64 George Street, Newport, NP20 2AA

Flood Consequence Assessment

For Deborah Holland

KRS.0817.001.R.001.A

August 2024

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64 George Street, Newport, NP20 2AA

Project	Flood Consequence Assessment
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Status	Final
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Date	August 2024

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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 Deborah Holland to support a planning application for the conversion and change of use of a former ground floor commercial unit to a one bedroom residential flat ("the Proposed Development") at 64 George Street, Newport, NP20 2AA ("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 Development Advice Maps (DAMs). 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 is due to be implemented in the near future. This will be supported by the new Flood Map for Planning, 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 outlines mitigation measures used to reduce the overall level of flood risk;
- Section 5 provides details of the Justification Test and the Acceptability Criteria; and
- Section 6 presents a summary and conclusions.

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

The Site is located at 64 George Street, Newport, NP20 2AA (see Figure 1). The National Grid Reference (NGR) of the Site is 331469, 187516

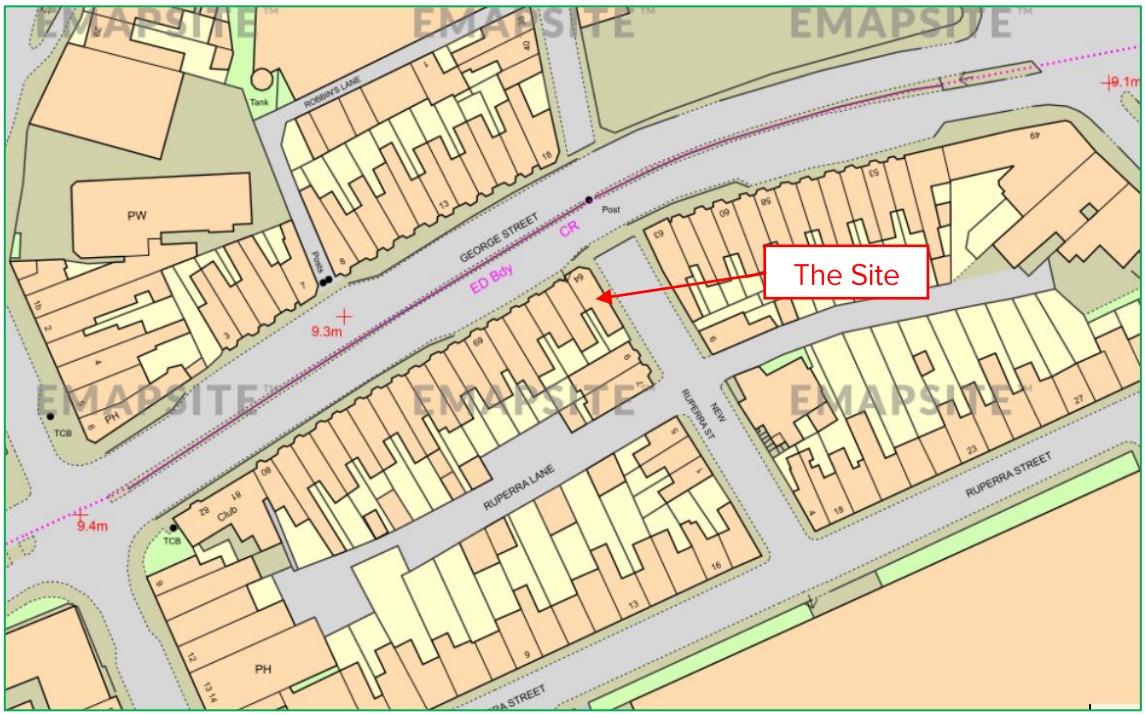

Figure 1 - Site Location

2.2 Existing Development

The existing Site currently comprises a vacant ground floor commercial unit. The existing finished floor levels are between 110 and 220mm above the external ground levels.

2.3 Proposed Development

The Proposed Development is for the conversion and change of use of a former ground floor commercial unit to a one bedroom residential flat. Further details with regard to the Proposed Development can be found in the accompanying information submitted with the planning application.

2.4 Ground Levels

The Site minimum ground level is 8.79 metres Above Ordnance Datum (mAOD), as per the Ordnance Survey Digital Terrain Model (DTM).

2.5 Catchment Hydrology

The River Usk is located approximately 485m to the east of the Site. It is noted that the River Usk is tidal at this location. There are no other watercourses evident either on, or within the vicinity of the Site.

2.6 Ground Conditions

The British Geological Survey (BGS)[1] map shows that the bedrock deposits consist of the St Maughans Formation - argillaceous rocks and sandstone, interbedded. Sedimentary bedrock formed between 419.20 and 393.30 million years ago during the Devonian period. The superficial deposits consist of Tidal Flat Deposits - clay and silt. Superficial deposits formed between 11.80 thousand years ago and the present during the Quaternary Period.

Information from the National Soil Resource Institute[2] details the Site area as being situated on loamy and clayey soils of coastal flats with naturally high groundwater. In low-lying sites, permeable soils are often affected by high groundwater that has drained from the surrounding landscape. They are described as naturally wet.

[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. Natural Resources Wales has supplied the Caldicot and Wentlooge 2016 model data and Site is located within the Wentlooge model domain.

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 Purposes [3], Flood Consequence Assessments: Climate change allowances[4] and Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales[5].

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.

Table 1 - Peak River Flow Allowances by River Catchment

River Basin	Allowance Category	2020s	2050s	2080s
Severn	Upper	+25%	+40%	+70%
	Central	+10%	+20%	+25%

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.

[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	95th	1.11	1.33
	70th	0.85	1.01

3.4 Historic Flooding

The Natural Resources Wales historic flood map shows that the Site has not historically flooded (see Figure 2). The British Hydrological Society "Chronology of British Hydrological Events[6]" 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 in the recent past.

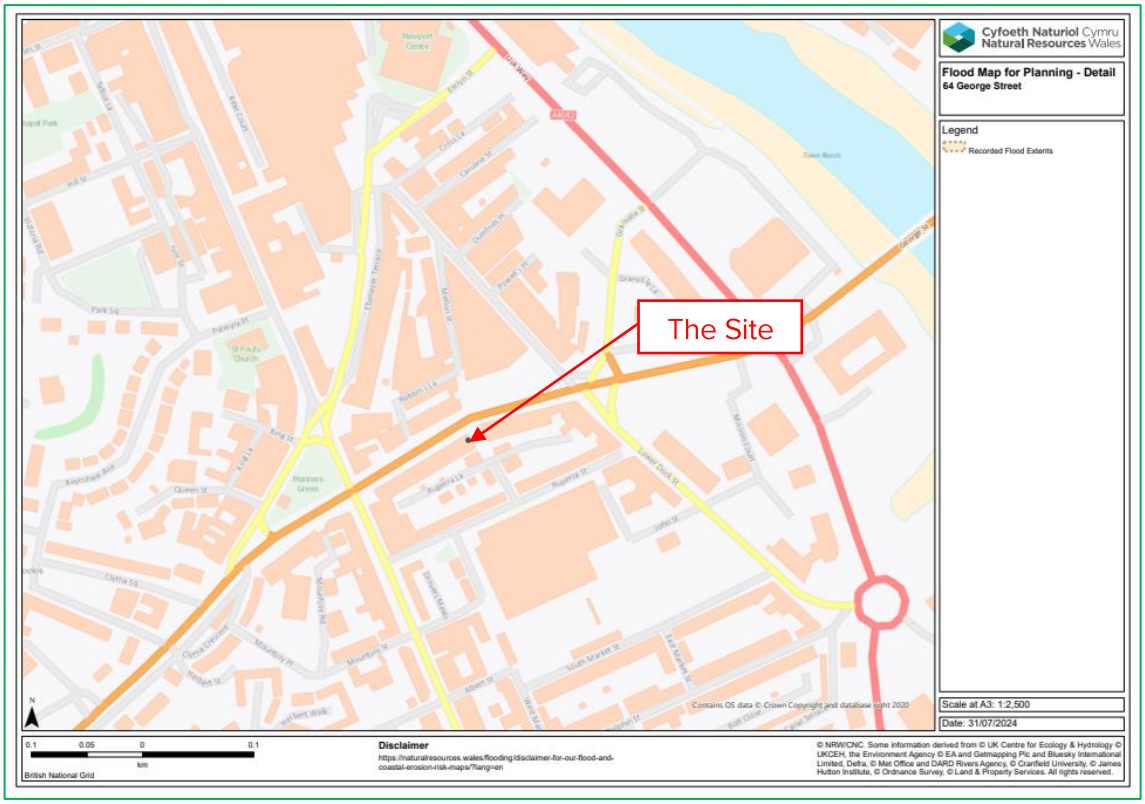

Figure 2 - Natural Resources Wales Historic Flood Map

3.5 Existing and Planned Flood Defence Measures

The Site is protected against tidal flooding by flood defence measures which provide a 1 in 200 year Standard of Protection (SoP). The flood defences take the form of flood embankments and flood walls which are all maintained by Natural Resources Wales. The flood risk will be further mitigated by using a number of risk management measures to manage the overall flood risk at the Site, these are discussed in Section 4.0.

[6] https://cbhe.hydrology.org.uk/

3.6 Flood Vulnerability

Table 3 describes the composition and use of the DAM Zones to control and manage development. Applying the Flood Risk Vulnerability Classification in Figure 3 of TAN15, the proposed development is classified as 'highly vulnerable'. It should be noted that the first floor of the building is already classified as 'highly vulnerable', being of residential use.

3.7 Development Advice Map

The DAM which accompanies TAN15 shows that the Site is located within Zone B - Areas known to have been flooded in the past evidenced by sedimentary deposits (see Figure 3). Used as part of a precautionary approach to indicate where Site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.

However, it has been concluded that the Site has not historically flooded in the recent past and therefore, this designation is based solely on sedimentary deposits. The Proposed Development is, therefore, appropriate for this location.

Table 3 - Development Advice Map Zones

Description of Zone	Zone	Use with the Precautionary Framework
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where site levels should be checked against the extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal).	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

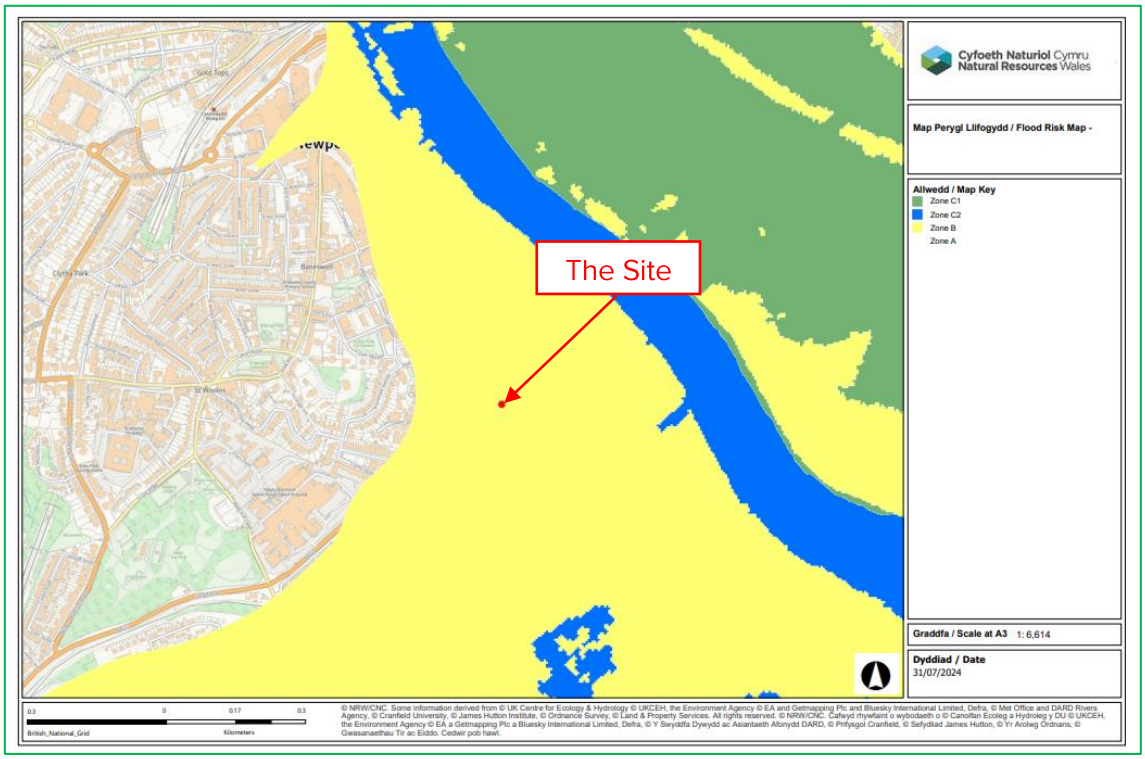

Figure 3 - Development Advice Map

3.8 Flood Map for Planning

The Flood Map for Planning (FMfP) has no official status for planning purposes. However, Natural Resources Wales may use the FMfP data as the 'best available information' on flood risk to inform their planning advice. The FMfP shows that the Site is located within the following flood zones:

- Rivers: Flood Zone 1 with less than a 1 in 1000 (0.1%) annual probability of flooding from rivers in a given year, including the effects of climate change (see Figure 4).
- Sea: Flood Zone 3 with a 1 in 200 (0.5%) annual probability of flooding from the sea in a given year, including the effects of climate change (see Figure 4).
- Surface water and small watercourses: The majority of the Site is located within Flood Zone 1 with less than a 1 in 1000 (0.1%) annual probability of flooding from surface water and/or small watercourses in a given year, including the effects of climate change. However, a very small proportion of the Site, on the very northern boundary, is located within Flood Zone 2 with 1 in 1000 to 1 in 100 (0.1% to 1%) annual probability of flooding from surface water and/or small watercourses in a given year, including the effects of climate change (see Figure 5).

Table 4 provides details of the FMfP Flood Zones. The Proposed Development is appropriate for this location.

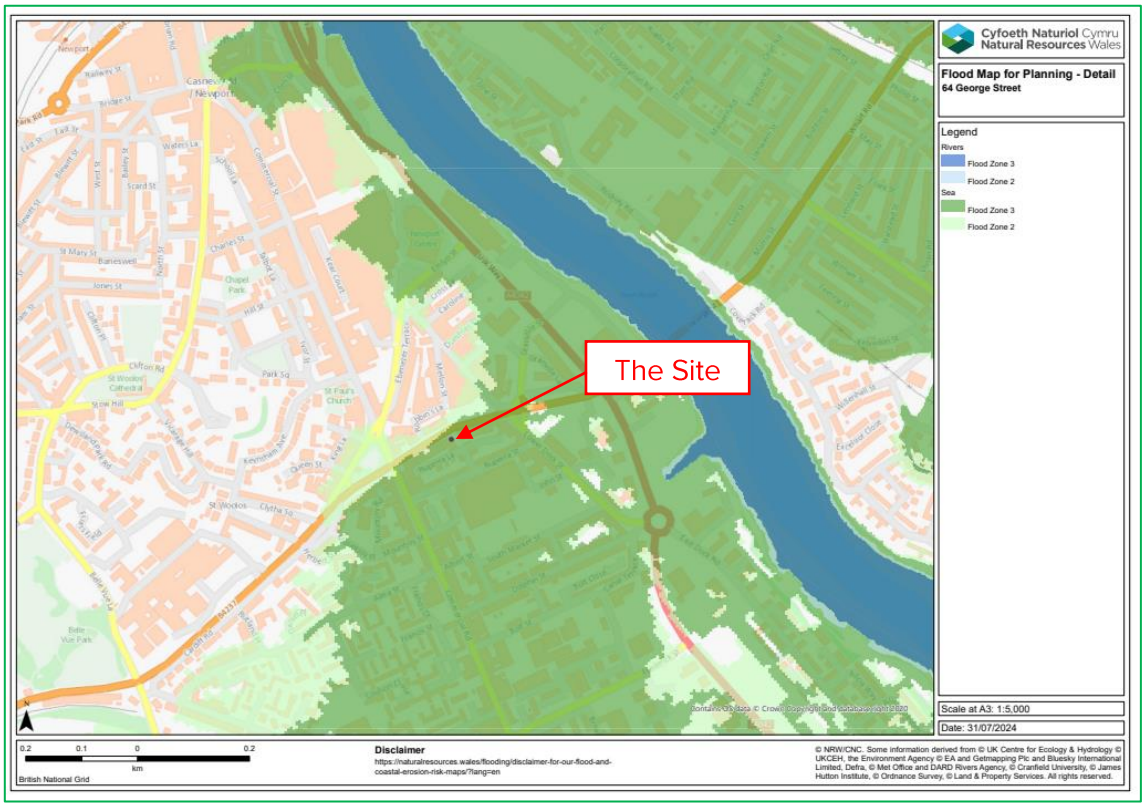

Figure 4 - Flood Map for Planning: Rivers and Sea

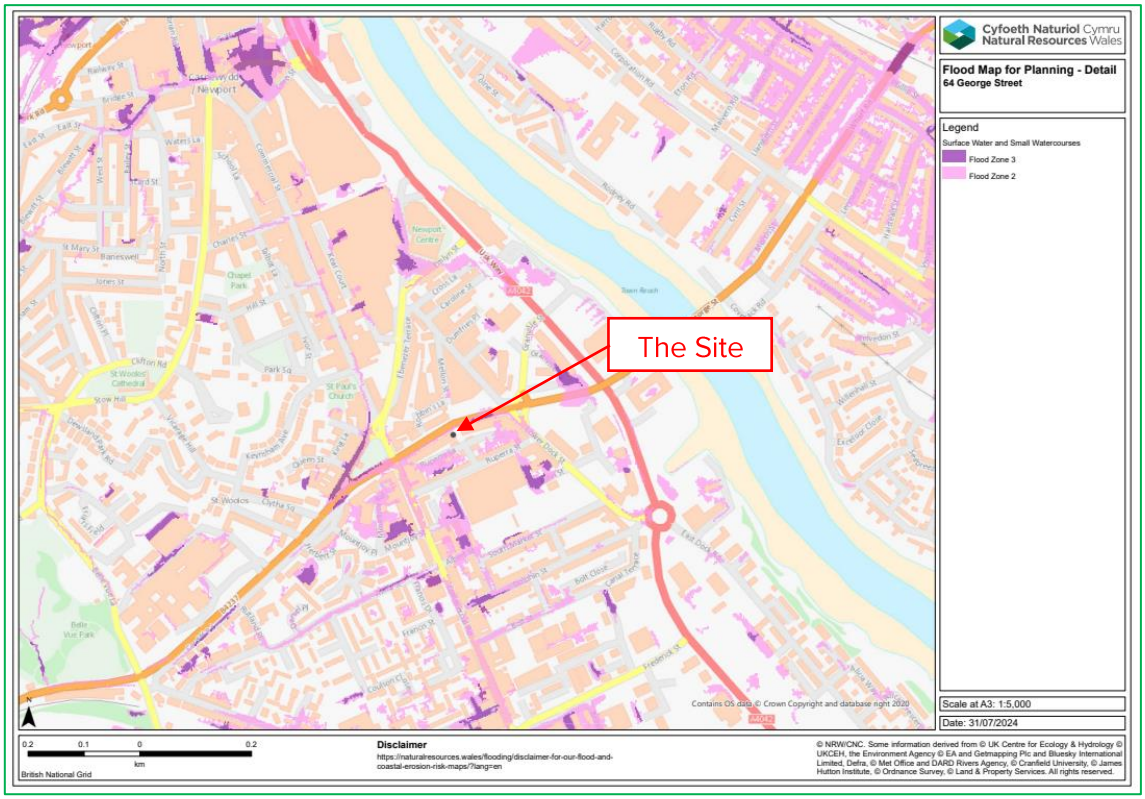

Figure 5 - Flood Map for Planning: Surface Water and Small Watercourses

Table 4 - 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.

3.9 Fluvial (River) Flooding

The River Usk is tidally influenced at this location and the Site is not at risk of fluvial flooding (see Figure 4). Therefore, the risk of flooding from fluvial sources is considered to be not significant.

3.10 Tidal (Coastal) Flooding

In an extreme event, which is highly unlikely, the River Usk may overtop its banks and inundate the Site with floodwater. Tidal flooding from the River Usk poses the primary flood risk to the Site.

Defended Scenario

Table 5 shows the Natural Resources Wales defended data from the Caldicot and Wentlooge 2016, Wentlooge model domain. Flood defences protect the Site from flooding from the River Usk with a SoP of 1 in 200 years. Natural Resources Wales data shows the Site has a very low risk of tidal flooding with a chance of flooding of less than 1 in 1000 (0.1%) years. Figures 6 and 7 confirm that the Site will not be inundated with floodwater during the defended 1 in 200 year and in 1000 year events. The Site is shown to be flood free during the defended 1 in 1000 year event, the actual flood risk posed to the Site is less than 1 in 1000 years.

It is only when climate change is considered that the area may be inundated with floodwater (see Figure 8). The Site may be inundated with floodwater to a maximum depth of 0.38m during the defended 1 in 200 year in 2115 event and to a maximum depth of 0.80m during the defended 1 in 1000 year in 2115 event.

To account for climate change from 2115 to 2124 the data has been updated as per Table 2 (i.e. 70th percentile = 0.008m per year). Therefore, during the defended 1 in 200 year in 2124 event the Site may be inundated with floodwater to a maximum depth of 0.45m and during the defended 1 in 1000 year in 2124 event to a maximum depth of 0.87m. However, it is reasonable to assume that the existing flood defences will not only be maintained but will be upgraded in the future to maintain the design SoP i.e. 1 in 200 years.

Table 5 - Natural Resources Wales Defended Data (Caldicot and Wentlooge 2016 model)

Return Period (yrs)	Water Level (mAOD)	Water Depth (m)	Water Velocity (m/s)	Hazard Rating
200	Null	Null	Null	Null
1000	Null	Null	Null	Null
200 in 2115	9.50	0.38	0.10	1.22
200 in 2124	9.57	0.45	0.10	1.22
1000 in 2115	9.92	0.80	0.15	1.50
1000 in 2124	9.99	0.87	0.15	1.50

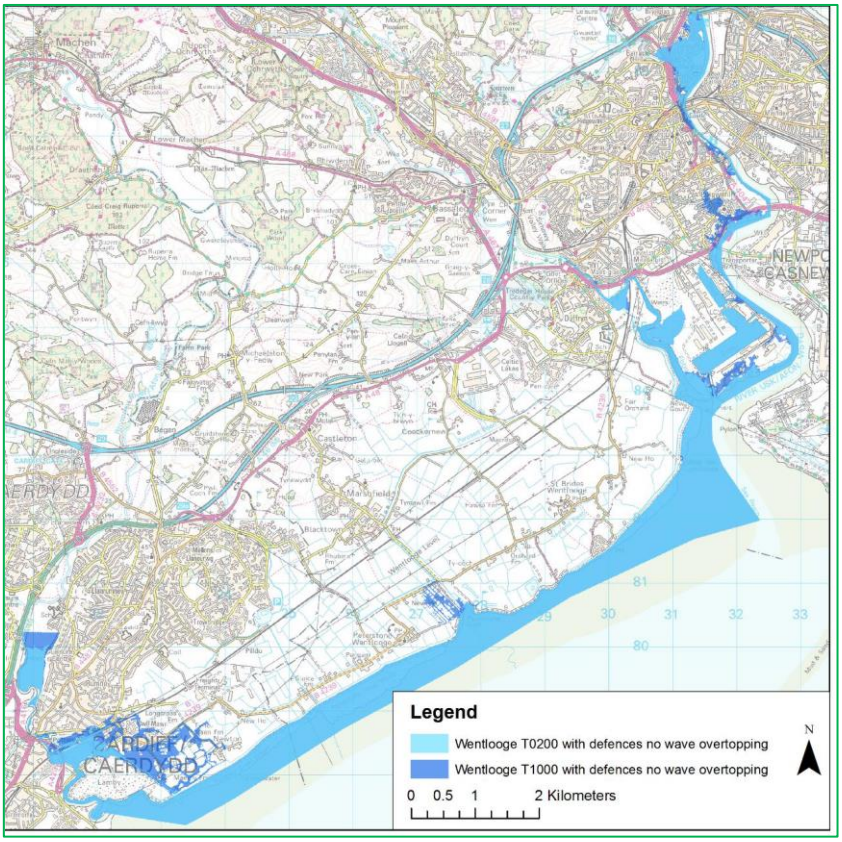

Figure 6 - Natural Resources Wales Tidal Flood Outlines with Defences (no wave overtopping)

Figure 7 - Natural Resources Wales Tidal Flood Outlines with Defences (wave overtopping)

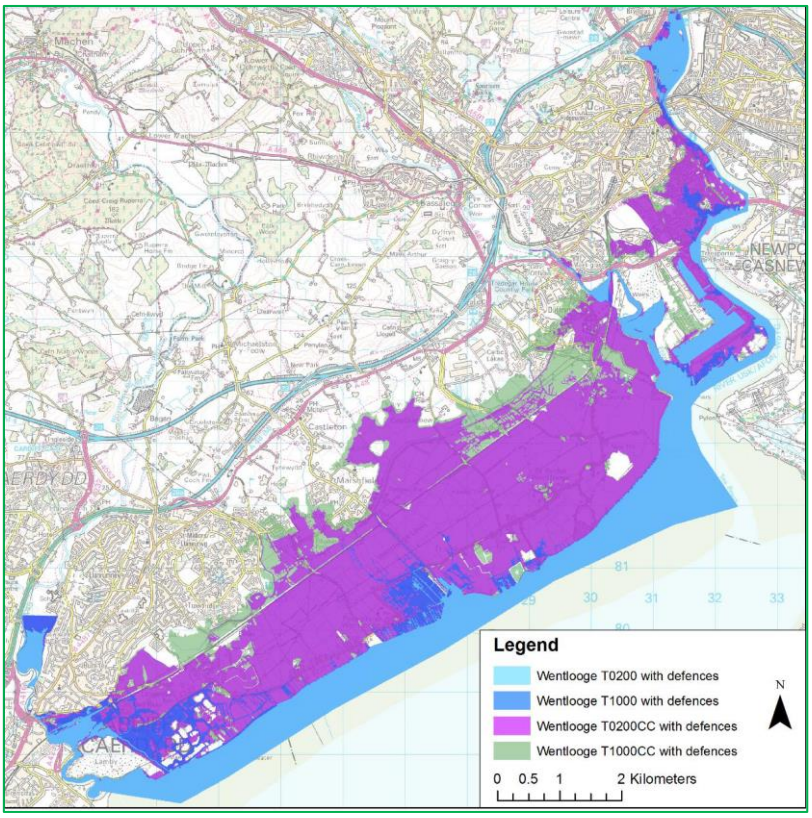

Figure 8 - Natural Resources Wales Tidal Flood Outlines with Climate Change, Defences and Wave Overtopping

Undefended Scenario

Table 6 shows the Natural Resources Wales undefended data from the Caldicot and Wentlooge 2016, Wentlooge model domain. Considerable investment has been made in the provision of the flood defences to protect this stretch of river from tidal flooding. However, the flood defences can only protect up to a point, they may malfunction, can be breached and have a finite structure life. Therefore, there is a residual risk of tidal flooding. Although it is unlikely that a breach in the flood defences would occur.

If the flood defences were not there, the area would be flooded. However, as area of land may benefit from the presence of flood defences even if the flood defences are overtopped, the presence of the flood defences means that the floodwater does not extend as far as it would if the flood defences were not there.

Natural Resources Wales data shows that the Site will not be inundated with floodwater during the undefended 1 in 200 year and 1 in 1000 year events, see Figure 9. The Site is shown to be flood free during the undefended 1 in 1000 year event, the residual flood risk posed to the Site is less than 1 in 1000 years.

It is only when climate change is considered that the area may be inundated with floodwater (see Figure 10). The Site may be inundated with floodwater to a maximum depth of 0.72m during the undefended 1 in 200 year in 2115 event and to a maximum depth of 1.37m during the undefended 1 in 1000 year in 2115 event.

To account for climate change from 2115 to 2124 the data has been updated as per Table 2 (i.e. 70th percentile = 0.008m per year). Therefore, during the undefended 1 in 200 year in 2124 event the Site may be inundated with floodwater to a maximum depth of 0.79m and during the undefended 1 in 1000 year in 2124 event to a maximum depth of 1.44m. However, it is reasonable to assume that the existing flood defences will not only be maintained but will be upgraded in the future to maintain the design SoP i.e. 1 in 200 years.

Table 6 - Natural Resources Wales Undefended Data (Caldicot and Wentlooge 2016 model)

Return Period (yrs)	Water Level (mAOD)	Water Depth (m)	Water Velocity (m/s)	Hazard Rating
200	Null	Null	Null	Null
1000	Null	Null	Null	Null
200 in 2115	9.78	0.72	0.17	1.44
200 in 2124	9.85	0.79	0.17	1.44
1000 in 2115	10.46	1.37	0.51	1.94
1000 in 2124	10.53	1.44	0.51	1.94

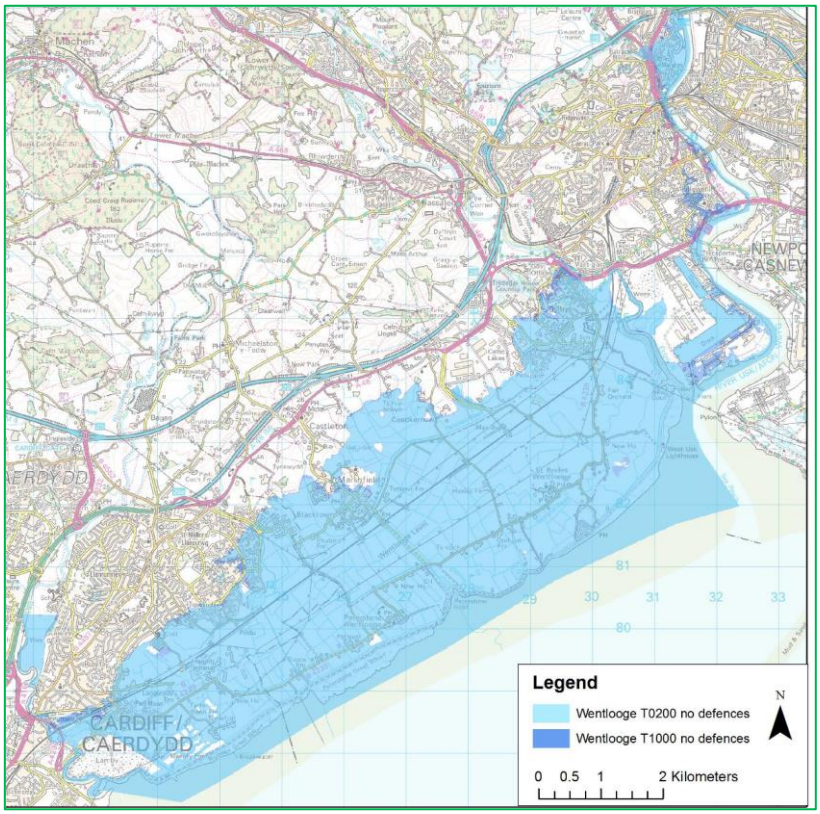

Figure 9 - Natural Resources Wales Tidal Flood Outlines No Defences

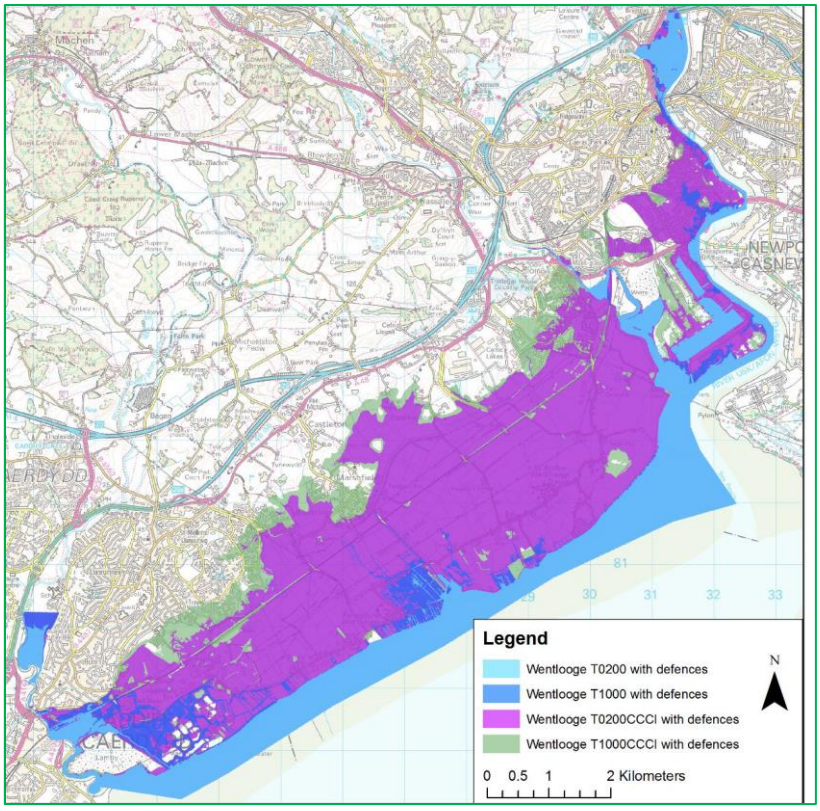

Figure 10 - Natural Resources Wales Tidal Flood Outlines with Climate Change, Defences and Wave Overtopping

Breach Scenario

Table 7 shows the Natural Resources Wales breach data from the Caldicot and Wentlooge 2016, Wentlooge model domain. Natural Resources Wales data shows that the Site will not be inundated with floodwater during the breach 1 in 200 year and 1 in 1000 year events, see Figure 11. The Site is shown to be flood free during the breach 1 in 1000 year event, the residual flood risk posed to the Site is less than 1 in 1000 years.

It is only when climate change is considered that the area may be inundated with floodwater. The Site may be inundated with floodwater to a maximum depth of 0.39m during the breach 1 in 200 year in 2115 event and to a maximum depth of 0.81m during the breach 1 in 1000 year in 2115 event.

To account for climate change from 2115 to 2124 the data has been updated as per Table 2 (i.e. 70th percentile = 0.008m per year). Therefore, during the breach 1 in 200 year in 2124 event the Site may be inundated with floodwater to a maximum depth of 0.46m and during the breach 1 in 1000 year in 2124 event to a maximum depth of 0.88m. However, it is reasonable to assume that the existing flood defences will not only be maintained but will be upgraded in the future to maintain the design SoP i.e. 1 in 200 years.

Table 7 - Natural Resources Wales Breach Data (Caldicot and Wentlooge 2016 model)

Return Period (yrs)	Water Level (mAOD)	Water Depth (m)	Water Velocity (m/s)	Hazard Rating
200	Null	Null	Null	Null
1000	Null	Null	Null	Null
200 in 2115	9.49	0.39	0.10	1.22
200 in 2124	9.56	0.46	0.10	1.22
1000 in 2115	9.92	0.81	0.12	1.48
1000 in 2124	9.99	0.88	0.12	1.48

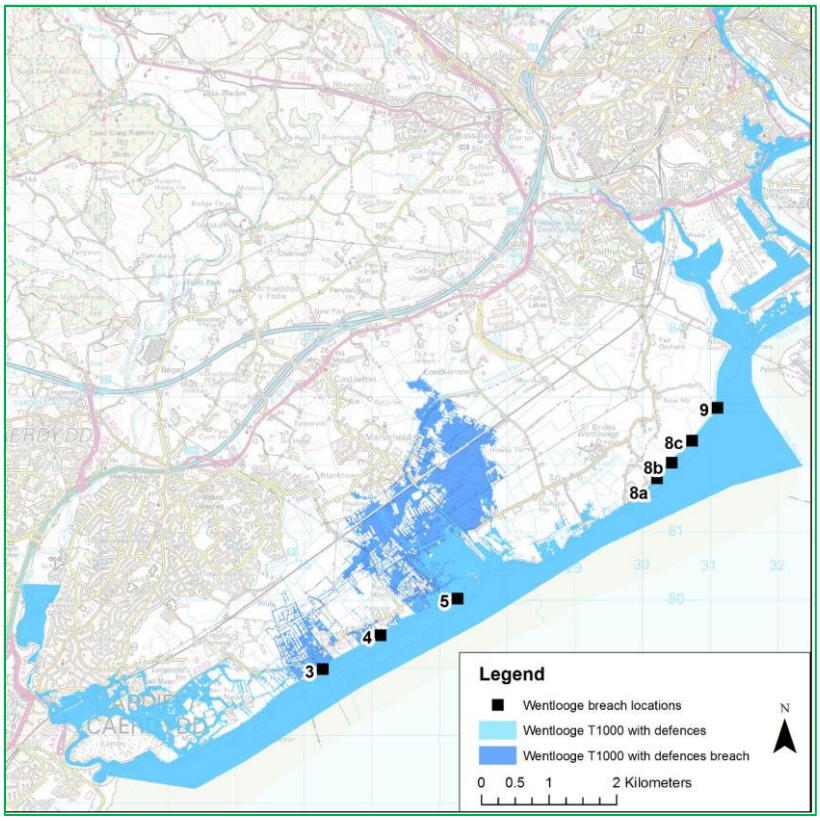

Figure 11 - Natural Resources Wales Tidal Flood Outlines Breach

Summary

The mechanism for flooding from tidal flooding is generally prolonged episodes of high sea levels, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event.

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.

It can be concluded that tidal flooding from the River Usk poses a low risk to the Site. Therefore, the risk of flooding from the River Usk is considered to be of medium significance. The risk from the River Usk 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 4.0).

3.11 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 conditions suggest a low probability of groundwater flooding. The Newport City Council Preliminary Flood Risk Assessment confirms that groundwater is not considered to a significant flood risk and is considered to rise and fall relatively slowly. In addition, the local geology is not considered to yield significant volumes of groundwater. No below surface infrastructure and buildings are located or are proposed for the Site. The risk of flooding from groundwater flooding is considered to be not significant.

3.12 Surface Water (Pluvial) Flooding

The Site is not situated near to large areas of poor permeability which may result in surface water flooding. The majority of the Site is located within Flood Zone 1 with less than a 1 in 1000 (0.1%) annual probability of flooding from surface water and/or small watercourses in a given year, including the effects of climate change. However, a very small proportion of the Site, on the very northern boundary, is located within Flood Zone 2 with 1 in 1000 to 1 in 100 (0.1% to 1%) annual probability of flooding from surface water and/or small watercourses in a given year, including the effects of climate change (see Figure 5).

Given the scale and nature of the Proposed Development and the size and location of the surface water flooding sources it has been concluded that surface water flooding poses a low flood risk to the Site and the risk of surface water flooding is considered to be of low significance.

3.13 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.

It has been assumed that 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.

Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 20 years. 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. Sewer flooding poses a flood risk to the Site therefore, the risk of flooding from sewer flooding is considered to be not significant.

3.14 Flooding from Artificial Drainage Systems/Infrastructure Failure

There are no nearby artificial water bodies, water channels, reservoirs and artificial drainage systems that could be considered a flood risk to the Site. The Natural Resources Wales Reservoir flood map shows that the Site is not at risk of reservoir flooding (see Figure 12). The risk of flooding from artificial drainage systems/infrastructure failure is considered to be not significant.

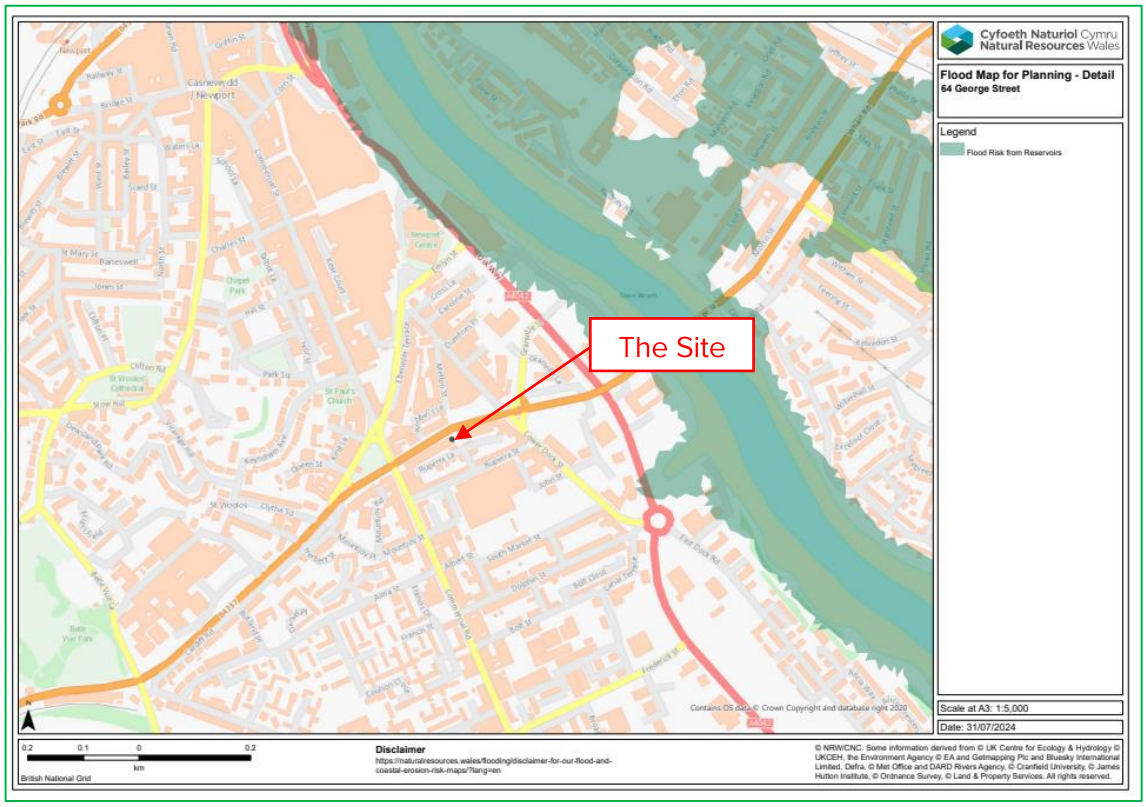

Figure 12 - Natural Resources Wales Reservoir Flood Map

3.15 The Effect of the Development on Flood Risk

The building is existing and no land raising will occur within the Site therefore, the Proposed Development will not impede the movement of floodwater across the Site. This will ensure no detriment to the flood storage capacity of the Site. 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. The Site proposals have been shown to be in accordance with A1.12 of TAN15.

3.16 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 8.

The Site is unlikely to flood except in extreme conditions. The primary, but unlikely, flood risk to the Site is from tidal flooding from the River Usk. The Site is located within Zone B - Areas known to have been flooded in the past evidenced by sedimentary deposits. The Site is located within FMfP Flood Zone 3 for tidal flooding, with a 1 in 200 (0.5%) annual probability of flooding from the sea in a given year, including the effects of climate change.

However, the Site is protected against tidal flooding by flood defence measures which provide a 1 in 200 year SoP and the Site has no history of flooding. The Proposed Development is classified as 'highly vulnerable' however, it should be noted that the first floor of the building is already classified as 'highly vulnerable', being of residential use.

Defended Scenario

Flood defences protect the Site from flooding from the River Usk with a SoP of 1 in 200 years. Natural Resources Wales data shows the Site has a very low risk of tidal flooding with a chance of flooding of less than 1 in 1000 (0.1%) years. The Site will not be inundated with floodwater during the defended 1 in 200 year and in 1000 year events. The Site is shown to be flood free during the defended 1 in 1000 year event, the actual flood risk posed to the Site is less than 1 in 1000 years.

It is only when climate change is considered that the area may be inundated with floodwater. The Site may be inundated with floodwater to a maximum depth of 0.38m during the defended 1 in 200 year in 2115 event and to a maximum depth of 0.80m during the defended 1 in 1000 year in 2115 event. During the defended 1 in 200 year in 2124 event the Site may be inundated with floodwater to a maximum depth of 0.45m and during the defended 1 in 1000 year in 2124 event to a maximum depth of 0.87m. However, it is reasonable to assume that the existing flood defences will not only be maintained but will be upgraded in the future to maintain the design SoP i.e. 1 in 200 years.

Undefended Scenario

Natural Resources Wales data shows that the Site will not be inundated with floodwater during the undefended 1 in 200 year and 1 in 1000 year events. The Site is shown to be flood free during the undefended 1 in 1000 year event, the residual flood risk posed to the Site is less than 1 in 1000 years.

It is only when climate change is considered that the area may be inundated with floodwater. The Site may be inundated with floodwater to a maximum depth of 0.72m during the undefended 1 in 200 year in 2115 event and to a maximum depth of 1.37m during the undefended 1 in 1000 year in 2115 event. During the undefended 1 in 200 year in 2124 event the Site may be inundated with floodwater to a maximum depth of 0.79m and during the undefended 1 in 1000 year in 2124 event to a maximum depth of 1.44m. However, it is reasonable to assume that the existing flood defences will not only be maintained but will be upgraded in the future to maintain the design SoP i.e. 1 in 200 years.

Breach Scenario

Natural Resources Wales data shows that the Site will not be inundated with floodwater during the breach 1 in 200 year and 1 in 1000 year events. The Site is shown to be flood free during the breach 1 in 1000 year event, the residual flood risk posed to the Site is less than 1 in 1000 years.

It is only when climate change is considered that the area may be inundated with floodwater. The Site may be inundated with floodwater to a maximum depth of 0.39m during the breach 1 in 200 year in 2115 event and to a maximum depth of 0.81m during the breach 1 in 1000 year in 2115 event. During the breach 1 in 200 year in 2124 event the Site may be inundated with floodwater to a maximum depth of 0.46m and during the breach 1 in 1000 year in 2124 event to a maximum depth of 0.88m. However, it is reasonable to assume that the existing flood defences will not only be maintained but will be upgraded in the future to maintain the design SoP i.e. 1 in 200 years.

Summary

The mechanism for flooding from tidal flooding is generally prolonged episodes of high sea levels, which affords good time for flood warnings to be issued. The likelihood of a rapid water

level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event.

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.

It can be concluded that tidal flooding from the River Usk poses a low risk to the Site. Therefore, the risk of flooding from the River Usk is considered to be of medium significance. A secondary flooding source has been identified which may pose a low significant risk to the Site. This is:

- Surface Water Flooding

The flooding sources will only inundate the Site to a relatively low water depth and water velocity, will only last a short period of time, in very extreme cases and will not have an impact on the whole of the Proposed Development Site. The 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 4.0).

The building is existing and no land raising will occur across the Site and the development will not impede the movement of floodwater across the Site. The Proposed Development will have no impact on the movement of floodwater across the Site.

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. The Site proposals have been shown to be in accordance with A1.12 of TAN15.

Table 8 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	No	None Reported	None
Tidal Flooding	Yes	River Usk	Medium
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low Spots / Poor Permeability	Low
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	No	None Reported	None