

FLOOD RISK AND DRAINAGE

JBA Project Code	2022s0514
Contract	Project Dragon (Phoenix Wharf, Port Talbot)
Client	LanzaTech UK Limited
Date	August 2022
Author	Faye Tomalin BSc (Hons) MSc C.WEM MCIWEM
Reviewer	Clare Burnell BSc (Hons) MSc
Subject	Flood Risk and Drainage Briefing Note

1 Introduction

This is a briefing note to facilitate discussion with Neath Port Talbot Local Planning Authority and SuDS Approval Body on Thursday 18th August 2022. This note summarises the work undertaken to date on flood risk and drainage, along with outlining the general principles to which the surface water drainage scheme means to comply.

2 Flood Risk

A Flood Consequence Assessment (FCA) has been prepared in support of the Environmental Impact Assessment (EIA) scoping opinion for the site. The FCA is currently written in line with the extant TAN-15. As a result of project programme shift, the FCA shall be required to be updated in line with the new TAN-15, expected to come into force on 1st June 2023. Consequently, the FCA currently considers the fluvial 1% Annual Exceedance Probability (AEP) plus an allowance for climate change and 0.1% AEP events, along with the tidal 0.5% AEP climate change and 0.1% AEP climate change events. The development, being industrial in nature, is considered to have a 75 year lifetime of development.

2.1 Current Understanding of Flood Risk

An update for TAN-15 was released in October 2021 and was due to come in force on the 1st December 2021. However, Welsh Government have since suspended the implementation of the new TAN15 until 1st June 2023. Although the new TAN15 is not a material consideration, Welsh Government and NRW are advising that some consideration is given to the draft Flood Map for Planning (FMfP) as best available information. Therefore, where a site is located in a FMfP flood risk zone it is recommended that an FCA is carried out, even where the site is not shown to be at risk on the Development Advice Map (DAM). Consequently, both the DAM and FMfP are considered.

The proposed development site is located within DAM Zone B, however, it is also partially located within Flood Zone 2 for fluvial flood risk and Flood Zone 3 for tidal flood risk on the FMfP, as shown in Figures 1 and 2 below. Consequently, an FCA is required.

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Figure 1 FMfP - Fluvial Flood Risk



Figure 2 FMfP - Tidal Flood Risk

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2.2 Flood Consequence Assessment

In order to comprehensively assess the risk of flooding to the proposed development site, flood modelling has been undertaken and presented within the FCA. The detailed fluvial and tidal flood risk model consisted of the 1D-2D linked ESTRY-TUFLOW Model of Port Talbot, originally developed by JBA Consulting in August 2017. This detailed model has since been updated for another location close to the proposed development (planning reference P2020 0303).

Updates to the modelling for this project include:

- Updating the building representation to be based solely on the OS Mastermap layer with a 90% blockage factor applied.
- Run the model with the latest version of TUFLOW.
- Update the tidal boundary conditions to be uplifted to 2021 to represent present-day conditions and consider the impact of the 2096 climate change epoch.

In accordance with Welsh Government Guidance on Climate Change Allowances for Planning Purposes the 75-year cumulative sea level rise needs to be considered for commercial land uses. To account for the impact of sea level rise over the lifetime of the development a further uplift was calculated for the 2096 scenario based on the Higher Central allowance (70th percentile) of the UKCP 18 for 2100, RCP 8.5 dataset.

Fluvial Flood Risk

The baseline model shows that the proposed development site is predicted to be flood free in the 0.1% AEP fluvial event, as shown in Figure 3. Therefore, no post-development fluvial modelling has been undertaken.



Figure 3 0.1% AEP Fluvial Event - Flood Depths

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Tidal Flood Risk

The tidal model shows that the proposed development site is predicted to be flood free in the 0.5% AEP event with an allowance for climate change. In the 0.1% AEP event with an allowance for climate change, a small area of the northern boundary is predicted to flood to depths of up to 250mm, as shown in Figure 4. The predicted water level is 7.3mAOD.

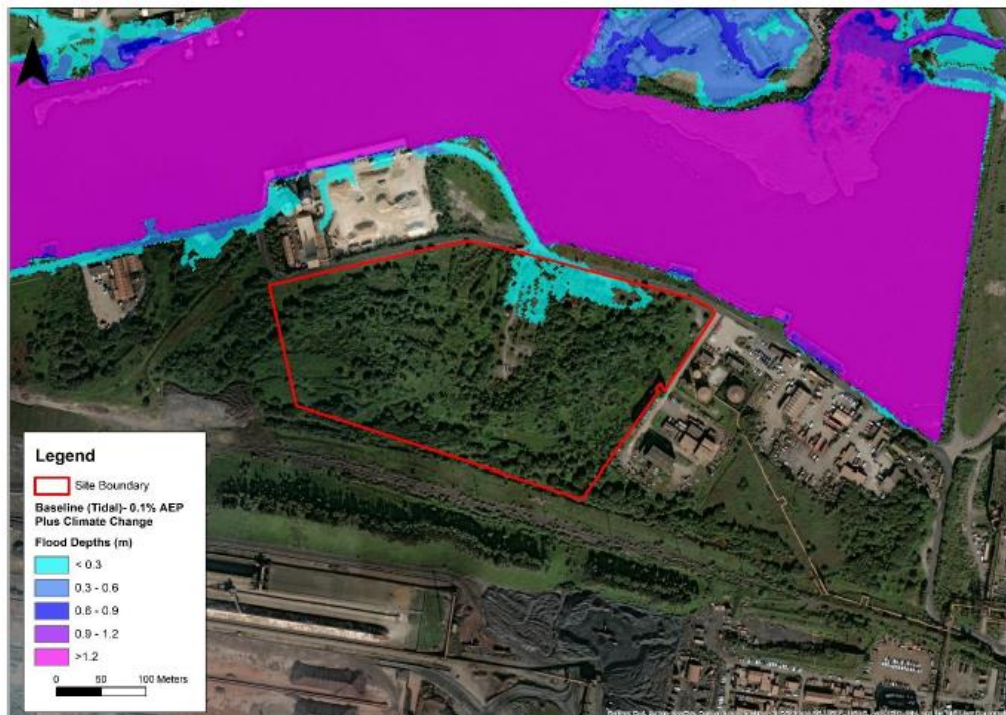


Figure 4 Baseline 0.1% AEP plus Climate Change Tidal Event - Flood Depths

As a result of the predicted flood depths across the site in the 0.1% AEP 2096 event, modest ground raising to a minimum ground level of 7.7mAOD (where ground levels do not already exceed this) across the development site is proposed.

As a result of ground raising, the site is predicted to be flood free in the 0.1% AEP plus climate change event, therefore complying with the requirements of A1.15 of TAN15. The predicted flood event for the 0.1% AEP event with an allowance for climate change post-development scenario is shown in Figure 5.

A comparison of maximum water depths from the baseline and post-development model results was undertaken to determine the impacts of the proposed development on off-site flood risk. A small area along the access road to the north of the site is predicted to increase in flooding by 36mm as a result of the proposed development.

There shall be no change to the frequency or extent of flooding as a result of the proposed development. Flood depths along the road are still predicted to be less than 300mm which are within the tolerable conditions as stated in A1-15 of TAN-15. The access road is owned by Associated British Ports (ABP) and therefore there will be no impact to any third parties land as a result of the proposed ground raising.

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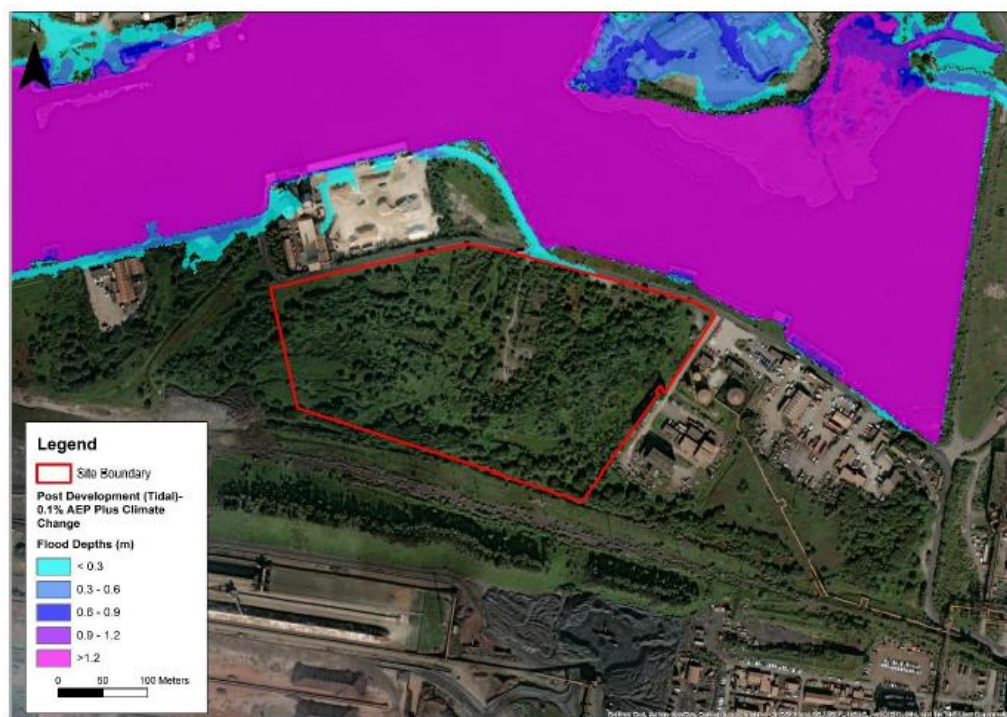


Figure 5 post-Development 0.1% AEP plus Climate Change Tidal Event - Flood Depths

3 Surface Water Drainage

A conceptual surface water drainage proposal for the site is being developed which will aim to control surface water runoff without increasing flood risk to other developments or impacting on water quality downstream. Sustainable Drainage Systems (SuDS) aim to mimic the natural processes of Greenfield surface water drainage by allowing water to flow along natural flow routes and also aims to reduce the runoff rates and volumes during storm events, whilst providing water treatment benefits. Schedule 3 of the Flood and Water Management Act 2010 was enacted in Wales in January 2019, leading to the requirement for all new developments to incorporate the four pillars of SuDS design.

3.1 Conceptual Drainage Strategy

The proposed development site is highly industrial, with the nature of the processes on site leading to a high potential for contamination. The development use/processes shall result in requirements to manage the potential for contamination prior to discharge of all surface water to the dock. Consequently, it is proposed to have two main surface water systems across the site. In areas where no contamination is anticipated, surface water shall be permitted to flow to the SuDS system and be discharged directly to the dock. In areas where contamination is anticipated, surface water shall be directed to the on-site wastewater treatment works.

3.2 Site Process Water and Potential for Contamination

Bunds are intended around hydrocarbon tanks and storage equipment that contains fluids that would contaminate the ground and watercourses if there was an unintended release. Ethanol tanks and caustic tanks will be bunded to ensure there is no accidental

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release of contaminants into the dock. In addition, equipment with the potential for leaks, such as rotating equipment, and the processing plant itself will be self-contained with a sump or bund system. Surface water from these areas shall flow directly to the wastewater treatment works prior to being discharged to the dock.

Relevant environmental permits shall be sought from NRW to facilitate discharge of such surface waters to the dock to ensure that there is no detriment to the surrounding environment as a result of the development.

Where possible across the site, process and utility water shall be reused as plant water across the site.

3.3 SuDS Implementation

Surface water in all areas outside of the potential contaminant zones, such as the office buildings and welfare facilities, the flare area and roads, shall be managed through the SuDS system, providing water quality, amenity and biodiversity benefits wherever possible.

SuDS Water Runoff Destination

The potential for water re-use across the development is being explored through the re-use of process water across the site. Full details are to be confirmed as to the viability of surface water from bunded areas of the site flowing towards the wastewater treatment works being included within this water re-use.

Given the underlying geology and previous industrial use across the site, it is unlikely that infiltration shall be a viable solution for surface water discharge. It is proposed that all SuDS assets shall be lined.

It is therefore proposed to discharge surface water from 'clean' areas of the site to Port Talbot Dock. Neath Port Talbot SuDS Approval Body (SAB) are minded to consider the docks a tidal waterbody. Further information requested by the SAB on the tidal nature of the dock shall be provided at pre-application stage.

Surface Water Runoff Hydraulic Control

As Port Talbot docks is tidally influenced there is no requirement to attenuate flows from the development site, this is in line with Standard G2.1 of the Statutory Standards for SuDS

"Where the surface water body is unaffected by either the discharge rate or volume of runoff (e.g. an estuary, the sea or a water body identified in the Local Flood Risk Management Strategy [LFRMS] as not needing hydraulic control of runoff to it), the hydraulic management control requirements are limited to the drainage service provisions for the site and adjacent areas that could be affected by the performance of the drainage system."

Given the direct connection to the dock for the surface water system, tidal locking of the outfall has been considered. The 1 in 20 year dock level has been considered. The 1 in 20 year tidal event coinciding with the 1 in 100 year plus 40% rainfall event has an extremely low probability of occurring and this therefore demonstrates a highly conservative estimation of flood risk to the development site. The 1 in 20 year dock level is 5.82mAOD. With a minimum ground level set at 7.7mAOD, it is therefore considered unlikely that the proposed SuDS system shall be tide locked in any design event. Therefore, attenuation shall not be required. As the proposed scheme progresses, this

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shall be verified, and further detail provided at pre-application and full submission stages.

Water Quality

The Simple Index Approach shall be utilised to determine a suitable treatment train across the site to manage water quality. It is proposed to utilise channel drains with fuel separators to manage surface water within highways across the site due to the elevated risk of contamination from these areas.

Amenity and Biodiversity

The use of SuDS to provide amenity and biodiversity benefits shall be focussed within the office and welfare facility area, to the north-eastern corner of the site. SuDS within this area are likely to be comprised of rain gardens, tree pits and swales.

Opportunities will be explored to provide SuDS across the site wherever possible as the proposed design scheme evolves.

Design for Construction, Maintenance and Structural Integrity

Schedule 3 of the Flood and Water Management Act was implemented in Wales on the 7th January 2019. Under this legislation, SuDS that serve multiple properties must be approved and adopted by the SuDS Approval Body (SAB) – a function performed by the Lead Local Flood Authority at Neath Port Talbot County Council. In the case of the proposed heavy industrial use of the site, the SuDS will serve a single curtilage and therefore the Client shall have the management and maintenance responsibilities for the proposed surface water drainage system. A detailed management and maintenance plan for the proposed system shall be provided at detailed design stage.