

Harvey Crescent, Port Talbot - Flood Consequence Assessment

Version 3

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Contract

This report describes work commissioned by Coastal Housing Group, by an email in July 2021. Erica Skinner and Hannah Booth of JBA Consulting carried out this work.

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Purpose

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1 Introduction

1.1 Terms of Reference

JBA Consulting (JBA) were commissioned by Coastal Housing Group to undertake a Flood Consequence Assessment (FCA) to support a planning application for the redevelopment of a brownfield site into residential properties.

1.2 FCA requirements

This FCA follows Welsh Government guidance on development and flood risk set out in Technical Advice Note 15: Development and Flood Risk (TAN15). Where appropriate, the following aspects of flood risk should be addressed in all planning applications over their expected lifetime:

- 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 flood water across the site
- Overland flow routes
- The effect of access and egress and infrastructure, for example, public sewer outfalls, combined sewer outflows, surface water sewers and effluent discharge pipes from wastewater treatment works
- The impacts of the development in terms of flood risk on neighbouring properties and elsewhere on the floodplain.

2 Site Description

2.1 Site Summary

The proposed development site is located on Harvey Crescent in Port Talbot. The development site comprises of an unused brownfield site, that previously hosted the Dewi Sant Housing Association office building, which was demolished between 2010 and 2013.

The site is approximately 0.25ha and is accessed from the south-eastern edge of the site boundary. There are a number of industrial/commercial premises to the north and east of the proposed development site, with residential properties to the south and west. Table 2-1 summaries the key characteristics of the site. The site location is shown in Figure 2-1.

Table 2-1 Site summary

Site name	Harvey Crescent
Site area	Approximately 0.25ha
Existing land use	Brownfield site
Purpose of development	Residential development
OS NGR	SS 75487 89591
Local Planning Authorities	Neath Port Talbot Council
Lead Local Flood Authority	Neath Port Talbot Council



Figure 2-1 Site Location

2.2 Site Topography

Natural Resources Wales (NRW) Open Source 1m Light Detection and Ranging (LiDAR) data has been used to analyse existing ground levels across the site and within the surrounding area, as shown in Figure 2-2. NRW LiDAR data demonstrates that the site is relatively flat, with a slight decline from the centre/western edge of the site (6.75mAOD) to the north and south (6.61mAOD).

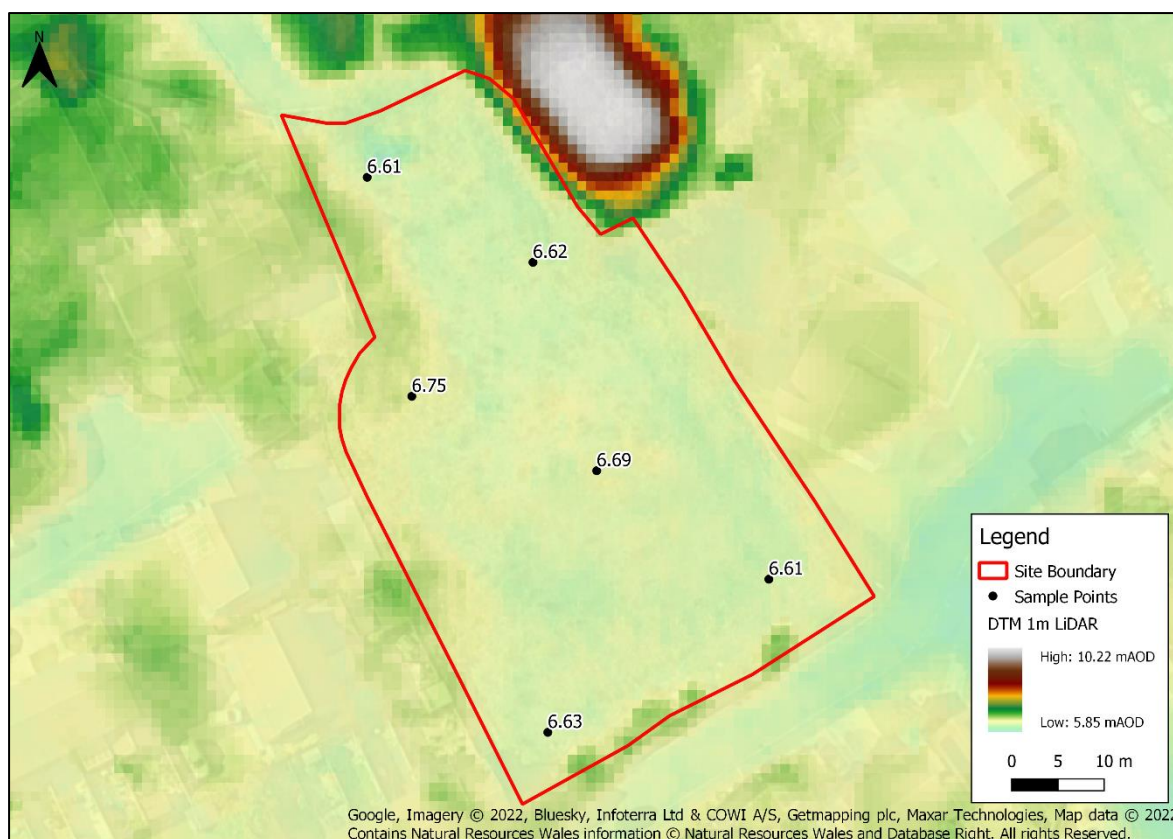


Figure 2-2 LiDAR Topographic data from NRW (1m resolution) with Sample Points

2.3 Soils and Geology

The geology of the site has been assessed using the British Geological Survey (BGS) Geology of Britain Viewer¹. The bedrock is shown to be South Wales Middle Coal Measures Formation comprised of mudstone, siltstone and sandstone. The superficial geology is formed of Blown Sand.

The soils on site have been assessed on the Cranfield University Soilscape viewer² and are shown to be sand dune soils.

2.4 Watercourses

An NRW designated Main River, the River Afan, flows in a south-westerly direction approximately 100m southeast of the development site, as shown in Figure 2-3.

¹ https://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.235342593.1646683261.1643098406-854211532.1643098406

² Cranfield Soil Scapes Viewer. <http://www.landis.org.uk/soilscales/>



Figure 2-3 Nearby Watercourses

2.5 Development Proposal

Development proposals for the site are to convert the unused brownfield site into residential properties with associated parking, as shown in Appendix A. The site will be raised to a minimum level of 7.75mAOD.

3 Planning Policy and Flood Risk

3.1 Planning Context

Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. These policies have the aim that all development in Wales is sustainable and improve the social, economic, environmental, and cultural wellbeing of Wales as set out in the Wellbeing of Future Generations Act 2015.

Technical Advice Note 15 (TAN-15), introduced by the Welsh Government in 2004, provides technical guidance relating to development planning and flood risk in Wales. The initial requirements of TAN-15 are to identify the vulnerability classification(s) and flood zones relevant to the proposed development, and to apply this information to the application of the justification tests.

An update for TAN-15 was released in October 2021 and was due to come in force on the 1st December 2021. However, Welsh Government have since suspended the implementation of the new TAN-15 until 1st June 2023. Although the new TAN-15 is not a material consideration, Welsh Government and NRW advise that some consideration is given to the draft Flood Map for Planning (FMfP) as best available information. Therefore, where a site is located in a FMfP flood risk zone it is recommended that an FCA is carried out.

As a result of the above, both the DAM and the FMfP are considered as part of this FCA.

3.2 Vulnerability Classification

TAN-15 assigns one of three flood risk vulnerability classifications to a development, as shown in Table 3-1. The proposed development is classed as residential development. Consequently, the development is classified as Highly Vulnerable.

Table 3-1 Development categories 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.

3.3 Development Advice Map Classification

Figure 3-1 shows that the site is predominantly located in Zone C1. The DAM zone classification is used to trigger different planning actions based on a precautionary assessment of flood risk. Zone C1 is described as areas of the floodplain which are developed and served by significant infrastructure, including flood defences.



Figure 3-1 Development Advice Map

3.4 Flood Map for Planning Classifications

Flood Map for Planning – Rivers

As shown in Figure 3-2, the majority of the site is located within Flood Zone 3. Flood Zone 3 represents areas with a greater than 1 in 100 (1%) chance of flooding in a given year, including climate change.

Only a small section at the north of the site is located within Flood Zone 2 for the Flood Map for Planning for Rivers. Flood Zone 2 represents areas which have less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.

The proposed development site is located within the TAN-15 Defended Zone for Rivers.

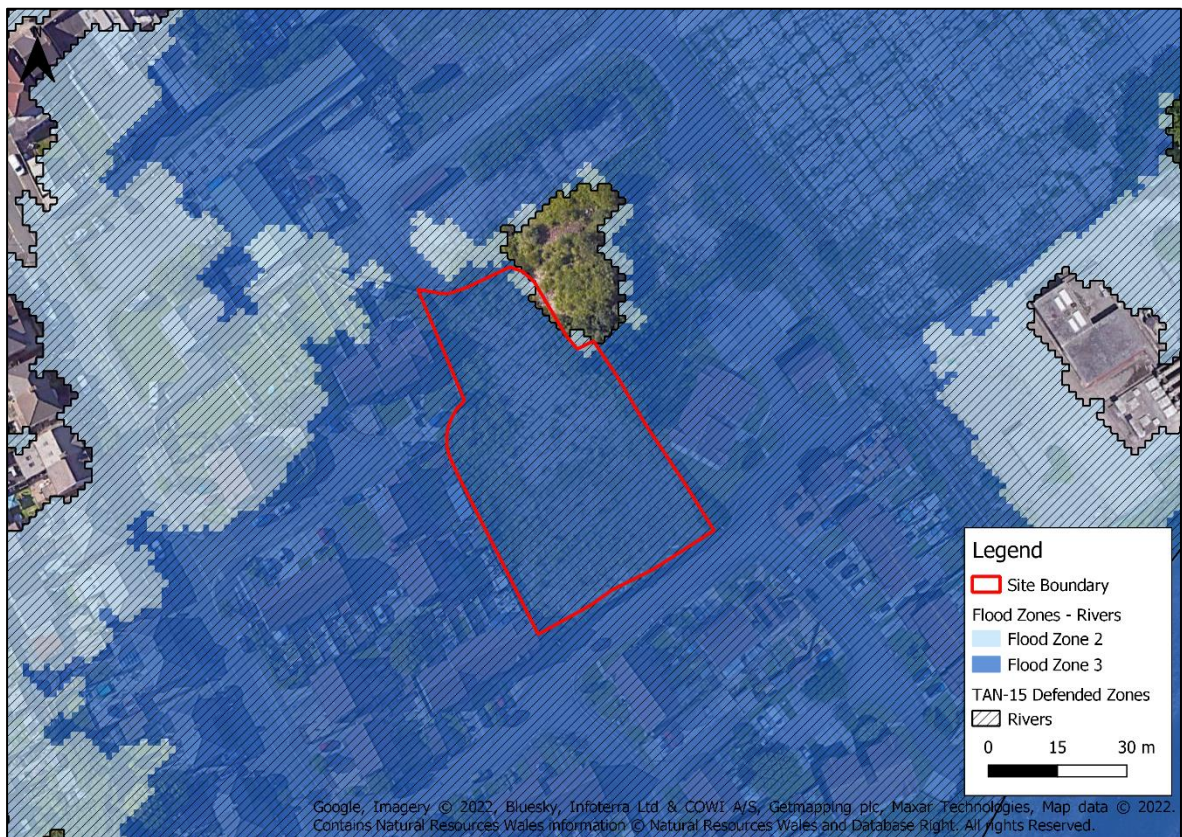


Figure 3-2 Flood Map for Planning – Rivers.

Flood Map for Planning - Sea

The majority of the site is located within Flood Zone 3 which represents an area greater than 1 in 100 (1%) chance of flooding in a given year, including climate change. There is minor encroachment of Flood Zone 2 into the north-eastern boundary of the site. Flood Zone 2 are areas which have less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year, including climate change.



Figure 3-3 Flood Map for Planning – Sea

3.4.1 Flood Map for Planning – Surface Water and Small Watercourses

The site is not at risk of Surface Water and Small Watercourses flooding in the Flood Map for Planning and is therefore not shown graphically.

3.5 Local Development Plan

The Local Development Plan (LDP) is a land-use document in which the council sets out its land use development over a 15-year period. The current LDP for Neath Port Talbot was adopted in January 2016 and provides a framework to guide future development and set out where, when, and how much new development can take place within the plan period (2011-2026).

Within the LDP, Policy SP7 for Housing Requirement states the need for an additional 8,760 dwellings between 2011-2026.

Paragraph 2.5.22 also states that “the housing supply within Neath and Port Talbot will be made up of brownfield redevelopment, greenfield sites and existing commitments, with the regeneration of brownfield land being balanced against the release of greenfield areas”, supporting Policy SP16 that requires development to be prioritised on brownfield sites over greenfield sites.

The proposed development therefore meets these criteria by constructing additional residential properties on an unused brownfield site.

3.6 Justification Test

Development in Zone C1 is subject to the Justification Test. TAN-15 states that development will be justified if it can be demonstrated that:

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

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

It concurs with the aims of Planning Policy Wales and meets the definition of previously developed land;

and,

The potential consequences of a flooding event for the particular type of development have been considered and found to be acceptable.

The proposed development has been assessed against the requirements of the Justification Test with the results summarised in Table 3-2. All the criteria have been satisfied with regards to the proposed development.

Table 3-2 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 assist with Policy SP7 listed in the Local Development Plan and will contribute to housing targets in the county.	✓
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 proposed development site meets the criteria of previously developed land.	✓
The potential consequences of a flooding event for the particular type of development have been considered and found to be acceptable.	The flood consequences have been assessed and are detailed further in Sections 4 and 5.	✓

4 Flood Risk Assessment

This section assesses the risk to the proposed development from all sources of flooding, the risk of increased flooding to others, and how flood risks can be managed.

4.1 Review of Existing Flood Risk Data

The latest available information on flood risk at the site, published by Natural Resources Wales (NRW) 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 is at low risk of river flooding.
Flood Risk from the Sea	✓	Although the FRAW map indicates a very low risk of tidal flooding, the FMfP suggests that the site has a risk of tidal flooding with the application of climate change
Flood Risk from Surface Water and Small Watercourses	×	The site is at very low risk of surface water flooding.
Flood Risk from Groundwater	×	The site is at very low risk of groundwater flooding.
Flood Risk from Reservoirs	×	The site is not considered to be at risk of flooding from reservoirs.
Flood Risk from Sewers	×	The site is considered to be at low risk of flooding from sewers.

4.2 Historical Flooding

NRW's map of recorded flood extents does not show any evidence of historic flooding on the site. Neath Port Talbot Preliminary Flood Risk Assessment³ and Flood Risk Management Strategy⁴ highlight that a flood event has previously occurred near to the site, however there is no indication that the site itself has previously flooded.

4.3 Flood Risk from Rivers

NRW's Flood Risk Assessment Wales (FRAW) flood mapping indicates that almost all of the site is located within a **low** risk area of flooding from rivers, with between a 1 in 1000 and 1 in 100 (0.1% - 1% AEP) chance of flooding in any given year, as shown in Figure 4-1.

The proposed development site is located within an Area Benefiting from Flood Defences for Rivers.

To better understand the risk of flooding posed by fluvial flooding sources and the implications of climate change on the flood risk to the proposed development, further assessment using detailed flood modelling data was undertaken and is discussed in Section 5.

³ Neath Port Talbot Preliminary Flood Risk Assessment (2011). Retrieved from https://www.npt.gov.uk/media/4629/pfra_report_2011.pdf?v=20171123145433

⁴ Neath Port Talbot Flood Risk Management Strategy (2013). Retrieved from https://www.npt.gov.uk/media/4930/lfrms_npt_local_flood_risk_management_strategy.pdf?v=20170627002244
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Figure 4-1 FRAW map – Risk of flooding from Rivers

4.4 Flood Risk from the Sea

The NRW FRAW Flood Risk from the Sea mapping shows that the site is not at risk of tidal flooding. However, FRAW does not consider the risk of flooding with climate change, and as discussed above in Section 3.4 the Flood Map for Planning, which includes the application of climate change, locates the site within an area with a risk of tidal flooding.

To better understand the risk of flooding posed by tidal flooding sources and the implications of climate change on the flood risk to the proposed development, further assessment using detailed flood modelling data was undertaken and is discussed in Section 5.

4.5 Flood Risk from Surface Water and Small Watercourses

The NRW FRAW Surface Water and Small Watercourse map, shows that the site is located outside of the mapped flood extent, therefore, is at **very low** risk of surface water flooding (<0.1% AEP), as shown in Figure 4-2.



Figure 4-2 FRA map - Risk of flooding from surface water and small watercourses

4.6 Flood Risk from Groundwater

Groundwater flooding is caused by unusually high groundwater levels. It occurs as excess water emerges at the ground surface or within manmade structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and can result in damage to property. This risk of groundwater flooding depends on the nature of the geological strata underlying the site and the local topography.

The Neath Port Talbot County Borough Council Flood Risk Management Strategy, states that 'there are no specific areas of groundwater flooding recorded in the Neath Port Talbot area'. It can therefore be concluded that the risk of groundwater flooding at the site is very low.

4.7 Flood Risk from Reservoirs

NRW flood maps indicate that the proposed development site is not at risk of flooding due to reservoir failure. It can therefore be concluded that the risk of reservoir flooding at the site is very low.

4.8 Flood Risk from Sewers

Neath Port Talbot County Borough Council Flood Risk Management Strategy⁵ states that there has been a total of 430 sewer flooding events recorded by the water companies within Neath Port Talbot, of which 355 were identified as being at high risk, with 34 suffering from internal flooding. One notable event occurred at Victoria Road approximately 200m from the site. However, due to the topography between the road and the site, it is unlikely sewer flooding would travel to the site. It can therefore be concluded that the risk of sewer flooding at the site is low.

5 Neath Port Talbot County Borough Council (2013) Local Flood Risk Management Strategy June 2013. Retrieved from https://www.npt.gov.uk/media/4930/lfrms_npt_local_flood_risk_management_strategy.pdf?v=20170627002244
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5 Detailed Fluvial and Tidal Flood Risk Assessment

As identified in Section 3-4, the site is considered to be at risk of fluvial and tidal flooding. To better understand the risk of flooding posed to the site and the potential implications of climate change, further assessment using detailed hydraulic modelling is provided in this section.

5.1 Hydraulic Modelling Availability

5.1.1 Existing Model

Natural Resources Wales's detailed fluvial and tidal flood model for Port Talbot consists of the 1D-2D linked ESTRY-TUFLOW Model developed by JBA Consulting in August 2017.

More recently the NRW model was updated for another location close to the proposed development (planning reference P2020/0303). This modelling included the following updates:

- Updating the building representation to be based solely on the OS Mastermap layer with a 90% blockage factor applied. Mannings N roughness is being applied to all buildings with a value of 0.1. This approach was discussed and agreed with NRW.
- Run the model with the latest version of TUFLOW.
- Update the tidal boundary conditions to be uplifted to 2021 to represent present-day conditions and consider the impact of the 2096 climate change epoch.

In accordance with Welsh Government Guidance on Climate Change Allowances for Planning Purposes⁶, 75-years of cumulative Sea Level Rise needs to be considered for non-residential development. Consequently, to account for the impact of sea level rise over the lifetime of the development an uplift was calculated for the 2121 scenario based on the Higher Central allowance (70th percentile) of the UKCP 18 for 2100, RCP 8.5 dataset. Table 5-1 summarises the sea level rise uplifts applied to the tidal boundary conditions and the resulting peak tide levels.

Table 5-1 Sea level rise uplifts and peak tide levels

Scenario	Sea level rise uplift (m)	Peak tide level (m AOD)	
		0.5% AEP	0.1% AEP event
2121	1.03	7.40	7.72

5.1.2 2022 Model Updates

For this FCA the tidal boundaries have not be updated from a base year of 2021 to 2023 for consistency with other recent FCA's in the area. From 2121 to 2123 an additional increase of 25mm is expected based of the UKCP18 dataset. This negligible difference is not expected to impact on the results therefore the tidal boundaries have not been updated for these two additional years. However, for robustness these additional 25mm have been added to the recommend flood mitigation measures.

The fluvial flood risk flows have not been updated. New flow estimates for the Afan were recently calculated and agreed for a JBA/NRW project at Newbridge weir, which follows completion of the modelling work in support of this study. These new estimates show a small 9% increase in peak flow estimation across both the 1% and 0.1% AEP design events. This is well within the typical bounds of hydrology confidence and NRW typically only require hydrology updates where the change in estimates is greater than 10%. Added to which the current results (Section 5.2.1) suggest little risk of fluvial flooding and tidal risk is clearly

⁶ Welsh Government Guidance on Climate Change Allowances for Planning Purposes: <https://gov.wales/sites/default/files/publications/2018-11/flood-consequence-assessments.pdf>
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the dominate risk factor. We therefore conclude that updated fluvial flood modelling with updated hydrology is unwarranted.

The modelling used to inform this FCA uses the TUFLOW executable 2020-01-AB. Whilst it is acknowledged that this is not the most recent version of the software, subsequent software updates have focused on the TUFLOW HPC solver, not TUFLOW classic, which has been used as part of this modelling. Therefore the uses of 2020-01-AB has been deemed acceptable for this assessment.

The 0.5% AEP plus climate change and 0.1% plus climate change were simulated to assess the risk of tidal flooding. The 1% AEP plus climate change and 0.1% AEP defended events were simulated for the assessment of fluvial flooding. The results from these design events are detailed below.

5.2 Fluvial Flood Risk

5.2.1 Baseline Flood Modelling

1% AEP Plus Climate Change

During the 1% AEP plus climate change fluvial event the site is predicted to be flood free and is therefore not shown graphically.

0.1% AEP

Figure 5-1 highlights that the baseline 0.1% AEP fluvial event is predicted to be flood free.



Figure 5-1 Baseline Fluvial 0.1% AEP – Fluvial

As the proposed development site is not predicted to flood in the 0.1% AEP event, no further assessments of the post-development scenarios have been undertaken.

5.3 Tidal Flood Risk

5.3.1 Baseline Model Results

The site is predicted to be flood free in the present-day scenarios and therefore the model results for 2121 are shown below.

2121 0.5% AEP event

Figure 5-2 shows that the site is generally predicted to have flood depths less than 0.9m during the 0.5% AEP event plus climate change event, with a maximum flood depth of 0.96m in a localised area in the north of the site. The flood level at the site is 7.41m.

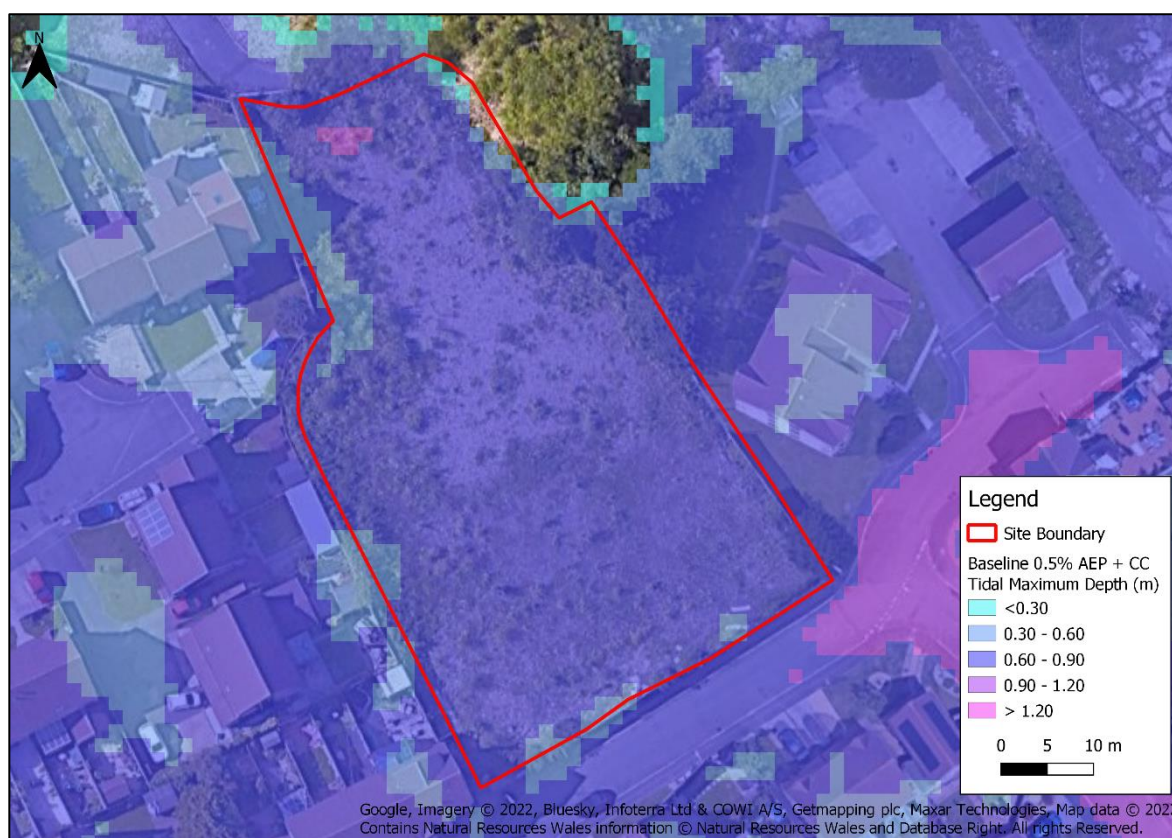


Figure 5-2 Baseline 0.5% AEP + Climate Change - Tidal

2121 0.1% AEP event

Figure 5-3 shows that the site is generally predicted to have flood depths up to 1.2m during the 0.1% AEP plus climate change event, with a maximum flood depth of up to 1.26m in a localised area in the north of the site. The flood level at the site is 7.71m.

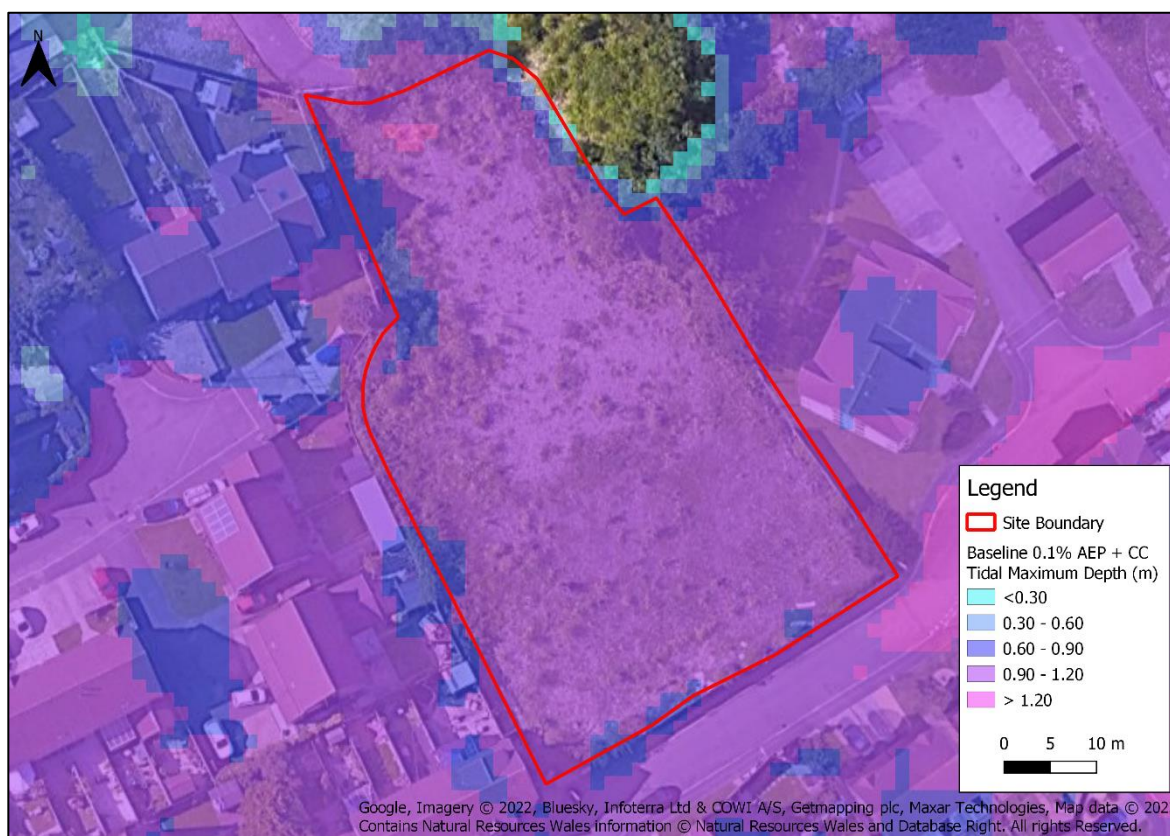


Figure 5-3 Baseline Tidal 0.1% AEP + Climate Change – Tidal

5.3.2 Post-Development Model Results

Where development is justified, suitable mitigation measures can be incorporated within the design to ensure that development is as safe as possible, and there is (TAN15, Para 7.3):

- minimal risk to life;
- minimal disruption to people living and working in the area,
- minimal potential damage to property;
- minimal impact of the proposed development on flood risk generally; and,
- minimal disruption to natural heritage.

Further guidance on assessing the above requirements is provided in Appendix 1 of TAN-15. Three requirements are particularly important concerning the proposed development and the flood mitigation required. These are:

1. [A1.12] No flooding elsewhere. The proposed development should have minimal impact of the proposed development on flood risk generally.
2. [A1.14] Residential development should be flood free in the 1% AEP plus climate change event. This is "indicative guidance".
3. [A1.15] Beyond the threshold set by A1.14 flooding should be safe for site users and recommended values of maximum flood depths and velocity are provided. The maximum recommend flood depth for residential development is 600mm. The figures provided are "indicative"; "Each site must therefore be considered individually, and a judgement taken in the context of the particular circumstances which could prevail at that site"

To mitigate flood risk to the site, it is proposed to raise the site to a minimum of 7.71mAOD, level with the 0.1% AEP plus climate change tidal flood level of 7.71m. The post-development scenarios were then assessed for the 2121 0.5% and 0.1% AEP events.

Present day scenarios are not shown below as the site is not predicted to flood, and therefore any changes in ground level will not affect the flood risk on site.

0.5% AEP Plus Climate Change Post-Development Scenario

The results for the 0.5% AEP plus climate change post-development scenario are presented in Figure 5-4. In this event, the site will remain flood-free and is therefore compliant with TAN-15 A1.14.

This figure indicates that parts of the northern and eastern boundary of the proposed development site may experience flooding. However, this can be attributed to limitations with the grid resolution, as it has been confirmed that all areas of the site will be above the predicted flood level as the site has been raised to a minimum level of 7.71mAOD, which is above the 7.41m flood level. The site is therefore flood free in the 0.5% AEP plus climate change post-development scenario.



Figure 5-4 Post-Development 0.5% AEP + Climate Change - Tidal

0.1% AEP Plus Climate Change Post-Development Scenario

The site is also predicted to remain flood-free in the 0.1% AEP plus climate change post-development scenario, as shown in Figure 5-5.

The predicted flood level at the site is 7.71mAOD, which would increase to 7.735mAOD with a further 25mm uplift for an additional 2 years of climate change allowance. This flood level remains below the proposed site level of 7.75mAOD. The site is therefore flood free in the 0.1% AEP plus climate change post-development scenario.



Figure 5-5 Post-Development 0.1% AEP + Climate Change – Tidal

5.3.3 Third-Party Impacts

TAN-15 requires the demonstration that the proposed development will not worsen the flood risk to others (third parties). Ground raising risks displacing flood water, either by disrupting flow paths, reducing floodplain storage, or combining both. Therefore, to assess this risk and determine the impact on predicted water levels, comparisons of pre- and post-development maximum water levels were undertaken.

0.5% AEP Plus Climate Change Scenario

Detriment analysis has been undertaken for the 0.5% AEP event plus climate change, as shown in Figure 5-6. Betterment is shown across the proposed development site, as expected, as a result of ground raising. Flood depths are also shown to slightly decrease by 0.5-1cm to the north and north-east of the development site. This is due to the raising of the proposed development site reducing the conveyance of flood water across Port Talbot.



Figure 5-6 Comparison of pre- and post-development in the 0.5% AEP + Climate Change event

0.1% AEP Plus Climate Change Scenario

Figure 5-7 shows the detriment analysis for the 0.1% AEP event plus climate change. As expected, a decrease in flood depth is predicted across the proposed development site as a consequence of ground raising. A decrease in flood depths is also shown to the north and east of the site, with an average decrease in flood depth of 0.5-2mm predicted.

Flood depths will increase up to 1cm in a small, isolated area to the south of the site. This increase is negligible compared to the significant depths predicted across Neath Port Talbot during both the 0.5% AEP and 0.1% AEP plus climate change scenarios and does not constitute an increase in flood risk. Of particular note are the following considerations when reaching this conclusion:

- There is no change to the frequency or extent of flooding as a result of the proposed development.
- Changes in flood depths are minimal, across all areas with only a slight increase in the tidal 0.1% AEP plus climate change event.
- The potential to cause third-party impacts exists only if the area is flooded. Should flood defences be improved in the future, it is likely that the site would not flood, and therefore there would be no detriment.
- The proposed development will contribute to improving the flood resilience of the area and may provide valuable refuge for existing local residents should flooding occur.

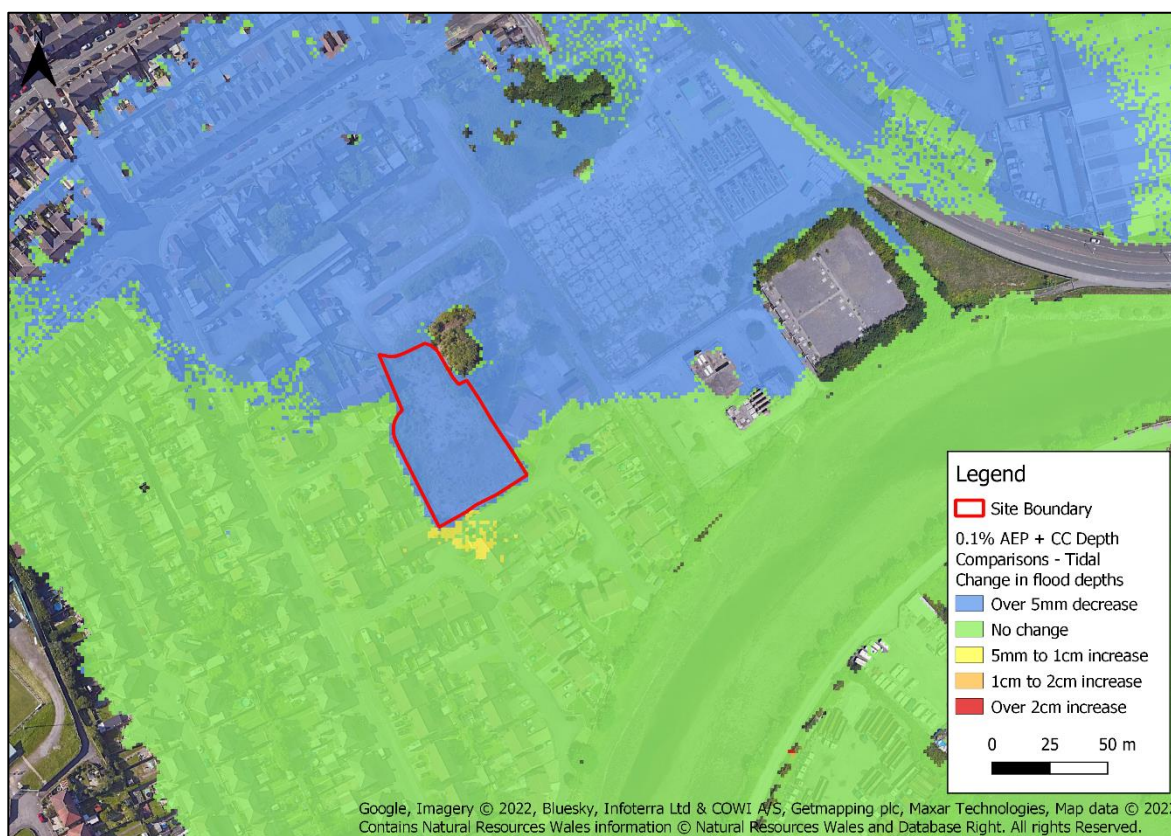


Figure 5-7 Comparison of pre- and post-development in the 0.1% AEP + Climate Change event

5.4 Access and Egress

During the 0.5% AEP plus climate change and the 0.1% AEP plus climate change tidal flooding events, access to dry land will be restricted due to the scale of flooding across Neath Port Talbot. It is recommended that residents sign up for flood warnings and an emergency plan is implemented to encourage residents to evacuate site prior to a flood event. If residents were unable or unwilling to evacuate the building, then it is recommended that they shelter in the building until flooding recedes to a safe level. Given the proposed flood mitigation measures the site will provide safe refuge to residents and would also provide a safe refuge for existing residents of the area.

Flooding is likely to be short lived as tidal water will begin to recede rapidly after the peak of high tide. Further guidance on mitigating the risk of flooding to the proposed development is provided in Section 5.5.

5.5 Mitigation options

The following mitigation measures are recommended to ensure the safety of the site's occupiers and users, in the event of an extreme flood.

- To mitigate the risk of flooding, the site should be raised to a minimum of 7.71mAOD, level with the 7.71m flood level in the 0.1% AEP plus climate change flood event.
- Site occupiers should sign up to the NRW flood warning service. The proposed development site is located entirely within the 'River Afan at Port Talbot' flood warning area and the 'Swansea Bay and Gower Coast' flood alert area. It is recommended, that the occupants sign up for these flood warnings and alerts to ensure the site can be evacuated before a flood event.
- A Flood Response Plan should be developed and adopted to ensure that occupiers and users are aware of the risk and know what action to take in the

event of receiving a flood warning. At a minimum, the flood emergency plan should cover adequate flood warning, evacuation and access/egress routes in the event of flooding for the lifetime of the development. NRW provide guidance for the production of flood emergency plans⁷. This guidance should be used to inform flood response procedures at the site.

⁷ Natural Resources Wales, How to prepare your home business or farm for a flood, retrieved from: <https://naturalresources.wales/flooding/preparing-your-home-business-or-farm-for-a-flood/?lang=en>
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6 Assessment of Acceptability Criteria

TAN-15 states that for highly vulnerable development to be considered within Zone C1, the site must meet both the Justification Test and the Acceptability Criteria. Section 3.6 details the assessment of the proposed development site against each criterion of the Justification Test. Our assessment of the Acceptability Criteria, as set out in TAN-15, is summarised in Table 6-1 below. These criteria must be satisfied for the proposed development to comply with all aspects of TAN-15.

Table 6-1 Assessment of accessibility criteria

TAN 15 Justification Criteria	Comments	Achieved
Developer is required to demonstrate that the site is designed to be flood free for the lifetime [Ref: TAN-15 A1.5] of development for a 1 in 100 (1%) chance (fluvial) and 1 in 200 (0.5%) chance (tidal) flood event including an allowance for climate change in accordance with TAN-15 table A1.14.	Fluvial: The proposed development site is predicted to be flood-free during the 1% AEP plus climate change flood event. Tidal: The site is predicted to be flood-free in the post-development 0.5% AEP plus climate change event.	Yes
The development 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 the property.	Fluvial: The proposed development site is predicted to be flood-free during the 0.1% AEP flood event. Tidal: By raising the proposed development site to 7.71mAOD the site will be flood-free during the 0.1% AEP plus climate change tidal event.	Yes
No flooding elsewhere.	The impact of the development on the surrounding areas has been carefully considered and concluded to be negligible as discussed in Section 5.3.3. The potential to cause third party impacts exists only in the 0.1% AEP plus climate change tidal event.	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
The developer must ensure that future occupiers of 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 Response	Yes

	Plan is prepared to ensure that future occupants of the site are aware of the flood risk.	
Effective flood warnings are provided at the site	The site is located within NRW's 'River Afan at Port Talbot' flood warning area and the 'Swansea Bay and Gower Coast' flood alert area.	Yes
Escape/evacuation routes are shown by the developer to be operational under all conditions.	Considerable flood warning lead time (>24hrs) should provide plenty of time to evacuate the site safely. 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 potentially hazardous floodwaters.	Yes
The development is designed by the developer to allow the occupier of the facility for rapid movement of goods/possessions to areas away from flood waters.	The development site is raised level with the 0.1% AEP plus climate change tidal flood level and is consequently not at risk of flooding, therefore goods and possessions should not need to be moved away from any areas at risk of flooding.	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 development site is raised above the 0.1% AEP plus climate change tidal flood level and is consequently not at risk of flooding, therefore structural damage is unlikely.	Yes

7 Conclusions and Recommendations

- JBA Consulting were commissioned to prepare a Flood Consequence Assessment (FCA) in support of a planning application for the redevelopment of a brownfield site into residential properties.
- The site is 0.25 hectares in size and is currently an unused brownfield site.
- An NRW designated main river, the River Afan, flows in a south-westerly direction approximately 100m southeast of the development site
- The proposal is classed as highly vulnerable development by TAN-15.
- The site is located within Zone C1, as categorised by NRW's Development Advice Maps. Zone C1 is described as areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
- The site is located within the TAN-15 Defended Zone for rivers, and Zone 3 of the FMfP for flood risk from seas.
- The site is not at risk of surface water flooding, and is at little or no risk of groundwater, sewer or reservoir flooding.
- Detailed hydraulic modelling results were used to assess the risk of fluvial and tidal flooding to the site. This demonstrated that the proposed development site will be flood free in the 1% AEP plus climate change fluvial event, and the 0.1% AEP fluvial flood event.
- The site should be raised to a minimum of 7.75mAOD. This level is above the 7.735m flood level in the 0.1% AEP plus climate change tidal flood event. Consequently, the proposed development site is predicted to be flood free in the 0.5% and 0.1% AEP plus climate change tidal events, satisfying and exceeding the requirements of A1.14 of TAN15.
- It is recommended that the building owners and occupiers should sign up to the NRW Flood Warning Service and that a Flood Response Plan is prepared to ensure that future occupiers of the site are aware of the flood risk and recommended flood risk management actions.
- The site satisfies all the requirements of the Justification Test and Acceptability Criteria.
- It is concluded that on the grounds of flood risk, the proposed development site is compliant with the aims and objectives of Planning Policy Wales and TAN-15.

A Appendices

Development Plan

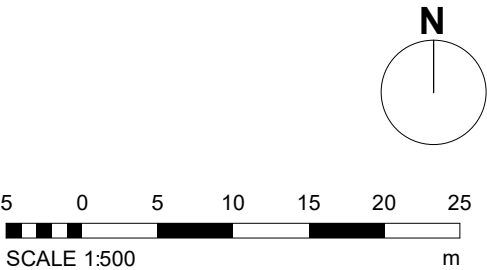
Drawing Note:

Proposals are based upon current digital OS mapping data obtained 08.06.22

Drawings are to be read in conjunction with other design consultant information.



Proposed Site Plan
1 : 500



Rev	Status	Date	Check	Description
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Project
Harvey Crescent
Port Talbot
Coastal Housing Association

Title
Proposed Site Plan

Job No	Scale at A3	Classification	Status	Revision
4653	As indicated			

Project - Originator - Functional Breakdown - Spatial Breakdown - Form - Discipline - Number
HCCCH-HMA-ZZ-ZZ-D-A-00092

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