

FLOODFLOWLTD

CONSULTING CIVIL AND  
STRUCTURAL ENGINEERS

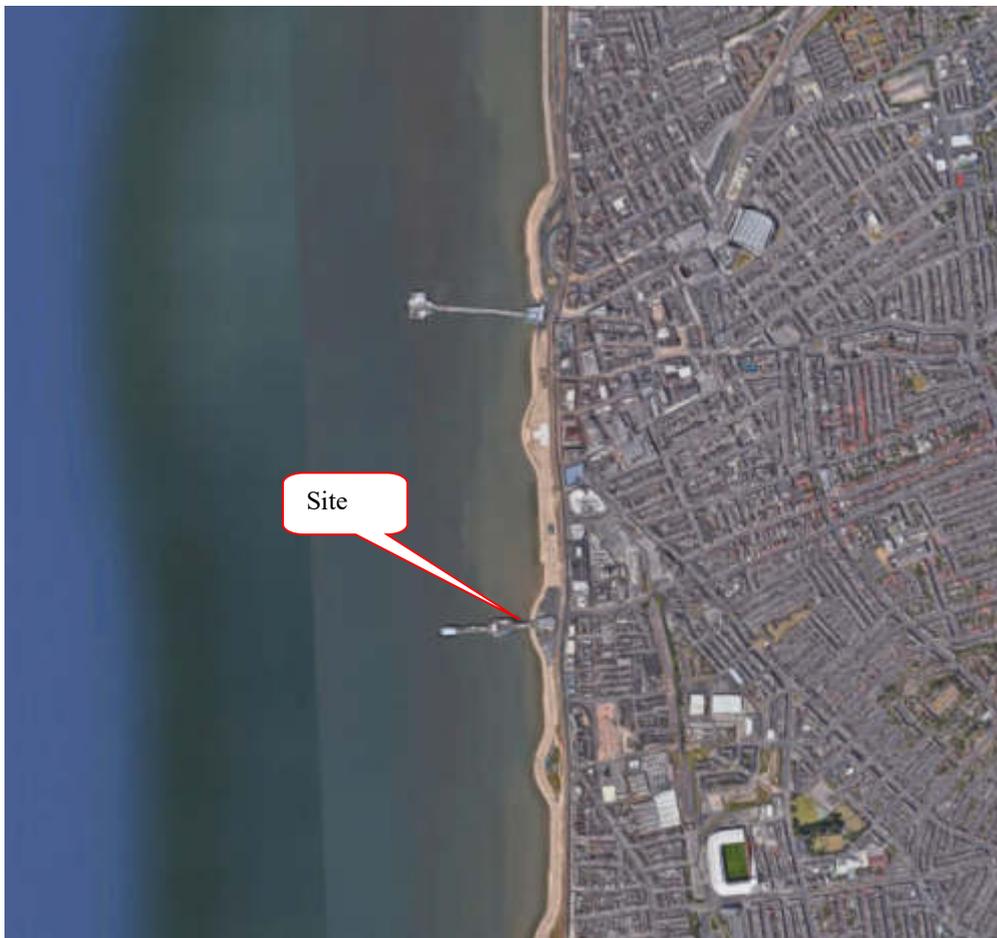
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**Flood Risk Assessment**  
**in accordance with NPPF (Feb 2019)**  
**and**  
**Surface Water Management & Disposal Strategy**  
**for a Proposed Commercial Development**  
**for Central Pier Terrace Bar, Blackpool**



**Project** : 21129  
**Date** : April 2021  
**Engineer** : J. Jones  
**Checked** : A. Jones  
**Issue** : 01



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## Abbreviations

ABD.....	Area Benefitting from Defences
AEP .....	Annual Exceedance Probability
AOD .....	Above Ordnance Datum
ARFQ .....	Advanced Request for Quotation
AStGWF .....	Areas Susceptible to Ground Water Flooding
CDA .....	Critical Drainage Area
EA .....	Environment Agency
FEH .....	Flood Estimation Handbook
FFL.....	Finished Floor Level
FRA .....	Flood Risk Assessment
IH .....	Institute of Hydrology
LIDAR .....	Light Detection And Ranging
NPPF .....	National Planning Policy Framework
PPG .....	Planning Practice Guidance
SFRA .....	Strategic Flood Risk Assessment
SuDS .....	Sustainable Drainage Systems
SWMP .....	Surface Water Management Plan
uFMfSW .....	Updated Flood Map for Surface Water
UU.....	United Utilities



## 0.0 Executive Summary

0.1 Flood Flow Ltd has been instructed to prepare a Flood Risk Assessment and Surface Water Disposal Strategy in support of a planning application for the proposed commercial development of Central Pier Terrace Bar, Blackpool.

0.2 The report has been commissioned to identify any flood related issues associated with the proposed development and any likely constraints that could be imposed. The following issues have been addressed within this report;

- Identify available data relating to flood risk at the site.
- Determine whether the site is at risk from flooding, including from breach or overtopping of any existing flood defences plus the potential risk from surface water, overland, sewer and/or ground water flooding.
- Determine any the current surface water drainage regime and assess any potential increase in surface water runoff as a result of the proposed development.
- Discuss Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk and devise an outline Drainage layout.
- Consider the recommendations of the Blackpool Council Strategic Flood Risk Assessment (SFRA).
- Assess mitigation measures & off-site impacts and define any residual risks.

0.3 The subject site location is illustrated in Appendix A with a site grid reference NGR 330558E, 435485N.

0.4 At present the site is located in a brownfield site, which it is proposed to develop a terrace bar.

0.5 The proposed site covers an area of approximately 0.0391 ha with 100% of this area within tidal Flood Zone 3. The area within Flood Zone 3 is entirely included within an Area Benefitting from Defences (ABD) constructed in 2018. There is no fluvial risk associated with the site and the main risk is tidal.

0.6 The Flood Risk Assessment has been undertaken with information compiled from Environment Agency sources. This assessment has concluded that the proposed development is located within the Flood Zone 3 with flood defences. This means the land is assessed as having a high probability of tidal flooding, which is 1 in 200 (0.5%) or greater. The site is protected by the inclusion of a flood defence wall running along the shoreline, which is maintained by Blackpool Council.



0.7 The site has been shown to be with medium-high risk of flooding from groundwater and therefore further mitigation measures are considered necessary for groundwater for the proposed development.

- 0.8 The assessment has determined the site as Less Vulnerable by NPPF and as it lies within Flood Zone 3, the proposed development is appropriate within this zone.
- 0.9 The proposed drainage and associated works for the development site will have a net improvement to the localised drainage as it imitates the existing localised catchment process whilst allowing more effective management of the system, with additional benefits to some adjacent properties.
- 0.10 The development target has been assessed against the National Planning Policy Framework (NPPF) 'Sequential Test'. Taking into consideration that the application is for development of leisure facilities in Flood Zone 3, a review of Table 3 (Flood Risk Vulnerability and Flood Zone 'Compatibility') has been appraised to confirm that this is an appropriate type of development and therefore an Exception Test is not required.
- 0.11 The peak storm water runoff rate from the development to the adjacent Public surface water sewer or ultimately Irish Sea will be in line with the agreed existing runoff rates for the site with a minimum flow of 5.0 l/s to comply with best practice. In light of this there is no residual flood risk from the redevelopment site to the surrounding district.
- 0.12 Foul water generated by the development will discharge to the United Utilities public sewer.
- 0.13 During the extreme flood events a safe dry access route is assured to the east of the development site. Safe access for the Emergency Services and egress for the occupiers is assured for higher order storm events up to and including the 200-year event.



## **1.0 Policy and Guidance**

### **1.1 National Planning Policy Framework and Technical Guidance**

The National Planning Policy Framework (NPPF) was published in England in February 2019. As a result, all previous Planning Policy Guidance (PPG) and Planning Policy Statements (PPS) were superseded. This included PPS25: Development and Flood Risk. One of the key aims of the NPPF 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 directing development away from areas of high risk. It advises that where development is necessary in areas of higher risk, it should be safe and that flood resilience should also be incorporated into the design. It also advises of the fact that new developments should not increase flood risk elsewhere and new development should aid in mitigating flood risk to the wide area.

### **1.2 Planning Practice Guidance – Climate Change, Flood Risk & Coastal Change**

The NPPF is also accompanied by a Technical Guidance document which borrows heavily from the superseded PPS 25 document with regards to:

- Climate change uplift
- Usage classification
- Flood zone categories
- Flood zone / Usage Compatibility
- The sequential test
- The exception test

### **1.3 Blackpool Council Strategic Flood Risk Assessment (SFRA)**

Local Planning Authorities are required to produce Local Development Frameworks, which are a portfolio of Local Development Documents that collectively deliver the spatial planning strategy. Blackpool Council Level 1 SFRA is one of these documents and it assesses the risks associated with all types of flooding and is used to identify the amount and types of suitable development permitted in an area.

The principal purpose of an SFRA is to refine the information available on the probability of flooding, taking other sources of flooding and the currently understood impacts of climate change into account. This SFRA presents additional information on the probability and consequences of flooding and, where the information is available, this SFRA takes the presence of flood defences into account and the effect that they have on river and tidal flooding by presenting information on the depth, velocity and time of inundation of flooding.

A summary of the main elements from the SFRA associated with the development sites are detailed below. The full report can be obtained from the Blackpool Council website. Flood risk overview drawing from the SFRA can be found in Appendix C.

- SFRA provides a detailed understanding of flood risks across the Blackpool area from all sources.
- SFRA Flood Risk Management Maps indicate that the site is not at risk of fluvial flooding.
- No sewer flooding has been identified at the site.



- The EA Areas Susceptible to Ground Water Flooding (AStGWF) map indicates that the site is located within an area considered to be susceptible to groundwater emergence, mainly due to permeable superficial (drift) deposits along the coast.
- Reservoir inundation mapping from the SFRA indicates that the site is not at risk from uncontrolled releases from reservoirs.
- Development should be designed so that there is no flooding to the development in a 1 in 30 year event and so that there is no property flooding in a 1 in 100 year plus climate change event. Where possible SuDS should be implemented.

## 1.4 CIRIA Guidance

### C624 Development and Flood Risk

The CIRIA Guidance publication “C624 Development and Flood Risk – Guidance for the Construction Industry” defines 3 levels of FRA, which can be undertaken:

- Level 1 – Screening Study
- Level 2 – Scoping Study
- Level 3 – Detailed Study

For this proposed development a Level 2 Scoping Study Flood Risk Assessment (FRA) is considered appropriate.

## 1.5 C753 The SuDS Manual

This document provides best practice guidance on the planning, design, construction, operation and maintenance of sustainable drainage systems (SuDS). This document provides details on all the typical sustainable drainage systems and details on how they can be interconnected to not only provide the required drainage performance but to also act as pollution control while enhancing the site wide Masterplan proposals.

On this site where the ground conditions have been reviewed, it has been ascertained that the use of infiltration as a method of disposal of surface water is likely to be appropriate. This is due to the permeability of sand sitting just beneath the surface. The next alternative to infiltration is to drain to a watercourse; there is the Irish Sea to the east of the proposed development and can be considered as a viable alternative without substantial cost and land agreement/ acquisitions. The statement above is based on Environment Agency online information and the British Geological Society (BGS) online information.

## 1.6 Sustainable Drainage Systems, Non-Statutory Technical Standards

Within this document, it is defined how the surface water discharge rates from the development should be derived and provides desirable discharge rates based on storm events. Peak flow rates and volume controls are discussed, and consideration needs to be given within the design of the surface water system to ensure that both peak flows and volumes do not exceed that of the predevelopment case.



## **1.7 Reservoir Act 1975**

The site will be limited to and will not exceed the existing discharge rate and will therefore require attenuation. The attenuation proposals will limit storage volumes to below 10000 cubic metres so as to ensure that the requirement of the Reservoir Act 1975 and subsequent amendments are not applicable.

## **1.8 Statutory Authority Correspondence**

No specific meeting has been held with the statutory Authorities. However, discussions have taken place with the Environment Agency, Development & Flood Risk Engineer;

- Site located in Flood Zone 3a and therefore an FRA is required.
- The FRA should be appropriate to the nature and scale of the proposed development.
- Sequential test and Exception test to be considered in Paragraph 3.5.
- FRA to demonstrate site not at risk of flooding from the Q100 + CC event not contribute to surface water flooding.
- Existing flood defences to be maintained.

## 2.0 Existing Site Description and Location

- 2.1 The site for which the FRA has been commissioned is located in Blackpool, adjacent to central pier and is brownfield land with a total site area of 0.0391 Ha, see Appendix A. The development site grid reference used is NGR 330558E, 435485N. Site photographs are contained within Appendix I.
- 2.2 The main access to the site is via existing entrance and exit off the Promenade. The site is bounded by the Promenade to the east and the Irish Sea to the west.
- 2.4 General topography has ground generally falling in the western tarmacked area towards the flood defences. The tidal flood defences to the east are raised up to circa 6.70m AOD approx.
- 2.5 Reference to the extract of the online Gov.uk flood risk map – see below - confirms the site is within an area classified at Flood Zone 3 – high Probability, representative of land having greater than 1 in 200 (0.5% annual exceedance probability - AEP) of sea flooding.

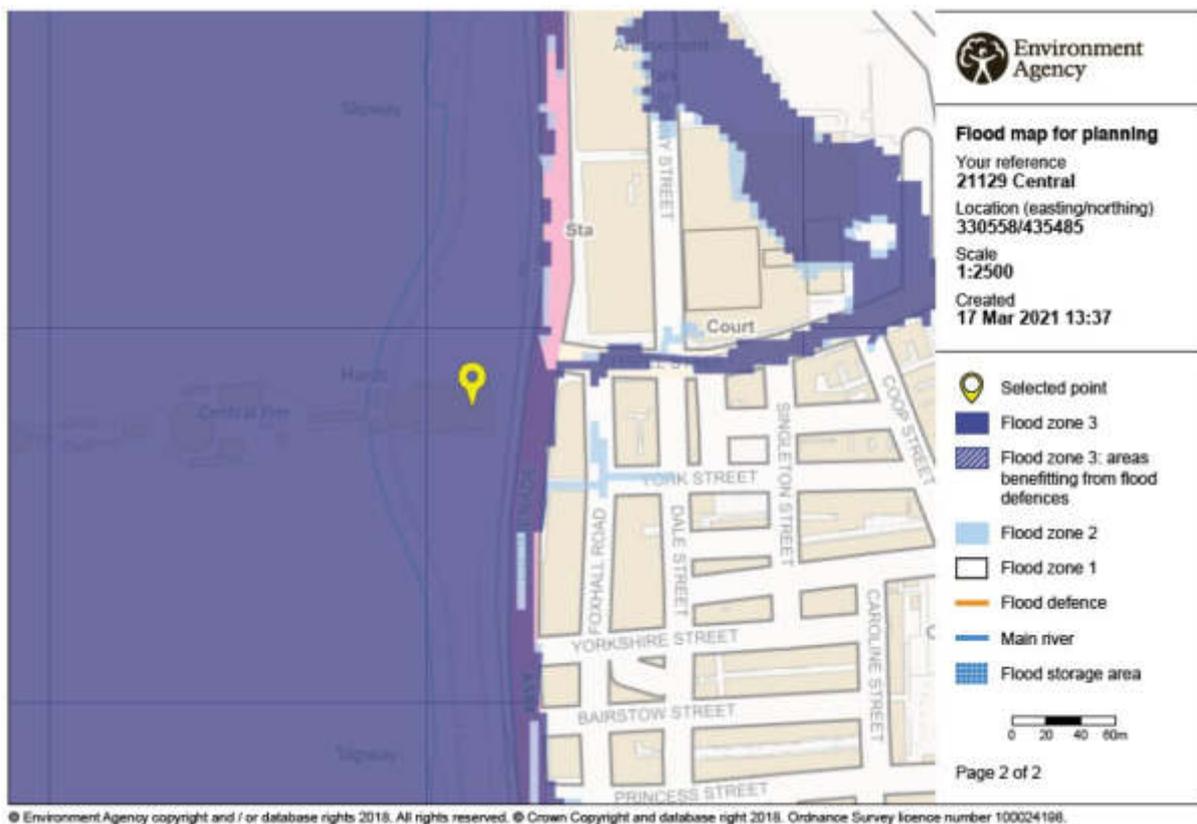


Figure 2.5 - EA Flood Map for Planning

- 2.6 Reference to the online British Geological Survey Online Viewer – extract below - confirms the site underlying bedrock is Singleton Mudstone Member – Mudstone, whilst the superficial deposits comprise Blown Sand - Sand. The Cranfield University Soilscapes online viewer indicates that the local ground is, *“Sand dune soils”- freely draining soils which absorb rainfall readily and allow it to drain through to underlying layers.*

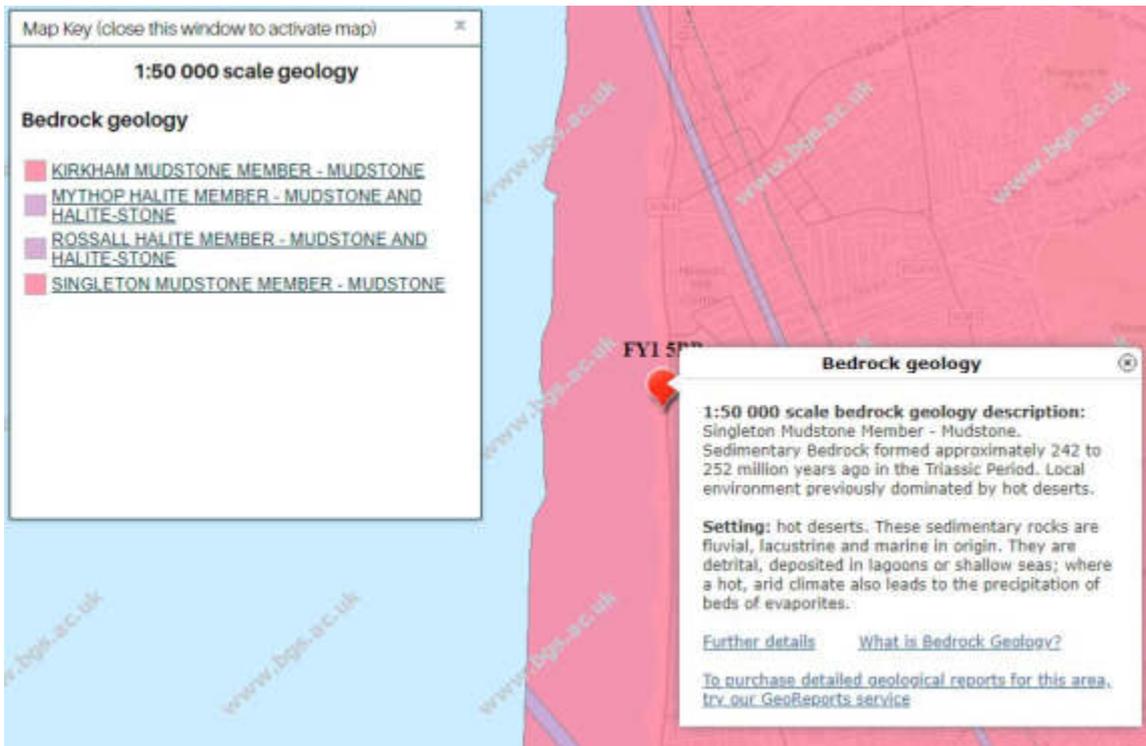


Figure 2.6A - BGS Bedrock Geology

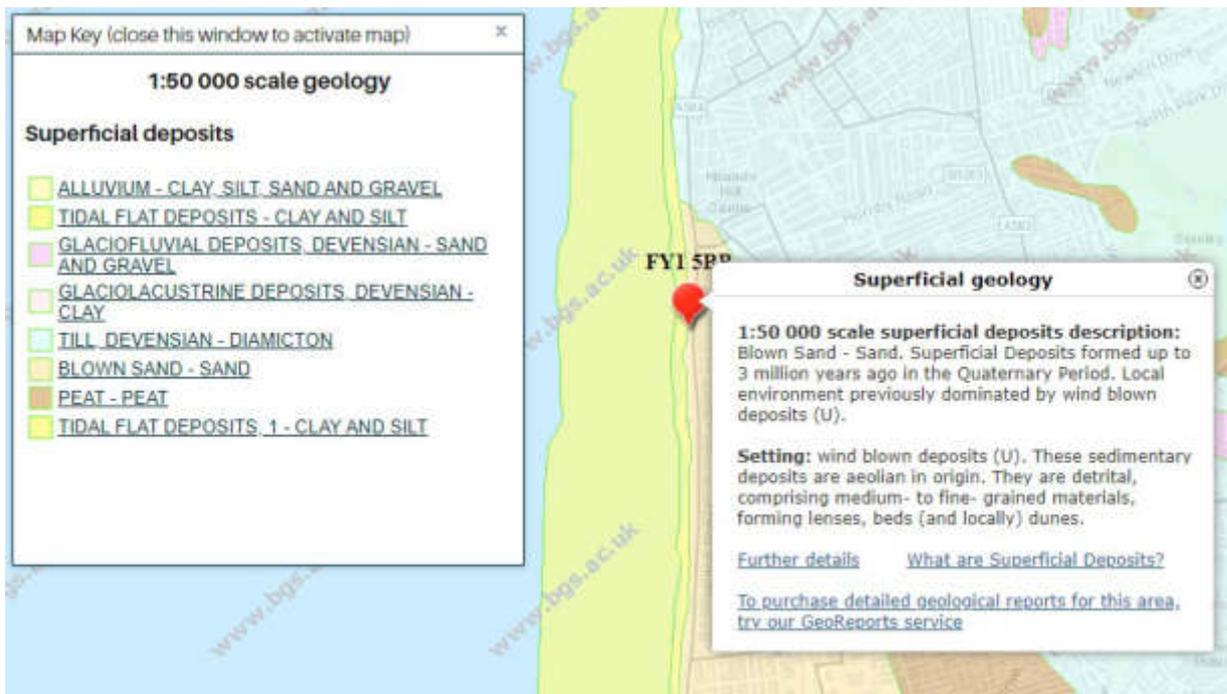


Figure 2.6B - BGS Superficial Geology

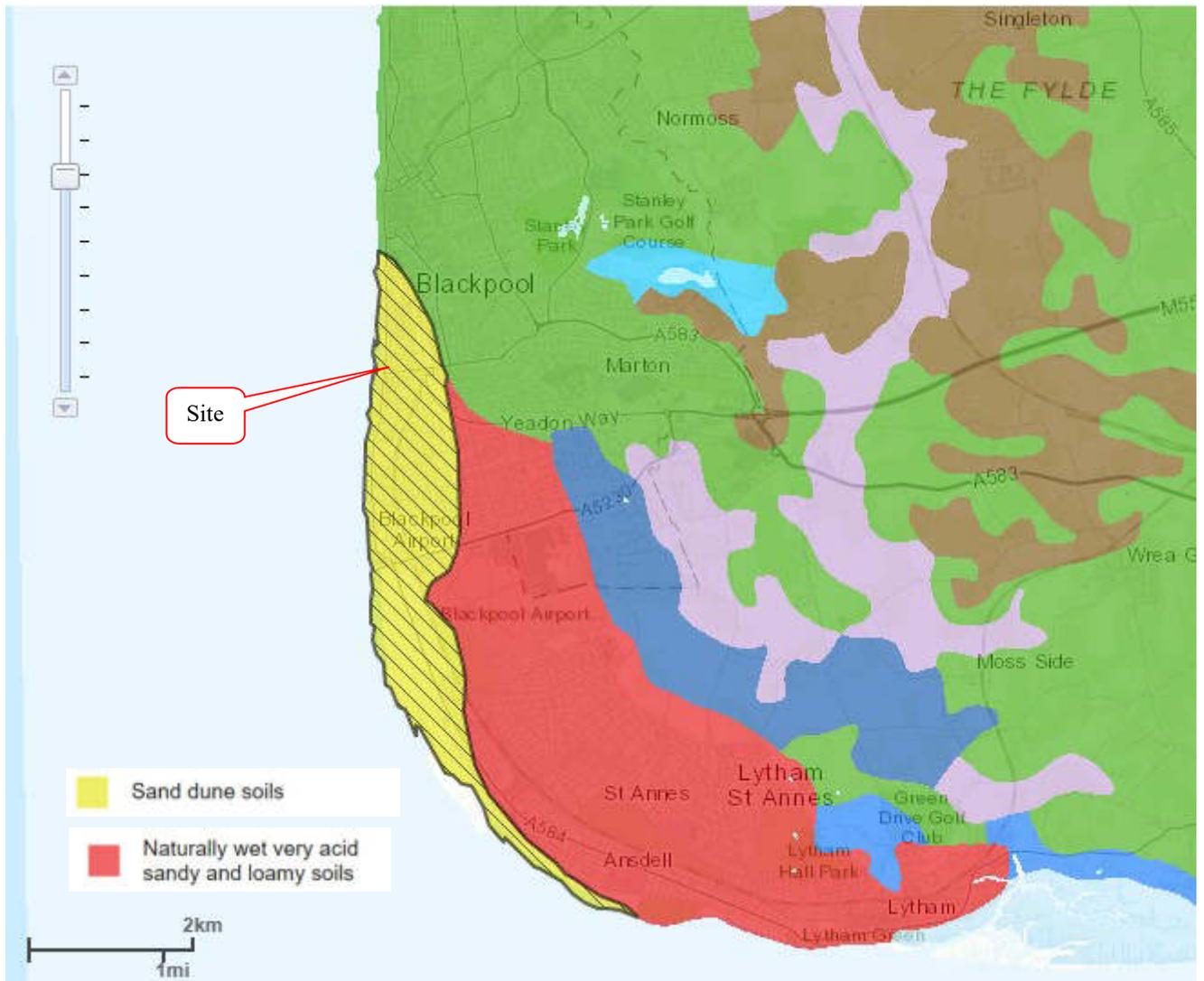


Figure 2.6C - Cranfield University Soilscape Map

- 2.7 Reference to Magic online mapping shows that a small part of the site lies within a groundwater medium-high risk zone and the majority within the medium risk zone. It also lies in an area of a secondary aquifer.



Figure 2.7A Aquifer Designation Map

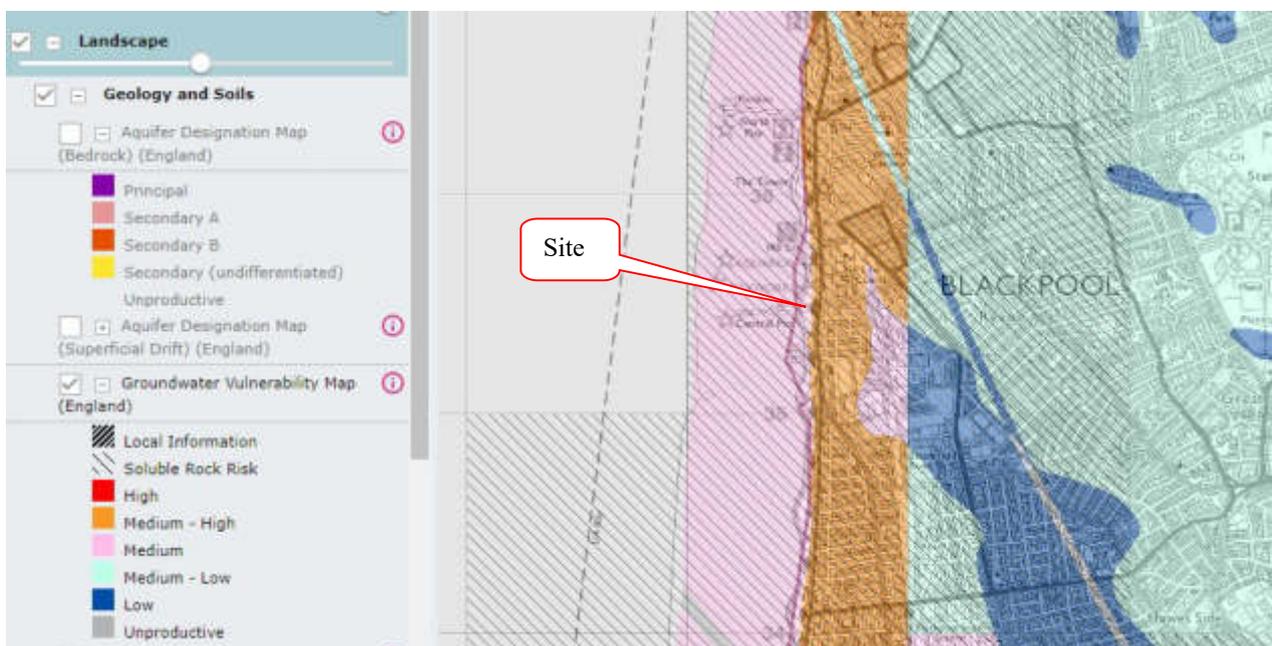


Figure 2.7B Groundwater Vulnerability Map

- 2.8 The existing impermeable drained area is significant and drains naturally towards the flood defences. It is proposed not to exceed the existing discharge rate.
- 2.9 Theoretical greenfield run-off from the total site area can be estimated by Micro-Drainage software using the methods set out in IH124 and Interim Code of Practice for SuDS (ICP SuDS) system together with the greenfield Run-off Volume method. Rates are significantly lower than the brownfield rates and therefore the calculation was not carried out.

The site is considered brownfield and higher discharge rates are likely but would have to be proven to be entering the public sewer surface water network or the Irish Sea and a discharge rate of 5 l/s is likely to be acceptable to the approving authorities.

- 2.9 There are public sewers recorded within the immediate vicinity of the proposed development. The records are contained on the proposed drainage layout in Appendix F and the original copy included in Appendix B.
- 2.10 The site lies within the planning authority of Blackpool Council, which is also the Lead Local Flood Authority.



### **3.0 Development Proposals**

- 3.1 This report has been prepared to support an outline planning application for a proposed commercial development encompassing the construction of a terrace bar.
- 3.2 The current outline Architectural site plan as indicated in Appendix A provides an indication of the proposed development within the site.
- 3.3 Finished floor levels will be discussed later in the report.
- 3.4 At present the site is in an urban location containing existing brownfield land – tarmac paved area.
- 3.5 The total existing development site area is 0.0391 ha and the proposed development is 100% impermeable.
- The proposed drainage layout is included in Appendix F.
- 3.6 The existing primary access to the site is from Promenade.
- 3.7 With development elements classified as non-residential, it is considered the development falls within the “Less Vulnerable” flood risk classification as defined in Table 2 of the Guidance below.

#### **Less vulnerable**

- Police, ambulance and fire stations which are *not* required to be operational during flooding.
- Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in “more vulnerable”, and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do *not* need to remain operational during times of flood.
- Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place).

*Figure 3.4 - Table 2 (NPPF Technical Guidance): Flood risk vulnerability classification*

### 3.8 Sequential Test

Under the requirements of PPG “Flood Risk and Coastal Change”, the local authority is required to apply a risk based sequential test to new developments. This allows the local authority to direct development to areas which are at the lowest probability of flooding.

As this development falls within Flood Zone 3 and less vulnerable, in accordance with Table 3 of the Guidance shown below, the proposed development is appropriate and therefore a sequential and exceptions test is not required.

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	*	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	*	*	*

*Figure 3.5 - Table 3 (NPPF Technical Guidance): Flood risk vulnerability and flood zone `compatibility`*

### 3.9 Exception Test

In accordance with Table 3 of the NPPF Technical Guidance an exceptions test is not required for the proposed development.

### 3.10 Development and Flood Risk

Table 1 of the NPPF Technical Guidance states that for development proposals sited in Flood Zone 3 comprising of less than one hectare, the vulnerability to flooding from other sources and the effect of the new development on surface water runoff are incorporated in the Flood Risk Assessment.

## **4.0 Definition of Flood Hazard**

4.1.1 Reference has been made to: -

- Environment Agency (EA) online data.
- EA River Wyre Catchment Flood Management Plan December 2009 (CFMP)
- EA Adapting to Climate Change
- Blackpool Council Strategic Flood Risk Assessment – November 2014 (SFRA)
- Blackpool & Fylde Coast protection Strategy – January 2011
- Local Flood Risk Management Strategy for Lancashire 2011 - 2027
- British Geological Survey online data.

4.1.2 The NPPF (2019) requires the developer to consider the impact of runoff generated by the proposed development onto the downstream catchment, and to assess the risk of runoff from the surrounding district impacting on the development's footprint. Further, the report is to consider flood risk from all other sources. The following section defines the flood risk receptors and anticipated flood risk. Section 4 then discusses in further the probability of flooding and the likely impacts.

### **4.2 Flooding from Sewers and Drains**

4.2.1 The site could be at risk of flooding caused by local sewers that are blocked or have insufficient capacity.

4.2.2 The United Utilities (UU) sewer records have been reviewed and confirm that there are a number of public water sewers in main access road to the south of the development site. Plans of the records are located in Appendix C and summarised below:

Foul Water Sewers: There is a 2850mm diameter concrete combined water sewer in the Promenade flowing in a northerly direction.

Surface Water Sewers: There are surface water public sewers in the Esplanade road discharging in a northerly direction.

4.2.3 The extensive UU adopted drainage network serving the surrounding urban district ensures that that part of the development footprint is protected from the impact of both upstream and downstream runoff. It is speculated that complete protection may well exist beyond a storm event equivalent to the 30-year statistical event. Beyond this projection, there may be a small degree of peripheral 'Exceedance' flooding within the highway areas above the sewers. However, this is expected to be localised and restricted to the location of specific manhole covers located outside the development footprint. Thus flood risk to the site from sewers is diminished to acceptable levels.

4.2.4 The site is not situated within a locally-designated Critical Drainage Area (CDA) defined through the CFMP 2009 and SFRA 2014. It should also be noted that no uFMfSW flood depth data has been provided by Blackpool Council at this stage.



### **4.3 Flooding from Rivers (Fluvial Flood Risk)**

4.3.1 The source of flood zones 3 is entirely tidal with no risk from fluvial flooding from Main River or Ordinary Watercourses.

### **4.4 Groundwater Flooding**

4.4.1 Long term flood risk assessment indicates that there is no risk to site from groundwater flooding. However, groundwater vulnerability map (Figure 2.7B) is generally indicated as medium risk with a small part in the medium-high risk zone.

4.4.2 No specific Phase 1 desk top study or Phase 2 intrusive site investigation has been carried out to date at the site. The BGS maps indicate superficial deposits of Blown Sand over bedrock of Mudstone. It is speculated however that due to the close proximity of the sea the ground water levels will not pose a flood risk.

4.4.3 The Strategic Flood Risk Assessment for Blackpool Council SFRA would indicate that no groundwater flooding has been experienced in the locality of the development site. However, it also states that some areas of Blackpool also have problems with high groundwater and so it is important that new development does not increase the water table in adjacent areas by preventing drainage or by incorporating inappropriate infiltration SuDs.

### **4.5 Flooding from Land (Overland Flow)**

4.5.1 Any increase in impermeable areas within the development site will increase the risk of overland flooding. The current proposal does not increase the flow rate from the existing flow rate and therefore does not increase the existing flood risk of overland flows.

4.5.2 The surrounding roads and properties generally hold a flat level. The main risk of overland flows relates to any water heading into the site from the new access off the Promenade, and the development site has a slightly elevated level reducing the potential impact of overland flows. As discussed in section 4.2, the surrounding sewers and highway drains should protect the site from overland flood flow ingress and only for the more extreme events could there be a risk. However, as the new buildings will be raised the risk is mitigated.

### **4.6 Flooding from the Sea (Tidal Flood Risk)**

4.6.1 The EA maps suggest the development site could lie within periphery of the current statistical tidal floodwater model footprint generated by the tidal sea levels for the 200 year or greater flood event (>0.5% Annual Exceedance Probability (AEP)), i.e. Flood Zone 3. The long term flood risk data in Appendix E contradicts this, however, it is likely the EA data has not been updated with the result post construction of flood defences in 2018.

4.6.2 The following, Figure 4.3, extract from the EA's Indicative Tidal Flood Levels Map for the development zone details. The information supplied shows where flooding could occur with flood defences.





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Figure 4.3 - EA Tidal Flood Mapping

- 4.6.3 As identified in Section 3, the flood risk vulnerability classification for this development is 'Less Vulnerable'. Planning Practice Guidance Table 34 states that 'Less Vulnerable' development, and therefore the proposed leisure Terrace Bar, is appropriate in Flood Zones 3.
- 4.6.3 The site is currently protected by a man-made sea defence wall, according to the EA defence data, though the site is at risk of overtopping or breaching of coastal flood defences when accounting for the effects of climate change. According to the SFRA, however, there is no information on the consequences of any failure of these new flood defences, therefore residual tidal risk cannot be assessed as part of this FRA. The EA should be asked to review this as they may have additional investigations for this site before they agree to any development.
- 4.6.4 The EA Flood Map for Planning was created on the 17<sup>th</sup> March 2021 (Appendix D) and reveals much greater risk from Flood Zone 3. The EA Tidal Flood maps indicate that sea level rise at the seafront could rise from a current level of 6.26 m AOD for the 1 in 200 AEP event to 6.63 m AOD when accounting for climate change.
- 4.6.5 The area of Flood Zone 3 outline suggests that this site is wholly protected against a 1 in 200 AEP tidal event. New flood defences have been constructed in 2018. This does not however account for possible defence breach or failure. The defences were recently constructed, therefore, good condition and well maintained by Blackpool Council.

4.6.6 Modelled tidal or breach model outputs have not been made available for this FRA at this stage.

#### **4.7 Flooding from Drainage Infrastructure Failure**

4.7.1 The site could be at risk of flooding caused by failure of local infrastructure such as mains water pipes or failure of other local industrial and historical processes.

4.7.2 The site could be at risk of flooding caused by site drainage or failing culverts which are not properly maintained, or which are subjected to flows greater than those for which it was designed.

#### **4.8 Flooding from Other Sources**

4.8.1 The site could be at risk of flooding caused by flooding from highway infrastructure and local ordinary watercourses.

4.8.2 There are no other bodies of water, such as ponds, reservoirs or canals located within the vicinity of the site. The flood risk from artificial sources is therefore negligible.



## 5.0 Probability of Flooding

- 5.1 A site classified within Environment Agency Flood Zone 3 – High Probability, representative of land having greater than 1 in 100 (>1.0% annual exceedance probability - AEP) of river flooding or 1 in 200 (>0.5% annual exceedance probability) of sea flooding in any year. This is related to flood risk from the Irish Sea.
- 5.2 There is mention in the SFRA to flooding events associated with the River Wyre but not specifically to the proposed development site.
- 5.3 Reference to the online Environment Agency surface water flood risk map (See Figure 5.3 A to C) indicates that a section of the site has a low risk of surface water flooding. The Irish Sea is located to the west of the site.



Figure 5.3A - Flood Risk from Surface Water - Extent of Flooding

- 5.4 The carriageway at the Promenade does benefit from highway drainage (i.e. gully and pipe network) and is likely to be a contributing factor to the surface water flooding.
- 5.5 Whilst the level at which groundwater occurs is subject to seasonal and other variations, there is no visible evidence of groundwater issues on site.
- 5.6 Any new infrastructure water mains will be designed and installed to current standards thereby presenting only low risk of flooding due catastrophic failure of the pipe network.

- 5.7 There are no other local industry activities identified, whose infrastructure failure could cause flooding on site. The EA long term risk assessment in Appendix E for The Reservoir Flooding does not indicate that there is a risk from reservoir flooding. Reservoirs represent a risk to the surrounding area should the embankments fail or be overtopped. As stated on the Environment Agency website, reservoirs have a good safety record with no incidents resulting in the loss of life since 1925. The Environment Agency, enforcing authority for the Reservoir Act 1974 in England and Wales, specifies that all large reservoirs must be inspected and supervised by reservoir panel engineers. The Environment Agency ensures that reservoirs are regularly inspected and essential safety work carried out. Given the high standard of maintenance required, flooding for the reservoirs is considered unlikely.
- 5.8 The development site (0.0391 ha) will have a potential gross drained area of approximately 391m<sup>2</sup> including roofs and other paved areas and the runoff rate will not exceed that of the existing. On that basis, the risk of overland surface water flooding will not be increased and mitigation measures are not required.
- 5.9 A properly designed and maintained site drainage system will meet the requirements of the sewerage provider in that the pipelines will not flood at the critical 30 year (3.33%) rainfall event. NPPF requires that all exceedance flows either infiltrate to ground or are contained safely on site or within underground storage, or such that there will be no risk of flooding of vulnerable or critical areas on site and there will only be low risk of flows from the site causing flooding to other nearby areas.
- 5.10 The online Environment Agency surface water flood risk map for depth – see below – indicates that the current arrangement of the site is low risk.
- 5.11 The site is within an area where there has been historic flooding and further mapping has been obtained from the Environment Agency (EA). This is included as Appendix C and the mapping details the following;
- Flood Zones Map
  - Flood History Maps
  - Tidal Flood Levels Map – Tidal Defended 0.5%
  - Tidal Flood Levels Map – Tidal Defended 0.5% + CC (+370mm SLR)
  - Tidal Flood Levels Map – Tidal Defended 0.5% + CC (+970mm SLR)
  - Tidal Flood Levels Map – Tidal Defended 0.1%
  - Tidal Flood Levels Map – Tidal undefended 0.5%
  - Tidal Flood Levels Map – Tidal undefended 0.5% + CC (+370mm SLR)
  - Tidal Flood Levels Map – Tidal undefended 0.5% + CC (+970mm SLR)
  - Tidal Flood Levels Map – Tidal undefended 0.1%

This information has been taken into account when setting the finished floor level for the proposed buildings and in identifying the flood protection measures to be implemented in the conversion works.

#### 5.12 Tidal Flood Risk Assessment

- 5.12.1 It is evident from the EA flood zones map that the cause of any potential flooding to the site can be attributed to the Irish Sea.
- 5.12.2 As discussed in previous sections, the EA has suggested the development site does not lie within the current statistical tidal floodwater model footprint generated for Irish Sea during the 200 year flood



event (0.5% probability of occurrence) and the development is only susceptible within a 1 in 200 plus climate change (+970mm SLR).

5.12.4 The findings of the study can be found in Appendix C.

<b>Return Period</b>	<b>Peak Flood Level (CL202337)</b>
200yr (Undefended)	6.25
200yr (Defended)	6.26
200yr + CC (+370mm SLR Undefended)	6.61
200yr + CC (+370mm SLR Defended)	6.63
200yr + CC (+970mm SLR Undefended)	7.21
200yr + CC (+970mm SLR Defended)	7.22
1000yr (Undefended)	6.49
1000yr (Defended)	6.51

5.12.5 Superimposing the defended 200 year + CC floodwater levels onto the LiDAR levels model has determined that the magnitude of the Irish Sea flooding will not extend into the development site due to the raised flood defences along the sea front.

5.12.6 In order to mitigate the risk of flooding to the development the EA have suggested that a freeboard of 600mm be placed above the 200 year + CC (6.63mAOD) tidal peak flood level. Thus, the finished floor level for the development would be set at 7.23mAOD. However, this FFL is to be agreed with the EA.

5.12.7 In light of this the tidal flood risk to the proposed development is reduced to acceptable levels.

5.13 It is understood that the existing site is drained to drains which outfall into the established public sewer system. United Utilities records have been checked and there are foul and surface water sewers adjacent to the proposed development.





Figure 5.13B - Flood Risk from Surface Water – Low Risk: Depth

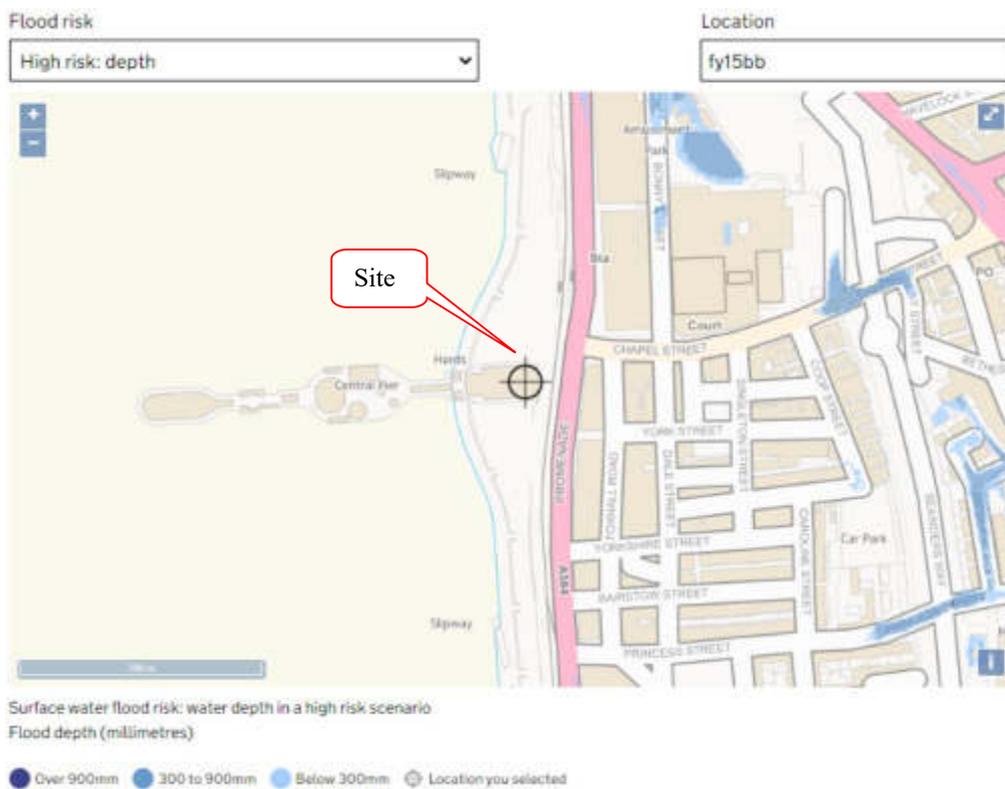


Figure 5.13C - Flood Risk from Surface Water – High Risk: Depth

## **6.0 Historical Flooding**

- 6.1 There are 2 recorded flood incidents to the east of the site on the 01/02/2002 and 05/12/2013, however, both incidents did not affect the area of the proposed site and were pre flood defence scheme. This is based on DG5 data received from United Utilities. The Blackpool Strategic Flood Risk Assessment (SFRA) does not have any details of flood history at the allocation site.



## 7.0 **Breach and Overtopping of Flood Defences**

- 7.1 Land intended for development behind flood defences is at risk due to the possibility of breaching or overtopping of those defences and the consequential onset of fast flowing and deep-water flooding with little or no warning.
- 7.2 The level of risk generally relates to the distance and the relative elevation of the land in relation to the form of the water source (i.e. whether it is due to a breach, overtopping or wave action).
- 7.3 A breach scenario is the worst form of a flood event during which, a portion of the existing defence fails, permitting large quantities of flood water to pass through and the form of failure depends on a large number of factors including the material composition and condition of the defence.
- 7.4 DEFRA under their Research and Development Technical Report FD2320/TR2 – Flood Risk Assessment Guidance for New Development in Section 12. S3.2 sets out the parameters regarding “Risk to People Behind Defences”. This document includes a summary table of Danger for Different Combinations of Depth and Velocity. Combinations of flood depth not greater than 0.25 metres and velocities of below 0.5m/s would generally be considered a low hazard.
- 7.5 For the land under consideration, whilst it is in close proximity to Irish Sea, there is no significant flooding indicated on the maps for the defended 1 in 200 and 1 in 1000 year events, provided by Environment Agency.
- 7.6 Section 12.6.2 of the above DEFRA document advises that a classification of “danger to people” should be viewed subjectively and should not be used to refuse development, particularly if it is possible to provide mitigation in order to reduce the residual risk to acceptable levels.

### ***Consideration for Overtopping of Flood Defences***

- 7.7 The flood defences for Irish Sea are sufficient to provide a protection for the 0.5% AEP event (1:200 year), and 0.1% (1:1000 year).
- 7.8 Online reports advise that the “With Defences” surface water modelling results indicated that the risk from large scale surface water overtopping in the study area as low, however, it is always possible that intermittently sea levels may rise above the flood defences and thus overtop them.
- 7.9 On review of the EA Historical Flooding Maps for the Sea (Appendix C) it is clear that even in the undefended scenario the proposed building will not be affected based on the proposed finished floor level. However, climate change must be considered a possibility.
- 7.10 On review of the Shoreline Management Plan, Blackpool is managed under Sub-cell 11b. This area is discussed in great detail, in particular providing adequately well-maintained flood defences.
- 7.11 The proposed development has suffered flooding prior to the Flood Alleviation Scheme, the generation of surface water from any proposed development would be wholly insignificant in relation to the potential from flooding due to a breach of the defences. It is considered that all of the flood waters would be contained within the low lying land to the western side of the development and



consequently reiterates the fact that the land is unaffected due to the existing flood defences.

## **8.0 Climate Change**

- 8.1 It is anticipated that Climate Change will bring about an increase in rainfall intensities in the future.
- 8.2 Most recent Environment Agency guidance on climate change allowances is dated July 2020 and is called Flood and Coastal Risk Projects, Schemes and strategies: Climate Change Allowances.
- 8.3 With an estimated design life not exceeding 100 years for commercial development, any necessary on-site designs for drainage, soakaways or other sustainable disposal methods limiting surface water disposal flows will incorporate rainfall intensities that have been increased by 20% to 40% (depending upon the sensitivity of the location) to take account of the effects of climate change up until the year 2121.
- 8.4 From Table 4 of the ACC it is anticipated that for this site a mid Estimate Level increase of 30% over the life of the development will be appropriate and has been adopted by Blackpool Council.



## 9.0 Surface Water Management Strategy and Disposal Design Criteria

- 9.1 The development land is currently draining to the public sewer network. The hierarchical approach to dealing with surface water requires that consideration be first given to discharging to ground.
- 9.2 At this stage investigations have yet to be undertaken on site to establish the potential for disposal of surface water via infiltration. However, based on the indicators from information on BGS website, the superficial deposits at the site comprise Blown Sand - Sand overlying mudstone bedrock. This is supported by the Cranfield University Soilscape online viewer, which indicates that the local ground is, *Sand dune soils”- freely draining soils which absorb rainfall readily and allow it to drain through to underlying layers*. Infiltration techniques are considered possible but further investigation is required to confirm that this is the case. Therefore, a fully attenuated surface water system has been appraised at this outline planning stage.
- 9.3 Notwithstanding the BGS and Soilscape mapping, percolation tests will be undertaken at the site to confirm whether soakaways are feasible. However, for the purposes of this assessment it is assumed that the use of soakaways for the discharge of surface water would not be feasible.
- 9.4 If the percolation tests indicate that infiltration techniques are not feasible, it is proposed that the proposed arrangement of discharging surface water to existing sewer network is maintained.
- 9.5 Climate change for a development of this nature is based on the design life and whether the development will still be operational after the year 2085. If the design life assumes that the development will not be functioning after 2085, then a climate change allowance of 20% should be added to the 1 in 100yr storm event. If it is believed that the development will continue to function after 2085 then a 40% climate change should be added to the 1 in 100yr storm event.
- 9.6 When combining the restrictions on outflows and the performance requirement for the network attenuation will be required. This can take a number of forms, for a development of this nature and it is likely to be a combination of the following:
- Oversized pipes.
  - Plastic crate storage (Aquacell or similar approved) – surface water positively drained using either kerb and gullies or a linear drainage system.
  - Filter strips - These aid in the treatment of surface water run-off and form part of the design of the swales. The typical width of a filter strip is 6m and the maximum slope should be 1 in 20.
  - Pervious Pavement – These are suited to car parking areas and in this case the water can be stored within the 30% void sub-base. The sub-base will be connected to the site wide drainage network via perforated pipes.
- 9.7 Attenuation for the development has been calculated using the brownfield runoff rate estimated at 5l/s. Where practical the paved areas would be controlled at source using permeable paving products, which will mimic the existing surface water flow/ infiltration. Events exceeding the 1 in 100 year plus climate change (40%) within these areas will be permitted to discharge into the surrounding area and directed away from the proposed building structure. Attenuation has been estimated at between 4.4m<sup>3</sup> and 10m<sup>3</sup>.
- 9.8 The above strategy will be initially passed to the United Utilities for review and will be subsequently passed to Blackpool Council in their role as Lead Flood Authority.



- 9.9 A copy of the runoff calculations and attenuation calculations for the site is provided in Appendix G and H respectively.

### **Sustainable Drainage Systems**

SuDS Objectives:

- 9.10 Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

SuDS's Design Themes.

- 9.11 A strong design theme is essential if the maximum aesthetic benefits are to be gained from the SuDS approach. At a more local scale the SUDS should link with the individuals plot structure, planting, public open space requirements and amenity areas, gaining multiple benefits from a limited area of land.

The SuDS Management Train

- 9.12 The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

1. Prevention – The use of good site design and housekeeping measures to prevent runoff and pollution and includes the use of rainwater reuse / harvesting.
2. Source Controls – Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
3. Site Control – Management of water in a local area and can include below ground storage / attenuation, detention basins, large infiltration devices.
4. Regional Control – Management of water from a site or various sites and can include wetlands and balancing ponds.

The drainage techniques for this development will seek to include where possible Prevention, Source Control and Site Control measures.

## SuDS Site Constraints

- 9.13 SuDS techniques are suitable for all sites; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.
- Land Use Characteristics: The significant size and type of development plot enables the full range of source control and site control SuDS devices to be considered both above and below ground.
  - Site Characteristics: No intrusive Phase 2 site investigation has been carried out to date. However local information would indicate that infiltration techniques may be possible.
- 9.14 Catchment Characteristics: The site is currently ‘Brownfield’ and the discharge rate from the site will be confirmed by United Utilities in due course. At this time we are assuming that they can be no greater than existing rates. Environmental and Amenity Performance: The inclusion of SuDS within the overall development is a key driver in providing both amenity and habitat creation. Safety to all future visitors of the site is paramount and so best practice guidance will be incorporated so that these devices blend into the surrounding without the need for significant safety precautions. Maintenance plans will be prepared for all SuDS devices that are included.

## SuDS Design Philosophy

- 9.15 The SuDS philosophy for the development site is the promotion of Prevention, Source Control and Site Control techniques with restriction in discharge rates to below predevelopment rates to reduce the risk of both site and downstream flooding.
- 9.16 The following design philosophy is proposed:
- Surface water treatment using the ‘Management Train’ approach to remove and isolate contamination at all SuDS facilities prior to conveyance to the ground or adjacent ditch network.
  - Restrict new development runoff peak flow rates to below pre-development rates.
  - Prevention measures by the inclusion of water butts and rainwater harvesting.
  - Source Control by the use of soakaways and other forms of below ground attenuation with either infiltration to ground or with the inclusion of a flow restricting device to the downstream sewer networks or watercourse.
  - Site Control by the inclusion below ground attenuation tanks again with infiltration to ground or controlled outflow to the adjacent sewers/watercourse.
  - Aim to limit where possible the impermeable fraction of development.

## SuDS Parameters

- 9.17 It is proposed that the development site has two levels of treatment. Prevention and source controls are considered as the first level of treatment and the site control as the second level of treatment.

## Prevention and Source Control – Principals and Objectives

- 9.18 The main objective of prevention and source control is treatment and control of runoff as near to source as possible. Application of these techniques will require reduction of impermeable areas and techniques to restrict the runoff rates.
- 9.19 Prevention and Source Control measures to be considered where possible as part of the overall approach to the management train at this site includes water butts, rainwater harvesting and



infiltration by the use of soakaways. Typical examples are given in the SUDS manual and are briefly described below. It must be noted that the effectiveness of each system is dependent on the final design as well as the actual site conditions.

- 9.20 Water Butts; Plastic or GRP tanks are placed at the base of rainwater down pipes to collect rainwater runoff from the roof areas. This water can then be used by the development owners for watering both indoor and outdoor plants and soft landscaping. Rainwater Harvesting; Similar to the use of water butts this prevention method stores rainwater runoff from roofs and external areas in below ground tanks. The water can then be used for irrigation purposes to the soft landscaping areas or alternatively pumped to an internal storage tank where the 'Grey' water can be used for WC's and washing machines.
- 9.21 Filter Drainage; Consideration will be given to use filter drains for softscape / hard landscape interfaces. The solution will be used to drain the home zone 'capping beds' before discharge into the adopted drainage network.
- 9.22 Soakaways; Rainwater from roofs and other hard standing areas is directed via the below ground drainage system to an underground chamber that allows the water to infiltrate to ground. Units can be located within each individual property or on a larger scale for a number of properties. The size of each unit is dependent on the inherent ground conditions at each location.

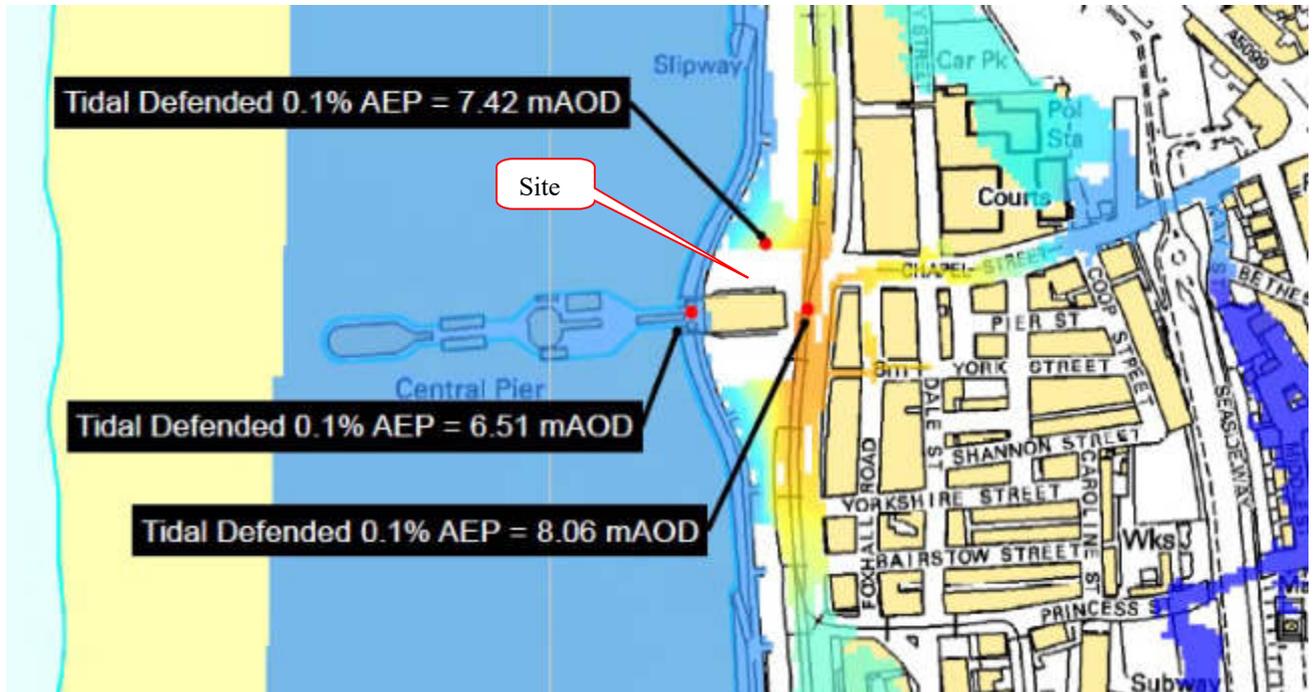
#### Site Control – Principals and Objectives

- 9.23 Site control features such as geocellular storage can be designed to attenuate storm runoff and provide conditions for settlement of suspended solids. The use of these types of attenuation devices within the development may have to be discounted due to space, Safety implications and as UU do not presently allow connection from these devices into the public sewer network due to ongoing issues with maintenance. Legislation is currently changing on the use of such devices, which may enable the use in the near future and reduce the current adoption constraints.
- 9.24 Below ground storage may lack amenity benefits but can be provided in the form of oversized pipes, geocellular storage crates, or concrete storage tanks. This type of attenuation is more likely to be adopted by UU and reduces the land take of ponds and basins as well as reducing the health and safety implications. Ultimately it will be with the developer to put forward appropriate solutions that best suit the development layout as well as the underlying ground condition constraints. However, as discussed *discharge to ground* would be the preferred option.

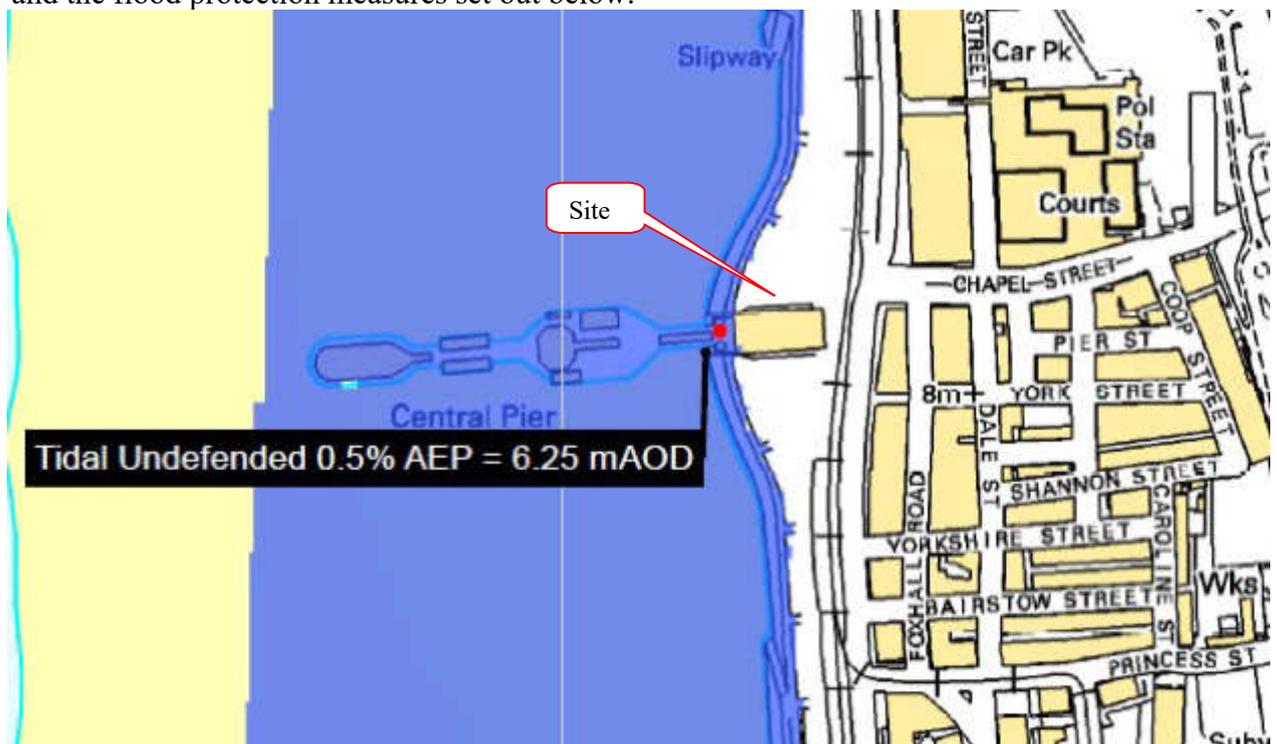


## 10.0 Assessment of Predicted Flood Levels

10.1 The data obtained from the EA indicates the site is close to the tidal modelled flood outlines for the Irish Sea, for 1 in 1000 year tidal events. The site is only marginally affected by the Irish Sea and this is confirmed by the historic flooding map which shows the extent of flooding taken from the Tidal ABD Study 2014.



10.2 If the flood defences were breached then the flood level data indicates that the flood level would be 6.25m AOD for Q200 year event (undefended). The level for a 1 in 1000 year event (undefended) would be 6.49m AOD. These levels have been taken into account in setting the ground floor levels and the flood protection measures set out below.





## **11.0 Proposed Flood Resistance and Resilience**

- 11.1 The proposed finished levels for the proposed building are to be set at 7.23m AOD. This is 600mm above the predicted flood level for a 1 in 200 year event. It is therefore unlikely that flood water would enter the property. However, as the 1 in 1000 year flood level is 6.51m AOD (720mm below FFL) and shown to breach the defences, it would be prudent to introduce flood resistance/resilience measures to the development.
- 11.2 Flood proofing is defined as any structural or non-structural measures intended to prevent damage from flooding to a building. This property is not expected to suffer from water entering the building, except in an above 1 in 1000 year event. It is proposed to introduce dry proofing methods which are designed to keep water out of the building. Measures for flood proofing are detailed in the document “Improving the Flood Performance of New Buildings” published by the Department of Communities and Local Government in 2007. Typical flood proofing measures include;
- External walls – use low permeability materials to limit water penetration. Avoid the use of timber frames, consider applying a water resistant coating. Provide fittings for flood boards across door openings.
  - Internal Walls – Avoid gypsum plaster and plasterboards; use more flood resistant linings e.g. hydraulic lime, ceramic tiles. Avoid the use of stud partition walls.
  - Floors – avoid the use of wooden floors. Use concrete floors with integrated and continuous damp proof membrane and damp proof course.
  - Fittings, fixtures and services – Locate all fittings, fixtures and services above design floor level. Avoid chipboard and MDF. Use solid wood staircases and avoid carpets. Locate electrical, gas and telephone equipment 300mm above FFL.
  - Drainage – Fit anti flooding devices to foul and surface water drainage systems.
- 11.3 As noted above, the finished floor level is 600mm above the 1 in 200 year plus climate change flood level of 6.63m and water would not enter the properties. Provision of the flood resilience measures outlined above, to a level 300mm above the proposed floor level of 7.23m, would provide further protection for the 1 in 1000 year event.
- 11.4 Further information is included in Section 12.0 Flood Risk Management Measures.

## **12.0 Foul Wastewater Management Strategy**

- 12.1 United Utilities records have been checked and there are foul and surface water sewers to the east of the proposed development.
- 12.2 Direct discharge will be made to the public foul sewer network and a free draining discharge would be considered acceptable for a development of this type.



### 13.0 Flood Risk Management Measures

- 13.1 The Environment Agency is the lead organisation for flood forecasting and flood warning in England and Wales. The EA currently offers a 3-stage warning service to properties at risk of flooding.
- 13.2 The Environment Agency currently only issues direct flood warnings to properties at risk of flooding. The "Floodline Warnings Direct" (FWD) system automatically telephones the occupants of properties where flood forecasts predict flooding is likely.
- 13.3 The site is located within a Flood Warning Area or the adjacent Flood Alert Area associated with the Irish Sea. The Flood Warning and Alert areas are shown below.

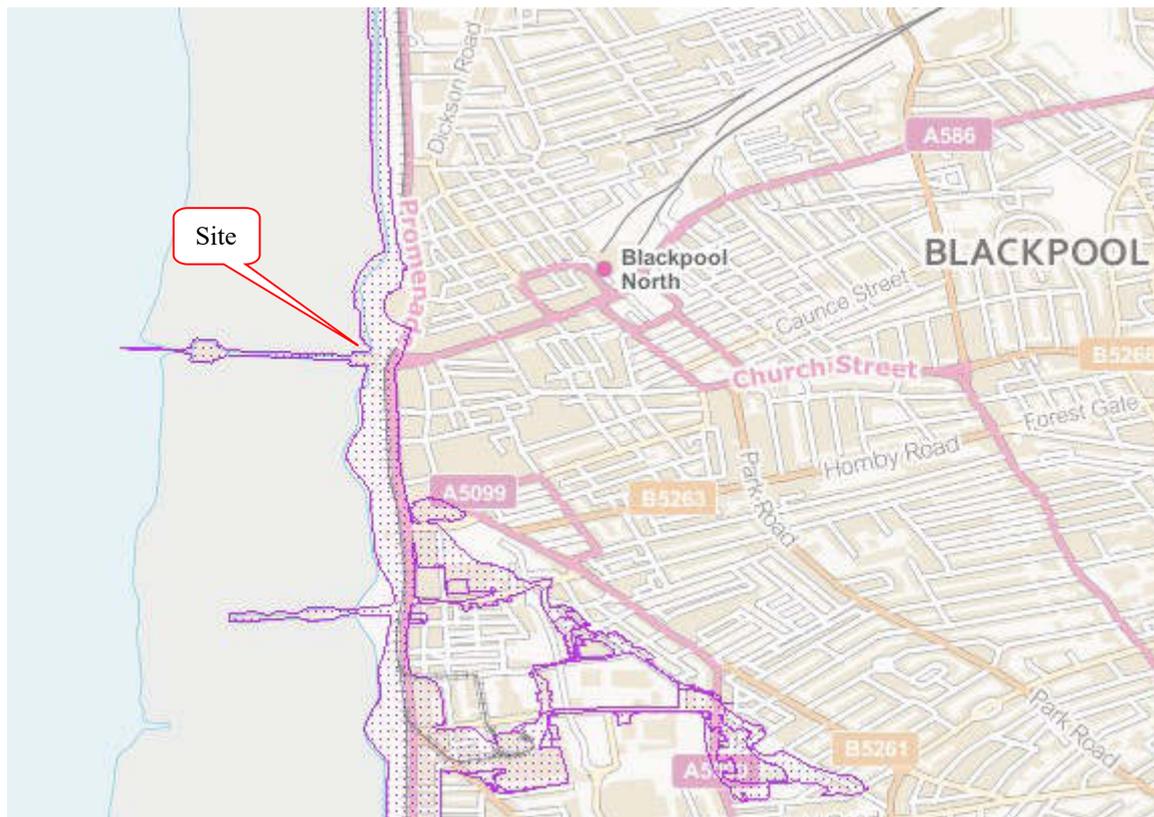


Figure 13.3 Flood Warning Zones

- 13.4 In the event of extreme emergency, the local authority and other emergency services also have contingency plans for dealing with the consequences of flooding.
- 13.5 Setting finished floor level of the lowest level buildings at least the minimum required by the Building Regulations 150mm above surrounding external ground; shedding surface water away from the buildings, will reduce the risk of damage to buildings and contents because of surface flows around the site.
- 13.6 The design of surface water drainage will ensure that there are no uncontrolled off-site overland flood flows created by the proposed development. Where possible, site surfaces will be modelled so that flood flows generated on site from events beyond the stipulated drainage design criteria will flow to and be contained on site within landscaped or pervious paved areas such that there is no increased risk of flooding to buildings and other vulnerable areas. Such flood flows will not be allowed to flow from the site onto adjoining property or highways.

- 13.7 Development owners will be responsible for the maintenance of private drainage systems to ensure satisfactory performance.
- 13.8 Any surface water flows onto the site from adjoining property will either be retained on site safely or be encouraged to pass across the site such that there is no increased risk of flooding to buildings and other vulnerable areas.
- 13.9 National Government and the Environment Agency have provided some guidance for property owners & occupants as to measures that can be undertaken to reduce the impact of flooding on existing properties. Such measures include the following: -
- Property owner and occupier to register to receive flood alerts and warnings.
  - Install specially made flood doors, or flood tight door panels / barriers that can be installed when flooding is imminent.
  - Install purpose made air brick covers when flooding is imminent
  - Install a pump sump below ground floor level to facilitate the temporary installation of a pump in the event of flood.
  - Raise electrical sockets, consumer units, controls, wiring and audio-visual equipment to at least 1.5m above floor level or if rewiring bring cables down the wall to raised sockets etc.
  - Fit non-return valves to drains, water inlet & outlet pipes.
  - Use water resistant materials such as stainless steel, plastic, solid wood, polished stone rather than chipboard.
  - Install synthetic, varnished, or waxed windows & doors.
  - Lay tiles with rugs rather than fitted carpets; fit shelves at least 1.5m above floor level.
  - Have on hand a supply of sand bags or hydro bags or hydrosnakes.
  - Have on hand a toilet pan seal or flexible (inflatable) toilet and drain plugs.
  - In the event of a severe flooding a flood evacuation plan is to be provided to the occupants in order that a safe route of egress / access is available to higher ground.

13.10 Flood Risk Resilience Measures are discussed in Section 9.



## **14.0 Off-Site Impacts**

- 14.1 The surface water from the site is proposed to discharge onto pavement and fall towards the surrounding paved area, which ultimately discharges into the public sewer system/ Irish Sea.
- 14.2 Proposed on-site drainage will be designed and constructed in accordance with current best practices and The Building Regulations as appropriate.
- 14.3 The areas of the development located within Flood Zone 3 and the new development will be raised above the peak water event from the Irish Sea. As the development building is raised above ground levels, up to and beyond the Environment Agency imposed 100 year design criterion, the Development has no risk of flooding from fluvial waters by overland flows from the rivers.
- 14.4 There will be no significant off-site impacts because of this development and therefore the proposal satisfies paragraph 103 of the Framework as it will not increase flood risk elsewhere.

## **15.0 Residual Risks**

- 15.1 The development and its drainage system will be designed to cope with intense storm events up to and including the 1 in 100 year return period rainfall event, which includes an allowance for climate change. If an extreme rainfall event occurs, which exceeds this event, then it is likely that there will be an increase in overland flows due to the additional rain water being unable to enter the drainage network. It is therefore important that these potential overland flows are catered for within the design of the external areas and any reconstruction of existing land drains to be reinstated with the original capacity.
- 15.2 Any overland flows generated by the proposed development must be directed away from any properties and towards the highway network and onsite drainage system.
- 15.3 As with any drainage system, blockages within the network have the potential to cause flooding and disruption. It is important that any drainage system not offered for adoption has appropriate maintenance regime included within the operation and maintenance (O & M) manuals for the development.
- 15.4 Furthermore, with the installation of appropriate flood defence measures such as flood barrier facilities to external doors, specialised air bricks and other further measures indicated in paragraph 13.9 – property damage from flooding can be managed more effectively, and the level of risk reduced.



## 16.0 **Summary and Conclusion**

- 16.1 Information has been sourced from the EA online information and the Blackpool Council Strategic Flood Risk Assessment (SFRA).
- 16.2 This FRA has been written in accordance with the following:
- National Planning Policy Framework (NPPF)
  - National Planning Policy Framework – Technical Guidance (NPPF – TG)
  - Blackpool Council Strategic Flood Risk Assessment (SFRA)
  - CIRIA Guidance
  - The Reservoir Act 1975
  - The SuDS Manual
  - DEFRA Improving the Flood Performance of New Buildings, May 2007
- 16.3 Flood risk:
- Tidal – high but defences reduce risk significantly
  - Fluvial (River or sea flooding) – no risk
  - Pluvial (rainfall/surface water) – very low risk
  - Sewers – low
  - Groundwater – medium to high
  - Other (Reservoirs & Canals) – no risk
- 16.4 The underlying geology for the development site allows the use of SuDS infiltration techniques.
- 16.5 The total site area is 0.0391 ha, the usages of the proposed development are classed as less vulnerable and the site is located in Flood Zone 3, which is defended.
- 16.6 The proposed development will be protected with the discussed additional measures from flooding up to the 1 in 1000 year storm events for the Irish Sea. Water would not enter the buildings in a 1 in 200 year event. Detailed design of the buildings should provide for flood resistance and resilience to a level of 350mm above the proposed finished floor level of 7.23m AOD.
- 16.7 The drainage strategy of the site will account for the fact that there are adjacent developments currently discharge into a series of drains and public sewers.
- 16.8 Attenuation for the development has been calculated using the brownfield runoff rate and the impermeable area of the roofs. The paved areas will be controlled at source using permeable paving products. Events exceeding the 1 in 100 year plus climate change (30%) within these areas will be permitted to discharge into the surrounding area and directed away from the proposed building structure. Attenuation has been estimated at between 4.4m<sup>3</sup> and 10m<sup>3</sup>.
- 16.9 Foul drainage would discharge freely in the public sewer to the east of the proposed development.
- 16.10 It is therefore evident that the proposed development would have adequate protection from flooding, could be drained in a satisfactory manner and would not exacerbate flood risk elsewhere.

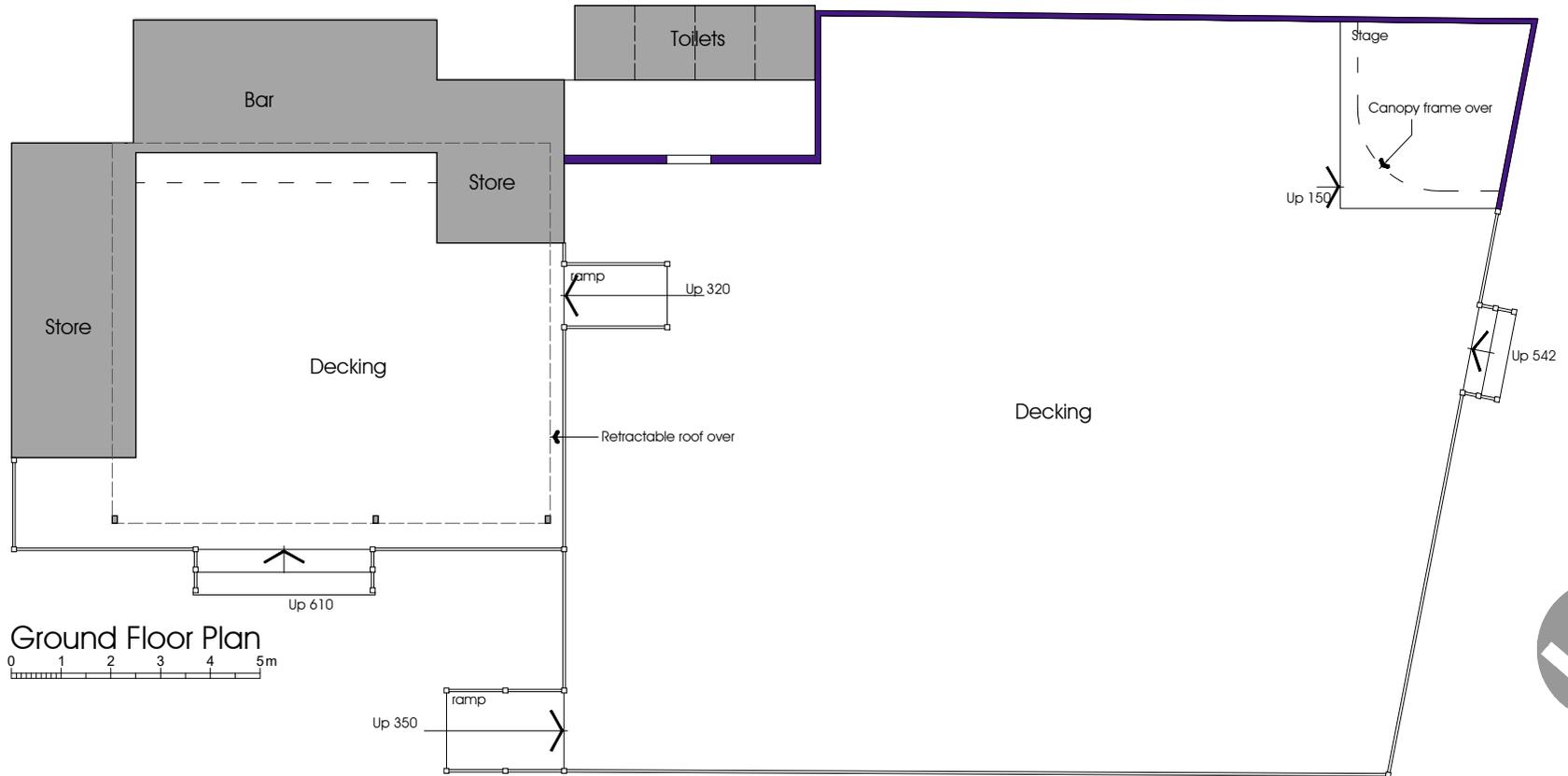
APPENDIX A – Location Plan & Development Proposals



NOTES:

1: Do not scale this drawing, use figured dimensions only 2: The Contractor, Sub Contractor or specialist supplier are responsible for confirming site dimensions prior to fabrication 3: Any dimensional discrepancies are to be reported to the Architect immediately

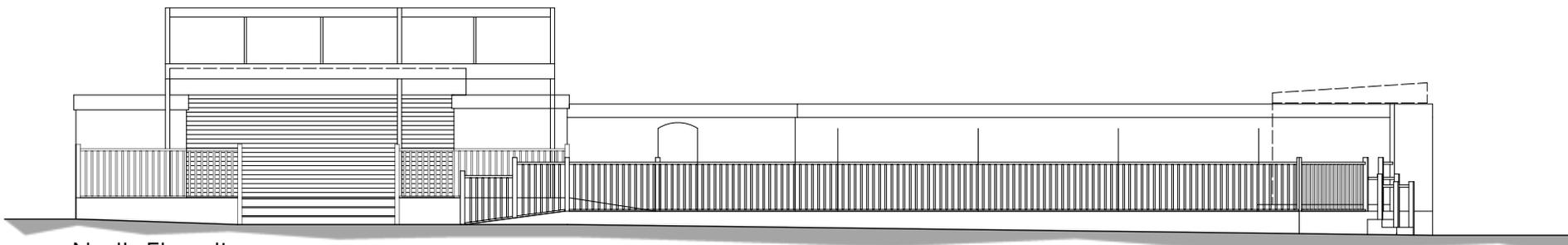
Line of Central Pier behind



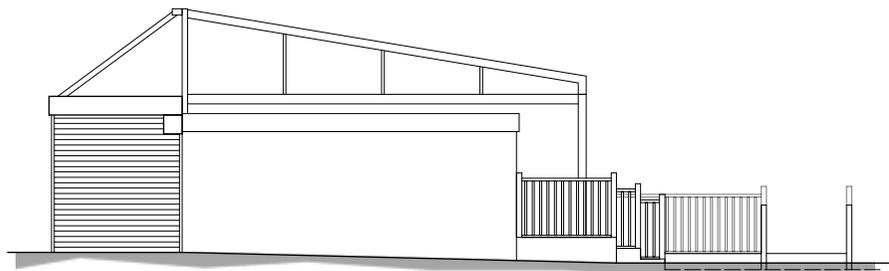
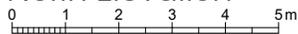
Ground Floor Plan  
0 1 2 3 4 5m

NOTES:

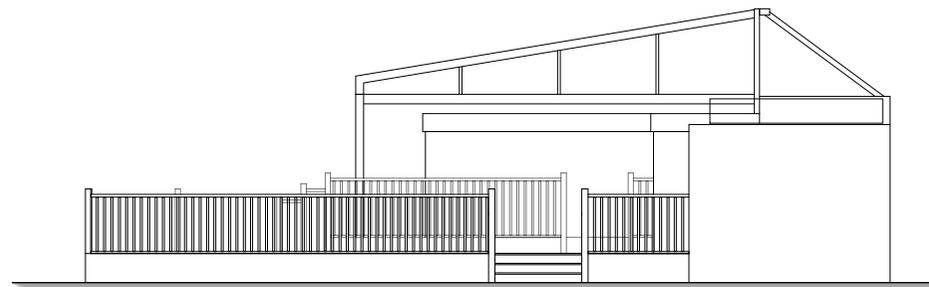
1: Do not scale this drawing, use figured dimensions only 2: The Contractor, Sub Contractor or specialist supplier are responsible for confirming site dimensions prior to fabrication 3: Any dimensional discrepancies are to be reported to the Architect immediately



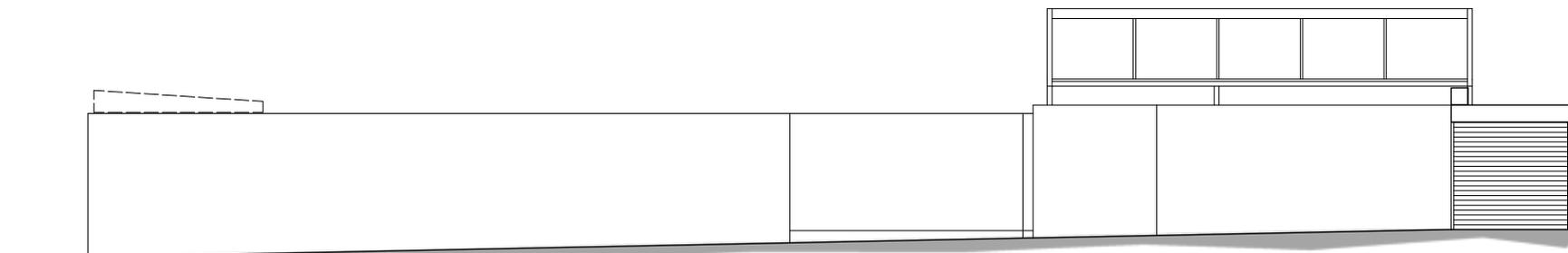
North Elevation



East Elevation



West Elevation



South Elevation

Terrace Bar  
Central Pier, Blackpool

Blackpool Pier Co.

Empress Buildings, 97 Church St.FY1 1HU

Elevations As Existing

DATE 17.02.21

JOB NO. 3260  
DRAWING NO. 002

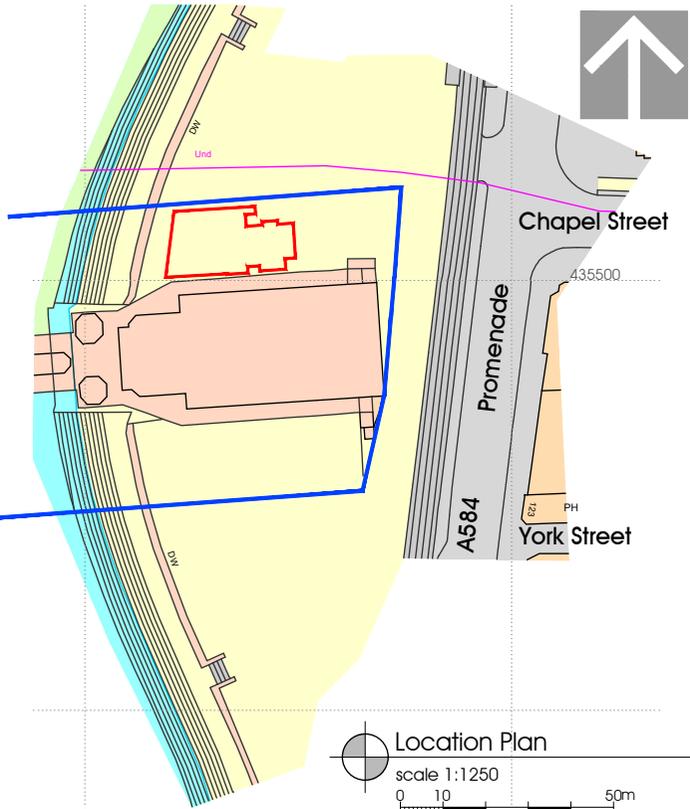
REVISION

SCALE 1:100 @ A3

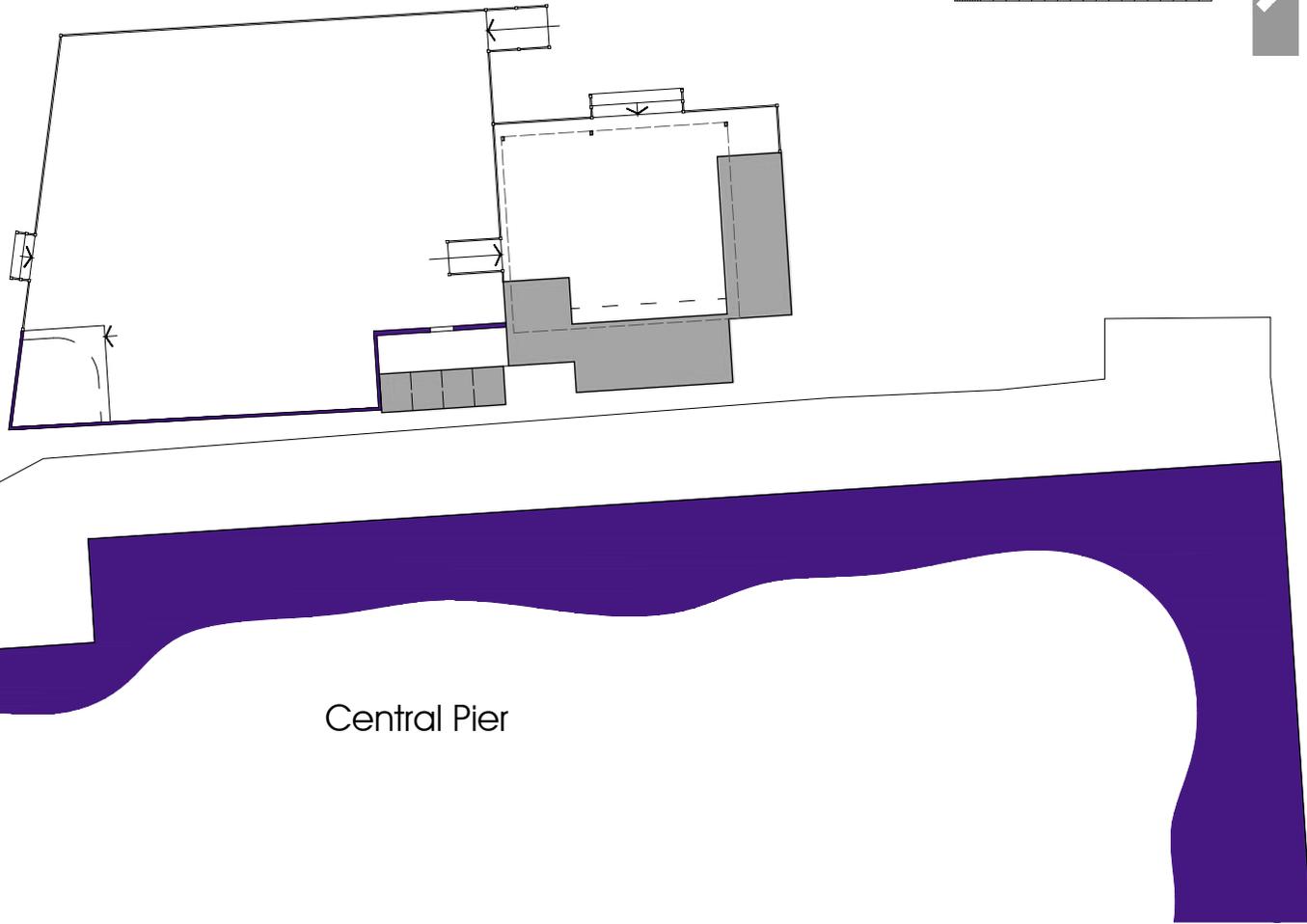


NOTES:

1: Do not scale this drawing, use figured dimensions only 2: The Contractor, Sub Contractor or specialist supplier are responsible for confirming site dimensions prior to fabrication 3: Any dimensional discrepancies are to be reported to the Architect immediately



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APPENDIX B – United Utility Records



**Jason Jones**

**36  
Holdenbrook Close, Greater Manchester  
Leigh, Greater Manchester, Greater Manchester  
WN72HL**

**FAO:**

**How to contact us:**

**United Utilities Water Limited  
Property Searches  
Haweswater House  
Lingley Mere Business Park  
Great Sankey  
Warrington  
WA5 3LP**

**Telephone: 0370 7510101**

**E-mail: [propertysearches@uuplc.co.uk](mailto:propertysearches@uuplc.co.uk)**

**Your Ref: 21129 Central Pier  
Our Ref: UUPS-ORD-268009  
Date: 12/04/2021**

**Dear Sirs**

**Location: 5A CHAPEL STREET, BLACKPOOL, FY1 5AE**

I acknowledge with thanks your request dated 07/04/2021 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack  
Property Searches Manager

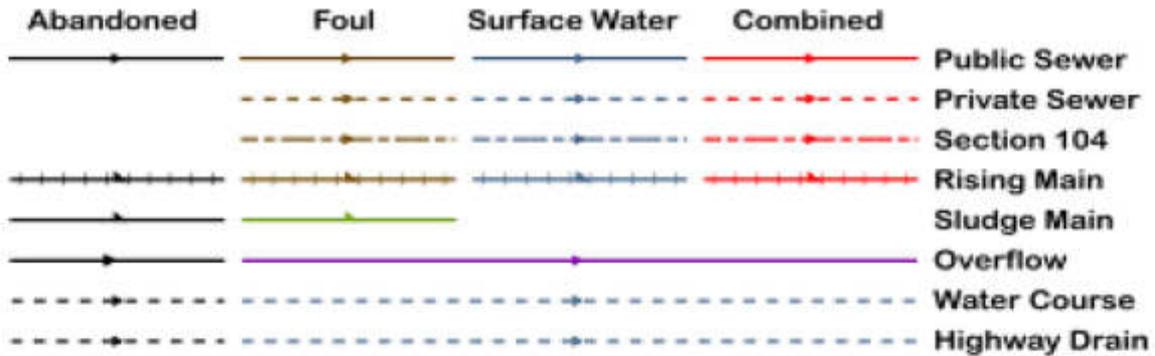
## TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

### TERMS AND CONDITIONS:

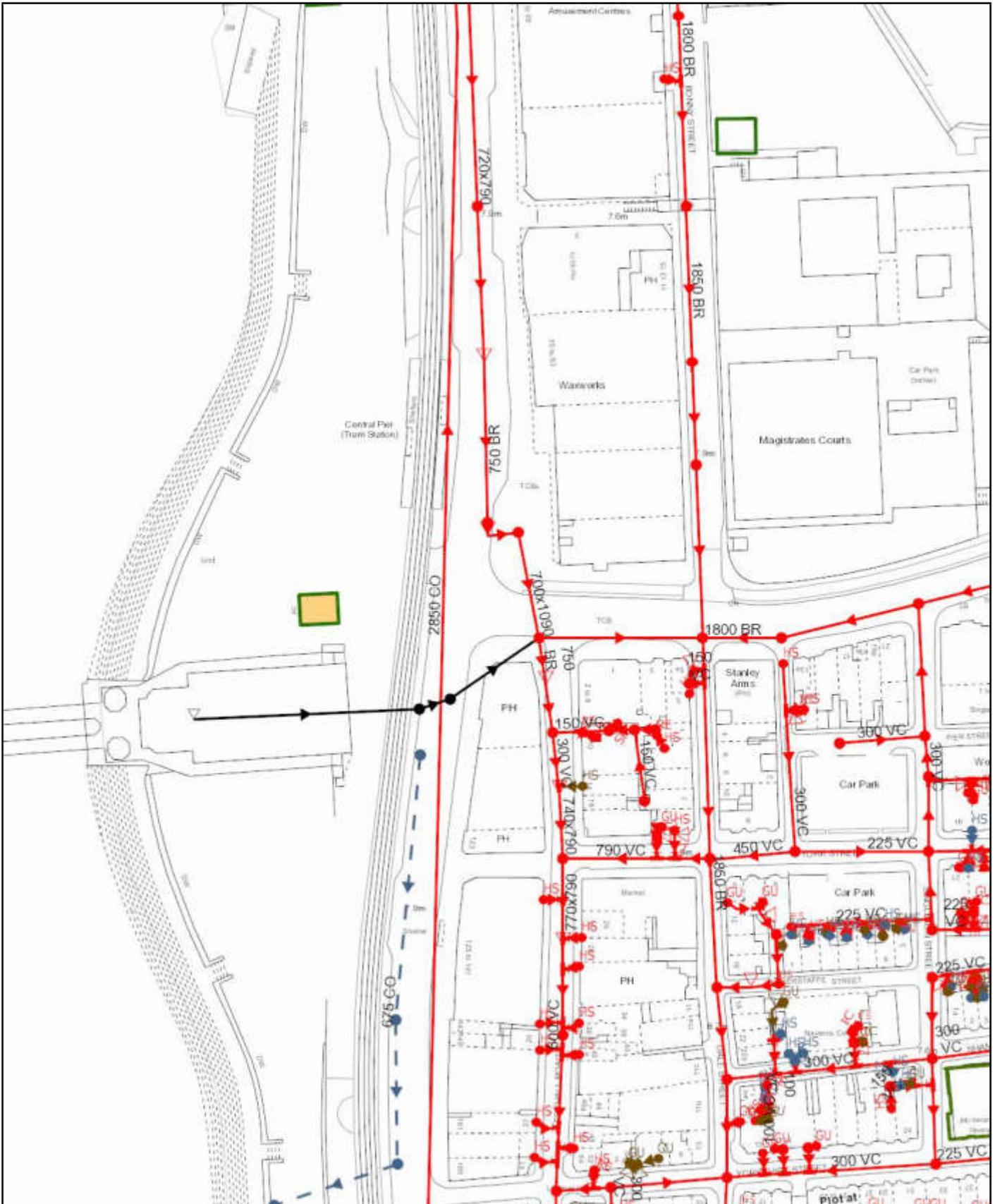
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

## Wastewater Symbology



All point assets follow the standard colour convention: **red** – combined      **brown** - foul  
**blue** – surface water      **purple** - overflow

- |                  |                          |
|------------------|--------------------------|
| Manhole          | Side Entry Manhole       |
| Head of System   | Outfall                  |
| Extent of Survey | Screen Chamber           |
| Rodding Eye      | Inspection Chamber       |
| Inlet            | Bifurcation Chamber      |
| Discharge Point  | Lamp Hole                |
| Vortex           | T Junction / Saddle      |
| Penstock         | Catchpit                 |
| Washout Chamber  | Valve Chamber            |
| Valve            | Vent Column              |
| Air Valve        | Vortex Chamber           |
| Non Return Valve | Penstock Chamber         |
| Soakaway         | Network Storage Tank     |
| Gully            | Sewer Overflow           |
| Cascade          | Ww Treatment Works       |
| Flow Meter       | Ww Pumping Station       |
| Hatch Box        | Septic Tank              |
| Oil Interceptor  | Control Kiosk            |
| Summit           |                          |
| Drop Shaft       | Change of Characteristic |
| Orifice Plate    |                          |



Scale: 1:1568  
 Date: 12/04/2021

# SEWER RECORDS



Address or Site Reference: 5A CHAPEL STREET, BLACKPOOL, FY1 5AE  
 Printed by: Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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APPENDIX C – Environment Agency Product Data



**Flood Zones Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

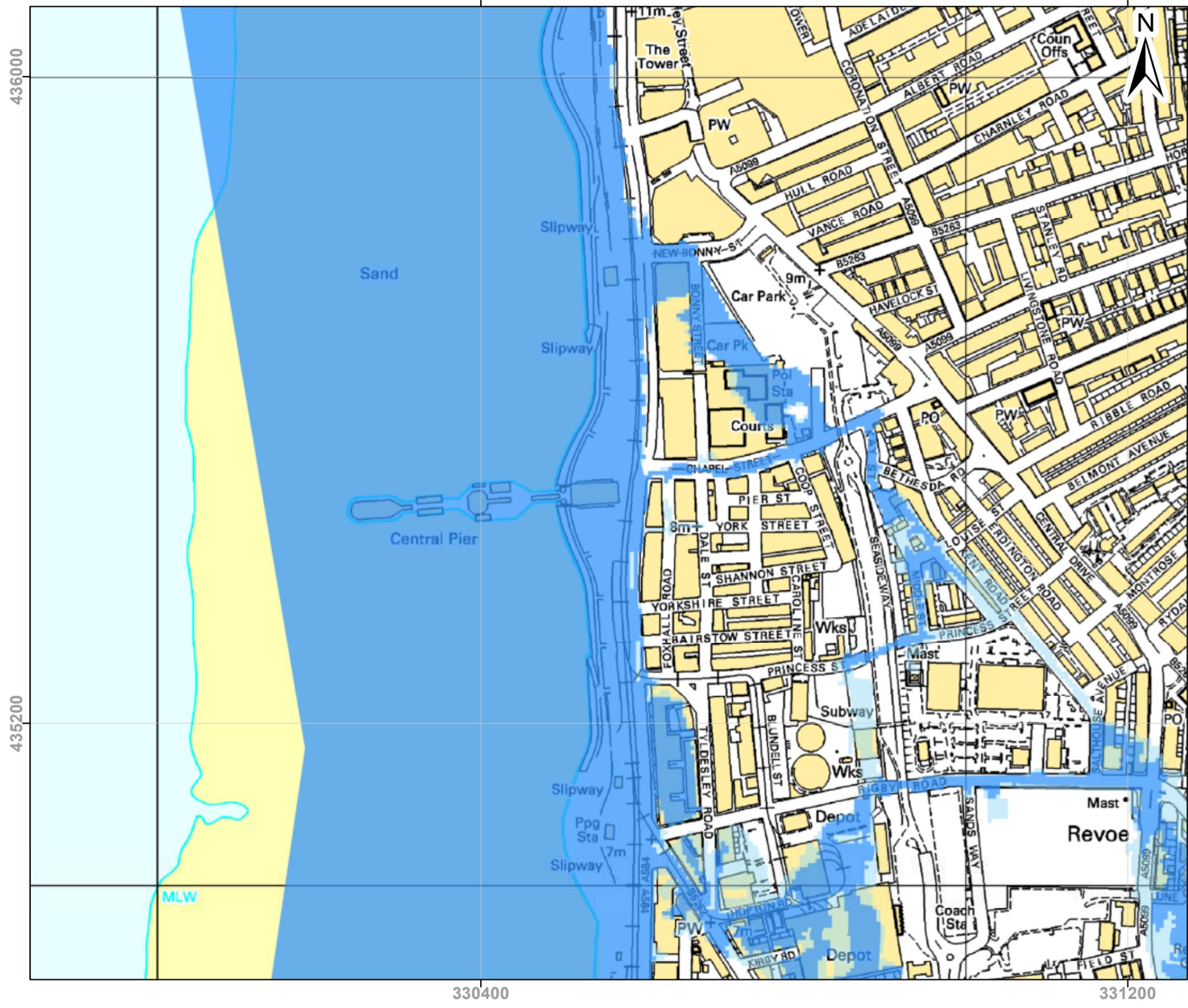
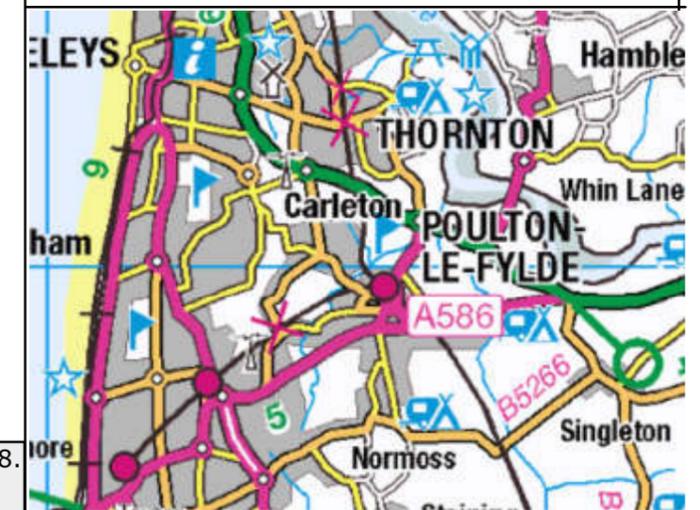
-  Main River
-  Areas Benefiting from Defences
-  Flood Zone 3
-  Flood Zone 2

**Flood Zone 3** shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



**Flood History Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

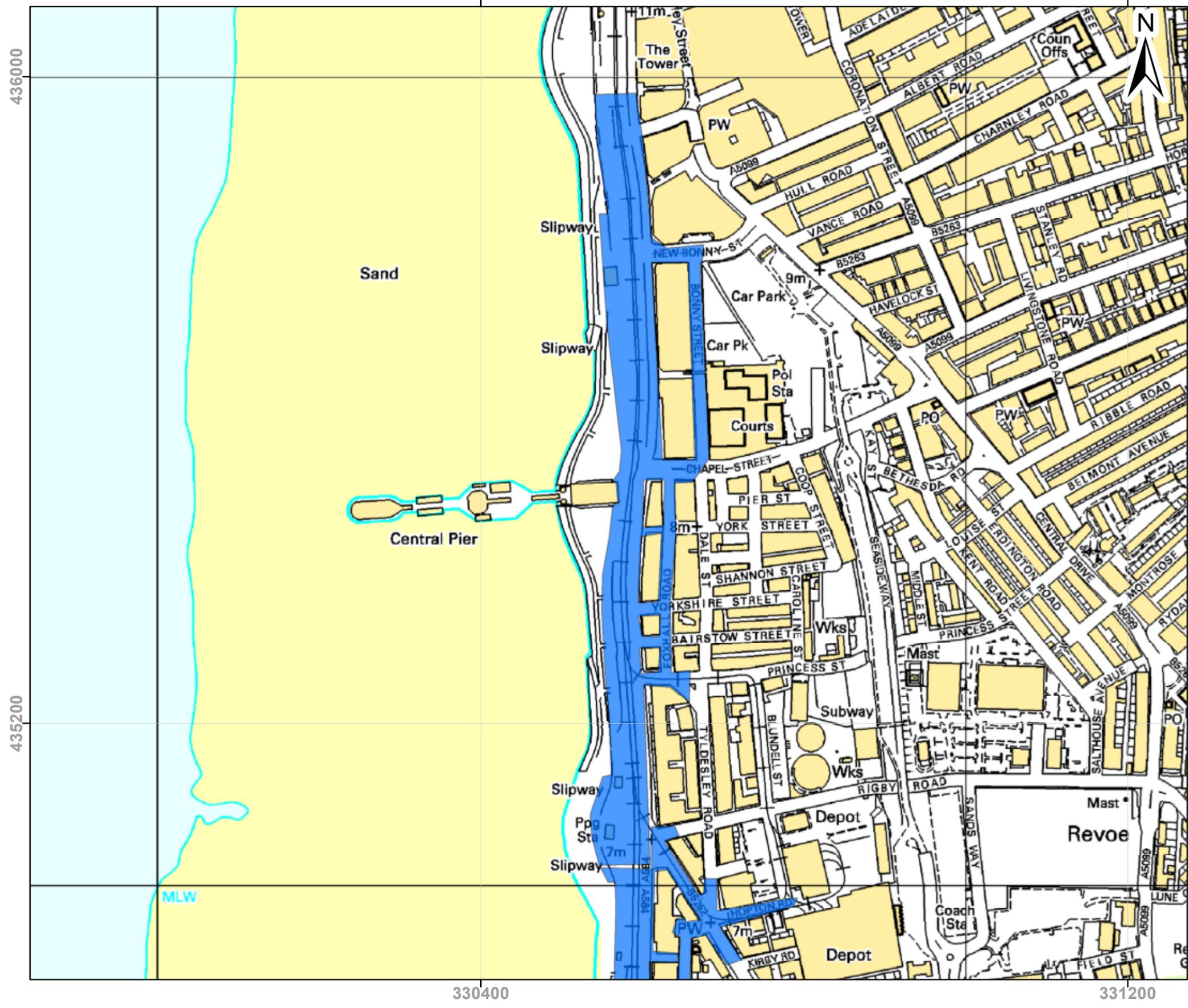
 01/02/2002

**Flood Zone 3** shows the area that could be affected by flooding:

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- or from a river with a 1.0% or greater chance of happening each year.

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**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



**Flood History Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

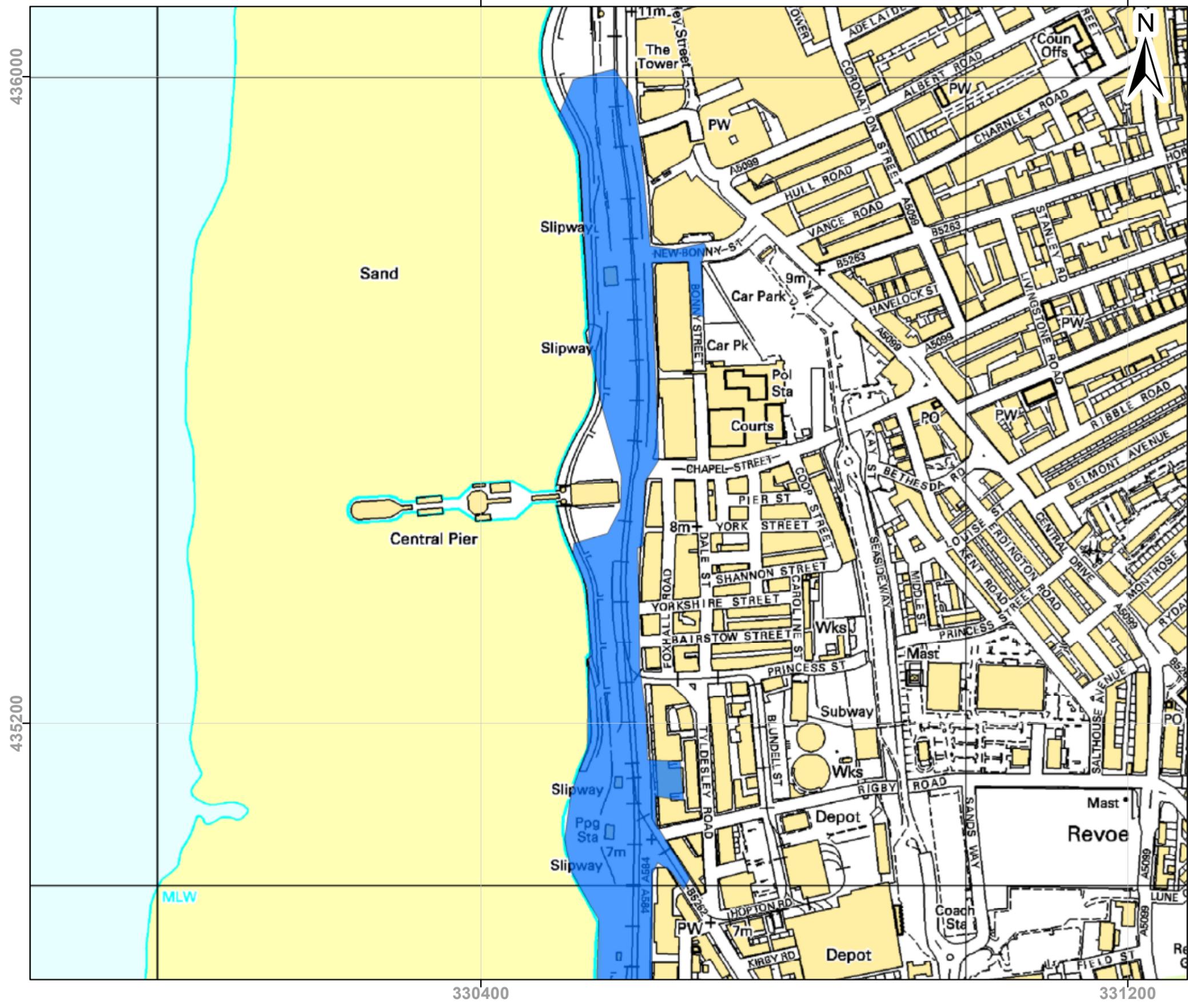
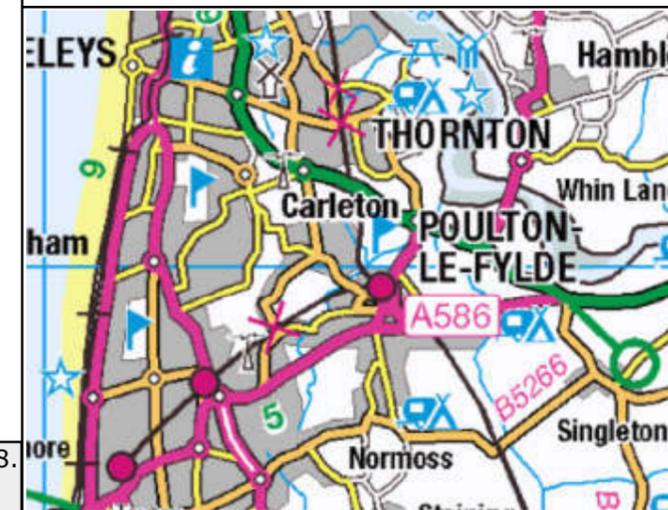
 05/12/2013

**Flood Zone 3** shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

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**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.

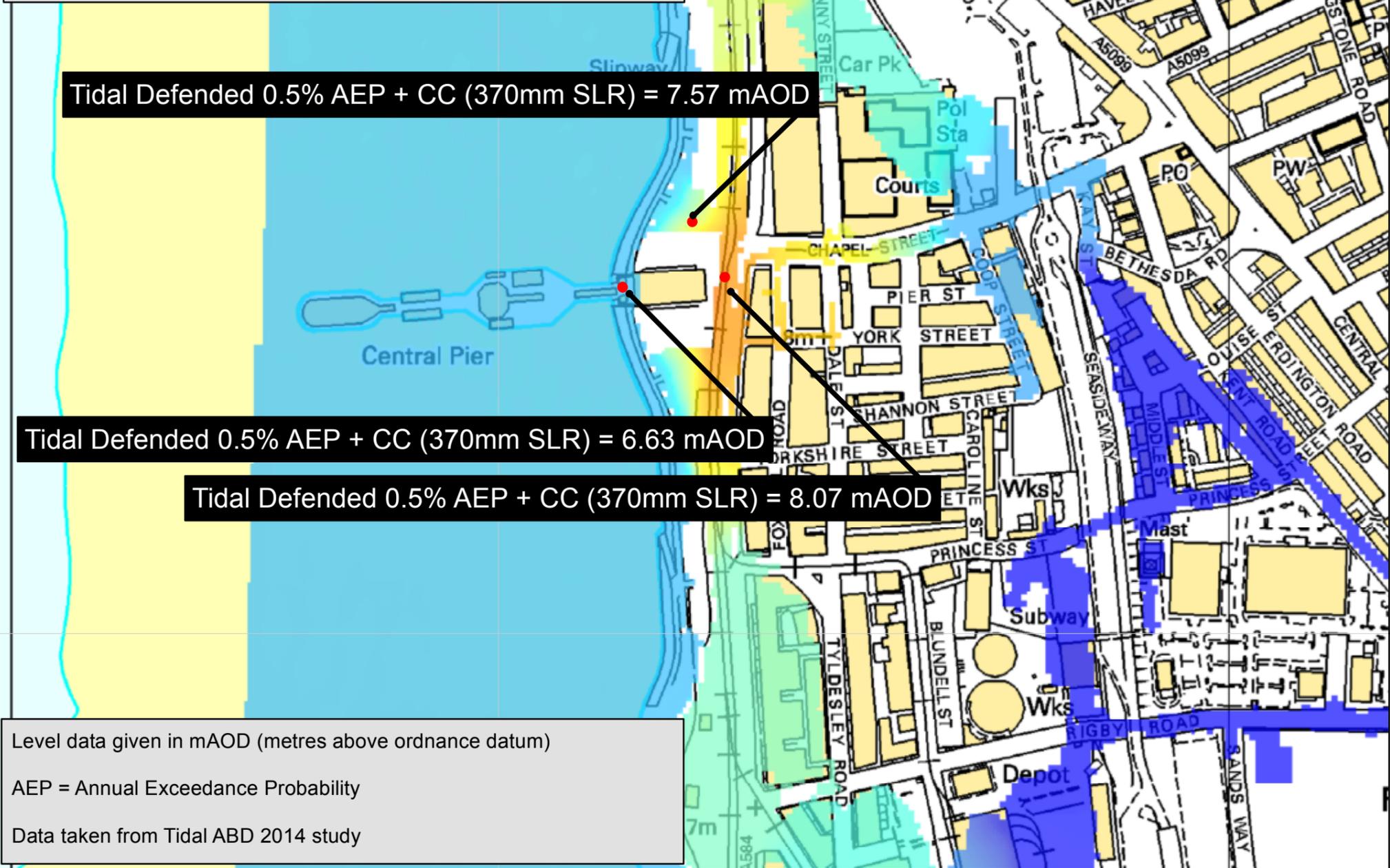




**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

Level data given in mAOD (metres above ordnance datum)  
AEP = Annual Exceedance Probability  
SLR = Sea Level Rise  
Please note; for the Climate Change scenarios, Sea Level Rise is applied to the 0.5% AEP defended/undefended scenario(s)  
Data taken from Tidal Climate Change update 2020



Level data given in mAOD (metres above ordnance datum)  
AEP = Annual Exceedance Probability  
Data taken from Tidal ABD 2014 study

**Key**

 Main River

**Tidal Defended 0.5% annual probability of flooding + climate change (+370mm SLR) scenario**

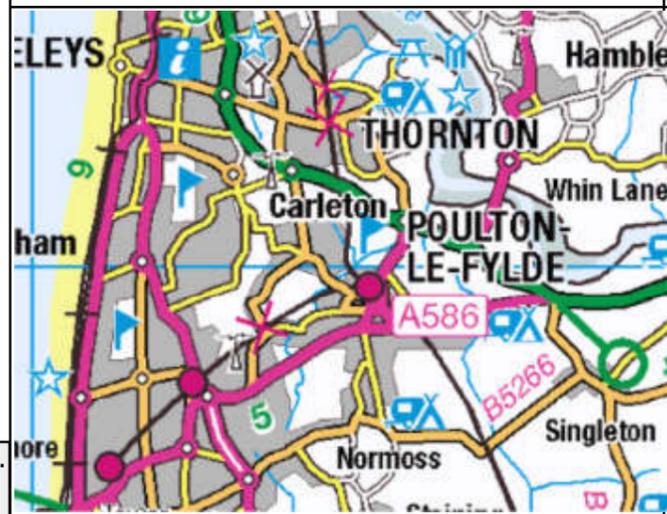
**mAOD**

 High : 8.5  
Low : 6

**Flood Zone 3** shows the area that could be affected by flooding:  
- from the sea with a 0.5% or greater chance of happening each year  
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs (Areas Benefiting from Defences)** show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



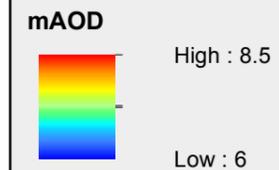
**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

Tidal Defended 0.5% annual probability of flooding + climate change (+970mm SLR) scenario

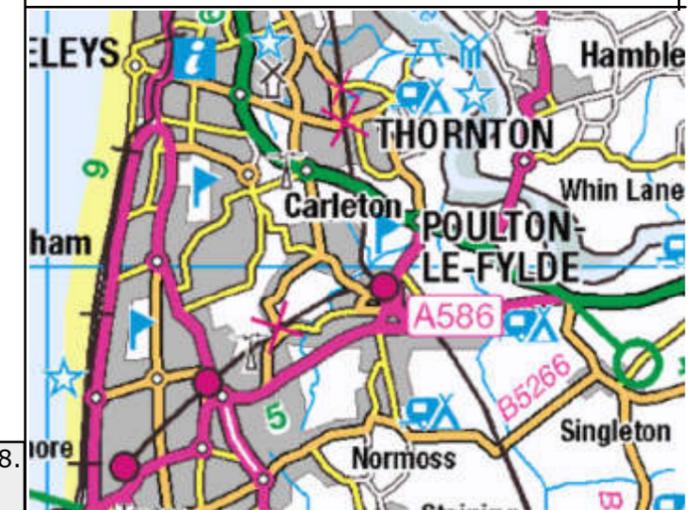


**Flood Zone 3** shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

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**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

SLR = Sea Level Rise

Please note; for the Climate Change scenarios, Sea Level Rise is applied to the 0.5% AEP defended/undefended scenario(s)

Data taken from Tidal Climate Change update 2020

Tidal Defended 0.5% AEP + CC (970mm SLR) = 7.57 mAOD

Tidal Defended 0.5% AEP + CC (970mm SLR) = 7.22 mAOD

Tidal Defended 0.5% AEP + CC (970mm SLR) = 8.07 mAOD

Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

Data taken from Tidal ABD 2014 study

330400

435200

**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

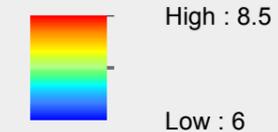
Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

Tidal Defended 0.1% annual probability of flooding scenario

mAOD

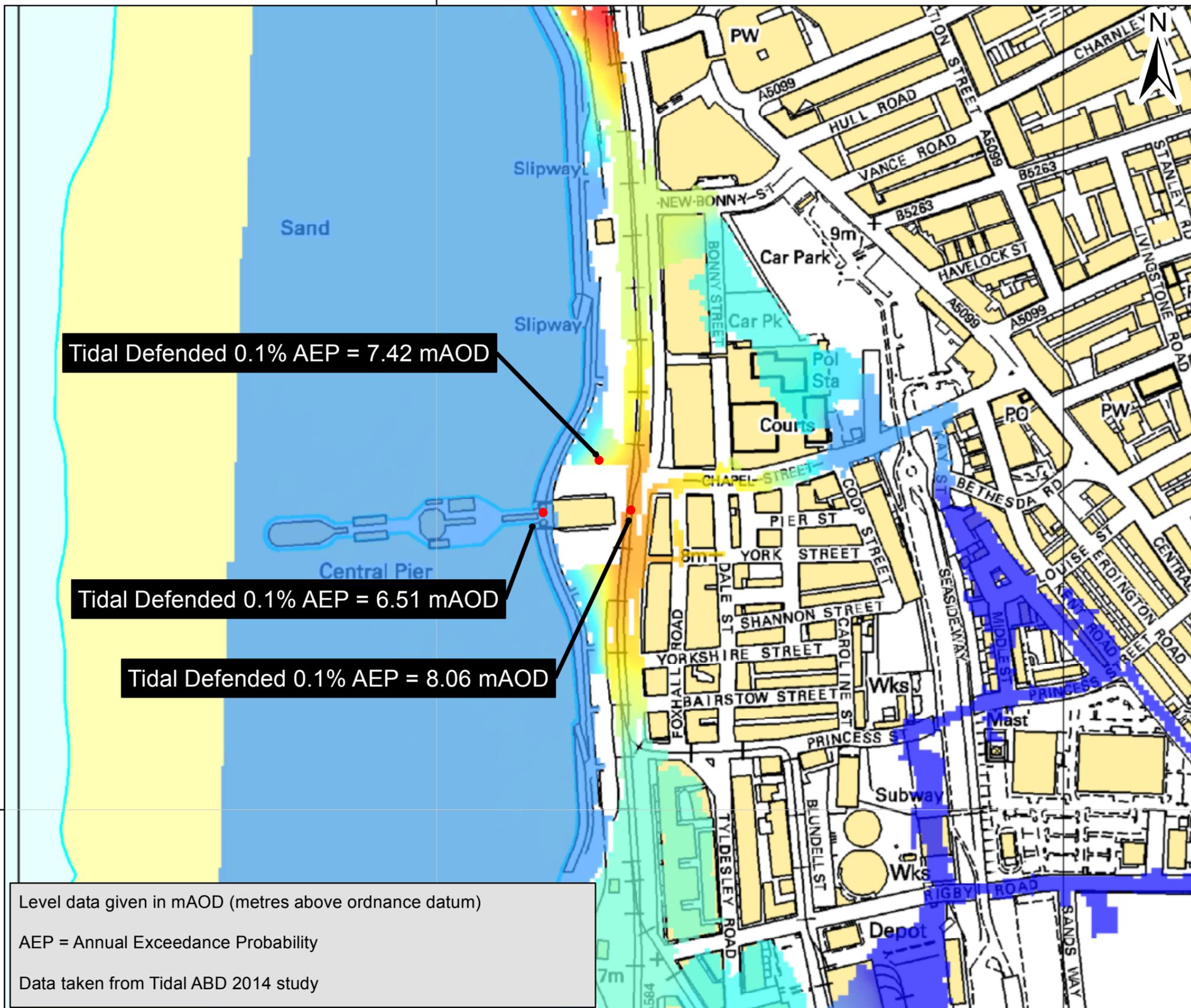
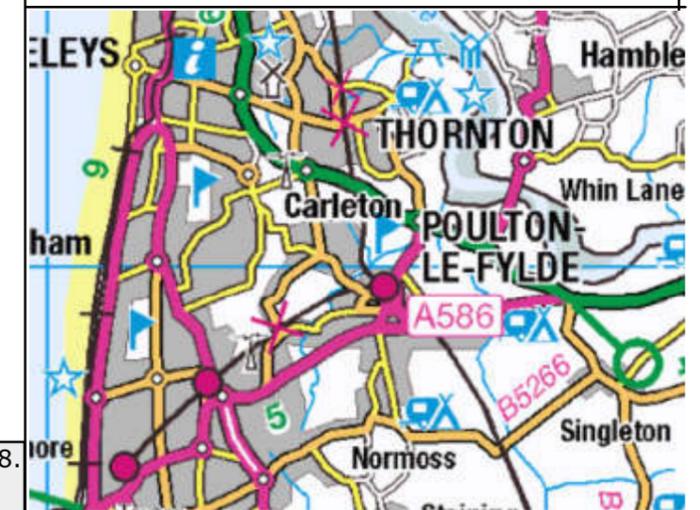


**Flood Zone 3** shows the area that could be affected by flooding:

- from the sea with a 0.5% or greater chance of happening each year
- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



330400

435200

**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

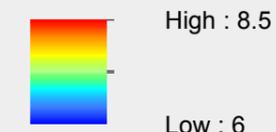
Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

Key

 Main River

**Tidal Undefended 0.5% annual probability of flooding scenario**

mAOD

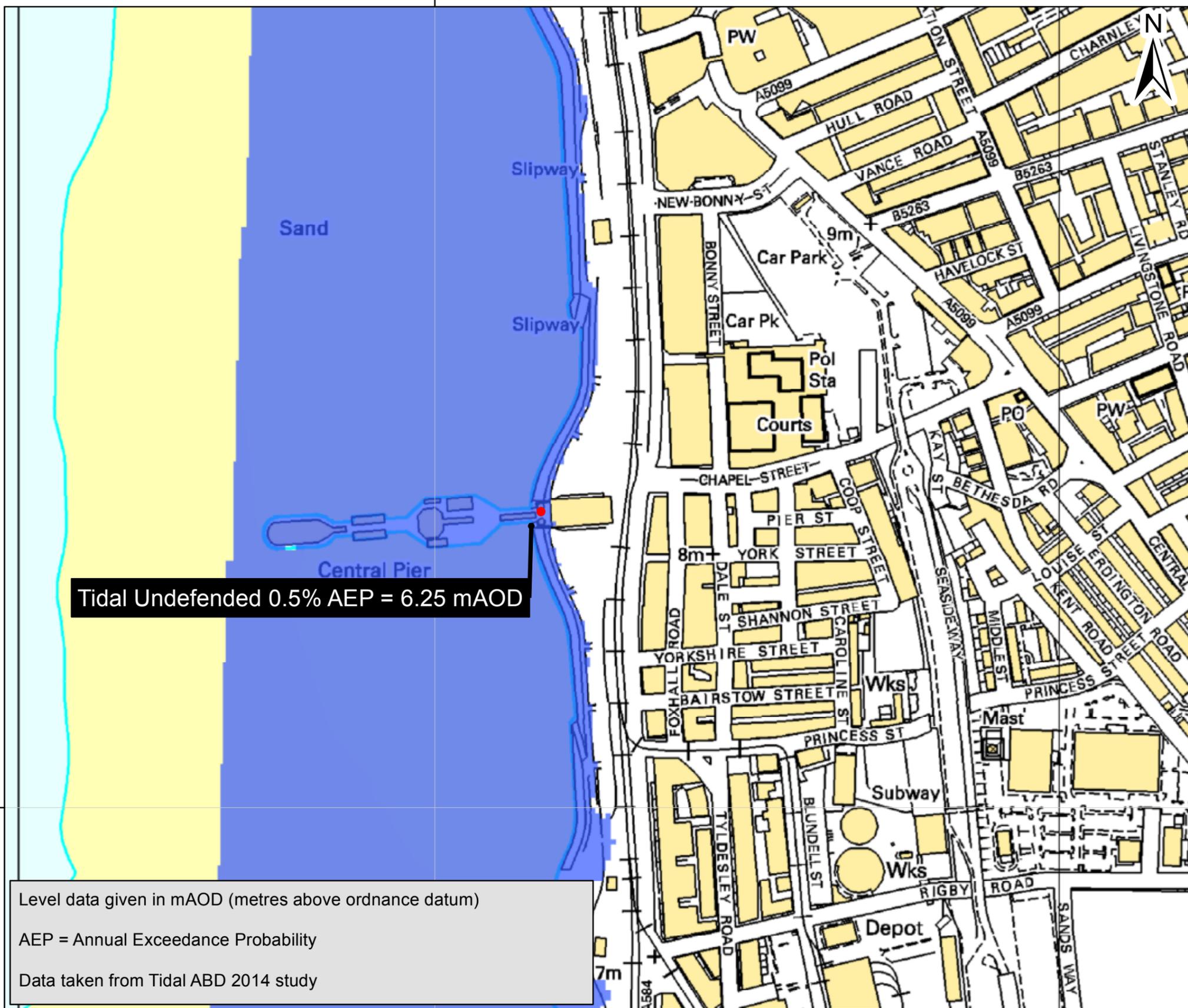
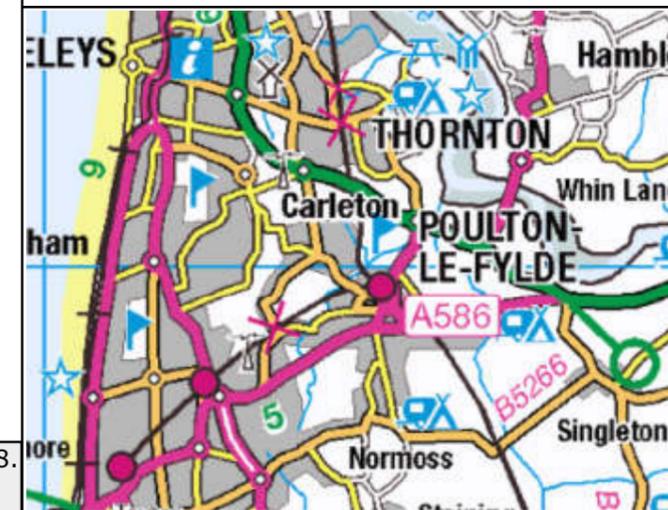


**Flood Zone 3** shows the area that could be affected by flooding:

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- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



**Tidal Undefended 0.5% AEP = 6.25 mAOD**

Level data given in mAOD (metres above ordnance datum)  
AEP = Annual Exceedance Probability  
Data taken from Tidal ABD 2014 study

435200

330400

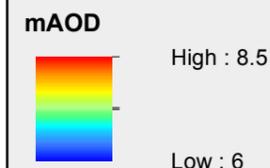
**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

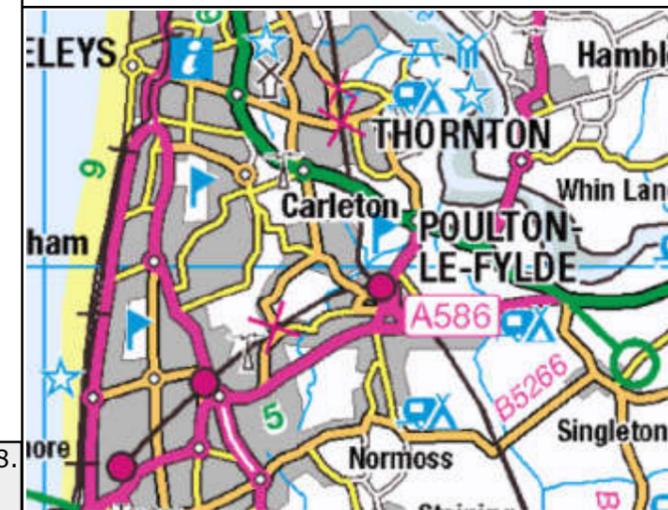
**Tidal Undefended 0.5% annual probability of flooding + climate change (+370mm SLR) scenario**



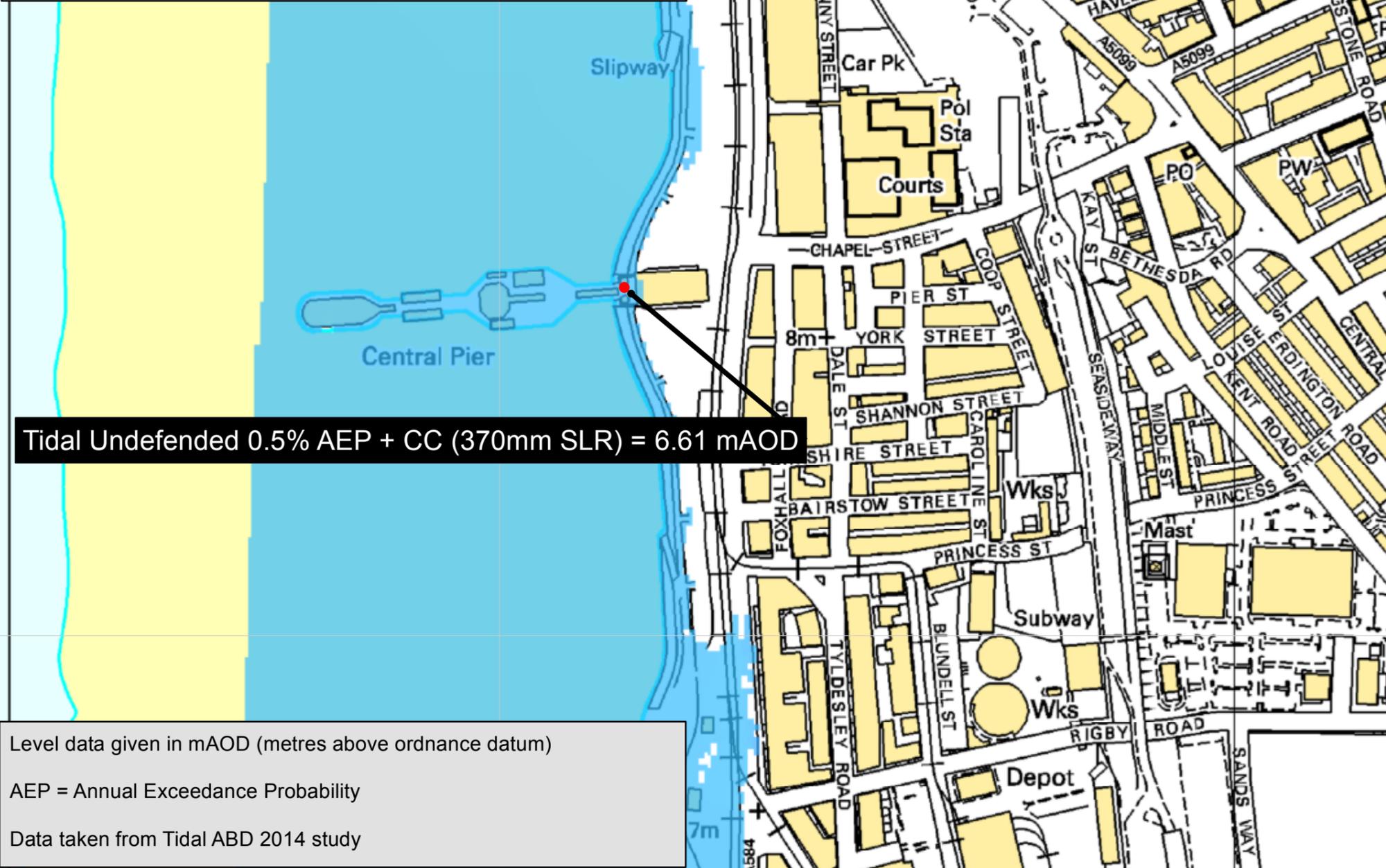
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- or from a river with a 1.0% or greater chance of happening each year.

**Flood Zone 2** shows the extent of an extreme flood from rivers or the sea with up to 0.1% chance of occurring each year.

**ABDs** (Areas Benefiting from Defences) show the area benefiting from defences during a 0.5% tidal, or 1.0% fluvial flood event.



Level data given in mAOD (metres above ordnance datum)  
AEP = Annual Exceedance Probability  
SLR = Sea Level Rise  
Please note; for the Climate Change scenarios, Sea Level Rise is applied to the 0.5% AEP defended/undefended scenario(s)  
Data taken from Tidal Climate Change update 2020



**Tidal Undefended 0.5% AEP + CC (370mm SLR) = 6.61 mAOD**

Level data given in mAOD (metres above ordnance datum)  
AEP = Annual Exceedance Probability  
Data taken from Tidal ABD 2014 study

330400

435200

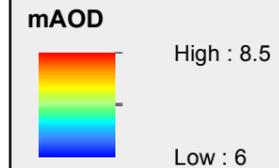
**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

Tidal Undefended 0.5% annual probability of flooding + climate change (+970mm SLR) scenario

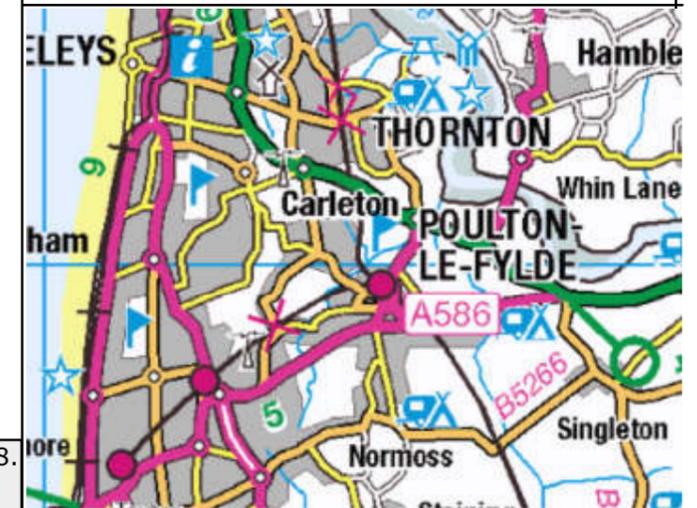


**Flood Zone 3** shows the area that could be affected by flooding:

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Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

SLR = Sea Level Rise

Please note; for the Climate Change scenarios, Sea Level Rise is applied to the 0.5% AEP defended/undefended scenario(s)

Data taken from Tidal Climate Change update 2020

**Tidal Undefended 0.5% AEP + CC (970mm SLR) = 7.22 mAOD**

**Tidal Undefended 0.5% AEP + CC (970mm SLR) = 7.21 mAOD**

Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

Data taken from Tidal ABD 2014 study

330400

435200

**Tidal Flood Map:  
Central Pier Terrace Bar,  
Blackpool, FY1 5BB**

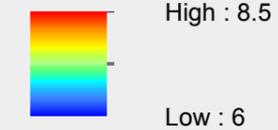
Produced: 01 April 2021  
Our Ref: CL210340  
NGR: 330558,435485

**Key**

 Main River

**Tidal Undefended 0.1% annual probability of flooding scenario**

mAOD

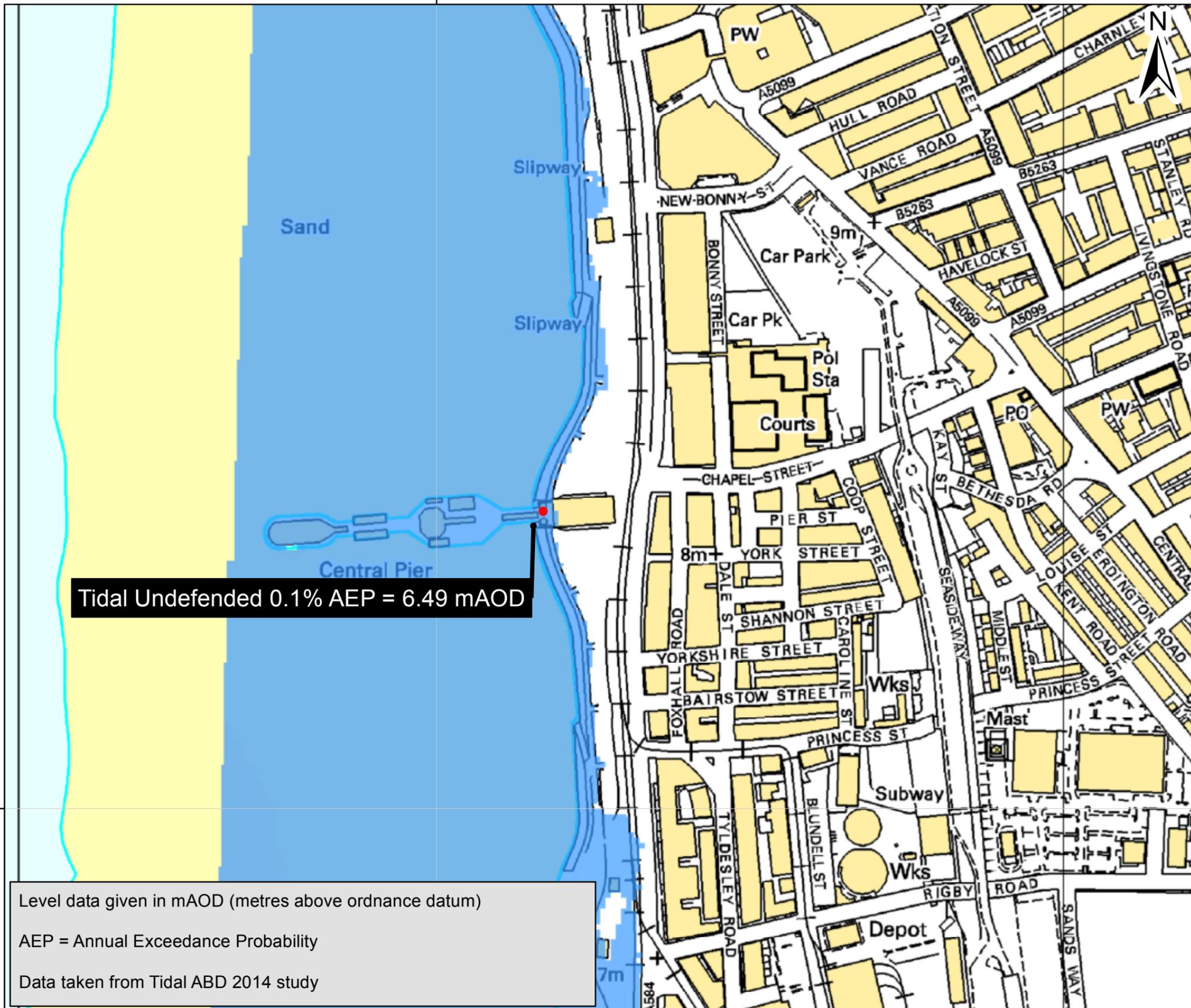
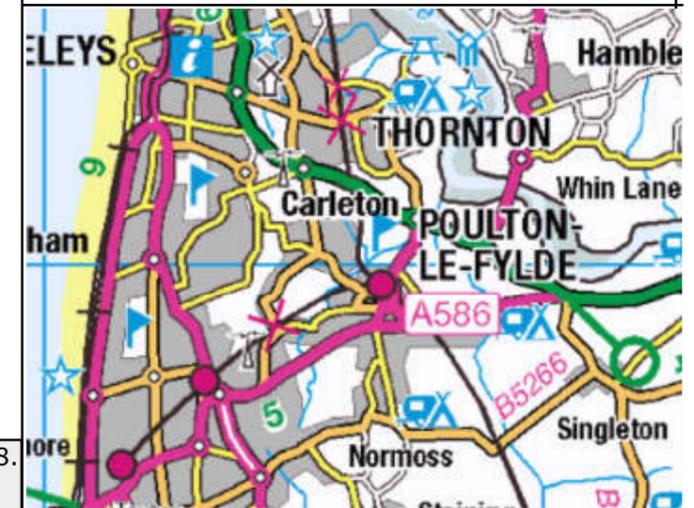


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Level data given in mAOD (metres above ordnance datum)

AEP = Annual Exceedance Probability

Data taken from Tidal ABD 2014 study

330400

435200

APPENDIX D – Flood Zone Map for Planning



# Flood map for planning

Your reference  
**21129 Central**

Location (easting/northing)  
**330558/435485**

Created  
**17 Mar 2021 13:37**

**Your selected location is in flood zone 3, an area with a high probability of flooding.**

## **This means:**

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see [www.gov.uk/guidance/flood-risk-assessment-standing-advice](http://www.gov.uk/guidance/flood-risk-assessment-standing-advice))

## **Notes**

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.  
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

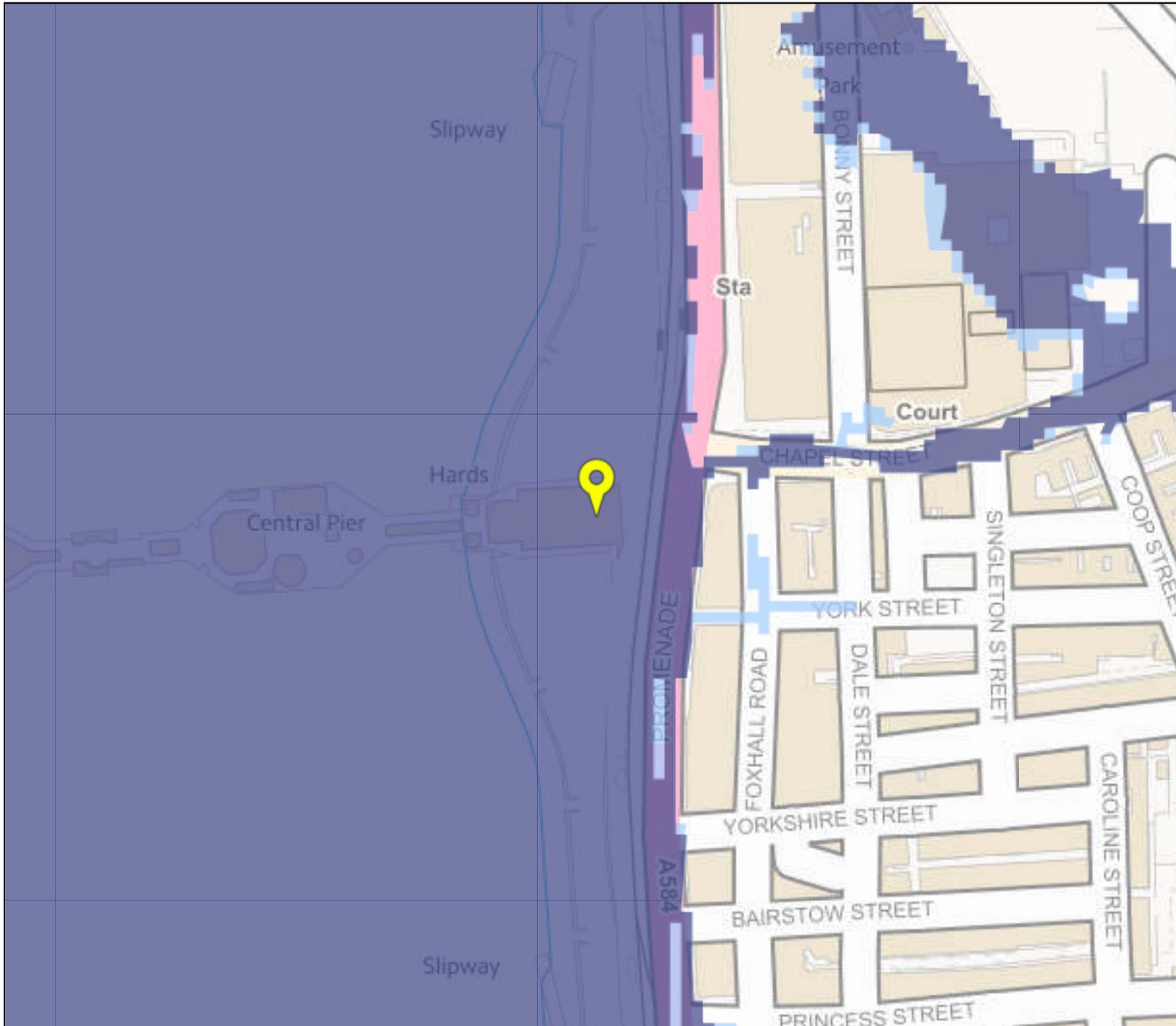
### Flood map for planning

Your reference  
**21129 Central**

Location (easting/northing)  
**330558/435485**

Scale  
**1:2500**

Created  
**17 Mar 2021 13:37**



-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area



APPENDIX E – Flood Risk Online Information



**CENTRAL PIER, PROMENADE, BLACKPOOL, FY1 5BB****Rivers and sea risk****High risk**

High risk means that each year this area has a chance of flooding of greater than 3.3%.

---

**Surface water risk****Very low risk**

Very low risk means that each year this area has a chance of flooding of less than 0.1%.

Lead local flood authorities (LLFA) manage the risk from surface water flooding and may hold more detailed information. Your LLFA is **Blackpool**.

---

**Reservoir risk**

There is no risk of reservoir flooding

---

**Groundwater risk**

No risk of groundwater flooding

---

APPENDIX F – Proposed Indicative Drainage Layout





APPENDIX G – Greenfield Runoff Document



FLOOD FLOW LTD

CONSULTING CIVIL AND  
STRUCTURAL ENGINEERS

Tel: 07940 523819

Website: [www.floodflow.co.uk](http://www.floodflow.co.uk)

Email: [mail@floodflow.co.uk](mailto:mail@floodflow.co.uk)



**21129 - Greenfield Runoff for the Proposed Development**

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.039	Urban	0.000
SAAR (mm)	899	Region Number	Region 10

**Results 1/s**

QBAR Rural 0.2

QBAR Urban 0.2

Q100 years 0.5

Q1 year 0.2

Q30 years 0.4

Q100 years 0.5

**Director:** Jason Jones B.Eng (Hons) MCIHT NMICE,  
Associate Directors: Adam John Jones B.Eng (Hons) MEng CIWEM, Ausrine Jones BSc MSc

APPENDIX H – Attenuation Calculations





**21129 Central Pier, Blackpool**

**Attenuation Calculations**

**1 in 100 yr plus 30% CC**

Parameter	Value
FSR Rainfall	FSR Rainfall
Return Period (years)	100
Region	England and Wales
M5-60 (mm)	18.000
Ratio R	0.350
Cv (Summer)	0.750
Cv (Winter)	0.840
Impermeable Area (ha)	0.039
Maximum Allowable Discharge (l/s)	5.0
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	30

Buttons: Analyse, OK, Cancel, Help

Footer: Enter Climate Change between -100 and 600

**Global Variables require approximate storage of between 4.4 m<sup>3</sup> and 10 m<sup>3</sup>.**

Buttons: Analyse, OK, Cancel, Help

Footer: Enter Climate Change between -100 and 600

Director: Jason.Jones B.Eng (Hons) MCIHT NMICE,  
Associate Directors: Adam John Jones B.Eng (Hons) MEng CIWEM, Ausrine Jones BSc MSc