



Unit 5, Tregwilym Road Industrial Estate, Rogerstone,
Newport, Gwent NP10 9DQ

Flood Consequence Assessment

For Dragon Padel Rogerstone Ltd

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Unit 5, Tregwilym Road Industrial Estate, Rogerstone, Newport, Gwent NP10 9DQ

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Client	Dragon Padel Rogerstone
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EXECUTIVE SUMMARY

The Site would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this Flood Consequence Assessment (FCA) are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of Technical Advice Note 15 Development and Flood Risk (TAN15).

This FCA demonstrates that the Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of TAN15. The development should not therefore be precluded on the grounds of flood risk.

1.0 INTRODUCTION

1.1 Background

This Flood Consequence Assessment (FCA) has been prepared by KRS Enviro at the request of Dragon Padel Rogerstone Ltd to support a planning application for the conversion of a vacant warehouse to create a Padel Centre (“the Proposed Development”) at Unit 5, Tregwilym Road Industrial Estate, Rogerstone, Newport, Gwent NP10 9DQ (“the Site”).

This FCA has been carried out in accordance with guidance contained in the Technical Advice Note 15 Development and Flood Risk (TAN15) and associated Flood Map for Planning (FMfP). This FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 Technical Advice Note 15 (TAN15)

One of the key aims of TAN15 is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.

It advises that where new development is exceptionally necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible, reduce flood risk overall. A risk-based approach is adopted at stages of the planning process, applying a source pathway receptor model to planning and flood risk. To demonstrate this, an FCA is required and should include:

- whether a proposed development is likely to be affected by current or future flooding from all sources;
- whether it will increase flood risk elsewhere;
- whether the measures proposed to deal with these effects and risks are appropriate; and
- satisfy the justification test, including the acceptability of consequences.

A revised TAN15 has now been implemented. This is supported by the new FMfP, which includes climate change information to show how this will affect flood risk extents over the next century. It shows the potential extent of flooding assuming no defences are in place

1.3 Report Structure

This FCA has the following report structure:

- Section 2 describes the location and the existing and Proposed Development;
- Section 3 outlines the flood risk to the existing and Proposed Development;

- Section 4 details the proposed surface water drainage for the Site and assesses the potential impacts of the Proposed Development on surface water drainage;
- Section 5 outlines mitigation measures used to reduce the overall level of flood risk;
- Section 6 provides details of Acceptability Criteria; and
- Section 7 presents a summary and conclusions.

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

The Site is located at Unit 5, Tregwilym Road Industrial Estate, Rogerstone, Newport, Gwent NP10 9DQ (see Figure 1). The National Grid Reference (NGR) of the Site is 327377, 187522.

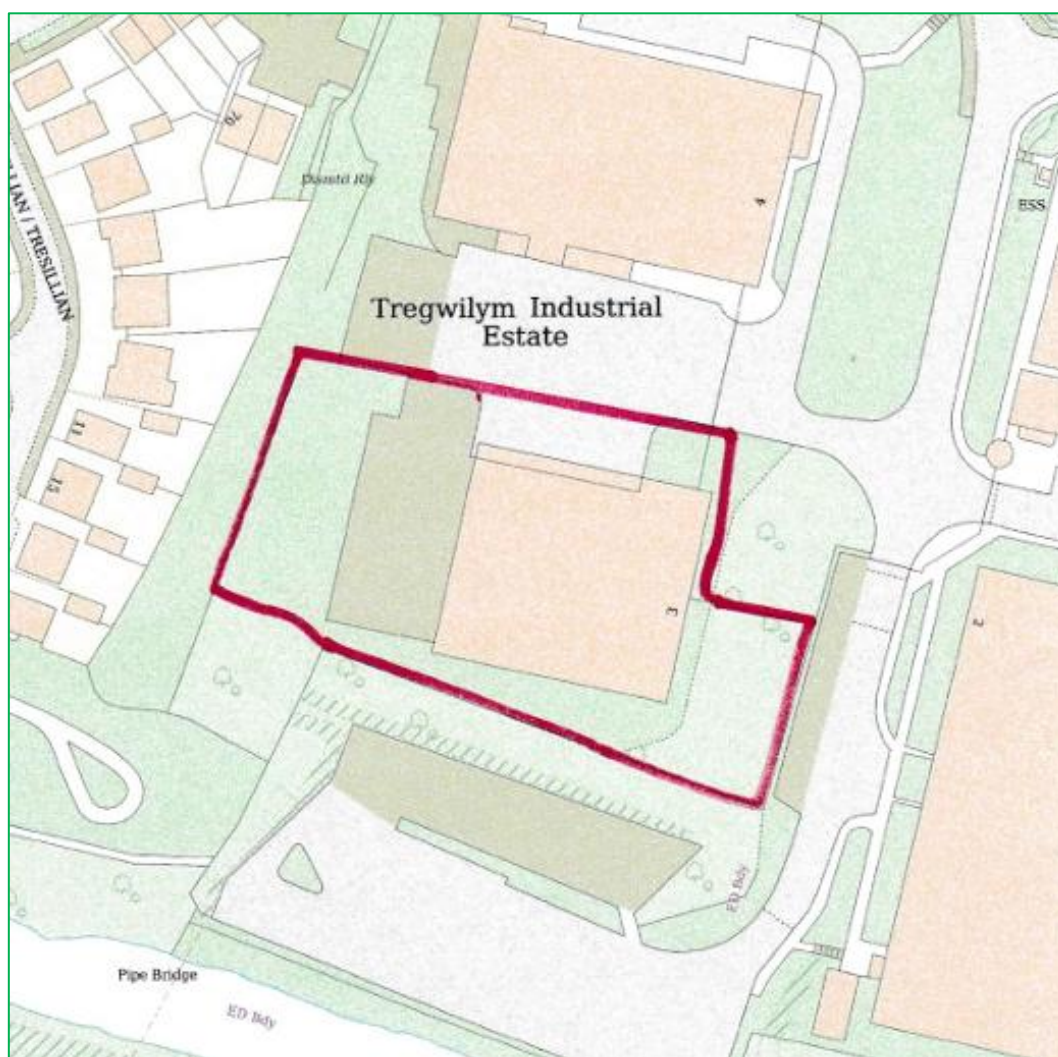


Figure 1 - Site Location

2.2 Existing Development

The existing Site currently comprises a vacant warehouse unit (see Appendix 1). The existing finished floor levels are raised 1.30m above the external ground levels, as shown in Figures 2 and 3.

2.3 Proposed Development

The Proposed Development is for the conversion of a vacant warehouse to create a Padel Centre (see Appendix 1). The conversion will comprise 6 padel courts, changing and W.C facilities, a reception area and staff office. The proposed finished floor levels will be raised

1.30m above the external ground levels. Further details with regard to the Proposed Development can be found in the accompanying information submitted with the planning application.



Figure 2 - Existing Finished Floor Levels



Figure 3 - Existing Finished Floor Levels

2.4 Ground Levels

The Site falls from west to east, with an approximate maximum ground level of 24.48 metres Above Ordnance Datum (mAOD) to the west and an approximate minimum ground level of 23.79mAOD to the east, as shown on the Ordnance Survey Digital Terrain Model 50 (DTM).

2.5 Catchment Hydrology

The River Ebbw is located approximately 60m to the south of the Site which ultimately discharges into the Severn Estuary located approximately 7.50km to the southeast of the Site.

2.6 Ground Conditions

The British Geological Survey (BGS)¹ map shows that the bedrock deposits consist of the Moor Cliffs Formation - interbedded mudstone and sandstone. These sedimentary rocks are shallow-marine in origin. They are biogenic and detrital, generally comprising carbonate material (coral, shell fragments), forming beds and locally reefs. The superficial deposits consist of Alluvium - clay, silt, sand and gravel. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).

Information from the National Soil Resource Institute² details the Site area as being situated on freely draining floodplain soils.

¹ https://geologyviewer.bgs.ac.uk/?_ga=2.66736489.617109230.1694767835-1467391725.1694767835

² <https://www.landis.org.uk/soilscapes/>

3.0 FLOOD RISK

3.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

3.2 Natural Resources Wales

Information regarding the current flood risk at the application Site, local flood defences and flood risk has been obtained from Natural Resources Wales, which is the most up to date at the time of this FCA. Modelling from the Tredegar Park Flood Map Challenge (FMC) (2023) and River Ebbw Integrated Catchment Model (2019) has been provided.

3.3 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within TAN15 recommends that the effects of climate change are incorporated into FCA. Recommended precautionary sensitivity ranges for peak rainfall intensities, peak river flows and sea level rise are outlined in the following documents CL-03-16 - Climate Change Allowances for Planning Purposes³, Flood Consequence Assessments: Climate change allowances⁴ and Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales⁵.

The 9th of January 2014 Welsh Government letter to all Chief Planning Officers (CPO) in Wales and CL-03-16 - Climate Change Allowances for Planning Purposes clarifies and refers to the Natural Resources Wales recommendations that the lifetime of development for residential development is 100 years, and for other development it is considered to be 75 years. Table 1 show the peak river flow allowances by river catchment therefore, the fluvial design event is the 1 in 100 year (+35%) event.

Table 1 - Peak River Flow Allowances by River Catchment

River Basin	Allowance Category	2020s	2050s	2080s
Severn	Upper	+20%	+40%	+70%
	Central	+10%	+20%	+35%

Projections of relative mean sea level rise for each epoch (period of time) is provided for the Welsh coastline in Table 2. These projections are consistent with the latest global predictions for sea level rise. The rate of change is projected to increase in each epoch. Therefore, the tidal design event is the 1 in 200 year in 2101 event.

³ <https://gov.wales/sites/default/files/publications/2018-11/cl0316-climate-change-allowances.pdf>

⁴ <https://gov.wales/sites/default/files/publications/2018-11/flood-consequence-assessments.pdf>

⁵ <https://gov.wales/sites/default/files/publications/2021-09/adapting-to-climate-change-guidance-for-flood-and-coastal-erosion-risk-management-authorities-in-wales.pdf>

Table 2 - Sea Level Allowances (m)

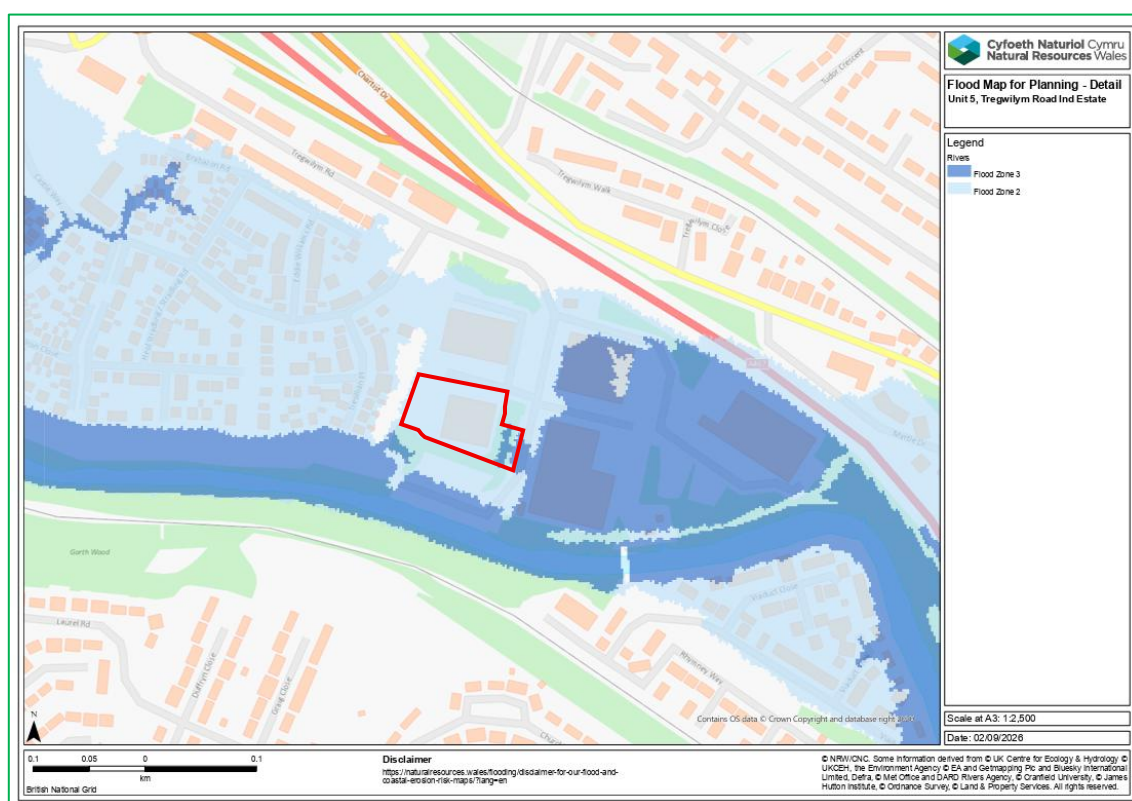
Local Authority Area	Allowance Category	Mean Sea Level Rise (m) by 2100*	Mean Sea Level Rise (m) by 2120*
Newport	95 th	1.14	1.68
	70 th	0.87	1.25

3.4 Flood Map for Planning

The Flood Map for Planning (FMfP) represents the best available information on flood risk. The FMfP shows that the Site is located within the following flood zones:

- Rivers: The majority of the Site is located within Flood Zone 2 however, a small area of the Site, on the eastern boundary, is located within Flood Zone 3 (see Figure 4).
- Sea: Flood Zone 1 (see Figure 5).
- Surface water and small watercourses: Flood Zones 1 and 3 (see Figure 6).

Table 3 provides details of the FMfP Flood Zones.

**Figure 4 - Flood Map for Planning: Rivers**

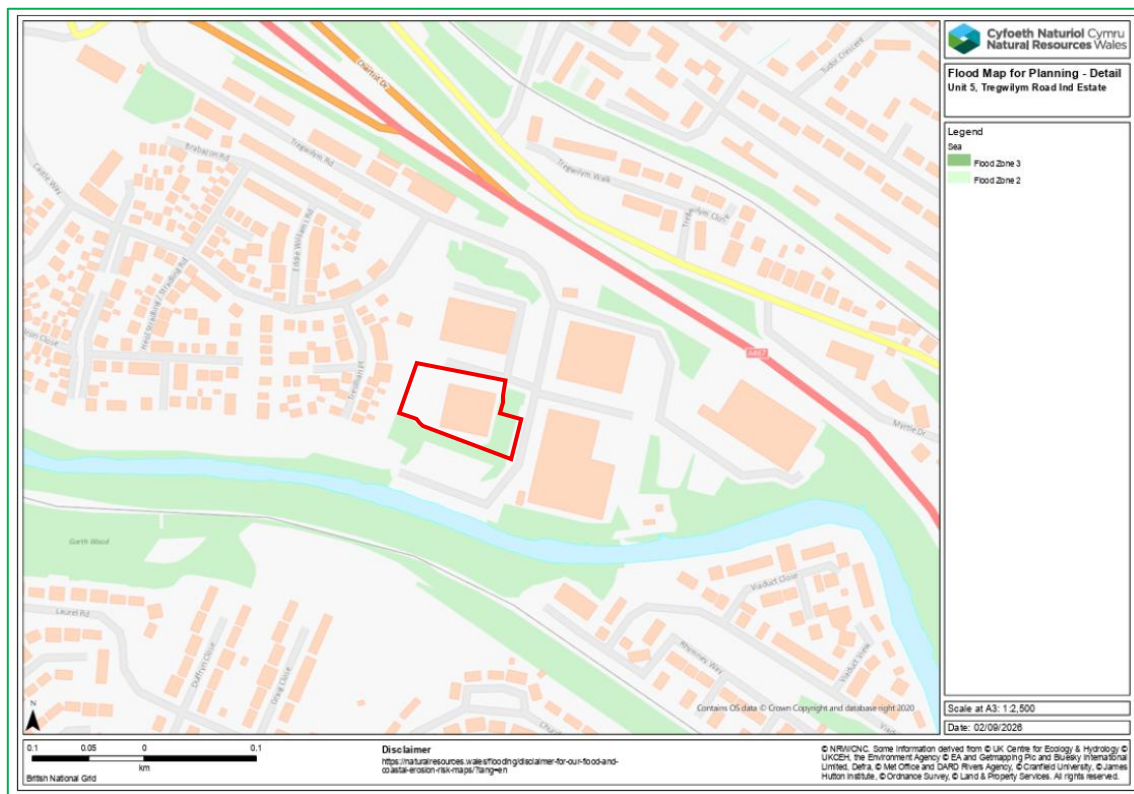


Figure 5 - Flood Map for Planning: Sea

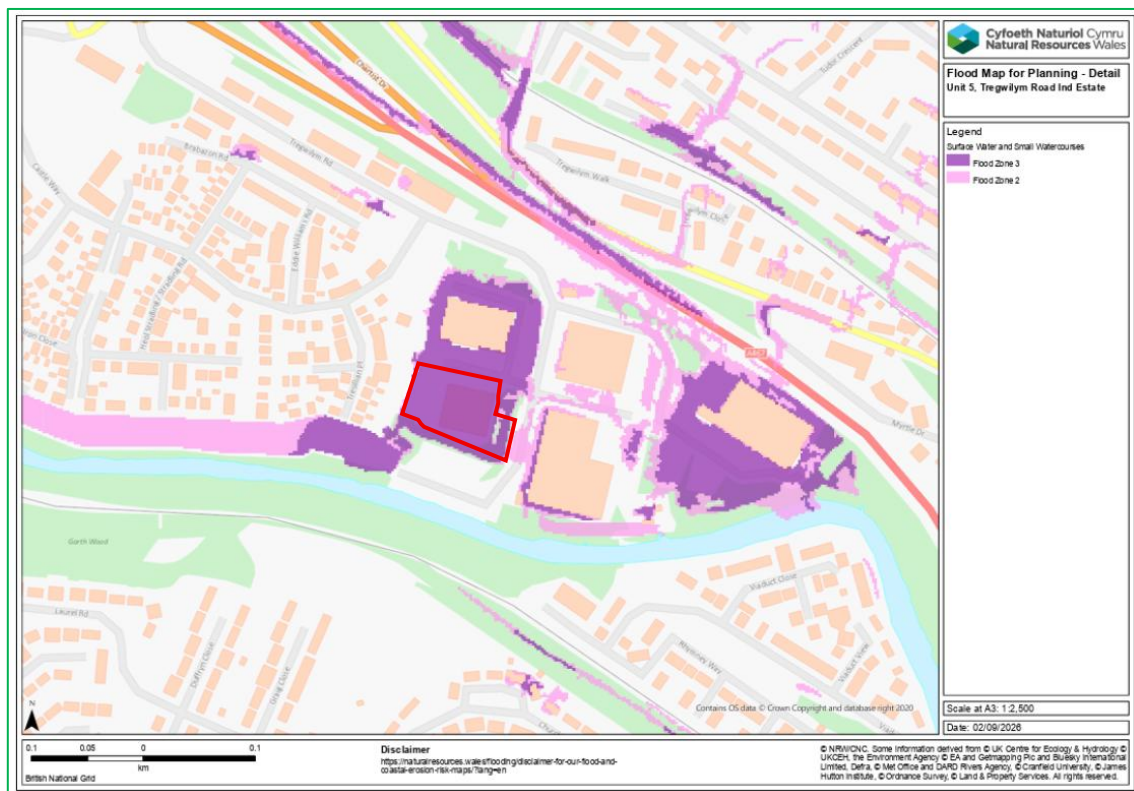


Figure 6 - Flood Map for Planning: Surface Water and Small Watercourses

Table 3 - Flood Map for Planning Flood Zones

Flood Zone	Explanation
Rivers - Flood Zone 2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
Rivers - Flood Zone 3	Areas with more than 1% (1 in 100) chance of flooding from rivers in a given year, including the effects of climate change.
Sea - Flood Zone 2	Areas with 0.1% to 0.5% (1 in 1000 to 1 in 200) chance of flooding from the sea in a given year, including the effects of climate change.
Sea - Flood Zone 3	Areas with more than 0.5% (1 in 200) chance of flooding from the sea in a given year, including the effects of climate change.
Surface Water and Small Watercourses - Flood Zone 2	Areas with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.
Surface Water and Small Watercourses - Flood Zone 3	Areas with more than 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

3.5 Flood Vulnerability

Applying the Flood Risk Vulnerability Classification in Figure 4 of TAN15, the existing and proposed use of the Site is classified as 'less vulnerable'. The Proposed Development will not change the vulnerability of the Site to flooding or introduce a new vulnerable use into the floodplain. The Proposed Development is deemed appropriate for this location.

3.6 Historic Flooding

Natural Resources Wales historic flood map shows that a very small proportion of the Site, along the eastern boundary, may have historically flooded in December 1979 (see Figure 7). The flood event is recorded as fluvial flooding as a result of the channel capacity of the River Ebbw being exceeded. The British Hydrological Society "Chronology of British Hydrological Events⁶" has no information on flooding within the vicinity of the Site. No other historical records of flooding for the Site have been recorded. Therefore, it has been concluded that the Site has not historically flooded since the 1979 flood event.

⁶ <https://cbhe.hydrology.org.uk/>

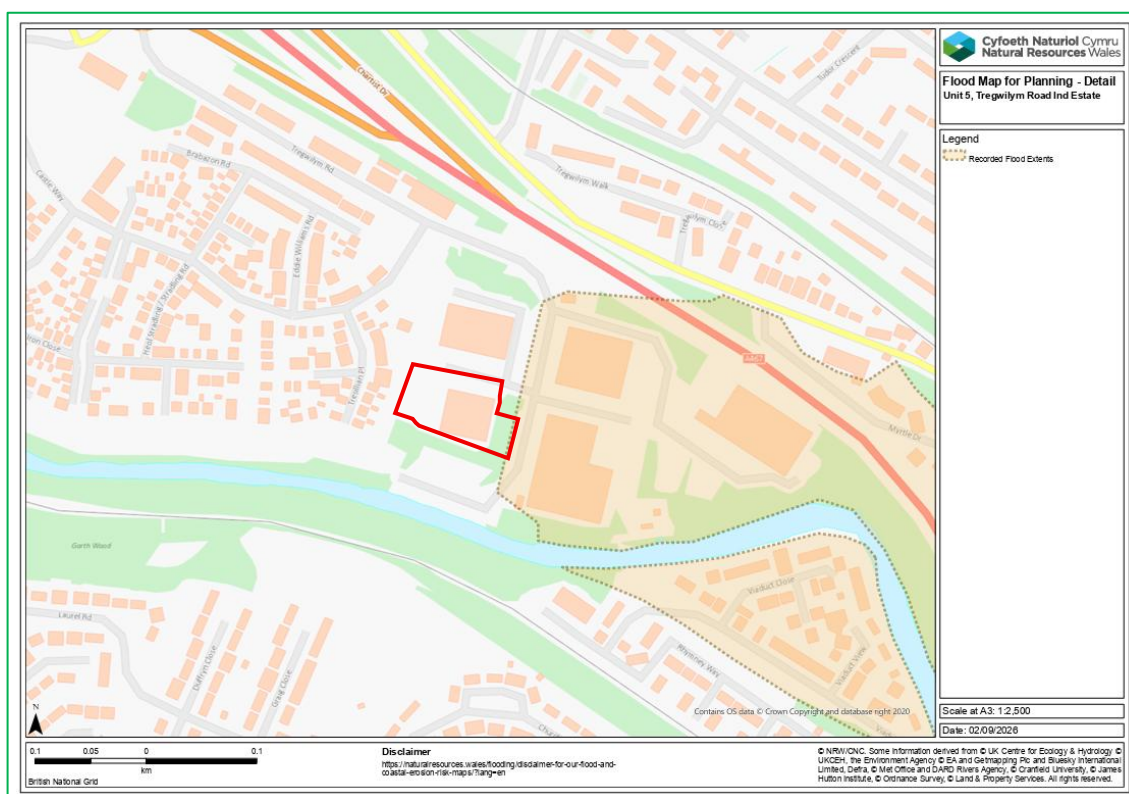


Figure 7 - Natural Resources Wales Historic Flood Map

3.7 Existing and Planned Flood Defence Measures

The Site is not protected against flooding by existing flood defence measures to the south of the Site however, there are flood defences in the form of embankments to the east of the Site.

3.8 Fluvial (River) Flooding

The River Ebbw is located approximately 60m to the south of the Site and poses the primary but unlikely a flood risk to the Site. The FMfP shows that the majority of the Site is located within Flood Zone 2 however, a small area of the Site, on the eastern boundary, is located within Flood Zone 3, with a 1 in 1000 to a 1 in 100 (1%) annual probability of flooding from rivers in a given year, including the effects of climate change.

Modelling from the Tredegar Park FMC (2023) is shown in Figure 8 and 9. The Site will not be inundated during the undefended 1 in 100 year in 2122 event. The Site will be flood free during the undefended 1 in 100 year in 2101 event (i.e. the design event). It is only during flood events of a greater magnitude is taken into account that the Site may be inundated with floodwater such as during the 1 in 1000 year in 2122 event. During the 1 in 1000 year in 2122 event the Site may be inundated with floodwater with water depths of up to 1m.

However, this includes an additional 21 years of climate change therefore the water depths experienced on the Site would be considerably less than 1m. These scenarios are considered to represent conservative, low-probability events and provide confidence in the effectiveness of flood risk with defences events. Flood hazard ratings under the defended scenario reflect the slow-onset and backwater driven mechanism of flooding at this location.

Furthermore, the existing and proposed finished floor levels are raised 1.30m above the external ground levels, which remains above the 1 in 1000 year in 2101 water level for the Site therefore, the building will not be flooded internally.

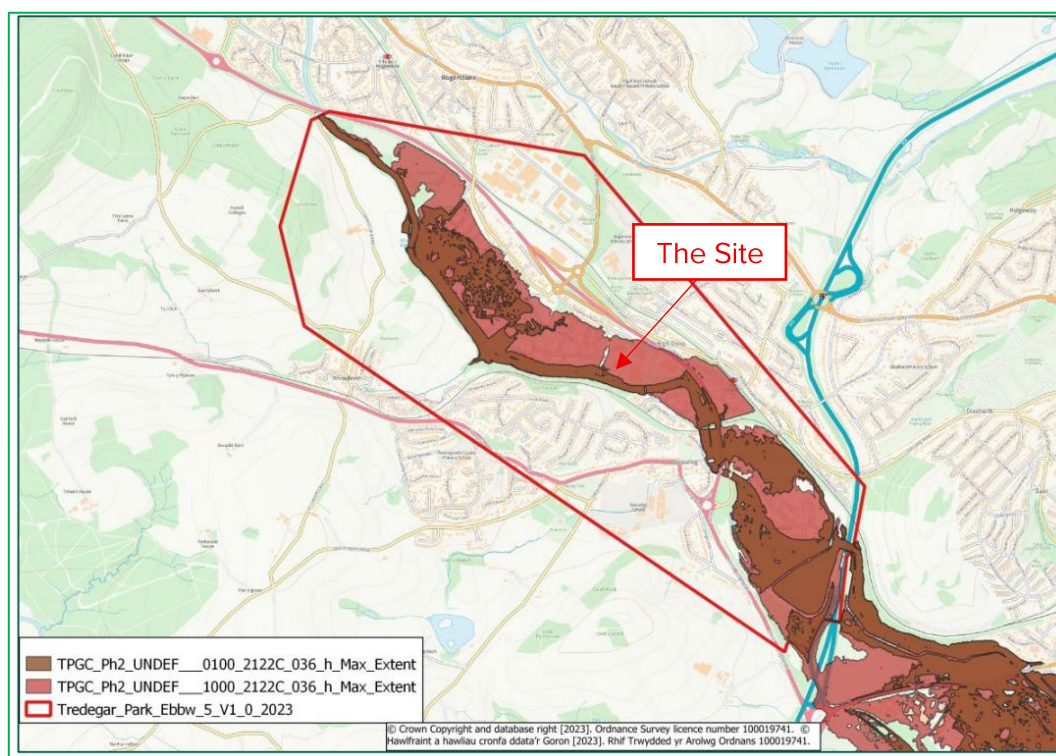


Figure 8 - Natural Resources Wales Modelled Undefended Flood Extents

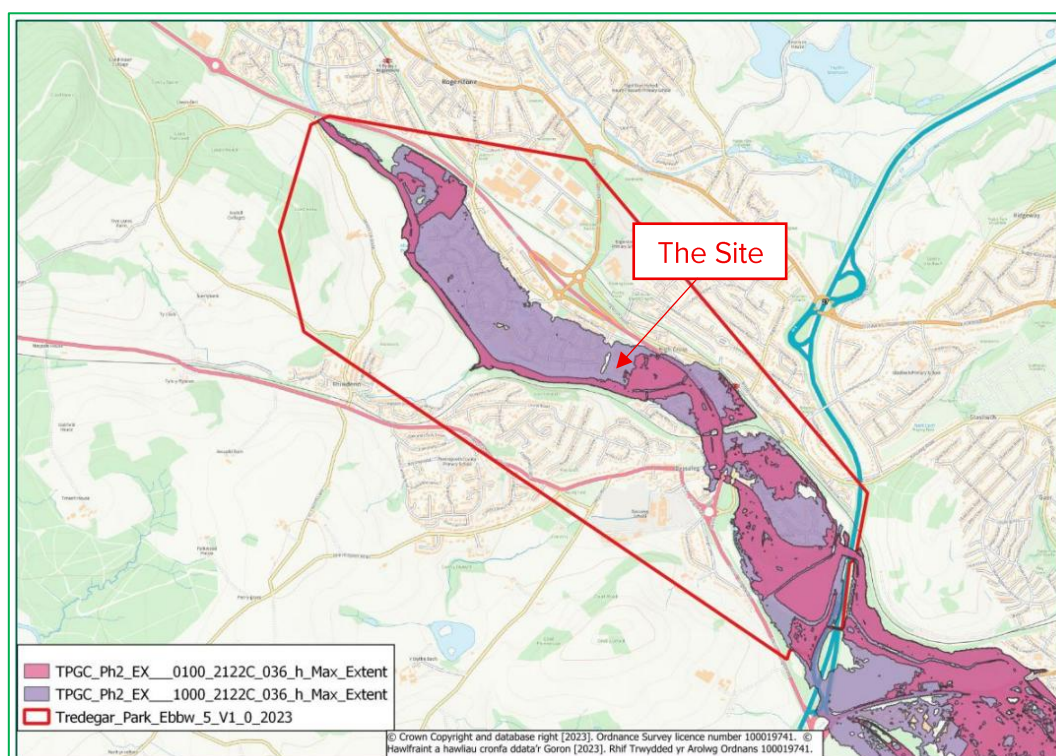


Figure 9 - Natural Resources Wales Modelled Existing Flood Extents

The Site lies within a wider floodplain system that performs an important flood storage function during extreme fluvial events. This results in extensive inundation of surrounding low-lying land, with comparatively low flow velocities away from the main river channels.

Fluvial flood risk at the Site is influenced by local topography. Any overbank flow would be expected to follow surrounding ground contours, with floodwaters routing across lower-lying areas of the floodplain rather than preferentially towards the Site. Based on available flood mapping, historical records, and observed flood behaviour, inundation of the Site would be expected to occur later than surrounding low-lying floodplain areas during extreme fluvial events.

The Site is located within an area where the onset of fluvial flooding is typically gradual, consistent with the characteristics described in *Flood Risk Assessment Guidance for New Development – Phase 2 (FD2320/TR2)*. Flooding within the catchment is generally associated with low-intensity, long-duration rainfall events linked to frontal weather systems. As a result, the rate of floodwater rise is expected to be relatively slow.

Taking account of the scale and nature of the Proposed Development, the characteristics of the fluvial flooding source, and the findings of the modelling and historical evidence, fluvial flooding represents a material source of flood risk at the Site. Given the scale and nature of the Proposed Development, it is concluded that the risk of flooding from fluvial sources is considered to be of a **medium significance** and the consequences will be acceptable for ‘less vulnerable’ development in accordance with TAN15. The flood risk from all sources will be further mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site (see Section 5.0).

3.9 Tidal (Coastal) Flooding

The Site is not located within the vicinity of tidal flooding sources (see Figure 3) therefore, the risk of tidal flooding is considered to be **not significant**.

3.10 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers).

Site ground conditions suggest a low potential for groundwater flooding. The Site is not located within an area of elevated groundwater emergence potential, and the bedrock geology does not suggest susceptibility to groundwater flooding. The risk of flooding from groundwater flooding is considered to be **not significant**.

3.11 Surface Water (Pluvial) Flooding

The Site is not situated near to large areas of poor permeability which may result in surface water flooding. The Site surroundings are relatively flat and there are no large catchments that would tend to generate surface water runoff towards the Site. Surface water flow flooding tends to occur sporadically in both location and time such surface water flows would tend to be confined to the streets around the Site.

The FMfP shows that the Site is located within Flood Zones 1 and 3 with less than 1 in 1000 to 1 in 100 (0.1% to 1%) to a 1 in 100 (1%) annual probability of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

The mapped surface water flooding is generally localised and shallow and occurs predominantly during more extreme events. Furthermore, the existing and proposed finished floor levels are raised 1.30m above the external ground levels, which remains above the surface water levels for the Site therefore, the building will not be flooded internally.

It should be noted that this is a most conservative estimate of surface water flood risk, any resulting flooding would be expected to be infrequent or have a low predicted depth. Therefore, the risk of flooding from surface water flooding is considered to be of **low significance**. The risk from this source will be further mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 5.0).

3.12 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are existing sewers located within the vicinity of the Site and these will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment.

The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 100 years or less. Taking the above into consideration, the fact that there have been no infrastructure failure flooding events in the Site area and the Site's topography it can be concluded that the risk of flooding is very low. There are no records of sewer flooding in the vicinity of the Site, the Site is not identified as being at risk of having historically flooded due to sewer overloading and in the absence of confirmed DG5 entries, sewer flood risk is considered very low. It can therefore be concluded that the risk of sewer flooding is **not significant**.

3.13 Flooding from Artificial Drainage Systems/Infrastructure Failure

Reservoirs are located within the vicinity of the Site. The Natural Resources Wales Reservoir flood map shows that the Site is at risk of reservoir flooding (see Figure 10). This map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The Environment Agency Reservoir flood map has been prepared for emergency planning purposes and for this reason they reflect a worst-case scenario. Since this is a prediction of a worst-case scenario, it is unlikely that any actual flood would be this large.

Reservoir flooding is extremely unlikely; reservoirs in the UK have a very good safety record. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to make sure reservoirs are well maintained.

The hazard is well managed through effective legislation and it is unlikely that the impact zone downstream of these reservoirs should preclude the Proposed Development. The risk of flooding from reservoir flooding is considered to be **not significant**.



Figure 10 - Natural Resources Wales Reservoir Flood Map

3.14 The Effect of the Development on Flood Risk

The building is existing and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the floodwater levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

3.15 Summary of Site Specific Flood Risk

A summary of the sources of flooding and a review of the risk posed by each source at the Site is shown in Table 4.

The River Ebbw is located approximately 60m to the south of the Site and poses the primary but unlikely a flood risk to the Site. The majority of the Site is located within FMfP Flood Zone 2 for rivers however, a small area of the Site, on the eastern boundary, is located within Flood Zone 3, with a 1 in 1000 to a 1 in 100 (1%) annual probability of flooding from rivers in a given year, including the effects of climate change.

Modelling from the Tredegar Park FMC (2023) shows that the Site would not be inundated during the undefended 1 in 100 year in 2122 event. The Site will be flood free during the undefended 1 in 100 year in 2101 event (i.e. the design event). It is only during flood events of a greater magnitude that the Site may be inundated with floodwater such as during the 1 in 1000 year in 2122 event. During the 1 in 1000 year in 2101 event the Site may be inundated with floodwater with water depths of up to 1m.

However, this includes an additional 21 years of climate change therefore the water depths experienced on the Site would be considerably less than 1m. These scenarios are considered

to represent conservative, low-probability events and provide confidence in the effectiveness of flood risk with defences events. Flood hazard ratings under the defended scenario reflect the slow-onset and backwater driven mechanism of flooding at this location.

Furthermore, the existing and proposed finished floor levels are raised 1.30m above the external ground levels, which remains above the 1 in 1000 year in 2101 water level for the Site therefore, the building will not be flooded internally.

Taking account of the scale and nature of the Proposed Development, the characteristics of the fluvial flooding source, and the findings of the modelling and historical evidence, fluvial flooding represents a material source of flood risk at the Site. Given the scale and nature of the Proposed Development, it is concluded that the risk of flooding from fluvial sources is considered to be of a **medium significance** and the consequences will be acceptable for 'less vulnerable' development in accordance with TAN15. A secondary flooding source has been identified which may pose a low significant risk to the Site. This is:

- Surface Water Flooding

The existing and proposed use of the Site is 'less vulnerable'. The Proposed Development will not change the vulnerability of the Site to flooding or introduce a new vulnerable use into the floodplain. The Proposed Development is deemed appropriate for this location. The flood risk at the Site will be further mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site (see Section 5.0).

The building is existing and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the floodwater levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

In conclusion, the flood risk to the Site can be considered to be very limited and the Site is unlikely to flood except in very extreme conditions.

Table 4 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	Yes	River Ebbw	Medium
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low spots	Low
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	Yes	Reservoirs	Not Significant

4.0 SURFACE WATER DRAINAGE

4.1 Surface Water Management Overview

It is recognised that consideration of flood issues should not be confined to the floodplain. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in the catchment, particularly flooding downstream. For example, replacing vegetated areas with roofs, roads and other paved areas can increase both the total and the peak flow of surface water runoff from the Site. Changes of land use on previously developed land can also have significant downstream impacts where the existing drainage system may not have sufficient capacity for the additional drainage.

An assessment of the surface water runoff rates has been undertaken, in order to determine the surface water options and attenuation requirements for the Site. The assessment considers the impact of the proposals compared to current conditions. Therefore, the surface water attenuation requirement for the developed Site can be determined and reviewed against existing arrangements.

The surface water drainage arrangements for any development site should be such that the volumes and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the Proposed Development unless specific off-site arrangements are made and result in the same net effect.

4.2 Surface Water Runoff Rates/Volumes

The Proposed Development will not increase the footprint of the building or the impermeable areas of the Site. The surface water runoff from the developed Site will be no different to pre and post-application. It is understood the existing Site discharges surface water to the adjacent public sewer. It is deemed sustainable to re-use this connection.

There will be no increase in surface water runoff or exacerbation of off-site risk as a result of the development. The risk of flooding from surface water is considered to be low and it is likely that the current drainage system is sufficient for the proposed use.

5.0 RISK MANAGEMENT

5.1 Introduction

In this flood zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the use of flood mitigation measures.

A number of techniques and mitigation strategies to manage and reduce the overall flood risk in the area will be used. This will ensure the development will be safe and there is:

- 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.

The flood risk at the Site will be reduced by using a number of risk management measures to mitigate and reduce the overall flood risk at the Site.

5.2 Finished Floor Levels

The Proposed Development relates to an existing building and does not involve raising ground levels or altering finished floor levels. The existing and proposed finished floor levels are raised 1.30m above the external ground levels, which remains above the 1 in 1000 year in 2101 water level and the surface water levels for the Site therefore, the building will not be flooded internally. A combination of resistance (proofing) and resilience measures will be included to provide further protection. This is discussed below.

5.3 Flood Resilience and Resistance

Flood risk can be mitigated through the design of the building. Flood resistance measures are measures that help resist floodwaters entering a property (airbrick covers are an example of a flood resistance measure). Flood resilience and resistance measures will be used, including:

- The walls of the Proposed Development will be thick.
- Sealant will be used around all external doors and windows.
- All windows will be located above ground levels.
- All external doors and windows are constructed from hard wearing materials.
- All electrics wiring, switches, sockets, socket outlets etc. are to be located above the floodwater levels.

5.4 Flood Warning

The Site is located within an area at risk of fluvial flooding. As part of the approach to managing flood consequences, the Site will be registered with Natural Resources Wales Flood Warning Service in order to receive advance notification of flood events. Registration enables timely awareness of flood conditions and informs appropriate response actions in accordance with the Flood Plan.

Natural Resources Wales operate a free flood warning service providing alerts by phone, text or email when flooding is anticipated providing an opportunity for owners to take necessary precautions, giving enough time for the building to be safely evacuated and mitigation measures to be put in place.

All occupants of the Site will be made aware of the Natural Resources Wales Floodline telephone number and the Flood Warning Codes and their meaning. Natural Resources Wales uses Flood Warnings Codes. They can be issued in any order, usually ending with an 'all clear'. They are issued by Natural Resources Wales through their website and Floodline Warning Direct. The flood warning will be passed onto the occupiers and visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

The Site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The speed of inundation and rate of floodwater rise would be low. In order for the following evacuation procedures to be effective:

- The Site will register contact details with the Natural Resources Wales Flood Warning Service (Floodline 0345 988 1188) in order to receive Flood Warnings/Alerts.
- The flood warning will be passed onto the occupants and visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

5.5 Flood Plan

A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed and made available to occupants/visitors of the Site and will include the safe access and egress route. Suitable warning notices will be erected to inform the occupants/visitors of the flood risk and evacuation procedures.

Sensible precautions would include raising electrical items, irreplaceable items and sentimental items off the ground or where possible moving them to a higher floor, rolling up carpets and rugs and turning off utilities. In addition, consider what actions you would take should the property need to be evacuated including access and egress routes and preparing a flood kit in advance containing warm clothing, medication, a torch, food and wellingtons.

The Flood Plan is a 'living' document and therefore should be periodically reviewed and updated to provide advice and guidance to occupants in the event of an extreme flood. The Flood Plan will therefore reduce the vulnerability of the occupants to flooding and makes them aware of the mechanisms of flooding at the Site. The flood levels will be monitored and the occupants/visitors informed when the Flood Plan is to be initiated.

The following flood evacuation procedures have been developed for the Site, so that the Site is safe during a flood.

Flood Alert

'Flooding of low-lying land and roads is expected. Be aware, be prepared, watch out!'. The Natural Resources Wales will issue a Flood Alert status when flooding is possible, based upon weather and river/sea conditions.

Be prepared to act on your flood plan. At this stage occupants and visitors should make themselves aware of the Flood Plan and evacuation routes. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast.

Contact Natural Resources Wales Floodline on 0345 988 1188 to get more information should be contacted to get more information, periodically and listen to and watch for weather and flood warnings on local radio and television stations.

Flood Warning

'Flooding of homes and businesses is expected. Act now!'. The Flood Warning alert will be issued when water levels are rising and further rain is expected. The Site will be evacuated. Move family, pets and valuables to a safe place.

Water, electricity and gas supplies should be located and switched off before evacuating. Contact Natural Resources Wales Floodline on 0345 988 1188 to get more information should be contacted to get more information, periodically and listen to and watch for weather and flood warnings on local radio and television stations.

Severe Flood Warning

'Severe Flooding is expected. There is extreme danger life and property. Act now!'. If the Site has not already been evacuated it will be evacuated immediately. Co-operate with the emergency services and call 999 if immediately in danger.

Contact Natural Resources Wales Floodline on 0345 988 1188 to get more information should be contacted to get more information, periodically and listen to and watch for weather and flood warnings on local radio and television stations.

Warning No Longer in Force

'Flood Watches or Flood Warnings are no longer in force for this area'. Occupants and visitors should contact the LPA to check that it is safe to return to the Site. Please be careful water may be around for several days. If there is any doubt that appliances may be water damaged they must be checked before switching the power or gas back on. Contact your insurance company as soon as possible to get their approval before arranging any clean-up or repairs.

5.6 Access and Egress Route

Access routes should be such that occupants can safely access and exit their properties in design flood conditions. These routes must also provide the emergency services with access to the developments during a flood event and enable flood defence authorities to carry out any necessary duties during the period of flood.

The Site is one of the last places in the area to flood and remains flood free when other areas close by are flooded. The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development.

Safe access and egress routes, including emergency access can be maintained for vehicles and/or by foot. Given that the Site is located within a flood warning area, Site users would be aware of the flood risk and should have more than sufficient time to evacuate the Site before flooding of the access road would be expected. Therefore, the lead time of the flooding will provide Site users with more than ample time to evacuate the Site and seek safe refuge outside the floodplain.

The safe access and egress route indicates the exit route that all people (i.e. occupants and visitors) on Site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone. Facilities such as community centres, shops etc. are located within the areas shown in Figure 11 which may be used in the event of a flood event. There may also be large areas than those shown in the FMfP that are flood free located nearer and within the vicinity of the Site.

In the event of a Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site

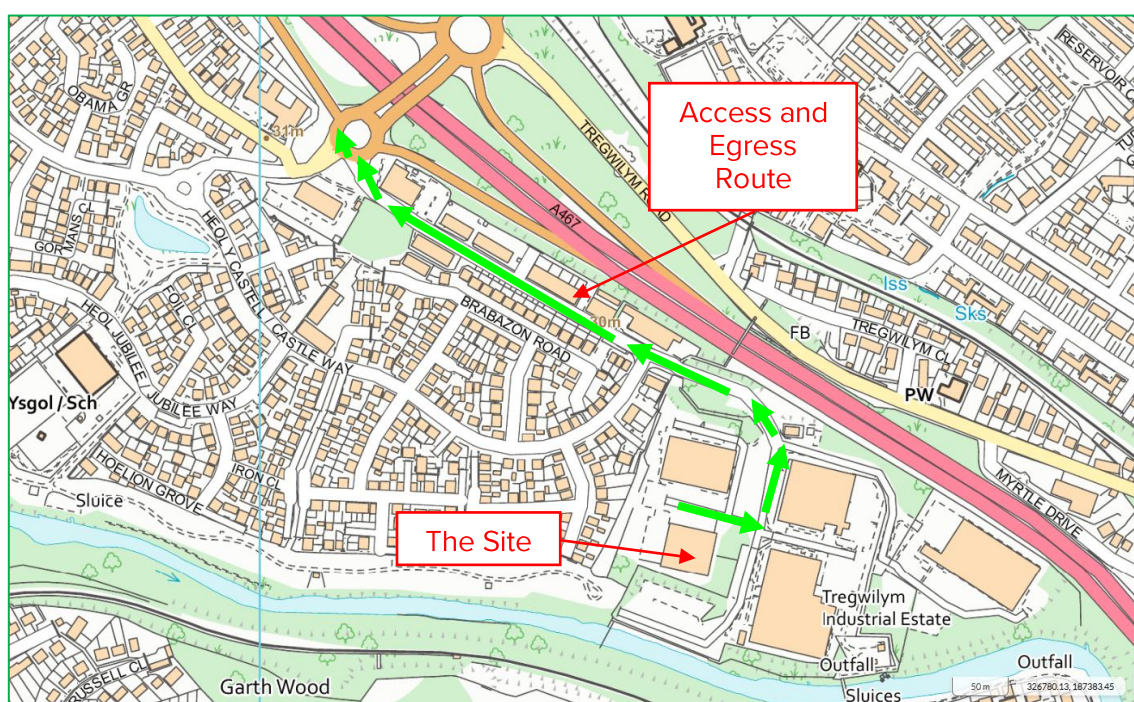


Figure 11 - Access and Egress Route

5.7 Residual Risk

The Site can be justified in accordance with TAN15 as it can be demonstrated that the consequences of flooding can be managed down to a level which is acceptable for the nature and type of Site. The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable.

6.0 JUSTIFYING THE LOCATION OF THE DEVELOPMENT

6.1 Assessment Framework

TAN15 seeks to avoid less vulnerable development within areas at highest flood risk. However, it recognises that development within the FMfP Flood Zones 2 and 3 may be acceptable where it can be demonstrated, through a site-specific FCA, that the consequences of flooding are acceptable and can be effectively managed.

Section 11 of TAN15 requires consideration of flood consequence indicators including:

- Flood depth
- Flood velocity
- Rate of onset
- Duration of flooding
- Access and egress arrangements
- Availability of warning
- Vulnerability of receptors

These indicators are applied holistically and are not intended to operate as absolute thresholds. The objective is to determine whether risks to life and property can be managed to an acceptable level over the lifetime of the development.

6.2 Application to the Proposed Development

Proposed Development comprises a change of use of existing vacant warehouse into a Padel Centre. No new building is introduced into the floodplain. There is no increase in the footprint, no land raising, and no alteration to floodplain storage or flood routing.

- Accordingly:
- Baseline floodplain conditions remain unchanged;
- There is no increase in flood levels on-site or elsewhere;
- There is no loss of floodplain storage;
- There is no obstruction to flood conveyance routes.

The proposal represents an intensification of an existing commercial use within an established building rather than the introduction of new 'less vulnerable' development into previously undeveloped floodplain land. The character of flooding at this location is:

- Gradual in onset;
- Forecast-led;

- Associated with long-duration rainfall events;
- Subject to advance warning via Natural Resources Wales flood warning services.

This flood behaviour significantly reduces the life-safety consequences associated with extreme events.

6.3 Risk Management Measures

The acceptability of development within Flood Zones 2 and 3 depends not on whether flooding can occur in extreme scenarios, but whether the consequences of flooding are manageable. In this case:

- Advance warning is available through the Natural Resources Wales Flood Warning Service;
- A Flood Plan will be implemented;
- The absence of physical works or increased flood risk elsewhere;
- Access and egress arrangements allow evacuation prior to peak flood conditions; and
- No increase in flood risk elsewhere arises from the proposal.

In this context, risk to life is managed through early warning, managed evacuation and the provision of internal refuge at first and second floor level. The nature of the flood mechanism, combined with the management measures identified, ensures that life-safety consequences remain acceptable in accordance with TAN15.

Importantly, the proposal does not introduce a new building into the floodplain, does not increase Site footprint, does not alter floodplain storage or routing, and does not increase flood risk elsewhere. The proposal represents an intensification of an existing commercial use within a building that benefits from flood warning systems.

Flood risk is therefore managed through:

- Warning-led evacuation;
- Managed emergency planning;
- Physical resilience measures;

Having regard to the indicators set out in Section 11 of TAN15, the consequences of flooding associated with the Proposed Development are considered acceptable in planning terms.

On this basis, and subject to implementation of the identified mitigation measures, the development satisfies the requirements of TAN15.

7.0 SUMMARY AND CONCLUSIONS

7.1 Introduction

This report presents an FCA in accordance with TAN15 for the Proposed Development at Unit 5 Tregwilym Road Industrial Estate, Rogerstone, Newport, Gwent, NP10 9DQ.

This FCA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

7.2 Flood Risk

The River Ebbw is located approximately 60m to the south of the Site and poses the primary but unlikely a flood risk to the Site. The majority of the Site is located within FMfP Flood Zone 2 for rivers however, a small area of the Site, on the eastern boundary, is located within Flood Zone 3, with a 1 in 1000 to a 1 in 100 (1%) annual probability of flooding from rivers in a given year, including the effects of climate change.

Modelling from the Tredegar Park FMC (2023) shows that the Site would not be inundated during the undefended 1 in 100 year in 2122 event. The Site will be flood free during the undefended 1 in 100 year in 2101 event (i.e. the design event). It is only during flood events of a greater magnitude that the Site may be inundated with floodwater such as during the 1 in 1000 year in 2122 event. During the 1 in 1000 year in 2101 event the Site may be inundated with floodwater with water depths of up to 1m.

However, this includes an additional 21 years of climate change therefore the water depths experienced on the Site would be considerably less than 1m. These scenarios are considered to represent conservative, low-probability events and provide confidence in the effectiveness of flood risk with defences events. Flood hazard ratings under the defended scenario reflect the slow-onset and backwater driven mechanism of flooding at this location.

Furthermore, the existing and proposed finished floor levels are raised 1.30m above the external ground levels, which remains above the 1 in 1000 year in 2101 water level for the Site therefore, the building will not be flooded internally.

Taking account of the scale and nature of the Proposed Development, the characteristics of the fluvial flooding source, and the findings of the modelling and historical evidence, fluvial flooding represents a material source of flood risk at the Site. Given the scale and nature of the Proposed Development, it is concluded that the risk of flooding from fluvial sources is considered to be of a **medium significance** and the consequences will be acceptable for 'less vulnerable' development in accordance with TAN15. A secondary flooding source has been identified which may pose a low significant risk to the Site. This is:

- Surface Water Flooding

The existing and proposed use of the Site is 'less vulnerable'. The Proposed Development will not change the vulnerability of the Site to flooding or introduce a new vulnerable use into the floodplain. The Proposed Development is deemed appropriate for this location. The flood risk at the Site will be further mitigated by using a number of risk management measures to manage and reduce the overall flood risk at the Site.

The building is existing and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. The conveyance routes (flow paths) will not be blocked or obstructed. There will be no increase in the floodwater levels due to the

Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

In conclusion, the flood risk to the Site can be considered to be very limited and the Site is unlikely to flood except in very extreme conditions.

7.3 Surface Water Drainage

The Proposed Development will not increase the footprint of the building or the impermeable areas of the Site. The surface water runoff from the developed Site will be no different to pre and post-application. It is understood the existing Site discharges surface water to the adjacent public sewer. It is deemed sustainable to re-use this connection.

There will be no increase in surface water runoff or exacerbation of off-site risk as a result of the development. The risk of flooding from surface water is considered to be low and it is likely that the current drainage system is sufficient for the proposed use.

7.4 Risk Management

The flood risk at the Site will be reduced by using a number of risk management measures to manage and reduce the overall flood risk at the Site. Measures used:

Finished Floor Levels: The Proposed Development relates to an existing building and does not involve raising ground levels or altering finished floor levels. The existing and proposed finished floor levels are raised 1.30m above the external ground levels, which remains above the 1 in 1000 year in 2101 water level and the surface water levels for the Site therefore, the building will not be flooded internally. A combination of resistance (proofing) and resilience measures will be included to provide further protection. This is discussed below.

Flood Resilience and Resistance: Flood resilience and resistance measures will be used, including:

- The walls of the Proposed Development will be thick.
- Sealant will be used around all external doors and windows.
- All windows will be located above ground levels.
- All external doors and windows are constructed from hard wearing materials.
- All electrics wiring, switches, sockets, socket outlets etc. are to be located above the floodwater levels.

Flood Warning: The Site is located within an area at risk of fluvial flooding. As part of the approach to managing flood consequences, the Site will be registered with Natural Resources Wales Flood Warning Service in order to receive advance notification of flood events. Registration enables timely awareness of flood conditions and informs appropriate response actions in accordance with the Flood Plan.

Flood Plan: A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause could be developed and will be made available to occupants/visitors of the Site and will include the safe access and egress route. Suitable warning notices will be erected to inform the occupants/visitors of the flood risk and evacuation procedures.

Access and Egress Route: The Site is one of the last places in the area to flood and remains flood free when other areas close by are flooded. The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development.

The safe access and egress route indicates the exit route that all people (i.e. occupants and visitors) on Site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone. In the event of a Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials for infants and children will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site.

7.5 Justifying the Location of the Development

The development proposals should be considered by the LPA to satisfy the acceptability of flood consequences as set out in TAN15.

7.6 Conclusion

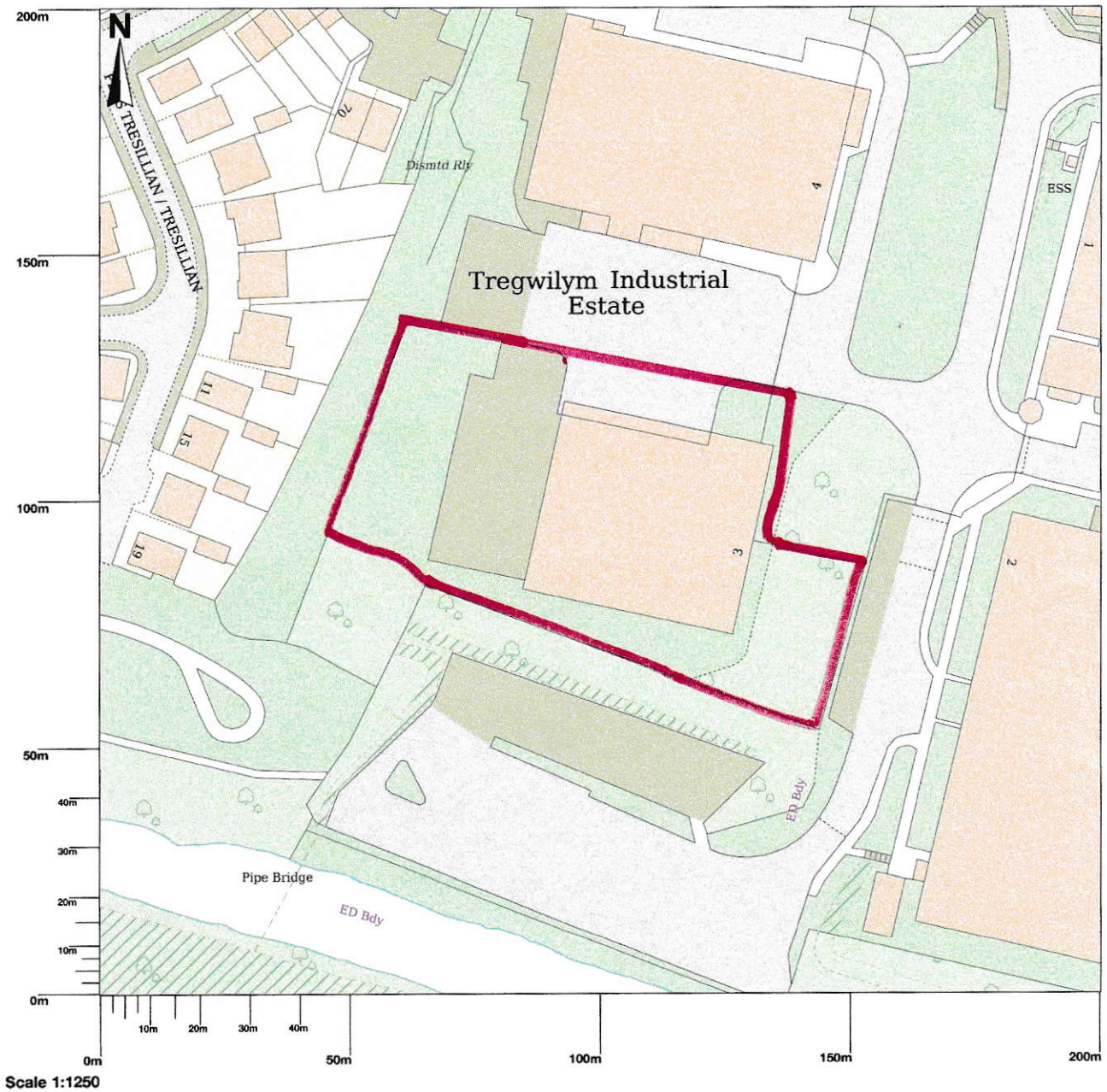
In conclusion, the Proposed Development would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this FCA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of TAN15.

This FCA demonstrates that the Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of TAN15. The development should not therefore be precluded on the grounds of flood risk.

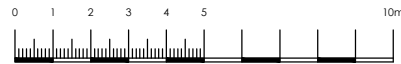
APPENDICES

APPENDIX 1 – Existing and Proposed Site Layout

Unit 5, Tregwilym Road Industrial Estate, Rogerstone, Newport, NP10 9DQ



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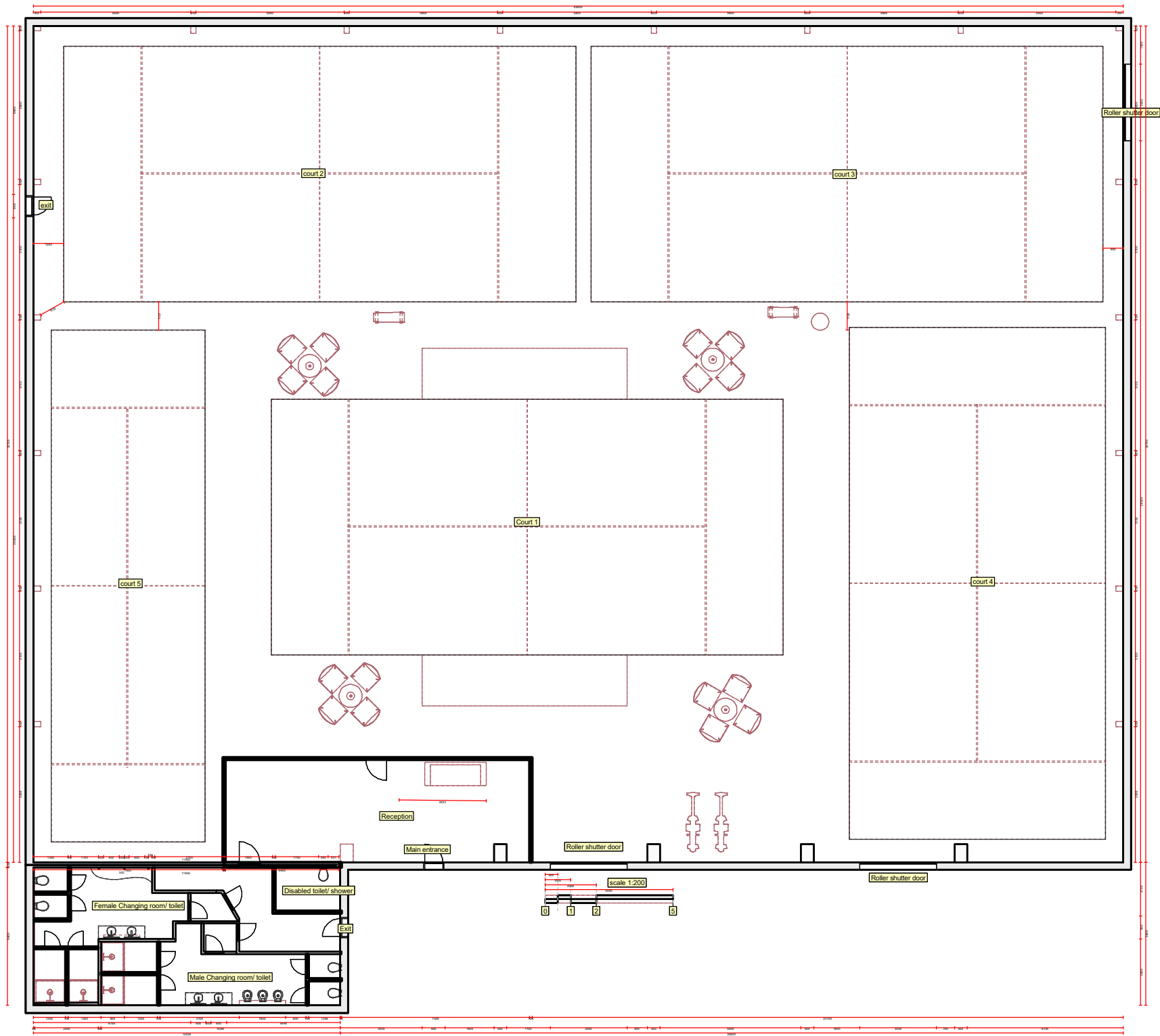
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Scale: 1:200 (A3)

