

FLOOD CONSEQUENCES ASSESSMENT USKMOUTH POWER STATION DEVELOPMENT

On behalf of SIMEC Uskmouth Power Ltd.

HLEF74825
Flood Consequences
Assessment
V2
May 2020

REPORT

Quality Management

| Version | Status | Authored by | Reviewed by | Approved by | Review date |
|---------|---|-----------------|-----------------|---------------|-------------|
| V1 | Draft | Daniel Percival | Jonathan Morley | Ola Holmstrom | 31/01/20 |
| V2 | Final – following response to client comments | Daniel Percival | Jonathan Morley | Ola Holmstrom | 20/05/20 |

Approval for issue

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31 January 2020

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1 SCOPE OF WORK

Background

- 1.1 RPS Consulting Services Ltd ('RPS') has been instructed by SIMEC Uskmouth Power Ltd to prepare a site-specific Flood Consequences Assessment (FCA) to support the planning application for the construction of the Proposed Development that will together with the Power Station Upgrade facilitate the delivery of the operational phase of the Uskmouth Conversion Project.
- 1.2 This FCA forms Appendix 6.1 of the Environmental Statement (ES) prepared on behalf of SIMEC Uskmouth Power Ltd.
- 1.3 The FCA has been prepared in accordance with Planning Policy Wales and Technical Advice Note (TAN) 15: Development and Flood Risk.
- 1.4 The key objectives of the FCA are:
- To assess the flood consequences to the Proposed Development and to demonstrate the feasibility of appropriately designing the Proposed Development such that any residual flood consequence to the Uskmouth Conversion Project and its uses would be acceptable;
 - To assess the potential impact of the Proposed Development and associated developments on flood consequences elsewhere and to demonstrate the feasibility of appropriately designing the Proposed Development such that the Proposed Development would not increase the consequences of flooding elsewhere; and
 - To satisfy the requirements of National and Local Planning policy relating to flood risk.
- 1.5 The FCA should be read in conjunction with the Outline Surface Water Drainage Strategy (Appendix 6.2) produced by RPS (report ref 019784-RPS-XX-XX-RP-D-0300).
- 1.6 The FCA comprises a desk study that has been undertaken with reference to information provided/published by the following bodies:
- Natural Resources Wales (NRW);
 - Newport City Council (NCC);
 - Welsh Water (WW);
 - Ordnance Survey (OS); and
 - British Geological Survey (BGS).
- 1.7 A site visit was undertaken by an experienced hydrologist on 19 January 2020.

Methodology

- 1.8 The proposed study area of the FCA follows the Uskmouth Power Station hydrology, drainage and flood risk study area as defined in Volume 3, Chapter 6: Hydrology, Drainage and Flood Risk. It includes a 500 m buffer around the Uskmouth Conversion Project site boundary.
- 1.9 The buffers applied are considered appropriate for data collection taking into account the nature of Uskmouth Conversion Project including the Proposed Development and likely zone of influence on hydrological receptors.
- 1.10 In order to achieve the objectives outlined above, a staged approach was adopted in undertaking the FCA in accordance with PPW10, TAN15 and Local Policies. Initially, screening studies have been undertaken utilising publicly available information, records and data to identify whether there are any potential sources of flooding within the site and elsewhere in the Proposed Development hydrology, drainage and flood risk study area, which may warrant further consideration. Identified potential flooding issues are then assessed further within a specific flood risk section.

2 PLANNING POLICY CONTEXT

National Planning Policy

Planning Policy Wales (Edition 10, December 2018)

- 2.1 Section 6.6 of Planning Policy Wales Edition 10 (PPW10) relates to 'Water and Flood Risk' and outlines the Welsh Government's objectives in terms of addressing flood risk.
- 2.2 PPW10 states that all development on land within the flood plain of a watercourse, or drained via culvert, or on low lying land adjacent to tidal water is at some risk of flooding and whilst flood risk can be reduced using mitigation measures it can never be completely eliminated.
- 2.3 Paragraph 6.6.22 states climate change is likely to increase the risk of flooding as a result of sea-level rises, increased storminess and more intense rainfall. Flooding as a hazard involves the consideration of the potential consequences of flooding, as well as the likelihood of an event occurring. Planning authorities should adopt a precautionary approach of positive avoidance of development in areas of flooding from the sea or from rivers. Surface water flooding will affect choice of location and the layout and design of schemes and these factors should be considered at an early stage in formulating development proposals.

TAN 15: Development and Flood Risk (July 2004)

- 2.4 TAN 15 provides technical guidance which supplements the policy set out in PPW10 in relation to development and flooding. It advises on development and flood risk as this relates to sustainability principles and provides a framework within which risks arising from both river and coastal flooding, and from additional run-off from development in any location can be assessed.

Local Planning Policy

- 2.5 The Newport Local Development Plan 2011-2026 was adopted by NCC in January 2015. The Local Development Plan contains the following policy in relation to flood risk:

Policy SP3 Flood Risk

- 2.6 Policy SP3 states that:

"Newport's Coastal and Riverside Location Necessitates that development be directed away from areas where flood risk is identified as a constraint and ensure that the risk of flooding is not increased elsewhere. Development will only be permitted in flood risk areas in accordance with national guidance. Where appropriate a detailed technical assessment will be required to ensure that the development is designed to cope with the threat and consequences of flooding over its lifetime. Sustainable solutions to manage flood risk should be prioritised."

Policy GP1 General Development Principles – Climate Change

- 2.7 Policy GP1 states that:

"Development proposals should be designed to withstand the predicted changes in the local climate change to reduce the risk of flooding on site and elsewhere by demonstrating where appropriate that the risks and consequences of flooding can be acceptable managed, including avoiding the use of non-permeable hard surfaces."

Policy CE9 Coastal Zone

2.8 Policy CE9 states that

“Development will not be permitted in the coastal area or adjoining the tidal river unless:

i) In the undeveloped coastal area such development is required to be on the coast to meet an exceptional need which cannot reasonably be accommodated elsewhere;

ii) the area is not itself at risk nor will the proposed development exacerbate risks from erosion, flooding or land instability.

Development which requires a coastal location should be sited within the developed coastal zone.”

Climate Change

2.9 PPW10 sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. PPW10 and TAN 15 explain when and how FCAs should be used. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.

2.10 In December 2016 the Welsh Government and NRW updated advice on climate change allowances. The new advice requires that FCAs and Strategic FCAs take into account, where appropriate, increases in rainfall intensity, peak river flows and sea level rise. Table 2.1 presents both the central and upper end estimates for climate change associated with rainfall intensity to understand the range of impact whilst Table 2.2 present changes to river flood flows.

Table 2.1: Change to extreme rainfall intensity compared to a 1961-90 baseline

| Applies across all of Wales | Total potential change anticipated for '2020s' (2015- 39) | Total potential change anticipated for '2050s' (2040- 2069) | Total potential change anticipated for the '2080s' (2070-2115) |
|-----------------------------|---|---|--|
| Upper Estimate | 10% | 20% | 40% |
| Central Estimate | 5% | 10% | 20% |

Table 2.2: Changes to river flood flows by river basin district (use 1961-90 baseline)

| Severn | Total potential change anticipated for '2020s' (2015- 39) | Total potential change anticipated for '2050s' (2040- 2069) | Total potential change anticipated for the '2080s' (2070-2115) |
|------------------|---|---|--|
| Upper Estimate | 25% | 40% | 70% |
| Central Estimate | 10% | 20% | 25% |

Sea Level Allowances

2.11 The guidance provides a single regional allowance for each epoch or timeframe for sea level rise, summarised in Table 2.3.

Table 2.3: Sea Level Allowances (2008 baseline)

| Wales | 2009 to 2025 | 2026 to 2055 | 2056 to 2085 | 2086 to 2116 | Cumulative rise to 2116 (m) |
|-----------------------|--------------|--------------|--------------|----------------|-----------------------------|
| Annual Change (mm/yr) | 3.5 (59.5mm) | 8.0 (240mm) | 11.5 (345mm) | 14.5 (449.5mm) | 1.094 m |

- 2.12 The climate change guidance notes that the allowances provided have been derived from regional scale research. There may be cases where local evidence supports the use of other local climate change allowances. With specific reference to changes to extreme rainfall, LIT 5707 notes that UKCP09 provides useful information on change to rainfall across the UK.
- 2.13 RPS has added 40% to all attenuation/runoff calculations for the proposed development to account for climate change.

3 SOURCES OF INFORMATION

3.1 Table 3.1 lists the sources of information consulted during the preparation of this FCA.

Table 3.1: Sources of information

| Data | Source | Notes |
|----------------------------|---|---|
| Site Setting and hydrology | OS Mapping. NRW | Area information, rivers and other watercourses, general site environment, built environment, catchment information |
| Geology | BGS online mapping | Site and area geology |
| Flood mapping | NRW long term flood maps TAN15 Development Advice Mapping | Flood risk from rivers and sea, surface water, reservoir flood risk, development advice mapping |
| NRW | NRW data holdings, customer service and engagement team | Current flood risk, local flood defences, flood levels |
| Local Planning Authority | NCC | Local Flood Risk Management Strategy |
| Water Authority | WW | Water and sewerage assets in the vicinity of the site |

4 SITE SETTING

Site Location and Description

- 4.1 The existing Uskmouth Power Station is located on the eastern bank of the River Usk, close to its confluence with the Severn Estuary, approximately 4 km south of central Newport at grid reference ST 32830 83838.
- 4.2 Uskmouth Power Station was constructed in the 1960s and currently comprises:
- The main power station buildings housing furnaces, boilers, steam turbines and electrical generators;
 - Offices, workshop buildings and car parking;
 - Two linear banks of cooling towers;
 - A single exhaust stack;
 - A coal storage area, conveyor systems and pulverising mills;
 - A pulverised fuel ash storage area;
 - Railway tracks and coal unloading facility;
 - Electrical export equipment; and
 - Areas of landscaping and surface water drainage including a large attenuation pond.

Surrounding Land Uses

- 4.3 Immediately to the west, the site adjoins the Severn Power combined cycle gas turbine (CCGT) power station which was constructed in 2007 on the site of the former Uskmouth A coal-fired power station.
- 4.4 Immediately to the north of the site is the River Usk and to the east is the railway line, a mixture of land with vegetation, hardstanding and a sewage treatment works. To the south the site is bounded by former ash pits (now vegetated) beyond which is the Newport Wetlands national nature reserve
- 4.5 The wider site setting is industrialised to the north, with the Liberty Steel works and industrial estates on the east bank of the River Usk stretching from the Uskmouth Conversion Project site to the A48 'Southern Distributor Road' dual carriageway through the outskirts of Newport.
- 4.6 The River Usk and the Severn Estuary lie beyond the CCGT power station and Newport Wetlands to the west and south. On the west bank of the Usk is Alexandra Docks, with commercial and industrial land-uses.
- 4.7 To the east, the wider setting is rural, with farmland, minor roads, reens (drainage channels) and individual or small groups of houses. The nearest settlement is the village of Nash, at a little over 1 km from the Uskmouth Conversion Project site.

Topography

- 4.8 A Topographic Survey of the site has been undertaken by The Survey Association and is included as Annex A. The Topographic Survey indicates levels within the site range between approximately 9 m Above Ordnance Datum (m AOD) along the northern boundary falling to 7.00 m AOD within the former coal stocking area.

Uskmouth Conversion Project

- 4.9 The Uskmouth Conversion Project comprises of converting the existing coal-fired power plant at Uskmouth to a plant that would generate electricity through the combustion of waste derived fuel pellets. The Uskmouth Conversion Project would include the Power Station Upgrade that would refurbish two combustions units, known as units 13 (110 MWe) and 14 (110 MWe) and associated plant, to provide 220 (MWe) megawatts of electrical energy generating capacity. The Power Station Upgrade together with the Proposed Development, providing fuel storage and supporting infrastructure will facilitate the operational phase of Uskmouth Conversion Project. The operational lifetime of the Uskmouth Conversion Project is expected to be 20 years post commissioning.
- 4.10 The Proposed Development comprises of the construction of fuel storage silos, conveyor systems, improved rail fuel unloading facilities also vessels and infrastructure for the delivery and storage of flue gas treatment reagents and residues.
- 4.11 The outward appearance of the existing power station buildings and exhaust stack would remain unchanged as the Power Station Upgrade, would involve changes to equipment made within the envelope of the existing buildings. The most visible difference to the appearance of the site will be from the Proposed Development, to include new fuel storage silos as well as new and refurbished conveyors. The primary storage silos will be constructed on the existing coal storage area. The footprint of fuel pellet storage silos will be smaller in comparison to that of the footprint of existing to external storage of coal. The resulting areas of the existing coal storage area being returned to green infrastructure.
- 4.12 No demolition is required. The construction phase, including the Proposed Development and Power Station Upgrade is anticipated to take around 18 months.
- 4.13 The new pellet storage silos, associated hardstanding and internal access road spurs would add only a small amount of additional impermeable surface relative to the existing power station site.

5 FLOOD RISK

Hydrological Overview

- 5.1 The River Usk passes to the north and west of the site as it flows in a southerly direction before discharging into the Severn Estuary. The River Usk is an NRW defined Main River and is tidally dominated within the vicinity of the site. An existing attenuation pond is located in the south east of the site.
- 5.2 The southern boundary of the site is defined by an existing coal stock ditch which runs around the edge of the coal storage area. The ditch conveys run off from the coal storage area in a general northerly direction pass through a lamella plate clarifier before discharging into an attenuation pond. Water is then directed to a drainage channel via an outfall on the southwest corner of the pond from where flows head south and then west along the perimeter of the coal storage area parallel to the coal runoff ditch. Water then finally discharges into the estuary via a headwall on the Usk coastline.
- 5.2 The Caldicot and Wentlooge Levels, which comprises a series of drainage channels and reens, is located to the south east of the site. The reen network is shown to discharge into Julian's Reen which discharges into the River Usk via Julian's Pill approximately 500 m north east of the site. OS mapping indicates levels within the Levels are between approximately 6 – 7 m AOD.
- 5.3 The Newport Wetlands National Nature Reserve is located approximately 500 m south of the site. The Nature Reserve comprises a series of ponds/lakes.

Tidal Flooding

- 5.1 The NRW Flood Map (Figure 1) indicates the existing site is predominantly located within Flood Zone 2 which is defined by the NRW as *"the extent of a flood from rivers or from the sea with up to a 1 in 1,000 chance of happening in any given year"*. The southern area of the site is shown to be partially located in Flood Zone 3 which is defined by the NRW as *"the extent of a flood from sea with a 1 in 200 chance or greater of happening in any given year"*.
- 5.2 Existing cooling towers in the north east of the site are shown to be located within an area of Flood Zone 1, however, this area is surrounded by Flood Zone 2 and is therefore considered to be a dry island which are generally considered to be at the same risk of flooding as the surrounding Flood Zone.

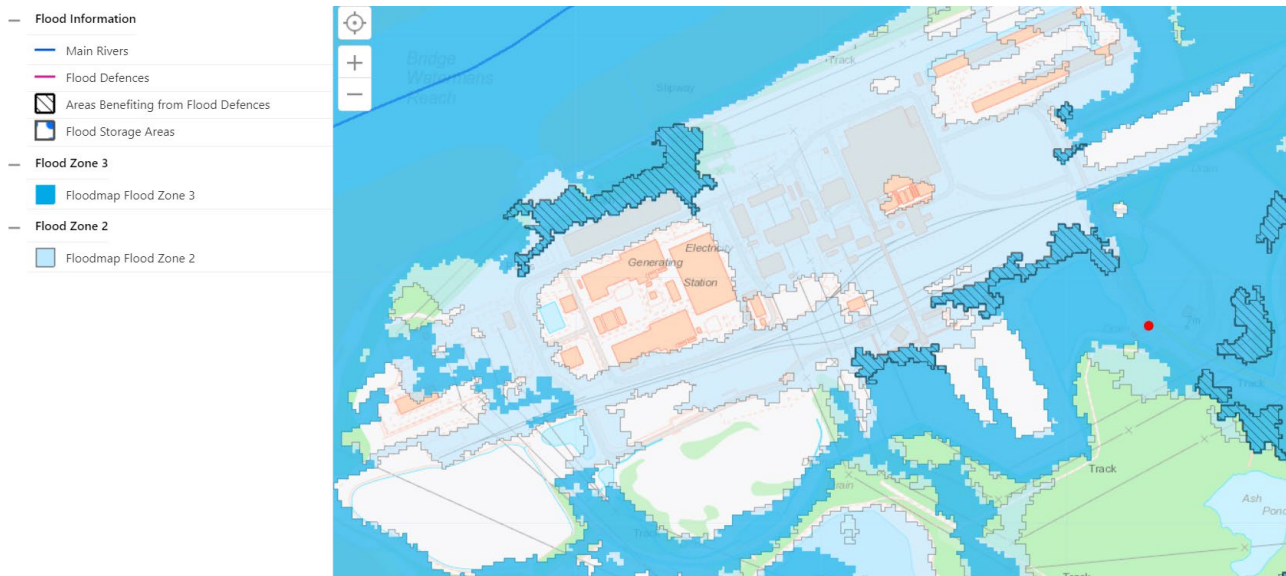


Figure 1: NRW online Flood Map

5.4 TAN15 Development Advice Mapping (Figure 2) indicates the site is predominantly located in Zone C1 which is described as “Areas of the floodplain which are developed and served by significant infrastructure, including flood defences”. The southern area of the site, the north eastern area of the site and a small area in the central area of the site shown to be located within Zone B which is described “areas known to have been flooded in the past evidenced by sedimentary deposits.”

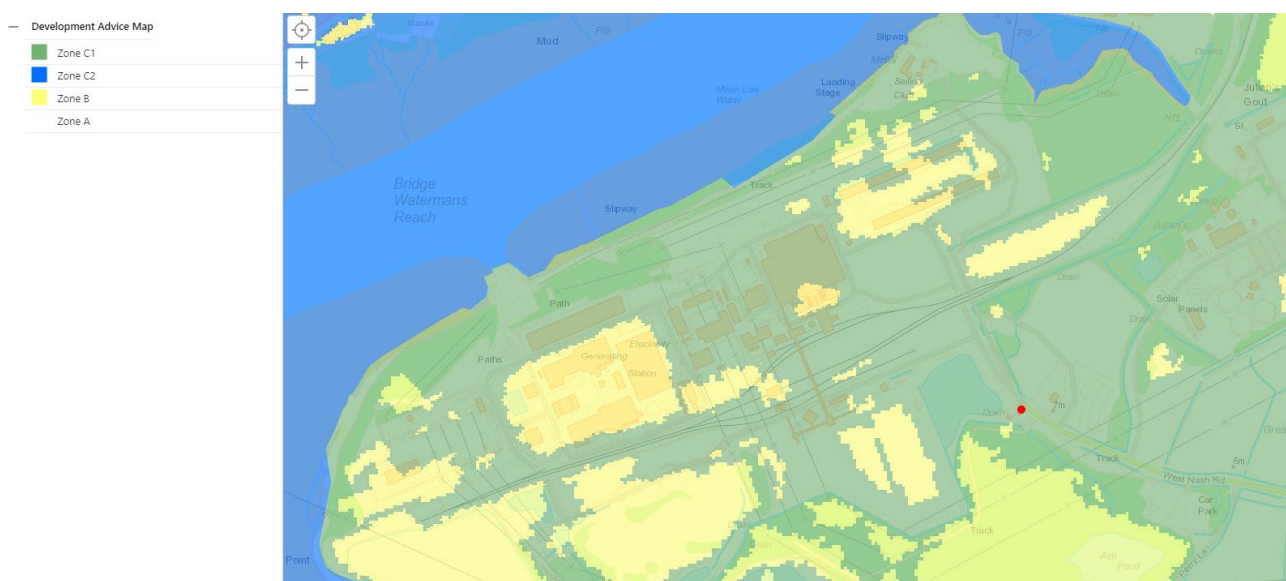


Figure 2: TAN15 Development Advice Mapping

5.1 Based on the nature flood risk indicated on published mapping, modelled flood level data was requested from NRW. NRW subsequently provided a copy of their existing hydraulic model for Newport in August 2019. The most recent version of the model (Version 6, October 2016) amalgamated a number of existing hydraulic models into one model. Model runs were undertaken for a range of return period scenarios including the 1 in 5, 1 in 20, 1 in 75, 1 in 100, 1 in 200 and a 1 in 1,000 year defended. scenarios. Additional model runs were undertaken for the 1 in 200 and 1 in 1,000 year events to take into account confidence intervals. The base year for the model was taken as 2015, with climate change values set at 75 years (2090) and 100 years (2115). To account for climate change, the FCDPAG3 guidance was used.

- 5.2 Prior to issue of the aforementioned hydraulic model, the NRW noted that extreme sea level information around the Welsh Coastline will shortly be subject to change following publication of the Coastal Flood Boundary Conditions for the UK Update 2018 project. The NRW anticipated that this updated information would be made available in Summer 2019, however, the information has not been provided at this stage. As such, for the purposes of this assessment, the existing publicly available data has been considered.
- 5.3 Modelled flood levels have been extracted for a series of node points within the Uskmouth Power Station site (Figure 3) from the model provided by the NRW and these are provided in Table 5.1. For the purposes of this assessment, confidence interval (CI) model runs have been considered as NRW has advised that this higher value can be used to future proof development. Based on the anticipated design life of the development, modelled flood levels for the 2090 scenario are considered the most appropriate to inform the design of flood risk mitigation. The site is shown to not be impacted during the present day (2015) 1 in 200 year scenario.

Table 5.1: Modelled flood levels extracted from NRW Newport Model Version 6, October 2016

| Node Point | Node Level (m AOD) based on Topographic Survey | Defended Scenarios | | | | | |
|------------|--|------------------------------------|--------------------------------|--------------------------------------|----------------------------------|------------------------------------|--------------------------------|
| | | 1 in 200 year 2090CI level (m AOD) | 1 in 200 year 2090CI depth (m) | 1 in 1,000 year 2015CI level (m AOD) | 1 in 1,000 year 2015CI depth (m) | 1 in 1,000 year 2090 level (m AOD) | 1 in 1,000 year 2090 depth (m) |
| SUP 01 | 8.30 | 9.22 | 0.92 | 9.17 | 0.87 | 9.32 | 1.02 |
| SUP 02 | 8.90 | 9.03 | 0.13 | 8.98 | 0.08 | 9.11 | 0.21 |
| SUP 03 | 8.57 | 8.84 | 0.27 | 8.80 | 0.23 | 8.90 | 0.33 |
| SUP 04 | 7.48 | 8.65 | 1.17 | 8.47 | 0.99 | 8.94 | 1.46 |
| SUP 05 | 7.20 | null | null | null | null | null | null |
| SUP 06 | 7.00 | null | null | null | null | null | null |
| SUP 07 | 7.20 | 8.61 | 1.41 | 8.45 | 1.25 | 8.88 | 1.68 |
| SUP 08 | 7.25 | 8.59 | 1.34 | 8.44 | 1.19 | 8.85 | 1.60 |

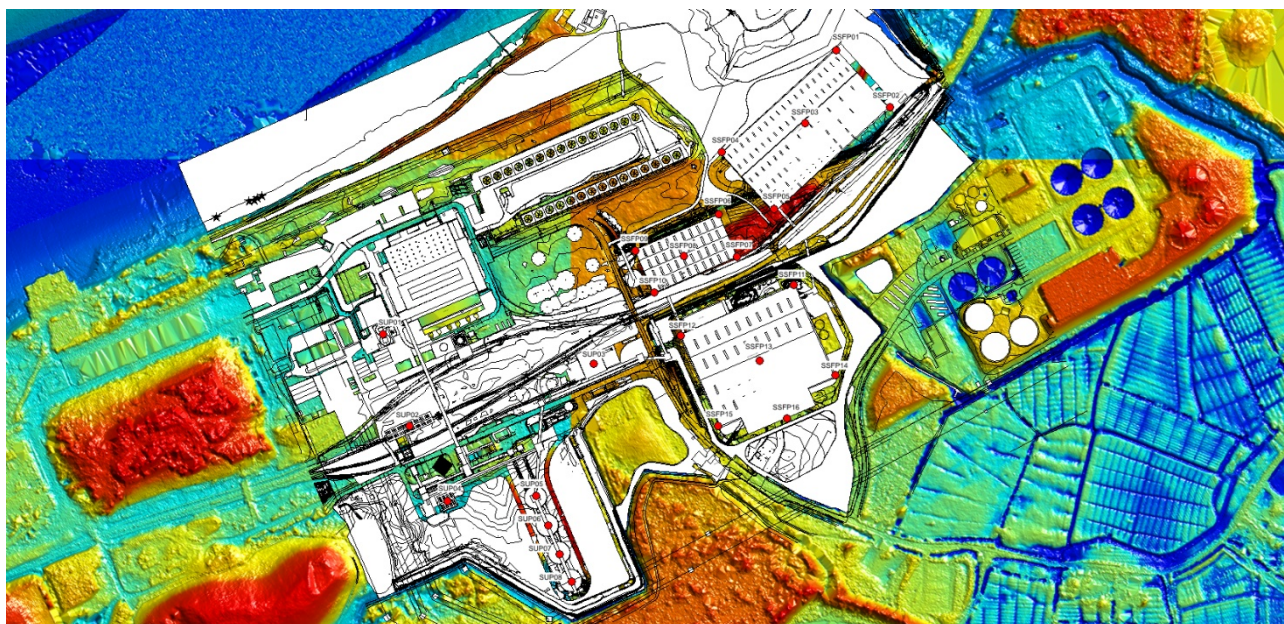


Figure 3: SUP modelled flood level node locations

- 5.4 Based on the above, the northern area of the site (SUP01) may be impacted by tidal flooding to a depth of 0.92 m during the 1 in 200 year 2090 defended scenario. The central area of the site (SUP02 and SUP03) may be impacted by flooding to a depth of 0.27 m during the 1 in 200 year 2090 defended scenario. The southern area of the site (SUP04 – SUP08) may be impacted by flooding to a depth of 1.41 m during the 1 in 200 year 2090 defended scenario.
- 5.5 At node points SUP05 and SUP06, the data supplied by NRW indicates that there would be no flooding in these locations, however, the topographic data within the NRW hydraulic model is likely to represent former coal stocks which were raised above surrounding ground levels. As such, the data provided for SUP07 is likely to be more representative of flooding at SUP05 and SUP06.
- 5.6 The node data extracted from the NRW Newport modelling exercise identifies that modelled water level vary across the site by approximately 400 mm with higher levels recorded within the Power station reducing towards the coal stocking area. This variation is associated with the overlap of two model domains, whereby the Newport Mapping Study model extents to the mouth of the River Usk immediately to the north of the site with flood extents reaching inland to the northern area of the Power Station. Whilst flooding shown within the former coal stocking area has been generated within the Newport SFRM Modelling which includes a tidal model. Each model is based on a specific set of parameters taking into account the aims of the study. Water levels within a model can alter in part due to the estuarine environment within which the study is undertaken, whereby both 'barotropic' and 'baroclinic' components effect flow, including geomorphology, bathymetry, wave effects and asymmetry of tidal propagation.
- 5.7 In addition to the above, breach modelling for the present day (2015) was also undertaken as part of the NRW Newport modelling exercise. The results of the breach modelling exercise indicate the site would not be impacted in the event of a breach during the 1 in 200 year 2015 scenario.
- 5.8 Given the complex nature of the water environment node data has been extracted from the model at key location associated with the Uskmouth Conversion Project , presented in Table 5.1 as utilised to inform the flood risk to the Uskmouth Conversion Project.

Surface Water Flooding

- 5.9 Surface water flooding is caused by rainfall generated overland flow, before the runoff enters a watercourse or sewer. In such events sewerage and drainage systems and surface watercourses

may be entirely overwhelmed. Surface water flood risk is assessed by simulating an extreme rainfall event over a 6.5 hours duration designed to completely overwhelm urban drainage systems, with 2D modelling used to identify overland flow routes and areas where surface water will pond.

- 5.10 Reference to the NRW online Surface Water Flood Map (Figure 4) indicates the site predominantly has a very low risk of surface water flooding. Small areas throughout the site are shown to have a low risk of surface water flooding which is likely due to the ponding of surface water run-off in topographic depressions within the site.



Figure 4: NRW online Surface Water Flood Map

Flood Defences

- 5.11 No formal flood defences are shown to protect the site.

Groundwater Flooding

- 5.12 British Geological Survey (BGS) online mapping (1:50,000 scale) indicates the site is underlain by superficial Tidal Flat Deposits which are described as comprising Clay and Silt. The site is shown to be further underlain by bedrock deposits from the Mercia Mudstone Group which is described as comprising Mudstone.
- 5.13 Consultation with NRW has established that they have no record of groundwater flooding within the site.
- 5.14 Reference to the Wye and USK Catchment Flood Management (Environment Agency, October 2010) indicates that groundwater is not considered to be a significant source of flooding.
- 5.15 The Newport City Council Preliminary Flood Risk Assessment (URS, April 2011) indicates that groundwater is not considered to be a significant risk and is considered to rise and fall relatively slowly. In addition, the PFRA notes the local geology is not considered to yield significant volumes of groundwater.
- 5.16 Recorded water strikes on the BGS borehole logs ST38SW/39-41 were at depths of 15.45 mBGL and 15.85 mBGL, at the interface between the base of the Tidal Flat Deposits and the Glaciofluvial Deposits.
- 5.17 Based on the above the risk associated with groundwater flooding is assessed as low.

Flooding due to Infrastructure Failure

- 5.18 No potential sources of flooding from artificial drainage systems, sewers or reservoirs have been identified and none have been reported.

Historical flood events

- 5.19 Anecdotal information supplied by the Applicant identifies a number of incidents during which basement areas within the site have been subject to flooding and required pumping.

6 FLOOD RISK VULNERABILITY CLASSIFICATION

Vulnerability Classification

- 6.1 In accordance with TAN 15, the Uskmouth Conversion Project including the Proposed Development is classified as a 'Highly Vulnerable' development in flood risk terms.

Table 6.1: Flood Risk Vulnerability and Zone Compatibility

| Flood Risk classification | Emergency Services | Highly Vulnerable | Less Vulnerable | Other |
|---------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------------|
| Zone A | Yes | Yes | Yes | Yes |
| Zone B | Yes | Yes | Yes | Yes |
| Zone C1 | Justification test required | Justification test required | Justification test required | Justification test required |
| Zone C2 | No | No | Justification test required | Acceptability of consequences |

Key: **Yes:** Development is appropriate, **No:** Development should not be permitted

Justification Test

- 6.2 The aim of the Justification Test is to steer new development towards suitable land in Zone A, otherwise to Zone B, where river or coastal flooding would be less of an issue. For developments in Zone C, the Justification Test is required. TAN15 states development will only be justified if it can be demonstrated that:
- a. Its location in Zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; **or**
 - b. Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;
- And**
- c. It concurs with the aim of PPW10 and meets the definition of previously developed land; and
 - d. The potential consequences of a flooding event for the particular type of development have been considered.
- 6.3 Whilst parts of the site are shown to be located within Zone B, the site is predominantly located within Zone 1 thus application of the Justification Test has been considered below.
- 6.4 With reference to point b, the Uskmouth Conversion Project has the potential for significant beneficial economic effects at a local level in relation to employment opportunities and the purchasing of local services by construction works. During operation, it is anticipated that there would a net increase of up to 15 staff.
- 6.5 With reference to point c, the Uskmouth Conversion Project comprises of conversion of the existing coal-fired power station (Power Station Upgrade) to generate electricity from the combustion of waste derived fuel pellets. The outward appearance of the existing power station buildings and exhaust stack would remain unchanged as other changes to equipment would be made within the envelope of the existing buildings. The most visible difference to the appearance of the site will be from the Proposed Development, to include new fuel storage silos as well as new and refurbished conveyors and rail infrastructure. The primary storage silos will be constructed on the existing coal storage area. The footprint of fuel pellet storage silos will be smaller in comparison to that of the footprint of existing to external storage of coal. The resulting areas of the existing coal storage area being returned to green infrastructure.

- 6.6 At this stage, the potential consequences of flooding have been considered as per the requirement of point d. As noted in Section 5, The northern area of the site may be impacted by tidal flooding to a depth of 0.92 m during the 1 in 200 year 2090 defended scenario (considered to be the design flood event). The central area of the site may be impacted by flooding to a depth of 0.27 m. The southern area of the site may be impacted by flooding to a depth of 1.41 m during the 1 in 200 year 2090 defended scenario. At this stage, it is understood that the proposed silos will be raised approximately 3 m above the existing ground level and will therefore be raised above the anticipated level of flooding. In addition, proposed conveyors will also be raised above surrounding ground levels. The proposed rail unloading facilities are required to be flush with surrounding ground levels therefore it is recommended these are constructed using flood resilient and resistant construction techniques.
- 6.7 It is recommended that the Uskmouth Conversion Project is registered with the NRW's flood warning service which allow site management to receive automatic alerts in the event flood warning/severe flood warnings are issued. In addition, it is recommended that a Flood Warning and Evacuation Plan (FWEP) is prepared to set out the procedures that site management and site staff should follow in the event a flood warning is issued. Based on the tidal nature of flooding it is anticipated that sufficient warning time would be available to safely evacuate from site, however, where insufficient time is available, safe refuge should be provided (i.e. a place at higher level to retreat to in the event of flooding).
- 6.8 Based on the above the requirement of point d is considered met.

7 FLOOD MANAGEMENT

Introduction

- 7.1 As noted in Section 5, the depth of flooding is likely to vary across the site in the event of flooding during the 1 in 200 year 2090 defended scenario. The northern area of the site may be impacted by tidal flooding to a depth of 0.92 m during the 1 in 200 year 2090 defended scenario. The central area of the site may be impacted by flooding to a depth of 0.27 m. The southern area of the site may be impacted by flooding to a depth of 1.41 m during the 1 in 200 year 2090 defended scenario.

Flood Risk Mitigation

- 7.2 The Uskmouth Conversion Project comprises the conversion of the existing coal-fired Uskmouth Power Station that would generate electricity by combusting waste derived fuel pellets. Reference to the Proposed Development indicates the construction of the following elements of external construction:
- fuel storage silos, connecting conveyor systems and a fuel pellet de-dusting building;
 - improved rail unloading facilities for the efficient rail delivery of fuel pellets;
 - altered and updated internal road network and drainage; and
 - vessels and infrastructure for the delivery, storage and removal of flue gas treatment (FGT) reagents and residues.
- 7.3 At this stage, it is understood that the proposed silos will be raised approximately 3 m above the existing ground level and will therefore be raised above the anticipated level of flooding. In addition, proposed conveyors will also be raised above surrounding ground levels. The proposed rail unloading facilities are required to be flush with surrounding ground levels therefore it is recommended they are constructed using flood resilient and resistant construction techniques.
- 7.4 It is recommended that the Uskmouth Conversion Project, including the Proposed Development, is registered with the NRW's flood warning service which allow site management to receive automatic alerts in the event flood warning/severe flood warnings are issued. In addition, it is recommended that a Flood Warning and Evacuation Plan (FWEP) is prepared to set out the procedures that site management and site staff should follow in the event a flood warning is issued. Based on the tidal nature of flooding it is anticipated that sufficient warning time would be available to safely evacuate from site, however, where insufficient time is available, safe refuge should be provided (i.e. a place at higher level to retreat to in the event of flooding).
- 7.5 Based on the tidal nature of flooding, there is no requirement to provide floodplain compensation within the site.

8 SURFACE WATER DRAINAGE

Surface Water Drainage Strategy

- 8.1 An Outline Drainage Strategy Report (Appendix 6.2) has been prepared by RPS and submitted as a standalone document (RPS 01784-RPS-XX-XX-RP-D-0300, dated December 2019). In brief, it is proposed to utilise existing drainage infrastructure where feasible. Surface water run-off generated within the Proposed Development will discharge to the existing coal stock ditch prior to discharging to the existing attenuation pond. Surface water run-off will be controlled by the existing lamella plate clarifier and Hydrobrake prior to discharge into the attenuation pond. Further details regarding the proposed surface water drainage strategy are provided in the aforementioned document.

9 SUMMARY AND CONCLUSIONS

- 9.1 A site-specific FCA in accordance with PPW10 and TAN 15 has been undertaken for the Uskmouth Conversion Project including the Proposed Development.
- 9.2 The NRW Flood Map, included as Figure 1, indicates the existing site is predominantly located within Flood Zone 2. The southern area of the site is shown to be partially located within Flood Zone 3. TAN15 Development Advice Mapping indicates the site is predominantly located within Zone C1, however, parts of the site are shown to be located in Zone B.
- 9.3 According to modelled flood level data obtained from NRW, the depth of flooding is likely to vary across the site in the event of flooding during the 1 in 200 year 2090 defended scenario. The northern area of the site may be impacted by tidal flooding to a depth of 0.92 m during the 1 in 200 year 2090 defended scenario. The central area of the site may be impacted by flooding to a depth of 0.27 m. The southern area of the site may be impacted by flooding to a depth of 1.41 m during the 1 in 200 year 2090 defended scenario.
- 9.4 Proposed silos will be raised approximately 3 m above the existing ground level and will therefore be raised above the anticipated level of flooding. In addition, proposed conveyors will also be raised above surrounding ground levels. The proposed rail unloading facilities are required to be flush with surrounding ground levels therefore it is recommended they are constructed using flood resilient and resistant construction techniques.
- 9.5 It is recommended that the Uskmouth Conversion Project including the Proposed Development is registered with the NRW's flood warning service which allow site management to receive automatic alerts in the event flood warning / severe flood warnings are issued. In addition, it is recommended that a Flood Warning and Evacuation Plan (FWEP) is prepared to set out the procedures that site management and site staff should follow in the event a flood warning is issued. Based on the tidal nature of flooding it is anticipated that sufficient warning time would be available to safely evacuate from site, however, where insufficient time is available, safe refuge should be provided (i.e. a place at higher level to retreat to in the event of flooding).
- 9.6 The site is considered to have a low risk of flooding from all other sources.
- 9.7 The Uskmouth Conversion Project is defined as "Highly Vulnerable" within TAN15, however, the development is considered to meet the requirements of the Justification Test (as set out in Section 7) and is therefore considered appropriate within Zone C1.
- 9.8 Overall, it has been demonstrated that the Uskmouth Conversion Project including the Proposed Development would be safe, without increasing flood risk elsewhere.

ANNEXES

Annex A

Topographic Survey (only available on request)