

Project: Aberpergwm, Plant Pool Shed

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1 Introduction

1.1 Project Background

1.1.1 UTC Associates (the consultant) has been commissioned by Energybuild Ltd (the Client) to produce a Flood Consequence Assessment and Justification Test Report in relation to the proposed New Plant Pool Shed for the Aberpergwm Colliery, Vale of Neath.

1.1.2 The development includes the construction of a new shed structure used to store plant and materials which is within the existing colliery site, adjacent to the existing dry coal store building, north of the attenuation and settlement lagoons.

1.2 Method

1.2.1 The report will firstly assess the existing site, including a Flood Consequences Assessment, and any potential constraints to the development and the Justification Test demonstrate the suitability of the proposals.

1.2.2 The following report will assess the development proposals against the requirements of the PPW and the standing advice of the Natural Resources Wales (NRW) and the Lead Local Flood Authority (LLFA).

1.2.3 After the introductory section, the following is discussed:

- Section 2 describes the existing site conditions.
- Section 3 comprises a Flood Consequence Assessment and Justification Test

2 Existing site

2.1 Site Description

- 2.1.1 The site is located within the Vale of Neath to the southwest of Morfa Glas just to the north of the B4242 and the Neath Canal. The development is within the existing colliery site with the approximate coordinates for the site E: 286745, N: 206076.
- 2.1.2 The proposed location of the development is to the east of the colliery and to the east of the main site access which is to the southeast of the existing dry coal store building, and to the north of the attenuation pond.
- 2.1.3 The site surroundings are largely rural areas but with the local residential areas of Cwmgwrach and Blaengwrach to the south and Morfa Glas and Glynneath to the east with the Neath Canal and River Neath to the south.
- 2.1.4 A topographical survey has not been undertaken for the site, but from interrogation of the Natural Resources Wales LiDAR database the approximate level for the existing site at the location of the storage shed is 46.62mAOD, but with level locally varying down to 45.75mAOD at the southern extent of the new shed. The new stores building is within an area of the colliery which has accommodated some open storage of materials which is clear on the LiDAR. In general the levels across the colliery vary between 58.0mAOD around the Fanhouse Substation to the northwest and down to 45.10mAOD at the existing site access from the B4242.
- 2.1.5 Levels vary significantly over the local area due to a series of bunds to the south, local settlement lagoons for the existing surface water runoff to the south, and the access up to the mine to the northwest.
- 2.1.6 There are also multiple small watercourses through the Aberpergwm Wood to the north and west.

2.2 Watercourses

- 2.2.1 The nearest Main River is the River Neath 160m to the south of the development.
- 2.2.2 The Neath Canal is not noted as a Main River but is a significant watercourse in the local area. It is artificially controlled at points along its reach, and it is currently undergoing restoration works at different locations along the stretch to restore some

of the extent to navigable use.

2.2.3 To the east of the site is the Nant Pergwm running from north to south, and the Nant Ysgwrfa runs from north to south through the colliery site some distance to the west of the proposed plant pool shed.

2.2.4 There are numerous noted springs within the Aberpergwm Wood to the north and west, but these typically drain towards the east and west through both some natural channels but also through ponds, lagoons and some culverts to convey water to the Neath Canal and Rive Neath to the south.

2.3 Existing Private Drainage

2.3.1 The existing colliery buildings have formalised foul and surface water drainage networks.

2.3.2 Over the area of the proposed stores extension is a storage area which drains to the primary settlement pond, attenuation pond and lagoons prior to discharge from the site.

2.4 Public Sewers

2.4.1 DCWW mapping for the location has not been acquired as there are no proposals to change the below ground drainage as part of the development. Given the location of the development and the site's history it is unlikely that there are any adopted sewers within the wider colliery area.

3 Development and Flood Risk

3.1 Flood Risk Guidance

- 3.1.1 It is noted in the production of this FCA that the TAN15 guidance is in a transitional phase between the policy first issued in 2004 and the postponed revised guidance due to be implemented on 1st June 2023. At the time of writing the original guidance stands and therefore shall be referenced within this report.

3.2 Proposed Development Category

- 3.2.1 The proposals include the construction of a new plant pool shed. From Figure 2 of the TAN15 buildings used for general industrial\mineral extraction have a development category of 'less vulnerable development'.

3.3 Flood Zone Classification

- 3.3.1 The maps.cyfoethnaturiolcymru.gov.uk website provides basic flood mapping data to determine the Flood Zoning and flood risk classifications for the site.
- 3.3.2 This planning mapping indicates that the proposed stores extension is on the edge, but within, the classification of Flood Zone C2, with the boundary to Flood Zone B being very closely aligned to that of C2. This is shown in Figure 3.1 below:

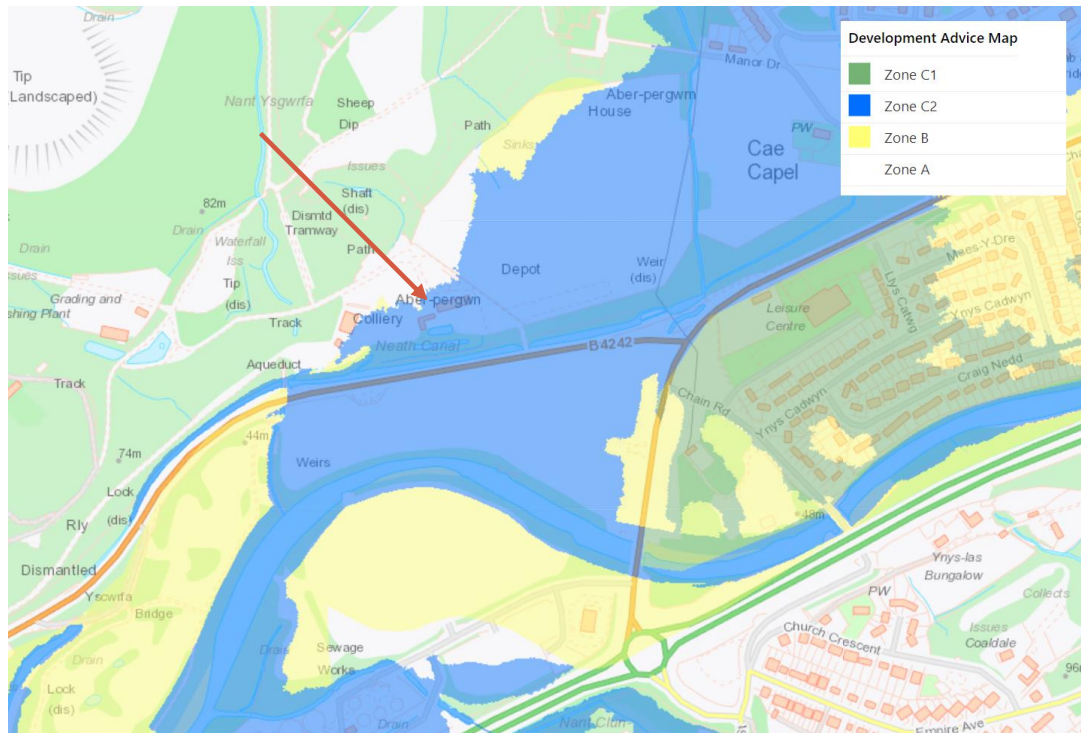


Figure 3.1 – TAN15 Development Advice Map

- 3.3.3 The Flood Zone extents are mainly associated around the Neath Canal and River Neath to the south and extending northwards across the site with the extent increasing to the east.
- 3.3.4 There are also some extents of Zone B for areas around the River Neath to the south of the colliery, and an area of Zone C1 around the Glynneath residential area which benefits from flood defences locally around the northern bank of the River Neath.
- 3.3.5 Based on the Flood Zone classification less vulnerable development is suitable where it is subject to the Justification Test, including acceptability of the consequences.

3.4 Fluvial Flooding

- 3.4.1 The maps.cyfoethnaturiolcymru.gov.uk website provides separate mapping of fluvial and tidal risk to determine the source of the zoning classification.
- 3.4.2 This mapping indicates that the site is not at risk from the sea and therefore the flood risk is from fluvial sources.

- 3.4.3 Whilst this mapping does not include climate change considerations on the flow the mapped extents suggest that the flood risk extents are smaller than the Flood Zone classification. This is more clearly viewed in comparison between these maps and the flood risk map below.

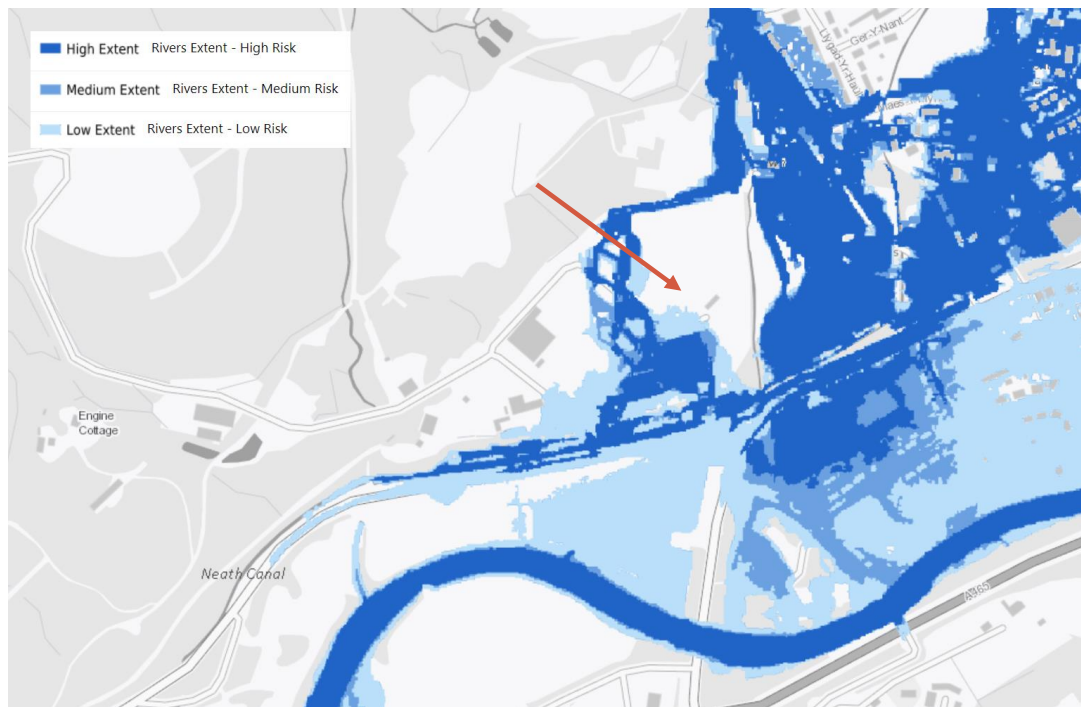


Figure 3.2 – Flood Risk from Rivers - Fluvial

- 3.4.4 Flood data for the site has also been acquired from Natural Resources Wales in the form of their Product 5 and 6 data from the JBA River Neath model Rev B2 (2019) and compared to the proposed site using QGIS and includes a data set for the defended and undefended simulations of the 1 in 30, 1 in 100 (with and without climate change), and the 1 in 1000-year event.
- 3.4.5 There are no flood defences which provide a benefit to the colliery site, and from comparison between the data sets there is no difference at the site location (there was a potential increase in risk from the loss of storage), and a decrease only around Glynneath to the east. As such only the undefended figures have been reproduced here:



Figure 3.3 – 1 in 30-year River Neath undefended model (2019)



Figure 3.4 – 1 in 100-year River Neath undefended model (2019)

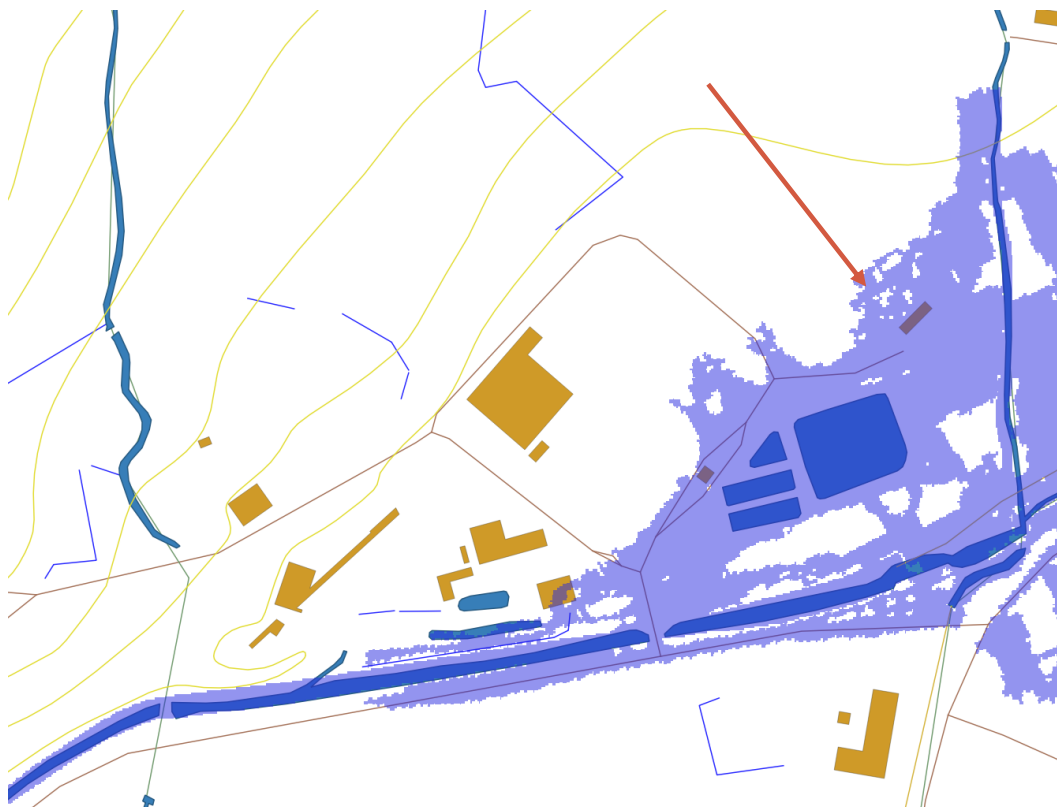


Figure 3.5 – 1 in 100 + CC year River Neath undefended model (2019)



Figure 3.6 – 1 in 1000-year River Neath undefended model (2019)

3.4.6 These sets of modelled flood extents have the following levels taken from the modelling:

Return Period	Flood Level (mAOD)
30	46.28
100	46.42
100 + CC	46.63
1000	46.65

Note: Values are approximate only from dataset as vary over extents and values are taken just south of existing substation immediately to the south.

Table 3.1 – River Neath fluvial flood levels from the 2019 updated model

3.4.7 Based on the most recent modelled flood levels the original Flood Zoning maps are out of date but still used for the planning classification. The flooding mechanism in the local area is based on overland flow routes rather than the level of flooding being inherently linked to a lateral out of bank flow driven by ponding in the local area. This is demonstrated by the River Neath 2019 modelling outputs of depth of flooding rather than just the extents from shown above.

3.4.8 The colouring used is the lightest band is less than 200mm, next less than 500mm, 1.0m, 1.5m and then 2.0m (larger depths of water removed for clarity):



Figure 3.7 – 1 in 30-year depths River Neath undefended model (2019)

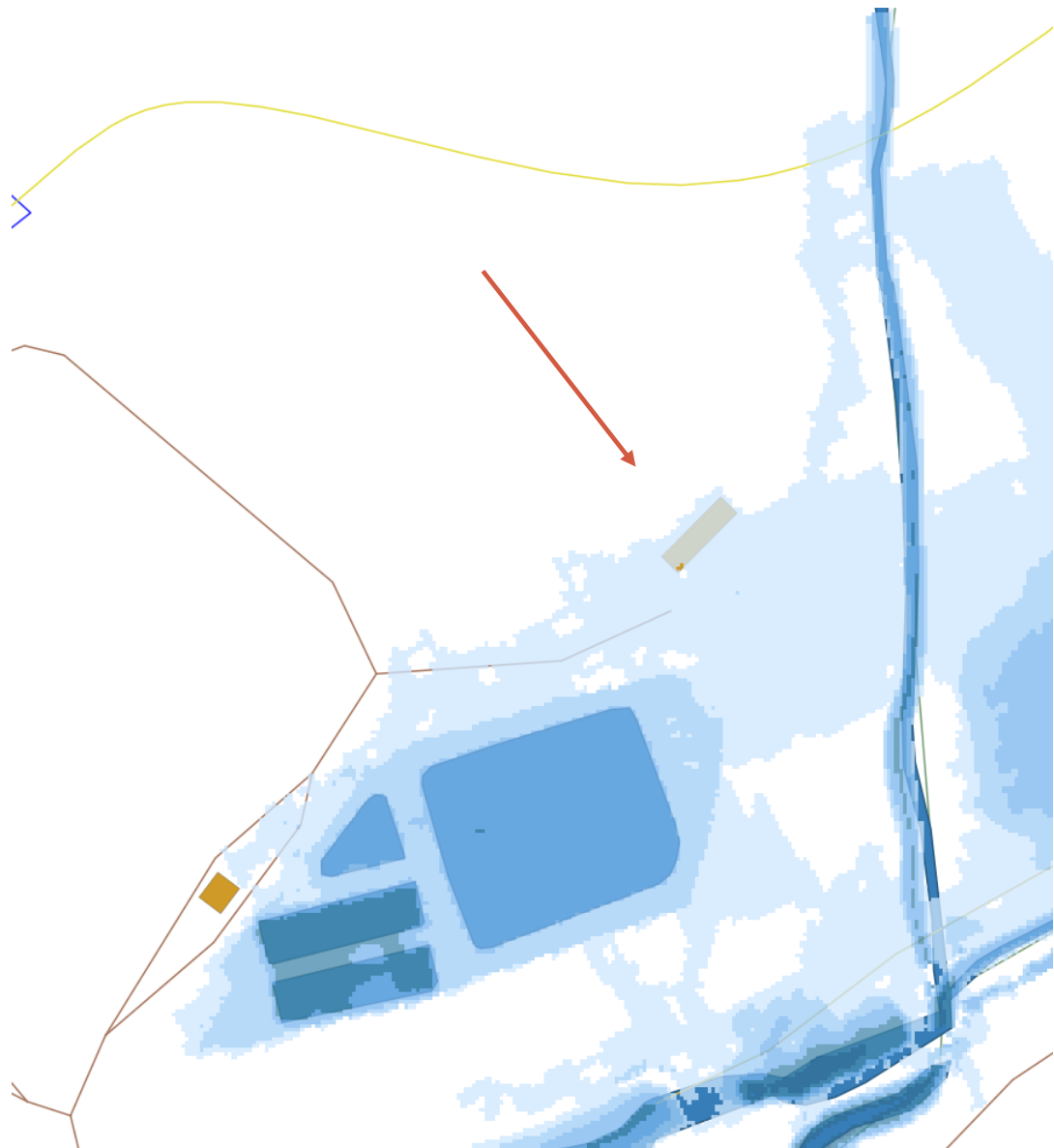


Figure 3.8 – 1 in 100-year depths River Neath undefended model (2019)

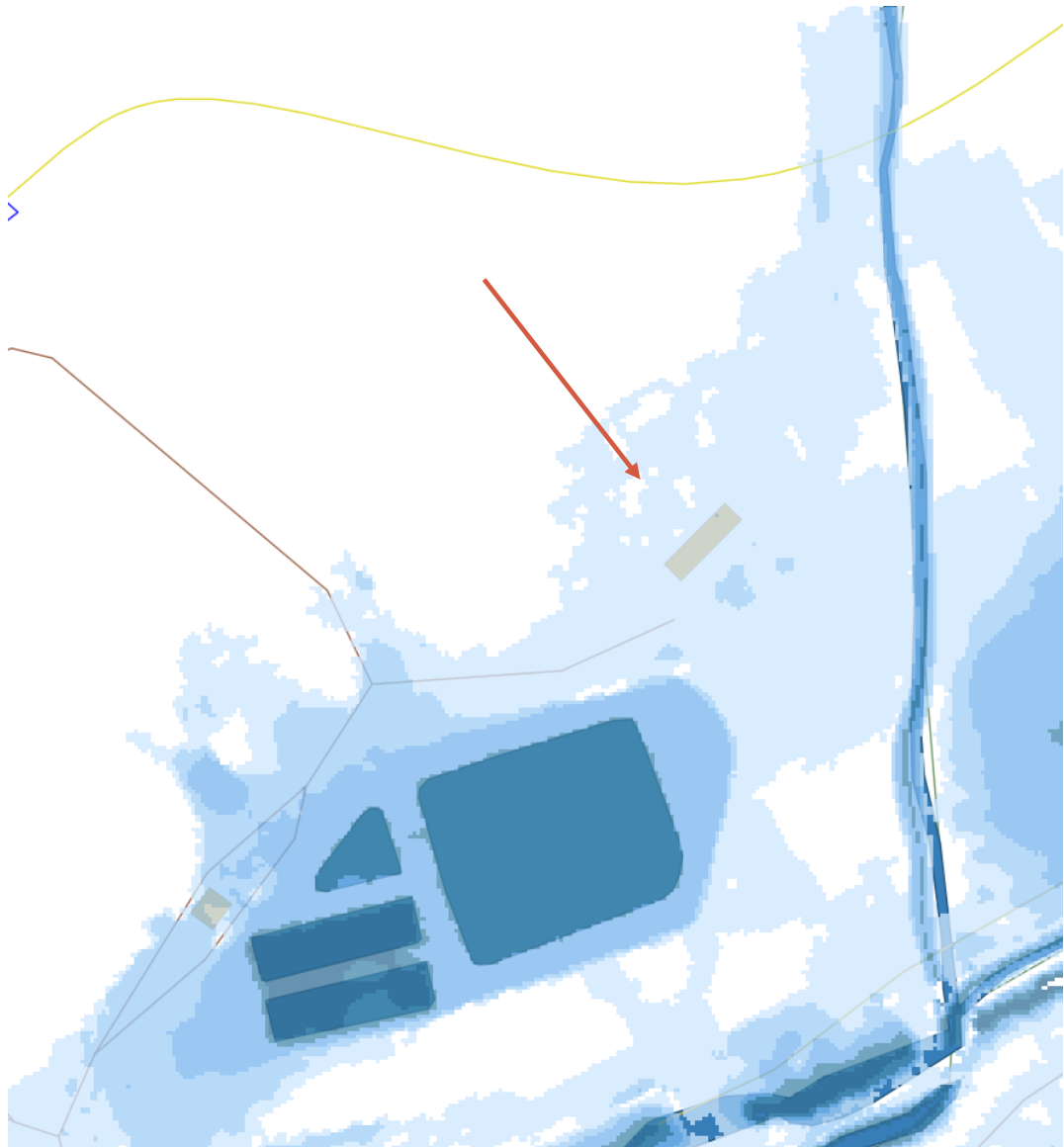


Figure 3.9 – 1 in 100 + CC year depths River Neath undefended model (2019)

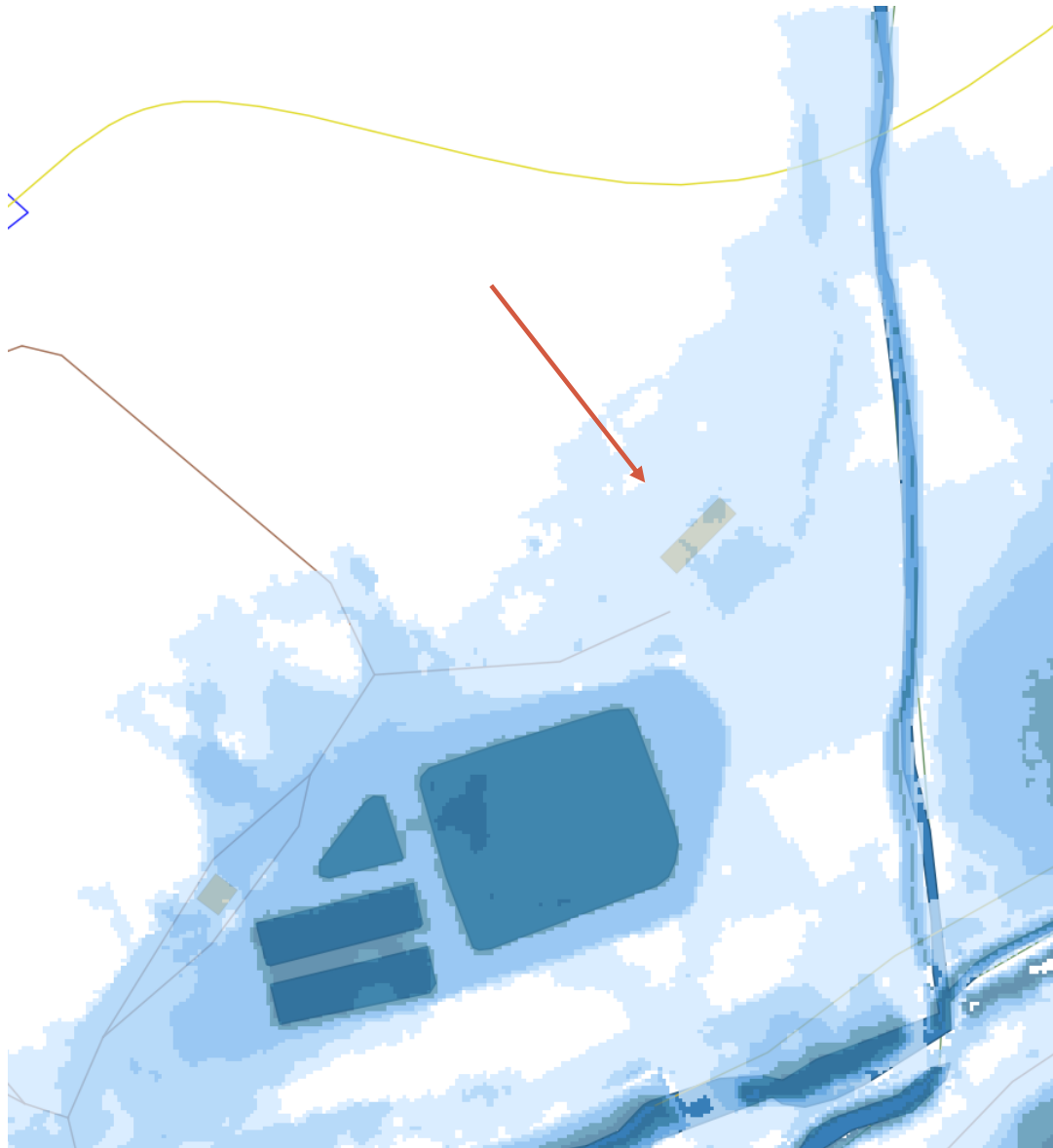


Figure 3.10 – 1 in 1000-year depths River Neath undefended model (2019)

3.4.9 This modelling shows a few factors. Firstly, that the flooding in the area include areas of no flooding which are likely associated with the storage of materials in this areas being picked up by the date at which the LiDAR survey was undertaken and therefore no risk where there is a pile of material.

3.4.10 Secondly the depth of flooding is not increasing above the 200mm depth band across the extent of the site, but with an increase in depth to the south of the substation where the set of flood levels was taken for this reporting.

3.4.11 This indicates that the inclusion of a preferential flow path by the construction of a

cut off drain to the rear of this area would be sufficient to mitigate the flood risk to the area of the proposed new plant pool shed:

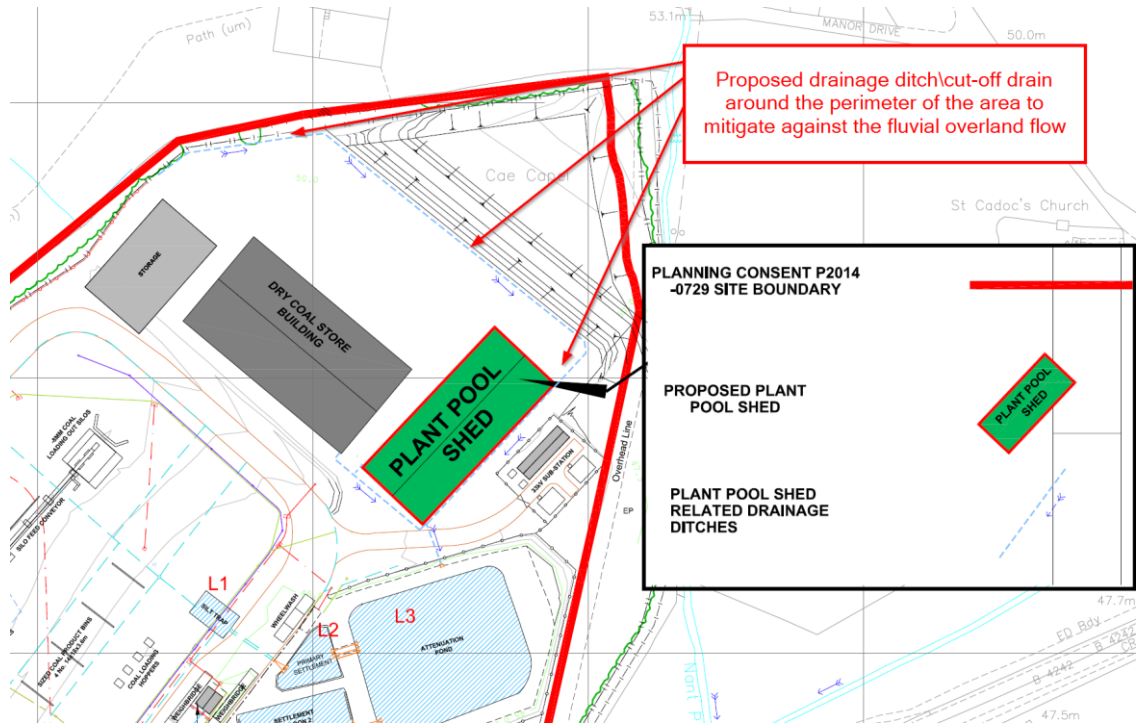


Figure 3.11 – Extract of proposed layout showing fluvial cut-off drain

3.4.12 Fluvial flooding to the development is therefore considered to be low with the inclusion of mitigation.

3.5 Coastal/Tidal Flooding

3.5.1 As noted above the source of the Flood Zoning classification is from old fluvial flooding, with no tidal flood influence at the site.

3.5.2 The closest area of influence is around Neath several kilometres to the southwest of the development and given the elevation of the site tidal flooding is considered to be a very low risk.

3.6 Flood Defences

3.6.1 As noted in the sections above the site is not defended, with the closest defences being associated with the residential area of Glynneath to the east. The defended and undefended flood extents from the 2019 River Neath have been checked with no changes on the flood extents within the proposed development from loss of storage.

3.7 Flooding from Groundwater

- 3.7.1 There are several springs noted through the Aberpergwm Wood to the north and west, but these are all managed through the natural and man-made channels which direct flows to the Neath Canal and River Neath to the south.
- 3.7.2 The new plant pool shed will be constructed on a concrete hardstanding which would form an effective barrier to any rises in groundwater.
- 3.7.3 Based on the existing drainage and concrete slab the risk of groundwater flooding is considered to be low.

3.8 Flooding from Adopted Sewers

- 3.8.1 The location of any adopted sewers has not been confirmed but are unlikely to run through the site due to the history and function of the site. Where any adopted drainage is present excess flows would follow the topography and quickly flow to the south of the site following the line of the canal and river. Therefore, the risk of flooding would be lower than the fluvial risk to the site which is noted above as low.

3.9 Flooding from Private Drainage

- 3.9.1 As noted above the location of the new shed is in an area which is already served by private drainage within the site. As there is no increase in drained area with surface water already managed through settlement ponds, attenuation basin and lagoons the risk of flooding from private drainage is considered to be low.

3.10 Flooding from Surface Water

- 3.10.1 Surface water flood maps (and risk from small watercourses where present) are also available based on a simplified rainfall event across large areas and ignoring the provision of formalised drainage features which includes public and private drainage but also excludes culverts on watercourses. Therefore, this form of modelling is indicative only and the actual site, and local area, conditions need to be taken into consideration.
- 3.10.2 The mapping indicates that the site is not in an area of surface water, with only some small extents in the local area which are likely indicative of low spots which have existing formalised surface water drainage features. A small version of the mapping is shown below:

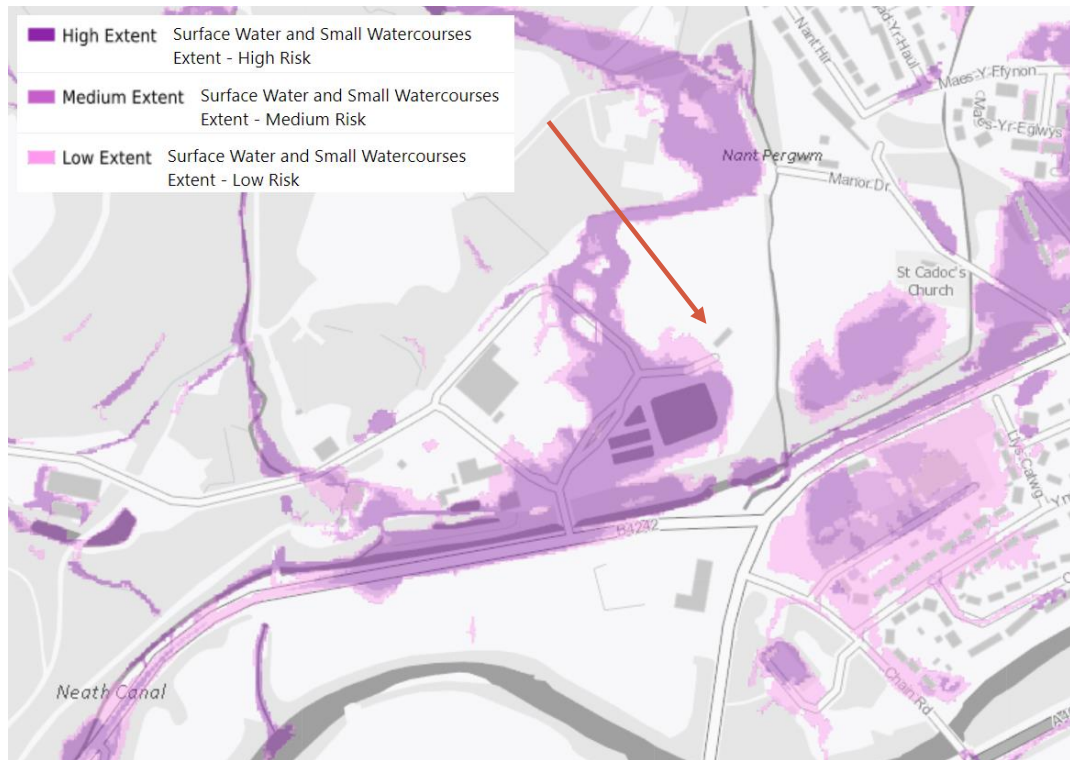


Figure 3.12 – Flood Risk from Surface Water and Small Watercourse

3.10.3 This shows that the risks are generally associated with the minor watercourses in the area, but there are known culverts across the site which are not included and therefore the flood risk shown is more extensive than would be present in reality.

3.10.4 However, the location of the proposed development is shown outside of the modelled extents. The inclusion of a cut off drain for the fluvial flooding would also reduce the overland flow\surface water flooding from off-site further.

3.10.5 Based on the above the flood risk from surface water is considered to be low.

3.11 Flooding from Reservoirs, Canals and Artificial Sources

3.11.1 The Neath Canal to the immediate south of the site is hydrologically linked to the River Neath and the runoff through the site and surrounding area. Therefore, the risk of flooding from this feature is inherently linked to the River Neath and as such the risks are addressed above.

3.11.2 There are no other sources of flood risk which have been identified as part of this assessment.

3.12 Overall Flood Risk

3.12.1 As noted in the previous sections the flood risk to the proposed development is considered to be low from all sources given the 2019 River Neath modelling which outdates the Flood Zoning modelling and therefore is suitable for the type of development proposed, subject to the Justification Test noting the classification from Flood Zoning.

3.13 The Justification Test

3.13.1 The aim of the Justification Test is to guide development away from areas at risk of flooding towards land situated within Zone A, and then Zone B. Where this is not possible it should be demonstrated that the risk of flooding, and the impact on people and property, is sufficiently mitigated to provide a solution which is as safe as possible.

3.13.2 As noted in TAN15 (2004) para 6.1:

“Much urban development in Wales has taken place alongside rivers and in the coastal plain. It is therefore inevitable, despite the overall aim to avoid flood risk areas, that some existing development will be vulnerable to flooding and fall within zone C. Some flexibility is necessary to enable the risks of flooding to be addressed whilst recognising the negative economic and social consequences if policy were to preclude investment in existing urban areas, and the benefits of reusing previously developed land. Further development in such areas, whilst possibly benefiting from some protection, will not be free from risk and could in some cases exacerbate the consequences of a flood event for existing development and therefore a balanced judgement is required.”

3.13.3 The development is part of the existing colliery site and as part of that function cannot be located elsewhere. Within the site the assessment of flood risk has shown that the actual flood risk based on more recent modelling results is low from all sources with the inclusion of a preferential flow path, cut off drain, and therefore is a suitable location for the development.

3.13.4 The consideration of suitable mitigation measures as described within TAN15 (2004) paragraph 7.3 are:

- 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.

3.13.5 As covered in the assessment of flood risk from different sources the overall risk to the site is considered low and therefore there is minimal risk to life. There is also no increase in staff from the development proposals and therefore no increase in the number of people on site.

3.13.6 The site is an existing functioning colliery, and as this development is part of the current operation there is no disruption to people living and working in the area.

3.13.7 As the actual flood risk is low there is minimal potential for damage to property.

3.13.8 The proposed development does not have any impact on flood risk generally, and there is no natural heritage as it is within the existing colliery site.

3.13.9 As there are also no negative impacts on flood risk generally, and no disruption to national heritage, the Justification Test is considered passed by the development.

3.14 Summary and Conclusions

3.14.1 Flood risk to the development has been considered from all sources. This identified the site as being located within Flood Zone C2 with the source of flood risk being from outdated fluvial modelling.

3.14.2 The C2 classification is due to previous models of the River Neath, but the 2019 version of the modelling has been assessed within this report noting that whilst there is flood risk noted in the area of the proposed shed for the 1 in 100 year plus climate change, and 1 in 1000 year event both models are for flood depths less than 200mm and are likely indicative of overland flow route rather than backing up in the area. On this basis a preferential overland intercept such as a cut off drain around the perimeter of the site will direct the flood waters away from the proposed plant pool shed to reduce the flood risk.

3.14.3 The proposed FFL for the new plant pool shed should be set around 46.70mAOD which is just above the 1 in 1000-year flood level of 46.65mAOD, but with the preferential flow route around the rear of the development, this will provide sufficient

mitigation of potential flood risk.

- 3.14.4 Based on the details within the report the site passes the Justification Test as it cannot be located somewhere else due to the development being inherently linked to the function of the colliery. The actual flood risk has been assessed to be low from all sources when the mitigation is included and using the most recent modelling for the area, and the requirements of TAN15 are demonstrated within this report.

Appendix A

Proposed Site Location

