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Cardiff Council Strategic Flood Consequences Assessment - Land off Forest Road (84)

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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. Ella Courtney 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 off Forest Road', 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 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 Table 2-1 below.

Table 2-1 Site Summary

Site Name	Land off Forest Road
Site ID	84
Site Area (ha)	7.22
Existing Land Use	Greenfield
Purpose of Development	Residential
OS NGR	ST 13700 82795
Access Location	Access from Heol-y-Fforest

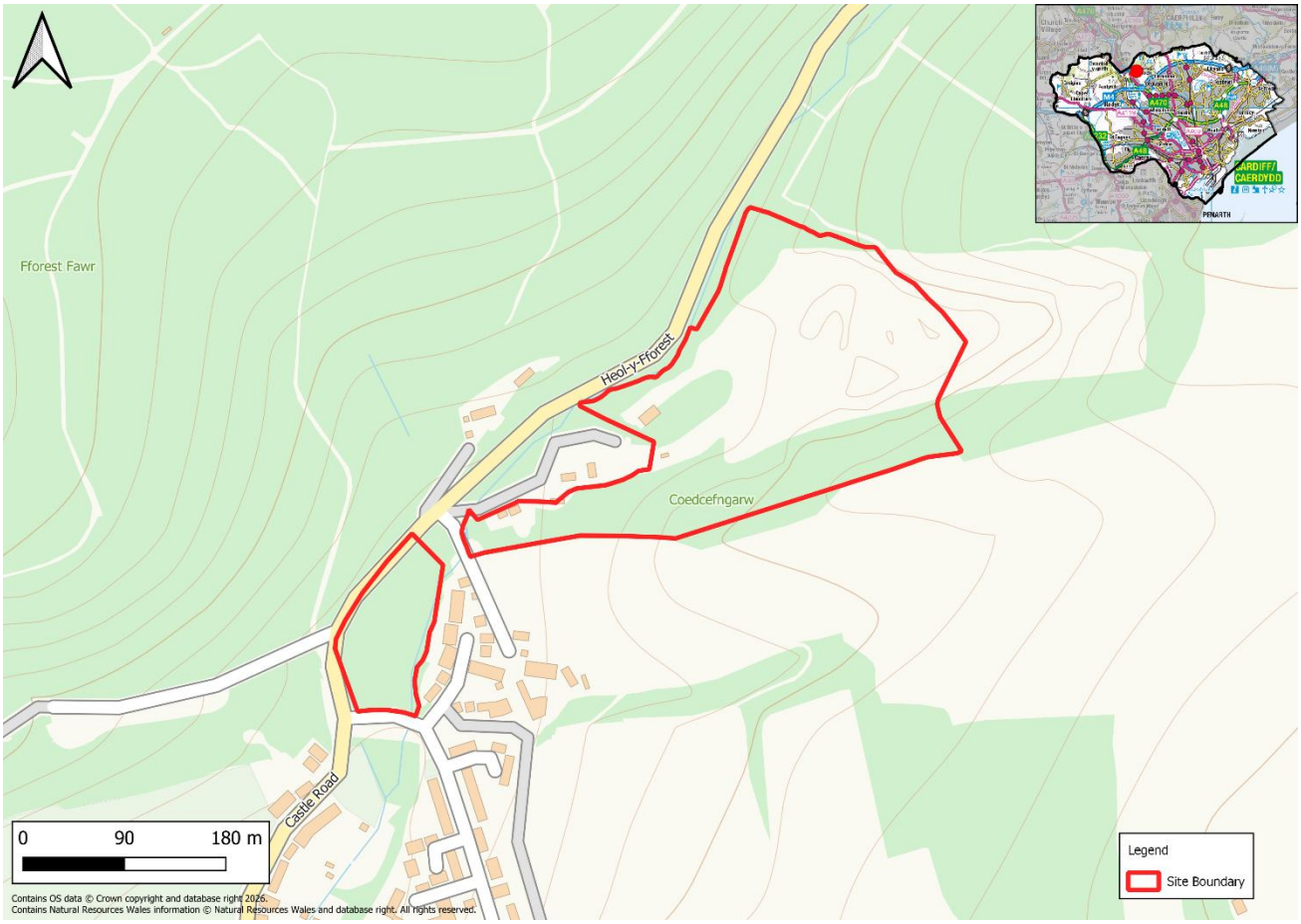

Figure 2-1 Site Location

2.1 Development Proposals

The proposed development is for residential use on greenfield land and is classed as a Highly Vulnerable development. The development is split into two parcels of land to the east and west of a cul-de-sac road, to the south of Heol-y-Fforest. The eastern parcel is situated on the former Cefngarw Quarry site.

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 across the site has been reviewed and is shown in Figure 2-2.

The site has distinct valley like topography, with levels generally falling in a westerly direction. The highest ground levels are in the southeastern corner of the eastern parcel at approximately 120.15 mAOD. From this point there is a steep decline in ground level in a northerly direction, with lowest ground levels in the east at approximately 83.45mAOD. In the eastern parcel, ground levels are lowest in the west, at approximately 63.45mAOD.

The western parcel declines more gently from north to south. In the north of this parcel, ground levels are highest at approximately 65.61 mAOD, falling to 59.68mAOD in the far south.

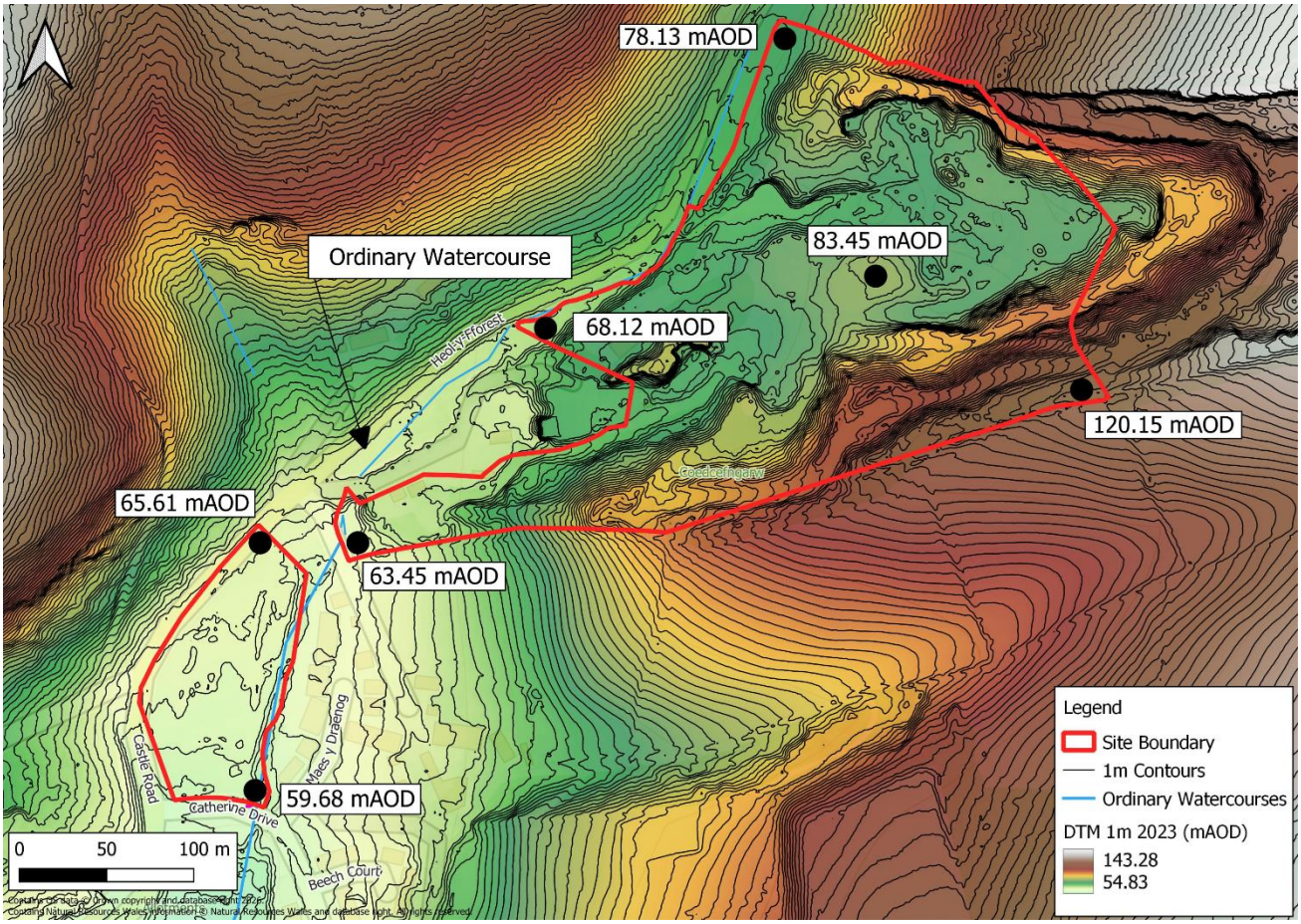

Figure 2-2 1m LiDAR

2.3 Watercourses and Flood Defences

Figure 2-3 shows the locations of the nearest waterbodies and watercourses to the site.

The Nant y Fforest ordinary watercourse flows in a south westerly direction along the northern boundary of the eastern parcel, and then southerly adjacent to the eastern boundary of the western parcel. This watercourse then discharges into the River Taff, an NRW Main River located approximately 0.6km to the west of the site.

The proposed development is not located within an area that benefits from flood defences.

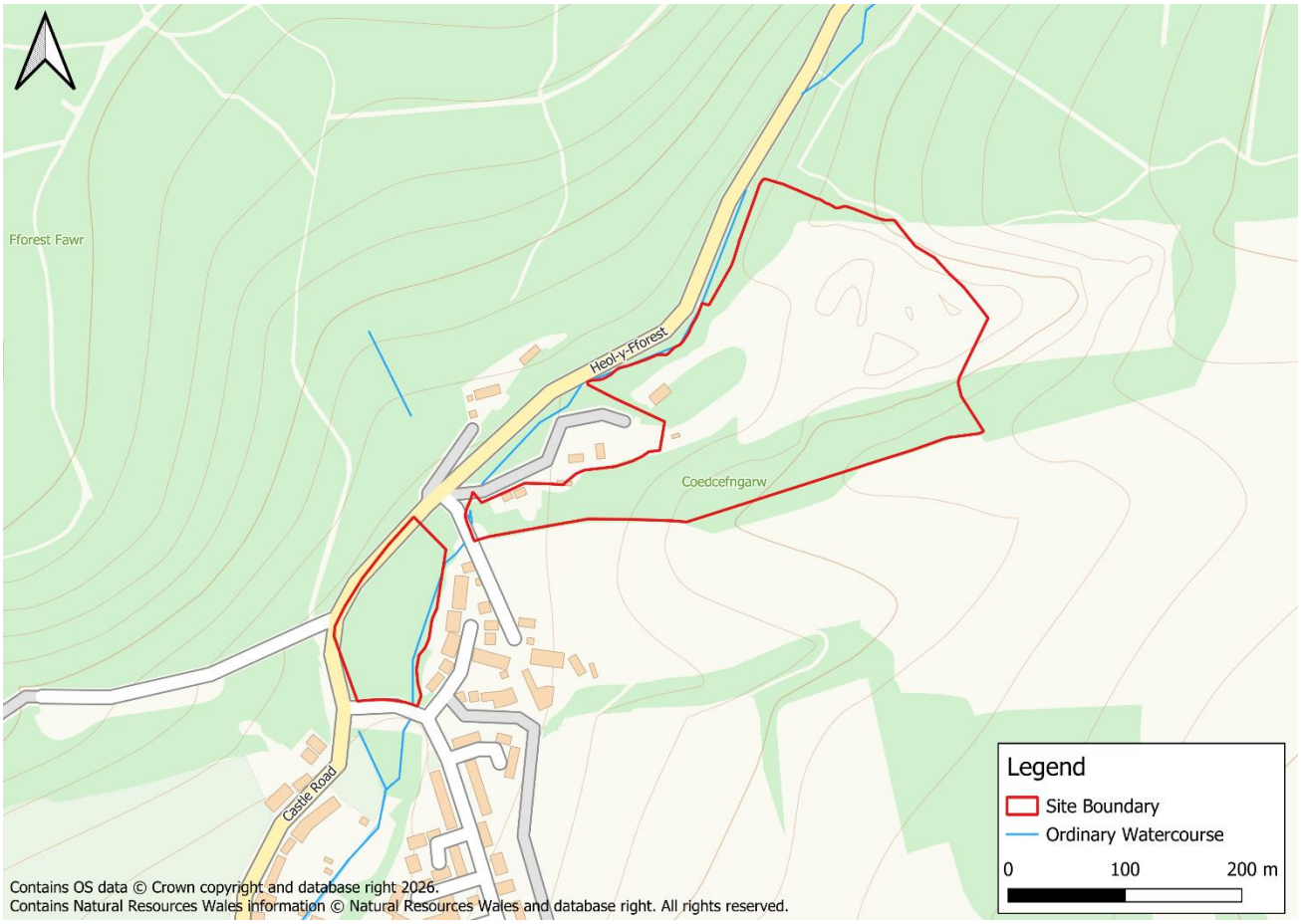

Figure 2-3 Watercourses and Flood Defences

3 Planning Policy and Flood Risk

TAN-15 provides a framework within which flood risk arising from rivers, the sea and surface water 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 classification (as defined in TAN-15) for the proposed development site.

Table 3-1 TAN-15 Development Classification Summary

TAN-15 Classification	Classification
Development Proposal	Residential Development
Form of Development	New Development
Vulnerability Classification	Highly Vulnerable Development
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 1, 2 and 3 - shown in Figure 3-1.

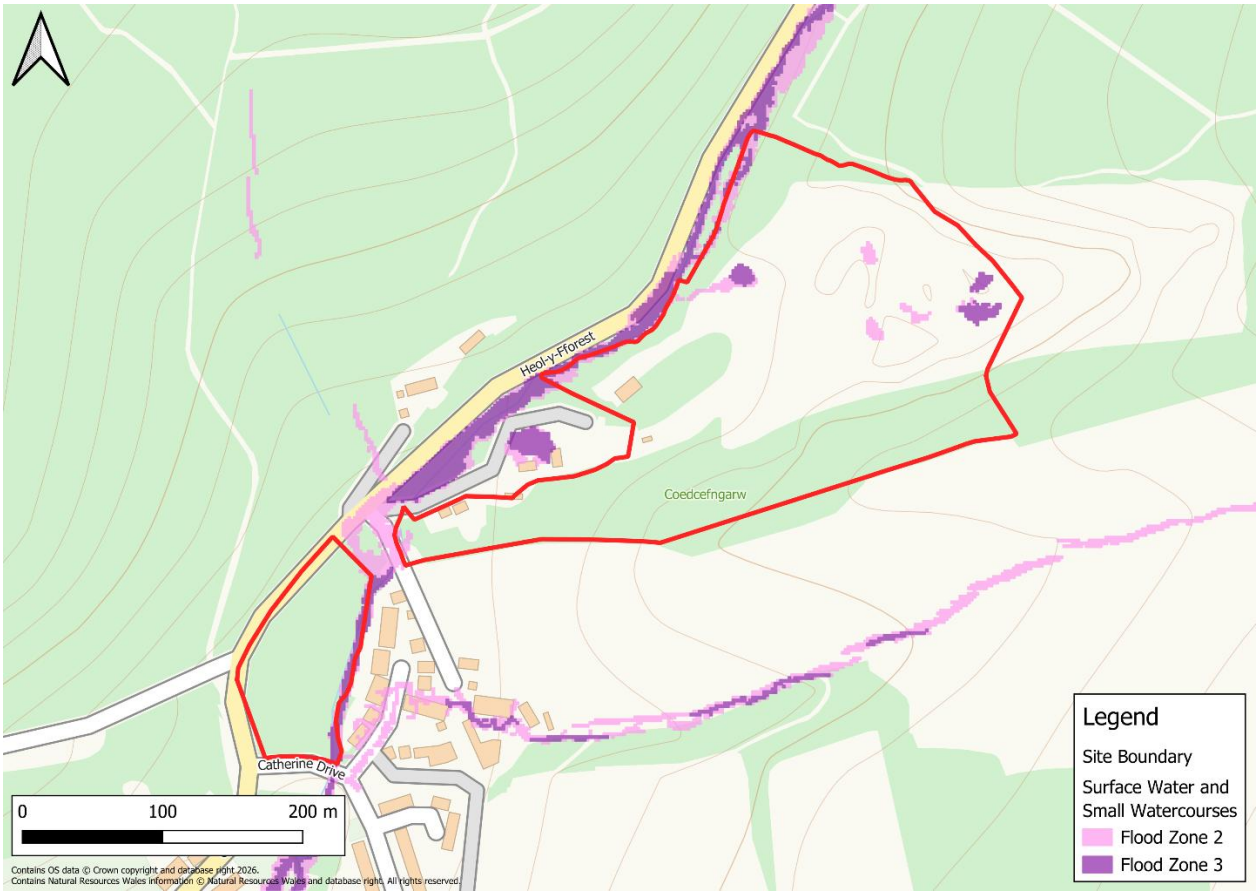

Figure 3-1 Flood Map for Planning - Flood Risk from Surface Water and Small Watercourses

4 Assessment of Flod Risk

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

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 **very low** 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 **very low** risk of tidal flooding.
Flood Risk from Surface Water and Small Watercourses	✓	The site is at **low** risk of surface water flooding. **See section 4.1 for further assessment.**
Flood Risk from Groundwater	✓	JBAs Groundwater Risk of Emergence map indicates the majority of the site as **very low** risk. An area along the northern boundary indicates that the groundwater levels are between 0.5m and 5m below the ground surface which indicates a low risk of emergence.
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 **very low**.
Flood Risk from Sewers	✓	The Cardiff SFCA has identified that there have been 45 sewer incidents within the Whitchurch and Tongwynlais Electoral District. 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 **low**.

4.1 Flood Risk from Surface Water and Small Watercourses

Surface water flooding occurs when rain falling on saturated ground flows 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 for Surface Water and Small Watercourses indicates that almost the entire site is located within Flood Zone 1, associated with a very low risk of flooding from surface water and small watercourses.

Along the north western boundary of the eastern parcel, and the eastern boundary of the western parcel, confined areas of land are shown to be at risk of surface water and small watercourse flooding, as illustrated by the presence of Flood Zones 2 and 3. These flood extents are associated with the Nant y Fforest ordinary watercourse which flows in a general south westerly direction adjacent to the site boundaries, as described above.

Within the eastern parcel there are localised areas of surface water flooding, associated with topographic depressions.

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

As shown in Figure 4-1, during the 1% AEP plus climate change event, almost the entire site is shown to remain flood-free. In the eastern parcel, the Nant y Fforest is shown to remain within the channel and does not encroach into the site boundary. There are several areas of localised surface water ponding, associated with topographic depressions, which are predicted to flood to depths of up to 400mm.

In the western parcel the flood extent of the Nant y Fforest is indicated to encroach marginally into the site boundary. It is anticipated that the flood extent will remain confined to the watercourse channel as maximum flood depths associated with the watercourse are shown to reach up to 1m, and further LiDAR analysis shows small watercourse is at least 2 metres deep with an invert level of approximately 60 - 61.5 mAOD.

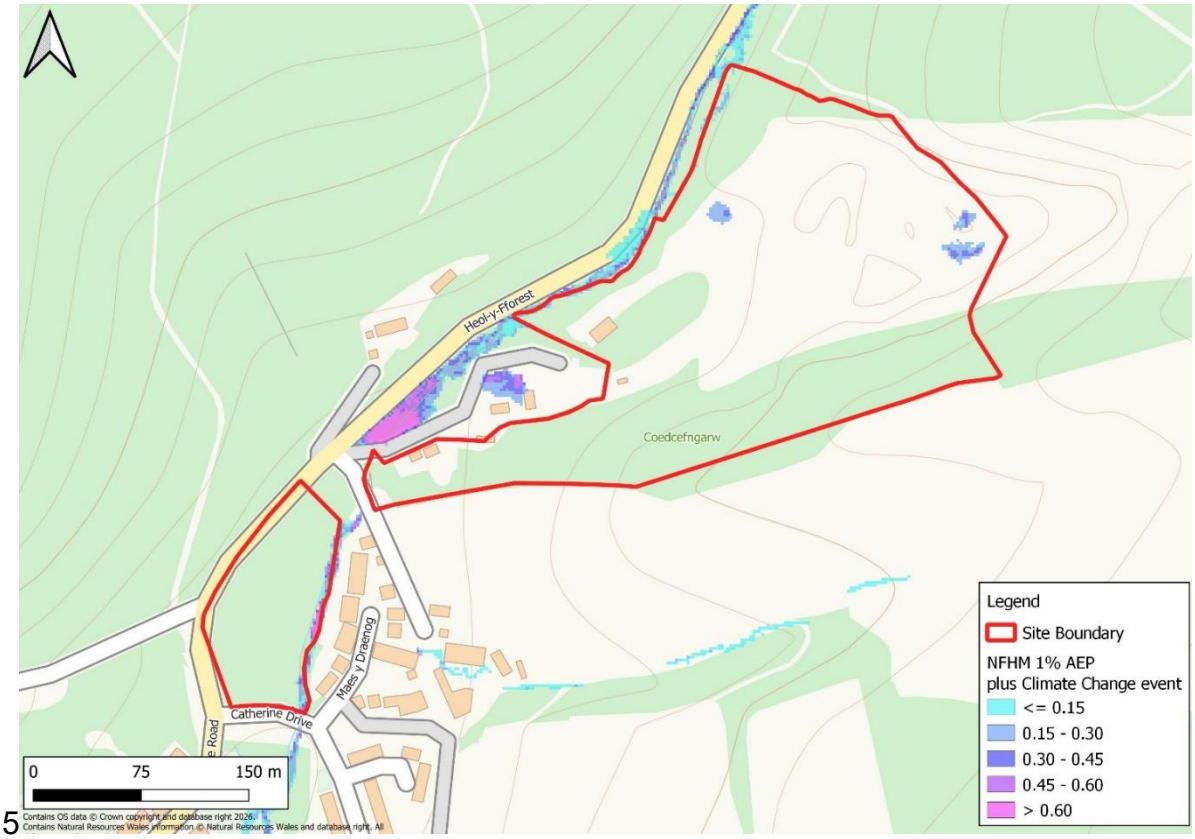

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Figure 4-1 Flood Risk from Small Watercourses- 1% AEP + Climate Change - Flood Depths

Figure 4-2 shows that during the 0.1% AEP plus climate change event, small watercourse flooding adjacent to the site boundary is predominantly confined to the existing watercourse corridor. However, there is an area within the eastern land parcel where the watercourse exceeds capacity and does encroach into the site boundary, before rejoining the watercourse ~100m downstream. Flood depths in the eastern parcel remain shallow, typically less than 0.3m.

In the western parcel, the Nant y Fforest flood extent is largely the same as the 1% AEP event, with flooding confined to the watercourse channel.

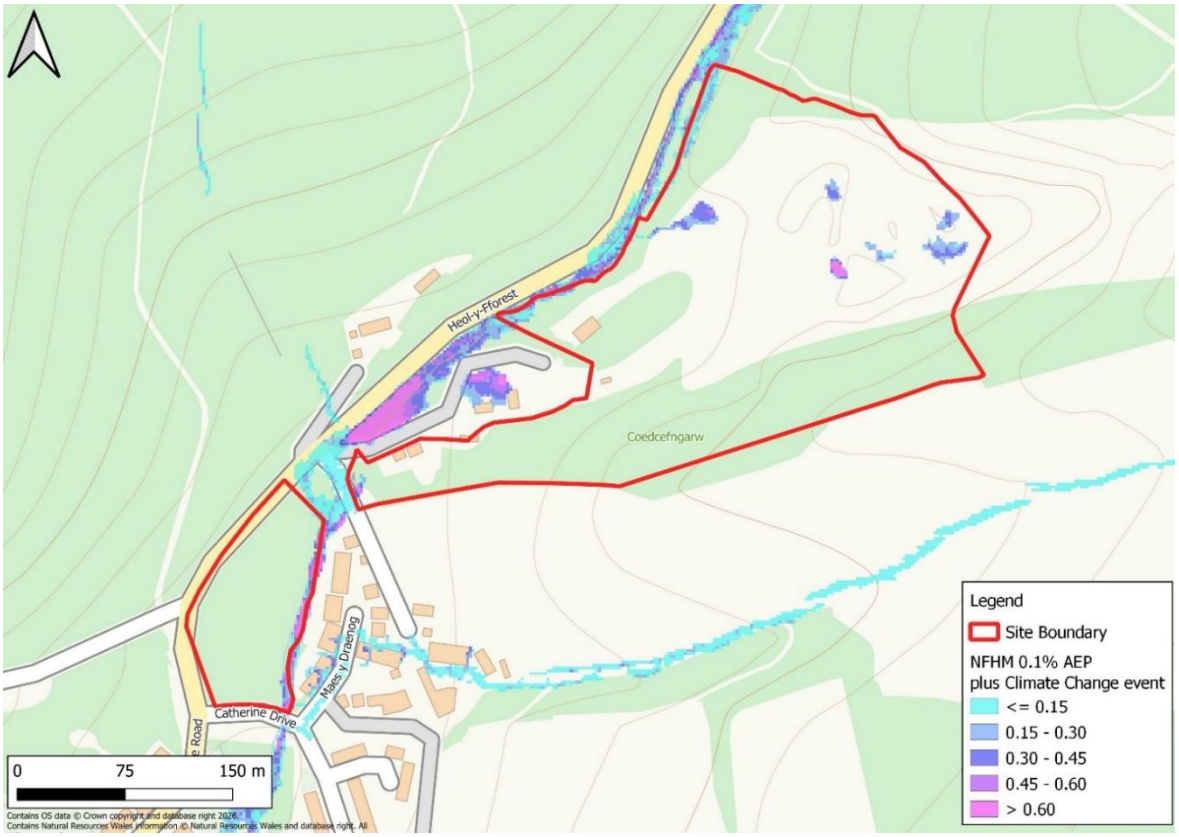

Figure 4-2 Flood Risk from Small Watercourses - 0.1% + Climate Change - Flood depths

The National Flood Hazard Mapping is comprised of broadscale modelling informed by general LiDAR data from 2018. Since the preparation of the NFHM by NRW, the LIDAR dataset has been updated (2023). In some instances, the updated LiDAR provides a better resolution and provides a more informed picture of ground levels around small watercourses.

Comparison of the 2018 and 2023 DTM LiDAR data reveals that the 2023 dataset provides a clearer indication of the drainage ditch within the LiDAR, with a refined channel, lower invert and higher bank features.

The location of the cross section with the corresponding profile is presented in Figure 4-3, which shows a cross section of the road, watercourse and the point at which flood waters are shown to enter the site, comparing both the 2018 and 2023 DTM LiDAR Data. The 2018 dataset, which underpins the NFHM, depicts a flatter channel profile with limited definition. In contrast, the 2023 LiDAR survey shows a more pronounced channel with higher banks capable of containing flood depths of up to approximately 0.9m. This updated topographic information suggests that the channel has sufficient capacity to retain flows during the 0.1% AEP plus climate change event, with no overtopping into the development site.

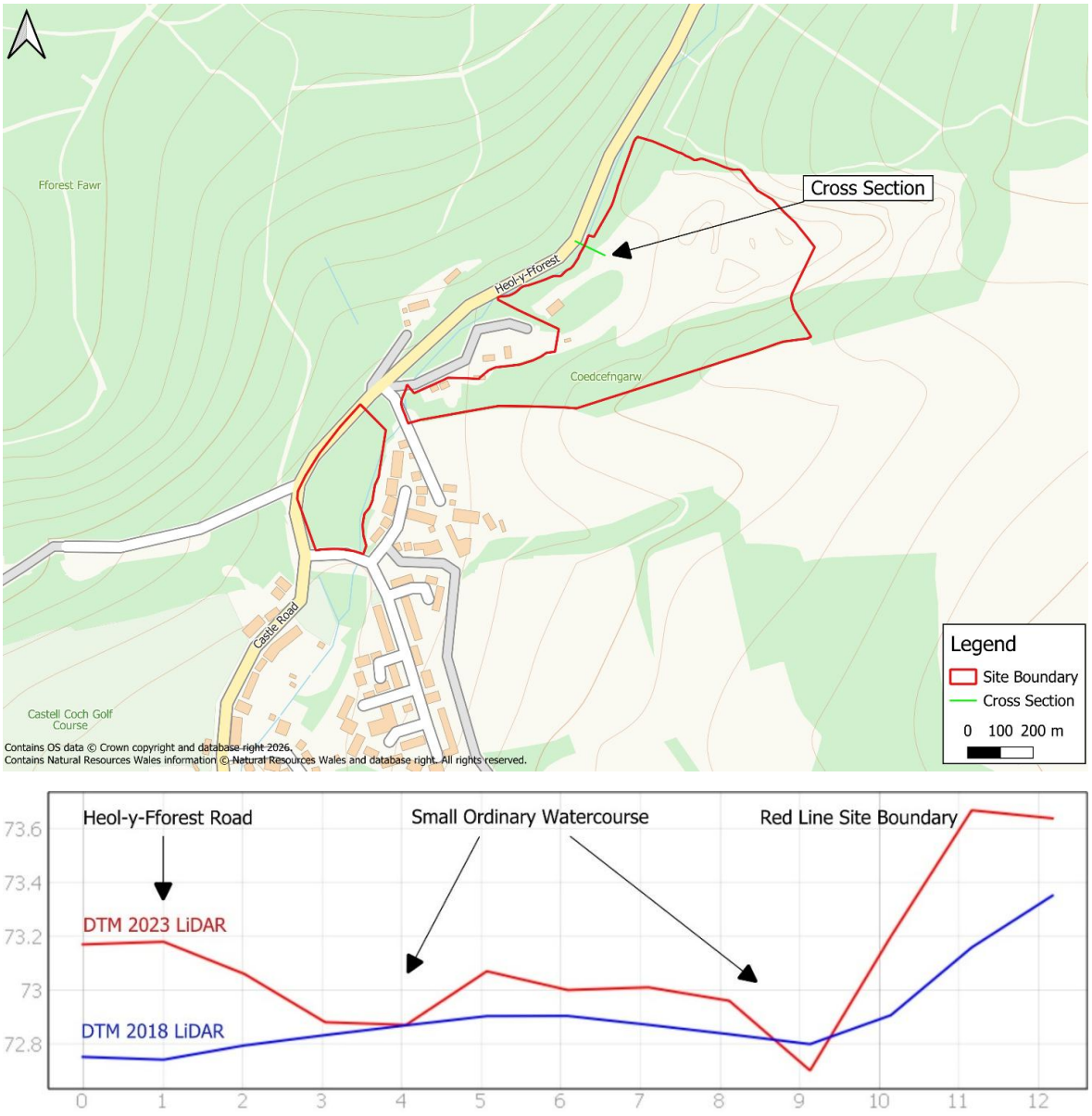

Figure 4-3 Cross Section of Small Watercourse comparing LiDAR Data

During the 0.1% AEP event, the unnamed access road which lies between the development parcels is shown to flood to shallow depths of up to 194mm. However, 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. It is considered likely that the culvert crossing beneath the unnamed cul-de-sac is not accurately represented within the broadscale modelling. Consequently, further analysis could be undertaken to further establish the small watercourse flood risk associated with the ordinary watercourse to refine the predicted flood extent. This would also provide a more accurate assessment for access and egress via the cul-de-sac.

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.

The site is predominantly located within Flood Zone 1 for surface water and small watercourses. However, areas of the site are shown to be located within Flood Zone 2 and 3 associated with the flood extent of the Nant y Fforest and also localised topographic depressions which cause surface water ponding.

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)

It is recommended that all watercourses within the site are retained, and development within their associated floodplains avoided, with the exception of crossing points. Any crossings over an ordinary watercourse will require Ordinary Watercourse Consent and should be designed to minimise the impact on the watercourse and risks associated with a potential blockage.

Access and Egress is a key consideration for proposed developments under TAN15. The primary site access route via the unnamed cul-de-sac road is predicted to flood to shallow depths of up to 0.2m during the 0.1% AEP plus climate change event. This is likely to be an overestimation of risk due to the likelihood of the culvert not being represented within the generalised NFHM modelling. It may therefore be beneficial to undertake a detailed hydraulic assessment to determine a more accurate understanding of the baseline flood risk to the site and redefine the flood extent.

Due to the presence of Flood Zones 2 and 3 of the FMfP for Surface Water and Small Watercourses, a planning application should be accompanied by a site specific FCA to assess this risk to the development proposals. It is likely that the illustrated flood risks can be managed through good site design and a comprehensive surface water drainage strategy to address localised surface water ponding.

6 Summary and recommendations

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

The site is mostly located within Flood Zone 1 for surface water and small watercourses, with limited areas of Flood Zones 2 and 3. Consequently, an FCA will be required in support of any planning application for the site. Flood extents are associated with the ordinary watercourse that flows adjacent to site boundaries, and also with localised surface water ponding.

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 masterplanning should be taken.
- Any planning application for the site should be accompanied by Surface Water Drainage Statement that demonstrates how SuDS will be integrated into the scheme in line with the Statutory Standards for SuDS in Wales, to manage areas of surface water ponding.
- Further analysis may be considered to refine baseline flood risk to the access and egress route of the site.

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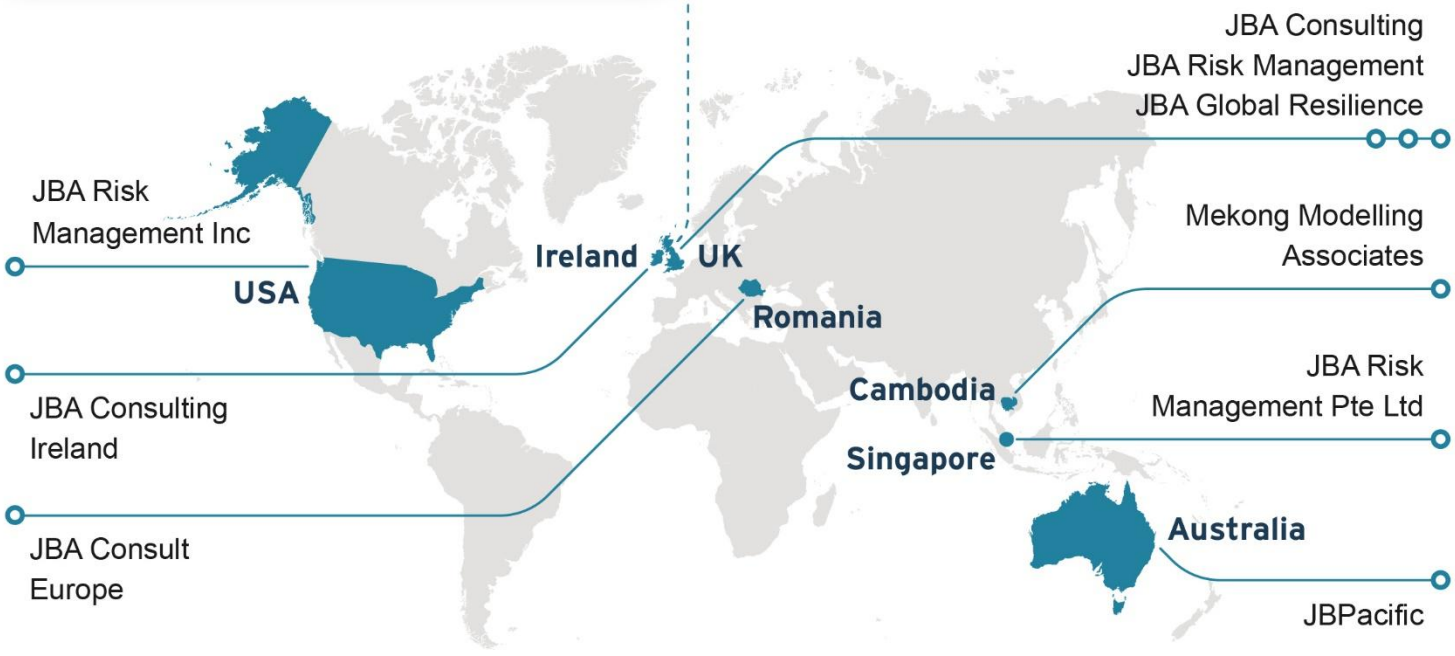

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