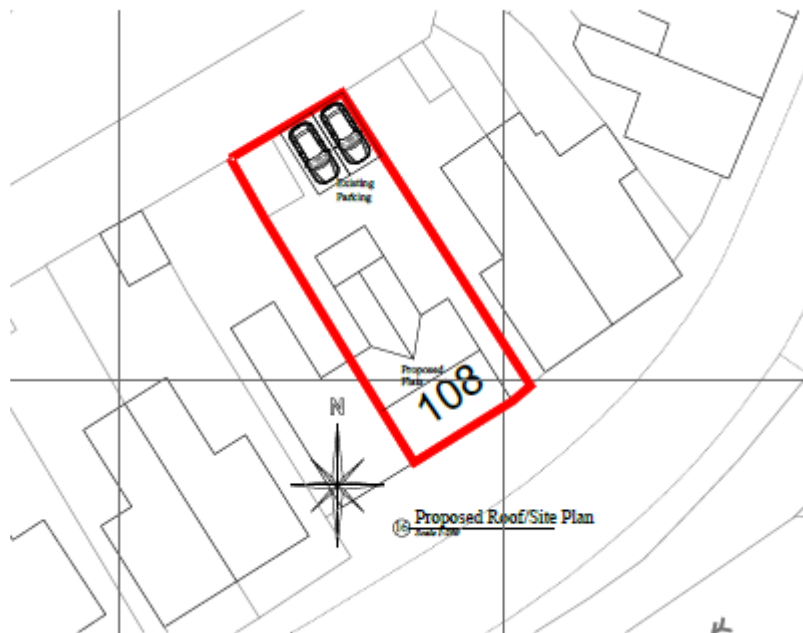


Francis Sant

Redevelopment of 108, High Street, Glynneath Flood Consequence Assessment Report



September 2022
Final

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Signed 

Date September 2022

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1 INTRODUCTION

The client proposes to convert an existing semidetached four bedroom house, at 108, High Street, Glynneath, into two 2 bedroom flats. The property lies in a Zone B flood area as defined by the development advice maps (see Figure 1.1) referred to in Technical Advice Note 15, Development and Flood Risk (TAN 15). This means that the building is not considered at risk of flooding during at least the 1 in 1000 year event but there is sedimentary evidence of potential historical flooding. The site, however, lies close to a C2 flood Zone which is considered at risk of flooding during a 1 in 1000 event. and is not afforded protection from significant and recognised flood defence infrastructure.

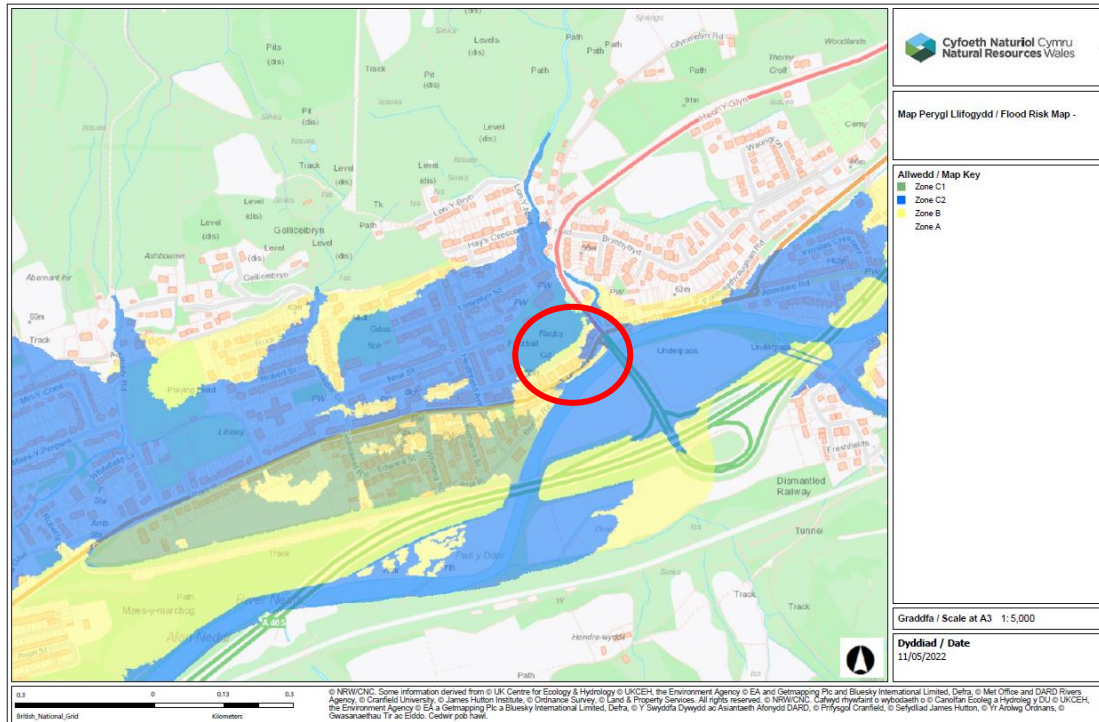


Figure 1.1 - Development Advice Flood Map

The Development Advice Maps are based on Natural Resources Wales Flood Maps (see Figure 1.2) supplemented by sediment data, held by the British Geological Survey (BGS), of historical flooding. The maps adopt the precautionary principle and are based on the best known information available at the time. However, a detailed examination of a site can refine an area's risk of flooding.

Considering the proximity of the site to the Afon Nedd and Nant Gwyddyl it is possible that the building could be at risk from fluvial flooding, particularly when taking climate change into consideration. As such the client has requested that a Flood Consequence Assessment be prepared to evaluate the risk to allow mitigation measures to be included in the proposed renovations if necessary. The assessment should be in accordance with the requirements of Section 7 and Appendix 1 of TAN 15. Francis Sant have been employed to undertake this task.

This document summarises the work undertaken as part of the study. Section 2 of the report gives a description of the surrounding area while the risk of flooding, from various sources, is considered in Section 3. Possible flood proofing measures are

discussed in Section 4 and the conclusions and recommendations of the study are provided in Section 5.

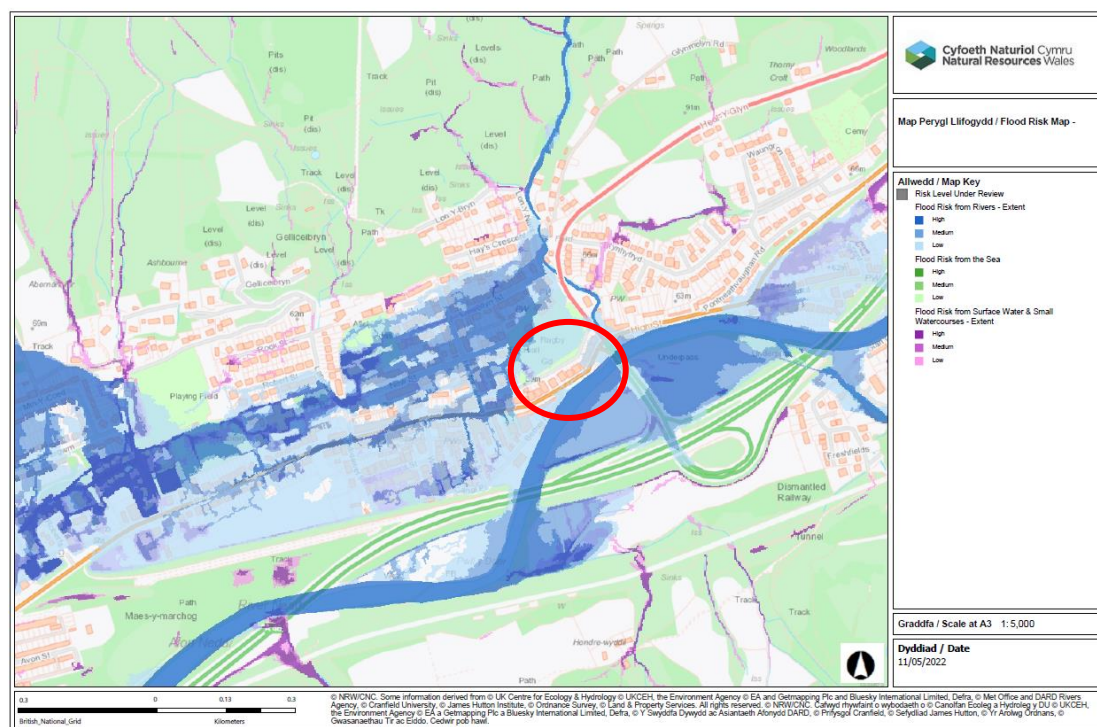


Figure 1.2 – NRW Flood Risk Assessment Map (New)

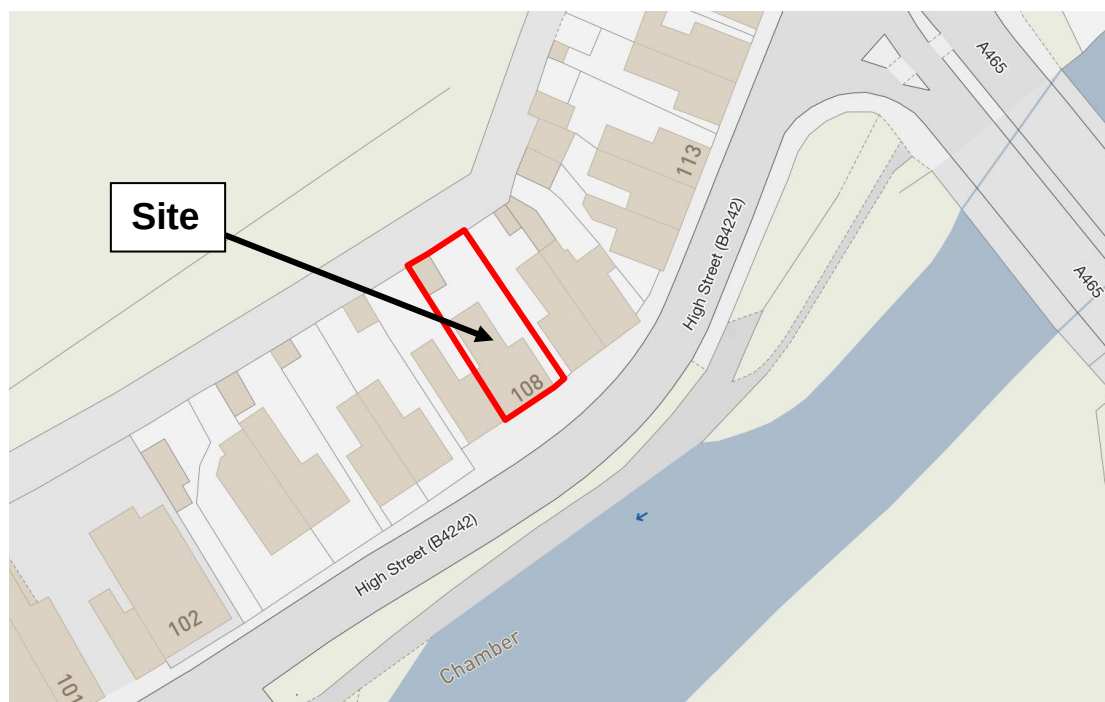


Figure 2.3 – Plan of Site

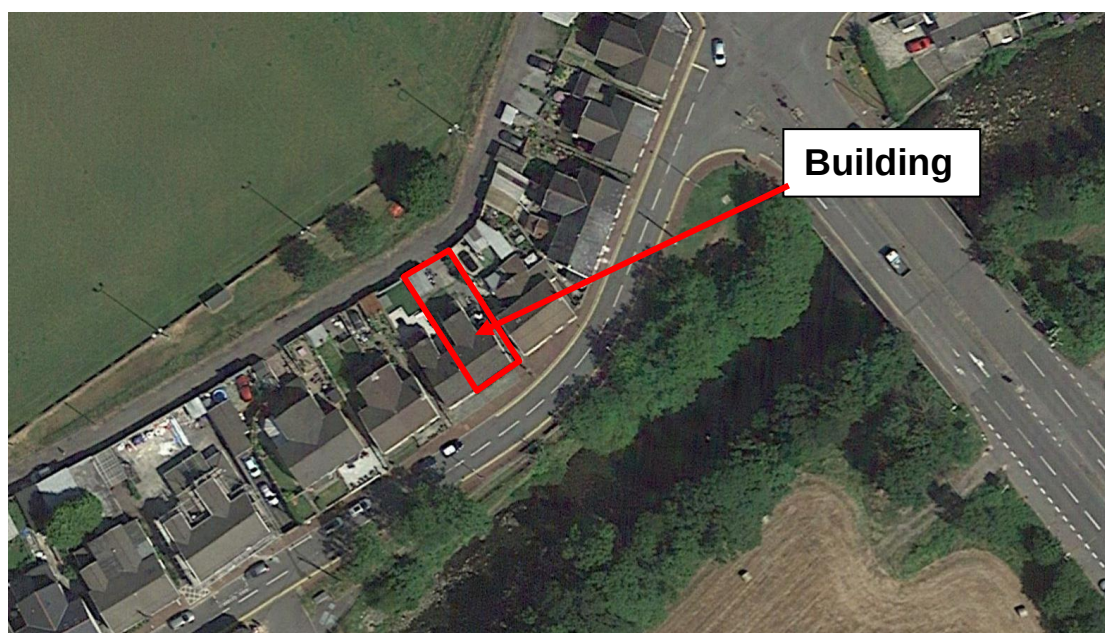


Plate 2.1 – Aerial View of Site



Plate 2.2 – Front of Building

Proposal

It is proposed to convert the existing four bedroom house into two 2 bedroom flats, one on the ground floor and one on the first floor (see Figure 2.4 to 2.7). Both current and proposed uses are designated as highly vulnerable developments in TAN 15.



Figure 2.4 – Existing Ground and First Floor Plans of the Building



Figure 2.5 – Existing Cross Sections Through the Building

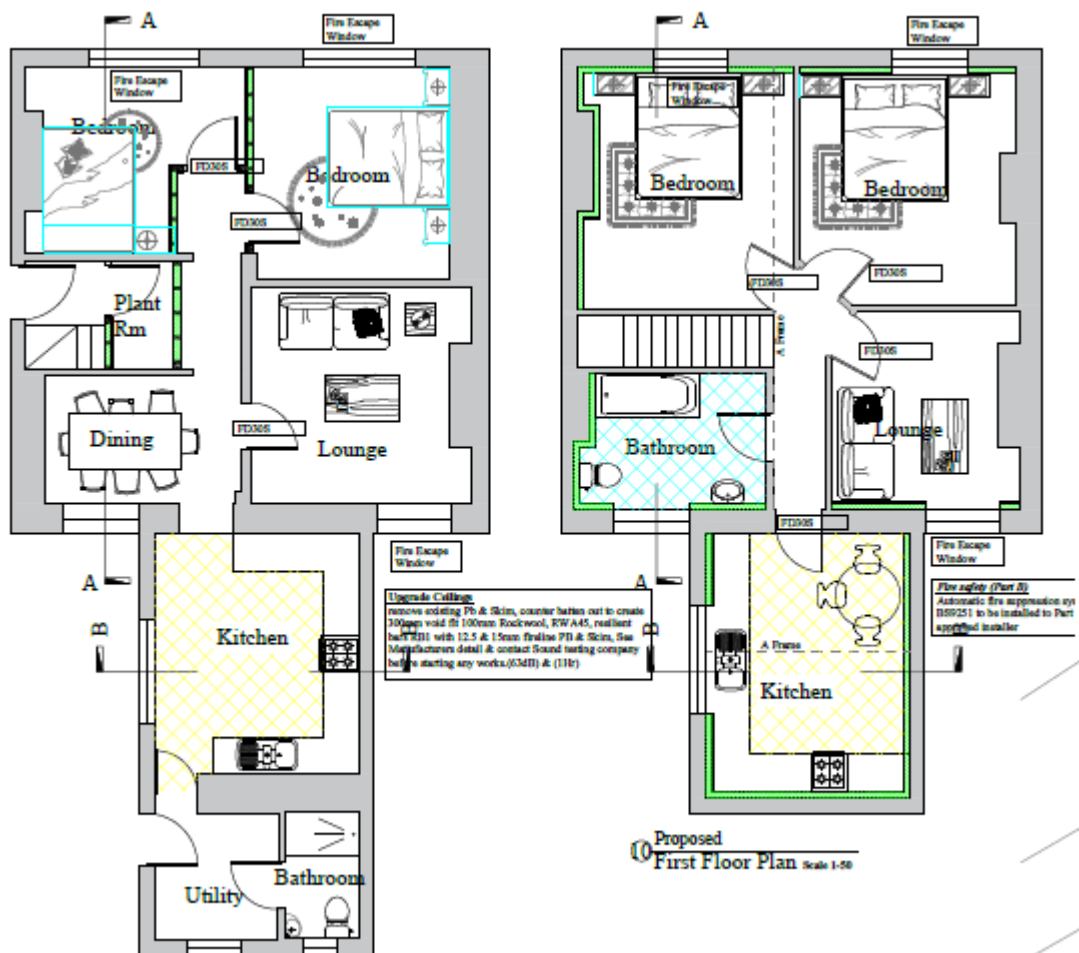


Figure 2.6 – Proposed Floor Plans of the Ground and First Floor Flats



Figure 2.7 – Proposed Cross Sections Through the Building

Topography

Lidar data (see Figure 2.8) shows that the road in front of the building is set at around 61.3m AOD and the land to the rear is set at around 61.1m AOD with the building set above 6.4m AOD. Generally the land to the rear falls gently from south to north.

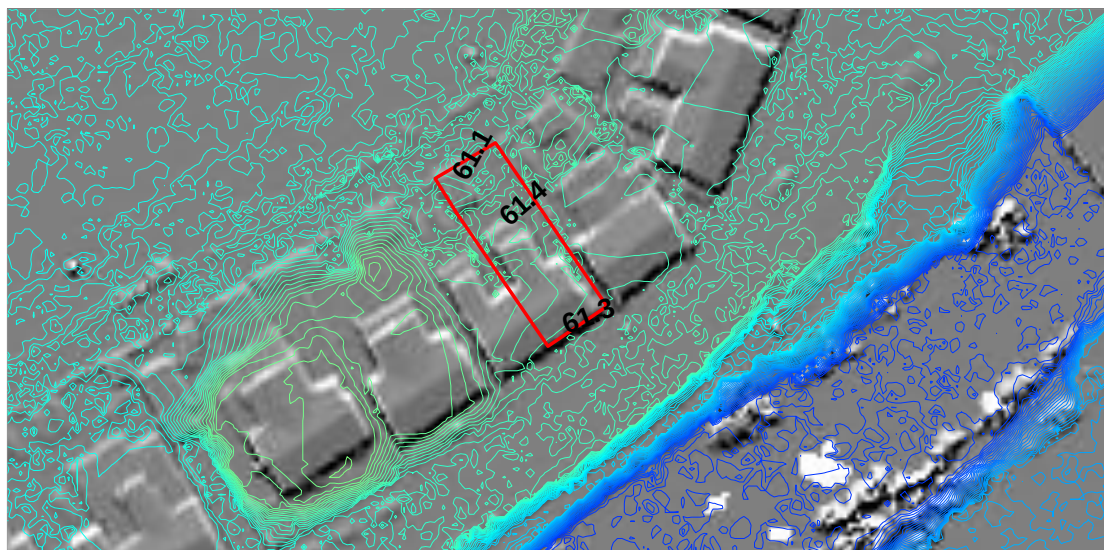


Figure 2.8 – Lidar Data for the Site

3 FLOOD RISK

Flooding can occur from several sources, some of which are considered in this section. The Flood Risk Assessment map (see Figure 3.1), produced by Natural Resources Wales, indicates that the property is not expected to be at risk of flooding during either the Q100 or Q1000 events. However, it is noted that the map does not take climate change into consideration.

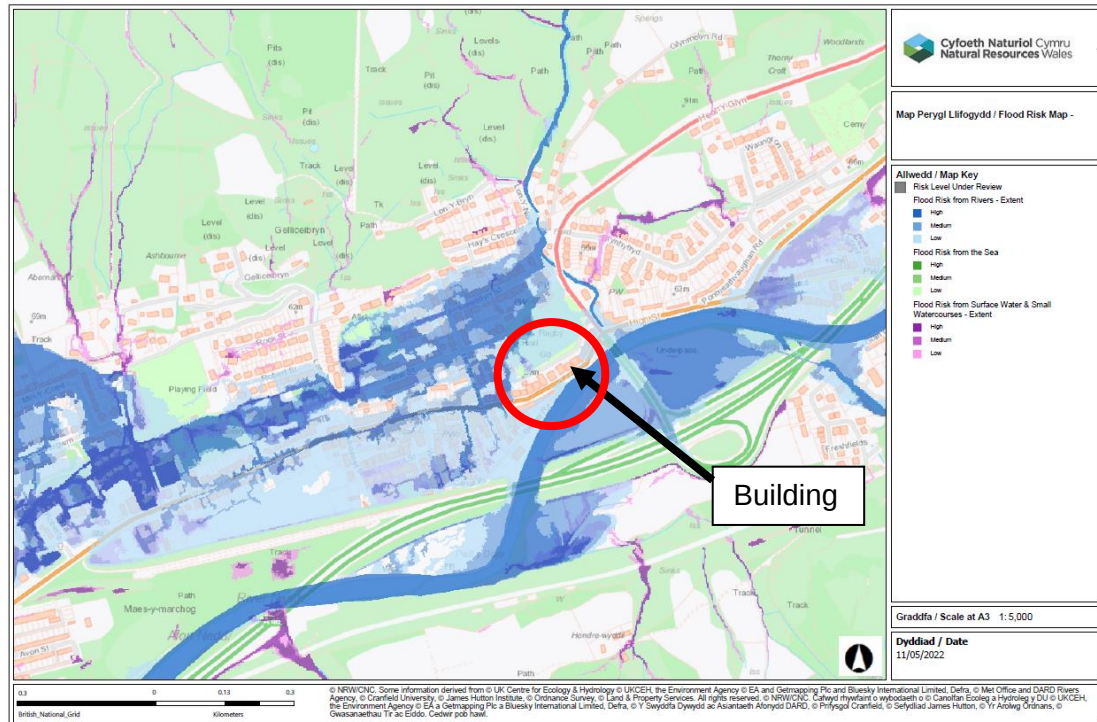


Figure 3.1- NRW Flood Risk Assessment Map

3.1 Fluvial

NRW's Flood Map For Planning, which allows for climate change, shows the building is expected to be flood free during a Q100 event as required by TAN 15 but could be at risk during a Q1000 event (see Figures 3.2 and 3.3). However, other than the road the surrounding land is expected to remain flood free suggesting that the flood depth and flow velocity is expected to be low (less than 600mm and 0.15m/s respectively). As the building already exists the proposed development will not result in a loss of flood storage capacity.

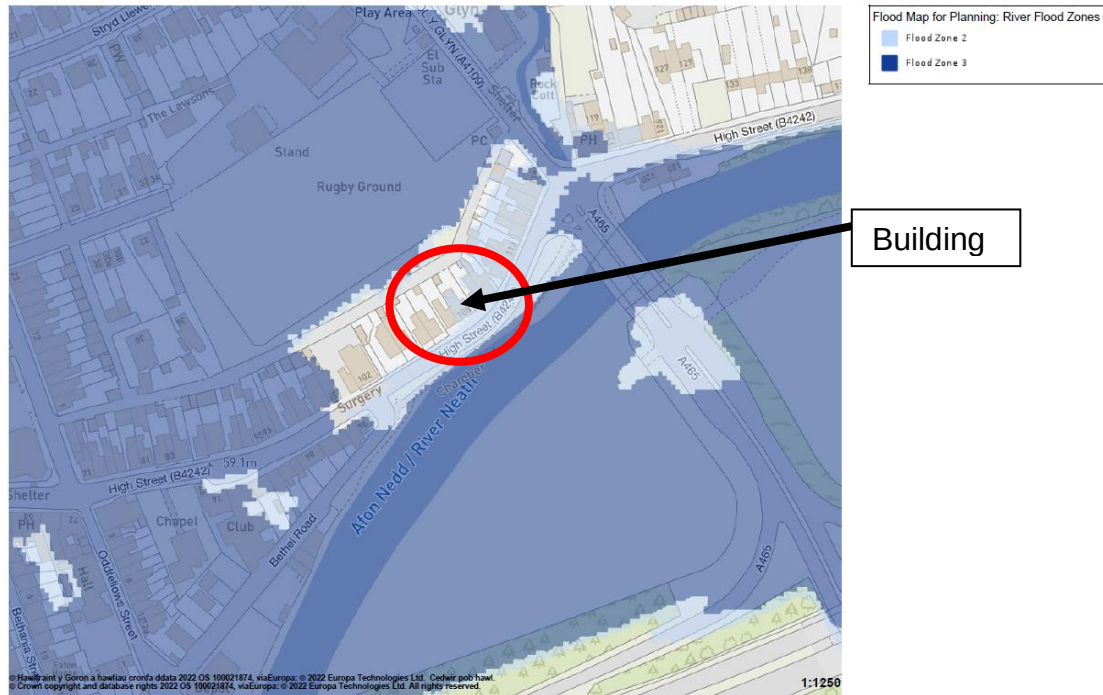


Figure 3.2 – River Flood Map For Planning

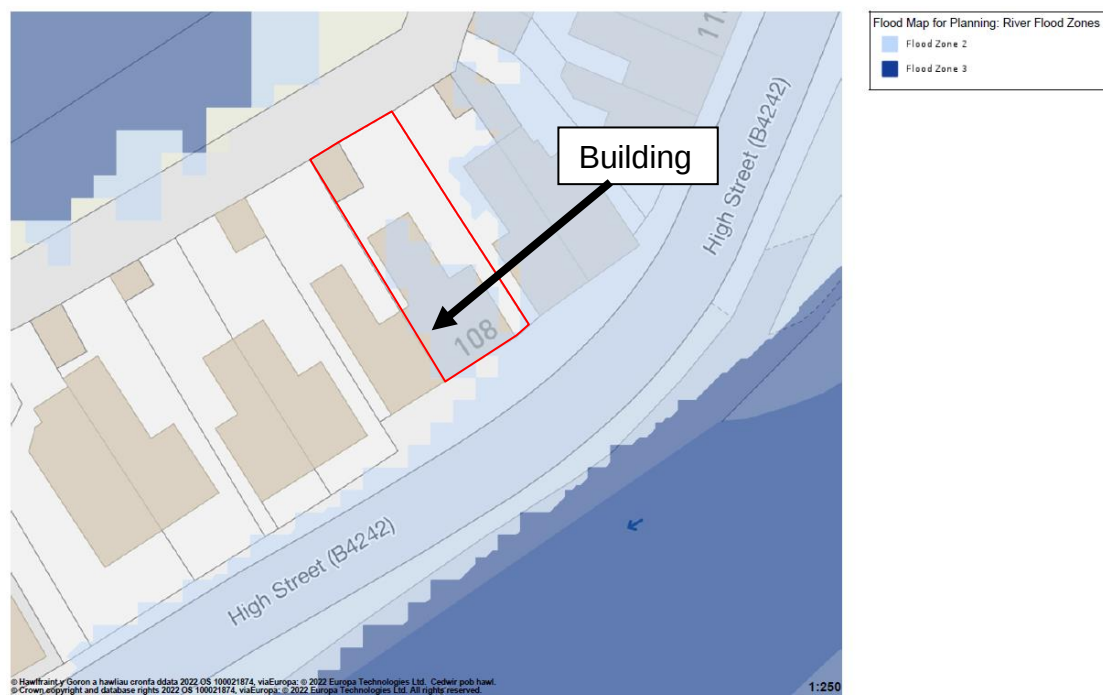


Figure 3.3 – Detailed River Flood Map For Planning

The results from the latest NRW 2D TUFLOW model suggests that the area is expecting to remain flood free for all considered events (see Figure 3.4 to 3.9 and Table 3.1). This assumes that the defences for the area are in place. However, when considering the undefended scenario, the flood depth and velocity did not change in the vicinity of the site (see Figure 3.10 to 3.15 and Table 3.1).

Table 3.1 Velocity and Depth Key			
Region	Depth	Region	Velocity
	0-0.1m		0 - 0.15m/s
	0.1m-0.2m		0.15m/s - 0.3m/s
	0.2m-0.3m		0.3m/s - 0.45m/s
	0.3m-0.6m		0.45m/s - 0.6m/s
	0.6m-1m		0.6m/s - 1m/s
	1m-2m		1m/s - 2m/s
	2m-3m		2m/s - 3m/s
	>3m		> 3m/s

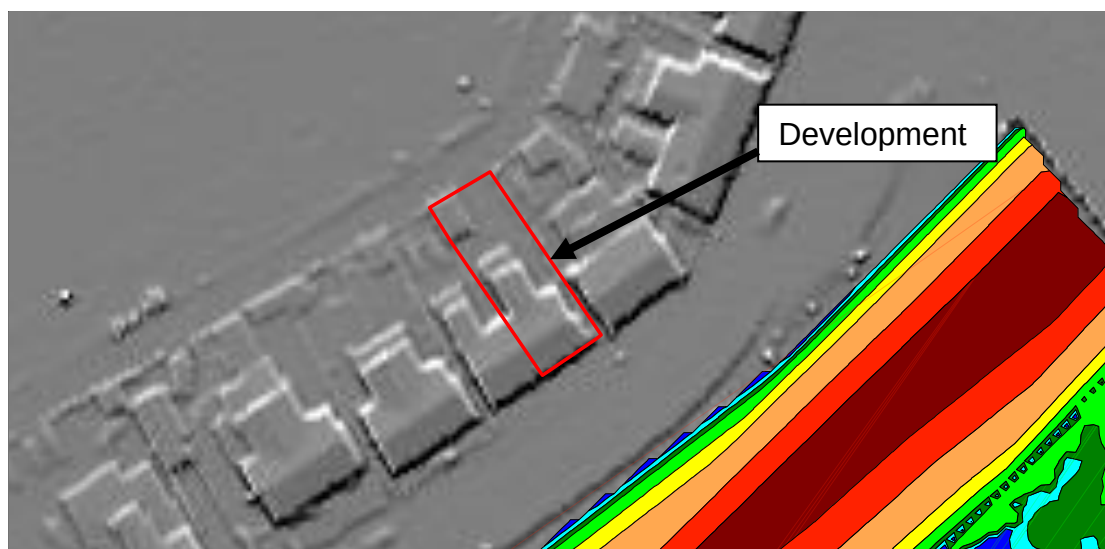


Figure 3.4 - Q100 Depth (Key on Table 3.1)

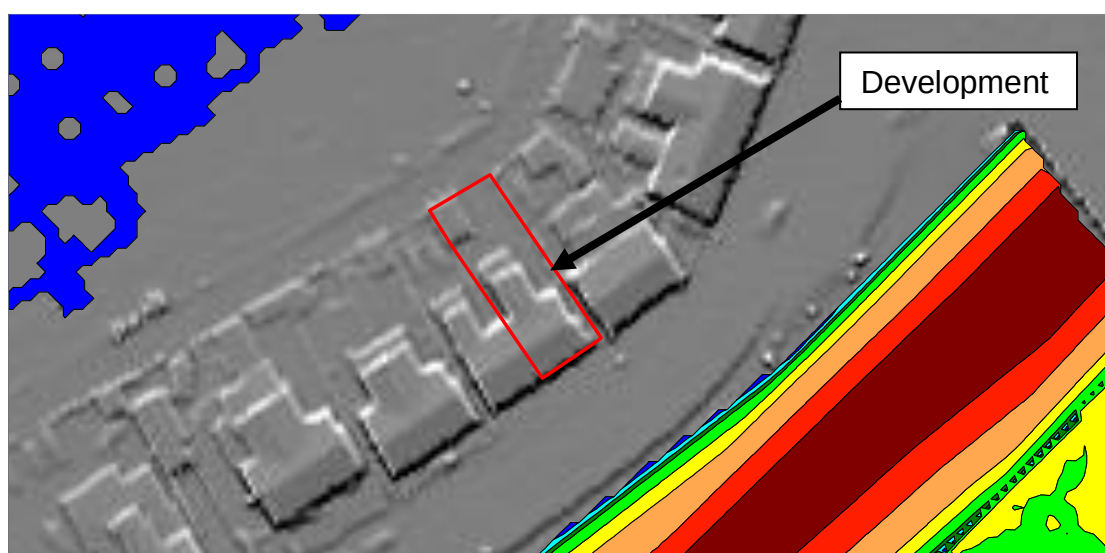


Figure 3.5 - Q100 With Climate Change - Depth (Key on Table 3.1)

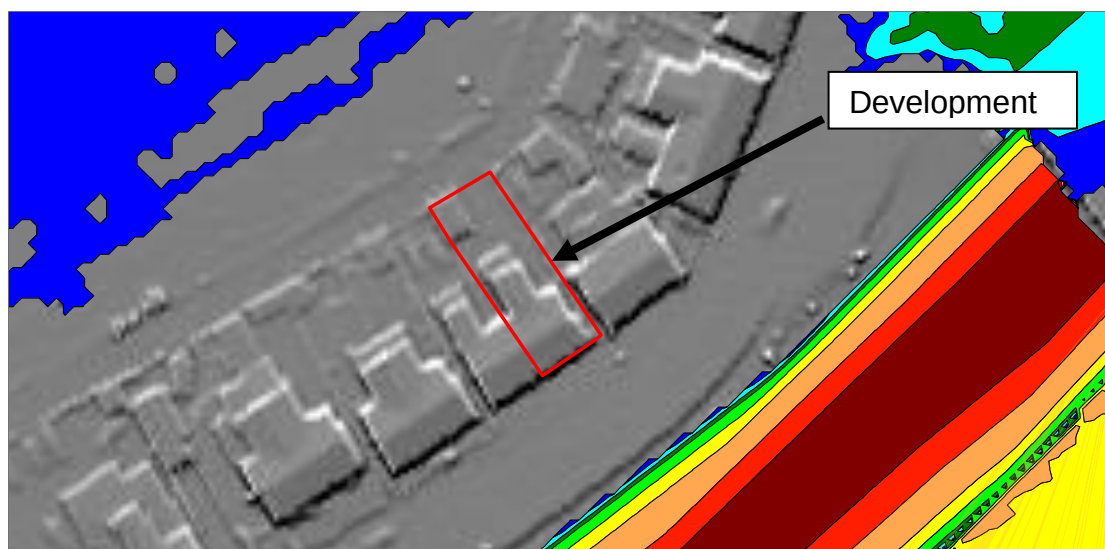


Figure 3.6 - Q1000 Depth (Key on Table 3.1)

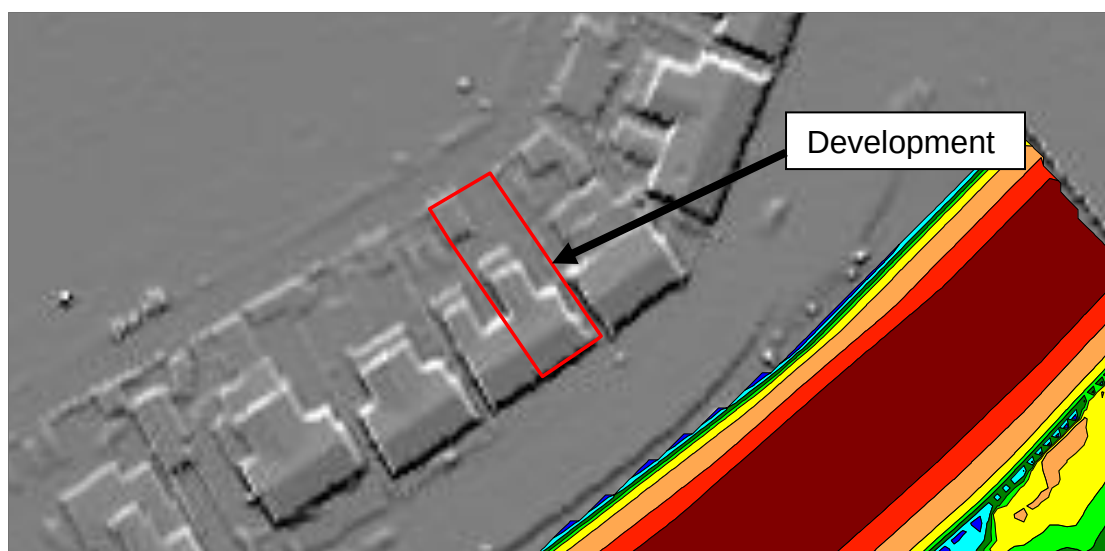


Figure 3.7 - Q100 Velocity (Key on Table 3.1)

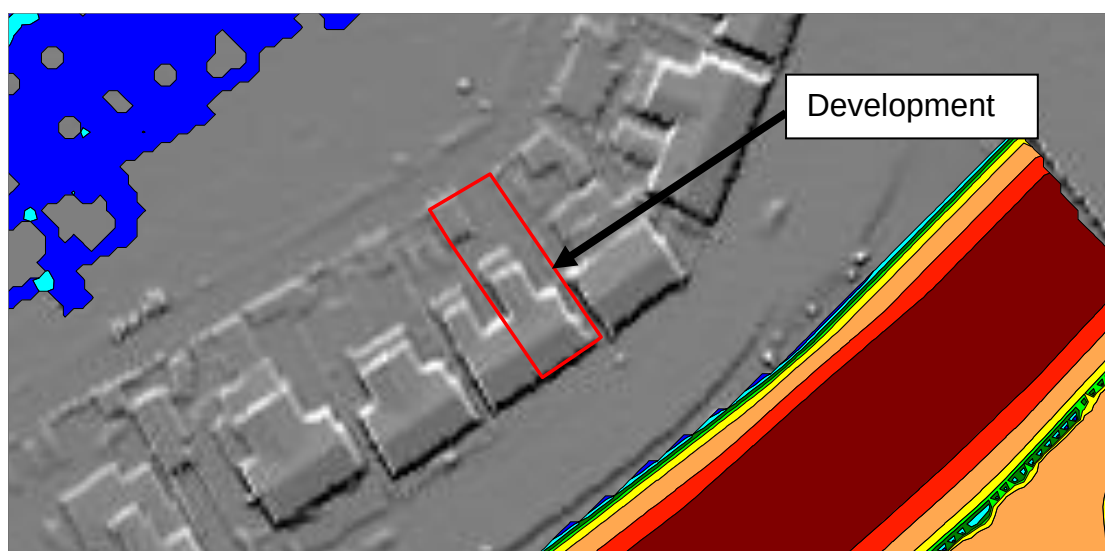


Figure 3.8 - Q100 + CC Velocity (Key on Table 3.1)

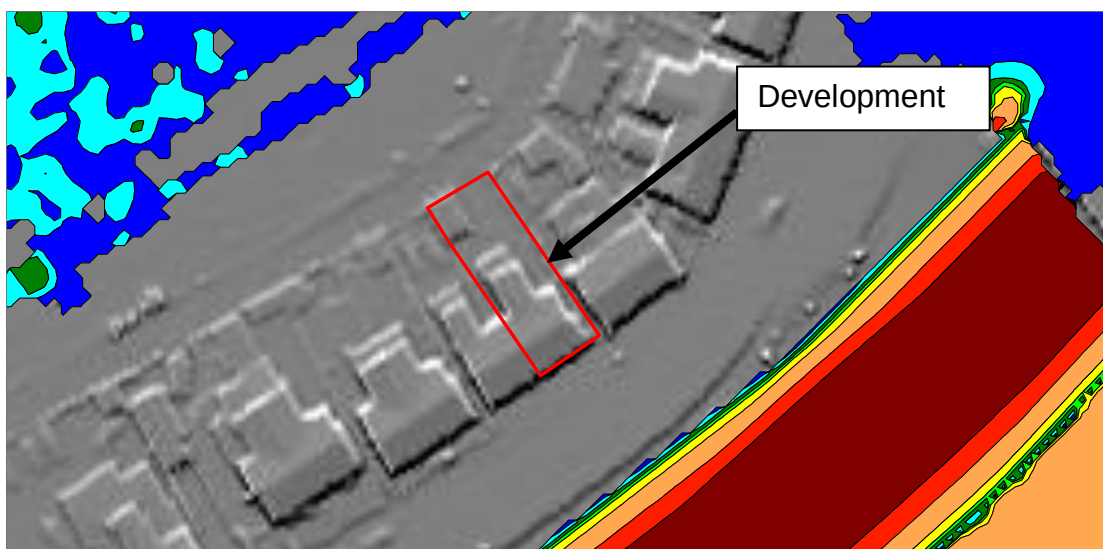


Figure 3.9 - Q1000 Velocity (Key on Table 3.1)

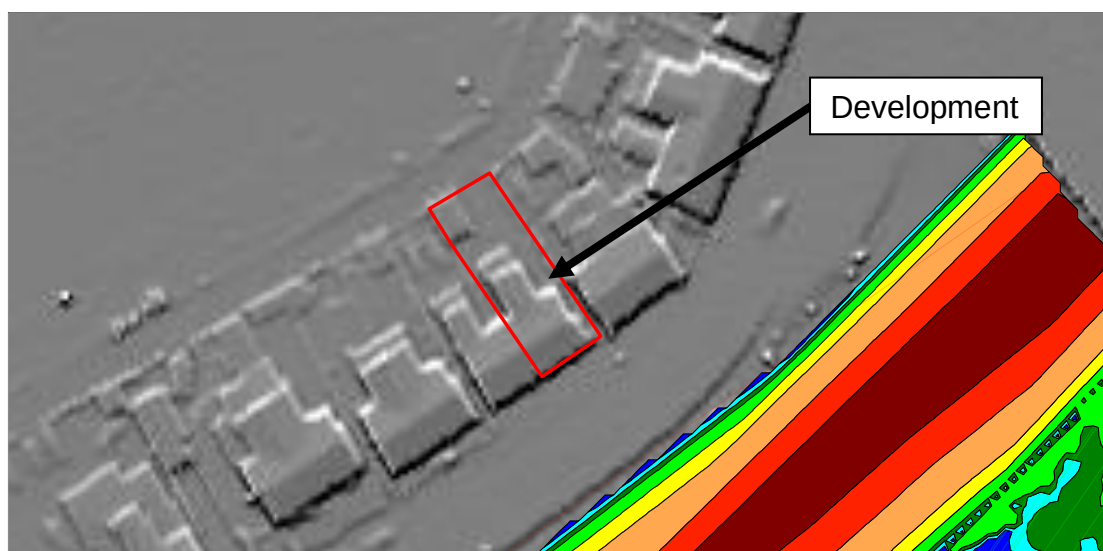


Figure 3.10 - Undefended Q100 Depth (Key on Table 3.1)

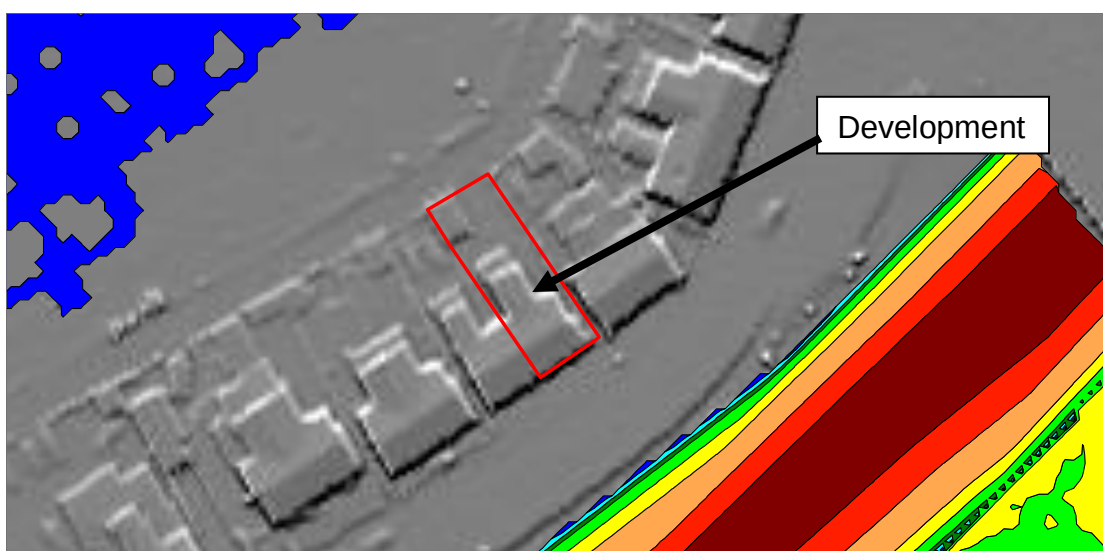


Figure 3.11 - Undefended Q100 + CC Depth (Key on Table 3.1)

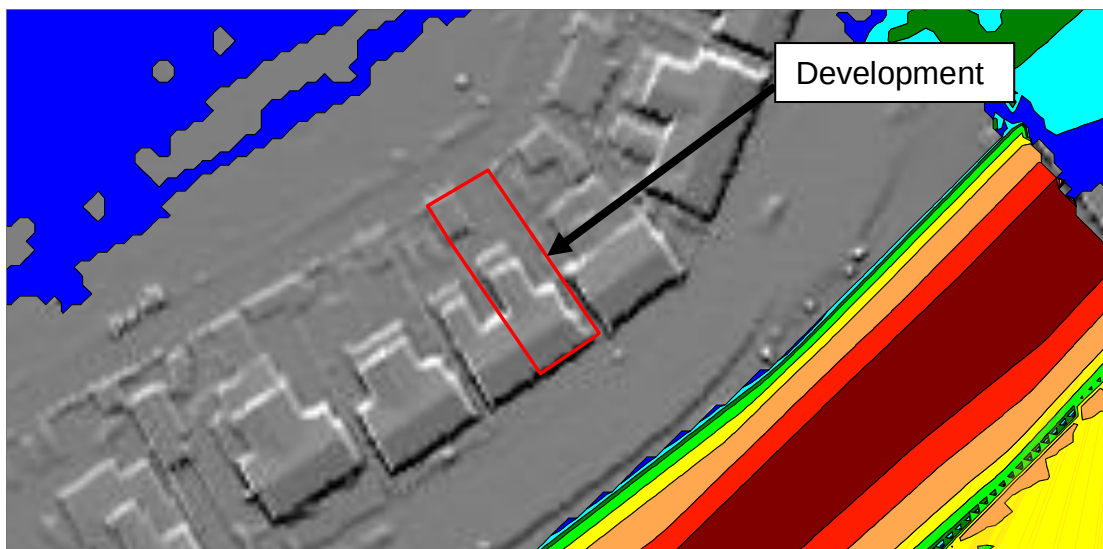


Figure 3.12 - Undefended Q1000 Depth (Key on Table 3.1)

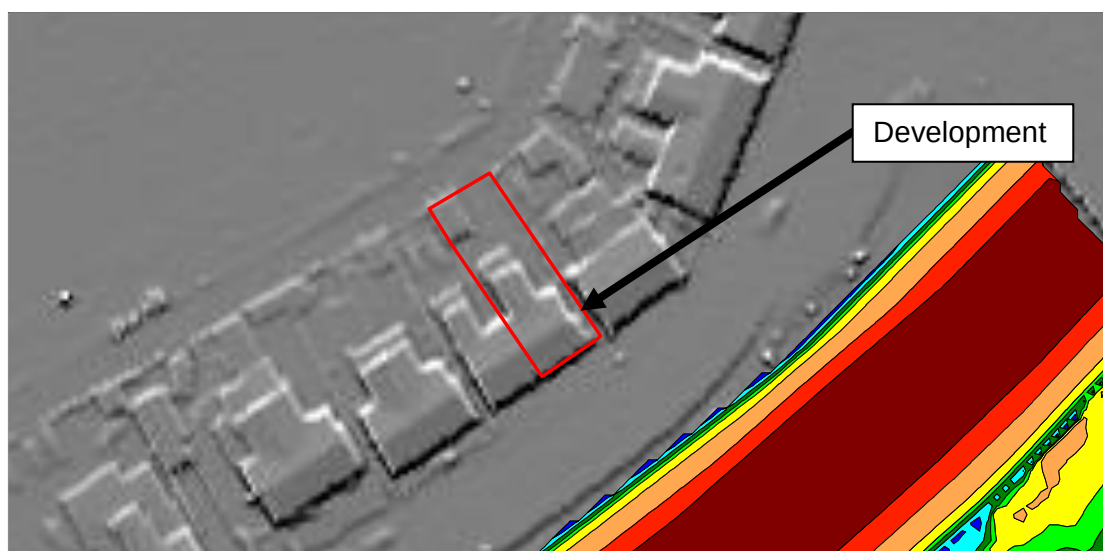


Figure 3.13 - Undefended Q100 Velocity (Key on Table 3.1)



Figure 3.14 - Undefended Q100 + CC Velocity (Key on Table 3.1)

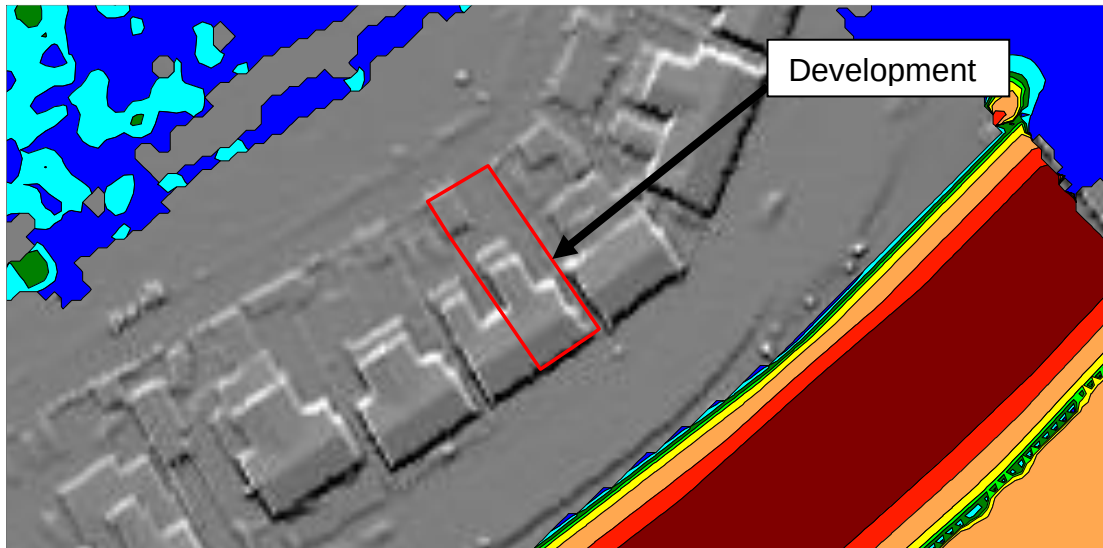


Figure 3.15 - Undefended Q1000 Velocity (Key on Table 3.1)

3.2 Tidal

The site is not considered at risk from tidal flooding.

3.3 Surface Water

The Surface Water Flood Map For Planning suggest that site is not at risk of flooding from this source (see Figure 3.16).

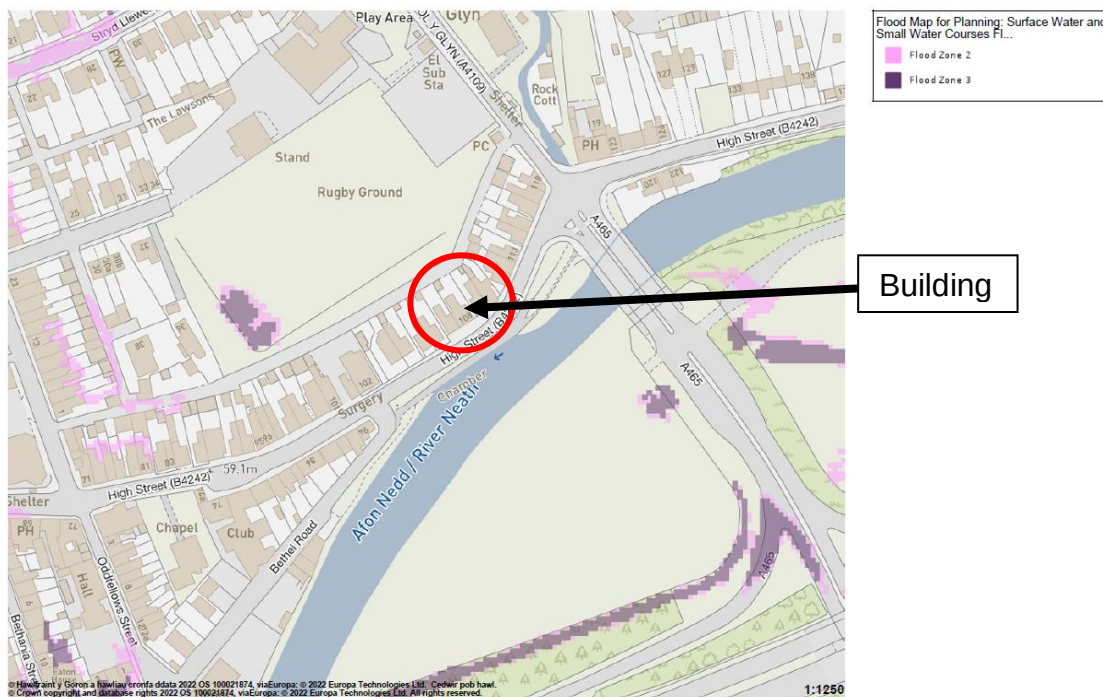


Figure 3.16 – Surface Water Flood Map For Planning

3.4 Sewage Backflow.

Care should be taken to ensure that water from the foul / combined sewer system is unable to back up into the property and consideration should be given to installing a none return valve.

3.5 Sustainable Drainage

As the scheme is for the redevelopment of an existing building the installation of a sustainable drainage system, in accordance with the Welsh Government Standards and the SUDS manual, is not strictly necessary. However, such a system should be considered as a matter of good practise.

3.6 Reservoir Failure

The building is at the edge of an area considered to be at risk from reservoir failure suggesting that the flood depth would be shallow (see Figure 3.17). Nevertheless, the risk of failure is considered to be very low.

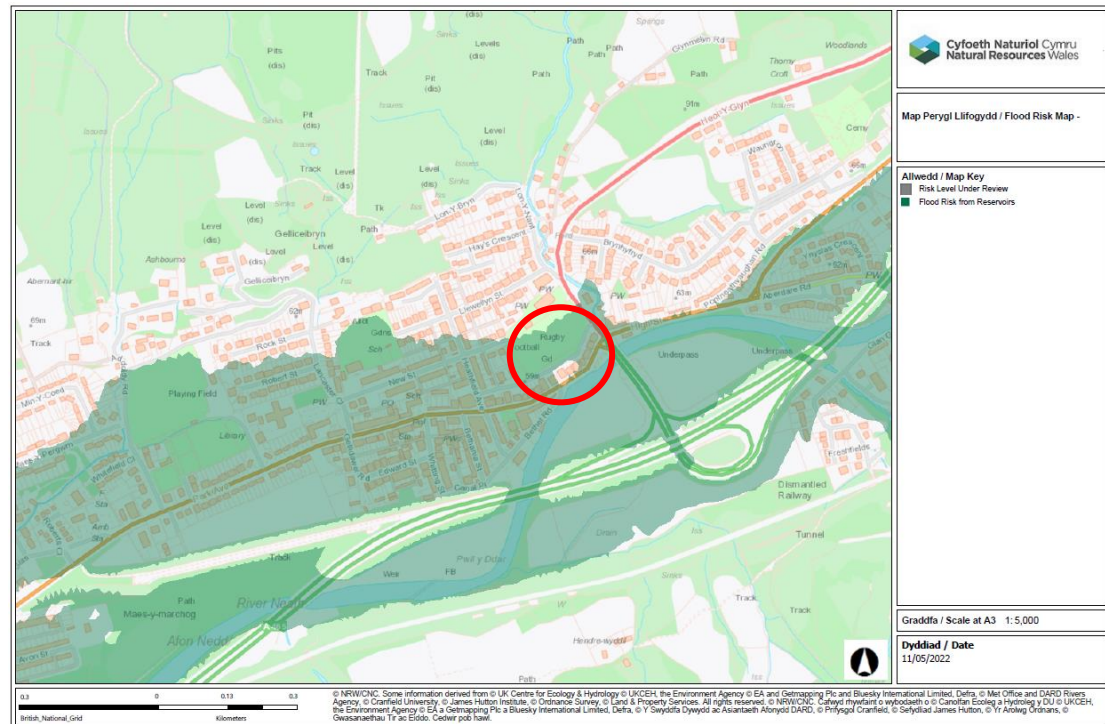


Figure 3.17 – Flood Map For Reservoir Failure

3.7 Ground Water

The superficial geology for the area consists of Clay, Silt, Sand and Gravel from Alluvium overlying a bedrock geology of Sandstone from the South Wales Lower Coal Measures Formation (see Figure 3.18 and 3.19). When also taking the terrain into account the risk of groundwater flooding is considered to be low to medium.

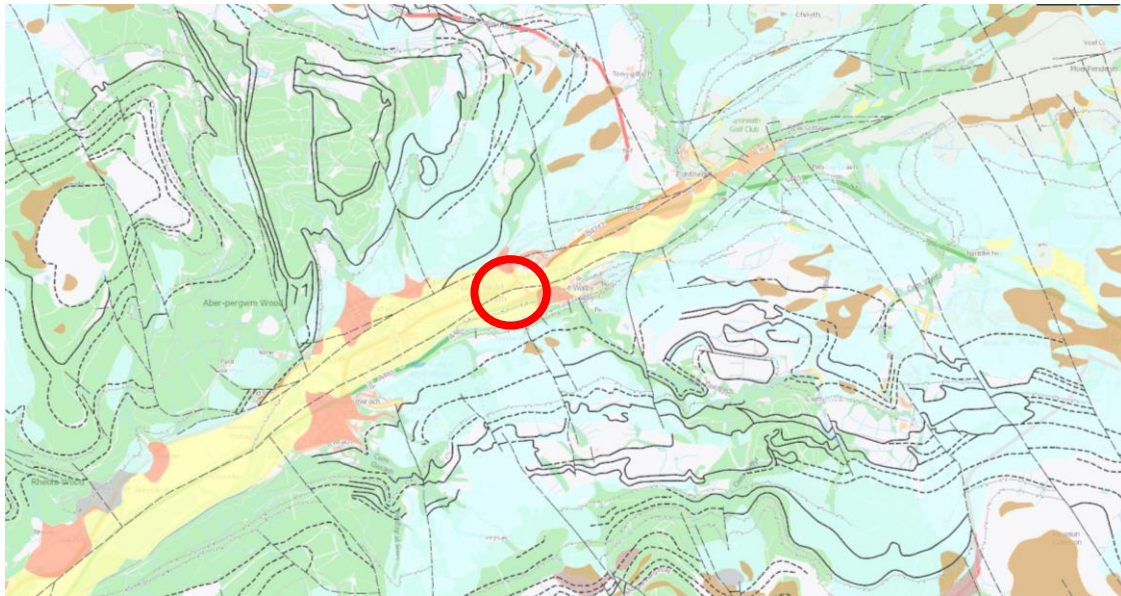


Figure 3.18 – Superficial Geology

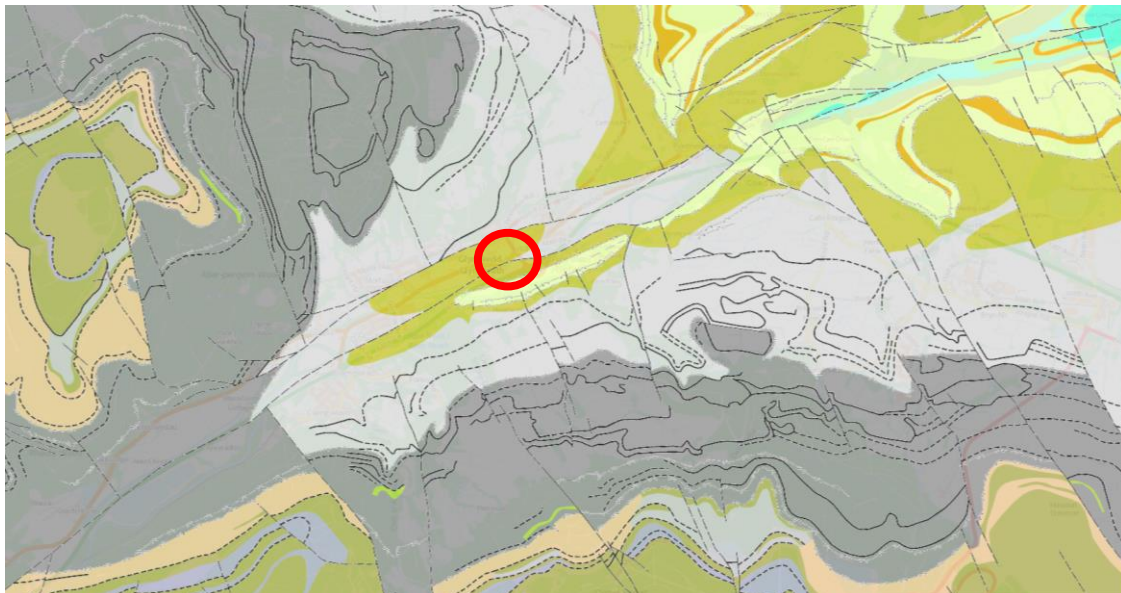


Figure 3.19 – Bedrock Geology

4 FLOOD PROOF MEASURES

Section 3 indicates that there is a small risk of flooding during a Q1000 event from a fluvial source. Flooding can result in the need for expensive repairs. As well as the direct damage caused to the building, flooding can impact in many other, and possibly more stressful, ways. The inconvenience of cleaning up a home and the loss of sentimental belongings can be immeasurable. There are methods, however, to limit and mitigate against the consequence of flood damage. Some of these are discussed in this section and should be considered as part of the development where applicable.

Water can enter a building:

- Around the edges of closed doors;
- Through airbricks;
- Backflow through overloaded sewers;
- Seepage through walls especially cracks;
- Seepage through the ground;
- Around cable / services entrance into the building.

Dryproofing - Preventing the water from entering the building.

In the first instance it is possible to take measures to prevent the ingress of water (dryproof).

- There are several propriety barriers available, however, these can be expensive. If desirable, it might be possible to ensure that the walls of the building are able to act as a barrier themselves (this will need to be assessed). Care should be taken to ensure that the pointing and any external plastering are kept in good order and that all cracks and gaps around cables and ducts entering the building are sealed;
- Providing temporary covers to any low air vents. These covers should be removed once the risk of flooding is over;
- Erecting a temporary barrier in front of any external doors or installing flood protection doors;
- Installing a valve allowing the sewer system to be shut preventing any back flow.

Wetproofing – Limiting the damage once water has entered a building.

It may not be practical to eliminate the risk of flooding, however, it is possible to limit the damage that the water can cause once in the building (wetproof). Where appropriate the following could be considered:

- Move valuable items to a higher level;
- Have solid concrete floors. Suspended floors are more difficult to clean and dry underneath;
- Have tiled floors or removable rugs in place of fitted carpets on the ground floor;
- Use water resistant plaster for the walls;
- Ceramic tiles can be used for wall coverings especially in the ground floor kitchen and bathroom;
- Use non water absorbing insulation;
- Use corrosion resistant fittings such as galvanised or stainless steel;
- Ensure that the electric cables are fed from above with the sockets kept high;
- Use an appropriate damp proof course;
- Avoid timber frame construction for any new internal partition walls;
- Consider freestanding movable equipment;

- Install any equipment on the ground floor with motors high up from the floor;
- Install solid internal and external doors effectively sealed;
- Avoid storage heaters on the ground floor;
- Ensure boilers are off the ground.

A flood response plan should be prepared and regularly maintained. All future occupiers should be made aware of the flood risk and what actions are to be undertaken during an event. It is important to also have as much warning as possible to allow the flood response plan to be followed safely. If available, this can be achieved by registering on the flood warning scheme provided by NRW.

5 CONCLUSION AND RECOMMENDATIONS

The client wishes to redevelop an existing 4 bedroom house into two 2 bedroom flats. Although the site lies in a Zone B flood area, in accordance with TAN 15, it is close to a Zone C2 and, therefore, they wish to evaluate the risk of flooding..

The Flood Risk Assessment Maps and the results from NRW's 2D hydraulic model suggest that the site is expected to remain flood free even during the Q1000 event. However, while the River Flood Maps For Planning shows that the site is also expected to remain flood free during a Q100 event the building could be at risk during a Q1000 event, although the land immediately surrounding the building is expected to remain flood free. This would indicate that even if the building is at risk the flood depth will be less than 600mm and the flow velocity is also expected to be low. In accordance with Tan 15, therefore, the risk is considered to be manageable.

The building is not considered to be at risk from, tidal or surface water flooding and the risk of ground water flooding is considered to be low to medium. The risk from reservoir failure is considered to be low.

The development will not change the current vulnerability status of the site or have an impact on flood risk. However, the opportunity to introduce floodproofing measures, as part of the proposed works, should be considered.

Recommendations

In refurbishing the building, it is recommended that:

- Wet proofing measures, as identified in Section 4, are included on the ground floor of the development where possible.
- Flood doors are used for the entrances.
- A non-return valve is installed on the foul sewer system.
- An emergency evacuation plan is prepared, maintained, and effectively disseminated to all future occupiers.
- If available, the property is registered on the flood warning scheme provided by NRW.