



Flood Consequence Assessment for Planning

May 2020

Our reference:
89578-BAS-CommericalRd

Prepared for:
Ciconia Properties Ltd

Location:
50 Commercial Road
Port Talbot
SA13 1LG



Document Issue Record

Project: Flood Consequence Assessment for Planning

Client: Ciconia Properties Ltd

Location: 50 Commercial Road, Port Talbot, SA13 1LG.

Application: Proposed part change of use of shop (Use Class A1) and first floor flat (Use Class C3) to a five-person House of Multiple Occupation (HMO) (Use Class C4) together with alterations to fenestration to main building and outbuilding

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Key Facts

Flood Risk Posed:

- Flood Zone C2 as defined by Natural Resource Wales (NRW).
- Fluvial risk originating from the Ffwrdd Wyllt.
- The site is shown to be entirely outside of the present day defended and undefended 1:100 year modelled flood extent, and will therefore remain dry during the modelled 1:100 year scenario at the present day.
- The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 150mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.
- Risk of groundwater and sewer surcharge flooding would appear to be low.
- The Natural Resources Wales Surface Water Flood Map suggests that the site lies outside of areas of "High", "Medium" and "Low" risk of flooding from surface water.
- Flood depths do not exceed 600mm at the site or along the escape route, and safe escape as per the requirements of TAN15 can be provided.

Flood Risk Management:

- No sleeping accommodation will be located at ground floor level.
- Safe refuge is provided on the first floors of the property.
- Internal access will be maintained to an area of safe refuge above modelled flood levels within the residential unit.
- Flood proofing of the building will be incorporated as appropriate.
- A flood warning and evacuation plan will be implemented post development.

Assuming accordance with these flood risk management measures, Unda Consulting Limited consider the proposed application to be suitable in flood risk terms.

Introduction

Unda Consulting Limited have been appointed Ciconia Properties Ltd (hereinafter referred to as "the applicant") to undertake a Site Specific Flood Consequence Assessment (FCA) for Planning at land to the rear of 50 Commercial Road, Port Talbot, SA13 1LG. (hereinafter referred to as "the site"). The FCA has been undertaken in accordance with Technical Advice Note 15 (TAN 15) and the associated technical guidance.

The site appears to be located within Flood Zone C2 as defined by Natural Resource Wales (NRW) on their Development Advice Map. Under Technical Advice Note 15 (TAN 15), a FCA is required if a proposed development:

- includes building or engineering works in Flood Zone C1 or C2;
- includes building or engineering works on land classified as having critical drainage problem;
- changes the use of land or buildings in a location at risk of flooding from rivers or the sea, or with critical drainage problems;
- changes the use of land or buildings in a way that increases the flood vulnerability of the development where it may be subject to other sources of flooding;
- is in Flood Zone B, but larger than 1 hectare.

Given that the proposed application site is located in Flood Zone C2 (Risk of flooding from rivers or the sea, without significant flood defence infrastructure, including flood defences), and includes building works, the applicant is required to submit a FCA under TAN 15. The assessment should demonstrate to the Local Planning Authority (LPA) and NRW how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its potential users.

The objectives of a FCA to support a planning application are to establish:

- whether the proposed development is likely to be affected by current or future flooding from any source;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate.

Existing Situation

Site Usage:

The site comprises of a shop (Use Class A1) and first floor flat (Use Class C3).

Existing plans can be found in the report Appendix.

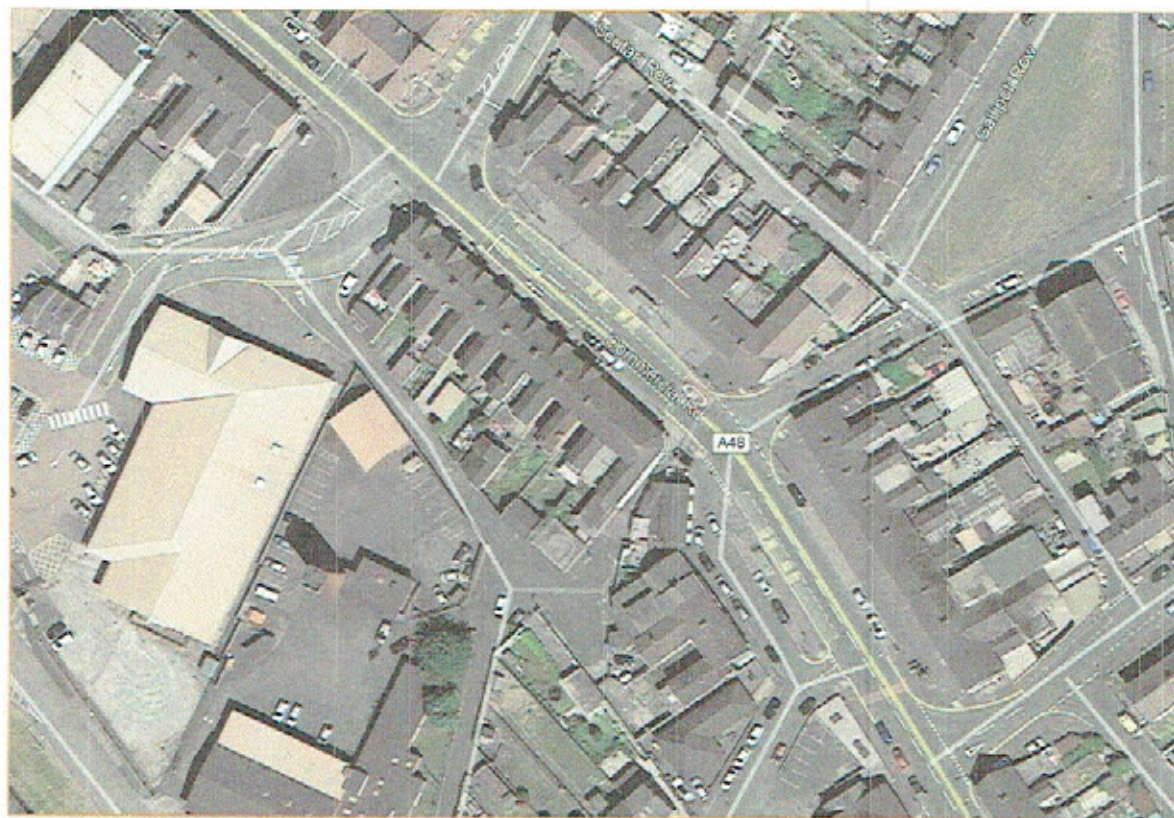


Figure 1: Aerial view of the site and immediate surrounding area (Source: Google Earth)

Topography:

Environment Agency LIDAR has been used to assess the topography across the site and wider area. Light Detection and Ranging (LIDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground surface. Up to 100,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated at high spatial resolutions. The EA's LIDAR data archive contains digital elevation data derived from surveys carried out by the EA's specialist remote sensing team. Accurate elevation data is available for over 70% of England. The LIDAR technique records an elevation accurate to $\pm 0.3\text{m}$ every 2m . This dataset is derived from a combination of our full dataset which has been merged and re-sampled to give the best possible coverage. The dataset can be supplied as a Digital Surface Model (DSM) produced from the signal returned to the LIDAR (which includes heights of objects, such as vehicles, buildings and vegetation, as well as the terrain surface) or as a Digital Terrain Model (DTM) produced by removing objects from the Digital Surface Model. 2.0m horizontal resolution DTM LIDAR data has been used for the purposes of this study.

2m LIDAR remotely sensed digital elevation data suggests that the ground topography on site ranges from approximately 9.10mAOD to 9.40mAOD , with the site sloping generally down from north to south.

Proposed Development

The proposed planning application is for the Proposed part change of use of shop (Use Class A1) and first floor flat (Use Class C3) to a five-person House of Multiple Occupation (HMO) (Use Class C4) together with alterations to fenestration to main building and outbuilding.

Proposed site plans can be found in the report Appendix.

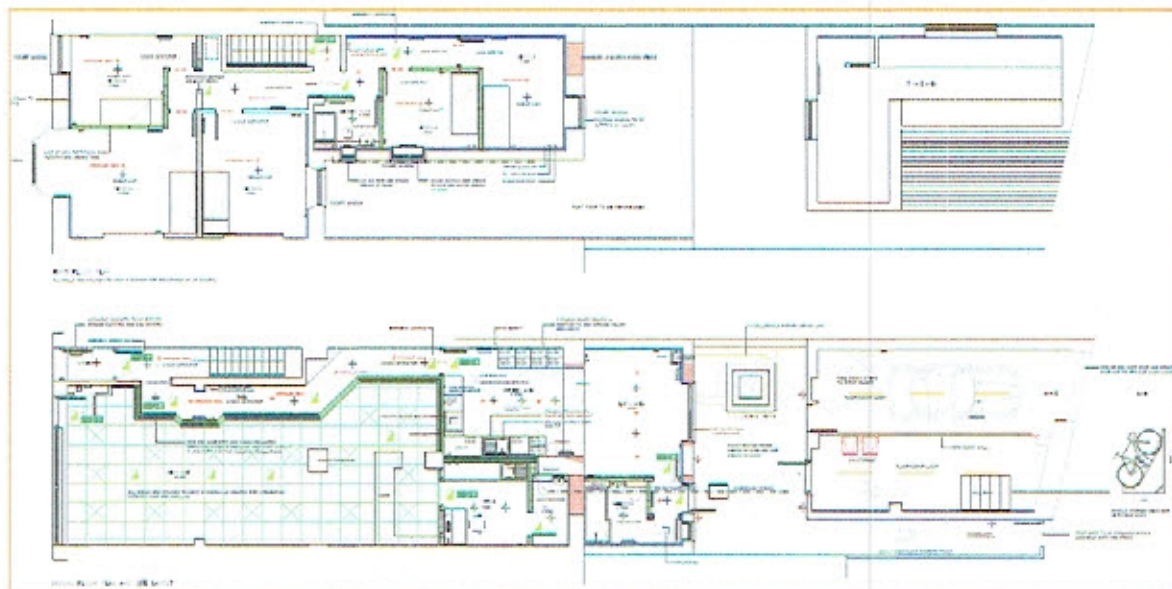


Figure 2: Proposed floor plans (Source: Beacon Architectural Services)

Assessment of Flood Risk

Flood Zones:

Within planning, Flood Zones refer to the probability of river and sea flooding. They are shown on the Natural Resource Wales Development Advice Map, available on Natural Resource Wales' web site.

Description of Zone	Zone Name	Use within the precautionary framework
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

Table 1: Flood Zones

The Flood Zones shown on the Natural Resource Wales Development Advice Map do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

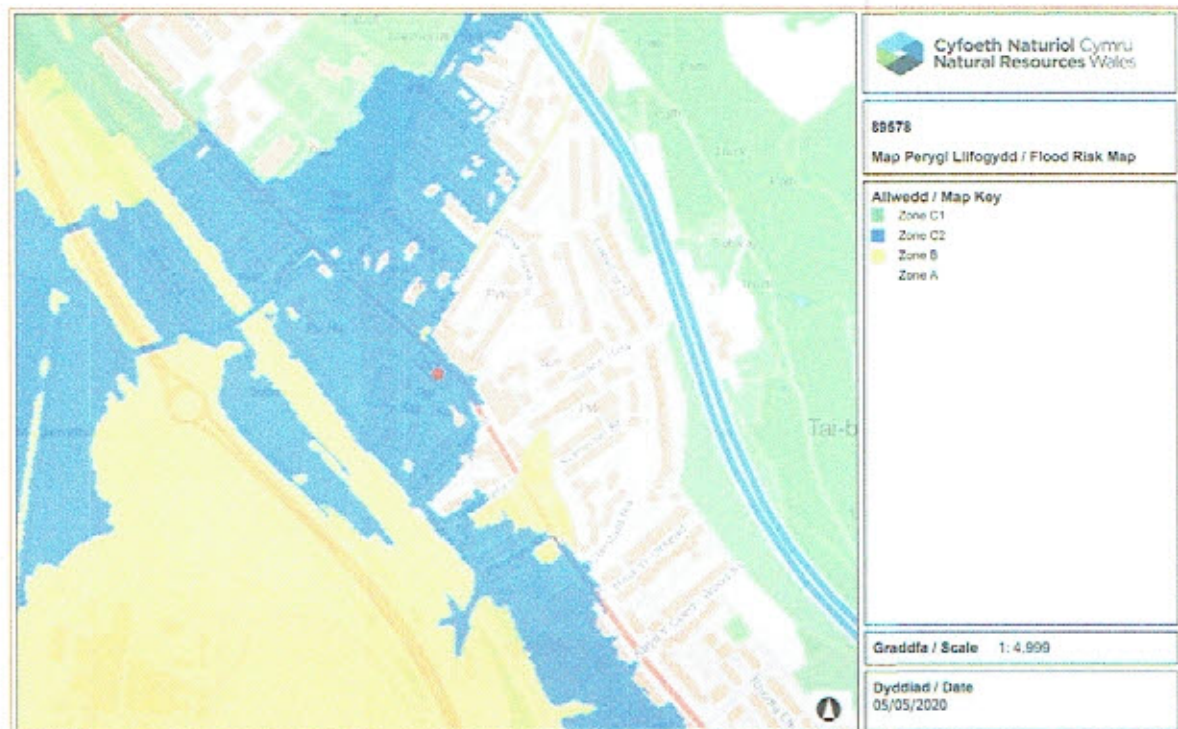


Figure 3: Natural Resource Wales Development Advice Map (Source: NRW)

The site is located within Flood Zone C2 (Areas of the floodplain without significant flood defence infrastructure), which means it is defined as land having a less than 1 in 1000 annual probability of tidal flooding.

The site is shown to be located entirely outside of the Flood Zone 3 (1:100 year) extent, but within the Flood Zone 2 (1:1000 year) extent.

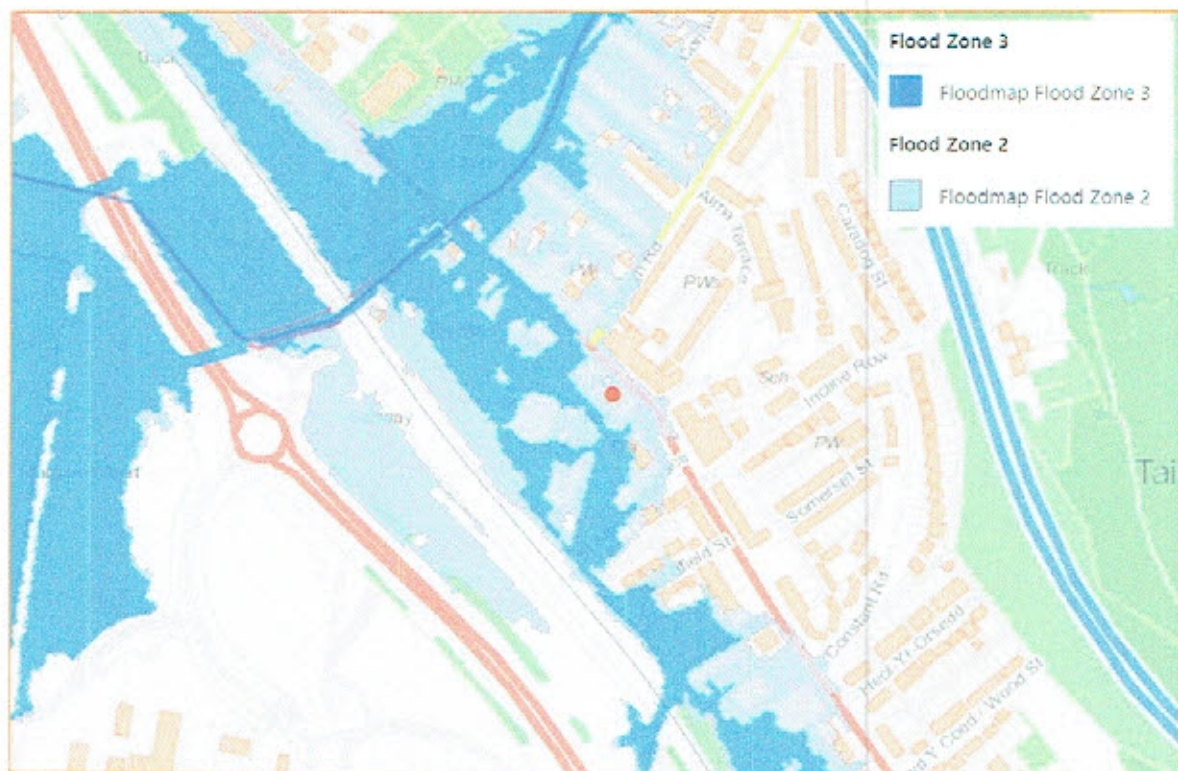


Figure 4: Environment Agency Flood Zone 2 and 3 extents (Source: NRW)

The risk would appear to be predominantly fluvial and originate from the Ffwrdd Wylt 200m to the north west of the site.

Fluvial (Ffwrdd Wylt):

Nant Ffwrddwylt (sometimes known as Nant Cwm Farteg) is a stream that runs through Cwm Dyffryn, within the county borough of Neath Port Talbot, Wales, from the village of Bryn, through the village of Goytre and the district of Taibach in Port Talbot, to the sea. The stream was originally a tributary of the River Afan but was diverted in the 18th century into the ironworks at what was to become Port Talbot to provide a source of water. It now flows into Port Talbot Docks.

Modelled flood levels and extents:

Modelled flood levels and flood extents have been received from the NRW as part of a flood data request (NRW ref: AT119274a). The results summarised below are taken from Port Talbot Harbourside Hydraulic Model. The 1 in 100, 1 in 100 + climate change and 1 in 1000 in defended and un-defended scenarios have been provided.

Return Period	Defended	Un defended
1:100 year	Outside	Outside
1:100 year plus climate change	0.15m depth and 0.15m/s velocity	0.15m depth and 0.15m/s velocity
1:1000 year	0.15m depth and 0.30m/s velocity	0.15m depth and 0.30m/s velocity

The site is shown to be entirely outside of the present day defended and un defended 1:100 year modelled flood extent, and will therefore remain dry during the modelled 1:100 year scenario at the present day.

The site would be susceptible to flooding, for return periods in excess of the present day 1:100 year event.

The Port Talbot Harbourside PAR Project Report states that climate change is modelled by increasing the fluvial inflows by 30% - this is the Change Factor / Central Allowance for the West Wales River Basin District anticipated by the 2080s, as required under the Flood Consequence Assessments: Climate Change Allowances government guidance. It should be noted that the tidal boundary to the model has also been updated using the estimated annual increase for difference epochs (i.e. peak tidal levels increase by approximately 1.06m over the next 100 years).

For the defended and un defended 1:100 year event with allowance for climate change the site could be inundated with up to 0.15m of floodwater, with a velocity of 0.15m/s. For the defended and un defended 1:1000 year event the site could be inundated with up to 0.15m of floodwater, with a velocity of 0.30m/s.

Flood defences:

According to NRW there are no recorded flood defences in the vicinity of the site.

Historical flood records:

According to NRW they hold no historic flooding information in this area.

Pluvial (Surface Water):

Pluvial (surface water) flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

In 2013 the EA and NRW, working with Lead Local Flood Authorities (LLFAs), produced an updated Flood Map for Surface Water. It is considered to represent a significant improvement on the previous surface water flood maps

available, both in terms of method and representation of the risk of flooding. The modelling techniques and data used are considerably improved, and also incorporated locally produced mapping where this is available to represent features best modelled at a local scale.

The Flood Map for Surface Water assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual probability of flooding is shown in brackets):

- 1:30 (3.3%)
- 1:100 (1%)
- 1:1000 (0.1%)

The mapping below shows the Risk of Flooding from Surface Water centred on the site. Please note that NRW do not consider this information suitable to be used to identify the risk to individual properties or sites. It is useful to raise awareness in areas which may be at risk and may require additional investigation.

The Natural Resources Wales Surface Water Flood Map suggests that the site lies outside of areas of "High", "Medium" and "Low" risk of flooding from surface water.

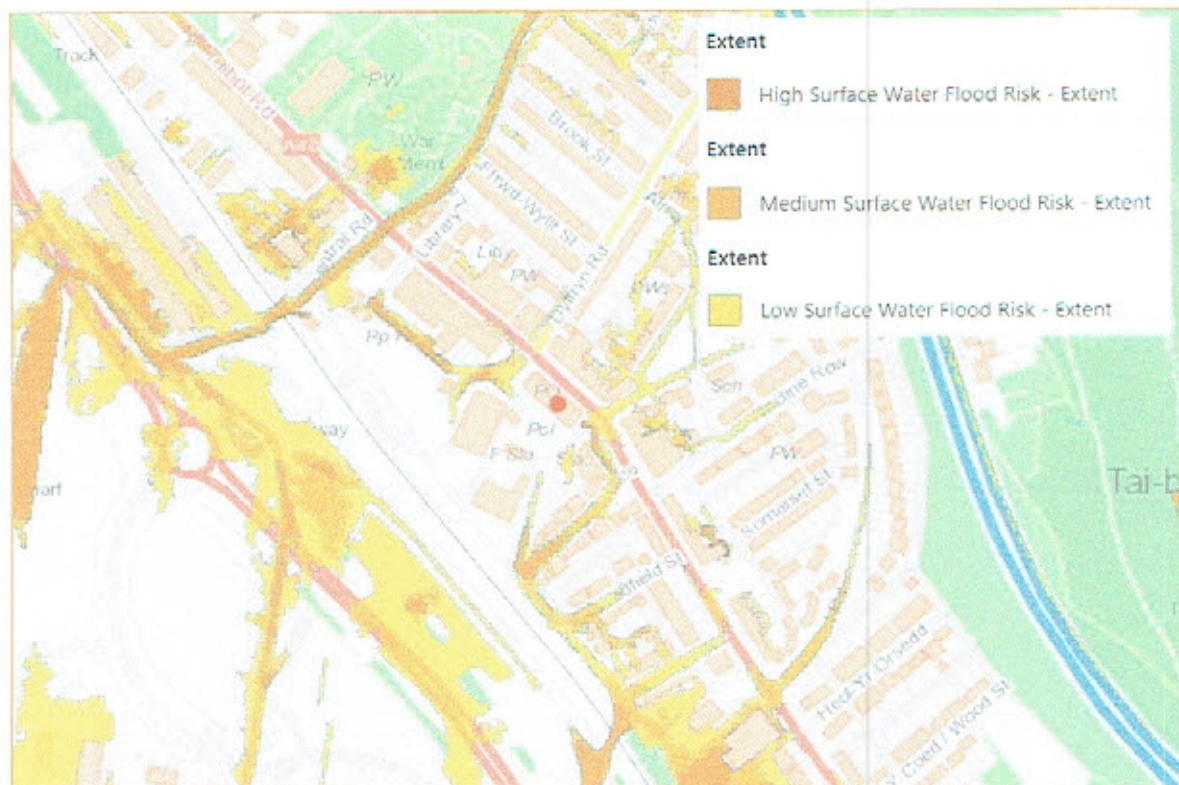


Figure 5: Extract from Natural Resources Wales Surface Water Flood Map (Source: NRW)

Groundwater:

Groundwater flooding occurs as a result of water rising up from the underlying rocks or from water flowing from abnormal springs. This tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands or river gravels in valley bottoms underlain by less permeable rocks. Groundwater flooding takes longer to dissipate because groundwater moves much more slowly than surface water and will take time to flow away underground.

No information has been provided to suggest that the site is susceptible to groundwater flooding.

Sewer Surge:

Sewer flooding occurs when the sewer network cannot cope with the volume of water that is entering it. It is often experienced during times of heavy rainfall when large amounts of surface water overwhelm the sewer network causing flooding. Temporary problems such as blockages, siltation, collapses and equipment or operational failures can also result in sewer flooding.

All Water Companies have a statutory obligation to maintain a register of properties/areas which have reported records of flooding from the public sewerage system, and this is shown on the DG5 Flood Register. This includes records of flooding from foul sewers, combined sewers and surface water sewers which are deemed to be public and therefore maintained by the Water Company. The DG5 register records of flood incidents resulting in both internal property flooding and external flooding incidents. Once a property is identified on the DG5 register, water companies can typically put funding in place to address the issues and hence enable the property to be removed from the register. It should be noted that flooding from land drainage, highway drainage, rivers/watercourses and private sewers is not recorded within the register.

No information has been provided to suggest that the site is susceptible to sewer surge flooding.

Other Sources:

The Natural Resources Wales Risk of Flooding from Reservoirs Map suggests that the site lies within the "Maximum extent of flooding" from reservoir failure. The Natural Resources Wales also advise on their website that reservoir flooding is extremely unlikely. All major reservoirs have to be inspected by specialist dam and reservoir Engineers. These inspections are monitored and enforced by the Natural Resources Wales themselves. The risk to the site from reservoir flooding is therefore minimal and is far lower than that relating to the potential for fluvial flooding to occur.

There do not appear to be any further artificial (man-made) sources of flood risk (such as raised canals) in the vicinity of the site.

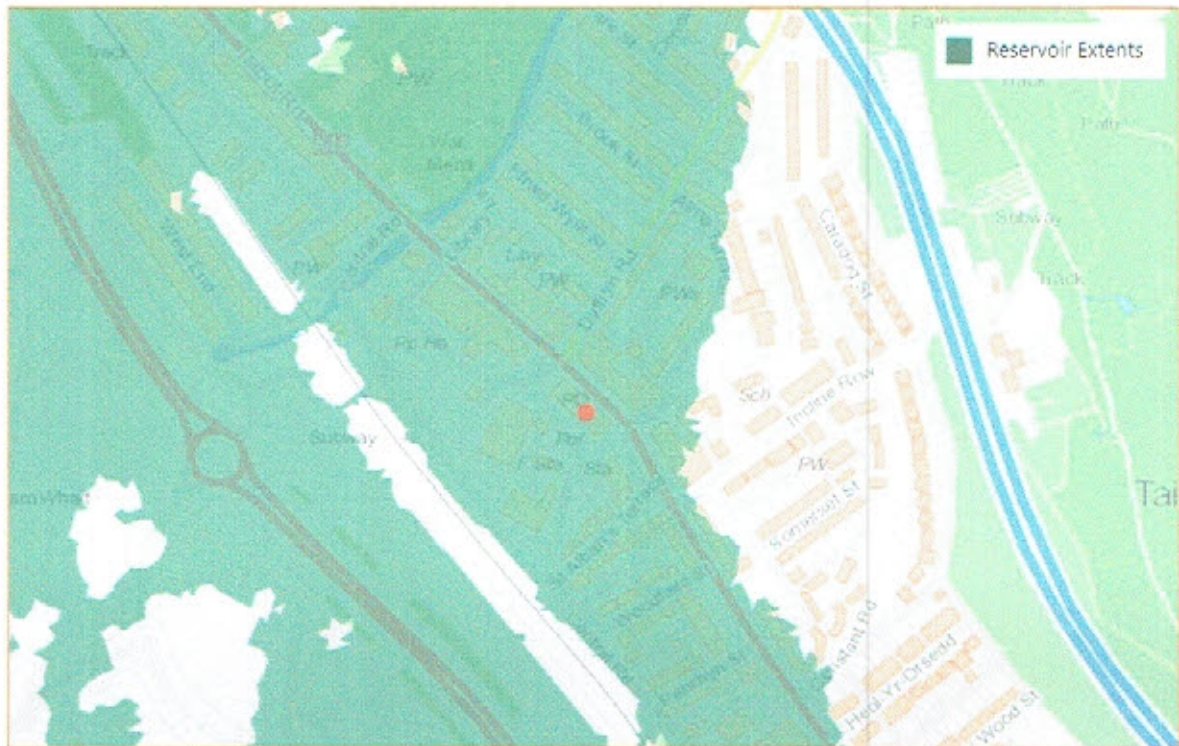


Figure 6: Extract from Natural Resources Wales risk of flooding from reservoirs (Source: NRW)

Flood Risk Management Measures

Vulnerability to flooding:

TAN15 classifies property usage by vulnerability to flooding.

The existing site usage is a ground floor shop (Use Class A1) and first floor flat (Use Class C3), which is classified as "less vulnerable development" and "highly vulnerable development" respectively under TAN15.

Post development, the site will remain "less vulnerable development" and "highly vulnerable development" t. as the application is for the Proposed part change of use of shop (Use Class A1) and first floor flat (Use Class C3) to a five-person House of Multiple Occupation (HMO) (Use Class C4) together with alterations to fenestration to main building and outbuilding. There will therefore be an intensification of usage post development, with some residential living accommodation located at ground floor level.

Particular flooding consequences may not be acceptable for particular types of development. For example, allowing residential development in areas which are subject to high risks of flooding can result in a traumatic impact on people's lives. The precautionary framework identifies the vulnerability of different land uses to flooding, and for this purpose, development has been subdivided into three categories:

Development category	Types
Emergency services	hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood
Highly vulnerable development	all residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites
Less vulnerable development	general industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites

Table 2: Vulnerability to flooding categories

The Emergency Services category describes facilities which need to be operational and accessible at all times. Highly vulnerable development describes development where the ability of occupants to decide on whether they wish to accept the risks to life and property associated with flooding, or be able to manage the consequences of such a risk, is limited. It also includes those industrial uses where there would be an attendant risk to the public and the water environment should the site be inundated. Less vulnerable development describes development where the ability of occupants to decide on whether they wish to accept such risks is greater than that in the highly vulnerable category. The vulnerability attributed to a mixed use proposal will be defined by the most vulnerable use.

There are uses which are considered to be exceptions to the general rule, and have not been classified above, because they are required in a fluvial, tidal or coastal location by virtue of their nature. These include boatyards, marinas, essential works required at mooring basins, and development associated with canals.

Physical Design Measures:

In accordance with section A1.14 of TAN15 there is a frequency threshold of flooding below which flooding of development should not be allowed. The following table, taken from TAN15, provides indicative guidance as to

what the frequency threshold could be for different types of development in terms of annual probability of occurrence:

Type of development	Threshold frequency	
	Fluvial	Tidal
Residential	1%	0.5%
Commercial / retail	1%	0.5%
Industrial	1%	0.5%
Emergency services	0.1%	0.1%
General infrastructure	1%	0.5%

Table 3: TAN15 Flood frequency thresholds

The site is shown to be entirely outside of the defended and undefended 1:100 year modelled flood extents at the present day.

The modelled outputs provided by NRW show a maximum depth of floodwater on site of 0.15m for a 1:100 year event including climate change. The proposal however is for the change of use of the existing building, and as such it will not be possible to raise the ground floor level above modelled flood levels.

Based on the plans provided, no bedrooms are located at ground floor level, and internal access is maintained from the ground floor to the first floor level. With a ground floor to underside of first floor height of 3.00m (based on the plans provided) the first floor (and therefore all bedrooms) will therefore be dry for the design event.

The depth of flooding on site for the defended 1:100 year event with allowance for climate change is 150mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.

To help protect against flooding during extreme events, the application has agreed to implement flood resistant design measures into the ground floor, in consultation with the Local Authority building control department. These measures can include the following:

- Solid concrete ground floor slab, with waterproof membrane;
- Waterproof screed used on floors;
- Closed-cell foam used in wall cavities;
- Waterproof ground floor internal render;
- External walls rendered resistant to flooding to first floor level;
- Exterior ventilation outlets, utility points and air bricks fitted with removable waterproof covers;
- Ground floor electrical main ring run from first floor level; and on separately switched circuit from first floor;
- Electrical incomer and meter situated at first floor level or above;
- Boilers, control and water storage / immersion installed at first floor level or above;
- Gas meter installed at first floor level or above;
- Plumbing insulation of closed-cell design;
- Non-return valves fitted to all drain and sewer outlets;
- Manhole covers secured;
- Anti-syphon fitted to all toilets;
- Built-in furniture units of solid, water resistant material;
- Use of MDF carpentry (i.e. skirting, architrave, built-in storage) avoided at ground floor level;
- Stairs of solid hardwood construction with wood faces treated to resist water penetration.

Safe Escape:

TAN 15 requires a route of safe escape for all residents and uses to be provided from new residential properties in flood zone C.

Type of development	Maximum depth of flooding (mm)	Maximum rate of rise of floodwaters (m/hr)	Maximum speed of inundation of flood risk area (hrs)	Maximum velocity of floodwaters (metres/sec)
	Property Access			Property Access
Residential (habitable rooms)	600 600	0.1	4	0.15 0.3
Commercial & Retail	600 600	0.3	2	0.15 0.3
Industrial	1000 1000	0.3	2	0.3 0.45
Emergency Services	450 600	0.1	4	0.15 0.3
General Infrastructure	600 600	0.3	2	0.3 0.3

Table 4: TAN15 Table A1.15

Table A1.15 shows the threshold frequency beyond which proposed development would be expected to flood under extreme conditions (1:100 year event with allowance for climate change). For new residential development a maximum flood depth of 600mm would be allowance at the property and for the site access, and maximum velocity of 0.15m/s at the property and 0.3m/s for the site access for the 1:100 year event with allowance for climate change.

The site is entirely outside of the defended and undefended modelled 1:100 year scenario at the present day. The depth of flooding on site and along the site access for the defended and undefended 1:100 year event with allowance for climate change is 150mm, with a velocity of 0.15m/s. This is below the tolerable allowances in TAN15.

The modelled flood depth and flood velocity maps provided by NRW shows that an escape route can be provided with a flood depth of below 600mm and a flood velocity of under 0.3m/s for the 1:100 year event with allowance for climate change.

Site users should exit the site and travel west along Commercial Road, then north along Dyffryn Road.

In the case of an extreme flood event without warning, residential occupants and users should seek refuge on the first floor of the building. Internal access will be maintained from the ground floor to the first floor and no bedrooms are located at ground floor level.

Owners, occupants and tenants should follow the warning and evacuation procedure detailed in the following section.