Whitmore High School

Flood Consequence Assessment

Vale of Glamorgan Council

Project number: 60571313

01 March 2019

Quality information

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Revision History

Revision	Revision date	Details	Approved	Position
1	11th May 2018	Draft Issue	Steve Cook	Associate Director
2	29th October 2018	Final Issue	Mark Davin	Associate Director
3	1st March 2019	Final Issue – inclusive of SuDS strategy	Mark Davin	Associate Director

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Table of Contents

1. Introduction

1.1 Commission

AECOM Infrastructure & Environment UK Limited (AECOM) has been commissioned by Vale of Glamorgan Council (VoGC) (hereafter referred to as the 'Client') to undertake a Flood Consequence Assessment (FCA) for submission with a planning application for the development of the existing Barry Comprehensive School (Whitmore High School).

1.2 Policy Context

The Development Advice Map (DAM) presented on the Natural Resources Wales (NRW) website, shows that the entire site is located within DAM Zone A. Areas located in DAM Zone A are classified as being at little or no risk of fluvial or coastal/tidal flooding. As the risk of flooding from rivers or seas is classified as low, the principal consideration of the FCA is surface water management.

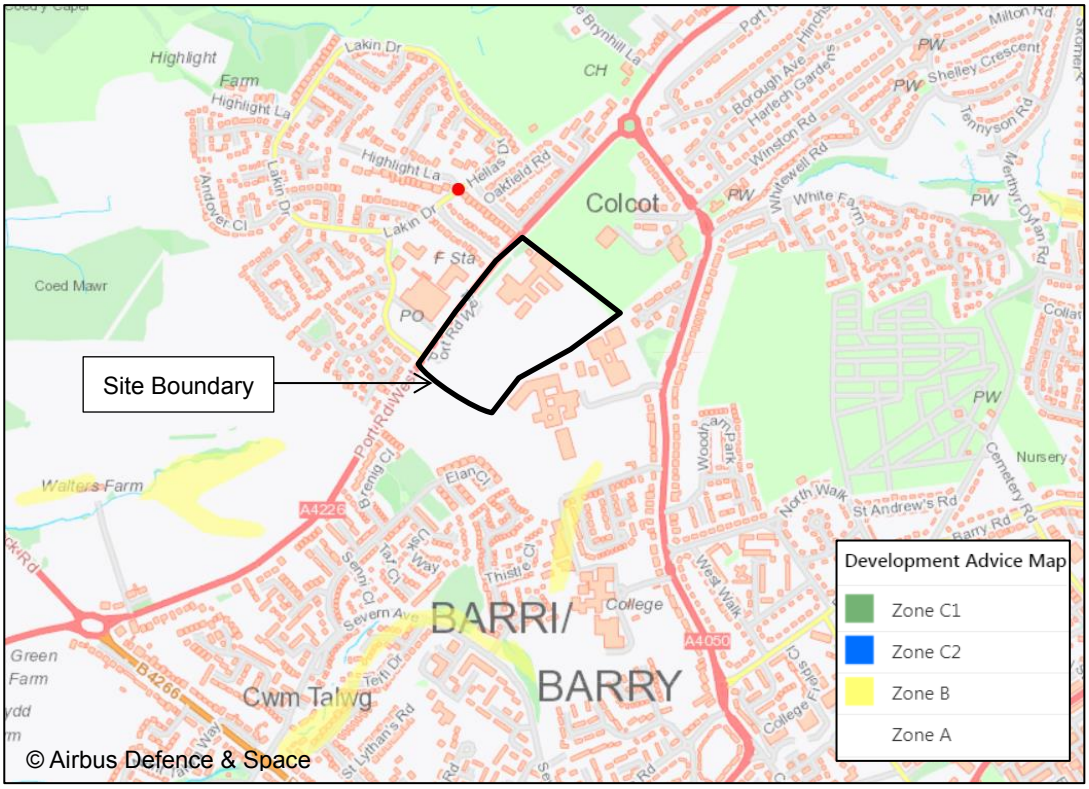


Figure 1-1 Natural Resources Wales Flood Map (Source: NRW)

(Adapted from NRW flood risk maps. Date Accessed: 23/10/18*)*

This report has been prepared in accordance with the *Technical Advice Note 15 (TAN15): Development and Flood Risk*[1]. The Welsh Government's accompanying TAN15 DAMs, alongside the NRW flood maps have also been used to inform this assessment. As the development is situated within DAM Zone A, a justification test is not applicable. However, as the surface water flood risk for the site is considered to be high in small localised areas of the site and impermeable areas of the Proposed Development could increase, an FCA report has been produced to demonstrate how surface water runoff will be managed.

[1] Technical Advice Note (TAN 15). Available from: https://gov.wales/docs/desh/publications/040701tan15en.pdf. Last Accessed: 09/05/18.

1.3 Aims and Objectives

The aim of this FCA is to consider the flood risk posed to and arising from the Proposed Development. In order to achieve this, the following objectives are required to be met:

- Collect and review existing flood risk data including topographic data, surface water drainage, NRW information, scheme proposals and the VoGC Strategic Flood Consequence Assessment (SFCA);
- Assess and interpret available information to identify potential sources of flood risk including groundwater, surface water and infrastructure failure;
- Summarise the surface water drainage strategy produced by Atkins in February 2019[2], and
- Produce an FCA report in full accordance with TAN15 to accompany the planning application.

[2] Atkins (2019) 'Whitmore High School Drainage Strategy'

2. Site Description

2.1 Location

The Proposed Development site is located within Colcot, which is approximately 1.5km north of the centre of Barry, in the Vale of Glamorgan. The approximate Ordnance Survey National Grid Reference (OSNGR) centred on the application site is ST 310605 169016. The approximate postcode for the site is CF62 8ZJ.

The site is approximately 5ha and is bound to the northwest by Port Road West (A4226), the east by playing fields, and to the south and west by Barry Community Hospital and Ysgol Gymraeg Bro Morgannwg school. This is shown within Figure 2-1.

2.2 Environmental Setting

As detailed in Figure 1-1, there is negligible flood risk to the site from fluvial or tidal sources with the site located within DAM Zone A.

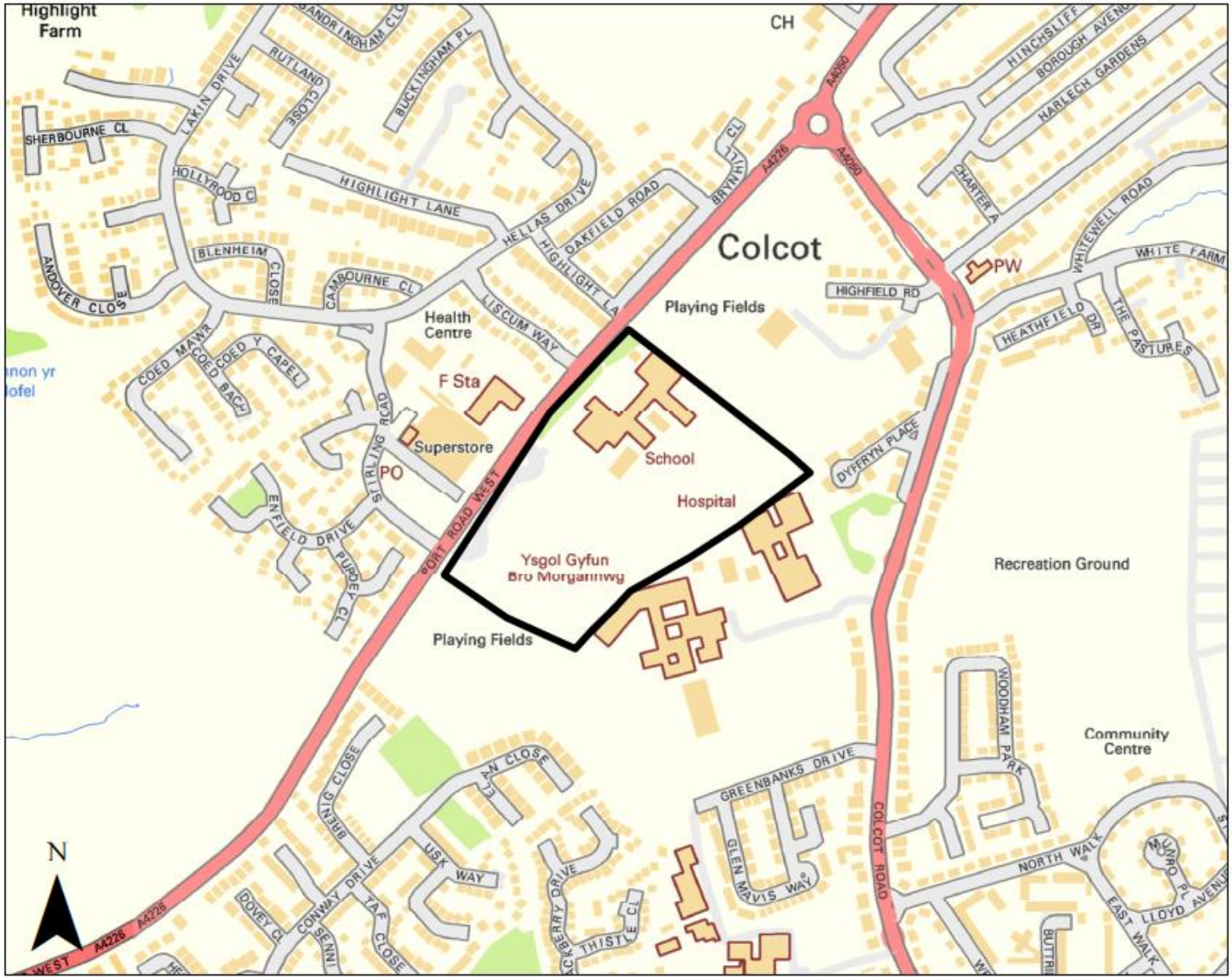
The Coldbrook watercourse is located approximately 480m northeast of the site while an unnamed watercourse also exists 250m to the west of the site, which joins River Waycock. Due to the distance from the site and direction of flow (west to east and east to west respectively – away from the site), it is unlikely that these watercourses would have an impact on the site. Located approximately 2.8km south of the development is the Barry Docks. Due to the distance from the Docks no risk of flooding to the site is presented from this area.

According to the GeoIndex Onshore Map[3] the bedrock geology at the site is made up of Porthkerry Member limestone and mudstone. There are no recorded superficial deposits.

NRW classifies zones around potable groundwater abstraction points as Groundwater Source Protection Zones (SPZ) and these are designed to limit potential pollution activities. The site is not in a SPZ and there are no SPZ limits within approximately 2km of the site boundary. In addition, DEFRA's Magic Map[4] shows that the site is within a Secondary A Aquifer. These are considered as permeable layers capable of supporting water supplies at a local level, and in some cases, form an important source of base flow to local watercourses.

Two borehole logs located to the south of the site (ST16NW105) provide an indication into the geological stratigraphy within this location. From the surface of the borehole to the west of the building to approximately 0.17m below ground level (bgl), turf and topsoil were recorded; dark clay was then recorded from 0.17m bgl to 1.16m bgl; firm yellow clay with occasional flaggy stone was then recorded to a depth of approximately 0.68m bgl; and the final layer recorded to the depth of 1.75m bgl was firm to stiff yellow/grey clay with occasional limestone boulders. The borehole to the east of the building follows an almost identical pattern. There were no records of groundwater within the boreholes.

[3] GeoIndex Onshore Map. British Geological Society. Available from: http://www.bgs.ac.uk/geoindex/. Last Accessed: 09/05/18.
[4] DEFRA Magic Map. Available from: http://www.natureonthemap.naturalengland.org.uk/magicmap.aspx. Last Accessed 10/5/18



AECOM

Project Title:

WHITMORE HIGH SCHOOL FCA

Client:

LEGEND

SITE BOUNDARY

AECOM Internal Project No:

60571313

Drawing Title:

SITE BOUNDARY

Drawing No:	Rev:
FIGURE 2.1	2
Drawn:	**Chk'd:** **App'd:** **Date:**
CD	MAR 2019

2.3 Topography

In the absence of a detailed topographic survey, Figure 2-2 displays the contour lines surrounding and within the Proposed Development site. The topography peaks at approximately 90m AOD in between the two schools, then slopes down to approximately 75m AOD towards the south.

The slope is steepest at the Ysgol Gymraeg Bro Morgannwg school to the south, where the contour lines are closer together. The associated flow path within this area (shown in Figure 4-1) is likely to be due to the sloping topography of the site.

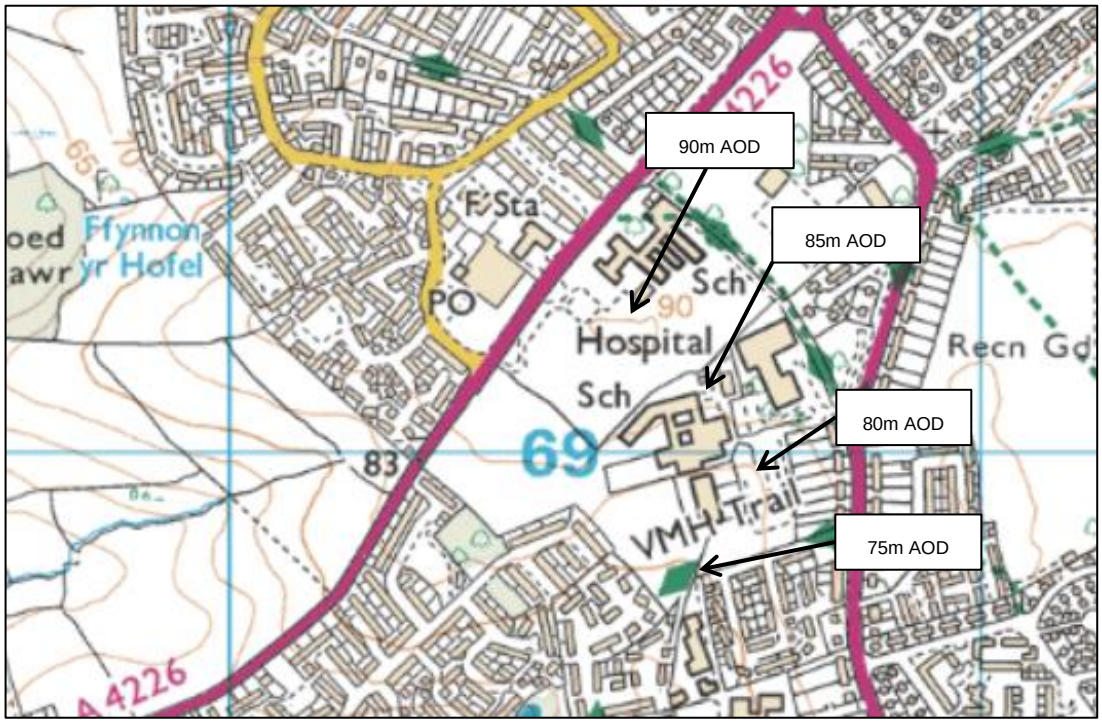


Figure 2-2: OS Contour Map

(Last Accessed 8/5/18)

2.4 Proposed Development

The Proposed Development will include construction of a replacement secondary school building at the site of the existing Whitmore High School and the demolition of the existing secondary school building upon completion.

3. Planning Policy & Guidance

3.1 Technical Advice Note 15

Technical Advice Note 15 (TAN15) provides guidance which supplements the policy set out in Planning Policy Wales[5] (PPW) in relation to development and flooding. A precautionary framework is set out which advises caution in respect of new development in areas at high risk of flooding and this is used as a guide for planning decisions. The overall aim of the precautionary framework is to direct new development away from those areas that have a high risk of flooding; and development will only be justified in these areas if it meets the criteria and tests specified in this guidance.

The operation of the precautionary framework is governed by DAMs which are made up of three zones (Table 3-1), used to trigger the appropriate planning test and definitions of vulnerable developments. The DAMs are based on the best available information considered adequate to determine when flood risk needs to be taken into consideration with future development.

Table 3-1: Flood Zone designations, their associated flood risk definition and use within the precautionary framework *(source: TAN 15)*

DAM Zone	Definition	Use within the precautionary framework
A	Little or no risk of fluvial/ tidal flooding	Justification test is not applied and do not need to consider further
B	Areas known to have flooded historically evidenced by sedimentary deposits.	Used as part of the precautionary approach to indicate where site levels should be checked against the extreme (0.1% annual probability) flood. No need to consider flood risks further if site levels are greater than the extreme flood level
C	Based on Environment Agency extreme flood outline (0.1% annual probability)	Indicates that flooding issues should be considered as an integral part of the decision making by the application of the justification test, including FCA
C1	Areas of Zone C which are developed and served by significant infrastructure, including flood defences	Indicates that development can take place subject to the application of the justification test, including acceptability of consequences
C2	Areas of Zone C without significant flood defence infrastructure	Indicates that only 'less vulnerable' development should be considered, subject to the application of the justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

The precautionary framework identifies the vulnerability of different land uses to flooding and classifies proposed uses accordingly as detailed in Table 3-2. This is because certain flooding consequences may not be acceptable for particular development types.

Table 3-2: Development Categories *(source: TAN 15)*

Flood Zone Definition	Use within the precautionary framework
Emergency Services	Hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood.
High vulnerable development	All residential premises (including hotels and caravan parks), public buildings (e.g. schools, libraries, leisure centres), especially vulnerable industrial development (e.g. power stations, chemical plants, incinerators), and waste disposal sites.
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites.

[5] Planning Policy Wales. Available from: https://gov.wales/topics/planning/policy/ppw/?lang=en. Last Accessed: 10/5/18.

According to TAN 15, new development should be directed away from Zone C and towards more suitable land in Zone A, otherwise to Zone B, where river or coastal flooding will be less of an issue.

Table 3-2 highlights that public developments such as schools (i.e. the Proposed Development) are classified as 'Highly Vulnerable' which are considered acceptable within DAM Zone A (Figure 1-1).

Built development tends to increase the surface area of impermeable ground, thus reducing percolation and increasing rapid surface runoff. This FCA summarises the proposed surface water drainage strategy produced by Atkins in 2019 which demonstrates how runoff will be sustainably managed, preventing increased risk to both the site and surrounding area.

3.2 Local Development Plan

The Local Development Plan[6] provides the local planning policy framework, which was adopted by VoGC on 28th June 2017. Local Development Plan policies relevant to water and flood risk are summarised below:

- MD1 – Location of new development: this policy seeks to ensure that development will minimise or avoid areas of flood risk. New development will be expected to avoid unnecessary flood risk and to meet the requirements of TAN 15: Development and Flood Risk. No highly vulnerable development will be permitted within DAM Zone C2 and development will only be considered in areas at risk of flooding where it can be demonstrated that the site can comply with the justification and assessment requirements set out in TAN 15.
- MD7 – Environmental protection: this policy seeks to ensure that development does not increase flood risk. In accordance with TAN15: Development and Flood Risk, no highly vulnerable development will be permitted in DAM Zone C2. Development will only be considered in other areas at high risk of flooding where it can be demonstrated that the site can comply with the justification and assessment requirements of TAN 15.

3.3 Strategic Flood Consequence Assessment

No Strategic Flood Consequence Assessment is available from VoGC at the time of writing.

3.4 Preliminary Flood Risk Assessment

VoGC developed a Preliminary Flood Risk Assessment (PFRA)[7] in 2011 which examined the areas within the Vale of Glamorgan that have historically suffered from flooding and potential future floods areas and to identify significant flood risk areas. No indicative Flood Risk Areas have been identified within the Vale of Glamorgan.

3.5 Local Flood Risk Management Strategy

In 2012, VoGC developed a Local Flood Risk Management Strategy (LFRMS)[8]; this document highlights the responsibilities of VoGC as Lead Local Flood Authority (LLFA) with respect to flooding from surface water, ordinary watercourses and groundwater.

The Local Strategy encourages effective flood risk management by enabling people, communities, business and the public sector to work together to:

[6] Vale of Glamorgan Local Development Plan (LDP). Available from: http://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/Planning/planning_policy/local_development_plan/Local-Development-Plan.aspx. Last Accessed: 09/05/18.
[7] Preliminary Flood Risk Assessment (PFRA) Vale of Glamorgan Council. Available from: http://www.valeofglamorgan.gov.uk/Documents/Living/Highways%20&%20infrastructure/Exec-Summary-ENG.pdf. Last Accessed: 09/05/18.
[8] Local Flood Risk Management Strategy, December 2013. Vale of Glamorgan Council. Available from: http://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/Planning/planning_policy/local_development_plan/Local-Development-Plan.aspx. Last Accessed: 09/05/18.

- Ensure a clear understanding of the risks of flooding and erosion, nationally and locally, so that investment in risk management can be prioritised more effectively;
- Set out a clear and consistent plan for risk management so that communities and businesses can make informed decisions about the management of the residual risk;
- Encourage innovative management of flood and coastal erosion risks, taking account of the needs of communities and the environment;
- Form links between the local flood risk management strategy and local spatial planning;
- Ensure that emergency plans and responses to flood incidents are effective and that communities can respond properly to flood warnings; and
- Help communities to recover more quickly and effectively after incidents.

The PFRA refers to two major historic flooding incidents in October 1998 and July 2007, these were classified as 'locally significant harmful consequences'. On 20th July 2007, Barry, together with a number of other locations in the Vale of Glamorgan, was subject to intense rainfall. Significant flooding of properties and roads were reported as watercourses and land drainage systems were unable to cope with the intensity of the event. One of the most significant areas of flooding was along the route of the Coldbrook watercourse which runs from the Colcot area (approximately 480m from the Proposed Development) to the open stream adjacent to the A4231 Barry Docks Link Road (approximately 2.9km from the Proposed Development). Approximately 100 residential properties and four schools were flooded along the route of the watercourse or within its catchment area and local roads were closed.

The locally agreed surface water information dataset combines local information on surface water flooding with the NRW's Flood Map for Surface Water. The analysis was completed on a county wide basis and Barry was not identified as at significant risk from surface water flooding.

In addition, localised groundwater flooding is reported to have occurred in Eqenny Village, St Brides Major, East Monkton, Rhoose and Barry. However, it is shown within Figure 2-4-2 in the LFRMS that the Proposed Development is in an area that is <25% susceptible to groundwater flooding.

3.6 SuDS Guidance

From 7th January 2019, all new developments of more than 1 dwelling house or where the construction area is 100m^2 or more, will require a Sustainable Drainage System (SuDS) for surface water. From this date, SuDS on new development must be designed and built in accordance with the Statutory SuDS Standards published by Welsh Ministers and SuDS schemes must be approved by the local authority (Vale of Glamorgan Council) acting in its SAB role, before construction work begins.

For more information regarding surface water design criteria and the methodology applied to the design of the surface water drainage strategy for this development (Section 5), the reader is directed to the Whitmore High School Drainage Strategy which has been produced alongside this FCA.

4. Flood Risk – To Development

4.1 Overview

TAN15 requires that all potential flood sources that could affect the Proposed Development be considered. This chapter includes flooding from rivers and the sea, directly from rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems. Flooding from reservoirs, canals, lakes and other artificial sources should also be considered. There should be demonstration of how these should be managed so that the development remains safe throughout its lifetime, taking into account climate change.

4.2 Tidal / Fluvial

As discussed in Section 1.2, the Proposed Development site is located within DAM Zone A, which are areas classified as having little or no risk of tidal/ fluvial flooding. Given the DAM Zone designation, the level of the site and distance from the coast, tidal and fluvial flood risk are considered to be low and not considered further in this investigation.

4.3 Groundwater

Groundwater flooding occurs where groundwater levels rise above ground surface levels. The geology has a major influence on where this type of flooding takes place; it is most likely to occur in low-lying areas underlain by permeable rocks.

As outlined in Section 3.5, the LFRMS states that localised groundwater flooding is reported to have occurred in Barry; however no specific flood incidents have been recorded at the site.

The BGS maintains an archive of historical exploratory logs throughout the UK and as part of this project AECOM has searched the database and taken information from log ST16NW105 which was explored in November 1970. This log shows two boreholes, which are located either side of the building furthest east of the Ysgol Bro Morgannwg School. The borehole to the west of that building had a depth of approximately 1.75m bgl; the borehole to the east had a depth of 1.77m bgl. These were both logged as dry with no groundwater recorded.

The heavy clay soils recorded at the site suggest low surface water percolation rates, which reduces the risk of groundwater flooding. In addition, according to the LFRMS, the Proposed Development is in an area that is just <25% susceptible to groundwater flooding.

Based on the information derived from the borehole log combined with no site specific flood incidents, the risk from groundwater is considered to be low.

4.4 Surface Water

Overland flow routes can form from rainfall that fails to infiltrate the surface and travels over ground; this is exacerbated where the permeability of the ground is low due to the type of soil/ geology (such as clayey soils) or urban development. Surface water is also promoted in areas of steep topography which can rapidly convey water that has failed to penetrate the surface.

As discussed in Section 2.2, the soil is likely to be made up of firm to stiff clay, which could reduce the permeability of the ground leading to an increased likelihood of surface water flood risk.

Figure 4-1 shows NRW's Surface Water Flood Risk Map[9]. The dark orange shading (high risk) shows areas that have a chance of flooding of greater than 3.33% AEP. The light orange shading (medium risk) shows areas have a chance of flooding between 1% AEP and 3.33% AEP. The yellow shading (low risk) shows areas have a chance of flooding between 0.1% AEP and 1% AEP.

[9] Source: Natural Resources Wales Flood Map for Surface Water. Available from: https://flood-warning-information.service.gov.uk/long-term-flood-risk. Last accessed 09/05/18.

According to NRW's Surface Water Flood Risk Map (Figure 4-1), the majority of the site is not considered to be at risk from surface water flooding. The only exception is against the existing building footprint where there are small areas of high/low risk.

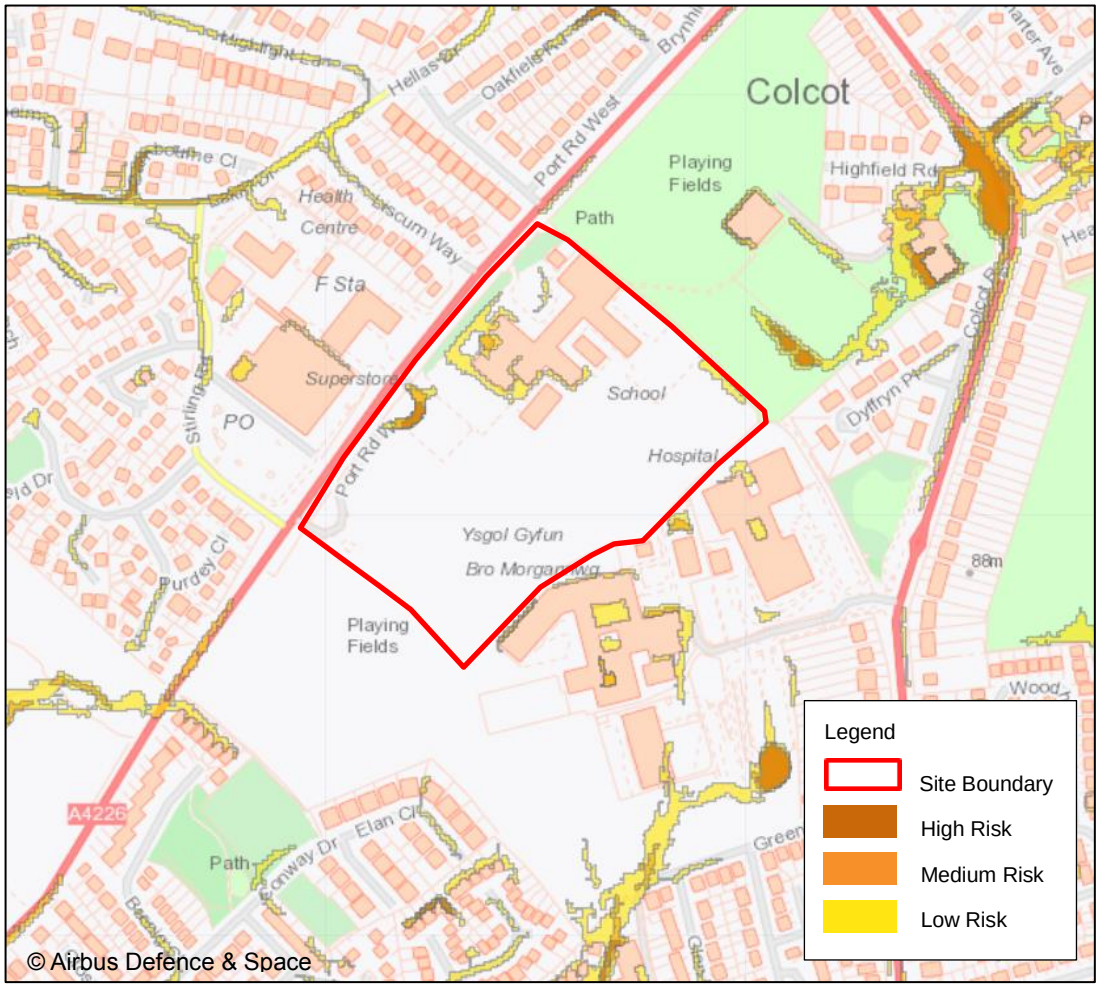


Figure 4-1: Flood Map for Surface Water (source: NRW)

(Adapted from NRW flood risk maps Last Accessed 1/3/19)

Overall it is considered that the flood risk from surface water is low at the Proposed Development site. There are localised areas where the risk from flooding increases (up to high along the northern boundary) and consequently it is recommended that development is steered away from these areas.

4.5 Artificial Sources

Artificial flood sources include raised channels such as canals or storage features such as ponds and reservoirs. The NRW Flood Risk from Reservoirs Map[10] indicates that the nearest reservoir flooding extents at Penarth Cwm Cydfin are approximately 7.6km west of the Proposed Development.

According to the LFRMS, the Warren Mill Pond, which is approximately 8.7km north of the site, has been identified as a large reservoir, but does not exceed the volume criteria set by NRW for potential breach mapping.

Due to the large distance from the flood extent, the risk from artificial sources is considered to be low and not considered further within this assessment.

[10] Natural Resources Wales Flood Map. Available from: https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en. Last Accessed: 09/05/18.

4.6 Sewers

Flooding can occur as a result of infrastructure failure e.g. blocked sewers or failed pumping stations. Sewer flooding can occur when the system surcharges due to the volume or intensity of rainfall exceeding the capacity of the sewer, or if the system becomes blocked by debris or sediment.

Due to the lack of historical flood information on sewer flooding in this area combined with the proposed drainage options (Section 5), flood risk from sewers is considered low and so will not be considered further within this investigation.

5. Flood Risk – From the Development

5.1 Overview

National Policy highlights how built development tends to increase the risk of flooding by increasing surface water runoff. Development often increases the area of impermeable surfaces thereby promoting rapid runoff to surface water sewers or watercourses rather than percolation into the ground. The effect has potential to lead to an increase in both total volume and peak water flows, contributing to flooding.

5.2 Surface Water Management

In February 2019, Atkins produced a drainage strategy for the Proposed Development in line with national policy. This section summarises the surface water strategy, however the reader is directed to the Whitmore High School Drainage Strategy for information on runoff rates and relevant planning policy requirements.

According to the drainage strategy document, planning policy requires all surface water drainage systems to be designed to retain runoff on site up to a 1% AEP rainfall event with an allowance for climate change. National policy advises that an uplift on rainfall intensities of 30% when designing for 2085 and beyond.

In accordance with current legislation the proposal has considered the use of sustainable drainage systems throughout the redeveloped site. A management train has been designed as part of the drainage strategy and is summarised below.

- **Level 1 Collected for use**: There is no proposal to collect and reuse water on site i.e. rainwater harvesting.
- **Level 2 Infiltrated to ground**: Ground conditions have been investigated which have indicated that infiltration options could be provided. The area available for infiltration has been considered against the acceptable depth of storage features at the surface and the recommendation that storage drains to half-empty within 24 hours. The remaining runoff from site will be discharged elsewhere. Infiltration will be provided through swales, basins, permeable paving, soakaways, rain gardens and bioretention systems.
- **Level 3 Discharge to surface water body**: The nearest surface water body is over 250m away and would therefore require laying a new outfall pipe through adjacent property. As this is not feasible and there is also a surface water drain with sufficient capacity already serving the site, this is considered a more realistic option.
- **Level 4 Discharge to surface water sewer or drainage system**: Flows exceeding the storage area are to be discharged at a controlled rate into the surface water sewer which already serves the site.
- **Level 5 Discharge to combined sewer**: All flows currently discharging from the existing site to the combined sewer will be removed; flows from the Proposed Development will follow the management train detailed above.

The proposed surface water drainage strategy is located within Appendix A. This drawing shows how all the elements discussed above interact and presents the location of the infiltration options. To summarise:

- Soakaway trenches (5No. 200m long x 5m wide x 0.3m deep) will be installed beneath the grass sports pitches to the north-east of the Proposed Development. These will be lined with a permeable geotextile membrane and filled with a drainage sub-base;
- Swale 1 (3m wide x 0.6m deep) will convey runoff from the Multi-use games area, social area, 3G sports pitch and grass sports pitches to an infiltration basin located along the southern boundary. Check dams will be introduced to regulate flow and promote infiltration. A flow control device will be located at the swale outlet into the basin;
- Two bioretention areas and two rain gardens are located along the eastern boundary of the site around the main school building. These collect runoff from the driveway into the school and from the roof/road/courtyard areas. The features have overflow pipes to additional storage in the car park subbase;

- Permeable paving will be provided at the car park to the south of the main school building. This will have storage within the subbase to allow infiltration. Exceedance flow to overflow via Swale 2 to infiltration basin along the southern boundary;
- Swale 2 (3m wide x 0.6m deep) conveys runoff from the utility buildings, part of roof area and car park exceedance to infiltration basin along the southern boundary; and
- The infiltration basin (0.6m deep, circa 600m^3) will store site runoff. High level outlet to flow control chamber which limits discharge to existing 300mm diameter surface water drainage pipe.

As detailed above, all discharge from the redeveloped site will be directed to the south. It is proposed to maximise infiltration within the main basin by restricting the outlet level, which ensures no discharge from the site in a 1% AEP rainfall event. Events exceeding this may overflow into the flow control chamber which is proposed to regulate discharge to a maximum of 60l/s. Any flow that backs up from this flow control will utilise additional storage within the basin.

According to the drainage strategy report, the proposed maximum discharge rate represents a reduction in discharge of approximately 60% during the 50% AEP rainfall event (6-hour storm) and 70% during the 1% AEP rainfall event. Furthermore, runoff volume from the site during the 1% AEP rainfall event (6-hour storm) can be reduced by infiltration to approximately 680m^3 with climate change uplift included in the calculation. This is around 20% less that greenfield predictions.

Based on the above information, it is considered that the rate and volume predictions satisfy the requirements for brownfield sites in the relevant policy i.e. there is shown to be a betterment following redevelopment.

6. Conclusion

6.1 Overview

This FCA has assessed flood sources to and from the Proposed Development in context of the existing and proposed development. The Proposed Development is classified as a highly vulnerable development however the site is located within DAM Zone A.

6.2 Flood Sources

The following potential sources of flooding which could affect the Proposed Development have been considered and assessed as follows:

- The current risk from fluvial and tidal sources is considered to be low with the site located within DAM Zone A;
- The risk of groundwater flooding is considered to be low;
- The risk of surface water flooding on site is considered to be low, with the exception of small localised areas where the risk from surface water flooding is high. It is recommended that development is steered away from these small, high risk areas. Any potential off-site impacts will be addressed through a surface water drainage strategy which has been produced by Atkins (2019) and summarised in Section 5;
- The risk of sewer flooding is considered to be low; and
- The risk of flooding from other sources is considered to be low.

6.3 Surface Water Management

A drainage strategy has been designed by Atkins (2019) in line with national guidance which utilises sustainable drainage options to manage runoff from the Proposed Development. The strategy has been designed to retain runoff on site up to a 1% AEP rainfall event with an allowance of 30% for climate change.

The strategy includes a range of attenuation features, all of which encourage infiltration to ground. These include swales, basins, permeable paving, soakaways, rain gardens and bioretention systems. The majority of the features link to an infiltration basin located along the southern boundary which outfalls to an existing surface water drainage pipe at a controlled rate.

According to the drainage strategy report, there will be a significant betterment of both discharge volumes and runoff rates following redevelopment at the site.

Appendix A – Surface Water Drainage Strategy

Millimetres 0 10 100

DO NOT SCALE

GRASS SPORTS PITCHES FOR CRICKET / RUGBY / ATHLETICS.

5No. 200m LONG x 5m WIDE x 0.3m DEEP SOAKAWAY TRENCHES.
- TO BE LINED WITH PERMABLE GEOTEXTILE MEMBRANE AND FILLED WITH DRAINAGE SUB-BASE (30% VOID)
- DEPTH TO FOUNDING LAYER = 0.6m
- PITCH DRAINAGE TO BE BY SPECIALIST SUBCONTRACTOR AND DISCHARGE EVENLY INTO SOAKAWAYS.
- SIZE OF SOAKAWAYS IS SUBJECT TO CONARMATION OF INFILTRATION RATE IN THIS PART OF SITE.

MULTI-USE GAMES AREA (MUGA)

SOCIAL AREA

BIORETENTION AREA 1 COLLECTS RUNOFF FROM PART OF DRIVEWAY

NEW KERB DRAIN OUTLET PIPE

NEW KERB DRAIN WITH OUTLET INTO RAIN GARDEN

RAIN GARDEN 1 (INFILTRATION) TO COLLECT RUNOFF FROM FRONT OF HOUSE AND SOME ROOF/ROAD AREAS. EXCEEDANCE OVERFLOW.

RAIN GARDEN / DETENTION BASIN OVERFLOW PIPE TO STORAGE IN CAR PARK SUB BASE FOR INFILTRATION

DRIVEWAY

3G PITCH DRAINAGE TO BE BY INFILTRATION FROM SUB-BASE. (DEPTH OF SUB-BASE SUBJECT TO INFILTRATION TESTING)

3G SPORTS PITCH

RAIN GARDEN 2 (DETENTION BASIN) TO COLLECT RUNOFF FROM COURTYARD AND SOME ROOF AREAS. RESTRICTED OUTFLOW, WITH EXCEEDANCE OVERFLOW.

COURTYARD

SWALE 1 CONVEYS RUNOFF FROM MUGA, SOCIAL AREA, 3G PITCH AND GRASS FIELD TO INFILTRATION BASIN, CHECKS DAMS TO REGULATE FLOW AND PROMOTE INFILTRATION. SWALE DIMENSIONS: 3m WIDE X 0.6m DEEP.

PERMEABLE PARKING WITH STORAGE IN SUB BASE TO ALLOW INFILTRATION. EXCEEDANCE FLOW TO OVERFLOW VIA SWALE TO INFILTRATION BASIN. 0.6m TO FOUNDING DEPTH.

BIORETENTION AREA 2 COLLECTS RUNOFF FROM DRIVEWAY

MAIN SCHOOL BUILDING

PARKING

GRASS SOCIAL AREA

WEIR TO CONTROL SWALE OUTLET INTO BASIN. FOOTPATH WILL BRIDGE OVER

HIGH LEVEL OUTLET HEADWALL

FLOW CONTROL CHAMBER WITH VORTEX DEVICE TO CONTROL DISCHARGE RATE TO 50L/S/ 1.5mØ, 1.5m DEEP.

NEW MANHOLE TO BE CONSTRUCTED ON EXISTING SURFACE WATER DRAIN. 1.5mØ, 3m DEEP WITH BACKDROP INLET.

EXISTING 300Ø SURFACE WATER DRAINAGE PIPE RETAINED

INFILTRATION BASIN (0.6m DEEP, CIRCA 600m²) TO STORE SITE RUNOFF FOR ALL EVENTS UP TO 1 IN 100 YEAR RETURN PERIOD (INCLUDING GREENFIELD RUNOFF FROM ADJACENT PLAY AREA AND DIRECT RAINFALL). HIGH LEVEL OUTLET TO FLOW CONTROL CHAMBER

UTILITY BUILDINGS

SWALE 2 CONVEYS RUNOFF FROM UTILITY BUILDINGS, PART OF ROOF AREA AND CAR PARK EXCEEDANCE TO INFILTRATION BASIN. SWALE DIMENSIONS: 3m WIDE X 0.6m DEEP.

Ysgol Gymraeg Bro Morgannwg

Model File Location (See Morgan Sindall Central Data Environment)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following:

CONSTRUCTION

Refer to: - Morgan Sindall pre-construction risk register.

MAINTENANCE/CLEANING

Refer to: - Future Cleaning and Maintenance Strategy

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

Notes:
1. Drawings to be read in conjunction with NBS specification where appropriate.
2. Drawings to be read in conjunction with all other disciplines' drawings and specification documents.
3. Drawings are shown for purely design intent purposes if stated. Relevant contractor's manufacturing drawings to be used for construction in this case.
4. All dimensions are in millimetres unless otherwise specified.
5. The surface water drainage design is subject to SUDS Approving Body (SAB) application and subsequent approval. Currently under pre-application consultation and assessment. Full application to be submitted with planning application.
6. Pipework levels, manhole details and longitudinal sections will be produced during Stage 4 design.

LEGEND:
- SW — SW — SURFACE WATER PIPE
- SWALE CHANNEL
- FLOW DIRECTION
- SUDS TRAIN

NORTH

Rev.	Date	Description	By	Chk'd	App'd
P01.1	11/02/2019	RIBA STAGE 3	JL	TR	AM

Drawing Status: PLANNING

Suitability: S2

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Project: WHITMORE HIGH SCHOOL
PORT ROAD WEST, BARRY, CF62 8ZJ

Drawing Title: DRAINAGE
PROPOSED SURFACE WATER NETWORK LAYOUT

Scale	Designed	Drawn	Checked	Authorised
1:500	JL	AE	TR	AM
Original Size	Date	Date	Date	Date
A1	14/01/2019	20/01/2019	25/01/2019	10/02/2019

Drawing Number: 26W006-ATK-0-XX-DR-D-X-8202

Revision: P01.1