Ysgol I. D. Hooson, Wrexham

Flood Consequences Assessment

April 2025



Waterco

Assessment | Modelling | Design

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Author:	Adam McCulloch BSc (Hons)
Checker:	Aled Williams BSc (Hons) MCIWEM C.WEM
Approver:	Nigel Jones Beng (Hons) CEng MICE

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This report will remain valid for a period of twelve months (from the date of last issue) after which the source data should be reviewed in order to reassess the findings and conclusions on the basis of latest available information.

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Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) in respect of a proposed school extension at Ysgol I. D. Hooson, Rhosllanerchrugog, Wrexham, LL14 2DS.

The purpose of this report is to outline the potential flood risk to the site, the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified flood risk. This report has been prepared in accordance with the guidance contained in Planning Policy Wales (PPW) and Technical Advice Note 15 (TAN15): Development and Flood Risk.

Existing Conditions

The site covers an area of approximately 2.58 hectares (ha) and is located at National Grid Reference (NGR) 328758, 346069. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed March 2025) shows that the site comprises an existing school with associated mobile classrooms, access, parking and yard space. The site is bordered by agricultural land to the north, residential properties to the east and south, and playing fields to the west. Access to the site is provided from Heol Caradoc to the north-east.

Local Topography

A topographical survey has been undertaken by PM Surveys UK Ltd in November 2024. The topographical survey shows that the site slopes from 176.8 metres Above Ordnance Datum (m AOD) in the north to 171.26m AOD in the south-east.

Topographic levels to m AOD have also been derived from a 1m resolution Natural Resources Wales (NRW) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). The LiDAR data generally corroborates with the topographical survey.

Topographical information is provided as Appendix B.

Ground Conditions

The British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain by superficial deposits of Devensian Till, generally comprising diamicton. The superficial deposits are identified as being underlain by the Pennine Lower Coal Measures Formation and the Pennine Middle Coal Measures Formation consisting of mudstone, siltstone and sandstone.

The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

The Cranfield University 'Soilscapes' map [accessed March 2025] indicates that the site is underlain by '*Slowly permeable seasonally wet loamy and clayey soils'*.

Local Drainage

Public sewer records have been obtained from Dwr Cymru Welsh Water (DCWW) and are included in Appendix C. The DCWW sewer records show that there is a 150mm public combined sewer serving residential properties east of the site. There is also a 150mm public surface water sewer serving residential properties east of the site.

Development Proposals

The proposed development is for the erection of 8no. additional classrooms (through 2no. building extensions), removal of mobile classrooms, minor internal alternations to the existing building and external works including playground areas, car parking and drainage. Existing and proposed development plans are included in Appendix D.

Flood Zone Category and Policy Context

Flood Zone Category

The Welsh Government Development Advice Map, included in Appendix E, shows that the site is located within Flood Zone A – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The NRW 'Flood Map for Planning' (Appendix E) shows that the site is located within an area outside of the extreme flood extent (Flood Zone 1), meaning it has a less than 0.1% annual probability of flooding from rivers and the sea, including the effects of climate change.

Development Vulnerability Classification

The proposed school extension is considered to be 'highly vulnerable' development in accordance with Figure 2 of the Welsh Government's Technical Advice Note 15 – Development and Flood Risk (TAN15). TAN15 states that highly vulnerable development is considered acceptable within Flood Zone A.

Local Policy

The Wrexham County Borough Council Local Development Plan (adopted December 2023) contains the following policies relating to flood risk:

'***Policy SP18: Climate Change***

To mitigate against the effects of climate change and adapt to its impacts, development proposals will need to demonstrate that they have taken into account the following…

vi. Avoiding areas susceptible to flood risk in the first instance in accordance with the sequential approach set out in national guidance. Highly vulnerable development, as defined in TAN15: Development and Flood Risk, should not be located within zone C2;

vii. Preventing development that increases flood risk; and

viii. Assesses the potential effects of climate change when preparing a Flood Consequence Assessment for the site.'

The Dee Preliminary Flood Risk Assessment (December 2018) has been reviewed and informs this report.

Sources of Flooding and Probability

Fluvial

The nearest watercourse is an unnamed watercourse which is located approximately 35m north-west of the site. The unnamed watercourse flows north in this location and is a tributary of the Afon Goch. Other watercourses in the area include an unnamed watercourse located approximately 70m east of the site. The unnamed watercourse flows south-east and joins the Afon Goch approximately 280m south-east of the site.

Flood risk from the unnamed watercourse west of the site is shown on the NRW 'Flood Risk from Surface Water and Small Watercourses' map and is discussed in the Surface Water flooding section below.

The unnamed watercourse east of the site is situated at approximately 163m AOD and 8m below site levels. Any potential flooding from the unnamed watercourse east of the site would therefore not affect the site.

The NRW 'Recorded Flood Extents' map (Appendix E) indicates that the site is not located within a historical flood extent.

The site is located within Flood Zone 1 on the NRW 'Flood Map for Planning', and the risk of fluvial flooding is therefore considered to be very low (less than 0.1% annual probability).

Tidal

The site is situated at a minimum of approximately 171.26m AOD and is significantly above sea level. The site is therefore not at risk of tidal flooding.

Surface Water

Surface water flooding occurs when rainwater does not drain away through the normal drainage system or soak into the ground. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is saturated, frozen or developed, resulting in overland flow and ponding in depressions in topography. Surface water flooding can occur anywhere without warning. However, flow paths can be determined by consideration of contours and relative levels.

The NRW 'Flood Risk from Surface Water and Small Watercourses' map (Appendix E) shows that the majority of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. A surface water flood flow route is shown to cross the site from north-west to east. The flood flow route encroaches into the location of the proposed classroom extension.

The flood flow route shown on NRW mapping appears to be associated with the unnamed watercourse located west of the site and is shown to have a low, medium, and high risk of occurrence. Low risk of surface water flooding has between a 1% and 0.1% annual probability of occurrence. Medium risk of surface water flooding has between a 3.3% and 1% annual probability of occurrence. High risk of surface water flooding has a greater than 3.3% annual probability of occurrence.

Surface water flood depth data has been obtained from the DataMapWales website and is included in Appendix F. The surface water flood depth data includes an allowance for climate change (applying the 'Central' climate change estimate for the year 2120).

As shown in Figure 1, during the 3.33% Annual Exceedance Probability (AEP) 'high risk' plus climate change (CC) (year 2120) event, the majority of the site is estimated to be flood free. The surface water flood flow route is shown to affect the parking area and location of the classroom extensions. Flood depths are generally less than 300mm.

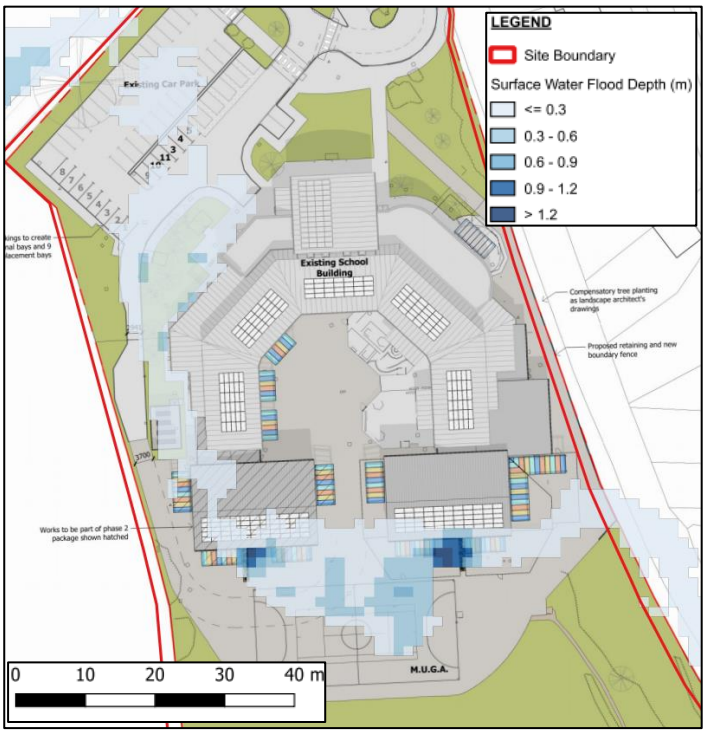


Figure 1 – 3.33% AEP + CC (Year 2120) Event – Surface Water Flood Depth

As shown in Figure 2, during the 1% AEP 'medium risk' plus CC (year 2120) event, the majority of the site is estimated to be flood free. The surface water flood flow route is shown to affect the parking area and location of the classroom extensions. Flood depths are generally less than 300mm in the location of the classroom extensions.

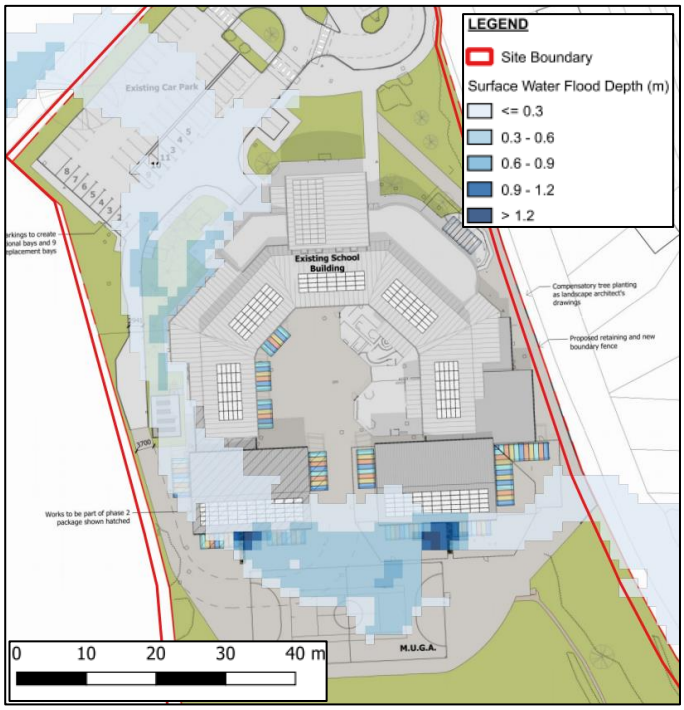


Figure 2 – 1% AEP + CC (Year 2120) Event – Surface Water Flood Depth

As shown in Figure 3, during the 0.1% AEP 'low risk' plus CC (year 2120) event, the majority of the site is estimated to be flood free. The surface water flood flow route is shown to affect the parking area and location of the classroom extensions. Flood depths are generally less than 300mm in the location of the classroom extensions, however, increase to between 300mm-600mm in the southern extent of the location of the classroom extensions.

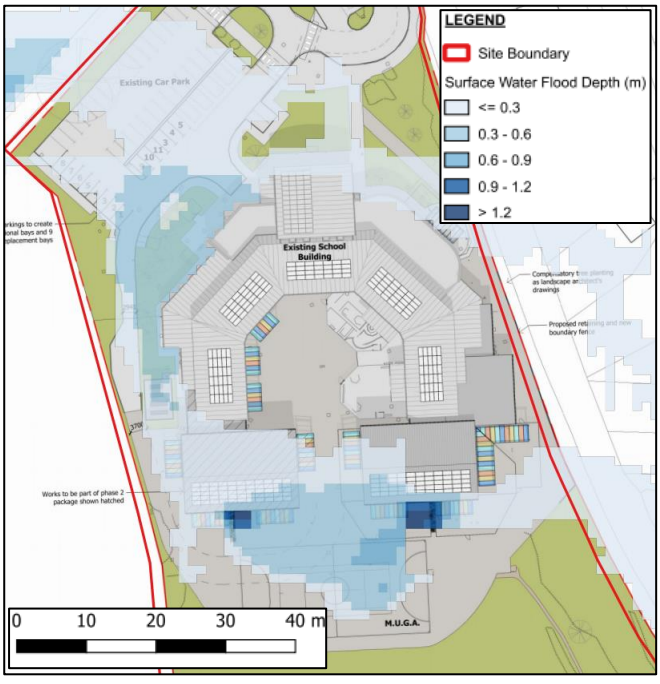


Figure 3 – 0.1% AEP + CC (Year 2120) Event – Surface Water Flood Depth

Flood depths which are shown to exceed 0.9m on the NRW flood mapping during all considered events are attributed to surface water ponding within a topographical low point formed by the higher ground of the adjacent playing fields. Following construction of the proposed extensions, the topographical low point will shift south, ensuring that the new buildings remain outside the areas of deeper surface water flooding.

To derive a flood level for the design 1% AEP plus CC (year 2120) event, the surface water flood extent has been overlaid onto LiDAR data. A surface water flood extent with LiDAR overlay is included as Appendix G. The surface water flood extent with LiDAR overlay shows that the 1% AEP plus CC flood extent reaches a maximum elevation of 176.09m AOD in the location of the westernmost classroom extension block and 176.03m AOD in the location of the easternmost classroom extension block.

As shown on the 'Drainage General Arrangement' drawing (Appendix H), 2no. existing field drains (150mm and 300mm diameter) enter the site in the north-western corner and provide a drainage function for agricultural land west of the site (from where the surface water flood flow route originates). The field drains merge before splitting into 2no. 150mm field drains. The field drains then flow south along the western edge of the site and east through the northern extent of the site, ultimately discharging to the unnamed watercourse south-east of the site. The NRW surface water flood risk mapping does not take account of drainage features such as field drains. When accounting for the presence of the field drains (assuming they are in good condition), the risk of surface water flooding arising from land west of the site will be reduced.

It can be concluded that based on NRW flood risk mapping, there is a potential risk of surface water flooding in the location of the proposed classroom extensions. Flood depths are typically less than 300mm during all considered events.

Sewer

Flooding from sewers can occur when a sewer is overwhelmed by heavy rainfall, becomes blocked, is damaged, or is of inadequate capacity. Flooding is mostly applicable to combined and surface water sewers.

The DCWW sewer records show that there is a 150mm public combined sewer serving residential properties east of the site. There is also a 150mm public surface water sewer serving residential properties east of the site.

Any potential flooding arising from the 150mm public combined sewer or the 150mm public surface water sewer east of the site would be directed south-east, away from the site, following the local topography.

There are no records of sewer flooding at or near to the site. It can therefore be concluded that the risk of sewer flooding is very low.

Groundwater

Groundwater flooding occurs when water levels underneath the ground rise above normal levels. Prolonged heavy rainfall soaks into the ground and can cause the ground to become saturated. This results in rising groundwater levels which leads to flooding above ground.

As described above, the site is underlain by superficial deposits of Devensian Till, generally comprising

diamicton. The impermeable nature of the superficial deposits would limit the vertical migration of groundwater.

There are no records of groundwater flooding at or near to the site. It can therefore be concluded that the risk of groundwater flooding is very low.

Artificial Sources

There are no canals in the immediate vicinity of the. The NRW 'Flood Risk from Reservoirs' map (Appendix E) shows that the site is not at risk of flooding from reservoirs. It can therefore be concluded that the risk of flooding from artificial sources is very low.

Summary of Potential Flooding

It can be concluded that surface water flooding is the main potential source of flood risk at this site. The associated risk has been used to inform mitigation design.

Mitigation

The site is identified at risk of surface water flooding with depths generally less than 300mm in the location of the proposed classroom extensions during the 1% AEP plus CC (year 2120) flood event. The flood risk identified on NRW mapping would likely be reduced when accounting for the presence of land drains which serve agricultural land west of the site.

Flood levels during the 1% AEP plus CC surface water flood event are estimated as 176.09m AOD in the location of the westernmost classroom extension block, and 176.03m AOD in the location of the easternmost classroom extension block.

To maintain level access within the school, the proposed finished floor levels (FFL) will be set to match the existing school buildings at 176.05m AOD. External ground levels will be modified to ensure surface water flow is redirected around the new extensions, preventing localised pooling or ingress.

Impact on Flood Risk Elsewhere

The proposed classroom extensions will be located partially within the surface water flood flow route identified by NRW mapping. Post-development, the surface water flood flow route will be allowed to continue around the proposed buildings before discharging off-site in the same location as the existing scenario. As the surface water flood flow route will be maintained through the site and will discharge off-site in the same location, albeit following a slightly altered route through the site, the development will have negligible impact on flood risk elsewhere.

Conclusions

The proposed development is for the erection of 8no. additional classrooms (through 2no. building extensions), removal of mobile classrooms, minor internal alternations to the existing building and external works including playground areas, car parking and drainage.

The site is located within Flood Zone A on the Welsh Government Development Advice Map – an area considered to be at little or no risk of fluvial or tidal flooding, with a less than 0.1% (1 in 1000) annual probability of flooding.

The main potential source of flooding at this site is surface water flooding. NRW surface water flood mapping identifies a flood flow route crossing the site from north-west to east. The flood extent encroaches into the location of the proposed classroom extensions. Flood depths are generally less than 300mm in the location of the proposed classroom extensions during the 1% AEP plus CC (year 2120) flood event and the 0.1% AEP plus CC (year 21020) flood event.

A 1% AEP plus CC flood level of 176.09m AOD is estimated for the westernmost classroom extension block. A 1% AEP plus CC flood level of 176.03m AOD is estimated for the easternmost classroom extension block.

To maintain level access within the school, the proposed finished floor levels (FFL) will be set to match the existing school buildings at 176.05m AOD. External ground levels will be modified to ensure surface water flow is redirected around the new extensions, preventing localised pooling or ingress.

The proposed classroom extensions will be located partially within the surface water flood flow route identified by NRW mapping. Post-development, the surface water flood flow route will be allowed to continue around the proposed buildings before discharging off-site in the same location as the existing scenario. As the surface water flood flow route will be maintained through the site and will discharge off-site in the same location, albeit following a slightly altered route through the site, the development will have negligible impact on flood risk elsewhere.

Recommendations

1. Submit this Flood Consequences Assessment to the Planning Authority in support of the Planning Application.

Appendix A Location & Aerial Plan

Rhosllannerchrugo

Education Facility

HEOL CARADOC

MAES GLAN

HEOL-YR-AFON / BROOK STREET

PW

CULFAN

BRYN GLAS

STRYT OSBOURNE / OSBORNE ST

ERW LWYD

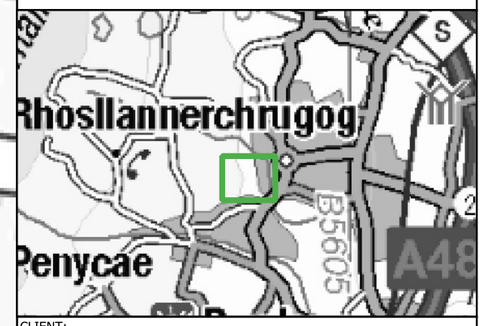
PANT HILL

0 50 100 150 200 250 m

Notes:
1) All dimensions are in metres and all levels in metres above Ordnance Datum unless stated otherwise

LEGEND

- Site Boundary
- Watercourses
- Waterbodies



CLIENT:
Read Construction Ltd

waterco
www.waterco.co.uk

SCHEME:
Ysgol I. D. Hooson, Wrexham

PLOT TITLE:
Location Plan

PLOT STATUS:	DATE:
FINAL	26-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:2000

PLOT NAME:	REVISION:
16126_Location_Plan	-

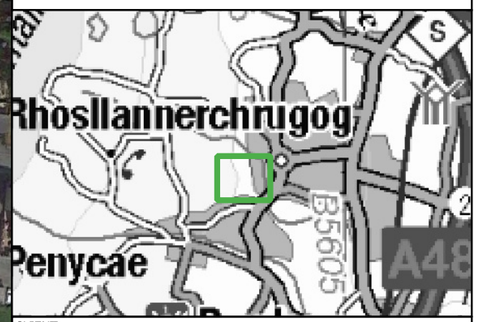
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Notes:
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LEGEND

Site Boundary



CLIENT:
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SCHEME:
Ysgol I. D. Hooson, Wrexham

PLOT TITLE:
Aerial Plan

PLOT STATUS:	DATE:
FINAL	26-03-2025

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE AT A3:
AM	AW	NJ	1:2000

PLOT NAME:	REVISION:
16126_Aerial_Plan	-

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