

Document Control Sheet

Document Title:	Nant Hall Road, Prestatyn Flood Consequences Assessment	
Document Author(s):	Matthew Williams – Technical Assistant / Bethany Evans – Assistant	
bocument Author(s).	Engineer	
Project Ref / Title:	CPF8152	
Project Manager:	Emyr Gareth	

Revision History

Date	Version No.	Summary of Changes	
07/03/2022	0.01	Initial draft version	
24/03/2022 0.02 Minor changes following review		Minor changes following review	
29/03/2022 0.03 Final draft issued to client		Final draft issued to client	
04/04/2022 1.00 Final version following client review		Final version following client review	
07/05/2024 2.00 An		Amendments following update to proposal and flood model	
13/05/2024 2.01 Minor corrections following client review		Minor corrections following client review	
15/05/2024	2.02	Amendments following update to red line boundary	

Reviews

Name	Title	Date	Version
Emyr Gareth	Principal Engineer	24/03/2022	0.01
Emyr Gareth	Principal Engineer	29/03/2022	0.02
Emyr Gareth	Principal Engineer	10/05/2024	2.00
Emyr Gareth	Principal Engineer	16/05/2024	2.02

Approvals

Name	Title	Date	Version
Emyr Gareth	Principal Engineer	29/03/2022	0.03
Emyr Gareth	Principal Engineer	10/05/2024	2.00
Emyr Gareth	Principal Engineer	16/05/2024	2.02

Distribution

Name	Title	Date	Version
Ngozi Ifere	Client	29/03/2022	0.03
JPH Architects	Architects	29/03/2022	0.03
Ngozi Ifere	Client	04/04/2022	1.00
JPH Architects	Architects	04/04/2022	1.00
Sal Franco	Client	10/05/2024	2.00
Sal Franco	Client	13/05/2024	2.01
Sal Franco	Client	16/05/2024	2.02

© 2023-24 Gwynedd Council / YGC. All Rights Reserved.

Copyright in any or all of this documentation belongs to Gwynedd Council / YGC of Council Offices, Shirehall Street, Caernarfon, Gwynedd, LL55 1SH (the 'Owner') and may not be used, sold, transferred, copied or reproduced in whole or in part, in any manner of form or on any media to any person other than in accordance with the terms of the Owner's agreement or otherwise without the prior written consent of the Owner.



Contact Details
Prepared by:
Ymgynghoriaeth Gwynedd Consultancy
Gwynedd Council
Council Offices
Shirehall Street
Caernarfon
Gwynedd
LL55 1SH

Tel: (01286) 679426

Email: fcrmu@gwynedd.llyw.cymru

Web: www.ygc.cymru

Disclaimer

This document has been prepared solely as a Flood Consequence Assessment report for Nant Hall Developments. Ymgynghoriaeth Gwynedd Consultancy accepts no responsibility or liability for any use, which is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

Copyright

The copyright for this document (including its electronic form) shall remain vested in Ymgynghoriaeth Gwynedd Consultancy, however, Nant Hall Developments shall have a licence to copy/reproduce and use the document for the purpose for which it was provided. Ymgynghoriaeth Gwynedd Consultancy shall not be liable for the use by any person of this document for any purpose other than for which the same was provided by Ymgynghoriaeth Gwynedd Consultancy. This document shall not be reproduced in whole or in part or relied upon by third parties for any use whatsoever without the express written authority of Ymgynghoriaeth Gwynedd Consultancy 2024.

Table of Contents

1.	Intr	troduction		
2.	Site	e Context	6	
	2.1.	Location	6	
	2.2.	Existing Use	7	
	2.3.	Development Proposal	7	
	2.4.	Site Topography	13	
3.	Flo	oding Context	14	
	3.1.	Development Advice Map (DAM)	14	
	3.2.	Flood risk assessment Wales (FRAW) maps	14	
	3.3.	Flooding History	15	
	3.4.	Flood Map for Planning (FMfP)	16	
4.	Flo	od Risk to the Development	19	
	4.1.	Nature of the development	19	
	4.2.	Lifetime of the development	19	
	4.3.	Present day flood risk – Defended	19	
	4.4.	Climate change flood risk - Defended	21	
	4.5.	Flood risk in Breach scenarios	22	
	4.6.	Access/egress	25	
	4.7.	Summary of flooding	27	
	4.8.	Flood risk elsewhere	27	
5.	Cor	nclusions & Recommendations	28	
	5.1.	Conclusions	28	
	5.2	Recommendations and mitigation measures	28	

Table of Figures

Figure 1: Map showing the location of the site on Nant Hall Road, Prestatyn, Denbighshire	6
Figure 2: Existing building	7
Figure 3: Proposed development outline	8
Figure 4: Proposed site plan	9
Figure 5: Proposed ground floor layout	10
Figure 6: Roof proposed plan	11
Figure 7: Concept pictures of proposed design	12
Figure 8: Lidar topographic map of the site	13
Figure 9: Natural Resources Wales' Development Advice Map	14
Figure 10: Flood Risk from rivers, surface water and small watercourses, and tidal (FRAW maps)	15
Figure 11: Extent of the 2013 Rhyl Sea flooding event	16
Figure 12: Flood Map for Planning - Tidal	17
Figure 13: NRW's TAN15 Defended Zones	17
Figure 14: Flood Map for Planning – Surface water & ordinary watercourses	18
Figure 15: Defended 1 in 200-year event present day scenario	20
Figure 16: Defended 1 in 1000-year event present day scenario	20
Figure 17: Defended 1 in 200-year event scenario plus climate change for year 2122	21
Figure 18: Defended 1 in 1000-year event scenario plus climate change for year 2117	22
Figure 19: Ffrith beach breach location	23
Figure 20: Breach 4 – Ffrith Beach T200 PD scenario	24
Figure 21: Breach 4 – Ffrith Beach T200 CC 2117 scenario	24
Figure 22: Access/egress route against Defended T1000 CC 2117 extreme scenario	25
Figure 23: Access/egress route against 1 in 1000-year extreme event (FMfP Zone 2)	26

1. Introduction

Ymgynghoriaeth Gwynedd Consultancy (YGC) has been commissioned by Nant Hall Developments to undertake a Flood Consequence Assessment (FCA) for the redevelopment of Nos.6-8 Nant Hall Road from a former county council office into a mixed-use development. The development proposal includes flats, holiday lets and commercial units. This report has been undertaken in accordance with policy document TAN 15, 'Development and Flood Risk'.

2. Site Context

2.1. Location

The proposed development is located on the western extremity of Nant Hall Road, Prestatyn. It lies in close proximity to the main high street, and 1.06 km south of the coastline (**Figure 1**).

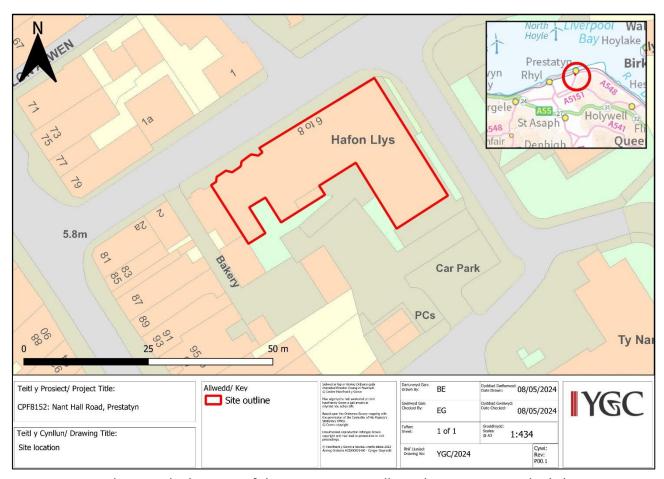


Figure 1: Map showing the location of the site on Nant Hall Road, Prestatyn, Denbighshire

2.2. Existing Use

The existing building is currently a county council office which has been vacant for 5+ years (**Figure 2**).



Figure 2: Existing building

2.3. Development Proposal

The proposal is to renovate and part re-construct the existing commercial building, forming a mixed commercial and residential space. The car park to the south of the existing building will also be redeveloped and form part of the proposed development. The development will retain its commercial use on the ground floor where a commercial area (total 285 m²) is proposed – use class E. A residential aspect will also be introduced to the ground floor, with 5 holiday lets proposed, each ranging from $61 \text{ m}^2 - 74 \text{ m}^2$ in size (**Figure 5**). On the first floor there will be 18 two bed flats.

It is proposed to demolish a section of the existing building and rebuild with a mirror extension (**Figure 3**). It is proposed to have a minimum of 5 entrances/exits across the entire development (**Figure 6**). The Finished Floor Levels (FFL) for the construction element will be the same as that of the existing building, 150 mm above ground level (approx.. 5.50 m).

The proposed development will utilise an existing brownfield site and will occupy a similar footprint to the existing building. The additional extension will be developed on existing impermeable surface and, as such, would be expected to maintain the status quo with respect to site drainage. The local SuDS Approval Body (SAB) should be consulted to ascertain whether a formal application is required for the work; SAB approval is required for developments which consist of construction of >100 m²

with 'drainage implications'. Approval of applications to the SAB sits outside the town and country planning process and the surface water drainage from the site is not discussed in detail in this FCA.

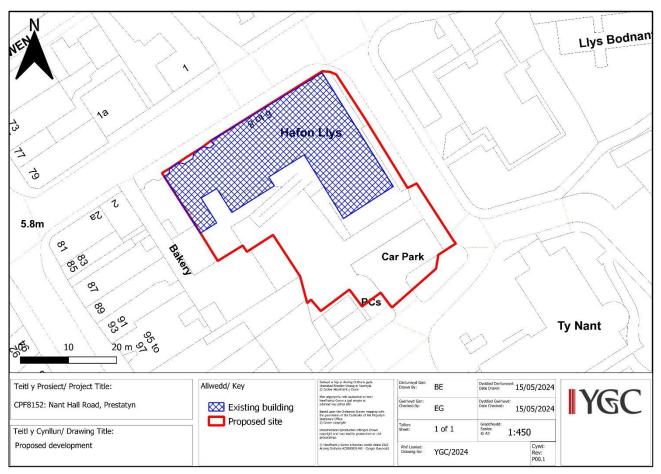


Figure 3: Proposed development outline

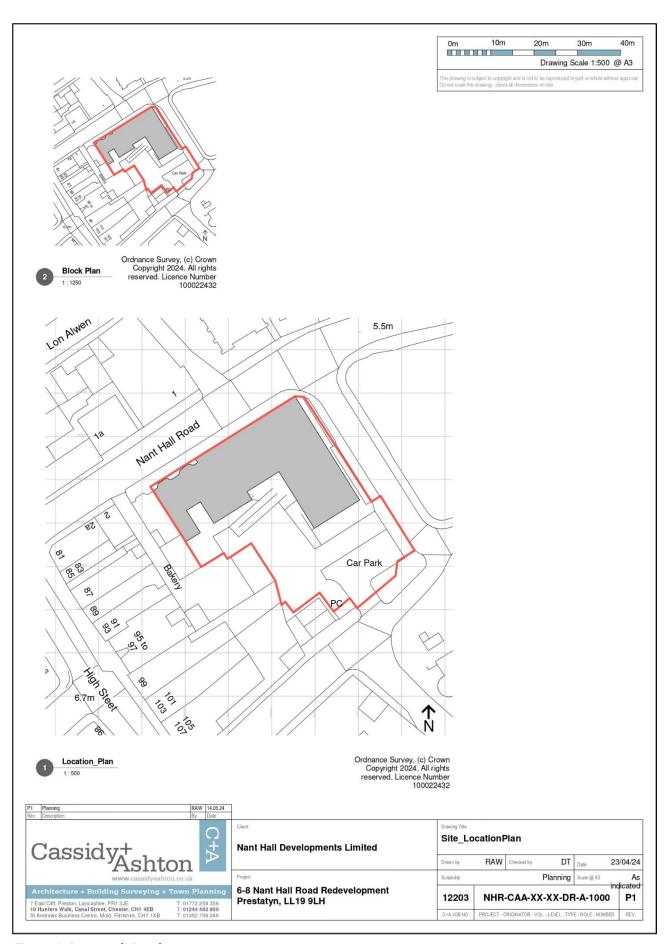


Figure 4: Proposed site plan

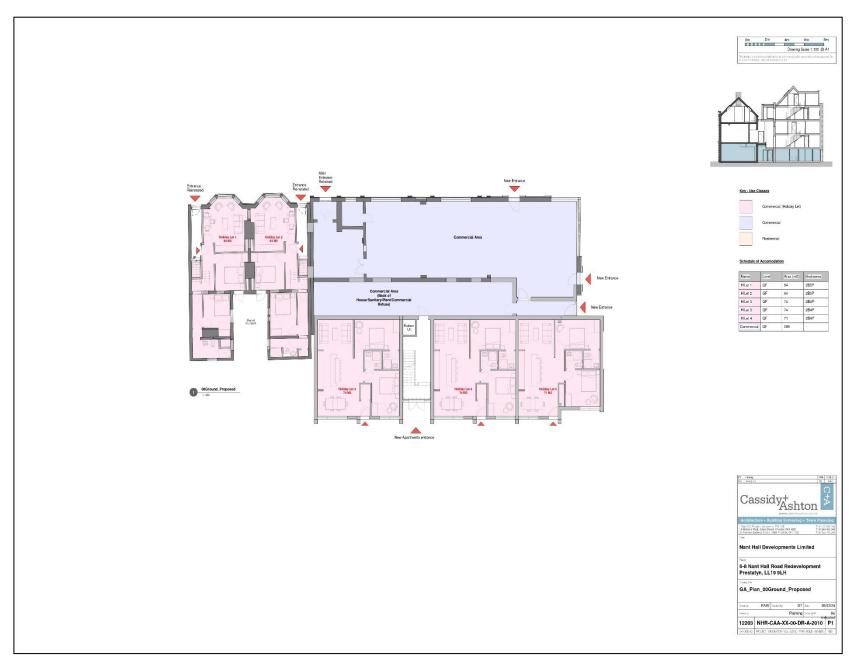


Figure 5: Proposed ground floor layout

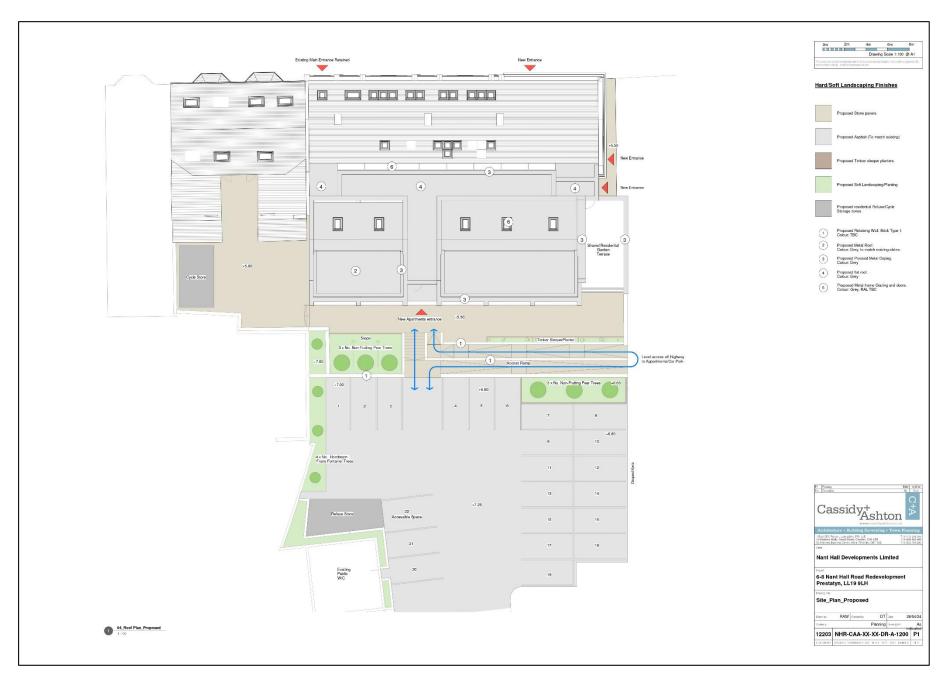


Figure 6: Roof proposed plan



Figure 7: Concept pictures of proposed design

2.4. Site Topography

Land levels in the vicinity of the development fall from south to north, towards the coast (**Figure 8**). The roadway immediately in front of the property lies at 5.60 mAOD, whilst ground levels rise to 6.00 mAOD along the High Street to the south of the junction with Nant Hall Road, and lower to 5.20 mAOD north of the junction. To the east of the property, ground levels also fall away to 5.42 mAOD.

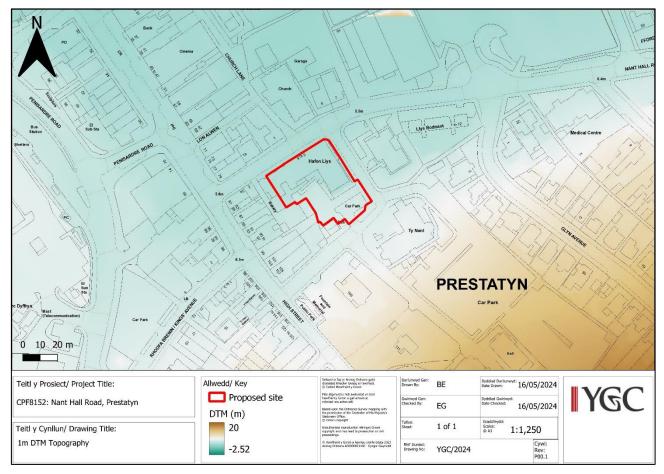


Figure 8: Lidar topographic map of the site

3. Flooding Context

3.1. Development Advice Map (DAM)

The site is located partially within flood Zone C1 (**Figure 9**), with the southern section lying within flood zone A. TAN15 defines Zone C1 as "Areas of the floodplain which are developed and served by significant infrastructure, including flood defences". In this instance, the building and the surrounding area is served by existing coastal defences running between the Afon Clwyd estuary and Talacre to the North, and to the West by levees running along the Afon Clwyd.

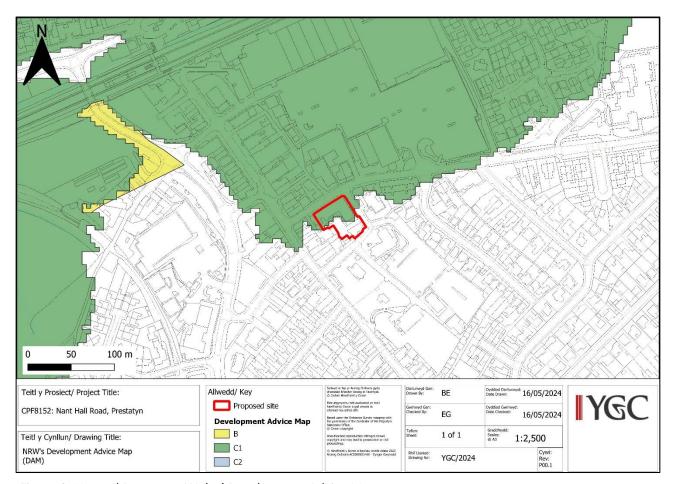


Figure 9: Natural Resources Wales' Development Advice Map

3.2. Flood risk assessment Wales (FRAW) maps

The latest FRAW maps indicate that the building is not within the risk zones of flooding from tidal or fluvial sources (**Figure 10**). However, sections of the proposed development are in contact with the surface water & ordinary watercourse low flood risk outline (1 in 1000-year event).

The impact of climate change is not accounted for in these FRAW maps, nor is the risk posed by a breach of the defences. Breach scenarios are discussed in greater detail in section 4 following an enhanced flood modelling exercise undertaken by Natural Resources Wales.

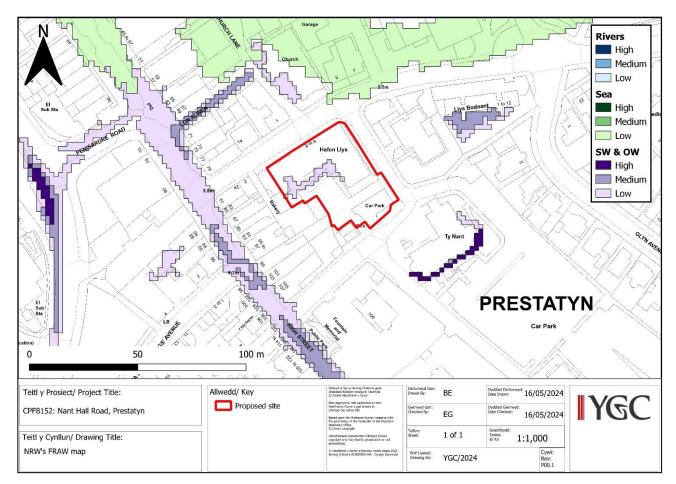


Figure 10: Flood Risk from rivers, surface water and small watercourses, and tidal (FRAW maps)

3.3. Flooding History

Natural Recourses Wales' recorded flood extents map indicates that the area of Prestatyn where the development is situated has not been flooded by the sea previously. Nearby, along the coast from Rhyl Splash Point from Molineaux Road to Rhyl Golf Club suffered severe flooding from the sea in 2013 with 400 homes being evacuated. **Figure 11** shows that the extent of the flood did not reach the vicinity of Nant Hall Road.

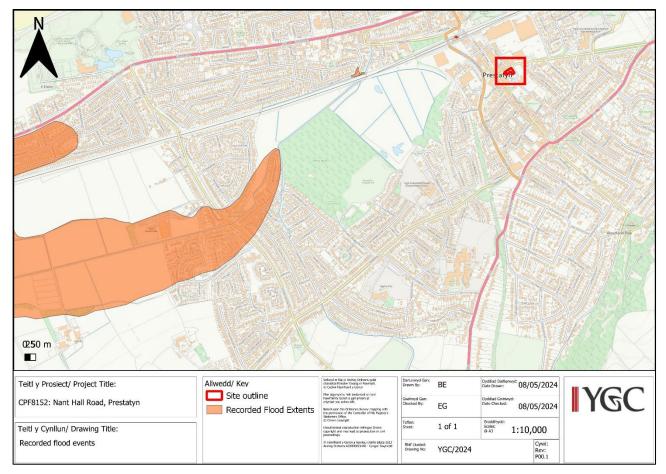


Figure 11: Extent of the 2013 Rhyl Sea flooding event

3.4. Flood Map for Planning (FMfP)

Although not yet statutory, the flood map for planning will soon be used to inform planning decisions with regards to flood risk and should supersede the DAM once a new version of TAN15 is published (currently no firm date for publication but expected to be in the next 12 months). Unlike the FRAW, the FMfP includes an allowance for climate change in all its maps over 100 years. It is therefore prudent to consider this map as well.

The FMfP indicates that the proposed site lies outside of any flood zones for fluvial flooding.

Figure 12 indicates that a large proportion of the proposed site lies within flood zone 3 for tidal flooding (1 in 200/AEP 0.5%+cc). A small section lies within flood zone 2 (1 in 1000/AEP 0.1%+cc). Developments vulnerable to tidal flooding should be flood free within flood zone 3 (1 in 200/AEP 1%+cc). However, the FMfP shows an undefended scenario – i.e., no defences in place – when in reality, the majority of the development site and surrounding area lie within a TAN15 Defended zone (**Figure 13**). TAN15 defended zones are areas that benefit from risk management authority owned flood defence infrastructure that have a minimum Present-Day level of protection of 0.5% (1 in 200) annual event probability (AEP) for the sea.

Figure 14 indicates that the proposed site lies partially within flood zone 2 (1 in 1000/AEP 0.1%+cc) and zone 3 (1 in 100/AEP 1%+cc) for surface water and ordinary watercourse flooding.

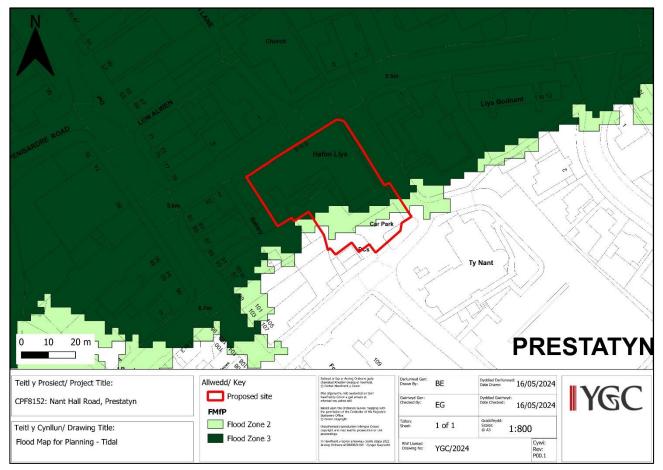


Figure 12: Flood Map for Planning - Tidal

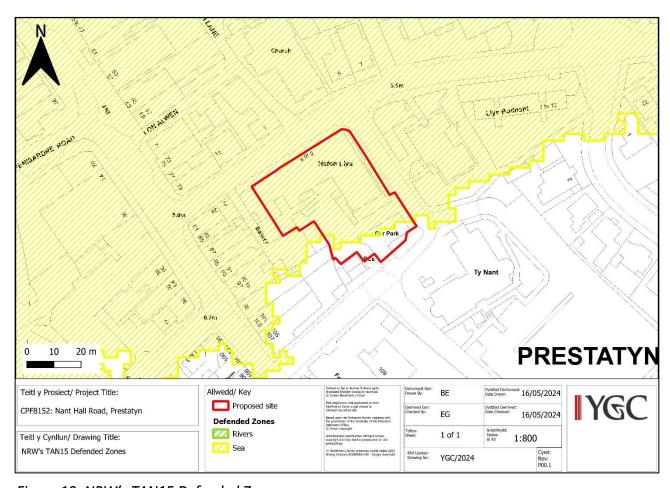


Figure 13: NRW's TAN15 Defended Zones

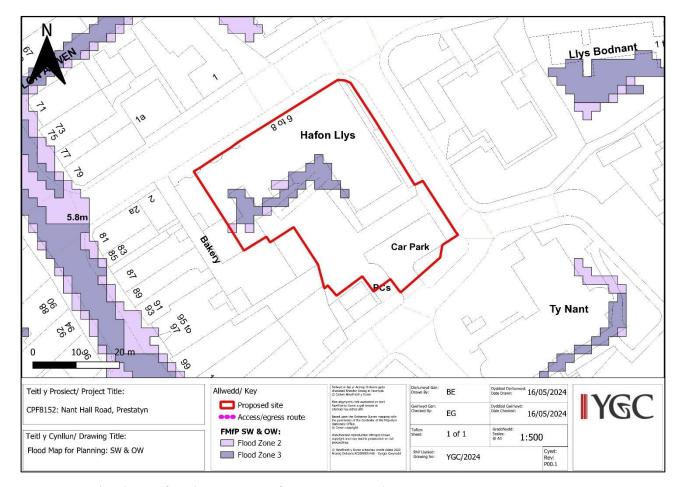


Figure 14: Flood Map for Planning – Surface water & ordinary watercourses

4. Flood Risk to the Development

NRW's latest flood modelling data¹ is considered the most relevant information relating to flood risk at the development site. The results of the Point of Ayr to Pensarn Tidal (PointofAyrtoPensarn_5_V1.1_2018) flood model has been analysed here. The Point of Ayr to Pensarn tidal model includes tidal breaches which have been modelled.

4.1. Nature of the development

TAN15's precautionary framework identifies the vulnerability of different land uses to flooding. Residential developments, such as this development, fall within the 'highly vulnerable development' category. Section 5.2 of TAN15 notes that "the vulnerability attributed to a mixed-use proposal will be defined by the most vulnerable use". Therefore, this constitutes a "change in use" as per TAN15, Section 11.20, as the previous use of the building (offices) was classed as low vulnerability due to the absence of any residential aspect.

4.2. Lifetime of the development

Welsh Government guidance² notes that "lifetime of developments for residential development is 100 years, and for other developments it is considered to be 75 years". It is important to note that the proposal is residential, therefore this report has considered the development lifetime to be 100 years. It is therefore necessary to take account of the potential impact of climate change over the lifetime of the development, including a tidal flood event which has a 0.5% probability of occurrence (1 in 200-year event). As stated in TAN15, Section A1.14, this is the standard of protection required of developments vulnerable to tidal flooding, which is the main threat to this development.

4.3. Present day flood risk - Defended

The Point of Ayr to Pensarn flood model demonstrates that, currently, both the T200 PD (**Figure 15**) and T1000 PD (**Figure 16**) defended scenarios will not result in flooding of the proposed site with sea levels as they are today.

TAN15, section 11.6 states, "all developments must be designed to be flood free during the 0.5% flood from the sea (i.e., a flood with a 1 in 200 chance of occurring in any year". These criteria must be met for a development to comply with TAN15.

 $^{^1}$ Contains Natural Resources Wales information $^{\odot}$ Natural Resources Wales and database right. All rights reserved

² https://gov.wales/planning-policy-flood-risk-and-insurance-change

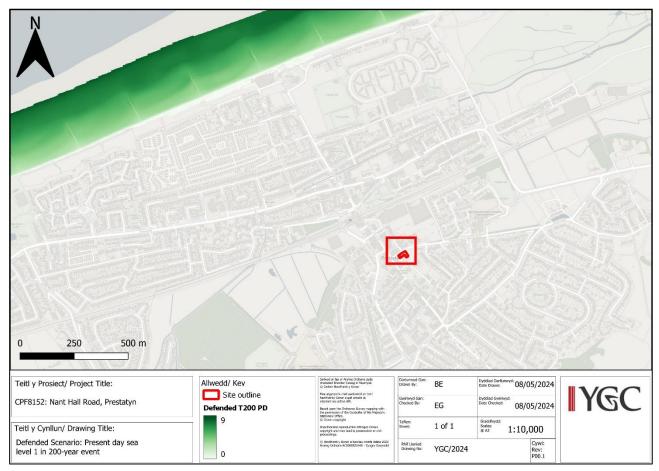


Figure 15: Defended 1 in 200-year event present day scenario

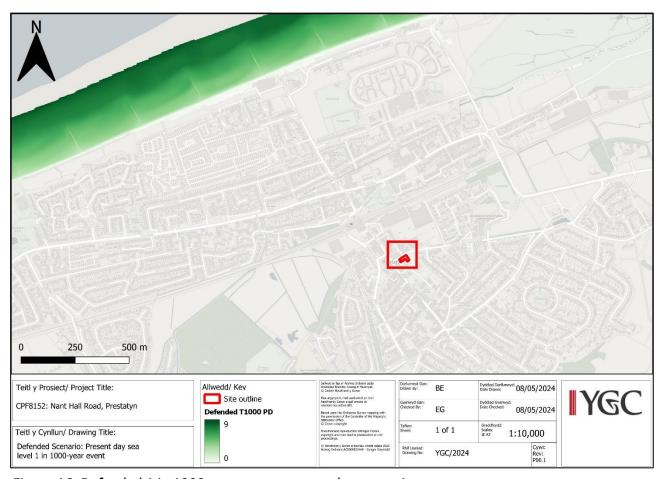


Figure 16: Defended 1 in 1000-year event present day scenario

4.4. Climate change flood risk - Defended

A recent update (2023) to the flood model has considered a wider range of return periods, and new breach locations to reflect the latest climate change guidance published by the Welsh Government (UKCP18 RCP 8.5). The scenario most relevant to the site is the Defended T200 CC 2122. As the model update did not include the T1000 run, the initial publication's T1000 CC 2117 scenario has been used.

It must also be noted that the T200 CC 2122 output provides only the maximum flood extent, therefore, any flood depth analysis must be extrapolated by intersecting the LiDAR data against the area with the flooding outlines.

Scenarios from the initial publication (2017) use the climate projection guidance FCDPAG3. This guidance has been superseded twice by new guidance (UKCP09 & UKCP18) and is considered out of date in comparison with the current UKCP18 guidance.

The model demonstrates that the T200 CC 2122 tidal defended scenario will not result in the flooding of the proposed site over its 100-year development lifetime (Figure 17). However, Figure 18 indicates that small sections of the site would flood up to 0.20 m in the extreme T1000 CC 2117 event. With the FFL around 5.65 mAOD, the sections vulnerable to flooding in this event may flood up to 0.05 m.

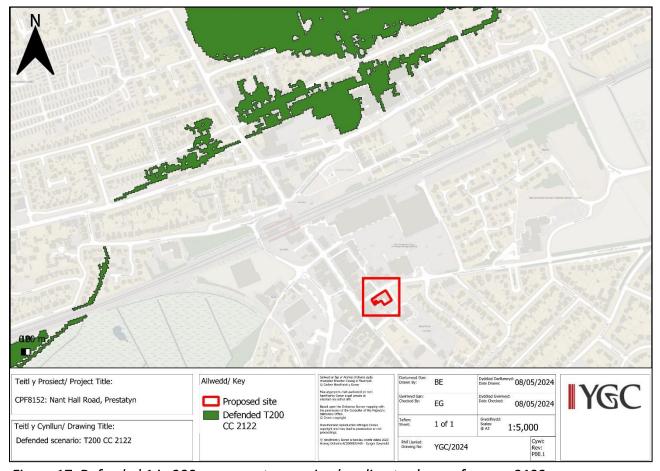


Figure 17: Defended 1 in 200-year event scenario plus climate change for year 2122

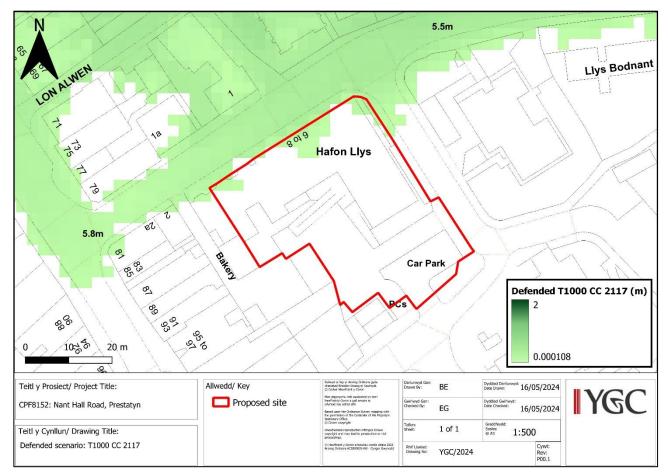


Figure 18: Defended 1 in 1000-year event scenario plus climate change for year 2117

4.5. Flood risk in Breach scenarios

Whilst NRW's models have considered 'undefended' scenarios, these model runs are produced in order to provide an extreme worst case flood outline for planning screening. This scenario is not considered to be realistic since it assumes that all defences are absent. A more realistic worst-case scenarios are provided by the breach model runs which consider a failure of the defences at various locations.

Numerous breach scenarios relevant to the site are available from the Point of Ayr to Pensarn's first publication (2017) and most recent publication (2023).

2017 publication:

- Ffrith beach
- Beach Road East
- Prestatyn Gutter Embankment
- Dunes East of Prestatyn

2023 publication:

- Clwyd Embankment Left
- Clwyd Embankment Right
- Gele Outfall

- Breach Marine Lake

From all breach scenarios listed above, the model suggested that *Ffrith beach* breach (Breach 4) presented the worst-case flood risk to the site (**Figure 19**). The defences in this area are maintained by NRW and Denbighshire Council with significant investments having been made in recent years to improve these defences. A breach is therefore considered to be unlikely but not impossible.

Although considered the greatest threat to the development, the model demonstrated that the site remains flood free in both the T200 PD and T200 CC 2117 scenarios (Figure 20 & Figure 21). The development is therefore compliant with TAN15 as it remains flood free in all 1 in 200-year event + CC over a 100-year development lifetime.

No T1000 equivalent scenarios were available for the 100-year development lifetime.

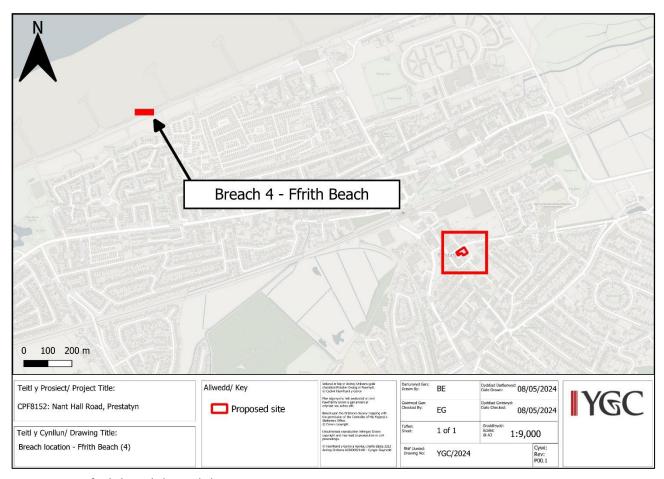


Figure 19: Ffrith beach breach location

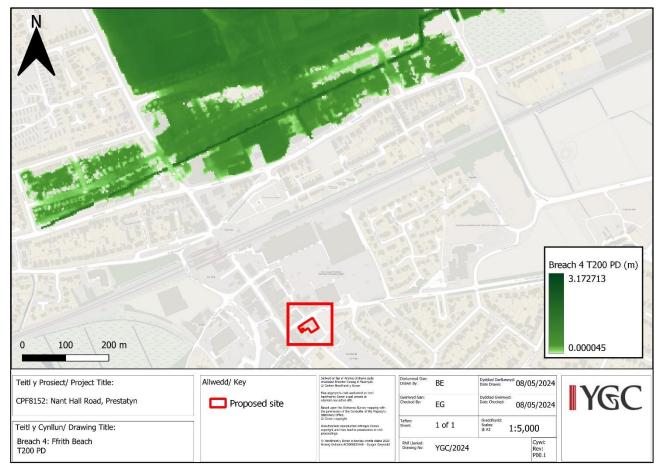


Figure 20: Breach 4 – Ffrith Beach T200 PD scenario

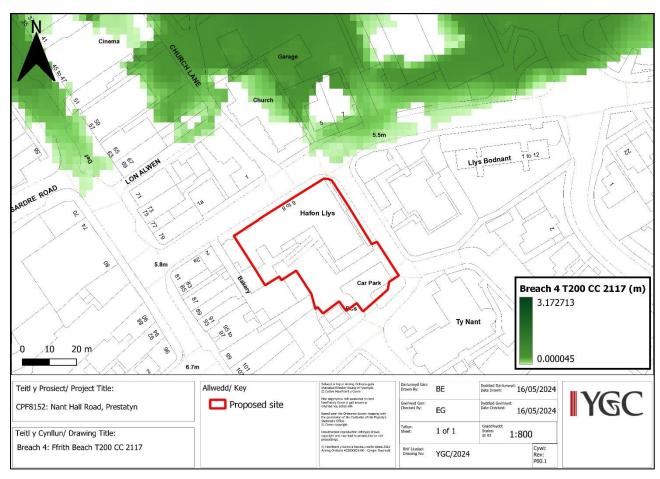


Figure 21: Breach 4 – Ffrith Beach T200 CC 2117 scenario

4.6. Access/egress

Consideration has been given to possible flooding under extreme conditions for tidal and surface water & ordinary watercourse flooding. According to TAN15, section A1.15, a development of this nature should not be considered unless the maximum depth of flooding along the access is not greater than 600 mm in an extreme flood event (T1000 + CC). The most viable emergency access/egress route can be seen in below in **Figure 22**. This route can be used as a pedestrian and vehicular exit in the event of an extreme flood.

In the extreme tidal scenario T1000 CC 2117, flood free access/egress to and from the proposed development is possible via this exit (Figure 22).

In the surface water FMfP Zone 2 (1 in 1000-year event), small areas along the main access/egress route are indicated at surface water flood risk (**Figure 23**). Through extrapolating the data by intersecting the LiDAR with the surface water flooding outline of zone 2, a maximum flood depth of 0.32 m is calculated. (~7.21 mAOD where flooding starts occurring, with flood zone 2 reaching approximately ~7.53).

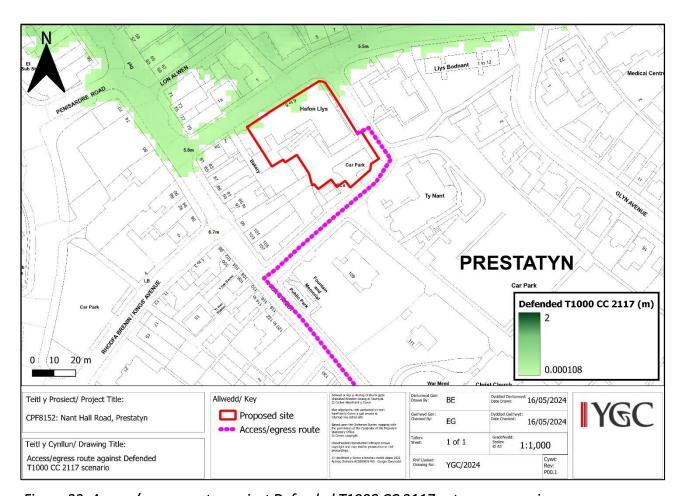


Figure 22: Access/egress route against Defended T1000 CC 2117 extreme scenario

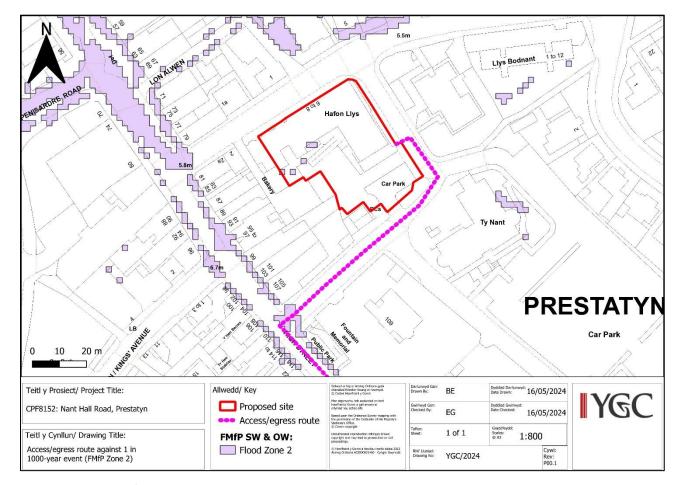


Figure 23: Access/egress route against 1 in 1000-year extreme event (FMfP Zone 2)

4.7. Summary of flooding

To summarise, in the Defended T200 CC 2122 event, the site is shown to be flood free. The worst-case breach scenario (T200 CC 2117) also demonstrates that the site will also remain flood free and will not impair access and egress routes.

However, in the defended T1000 CC 2117 event, the most severe defended scenario, the model suggests that small sections of the site may flood to a maximum of 0.05 m based on the FFL being 150 mm above ground level.

Table 1: Summary of flooding - green demonstrating compliance with TAN15 and orange showing the only scenario where flooding occurs.

Scenario	Flood magnitude and sea level	Outcome	Nearest flood outline (m)	Access/Egress implications
Defended:	1 in 200	Dry	991	Clear
Present day sea level	1 in 1000	Dry	985	Clear
Defended:	1 in 200: 2122 Sea level	Dry	379	Clear
Climate change	1 in 1000: 2117 Sea level	0.05 m flood	0	Clear
Breach 4: Ffrith Beach,	1 in 200: PD	Dry	379	Clear
Prestatyn	1 in 200: 2117 Sea level	Dry	6.9	Clear

4.8. Flood risk elsewhere

TAN15 stipulates that new developments should not increase flood risk elsewhere. As previously mentioned, the proposal is for the renovation and part re-construction of an existing development, with the redevelopment of the car park to the south. The additional construction will be constructed on already developed brownfield land (concrete/tarmac). Therefore, given the size of the development site and the relatively small increase in footprint, it is reasonable to conclude that the development would have a negligible impact on flood risk elsewhere.

5. Conclusions & Recommendations

5.1. Conclusions

This FCA has considered NRW's latest flood modelling in assessing the risk to the development; the main conclusions are:

- The proposed development lies almost completely within a tidal TAN15 defended zone
- The Defended T200 PD, T1000 PD & T200 CC 2122 scenarios demonstrate that the proposed development would be unaffected by floodwater. <u>This demonstrates compliance with TAN15</u>, section A1.14.
- For the worst-case breach scenario Ffrith Beach which follows NRW's latest breach guidelines (i.e. 50 m breach width), the site would be unaffected by floodwater in the T200 CC 2117 scenario. This demonstrates compliance with TAN15, section A1.14.
- The new development is at a low risk of flooding with flooding only occurring in the extreme Defended T1000 CC 2117 event maximum 0.05 m of flood depth at the building with FFL 150 mm above ground level. Section A1.15 of TAN15 notes that flooding up to 0.60m may be allowable during the T1000 event, therefore this demonstrates compliance with TAN15, section A1.15.
- Flood free access/egress is available in all T200 and T1000 tidal scenarios when considering a development lifetime of 100 years. This includes the T200 CC 2117 Ffrith Breach. <u>This demonstrates compliance with TAN15</u>, section A1.15.
- The proposed development will occupy a similar footprint to the existing building, and the additional construction will be developed on an existing impermeable surface. It can therefore be assumed there will be negligible risk of flooding elsewhere. This demonstrates compliance with TAN15, section A1.12.

5.2. Recommendations and mitigation measures

- The building's finished floor levels (FFLs) should be raised as high as possible above ground level thereby providing betterment and reducing the building's vulnerability to flooding. As a minimum, ensure the FFL's are constructed 150 mm above ground level as proposed, to ensure that the development remains compliant with Section A1.15 during an extreme T1000 CC 2117 event. According to the ESL, the development would flood to a maximum of 0.05 m. Section A1.15 of TAN15 notes flooding up to 0.60m may be allowable during this event.
- It is important that site management, staff and residents are made aware that the building is within a flood risk area. They should familiarise themselves with the evacuation routes from the site in the event of a flood. An evacuation procedure should be put in place in the event of a severe flood warning being issued for the area by NRW. This is of particular importance due to the proposed use as holiday lets, where occupants may not be familiar with the area.
- The site management should regularly review their evacuation procedure and should sign up for NRW's free flood alert service. This can be done via NRW's website. Due to the more predictable nature of tidal flooding, a warning time of 6-12 hours is usually provided, allowing time for contingency measures / evacuation.

- As part of the redevelopment of the building, where possible the opportunity should be taken to increase resilience to flooding. For instance:
 - ➤ Raised electrical sockets (minimum 600 mm above FFL)
 - > Waterproof rendering, plaster, and flooring
 - > Seals to all incoming services
 - > Fit non-return valves on drains and pipes.
 - > Replace wooden floors and carpets with tiled or flood-resilient flooring
 - ➤ Water-resistant air bricks
 - ➤ The use of PPL (Property Level Protection) measures such as door flood gates