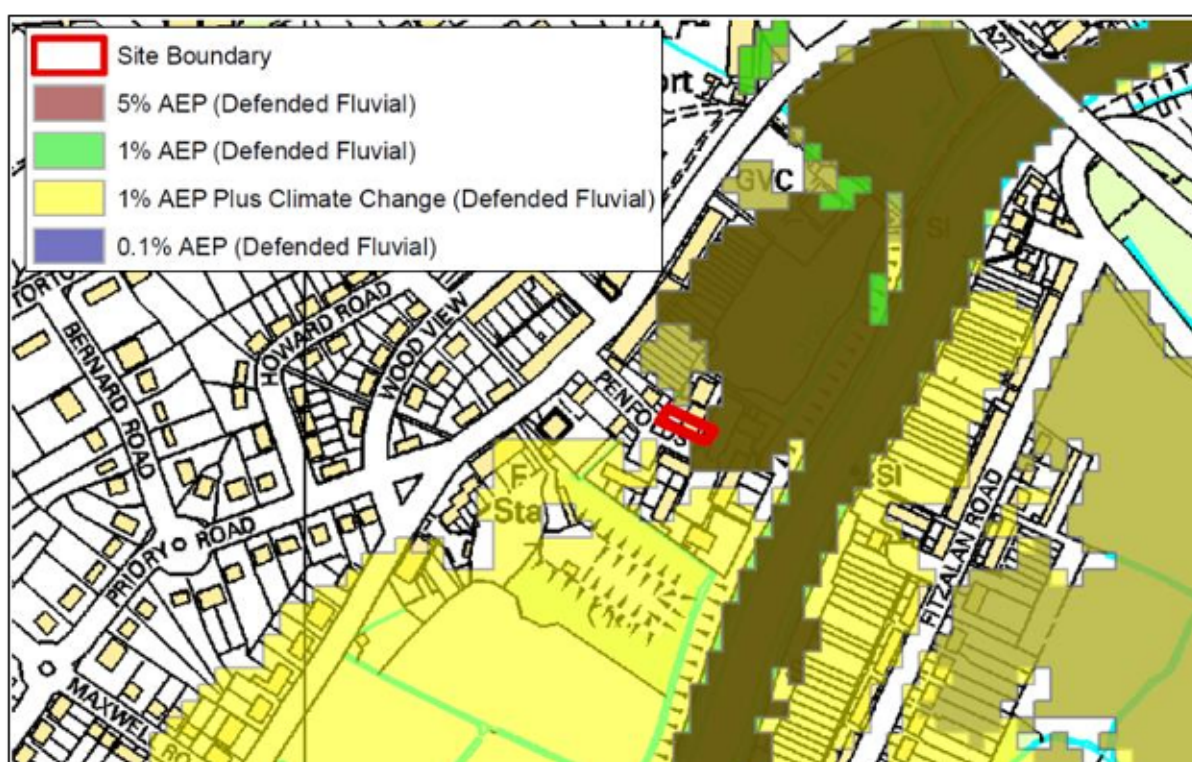


Figure 8 : Modelled defended fluvial flood extents, showing site boundary (Source: EA)

4.10 The Environment Agency also provided water levels and depths within the site boundary, extracted from three node points: Node 1 – west; Node 2 – centre; Node 3 - east. The location of these nodes is shown in Figure 9.



Figure 9: Location of modelled nodes within site boundary (Source: EA)

- 4.11 For the present-day fluvial defended flood events, there are no modelled flood levels or depths provided at the three node points for the modelled 1:20-year, 1:100-year, 1:100-year +CC and 1:1,000-year flood events. The EA data is included in Appendix 2 of this report.
- 4.12 Based on this analysis, it is considered that the site should be at low risk of flooding from fluvial sources, when taking account of the existing defences near the site on the River Arun.

Tidal Defended

- 4.13 The Environment Agency have provided modelled flood outlines for tidal defended flood events, as shown in Figure 10 below and as included in Appendix 2. The return periods shown are as follows:
- 5% AEP – 1 in 20-year event;
 - 0.5% AEP – 1 in 200-year event;
 - 0.5% AEP (2110) – 1 in 200-year (2110);
 - 0.1% AEP – 1 in 1,000-year event.
- 4.14 As demonstrated in Figure 10 below, the site is unaffected by the modelled 5% AEP (1:20-year), 0.5% AEP (1:200-year) and 0.1% (1:1,000-year) flood extents. The 0.5% AEP (1:200-year) flood extent in the year 2110, which takes account of the increased flood risk due to climate change, affects the site. The flood levels extracted from Nodes 1, 2, and 3 within the site boundary in this modelled event is 4.0mAOD. When this is compared with the existing topographic levels within the site boundary (2.8mAOD to 3.4mAOD), it is demonstrated that the site could be affected by flood depths of 0.6m to 1.2m.

- 4.15 The site is shown to be unaffected by flood risk in the 1:20-year, 1:200-year and 1:1,000-year; however, it is affected by the modelled climate change flood event. Thus, the risk of tidal flooding to the site could be considered to be moderate.

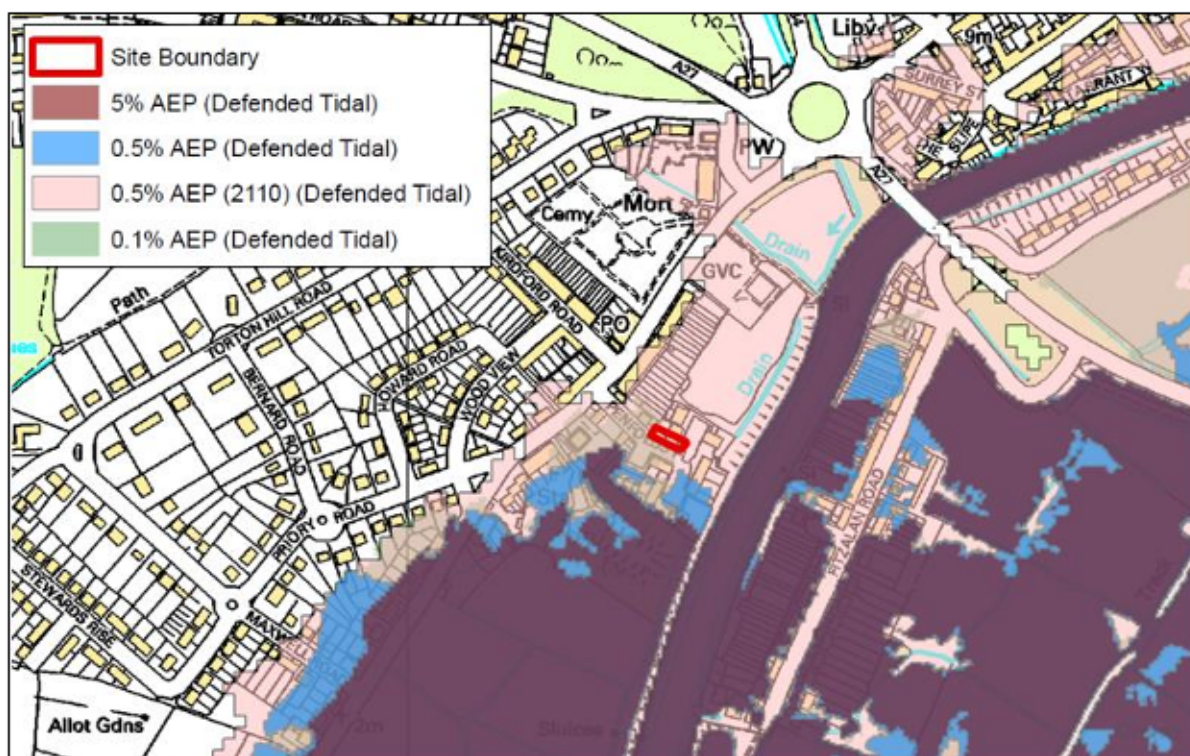


Figure 10: Modelled defended tidal flood extents, showing site boundary (Source: EA)

- 4.16 Given that the proposal is for a minor extension to the existing dwelling on site, it is considered that the EA Standing Advice for Minor Developments can be followed. In accordance with the EA Standing Advice, Finished Floor Levels of the proposed extension should be set no lower than those of the existing dwelling.
- 4.17 Furthermore, it is understood from the proposed plans that there will be no sleeping accommodation provided at the ground floor level post-development.
- 4.18 The proposed minor development has a footprint of less than 250m², will be set at the same level as the existing dwelling and will not create a new unit on site, it could be considered suitable and appropriate for development. Mitigation measures for the construction of the extension are discussed in Section 7 of the report.

Surface Water (Pluvial)

- 4.19 The online Environment Agency Flood Risk from Surface Water map (Figure 11) shows the site itself to be within an area of 'Very Low' risk of flooding from surface water; however, the road south and east of the site, Pensfolds Place, is shown to be at 'High' risk of flooding from surface water.
- 4.20 The following definitions of the annual surface water flood risk labels are given by the EA:

- 'High Risk'; >3.3% AEP (more often than 1 in 30)
- 'Medium Risk'; 3.3% to 1.1% AEP (between 1 in 30 and 1 in 100)
- 'Low Risk'; 1% to 0.1% AEP (between 1 in 100 and 1 in 1000)
- 'Very Low Risk'; <0.1% AEP (less often than 1 in 1000)

- 4.21 Ambiental have used GIS software to review the EA's surface water flood depths alongside the approximate built footprints of the extension and existing dwelling within the site boundary. This is based on site layout plans provided by the client (see Appendix 1).
- 4.22 The site and proposed extensions are located wholly outside the EA modelled 1:30-year (Figure 12), 1:100-year (Figure 13) and 1:1,000-year (Figure 14) surface water flood events. Thus, the risk of pluvial flooding to the proposed extensions could be considered as very low.
- 4.23 Pensfolds Place, the main access road to the site, is shown to be affected by flooding in all assessed return periods. The potential flood depths in each modelled event are as follows:
- Flood depths of 0.15m to 0.30m in the 1:30-year event (see Figure 12);
 - Depths of 0.15m to 0.30m and between 0.30m and 0.60m in some places, in the 1:100-year event (see Figure 13);
 - In the 1:1,000-year event, flood depths could reach between 0.30m and 0.60m at the entrance to the site (see Figure 14).
- 4.24 Given the pluvial flood risk to Pensfolds Place, site users should stay on site during an extreme rainfall event. Access and egress routes to and from the site could be affected by flooding.

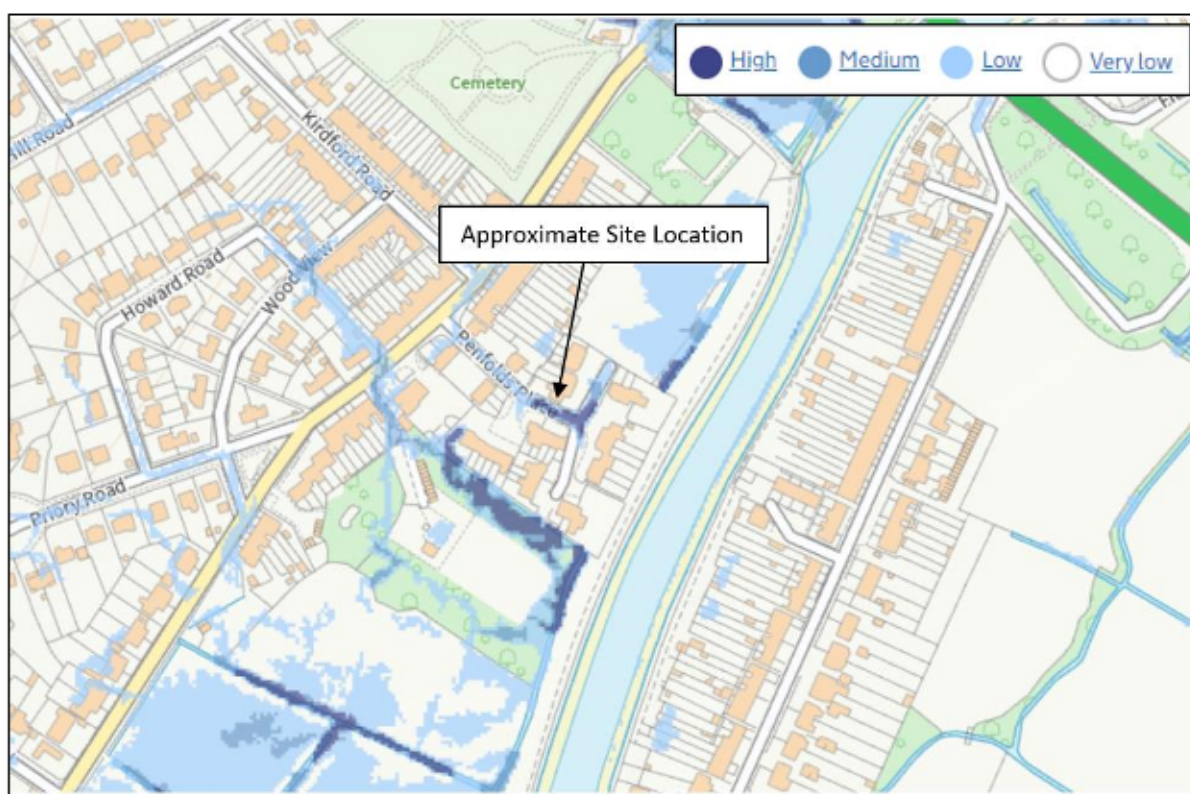


Figure 11: EA Surface Water Flood Risk Map, showing location of site (Source: EA)

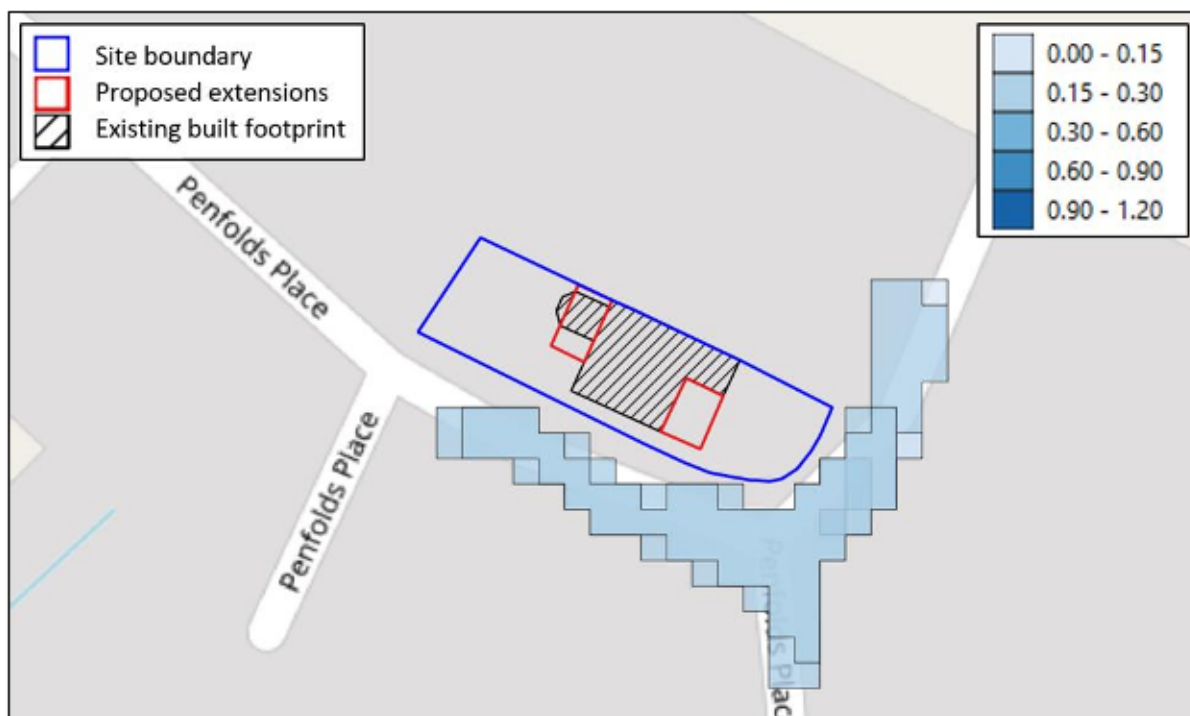


Figure 12: EA modelled 1 in 30-year surface water flood depths and site layout (Source: EA; plans from client)

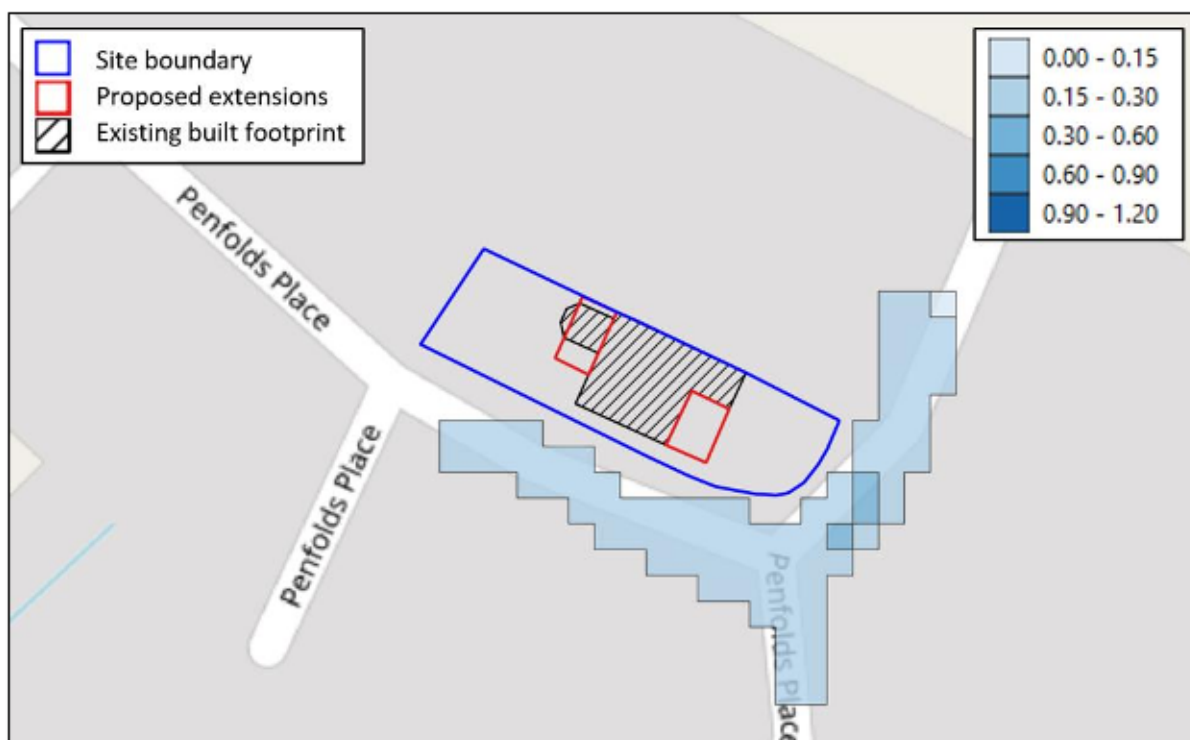


Figure 13: EA modelled 1 in 100-year surface water flood depths and site layout (Source: EA; plans from client)

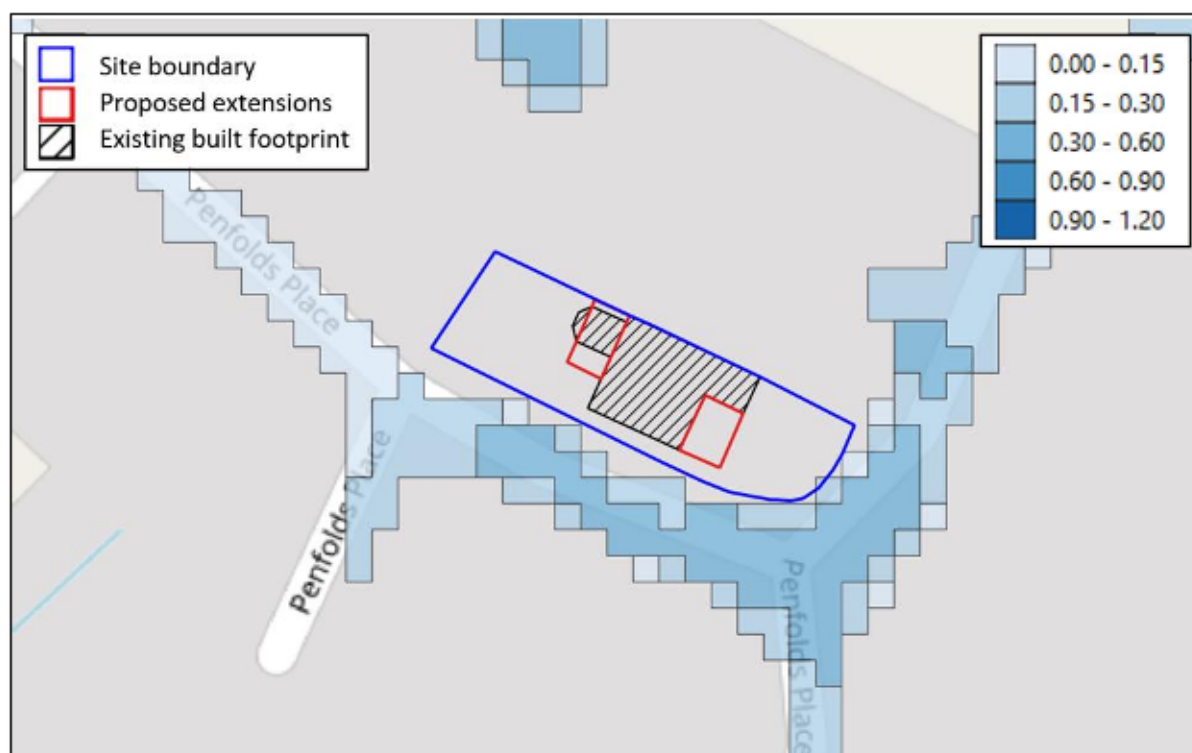


Figure 14: EA modelled 1 in 1,000-year surface water flood depths and site layout (Source: EA; plans from client)

Groundwater

- 4.25 Groundwater flooding usually occurs in low lying areas underlain by permeable rock and aquifers that allow groundwater to rise to the surface through the permeable subsoil following long periods of wet weather. Low lying areas may be more susceptible to groundwater flooding because the water table is usually at a much shallower depth and groundwater paths tend to travel from high to low ground.
- 4.26 The BGS Groundwater Susceptibility mapping (Figure 15) indicates that the site is in an area with 'Potential for groundwater flooding to occur at surface'. As such, the risk of flooding from groundwater emergence to the proposed extension could be considered high.
- 4.27 Ambiental have reviewed borehole record data provided on the BGS website. A borehole record (BGS Reference: TQ00NW88) located 290m north-east of the site demonstrated that groundwater was encountered at 1.30m below ground level. The ground level at this location was recorded as 2.30mAOD. In comparison, the topographic levels within the site boundary are between 2.8mAOD and 3.4mAOD, which is a maximum of 0.5m higher than the ground level at the borehole location.
- 4.28 This provides evidence that the groundwater level in this area is high. As such, if groundwater is encountered during the construction phase of the proposed extensions, construction works should immediately be halted and the developer should seek advice from contractors. Works should only continue when it is safe to do so.
- 4.29 The proposed extensions should be constructed with flood resilience measures, to prevent the ingress of groundwaters into the buildings. These recommended measures are detailed in Section 7 of the report.

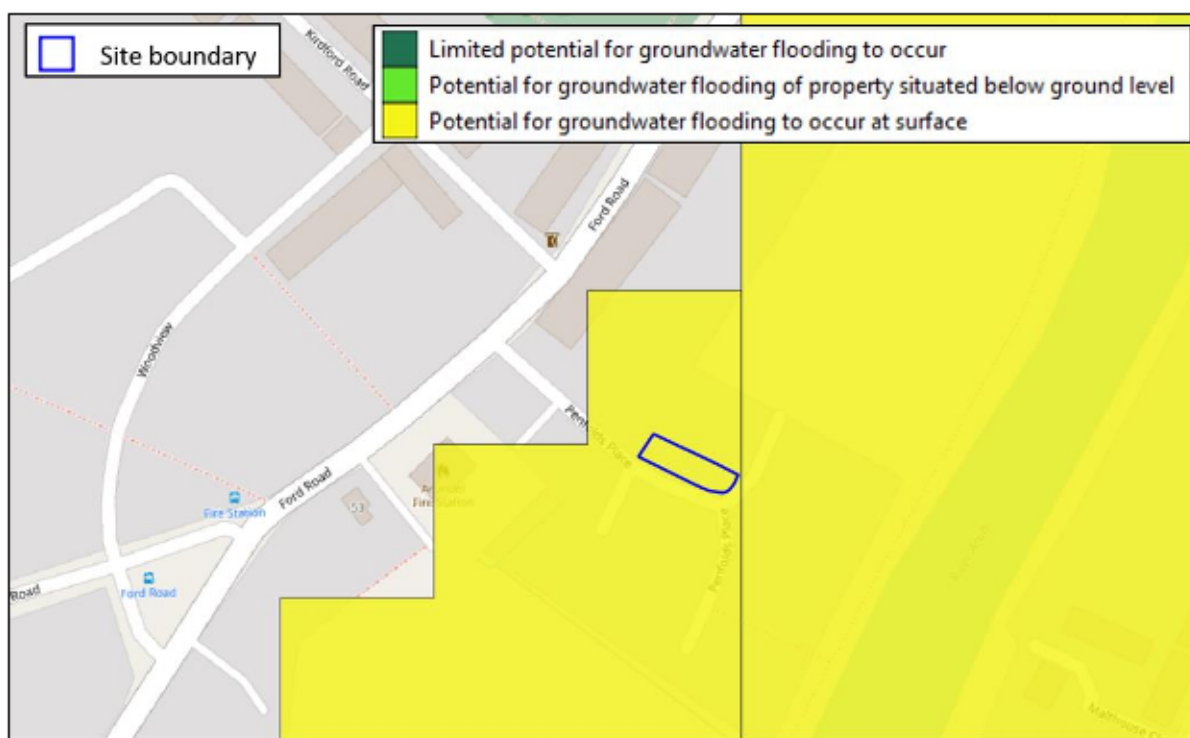


Figure 15: BGS Susceptibility to Groundwater Emergence, indicating location of site (Source: BGS)

Sewer

4.30 The Arun District Council Strategic Flood Risk Assessment, completed in 2016, states that there were a total of 315 recorded flood incidents in the district, according to data provided by Southern Water. These records are shown in Figure 16 below, according to postcode areas. The postcode area where the site is located is BN18 9 and is shown to have 8 recorded flood incidents. There is no information on the location of these incidents, so it is not known whether the site has been affected by sewer flooding in the past.

Post Code	Recorded Flood Incidents	Post Code	Recorded Flood Incidents
BN12 5	10	PO20 3	11
BN12 6	1	PO21 1	2
BN16 1	14	PO21 2	8
BN16 2	13	PO21 3	30
BN16 3	4	PO21 4	20
BN16 4	2	PO21 5	22
BN17 5	22	PO22 0	15
BN17 6	3	PO22 6	27
BN17 7	7	PO22 7	36
BN18 0	20	PO22 8	12
BN18 9	8	PO22 9	28
Total: 315			
Note: Based on information exported on 25/02/16			

Figure 16: Recorded sewer flood incidents in Arun District, according to SFRA

Surface Water Drainage Strategy

- 4.31 Any additional surface water runoff generated as a result of the proposed extension should be discharged via the existing drainage infrastructure of the house.

Records of Historical Flooding

- 4.32 According to the EA's historic flood records, the site does not lie within a flood extent. This is shown in Figure 18.



Figure 18: Historic Flood Map, indicating location of site by red crosshairs (Source: EA)

5. Probability of Flooding

Flood Zones

- 5.1 According to the EA Flood Map for Planning, the site is located within Flood Zones 1, 2 and 3 (low, medium and high risk of flooding).
- 5.2 The EA Flood Map for Planning has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; **the mitigating effects of any flood defences currently in place are not considered.** For reference, the definition of the NPPF flood risk zones is included below.

Zone	Description
1	Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium Probability. This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	High Probability. This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
3b	The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Table 4 Definition of the NPPF Flood Zones. (Source: EA)

Climate Change on Site

- 5.3 Climate change is likely to increase the flow in rivers, raise sea levels and increase storm intensity. The range of allowances in *Table 5* is based on percentiles. A percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flows fall below it and half fall above it.
- 5.4 The:
- central allowance is based on the 50th percentile
 - higher central is based on the 70th percentile
 - upper end is based on the 90th percentile
- 5.5 So, if the central allowance is 30%, scientific evidence suggests that it is just as likely that the increase in peak river flow will be more than 30% as less than 30%.
- 5.6 At the higher central allowance, 70% of the possible scenarios fall below this value. So, if the higher allowance is 40%, then current scientific evidence suggests that there is a 70% chance that peak flows will increase by less than this value, but there remains a 30% chance that peak flows will increase by more (Source: EA).

- 5.7 The risk of flooding to the site would, therefore, be expected to increase following the effects of climate change. The likely increases in peak rainfall intensity would also lead to an increased risk of surface water flooding.

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	Central	Central	Central	Central	None
2	Upper End	Higher Central and Upper End	Higher Central and Upper End	Central and Higher Central	Central
3a	Upper End	Development should not be permitted	Higher Central and Upper End	Central and Higher Central	Central
3b	Upper End	Development should not be permitted	Development should not be permitted	Development should not be permitted	Central

Table 5: Allowance and Flood Zone Table (Source EA)

- 5.8 The proposed extension is 'More Vulnerable' (residential) and is located within Flood Zones 1, 2 and 3.
- 5.9 With reference to Table 5, 'More Vulnerable' developments in Flood Zones 2 and 3 should consider the 'Higher Central' and 'Upper End' allowances.
- 5.10 The Environment Agency have provided Ambiental with site-specific modelled flood data for both fluvial and tidal flood risk. This includes modelled flood outlines for the climate change scenarios. These are discussed in Section 4. It is considered that the data provided by the EA is the most current and up-to-date available, at the time of writing.
- 5.11 In summary, the site is shown to be unaffected by fluvial flooding in the 1:100-year plus climate change scenario (defended); however, the site could be affected by flooding in the tidal (defended) 1:200-year (2110) event. The EA data indicates that a flood level of 4.0mAOD could affect the site, which could result in flood depths of between 0.6m and 1.2m when compared against existing topographic levels on site (2.8mAOD to 3.4mAOD according to EA 2m DTM LiDAR data).
- 5.12 The ground floor Finished Floor Levels of the proposed extensions will be set no lower than those of the existing residential dwelling. Also, the plans of the proposed development indicate that there will be no sleeping accommodation provided at the ground floor level post-development.
- 5.13 Given that the proposal is for a minor development to the existing residential dwelling, the risk of fluvial and tidal flooding to the site should not increase as a result of the development.

6. Residual Risks

Identification of Residual Risks

6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- failure of a reservoir, or;
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

Defence Breach

6.2 The site is not located in an area which benefits from formal flood defences. Therefore, there is no residual risk of flooding to the site from breach or overtopping of flood defences.

Reservoir Failure

6.3 The online EA Risk from Reservoir Flooding Map (Figure 20) demonstrates that the site is outside flood extents in the event of reservoir flooding.



Figure 20: EA Reservoir Flood Risk map, showing location of site (Source: EA)

Drainage Exceedance

- 6.4 In the event of drainage failure/exceedance, overland flows would be dictated by external topography. The site topography slopes downwards towards the south. Given that the proposed extension will be raised to the same level as the existing dwelling on site, it is considered that the residual risk of flooding from drainage exceedance would be low.

7. Flood Risk Management Measures

Flood Risks

- 7.1 There is an existing residential dwelling on site. It is understood that the development is for the construction of a single-storey rear and two-storey front extension to provide greater habitable space to the existing dwelling.
- 7.2 The site is in Flood Zone 1, 2 and 3 according to the EA Flood Map for Planning (Figure 4), so is in an area of low, medium and high risk of flooding. The River Arun, an EA Main River, is located approximately 60m south-east of the site boundary.
- 7.3 Site-specific flood levels provided by the EA indicate that the site should be unaffected by flooding in the modelled 1:20-year, 1:100-year, 1:100-year +CC and 1:1,000-year fluvial (defended) flood events. Thus, the site and proposed extensions could be considered to be at low risk of fluvial flooding.
- 7.4 In terms of tidal flood risk, the site is shown to be unaffected by flooding in the modelled 1:20-year, 1:200-year and 1:1,000-year tidal (defended) flood events. However, the site could be affected by flooding in the modelled 1:200-year climate change (2110 epoch) flood event. The modelled flood level that could affect the site in this event is 4.0mAOD, which could result in flood depths of 0.6m to 1.2m.
- 7.5 The report demonstrates that the risk of flooding from surface water sources to the proposed extension is very low; the site is identified to be within an area with '*Potential for groundwater flooding to occur at surface*'; properties in the local area have been affected by sewer flooding in the past, but there is no indication that the site itself has been affected by sewer flooding.
- 7.6 The proposal is for a 'Minor Development' under the NPPF, as it is for an extension to the existing residential dwelling and will not create a separate dwelling on site.
- 7.7 To mitigate against potential flood risk, the proposed extension should incorporate flood resilience measures in line with current best practice for construction within an area at risk of flooding in line with CLG 2007 'Improving the Flood Performance of New Buildings. These measures are detailed below:
- Damp proof membranes should be included within the design of the dwelling to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping. Effective methods of joining membrane sections are overlaps of 300mm, and also taping (mastic tape with an overlap of 50mm minimum). Care should be taken not to stretch the membrane in order to retain a waterproof layer.
 - Cavity insulation should preferably incorporate rigid closed cell materials as these retain integrity and have low moisture take-up. Other common types, such as mineral fibre, are not generally recommended as they can remain wet several months after exposure to flood water which slows down the wall drying process. Blown-in insulation can slump due to excessive moisture uptake, and some types can retain high levels of moisture for long periods of time (under natural drying conditions).
 - Avoid standard gypsum plasterboard as it tends to disintegrate when immersed in water.
 - Any new electrical sockets should be installed above flood level (0.3m) for ground floors to minimise damage to electrical services and allow speedy re-occupation.
 - Windows and patio doors are vulnerable to flood water and similar measures to those used for doors should be taken. Special care should be taken to ensure adequate sealing of any PVC

window/door sills to the fabric of the house. Of concern would be excessive water pressure on the glazing of patio doors. Double glazing conforming to the relevant standards would, in principle, adequately resist the pressures generated by flood waters.

- Any new sewer connections should be fitted with non-return valves to prevent back-flow and provide mitigation against potential sewer flooding.

7.8 It is also recommended that residents sign up to the EA Flood Warning Service if they have not done so already.

7.9 The following mitigation measures are recommended for the proposed extensions:

- First-floor FFLs of residential dwelling should be raised to no lower than 6.01mAOD, which is 600mm above the calculated 1:200 year +CC (Upper End) undefended flood level of 5.41mAOD;
 - Internal access should be maintained from the ground floor to the first and second floor, to allow for emergency safe refuge on site.
- Construction:
 - Sleeping accommodation to be confined to the first and second floor.
 - Flood resilient measures such as airbrick covers to be installed.
 - Ground floor to be of solid construction, with waterproof membrane (where possible).
 - Damp proof membranes should be included within the design of the dwelling, to minimise the passage of water through ground floors. Impermeable polythene membranes should be at least 1200 gauge to minimise ripping. Effective methods of joining membrane sections are overlaps of 300mm, and also taping (mastic tape with an overlap of 50mm minimum). Care should be taken not to stretch the membrane in order to retain a waterproof layer.
 - All floors to be finished with waterproof screed (where possible).
 - Wall cavities to be filled with closed-cell foam throughout.
 - Ground floor internal render to be waterproof.
 - Utilise waterproof seals on the doors/windows of the new building, to minimise flood water ingress during a flood event.
 - External walls to be resistant to flooding up to first floor level.
 - Exterior ventilation outlets, utility points and air bricks to be fitted with removable waterproof covers.
- Electrical connection:
 - Ground floor electrical main ring to be run from first floor level and on separately switched circuit from first floor (where possible).
 - Electrical incomer and meter to be situated at first floor level.
- Gas / water supply:

- Boilers, control and water storage / immersion to be installed at first floor level (where possible).
- Gas meter to be installed at first floor level (where possible).
- All plumbing insulation to be of closed-cell design.
- Drainage:
 - Non-return valves to be fitted to all drain and sewer outlets.
 - Manhole covers to be secured.
 - Anti-syphon fitted to all toilets.
- Interior fittings:
 - Kitchen units to be of solid, water resistant material.
 - Units to be raised on legs above plinth.
 - Use of MDF carpentry (i.e. skirting, architrave, built-in storage) to be avoided at ground floor level.
- Site owners/ staff/ management/residents will be required to sign up to the EA Flood Warning Service.

Flood Warning Service

- 7.10 It is recommended that residents are aware of the EA Flood Information service which identifies whether any flood warnings or alerts have been issued for a specific postcode or place in England or Wales: <https://flood-warning-information.service.gov.uk/>.
- 7.11 During periods of bad weather, site users should monitor local weather reports and sign up for the Met Office UK weather warnings. Warnings can be monitored through an Apple/Android app, Twitter or directly via emails. Further information can be found at <https://www.metoffice.gov.uk/>.
- 7.12 The EA operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. Further information can be found on www.environment-agency.gov.uk/floodline. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.
- 7.13 The proposed development site is located within an EA Flood Warning Service Area. As such, it is recommended that site users sign up to this service, if they have not done so already.
- 7.14 Upon receipt of a Flood Warning, site users are advised to evacuate the site to a designated place of safe refuge within Flood Zone 1. Given that the proposal is for an extension to the existing property, it is recommended that residents follow the same evacuation route used for the current site.
- 7.15 If flood waters along the proposed evacuation route have exceed 25cm, site users are advised if possible, to seek refuge at the upper floors on site.

What to do if you receive a Flood Alert

7.16 A flood alert means you need to prepare, flooding is possible. You should:

- check your flood risk - <https://flood-warning-information.service.gov.uk/long-term-flood-risk>
- sign up for flood warnings - <https://www.gov.uk/sign-up-for-flood-warnings>
- keep up to date with the latest situation - call Floodline on 0345 988 1188 or follow @EnvAgency and #floodaware on Twitter for the latest flood updates
- have a bag ready with vital items like insurance documents and medications in case you need to leave your home
- check you know how to turn off your gas, electricity and water mains supplies
- plan how you'll move family and pets to safety



What to do if you receive a Flood Warning

7.17 A flood warning means you need to act, flooding is expected. You should do all the actions for a flood alert but also:

- move vehicles to higher ground if it's safe to do so
- move family and pets to safety
- move important items upstairs or to a safe place in your property, starting with cherished items and valuables, then furniture and furnishings
- turn off gas, electricity and water supplies if it's safe to do so; never touch an electrical switch if you're standing in water
- if you have property protection products such as flood barriers, or air brick covers, use them now
- keep track of the latest situation - <https://flood-warning-information.service.gov.uk/warnings>



What to do if you receive a Severe Flood Warning

7.18 A severe flood warning means there is danger to life: you must act now:

- call 999 if you're in immediate danger
- follow advice from the emergency services and evacuate if you're told to do so
- make sure you have an emergency kit including a torch, spare batteries, mobile phone and charger, warm clothes, important numbers like your home insurance, water, food, first aid kit and any medicines and baby care items you may need
- alert neighbours and offer help if it's safe to do so
- avoid driving or walking through flood water: just 30cm (1 foot) of fast flowing water could move your car and even shallow moving water can knock you off your feet
- keep your family and pets away from floodwater – it may contain heavy debris, sharp objects, open manhole covers, sewage and chemicals
- wash your hands if you've been in contact with flood water which may contain toxic substances



Flood Evacuation Plan

- 7.19 In the event of an extreme flood, site users and residents should follow the same evacuation route as that implemented for the existing dwelling.
- 7.20 Ambiental have used the EA Flood Zone extents for this area to identify a safe evacuation route from the site to an area of Flood Zone 1. This is shown in Figure 21 below. It is recommended that site users leave the site and turn right onto Penfolds Place (westwards). Site users should continue to the end of this road and turn right onto Ford Road. From here, they should continue along Ford Road until reaching the roundabout and take the first exit onto the A27. At this point, evacuees will be in an area of Flood Zone 1 and could travel to a place of safe refuge at low flood risk.
- 7.21 In the event of an extreme fluvial flood event, prior evacuation from the site should be sought, if directed to do so by 'Blue Lights Responders' and emergency services.
- 7.22 If flood depths along the recommended evacuation route have already exceeded 25cm, evacuees should seek refuge at the upper floors of the existing dwelling.

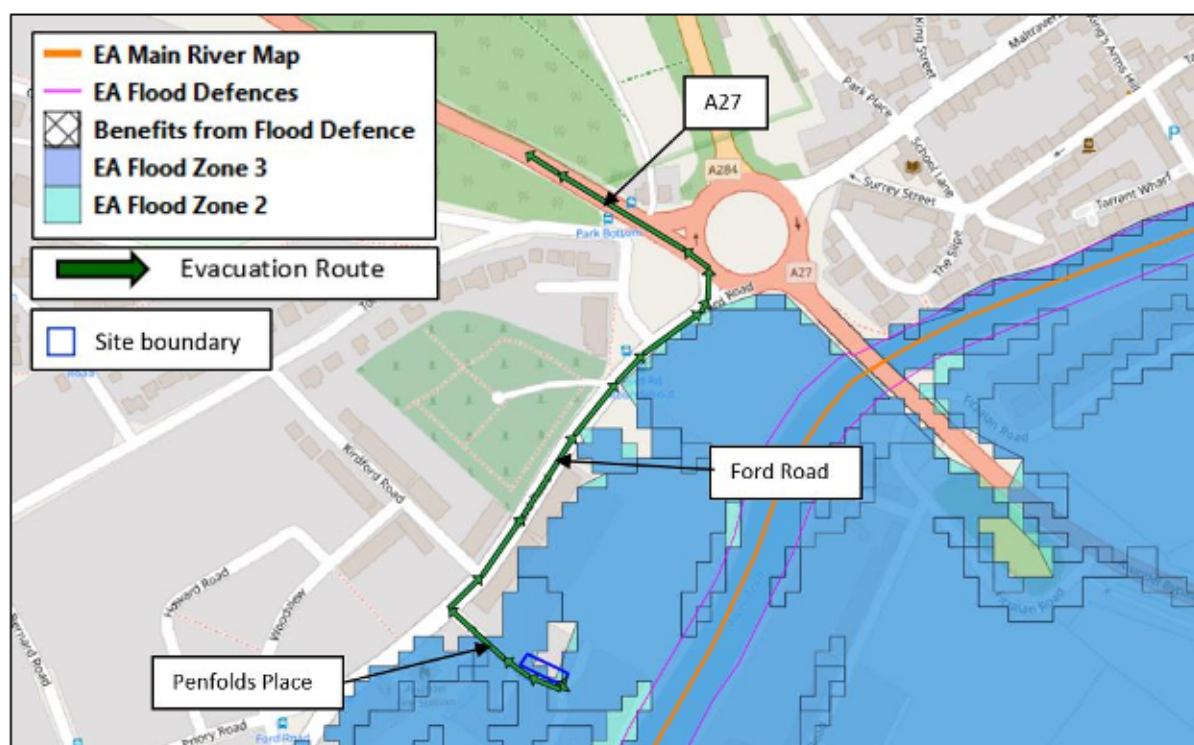


Figure 21: Recommended potential evacuation route from site to place of safe refuge in Flood Zone 1 (Source: EA)

8. Off Site Impacts

Impact to Flood Risk Elsewhere

- 8.1 The proposed development is for a minor extension to the existing property and is considered a 'Minor Development' under the NPPF.
- 8.2 Paragraph 047 of the Flood Risks and Coastal Change Planning Policy Guidance states the following, with regards to the impact of minor developments on flood risk:

Minor developments are unlikely to raise significant flood risk issues unless:

- *they would have an adverse effect on a watercourse, floodplain or its flood defences;*
- *they would impede access to flood defence and management facilities, or;*
- *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.*

- 8.3 As such, it is considered that the construction of the proposed extension should not have a significant impact on flood risk to the site, when compared to the existing situation.

Generation of Runoff

- 8.4 Any additional surface water runoff generated as a result of the proposed extension should be discharged via the existing drainage infrastructure of the house.

9. Conclusion

- 9.1 Ambiental Environmental Assessment has been appointed by John and Catherine Bradley to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at 4 Pensfolds Place, Arundel, West Sussex, BN18 9SA.
- 9.2 There is an existing residential dwelling on site. It is understood that the development is for the construction of a single-storey rear and two-storey front extension to provide greater habitable space to the existing dwelling.
- 9.3 The proposal is considered a 'Minor Development' under the NPPF as it is for a household development with a footprint of less than 250m², will have Finished Floor Levels no lower than those of the existing building and will not result in a new residential unit on site.
- 9.4 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zones 1,2 and 3. The proposed development is an extension of the existing residential dwelling, which is considered "More Vulnerable" under the NPPF. As such, the flood risk vulnerability will remain the same post-development.
- 9.5 A summary of flood risk is provided in the table below:

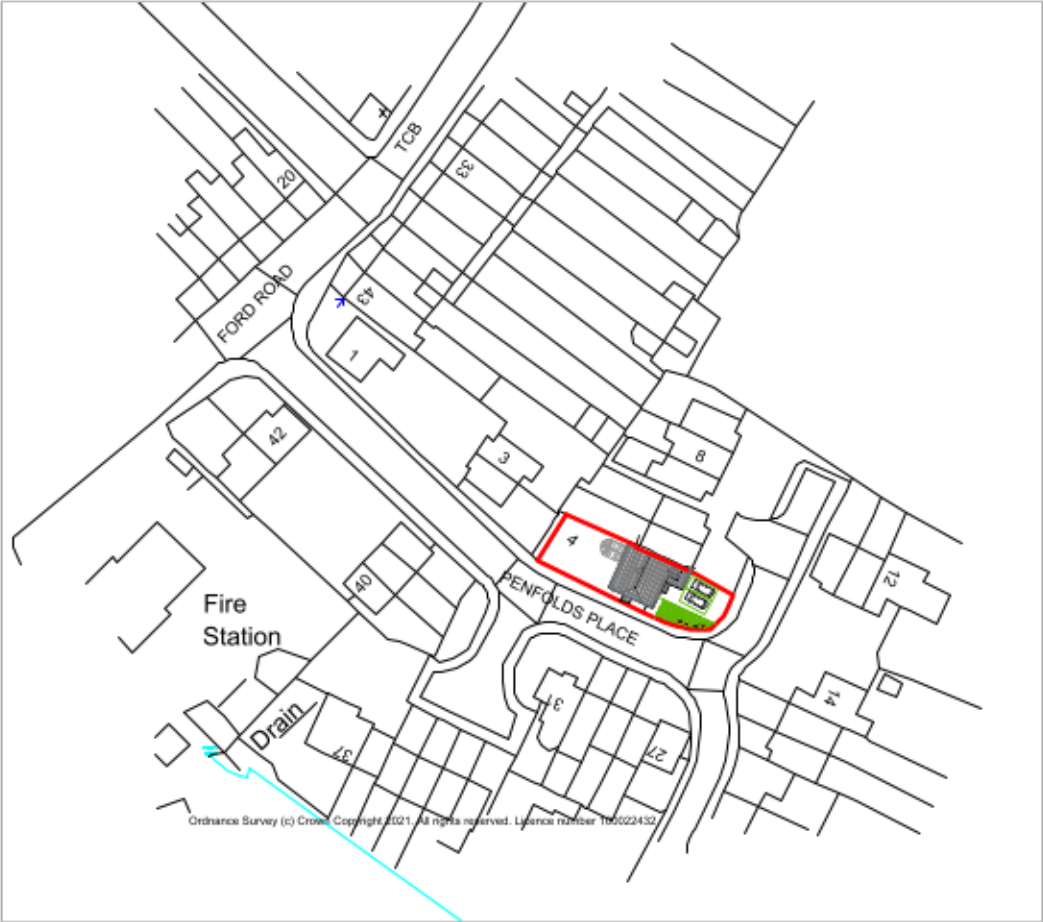
Source	Summary of flood risk	Recommended flood resilience and mitigation measures
Fluvial	The site is in Flood Zone 1, 2 and 3, according to the EA's online Flood Map for Planning. Ambiental received site-specific modelled flood outputs from the Environment Agency, for fluvial and tidal flood risk. The site is not affected by the modelled 1:20-year, 1:100-year, 1:1,000-year and 1:100-year +CC fluvial defended flood events. Access to the site is affected by flooding in the 1:20-year fluvial defended event. The risk of fluvial flooding to the site is considered low.	Site users should sign up to the EA Flood Warning Service, if they haven't done so already.
Tidal	The EA flood data shows that the site boundary is unaffected by flooding in the 1:20-year, 1:200-year and 1:1,000-year events. However, the site lies within the 1:200-year (2110) flood extent. Pensfolds Place is also affected by flooding in the 1:200-year (2110) flood event.	Site users should sign up to the EA Flood Warning Service, if they haven't done so already.
Surface	The EA Long-Term Surface Water Flood Risk map shows the main access road to the site, Pensfolds Place, is at high risk of surface water flooding. This could affect access/egress routes to and from the site. The site itself is at very low risk of pluvial flooding.	Site users should be informed on potential flood risks to area, if not already.

Groundwater	The British Geological Survey Susceptibility to Groundwater Flooding dataset indicates that the site is in an area identified as ' <i>Potential for groundwater flooding to occur at surface</i> '. This is considered to be high risk.	Recommended mitigation measures to prevent potential ingress of groundwater into proposed extensions.
Sewer	Based on records of sewer flooding incidences provided in the Arun District Council SFRA, the local area has been affected by sewer flooding in the past. There is no indication that the site itself has been affected by sewer flooding in the past.	Non-return valves to be fitted.

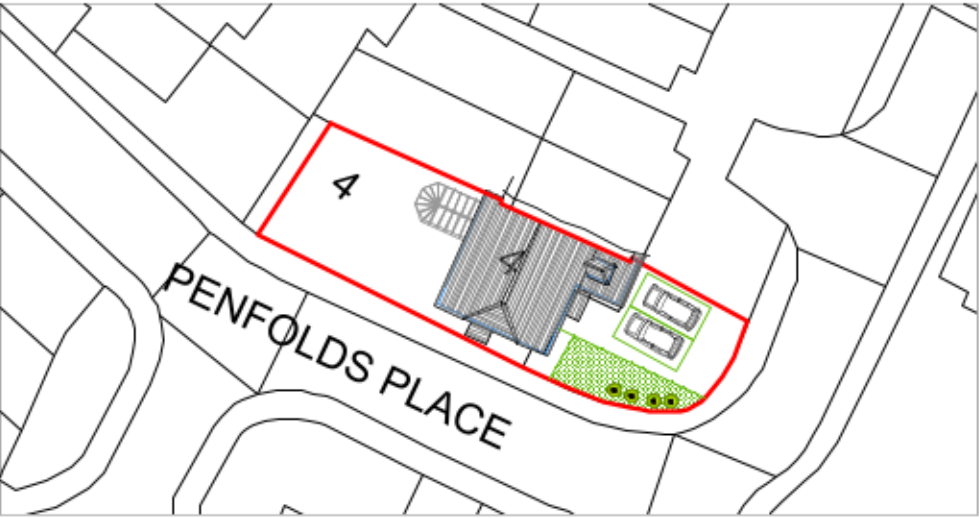
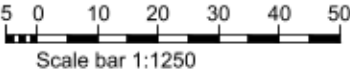
- 9.6 To mitigate against potential flood risk, the proposed extension should incorporate flood resilience measures in line with current best practice for construction within an area at risk of flooding, CLG 2007 'Improving the Flood Performance of New Buildings. These measures are detailed in Section 7 of the report.
- 9.7 Finished Floor Levels of the extensions will be set no lower than existing ground levels of the residential dwelling, in line with the EA Standing Advice for Minor Developments.
- 9.8 It is also recommended that residents sign up to the EA Flood Warning Service, if they have not done so already.
- 9.9 In summary:
- The proposed development is for a 'Minor Development' and extensions to the existing residential dwelling on site;
 - The site is in Flood Zone 1, 2 and 3, according to the EA Flood Map for Planning;
 - Access to the site via Pensfolds Place is at high risk of flooding from fluvial and pluvial sources. Thus, residents should sign up to the EA Flood Warning Service and be informed of flood risk, if they are not already;
 - The proposed extension should incorporate flood resilience measures, in line with current best practice for construction of buildings in high flood risk areas;
 - Finished Floor Levels of the proposed extension will be set no lower than those of the existing dwelling, in line with the EA's Standing Advice for Minor Developments.

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

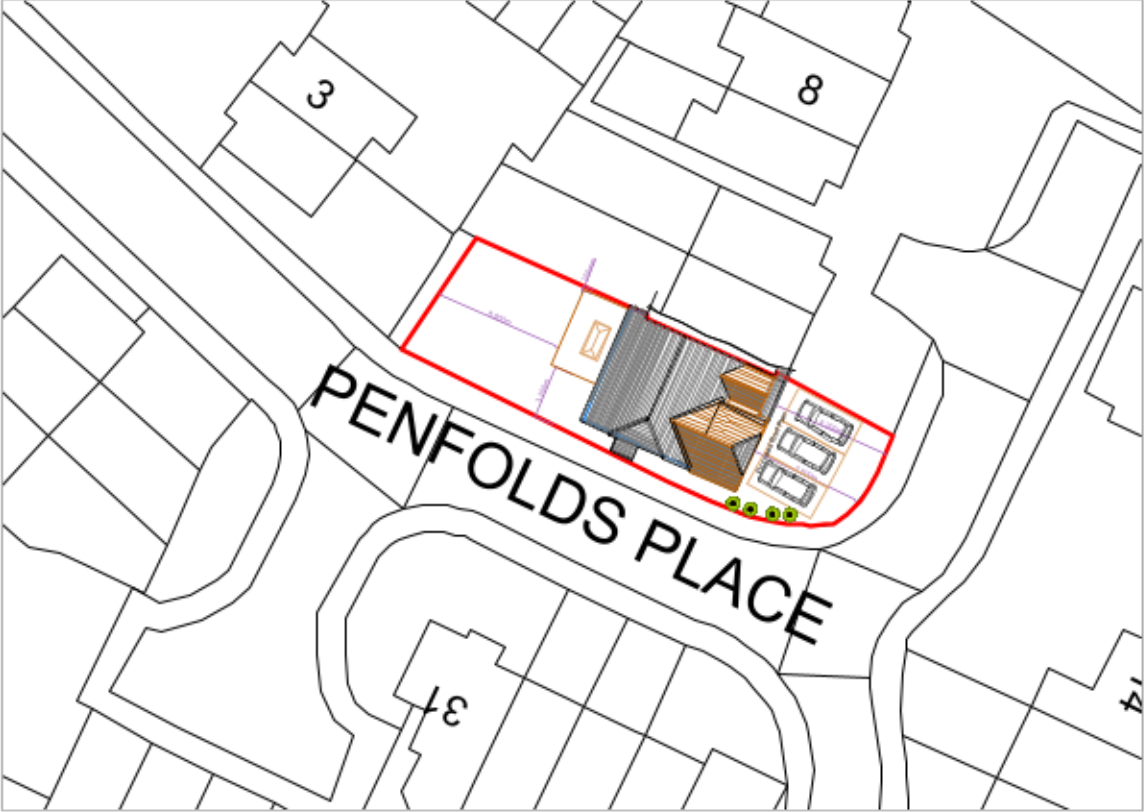
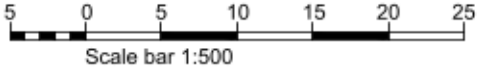
Appendix I - Site Plans



Location Plan



Existing Block



Proposed Block Plan

Dimensions & Scales
Do not scale off this drawing unless for Local Authority purposes. The Contractor is responsible for checking all levels, site dimensions etc. prior to ordering materials and starting work on any element.

Any discrepancies or anomalies should be brought to the attention of Caldotec Ltd prior to commencement of the works.

Rev.	Details	Date

Liz Galloway

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Issued for:
Discussion
Planning Application X
Building Control
Construction Issue
As Built

Location & Block Plan

Client
Site Address
4 Penfolds Place
Arundel
West Sussex
BN18 9SA

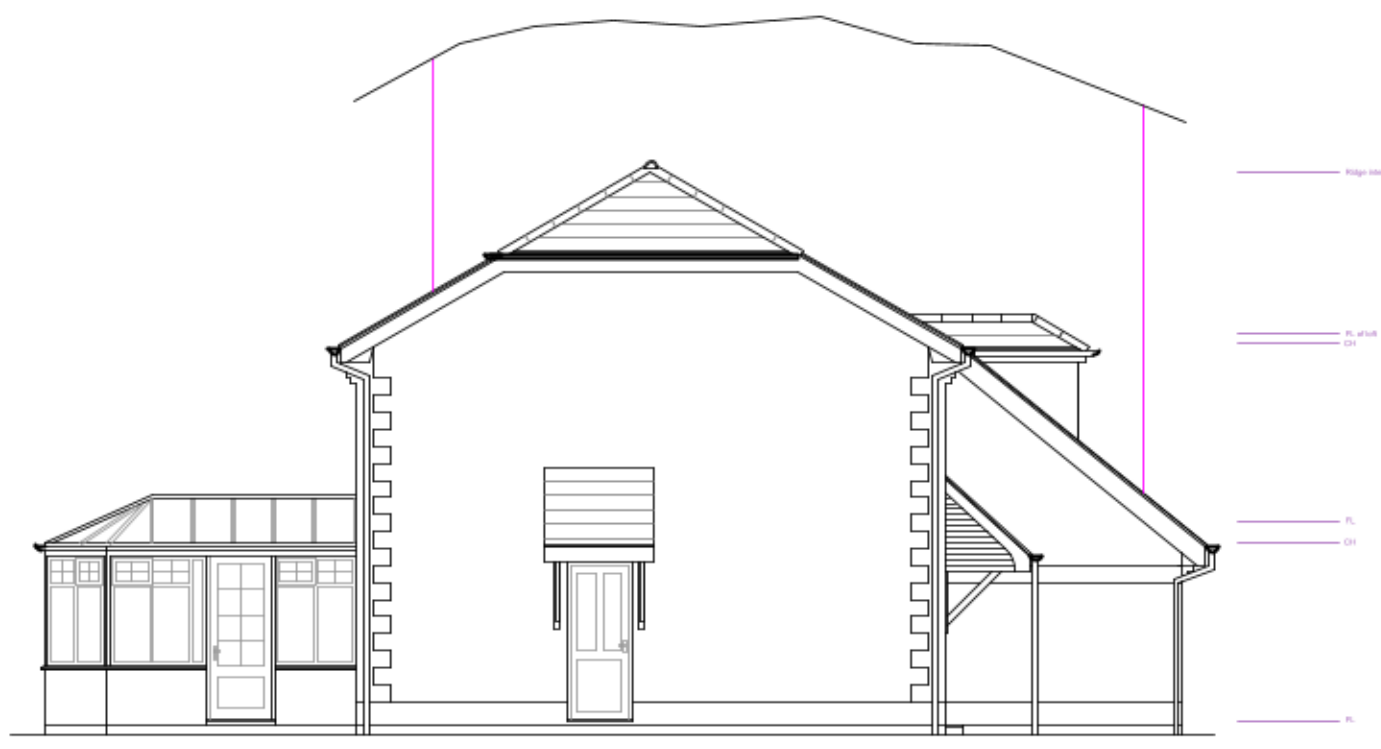
Bradley

Printed
Date
Drawing Number

As Shown on A3
<16/04/2021>
<20044/01a>



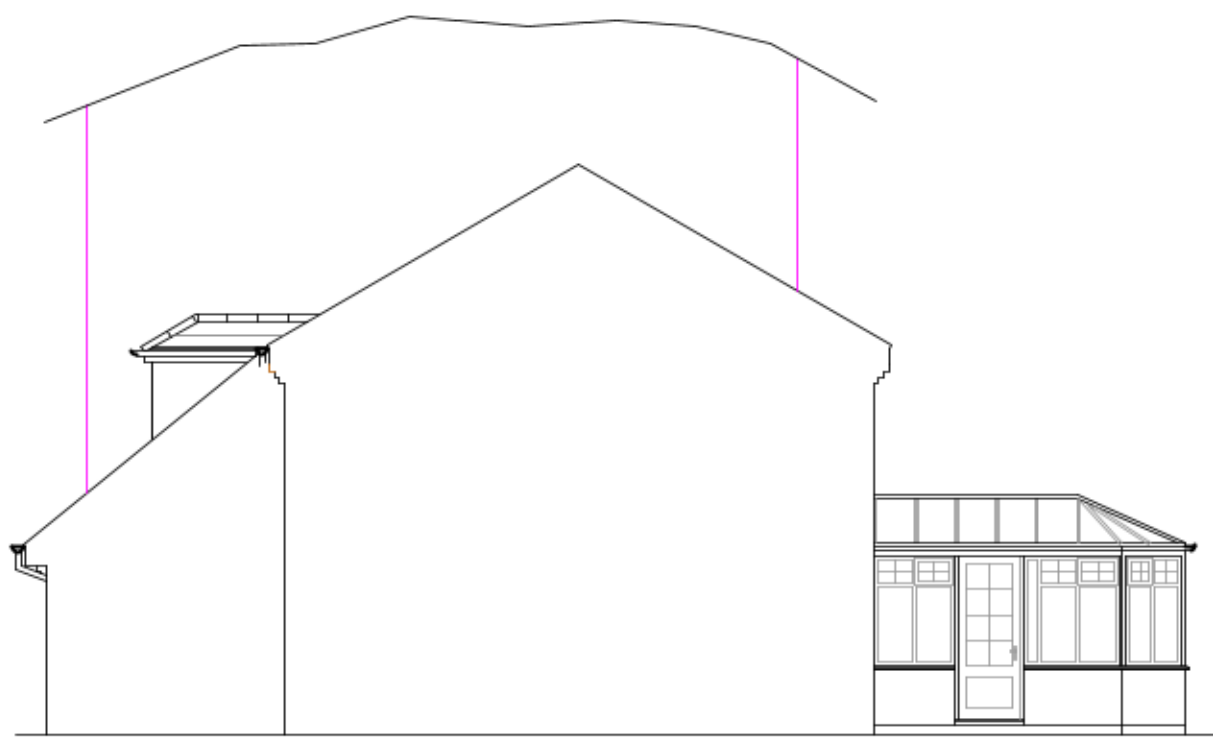
Existing Rear - West Elevation



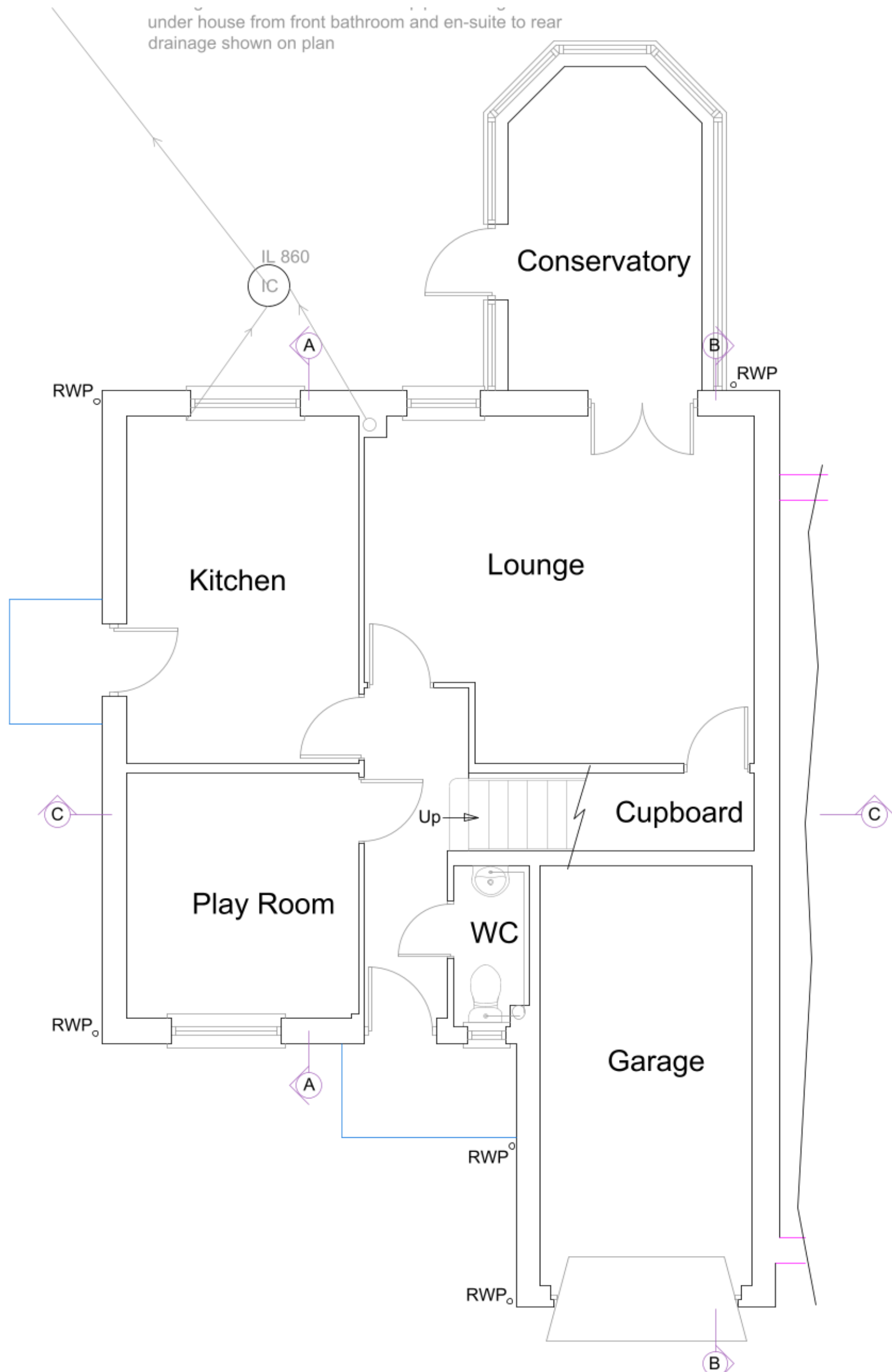
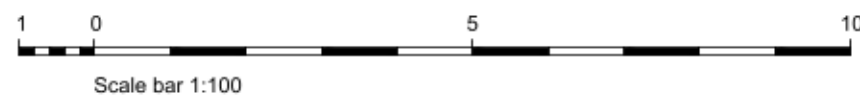
Existing Side - South Elevation



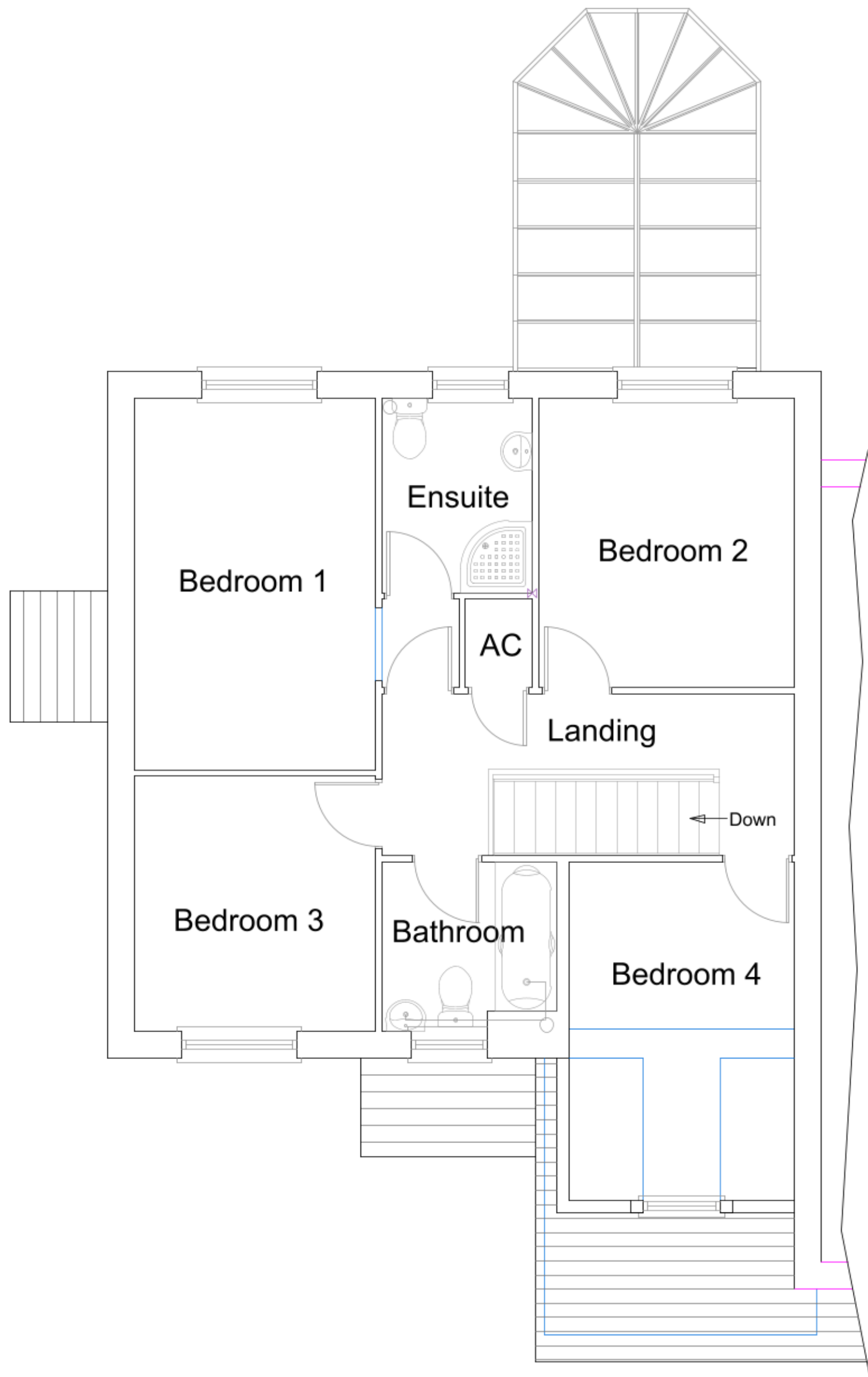
Existing Front - East Elevation



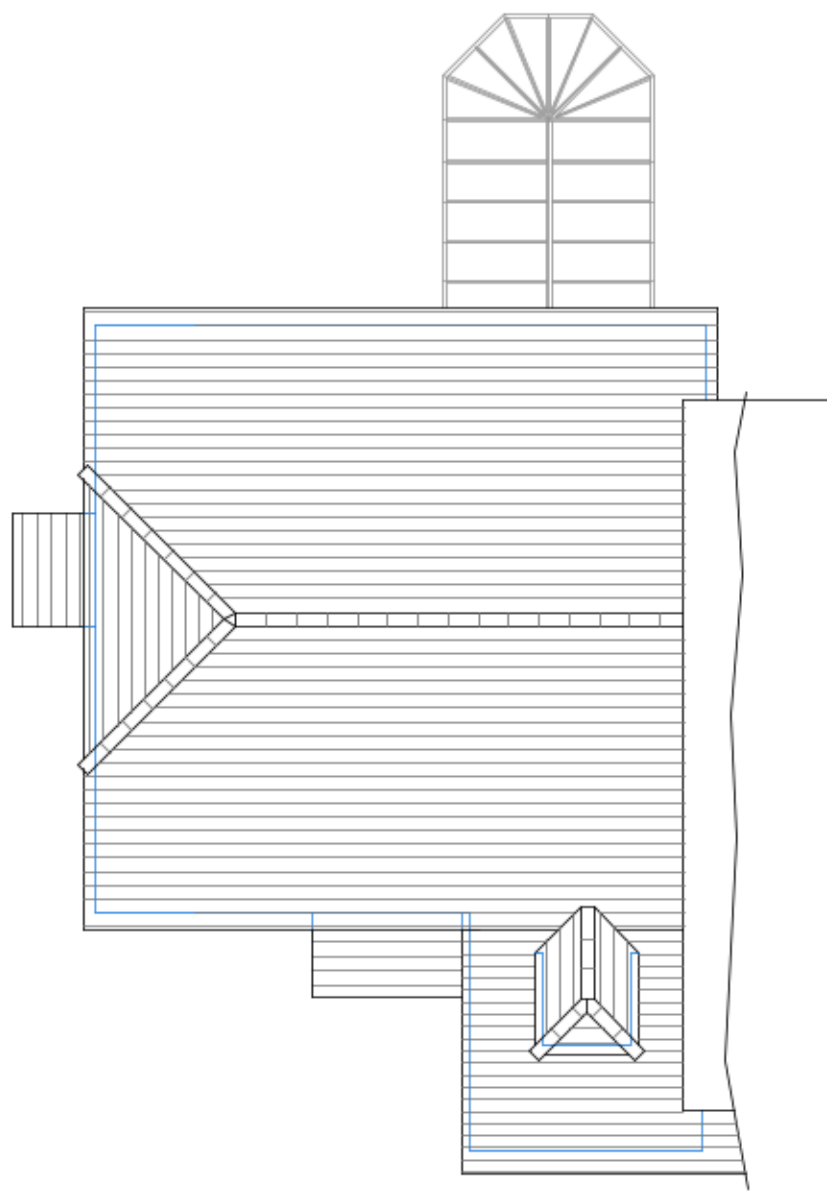
Existing Side - North Elevation



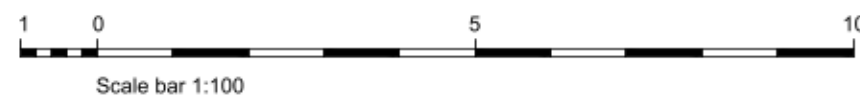
Existing Ground Floor Plan



Existing First Floor Plan



Existing Roof Plan



Existing Buildings and Boundaries
The Contractor is responsible for checking existing building and boundary dimensions prior to commencement of works.

Dimensions & Scales
Do not scale off this drawing unless for Local Authority purposes. The Contractor is responsible for checking all levels, site dimensions etc. prior to ordering materials and starting work on any element.

Any discrepancies or anomalies should be brought to the attention of Caldotec Ltd prior to commencement of the works.

Local Authority Approvals
Any work undertaken before all necessary Planning and Building Regulations Approvals are in place is done entirely at the Client's risk. Any conditions imposed on either Planning or Building Regulations Approvals must be discharged as prescribed on the Decision or Approval Notice. Discharge of Conditions is the responsibility of the Client.

Building Regulations Standards and Inspections
All work must be carried out in accordance with current Building Regulations and to the satisfaction of Building Control or Approved Inspector. The Client/Contractor is responsible for payment of the Inspection Charges to Building Control which will normally become payable upon commencement of works.

Southern Water Drainage Adoption
As of September 2011 Southern Water adopted certain drainage/sewers which were previously privately owned. In this case it may become necessary to obtain a licence from Southern Water to do the work. This would incur a licence fee payable to Southern Water.

Caldotec can advise as to whether this may affect your project, but it is the responsibility of the Client to ensure any necessary licences are obtained prior to construction work commencing. Client is responsible for the cost of any Southern Water drainage plans and licences.

Party Wall Act
It is the responsibility of the Client to ensure compliance with the requirements of the Party Wall Act 1996. A professional Party Wall Surveyor should be employed if further information or guidance is required.

Managing Agent/Landlord Consents
The Client is responsible for obtaining any permission/consent or agreement from Landlords, Estate Management as is necessary for the project. Caldotec Ltd can assist in facilitating, but any charges for such permission/consent or agreement is payable directly by the Client to the party imposing the charge.

Health & Safety
It is the responsibility of the Client to ensure compliance with the Construction (Design & Management) Regulations 2015. The Regulations impose obligations and responsibilities on Clients, Designers and Contractors. Additional responsibilities are imposed on those acting as Principal Designer, Principal Contractor, Designer and Contractor. Additional information regarding the obligations and responsibilities can be discussed with Caldotec Ltd or the Principal Designer.

Rev.	Details	Date

Liz Galloway
Design & Health & Safety
Consultancy

41 Willowhayne Avenue
East Preston
West Sussex
BN16 1PL

01903 859176
liz@galloway.co.uk

Issued for:
Discussion
Planning Application X
Building Control
Construction Issue
As Built

Existing Plans, Elevations & Roof
Plan

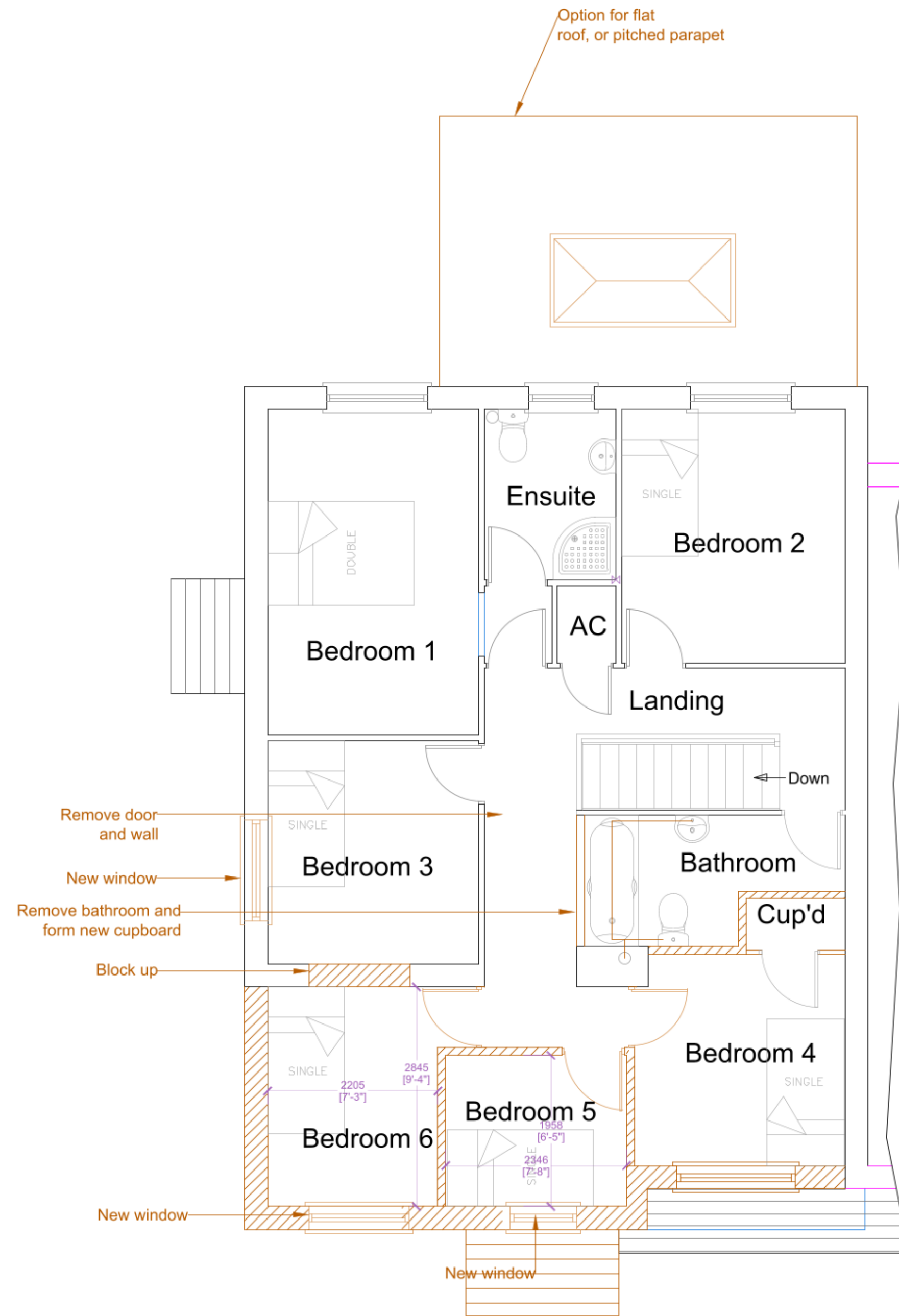
Client
Site Address
4 Penfolds Avenue
Arundel
West Sussex
BN18 9SA

Bradley

Printed
Date
Drawing Number

As Shown on A1
<26/02/2021>
20044/01>

- ### Health & Safety
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Proposed First Floor Plan

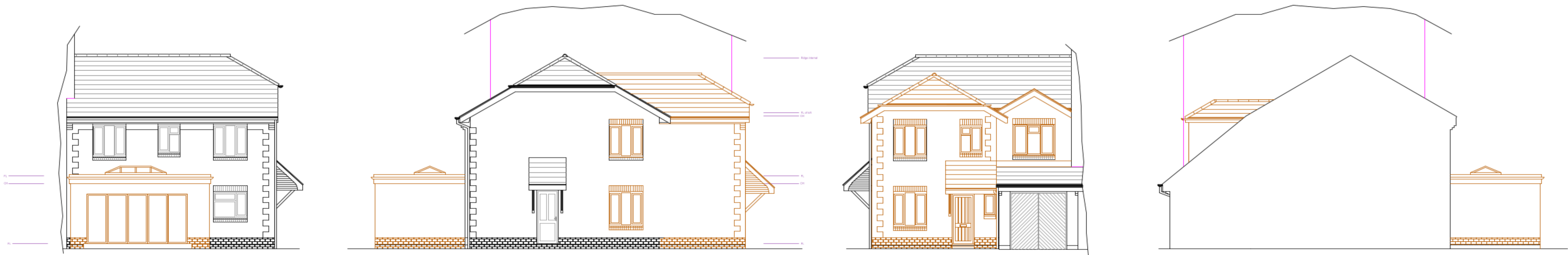
Liz Galloway
Design & Health & Safety
Consultancy

Issued for:
Discussion
Planning Application X
Building Control
Construction Issue
As Built

Proposed Floor Plans

Client Bradley
Site Address
4 Penfolds Place
Arundel
West Sussex
BN18 9SA

Printed	As Shown on A1
Date	07/07/21
Drawing Number	20044/02r1

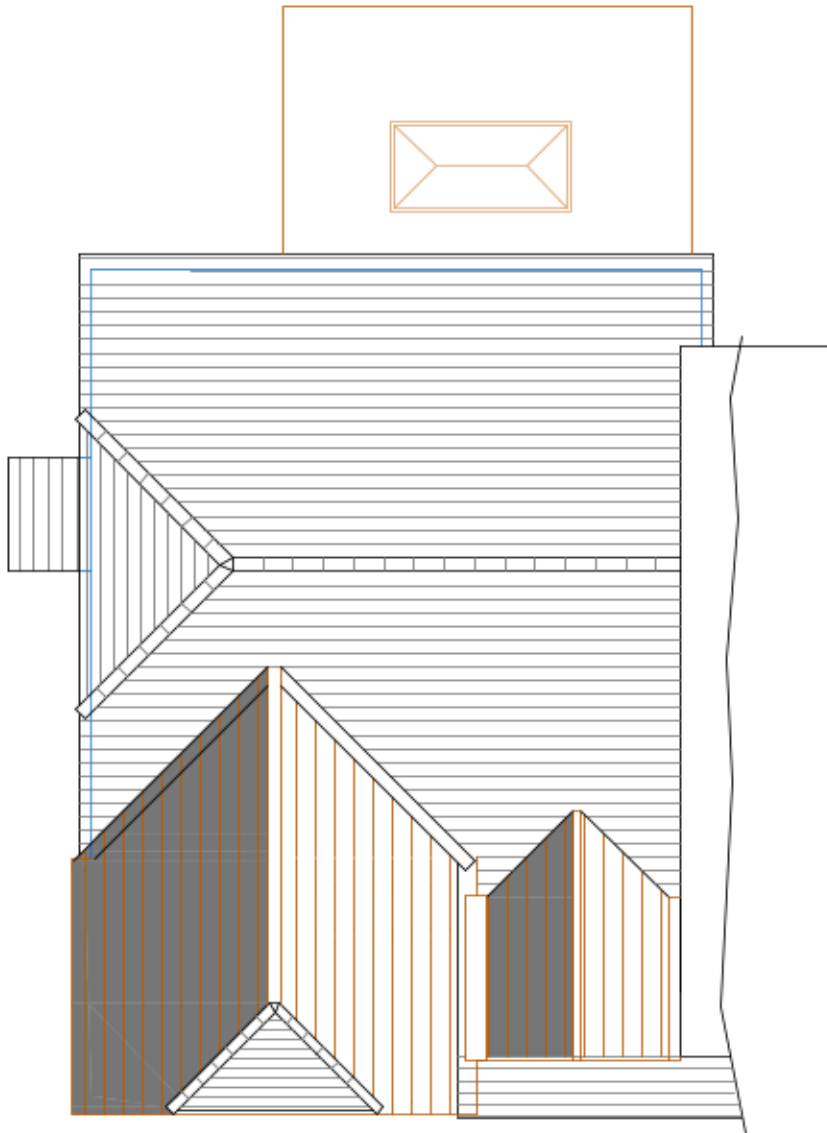


Proposed Rear - West Elevation

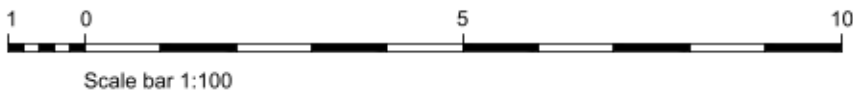
Proposed Side - South Elevation

Proposed Side - North Elevation

Proposed elevations 1:100 (showing removed conservatory in yellow)



Proposed Roof Plan



Existing Buildings and Boundaries
The Contractor is responsible for checking existing building and boundary dimensions prior to commencement of works.

Dimensions & Scales
Do not scale off this drawing unless for Local Authority purposes. The Contractor is responsible for checking all levels, site dimensions etc. prior to ordering materials and starting work on any element.

Any discrepancies or anomalies should be brought to the attention of Caldotec Ltd prior to commencement of the works.

Local Authority Approvals
Any work undertaken before all necessary Planning and Building Regulations Approvals are in place is done entirely at the Client's risk. Any conditions imposed on either Planning or Building Regulations Approvals must be discharged as prescribed on the Decision or Approval Notice. Discharge of Conditions is the responsibility of the Client.

Building Regulations Standards and Inspections
All work must be carried out in accordance with current Building Regulations and to the satisfaction of Building Control or Approved Inspector. The Client/Contractor is responsible for payment of the Inspection Charges to Building Control which will normally become payable upon commencement of works.

Southern Water Drainage Adoption
As of September 2011 Southern Water adopted certain drainage/sewers which were previously privately owned. In this case it may become necessary to obtain a licence from Southern Water to do the work. This would incur a licence fee payable to Southern Water.

Caldotec can advise as to whether this may affect your project, but it is the responsibility of the Client to ensure any necessary licences are obtained prior to construction work commencing. Client is responsible for the cost of any Southern Water drainage plans and licences.

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Rev.	Details	Date
Rev. 1	First floor arrangement amended	7/7/21

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Proposed Elevations & Roof Plan

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20044/02a r1