

File Note

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cc	
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Subject	Foul and Surface Water Drainage Summary Statement

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1. Introduction

Ove Arup and Partners have been appointed by WEPCo to provide engineering design services for a new Cardiff and Vale College located on Ffordd y Mileniwm and Hood Road in Barry. The Barry Waterfront Campus (BWC) is being developed under the Welsh Government's MIMWEP Framework. As part of this commission, Arup have developed a surface water drainage strategy for the site.

The proposed development covers an area greater than 100m² and therefore the proposed surface water drainage strategy must consider Sustainable Drainage Systems (SuDS) and is subject to approval by the SuDS Approval Body (SAB). The SAB for this scheme is Vale of Glamorgan (VoG). A pre-SAB application was submitted in November 2023, and formal SAB pre-application comments were received in February 2024.

2. Existing Site

2.1 Site Topography

The existing site comprises a grassed areas in the east, and areas of hardstanding in the west and along the northern boundary of the site. Existing levels on the site range from 8.3m above ordnance datum (AOD) in the west of the site and on the northern boundary, to 9.5m AOD within the grassed area in the south east of the site.

The eastern building plot is currently a grassed area with a high point at approximately 9.5mAOD which slopes to 9.15mAOD at the southern boundary, 8.4-8.5mAOD at the northern boundary and 9mAOD at the eastern boundary.

The BWC site is located at near the low point of a 1.3km² natural drainage catchment, which ultimately flows towards the Dock to the east of the site. Low points within the site boundary allow runoff to pond on the existing site during extreme rainfall events.

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2.2 Existing Drainage

Refer to Figure 1 for an extract from the DCWW record drawings showing existing public drainage within the site boundary.

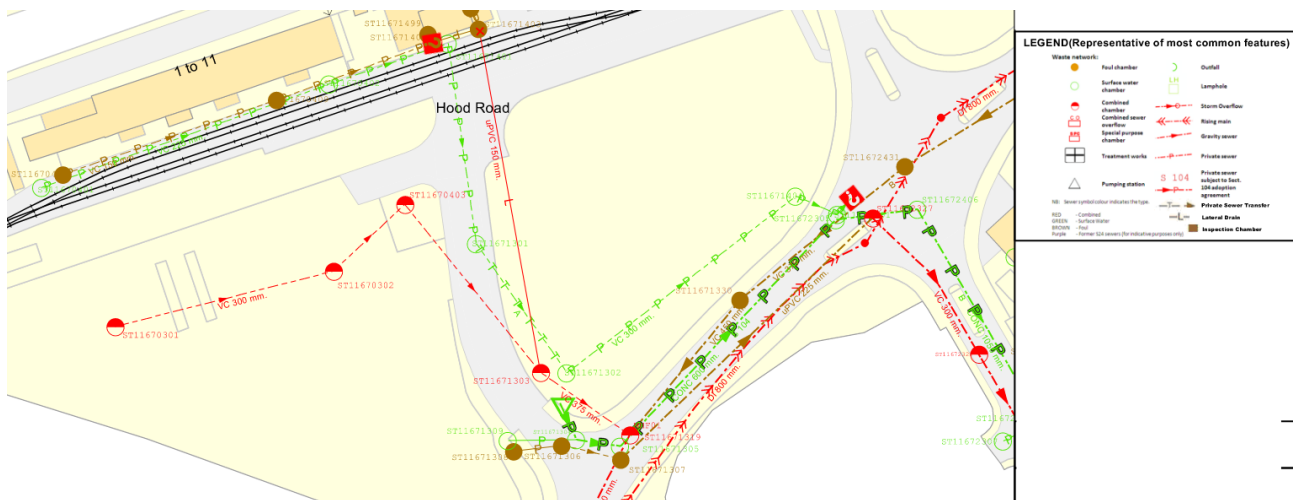


Figure 1: DCWW Record Information

As per Figure 1, record information shows a 300mm diameter DCWW combined drainage sewer in the west of the site which communicates to a chamber in the junction to the site from Ffordd Y Mileniwm. A 150mm diameter combined lateral drain connection from the Goodsheds site to the north is also shown on the DCWW record plans.

A 300mm diameter private storm sewer is present within the site which the Vale of Glamorgan Council (VoG) have confirmed as their asset. The sewer serves the Goodsheds development to the north and loops anticlockwise around the eastern half of the BWC site before exiting the site near the Hood Road/Ffordd y Mileniwm junction. DCWW records show this continues along Neptune Road and discharges into the Dock.

A network of storm drainage pipes and gullies are present in the west of the site which appear to serve the existing hardstanding. CCTV survey shows that this drainage communicates with the 300mm diameter surface water sewer present in the site.

Plans received from VoG show the presence of an 8'x8' (internal) historic culvert which enabled the water level in the dock and the now redundant 'West Pond' to be balanced. VoG believe that the culvert is no longer active or receives any positive flows however they do not have firm records to confirm this. VoG confirmed that the culvert falls under riparian ownership.

3. Flooding Consideration

The TAN15 and Natural Resources Wales (NRW) Flood Maps have been assessed for the site and can be seen in Appendix A. The majority of the site is within Zone B as identified in the TAN15 Development Advice Map (DAM), areas known to have experienced fluvial and/or tidal flooding in the past, as evidenced by sedimentary deposits. Figure 2 shows the site boundary overlaid on the DAM.

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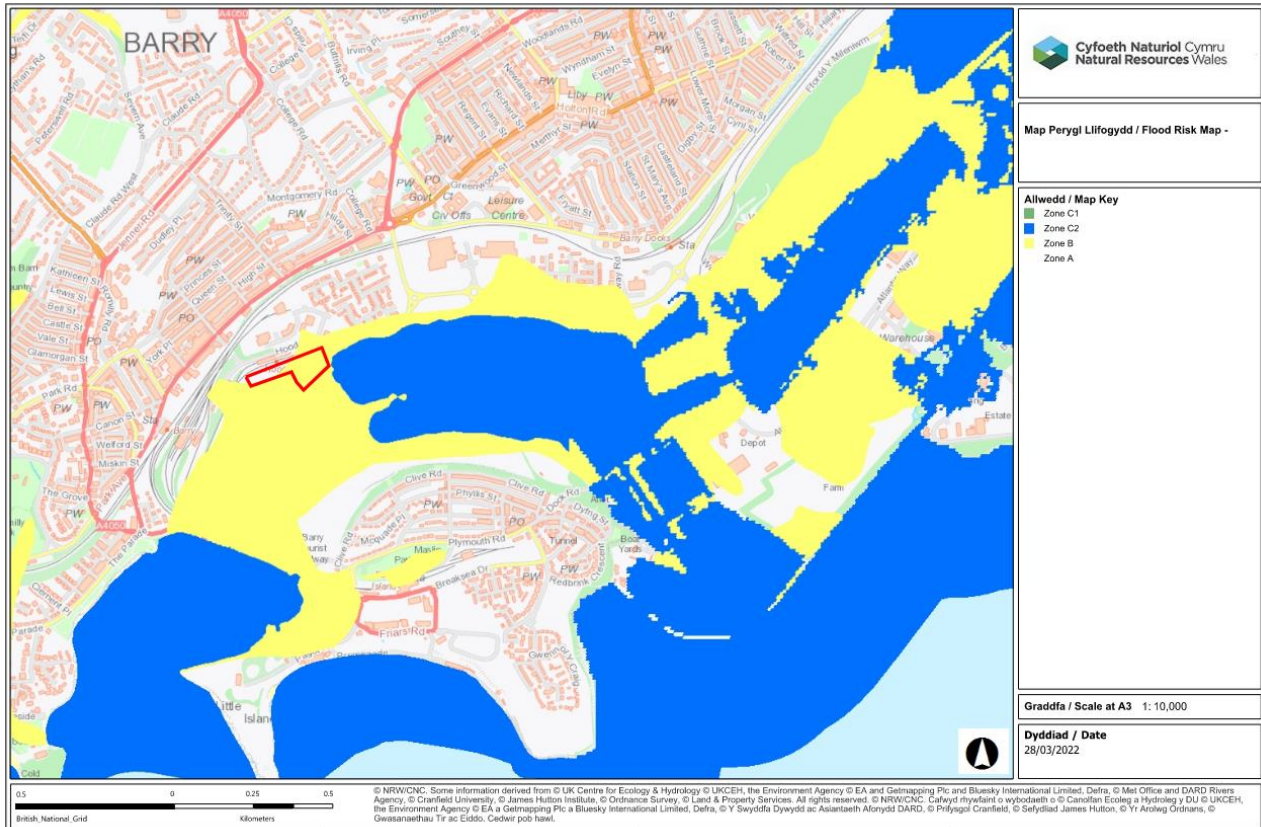


Figure 2: BWC TAN15 Development Advice Map

Welsh Government developed the Flood Map for Planning to support the revised TAN15 which is scheduled to be implemented in 2024. The Flood Map for Planning shows the impact that climate change is anticipated to have on the flood zones in the next 100 years. Whilst the Flood Map for Planning has no official status until the revised TAN15 is implemented, it is the best information available on flood risk and therefore has been used to assess the risk of flooding on the proposed development.

3.1 Tidal Flood Risk

An area in the north east of the site is recorded as being in tidal Flood Zone 2 of the NRW Flood Map for Planning, as shown in Figure 4. Flood Zone 2 shows areas with 0.1% to 0.5% (1 in 1000 to 1 in 200) chance of flooding from the sea in a given year, including the effects of 100 years of climate change.

As the NRW Flood Map for Planning identifies areas at risk of tidal flooding within the site, a Flood Consequences Assessment (FCA) is required to justify the development and determine the consequences of flooding. Detailed tidal flood modelling has been undertaken and an FCA (LPT-JBA-XX-XX-RP-Z-0001, P02) has been prepared. TAN15 recommends a 75 year design life for non-residential developments, and therefore the tidal flood risk model has been prepared using 75

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years of climate change. This demonstrates that, for the 0.1% annual exceedance probability (AEP) event including 75 years of climate change, the site is predicated to be flood free.



Figure 3: BWC NRW Flood Map for Planning (Rivers and Seas)

3.2 Fluvial Flood Risk

The NRW Flood Map for Planning does not identify any areas of the site as being located in the fluvial flood zones, as shown in Figure 3.

3.3 Surface Water Flood Risk

The western half of the site is recorded as being in Flood Zones 2 and 3 of the NRW Flood Map for Planning. The finished levels on the site are proposed to be at or below existing levels, to retain the surface water flood storage volume and flow paths within the site.

Owing to the extent of site area which is identified as being in Flood Zone 2 and 3, detailed surface water modelling has been undertaken for the catchment. The results of the modelling show that, for the 0.1% AEP event, including climate change;

- The proposed development does not cause an increase in flood risk to adjacent sites compared to the baseline, and

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- The main building of the proposed development remains flood free enabling safe access and egress to the building

A technical note detailing this modelling work is contained in Appendix C.

4. Drainage Diversions

As detailed in Section 2.2, an existing 300mm diameter surface water sewer is shown on record drawings received from Dŵr Cymru Welsh Water (DCWW). It is proposed to divert this sewer clockwise around the proposed building to facilitate the development. The route of the diversion has been planned to retain the existing network length and invert levels at each end of the diversion. The detailed design of this diversion will be agreed with VoG via the SAB application process.

Record drawings received from DCWW show a 375mm diameter combined sewer in the land to the east of the access road from Ffordd y Mileniwm. It is proposed to divert this to the west, further away from the proposed building. The detailed design of this diversion will be agreed with DCWW through the Section 185 process. CCTV survey indicated that the chamber in Ffordd y Mileniwm is partially collapsed and will require repair works to facilitate the connection.

5. Proposed Surface Water Drainage Strategy

As the development is over 100m² in area, it is subject to Schedule 3 of the Flood and Water Management Act and subsequently the storm drainage design is subject to approval by the SuDS Approval Body (SAB). As the development sits within the boundary of Vale of Glamorgan (VoG) Council, VoG are the SAB for the development.

A pre-SAB application was submitted in November 2023, and formal SAB pre-application comments were received in February 2024. The SAB raised comments and requested further information to be submitted for full SAB approval, however offered no objection in principle to the proposed drainage scheme. Since the SAB pre-application was submitted, the MUGA area has been replaced with car parking and SuDS. Although the use of the land has changed, the storm water strategy is unchanged with the area being captured and treated through permeable paving and raingardens.

The SuDS Manual hierarchy of discharge has been used to determine the appropriate storm water disposal form. Runoff from part of the roof area will be collected and stored in a rainwater harvesting tank which will treat runoff and subsequently pump it back to the building for reuse.

Infiltration is not viable due to the potential pollutants in the ground. Barry Docks is located to the east of the site and is the preferred discharge location. To avoid installing an additional drainage system in Hood Road and/or Ffordd y Mileniwm and constructing an additional outfall into the dock, it is proposed to utilise the existing DCWW adopted storm sewer in Ffordd y Mileniwm, which outfalls to the dock via Neptune Way. Through the DCWW pre-planning application, they offered a connection point to this sewer in Ffordd y Mileniwm. This is part of the same network that serves the current positive drainage network located on site. DCWW have confirmed the discharge rate from the developed site should be restricted to 50 l/s for all return periods up to 1:100 plus climate change. The DCWW correspondence is contained in Appendix D.

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The site is to be served by a new piped storm drainage sewer network designed to accommodate the 1:100 year return period plus a 40% climate change allowance. To meet the discharge rate agreed with DCWW from the site, flow control devices will be used with water attenuated using a combination of geocellular storage and permeable paving.

To treat the runoff to an acceptable level, runoff from the roof area not captured by the rainwater harvesting tank, and public realm space around the building will be captured and treated in raingardens around the building periphery. SuDS including raingardens, permeable paving and areas of green roof are to be used to ensure appropriate water quality. Where the constraints of the site limit the use of SuDS, vortex separators will be used to ensure appropriate water quality.

Soft landscaping, including the raingardens, are proposed across the site to provide pleasant spaces to learn and create amenity space for the College users. The layout of the site has been designed by the Landscape Architect, with a consideration for the best use of space for its intended purpose. Seating and external pedestrian space will be situated adjacent to the raingardens and other ground-level green landscaping features to maximise the impact of the amenity benefits provided for the end user.

The planting within the raingardens and other green landscaping will be designed by the Landscape Architect and in coordination with the Ecologist on the scheme, aiming to provide a variety of native flora and fauna.

6. Proposed Foul Drainage Strategy

The proposed development will generate foul flows and therefore require a foul drainage connection. The approximate foul peak flow has been estimated as 13.2l/s based on 1024 occupants per day, including an allowance for future expansion on the site. This assumes sprinkler tanks, pool etc are drained down out of hours, to avoid increasing the peak flows further.

Statutory records received from DCWW show a public combined sewer is present within the site. DCWW have been consulted via the pre-planning application process to establish whether a connection to this combined sewer is acceptable and have confirmed that there is sufficient capacity in their network to accommodate the proposed foul flow. DCWW suggested that a connection is made between manholes, ST11671303 and ST11671319.

It is proposed to connect foul flows generated by the development to the DCWW combined sewer upstream of ST11671303, as shown on SK001 Drainage Schematic in Appendix B.

7. Conclusion

A surface water drainage strategy for the site has been developed which considers the flood risk and the principles of sustainable drainage.

The flood risk maps show no risk of fluvial flooding on the site. The tidal flood risk maps show some areas of the site are at risk of the flooding in the 1:100 plus 100 year climate change event. TAN15 recommends a 75 year design life of a college facility and the results of the tidal flood risk model considering 75 years of climate change show no risk of flooding within the site.

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The existing site currently has areas with more than 1% (1 in 100) chance of flooding from surface water in any given year, including the effects of climate change. The proposed site levels have been designed to control the surface water flood risk and retain the existing risk provisions.

Following the hierarchy of discharge, it is proposed to outfall the sites storm water into the DCWW storm sewer located in Ffordd y Mileniwm. A discharge rate has been agreed with DCWW with the ultimate outfall being Barry Dock.

A combination of raingardens, permeable paving, a green roof and a vortex separator are proposed to ensure the storm water leaving the site has been treated to an appropriate level.

A SAB pre-application has been submitted to VoG who have offered no objection in principle. The surface water drainage design will be agreed with the SAB through a full SAB application following detailed design.

DCWW have offered a connection point to communicate foul flows generated by the development to their existing combined sewer in the access road from Ffordd y Mileniwm.

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Appendix A

Flood Mapping

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Appendix B

Proposed Drainage Schematic

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Appendix C

Surface Water Flood Modelling

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Appendix D DCWW Correspondence