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# Cardiff Council Strategic Flood Consequences Assessment - Land at Cwym Farm, Morganstown (80)

**Version 1**

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Cardiff Council

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## Document Status

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# Contract

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This report describes work commissioned by Cardiff Council, by an instruction dated 23rd January 2026. The Client's representative for the contract was Stuart Williams of Cardiff Council. Polly Stradling of JBA Consulting carried out this work.

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# 1 Introduction

JBA Consulting has been commissioned by Cardiff Council to prepare an independent Flood Risk Appraisal as part of a Stage 2 Strategic Flood Consequences Assessment (SFCA) for sites considered for allocation in its Replacement Local Development Plan.

This assessment will evaluate the risk of flooding from all sources to Land at Cwym Farm, the proposed development site, as well as the appropriateness of development at the site in accordance with Welsh Government policy, as outlined in Technical Advice Note 15 (TAN15). Furthermore, recommendations will be provided, where appropriate, to mitigate the risk of flooding at the proposed development site as well as recommendations for further works.

# 2 Site Description

The key characteristics of the site are summarised in Table 2-1 and the location and site boundary are shown in Figure 2-1 below.

Table 2-1 Site Summary

Site name	Land at Cwym Farm, Morganstown
Site ID	80
Site area (ha)	29.27
Existing land use	Greenfield land
Purpose of development	Residential
OS NGR	ST 12139 81825
Access Location	Access to both development parcels from Ffordd Treforgan Road



Figure 2-1 Proposed development site

## 2.1 Development proposals

The proposals are for residential development on greenfield land, which is classed as Highly Vulnerable development.

The red line boundary is split in two parcels of land, with most land located to the north of Ffordd Treforgan, and a smaller parcel of land located to the south of Ffordd Treforgan.

No indicative site layout is available for this assessment.

## 2.2 Topography

The Natural Resources Wales (NRW) Open Source 1m Light Detection and Ranging (LiDAR) data<sup>1</sup> across the site has been reviewed and is shown in Figure 2-2.

Levels across the northern parcel generally fall in a south easterly direction. The highest ground levels are in the north of the land parcel at around 119.57 mAOD. Lowest ground levels are around 47.63 mAOD in the east of the land parcel. Notably, there is a topographic depression in the central area which reaches a low point of 67.48mAOD, which can be identified within the below figure.

<sup>1</sup> <https://datamap.gov.wales/maps/lidar-data-download/>

Ground levels in the southern parcel fall in an easterly direction. The highest ground levels are in the southwest of the land parcel at around 54.77 mAO. Lowest ground levels are around 41.88 mAO in the east of the land parcel. Similarly to the northern land parcel, there is a topographic depression throughout the centre of the site which reaches a low point of 41.88mAO and is shown on Figure 2-3.

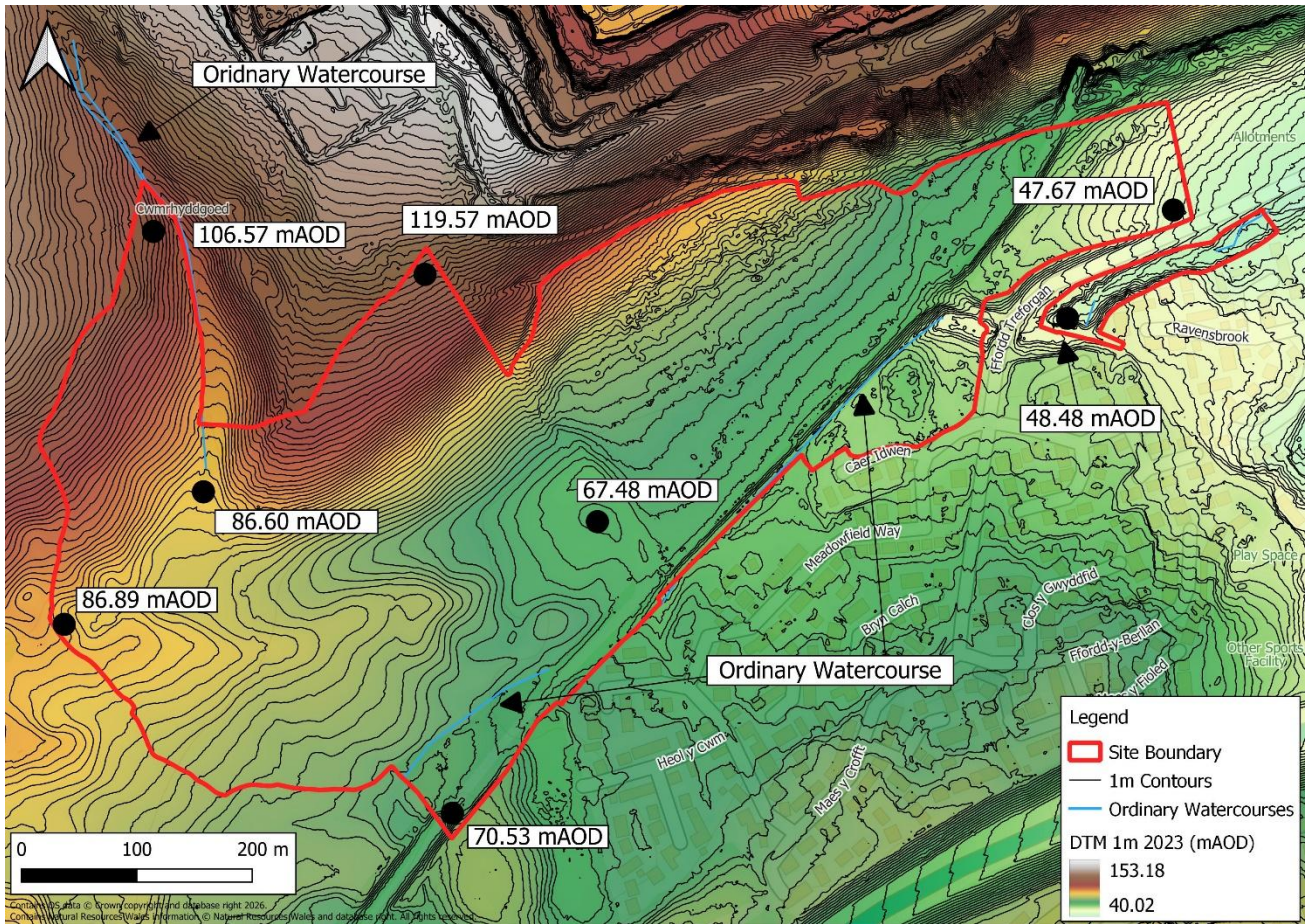


Figure 2-2 1m LiDAR

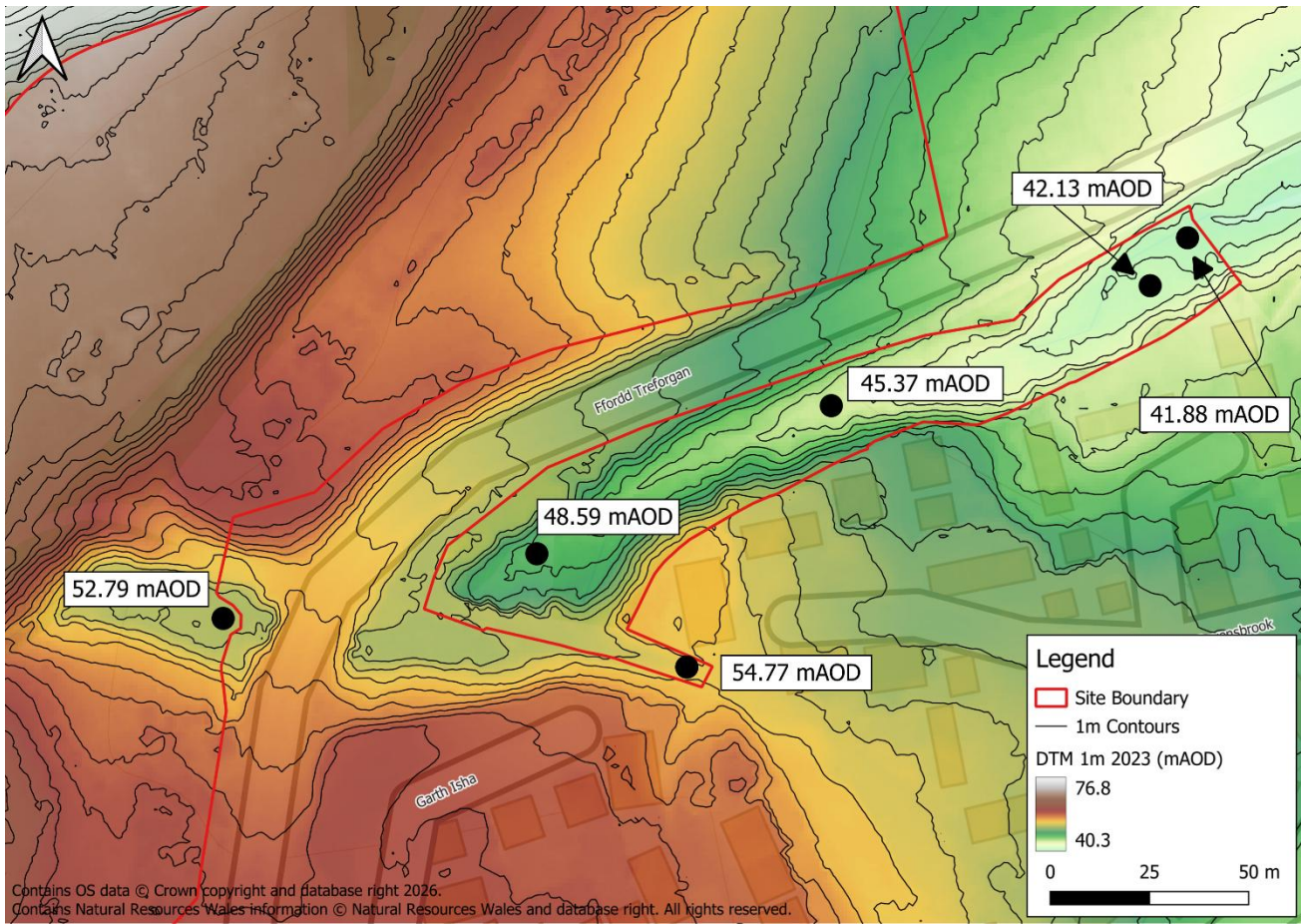


Figure 2-3 1m LiDAR - Southern Land Parcel

### 2.3 Watercourses and Flood Defences

Figure 2-4 shows the locations of the nearest waterbodies and watercourses to the site.

A small ordinary watercourse is located to the north of the development site, flowing into the northern land parcel. It is unclear where this watercourse drains to, however the valley like topography is continued in a southerly direction through the site, as detailed in Section 2.2.

A larger ordinary watercourse is an unnamed tributary of the River Taff, flowing in an easterly direction through the northern land parcel, before passing under Ffordd Treforgan and across Parcel 2.

The River Taff is an NRW Main River located approximately 0.5km to the east of the site.

The site is not within an area that benefits from flood defences.

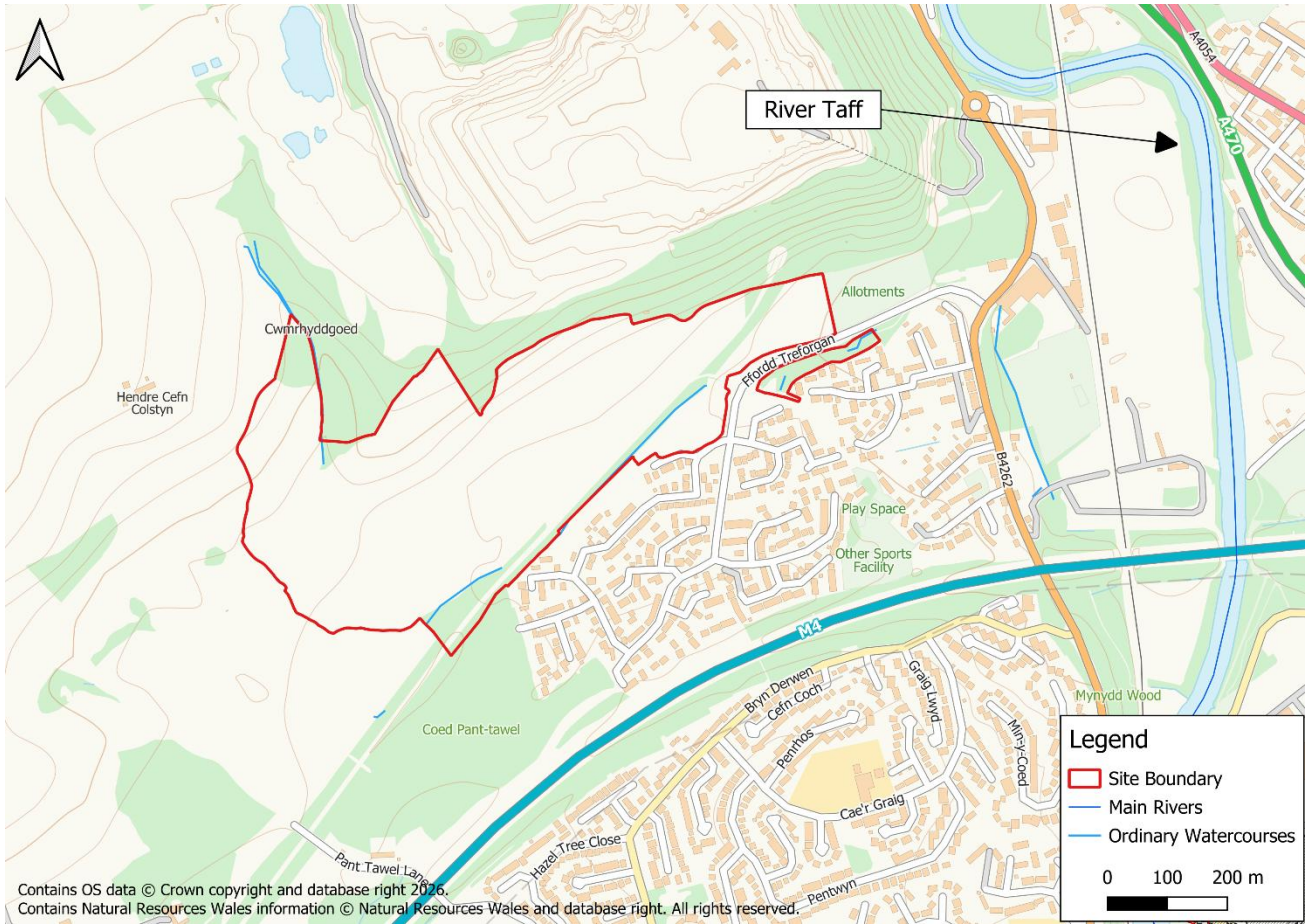


Figure 2-4 Watercourses and Flood Defences

### 3 Planning Policy and Flood Risk

TAN-15 provides a framework within which flood risk arising from rivers, the sea, and surface water, as well as the risk of coastal erosion, can be assessed. TAN-15 adopts a risk-based approach, which emphasises the ability to avoid or minimise risk depending on the type of development proposed.

The following table identifies the form of development, vulnerability classification and Flood Map for Planning (FMfP) classification (as defined in TAN-15) for the proposed development site.

Table 3-1 TAN-15 Development classification summary

TAN-15 classification	Classification
Development Proposals	Residential
Form of Development	New Development
Vulnerability Classification	Highly Vulnerable
Flood Map for Planning - Rivers	Flood Zone 1
Flood Map for Planning - Sea	Flood Zone 1
Flood Map for Planning - Surface Water and Small Watercourses	Flood Zones 2 and 3 - shown in Figure 3-1.

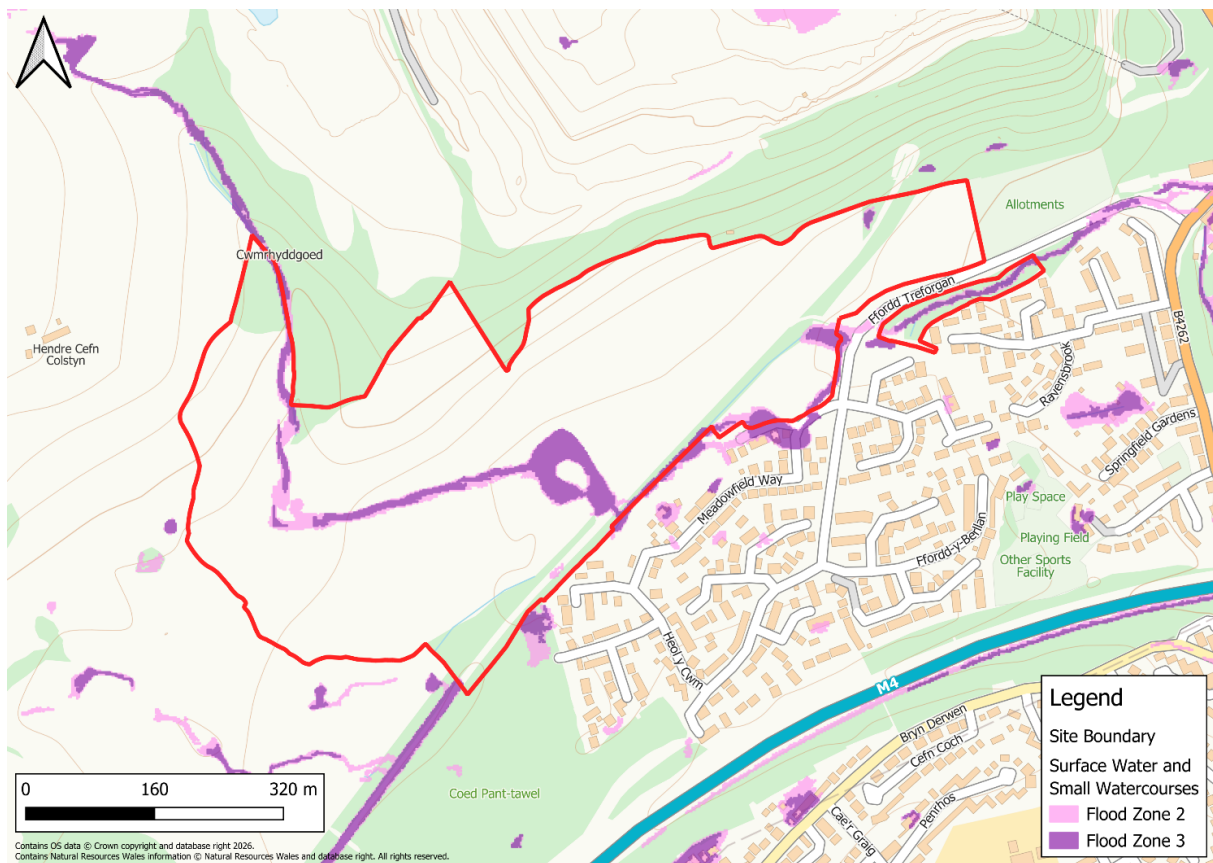


Figure 3-1 Flood Map for Planning - Surface Water and Small Watercourses

## 4 Assessment of Flood Risk

The latest available information on flood risk at the site, published by Natural Resources Wales (NRW) and datasets used in the SFCA are summarised in Table 4-1.

Table 4-1 Summary of flood risk

Source of Flooding	Onsite Presence	Description
Flood Risk from Rivers	✘	The site's location within Flood Zone 1 of the FMfP for Rivers indicates that the site is at <b>very low</b> risk of fluvial flooding.
Flood Risk from the Sea	✘	The site's location within Flood Zone 1 of the FMfP for the Sea indicates that the site is at <b>very low</b> risk of tidal flooding.
Flood Risk from Surface Water and Small Watercourses	✓	<b>Surface Water and Small Watercourse flood risk is further assessed in Section 4.1.</b>
Flood Risk from Groundwater	✓	<p>The Cardiff SFCA includes JBA's Groundwater Risk of Emergence map as part of the assessment. The groundwater map shows the site to be in an area where there is a risk of groundwater emerging at the surface locally and a risk of groundwater flooding to both surface and subsurface assets.</p> <p>In the western parcel the areas to the north and east are at low risk of groundwater emergence with levels at least 5m bgl. To the south of this parcel is an area that is at medium-high risk of emergence, and just to the north is an area of medium-low risk of emergence.</p> <p>Across the southern parcel, the west of the site is a low risk where groundwater levels are modelled to be at least 5m bgl and therefore at low risk of groundwater emergence.</p> <p>There have been no recorded incidents of groundwater flooding in this area of Cardiff mentioned in the SFCA. Therefore, it is concluded that the risk of flooding is <b>low</b>.</p>
Flood Risk from Reservoirs	✘	The NRW Flood Map for Planning shows that the site is not located in an area at risk of reservoir flooding. Therefore, it is concluded that the risk of flooding is <b>very low</b> .

Source of Flooding	Onsite Presence	Description
Flood Risk from Sewers	✓	The Cardiff SFCA has identified that there have been 14 sewer incidents within the Pentyrch and St Fagans Electoral District, and 10 sewer incidents within the Radyr Electoral District where the site lies between. However, the site is greenfield and is unlikely to have any sewerage infrastructure which could overflow and cause sewer flooding. Therefore, it is concluded that the risk of flooding is <b>low</b> .

#### 4.1 Flood Risk from Surface Water and Small Watercourses

Surface water flooding occurs when rain falling on saturated grounds flow overland, following the local topography. Surface water flooding and subsequent overland flow can therefore pose a risk to both the development site and the surrounding land. Overland flow may originate from the site itself or adjoining land at a higher elevation, from which flow migrates onto the development.

As shown in Figure 3-1, the FMfP mapping indicates that the majority of the northern parcel, and a large area of the southern parcel lie within Flood Zone 1. Flood Zones 2 and 3 are present within the both the parcels, associated with a prominent surface water flow path across the site.

In the absence of detailed modelling, the National Flood Hazard Mapping (NFHM) has been used to provide a further assessment of flood risk.

During the 1% AEP plus climate change event, as shown within Figure 4-1, flooding in the northern parcel is refined within the valley like topography associated with the ordinary watercourse which flows through the site, with depths remaining less than 100mm. In the central area of the northern parcel, surface water accumulates within the topographic depression, reaching depths of up to ~1.1m.

In the southern parcel, the ordinary watercourse flows eastwards through the central corridor before discharging into the River Taff 800m downstream. Flooding here remains confined to the ordinary watercourse channel, with in channel depths of up to 530mm.

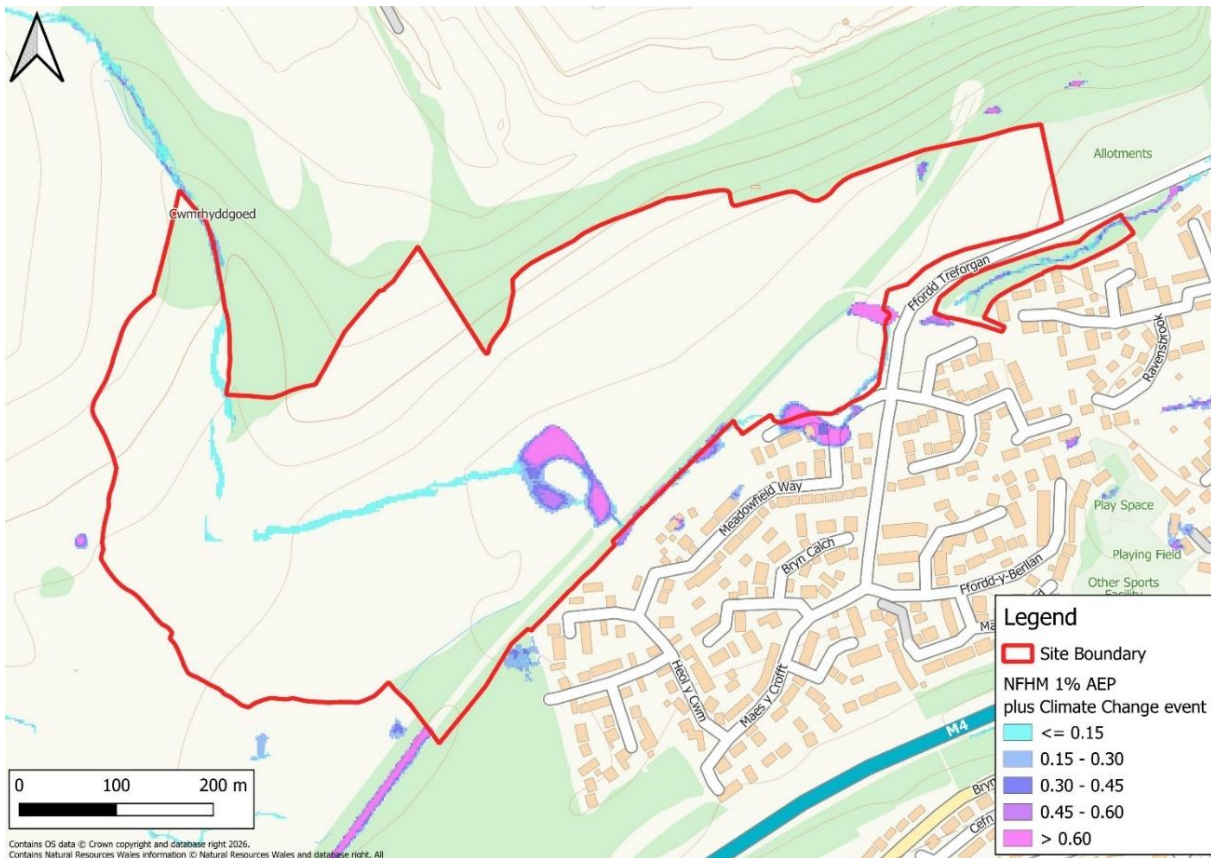


Figure 4-1 1% AEP + Climate Change - Flood depths

During the the 0.1% AEP plus climate change event, as shown within Figure 4-2, surface water enters the northern parcel via the watercourse at the northern boundary, flowing southwards and then eastwards, following the natural valley-like topography and ordinary watercourse. Flood depths remain less than 220mm. Surface water ponds up to depths of 1.28m in the topographic depression before continuing towards the larger ordinary watercourse and flowing eastwards adjacent to the southern boundary.

Within the southern parcel, flooding remains confined to the channel, reaching depths of up to 730mm.

Due to the broadscale nature of the NFHM dataset, channels, culverts, and other hydraulic structures are often omitted or inaccurately represented in the modelling. This can often result in an overestimation of risk. A detailed review of the LiDAR data underpinning both the FMfP and the NFHM datasets reveals that the upstream catchment is poorly defined, with no clearly identifiable watercourse present.

To identify changes in terrain and improved accuracy of modelled datasets, a comparison of the 2018 and 2023 DTM LiDAR datasets has been completed. The 2018 LiDAR underpins the NFHM, with the 2023 dataset providing a more recent picture of ground levels across the site.

Figure 4-3 presents a cross section of the ordinary watercourse where ponding occurs in the southeast of the site, north of Meadow Field Way. The review shows that the 2023 dataset provides a clearer representation of the watercourse along the southern boundary

of the site, including a more refined channel, and distinct bank features. This location has been selected for assessment as LiDAR clearly shows a consistently defined channel with measurable bank edges. In contrast, LiDAR coverage from 2018 does not extend across the full northern area of the site, indicating that the data underpinning the NFHM is unreliable and inaccurate. However, within the areas where both the 2018 and 2023 datasets overlap, the terrain shows only a shallow dip which would indicate a surface water flow path conveyance route, rather than a formed channel. Subsequently, the assessment is focused along the southern boundary, where the watercourse channel is clear and a more confident assessment can be made. The mapped location from which this cross section was taken has also been included within the figure to provide spatial context.

The 2023 cross-section profile suggests that ordinary watercourse it is unlikely to spill out of bank and inundate the wider site. This indicates that the NFHM may overestimate the flood extent within parts of the development site.

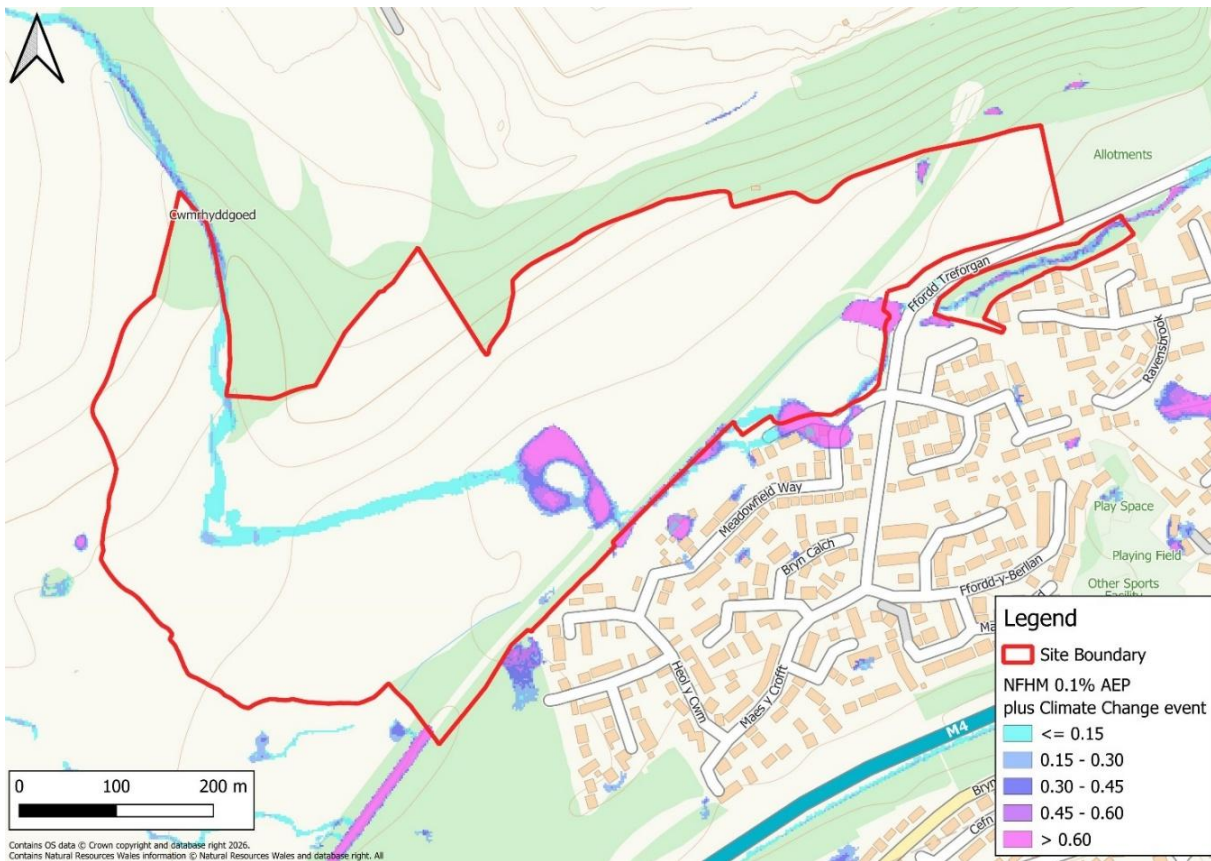
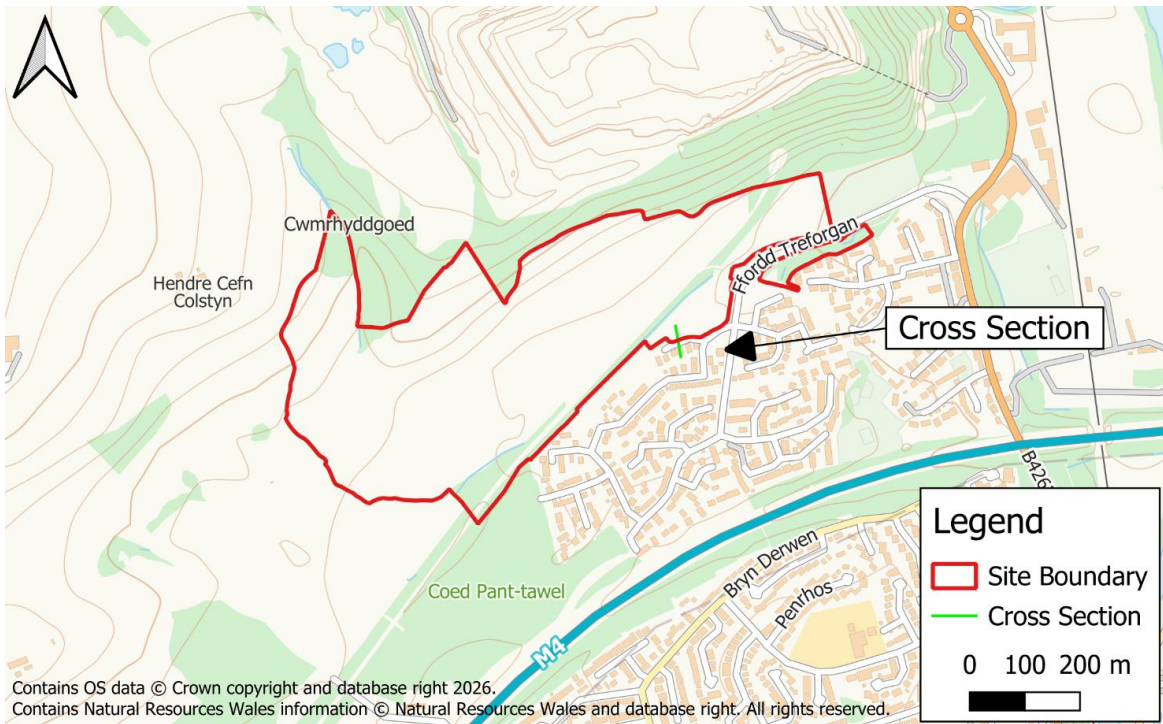


Figure 4-2 0.1% AEP + Climate Change - Flood depths



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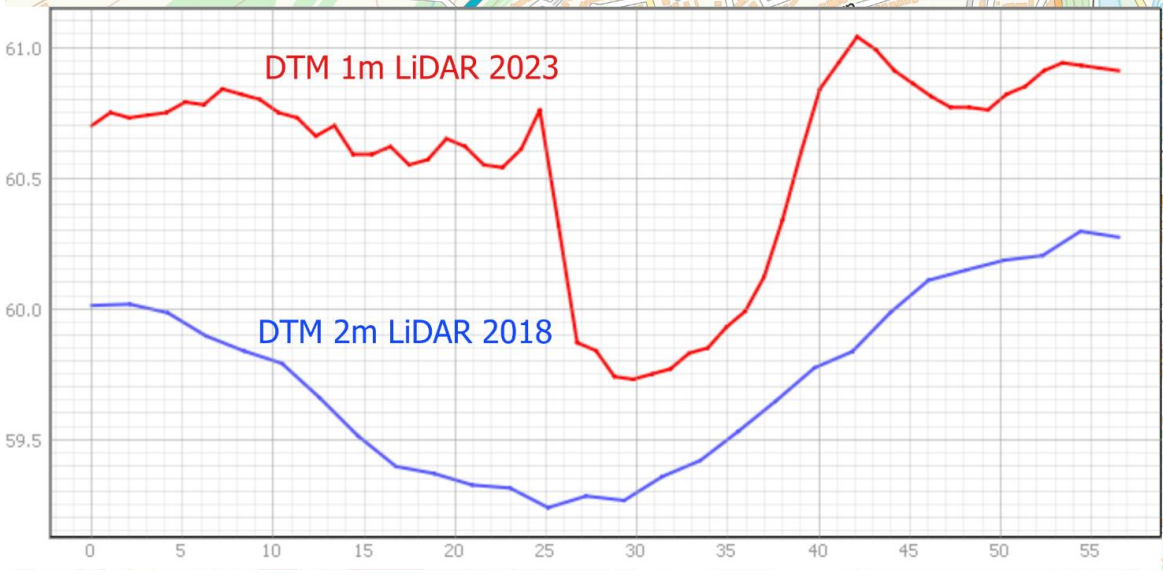


Figure 4-3 LiDAR DTM Comparison

## 5 Application of Flood Zones to Development Management Decisions

The site is located within Flood Zone 1 for river and sea flooding. Within Flood Zone 1 all forms of development are acceptable in principle and further assessment or justification is not typically required.

While the site is predominantly located within Flood Zone 1 for surface water and small watercourses, some areas of the site are located in Flood Zones 2 and 3. These areas are associated with ordinary watercourses and flow paths that cross through the site.

When considering a site for development, Sections 10 and 11 of TAN-15 outline the requirements for the type of development permitted in any given flood zone. However, these sections do not strictly apply to the surface water and small watercourse zones in which this proposed development site lies. Instead, it is for the applicant to demonstrate alignment with the risk-based principles of TAN-15 and the general acceptability criteria of Section 11.4 to ensure the following conditions are met:

- No increase in flooding elsewhere
- Occupiers aware of flood risk
- Escape / evacuation routes present
- Flood emergency plans and procedures agreed and in place
- Flood resistant and resilient design
- Acceptable consequences for type of use (see guidance below)

A sequential approach to master planning and good site design can result in an avoidance of development in the flood zones. All Highly Vulnerable development should be built within areas of Flood Zone 1, with the existing ordinary watercourses retained as an open channels. Opportunities to enhance the watercourse corridors should be considered through the provision of public open space and Blue Green infrastructure within this area of the site.

Proposed site layouts should also consider access to the watercourses for management and maintenance, and it is therefore preferable that the watercourse corridors are retained within public areas. Any crossings to facilitate development are likely to require Ordinary Watercourse Consent and should be designed to minimise the impact of the watercourse and risks associated with potential blockage. Any application should be supported by hydraulic calculations which demonstrate sufficient capacity of any proposed crossings to manage flood flows.

The broadscale nature of the NFHM dataset means that channels, culverts, and other hydraulic structures can often be omitted or not accurately represented, which can result in an over- or under-estimation of risk. Hydraulic modelling may be beneficial to determine a more accurate understanding of the baseline flood risk to the site but is not considered strictly necessary to facilitate development on site. This may refine the flood risk extent at the site.

Due to the presence of Flood Zones 2 and 3 of the FMfP for Surface Water and Small Watercourses on site, a planning application should be accompanied by a site-specific FCA to assess this risk to the development proposals.

## 6 Summary and recommendations

The site is located within Flood Zone 1 for river and sea flooding.

The site is predominantly within Flood Zone 1 for surface water and small watercourses, and Flood Zones 2 and 3 are present across areas of the site. Consequently, any planning application is required to be accompanied by an FCA.

It is therefore considered that this site is likely to satisfy the requirements of TAN-15, subject to the following recommendations:

- Any planning application for the site should be accompanied by an FCA which demonstrates how the proposals meet the requirements of TAN-15.
- A sequential approach to site masterplanning to retain all Highly Vulnerable development within areas of Flood Zone 1.
- A detailed hydraulic modelling assessment may be beneficial to refine the predicted flood extent, but it is not considered strictly necessary to facilitate development on site.
- Watercourses that cross the site should be retained, and development within their associated flood extents should be avoided, with the exception of crossing points and water compatible development. Any watercourse crossings to facilitate access within land parcels shall require Ordinary Watercourse Consent under the Land Drainage Act 1991. Any application should be supported by hydraulic calculations which demonstrate sufficient capacity of any proposed crossings to manage flood flows.



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