

Cymric House, Port Talbot, Flood Consequence Assessment

April 2021

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This report describes work commissioned by Jeanette Evans, on behalf of Victor Johnson, by an email dated 04 March 2021. Gwyn Jones of JBA Consulting carried out this work.

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Purpose

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Abbreviations

Abb	Abbreviation
AEP	Annual Exceedance Probability
BGS	British Geological Survey
CC	Climate change
DAM	Development Advice Map
ESTRY	1D solver component of TUFLOW
FCA	Flood Consequence Assessment
Flood Modeller	1D hydraulic modelling software
JBA	Jeremy Benn Associates
m AOD	metres Above Ordnance Datum
MHW	Mean High Water
NPTCBC	Neath Port Talbot County Borough Council
NRW	Natural Resources Wales
TAN	Technical Advice Note
TUFLOW	Two-dimensional Unsteady FLOW (a hydraulic model)

1 Introduction

1.1 Terms of Reference

JBA Consulting has been commissioned by Victor Johnson to prepare a Flood Consequence Assessment (FCA) for the proposed development of Cymric House. This site is located in central Port Talbot, South Wales. The FCA has been prepared in support of a planning application to change the use of Cymric House from commercial to residential.

This FCA has been prepared in accordance with Planning Policy Wales and Technical Advice Note 15: Development and Flood Risk (TAN-15)¹.

1.2 FCA Requirements

This FCA follows Welsh Government guidance on development and flood risk, as set out within TAN-15. Where appropriate, the following aspects of flood risk will be addressed over the expected lifetime of any potential future development:

- The likely mechanisms of flooding;
- The likely source of flooding;
- The depths of flooding through the site;
- The speed of inundation of the site;
- The rate of rise of flood water through the site;
- Velocities of floodwater across the site;
- Overland flood routes;
- The effect of access and egress and infrastructure; and
- The impact of the development in terms of flood risk on neighbouring properties and elsewhere on the floodplain.

1 Welsh Assembly Government. Planning Policy Wales. Technical Advice Note 15: Development and Flood Risk. July 2004.

2 Site Description

2.1 Site summary

Cymric House is located on Bethany Square in the centre of Port Talbot, South Wales – see Figure 2-1. The approximately 490m² site is surrounded by urban developments, including commercial and retail units to the north and east, places of worship to the west, and a carpark to the south. Further site details are provided in Table 2-1.

The Afon Afan main river is located approximately 40m to the north-west of the site, where it flows in a south-westerly direction towards Swansea Bay. The tidal Mean High Water (MHW) level on the Afan is approximately 550m to the south-west of the site.

Table 2-1 – Site summary

Site name	Cymric House
Site Area	490m ²
Existing land use	Office space
Purpose of development	Residential Flats
Postcode	SA13 1PQ
OS NGR	2765 1900
Local Planning Authority	Neath Port Talbot County Borough Council
Lead Local Flood Authority	Neath Port Talbot County Borough Council

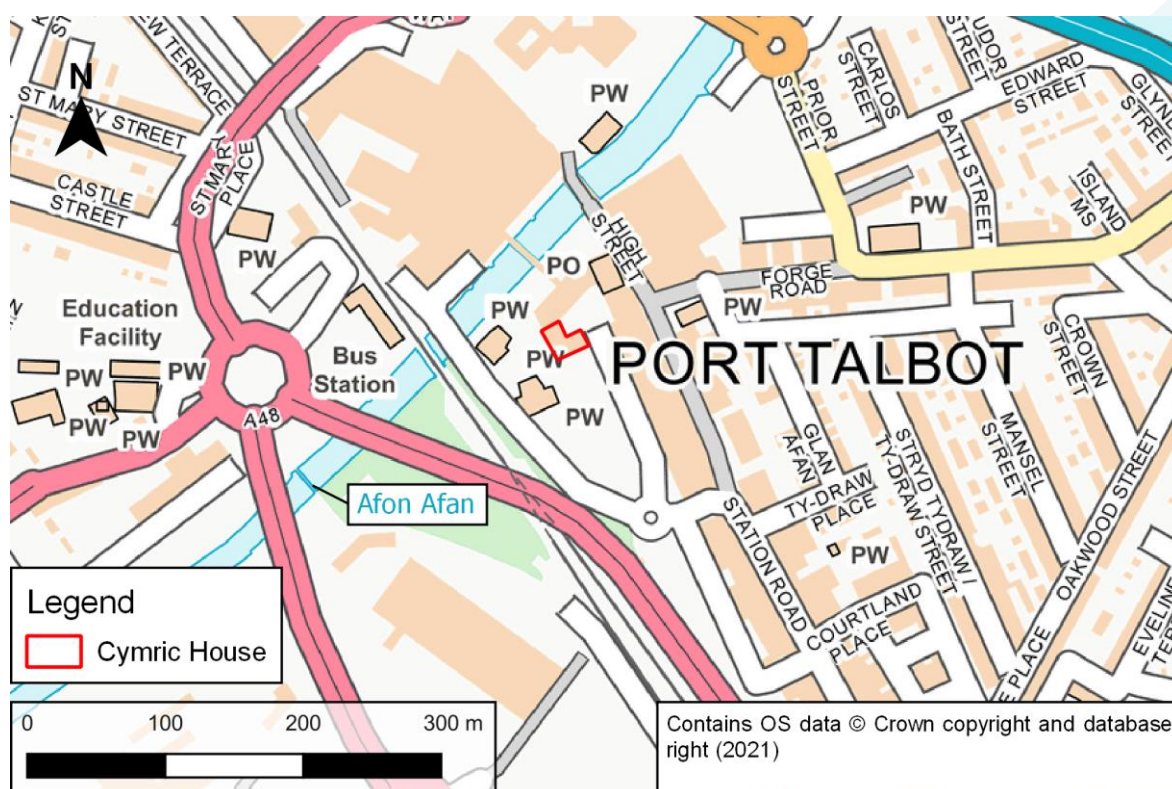


Figure 2-1 - Site location within Port Talbot

2.2 Existing land use and site topography

The site of Cymric House is currently occupied by commercial office space.

Figure 2-2 shows a satellite image of the current site and surrounding areas.

Topographic survey obtained from the client show that the site topography is relatively flat, with levels along the site footprint varying between 10.13m AOD on the south-western corner to 9.54m AOD on the south-eastern. Floor threshold levels within the site vary from 10.07m AOD on the north-eastern boundary to 10.13m AOD on the western. The surrounding area is of similar elevations, with levels across Bethany Square immediately to the north-east of the site varying from 9.96m AOD on the west side to 9.46m AOD on the east. Levels to the west of the site vary from 10.00m AOD on the site boundary to 10.23m AOD on the footprints of the Riverside and Carmel Churches. The ground slopes slightly to the south-east towards Station Road to 9.28m AOD approximately 60m south-east of the site. The site topographic survey can be seen in Appendix A.



Figure 2-2 - Satellite image of current site

2.3 Ground conditions and drainage

The British Geological Survey (BGS) Geology of Britain viewer² was consulted to view the local geological conditions. The site is underlain by the South Wales Middle Coal Measures Formation, consisting of mudstones, siltstones and sandstones. There are alluvial and tidal superficial deposits consisting of clay, silt, sand, and gravel.

The soils on site were determined from the Cranfield University Soilscape viewer³. The site is on the border between freely draining acid loamy soils over rock; and loamy and clayey soils of coastal flats with naturally high groundwater.

As the site is surrounded by tarmacked areas, the site is likely to drain through overland flow to surface water sewers and evapotranspiration.

2.4 Development proposal

The proposed development would change the use of the existing building from office space (Class B1) to 11 self-contained flats (Class C3), including changes to fenestrations. The development would include residential premises on the ground and first floors. An extract of the ground floor plans is included below in Figure 2-3. The proposed plans can be seen in Appendix B.



Ground Floor Outline

Figure 2-3 - Extract of ground floor plans

2 BGS Geology of Britain viewer <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>

3 Cranfield University Soilscape Viewer <http://www.landis.org.uk/soilsapes>

3 Flood Risk Assessment

A review of the existing flood risk data relating to the site has been undertaken. The main sources of flood risk information are Natural Resources Wales's (NRW's) online mapping and the Neath Port Talbot Flood Risk Management Plan⁴.

Table 3-1 - Summary of flood risk

Source of Flooding	Onsite Presence	Description
Flood Risk from River	Yes	The site is in the Low risk zone for flooding from rivers – see section 3.2.
Flood Risk from the Sea	No	The site is not shown to be at risk of tidal flooding – see section 3.3
Surface Water and Small Watercourses	No	The site is not shown to be at risk of flooding from surface water and small watercourses – see section 3.4.
Reservoirs	No	The site is not shown to be at risk of flooding from reservoirs – see section 3.5.
Groundwater	No	The site is not considered to be at risk of groundwater flooding - see section 3.6.
Sewers	No	The site is not considered to be at risk of sewer flooding - see section 3.7.

3.1 Historic Flood Risk

The Neath Port Talbot Flood Risk Management Plan mentions that flooding from the Afan has “historically been the cause of a number of significant flood events” within Port Talbot and represents the greatest flood risk to the town. However, the Flood Risk Management Plan also notes that the town is now protected by significant NRW-maintained flood defences along the banks of the Afan.

There is no explicit record of flooding to the site and it is not contained within NRW's Historic Flood Extents dataset.

3.2 Flood Risk from Rivers

NRW's Flood Risk Assessment Wales (FRAW) map shows that the site is within the Low risk zone of flooding from rivers - see Figure 3-1. This means that the site has between 0.1% - 1% AEP (Annual Exceedance Probability) of flooding in any given year from fluvial sources.

⁴ Neath Port Talbot Flood Risk Management Plan (2015)
<https://www.npt.gov.uk/media/5399/floodriskmanagementplan15.pdf?v=20170627002320>

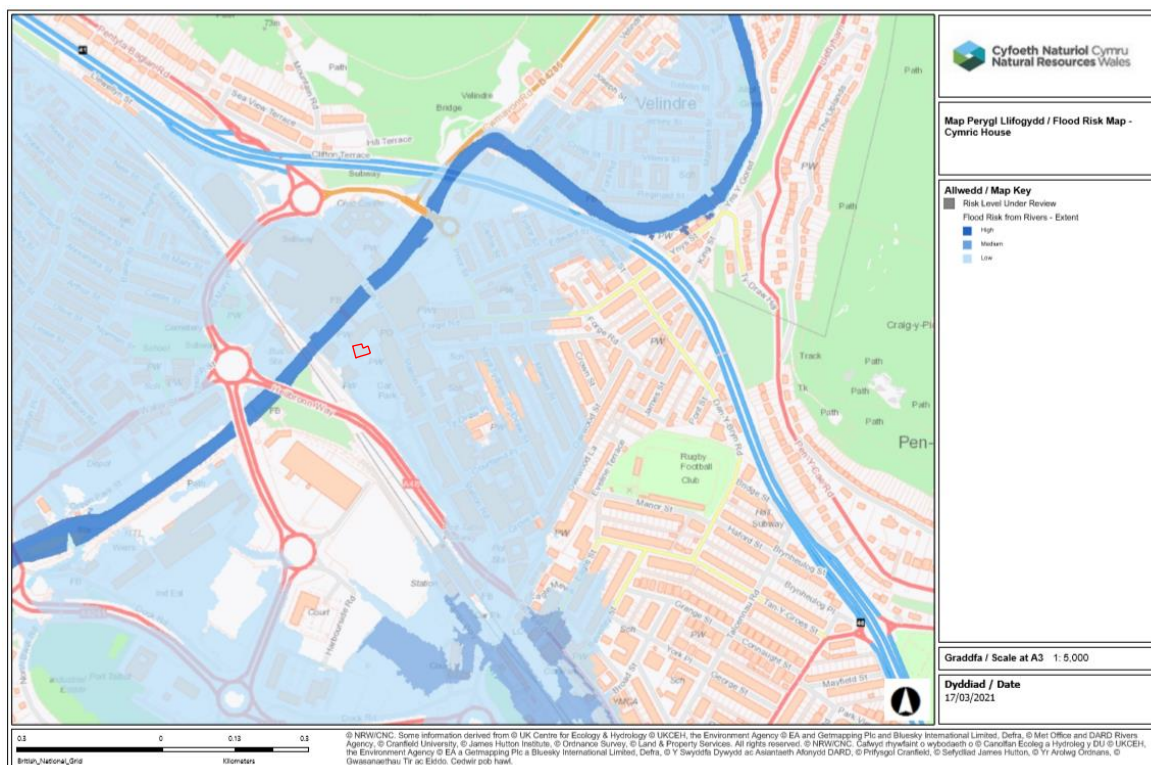


Figure 3-1 - NRW Flood Risk from Rivers Map

3.3 Flood Risk from the Sea

Figure 3-2 below shows that the site is not considered to be at risk from tidal flooding in the present day.

FRAW mapping does not show whether the site may be at flood risk from the sea over the 100 year lifetime of the development due to the effects of climate change. Consequently, the predicted extreme sea levels have been calculated for Port Talbot for the present-day (2021) and in the future accounting for 100 years of climate change (2121). This has been based on the latest guidance^{5,6} and the best available data. The predicted levels for key TAN15 return periods are shown in Table 3-2.

Table 3-2: Maximum sea levels (m AOD) for 2021 and 2121.

	T200	T1000
Present-day (2021)*	6.38	6.69
With 100 years of climate Change (2121)	7.50	7.81

*Uplifted from 2017 base year to 2021.

Table 3-2 illustrates that the predicted extreme tidal levels, now and in the future, are >2m below of the ground level of site and therefore the site will be at little or no risk of flooding from the sea over the lifetime of the development.

5 Guidance for Flood Consequence Assessments: Climate Change Allowances (Welsh Government, 2016)

6 Coastal flood boundary conditions for the UK: update 2018. User guide (EA, 2019)

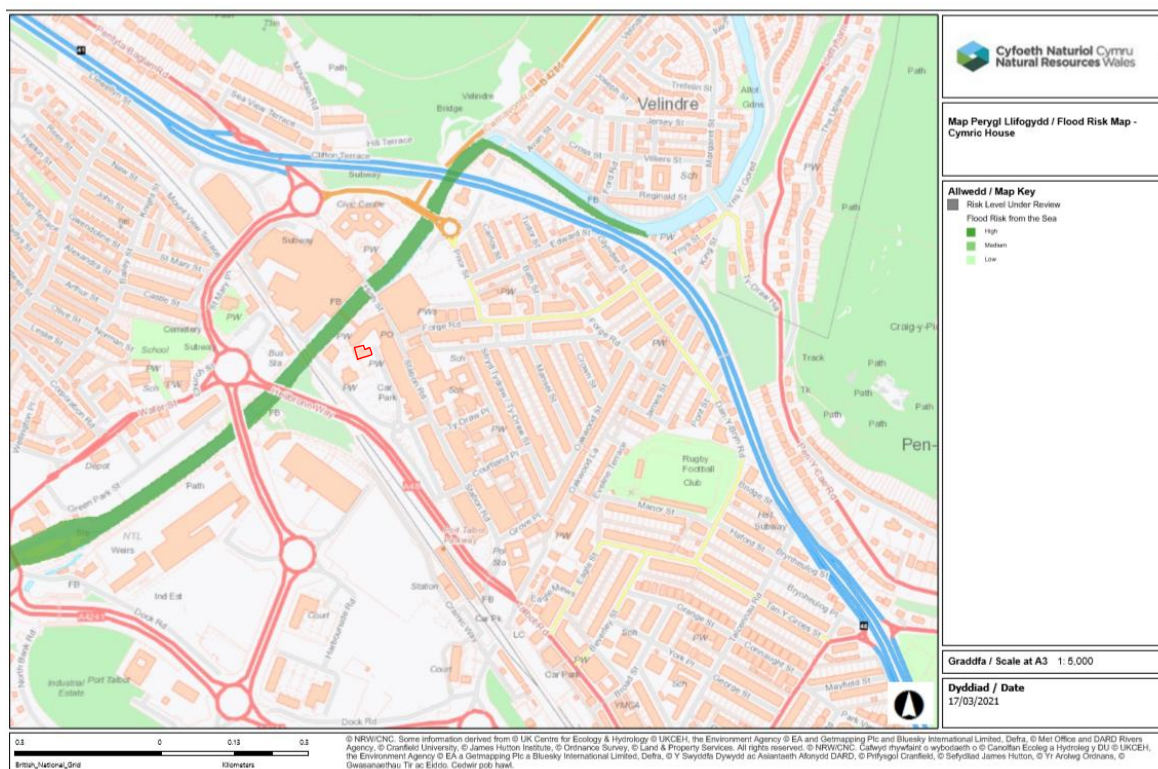


Figure 3-2 - NRW Flood Risk from the Sea Map

3.4 Surface water and small watercourses

NRW's Flood Risk Assessment Wales map shows that the site is not considered to be at risk of flooding from surface water and small watercourses.

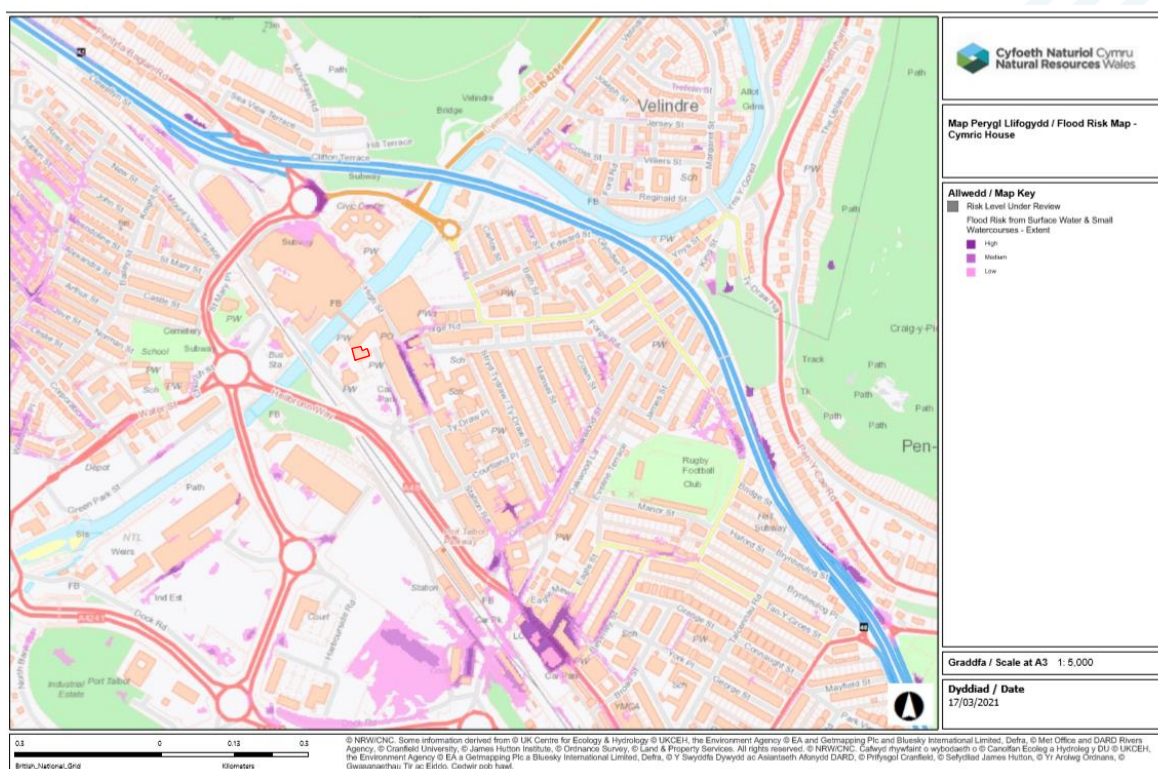


Figure 3-3 - NRW Flood Risk from Surface Water and Small Watercourses Map

3.5 Reservoirs

NRW's Flood Risk Assessment Wales map shows that the site is not considered to be at risk of flooding from reservoirs.

3.6 Groundwater

According to Neath Port Talbot Council's Flood Risk Management Plan, groundwater flooding "occurs as a result of water rising up from the underlying aquifer or from water flowing from abnormal springs", tending to occur "after long periods of sustained high rainfall" in areas "where the water table is more likely to be at shallow depth" or are underlain by major aquifers. The site is partially underlain by areas of naturally high groundwater – see section 2.3. However, there are "no specific areas of historical groundwater flooding recorded in the NPT area", and therefore the site is not considered to be at risk of flooding from groundwater.

3.7 Sewers

Flood risk from sewers is a result of excess surface water entering the sewer drainage network. The Neath Port Talbot Local Flood Risk Management Plan states that 430 sewer events have been recorded by Dŵr Cymru Welsh Water within the council area. However, there is no event mentioned in the Port Talbot area and therefore the site is not considered at risk of flooding from sewers.

4 Planning Policy and Flood Risk

4.1 Planning context

TAN-15 was introduced in 2004 by the Welsh Government. It provides technical guidance related to development planning and flood risk using a sequential characterisation of risk based on the Welsh Government's Development Advice Map (DAM). The initial requirement is to identify the DAM zones and vulnerability classification relevant to the proposed development.

4.1 Development Advice Map (DAM)

Figure 4-1 shows that the site is located in Zone C1 of NRW's Development Advice Map (DAM). Zone C1 is defined as "areas of the floodplain which are developed and served by significant infrastructure, including flood defences". Development is permitted within Zone C1 subject to application of the Justification Test, including the acceptability of flood consequences.

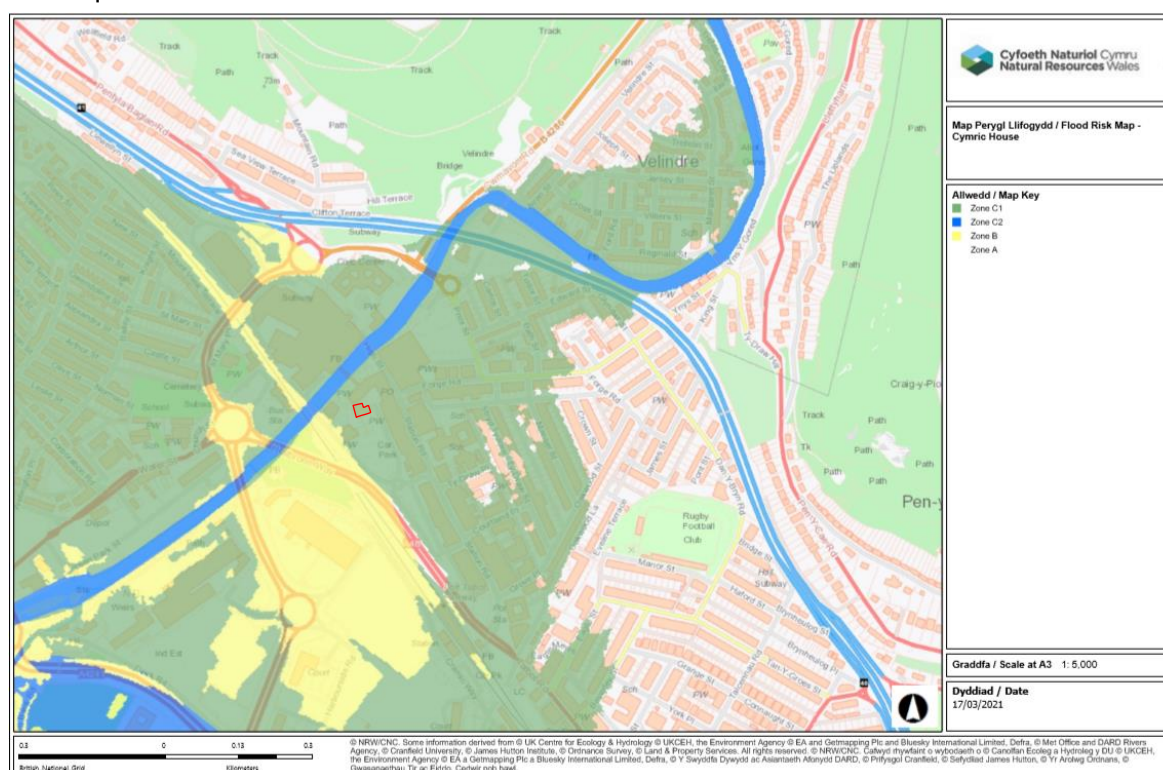


Figure 4-1 - NRW Development Advice Map

4.2 Development vulnerability classification

TAN-15 assigns one of three flood risk vulnerability classifications to a development as shown in Table 4-1 below. The residential nature of the proposed development is categorised a Highly Vulnerable Development.

Table 4-1 - Development categories as defined by TAN-15

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.

4.3 Local Development Plan

The Neath Port Talbot County Borough Council's (NPTCBC) Adopted Local Development Plan (LDP) 2011-2026⁷ contains numerous policy objectives relevant to the proposed development, including SP 5.5, which seeks to support mixed-use regeneration schemes in Port Talbot town centre; and SP 7, which seeks to build 8,760 new dwellings to meet the economic-led growth strategy. The proposed development would help satisfy these objectives.

4.4 Justification test

The Justification Test (TAN15 6.2) refers to 'New Development' and is not clear how or whether the Tests apply to proposals for change of use. Notwithstanding this point, the Justification Test states that development will only be justified if it can be demonstrated that:

- i. *Its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement;*
- or,**
- ii. *Its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;*
- and,**
- iii. *It concurs with the aims of PPW and meets the definition of previously developed land (PPW fig 2.1);*
- and,**
- iv. *The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 found to be acceptable.*

Table 4-2 below summarises how the proposed development shall meet the criteria set out within the Justification Test.

⁷ Neath Port Talbot Council Adopted Local Development Plan 2011-2026
https://www.npt.gov.uk/media/7321/ldp_written_statement_jan16.pdf?v=20170727124344

Table 4-2 - TAN-15 Justification Test applied to the proposed development

TAN-15 Justification Criteria	Comments	Achieved
Its location is necessary to assist a local authority regeneration initiative or strategy, or contribute to key employment objectives, necessary to sustain an existing settlement or region	The proposed development will contribute to delivering NPTCBC's SP 5.5 and SP 7 policy objectives of the Adopted Local Development Plan (2011-2026). These objectives aim to promote mixed-use regeneration schemes in Port Talbot town centre, and provide 8,760 new dwellings, respectively.	Yes
The site meets the definition of previously developed land (i.e. it is not a Greenfield site) and concurs with the aims of Planning Policy Wales (i.e. the presumption in favour of sustainable development)	The site is currently occupied by office space. This meets the definition of previously developed land.	Yes
A Flood Consequence Assessment has been produced to demonstrate that the potential consequences of a flood event up to the extreme flood event (1 in 1000 chance of occurring in any year) have been considered and meet the Acceptability Criteria	Section 5 details the site flood risk assessment using detailed flood modelling data. The model results demonstrate the flood risk at the site can be acceptably managed for the lifetime of the proposed development.	Yes

5 Detailed Assessment of Flood Risk from Rivers

As identified in Section 3, the primary source of flood risk identified at the development site is Flood Risk from Rivers. The following section therefore assesses this source of flood risk in more detail.

5.1 Detailed hydraulic modelling

NRW were contacted to obtain detailed fluvial flood risk modelling data for Port Talbot. The supplied data (FCA Product 6) is sourced from a flood model developed by JBA Consulting as part of a comprehensive flood modelling exercise for Port Talbot commissioned by NPTCBC in September 2016, under a grant by the Welsh Government's Coastal Risk Management Programme. The model was based on an earlier model built by Hyder Consulting for NRW in 2010. A range of 1D and 2D model elements were updated upon review of this model, including: updated hydrology, construction of a new 1D-2D model element for Baglan Brook and Ffrwd Wyllt, and incorporation of new survey data for Port Talbot town centre, Baglan Brook and Ffrwd Wyllt. Full details on these model updates are available from NPTCBC and NRW.

The updated Port Talbot flood model was thoroughly reviewed and subsequently accepted by NRW in July 2017. NRW are now custodians of the model.

The results for the 1% AEP plus climate change and 0.1% AEP defended events were used for this assessment as detailed below.

5.2 Detailed flood model results

This section details the modelled flood extents and depths for the 1% AEP plus climate change and the 0.1% AEP events, as required by TAN15.

5.2.1 1% AEP plus climate change event

Figure 5-1 below shows that the site is predicted to flood in the 1% AEP plus climate change event. A maximum flood depth of 0.13m is predicted within the building footprint with a corresponding peak flood level of 10.12m AOD along the north-west boundary.

However, these results do not account for the existing finished floor level of the building, as shown in the topographical survey (Appendix A). Figure 5-2 shows that flood levels do not exceed the surveyed threshold levels at any of the building entrances. Therefore, based upon this analysis it is concluded that internal flooding of the building is unlikely to occur in this event.

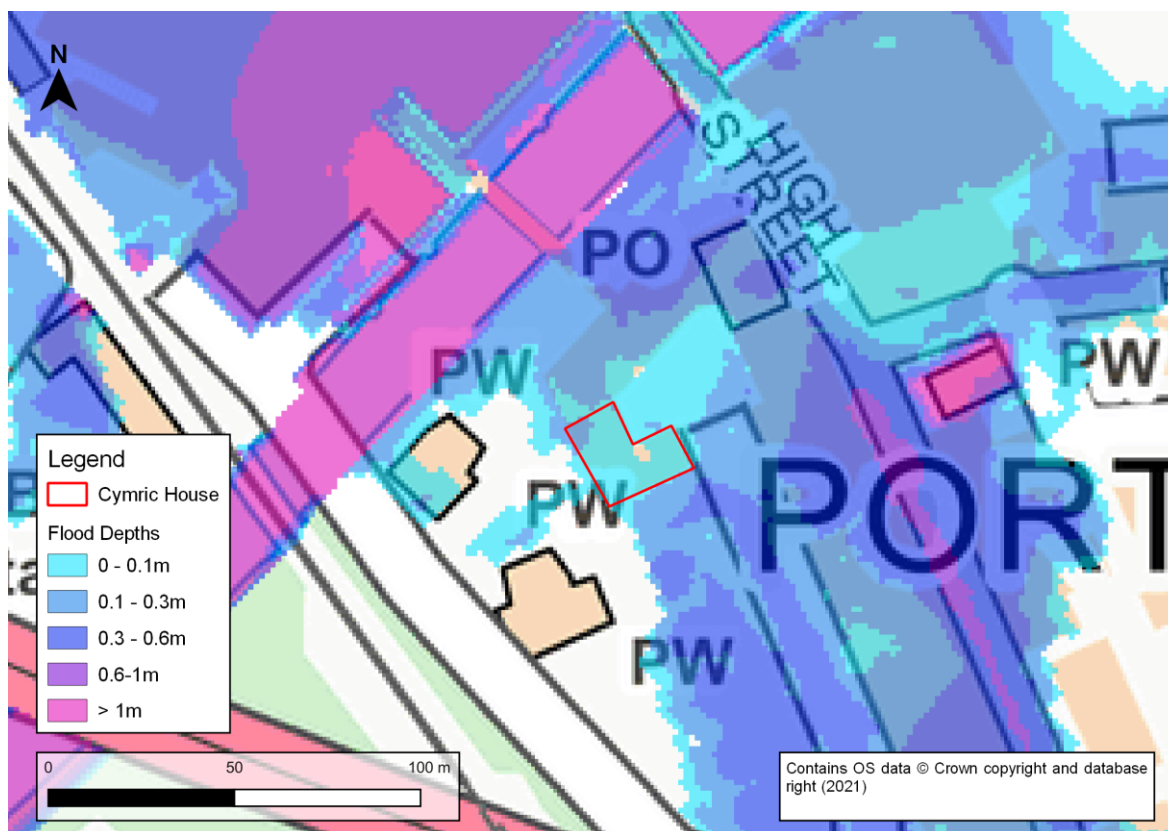


Figure 5-1 - 1% AEP plus CC flood depths

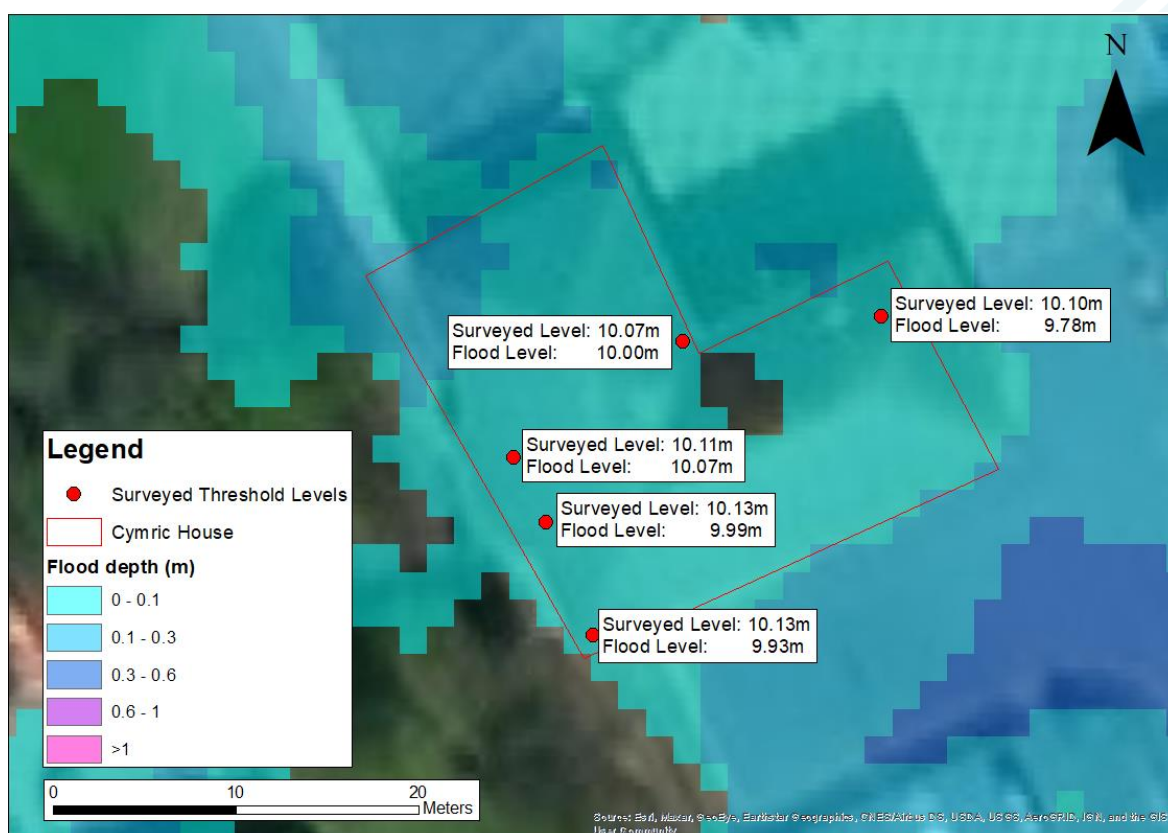


Figure 5-2 - 1% AEP plus CC flood levels compared to surveyed threshold levels

5.2.2 0.1% AEP event

Figure 5-3 shows the site is flooded to a maximum depth of 0.49m in the 0.1% AEP event. The corresponding peak flood level is 10.23m AOD. However, as above, these do not account for the existing finished floor levels of the building. The minimum surveyed floor threshold level is 10.07m AOD, giving a maximum predicted internal flood depth of 160mm in the 0.1% AEP event.

Once the Afan defences are overtopped, there is significant flooding predicted in the centre of Port Talbot, particularly to north, east, and south of the site, with flood depths exceeding 600mm on Bethany Square, 800mm along the access road from Station Road, and 1m on High Street. If needed, there is a route to higher, flood-free ground on the unnamed road 50m to the west of the site through shallow water (<300mm). However, access further afield is likely only to be suitable for emergency vehicles, and so residents are advised to shelter in place.

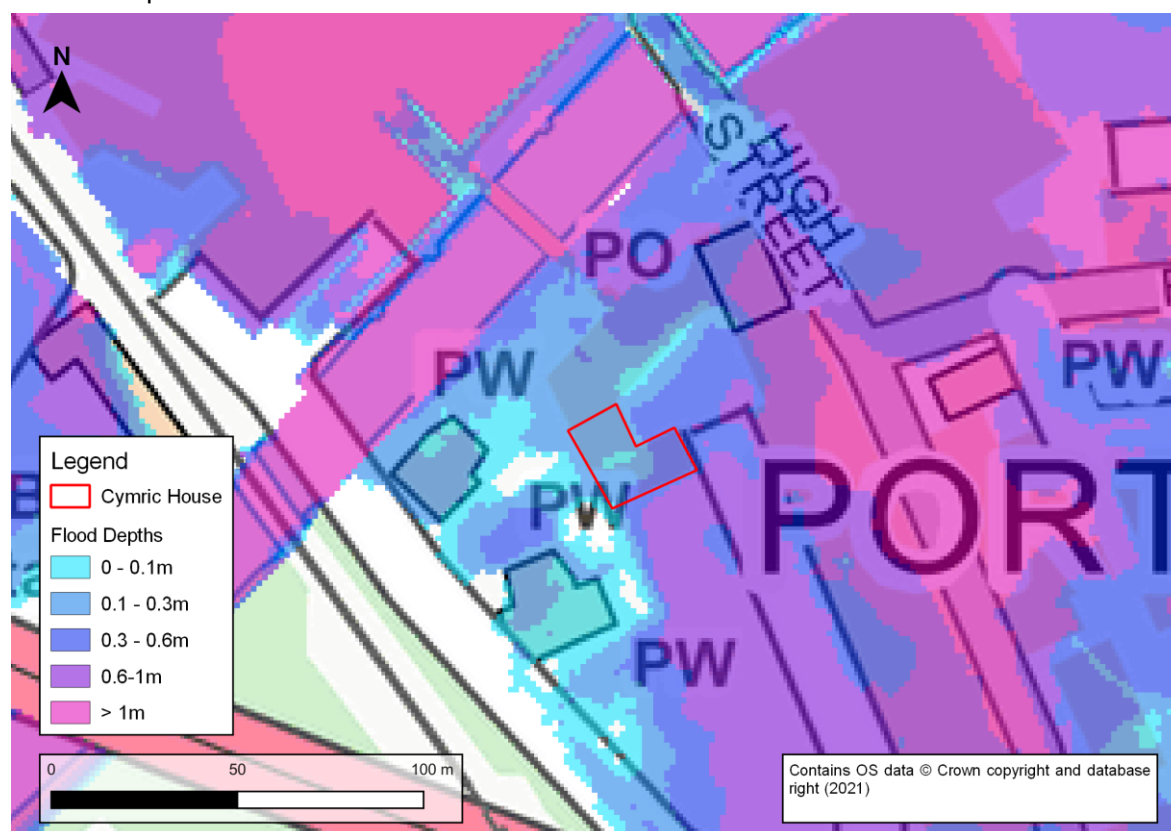


Figure 5-3 - 0.1% AEP flood depths

6 Assessment of Acceptability Criteria

Table 6-1 below details the acceptability criteria required by TAN-15.

Table 6-1 - TAN-15 Acceptability Criteria

TAN-15 Acceptability Criteria	Comments	Satisfied
Developer is required to demonstrate that the site is designed to be flood free for the lifetime of development for a 1 in 100(1%) chance (fluvial) flood event including an allowance for climate change, in accordance with Tan-15 Table A1.14.	Surveyed floor threshold levels exceed the modelled flood levels. Consequently, the development is predicted to be flood-free in the 1% AEP plus climate change event.	Yes
In respect of the residual risk to the development it should be designed so that in an extreme (1 in 1000 chance) event there would be less than 600mm of water on access roads and within property, the velocity of any water flowing across the development would be less than 0.4m/seconds.	In the 0.1% AEP event, the development is predicted to flood to a localised maximum internal depth of 160mm, below the 600mm threshold.	Yes
No flooding elsewhere	The proposed change of use will not alter the footprint of the existing building and so will not affect flood risk elsewhere.	Yes
Flood defences must be shown by the developer to be structurally adequate particularly under extreme overtopping conditions (i.e. that flood with a 1 in 1000 chance of occurring in any given year).	The flood defences in Port Talbot are owned and maintained by NRW, and are regularly inspected.	Yes
Effective flood warnings are provided at the site.	The site is located within NRW's River Afan at Port Talbot flood warning area.	Yes
The developer must ensure that future occupiers of the development are aware of the flooding risks and consequences.	The building occupants should sign up to the NRW Flood Warning Service to provide warning in the event of an extreme flood event. It is recommended that a Flood Emergency Plan is prepared to ensure that future occupiers of the site are aware of the flood risk associated with the ground floor.	Yes
Escape/evacuation routes are shown by the developer to be operational under all conditions.	Once the River Afan flood defences are overtopped widespread flooding across Port Talbot is predicted. Consequently, if flooding occurs and it has not been possible to evacuate from the area in advance, residents are advised to shelter in place and not enter otherwise hazardous floodwaters. If necessary, high ground is available on the unnamed road 50m to the	Yes

	southwest of Cymric House. This is accessible through shallow (<300mm) floodwater even in the 0.1% AEP event. However, access further afield from this location is likely only to be suitable for emergency vehicles due to predicted flood depths of ~600mm.	
The development is designed by the developer to allow the occupier the facility for rapid movement of goods/possessions to areas away from flood waters.	The developed is raised above the 1% AEP plus climate change event. In the extreme 0.1% AEP event internal modelling will not exceed 160mm; a depth that will enable most possessions to be raised above the floodwaters.	Yes
Development is designed to minimise structural damage during a flooding event and is flood proofed to enable it to be returned to its prime use quickly in the aftermath of the flood.	The developed is raised above the 1% AEP plus climate change event. In the extreme 0.1% AEP event internal modelling will not exceed 160mm; a depth that is very unlikely to cause structural damage to the building.	Yes

7 Conclusions and Recommendations

- JBA Consulting (JBA) were commissioned by Victor Johnson to prepare a Flood Consequence Assessment (FCA) in support of the proposed development application of Cymric House, Port Talbot.
- The proposed development is for the change of use of the existing building from office space (Class B1) to 11 self-contained flats on the ground and first floors (Class C3), including changes to fenestrations.
- The proposed development lies within Zone C1 of the Natural Resources Wales (NRW) Development Advice Map (DAM). Zone C1 denotes areas of the floodplain that are developed and are served by significant infrastructure, including flood defences. Development is permitted in Zone C1 subject to application of the Justification Test, and the acceptability of flood consequences.
- The site is at low risk of fluvial flooding, and little or no risk of flooding from the sea, surface water and small watercourses, reservoirs, groundwater, and sewers.
- Detailed hydraulic modelling results was used to assess the risk of fluvial flooding to the site. This demonstrated that the predicted flood levels do not exceed the existing threshold levels of the building in the 1% AEP plus climate change event, thus satisfying A1.14 of TAN15.
- Flood depths in the 0.1% AEP event are predicted not to exceed 160mm within Cymric House, remaining well within the recommended acceptable thresholds of A1.15 of TAN15.
- It is recommended that the building owners and occupiers should sign up to the NRW Flood Warning Service and that a Flood Emergency Plan is prepared to ensure that future occupiers of the site are aware of the flood risk and recommended flood risk management actions.
- It is concluded that on the grounds of flood risk, the proposed development of Cymric House meets the principles and requirements set out in TAN-15 and the aims of Planning Policy Wales

Appendices

A Topographical Survey

B Proposed Site Plans

Offices at

Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
Saltaire
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