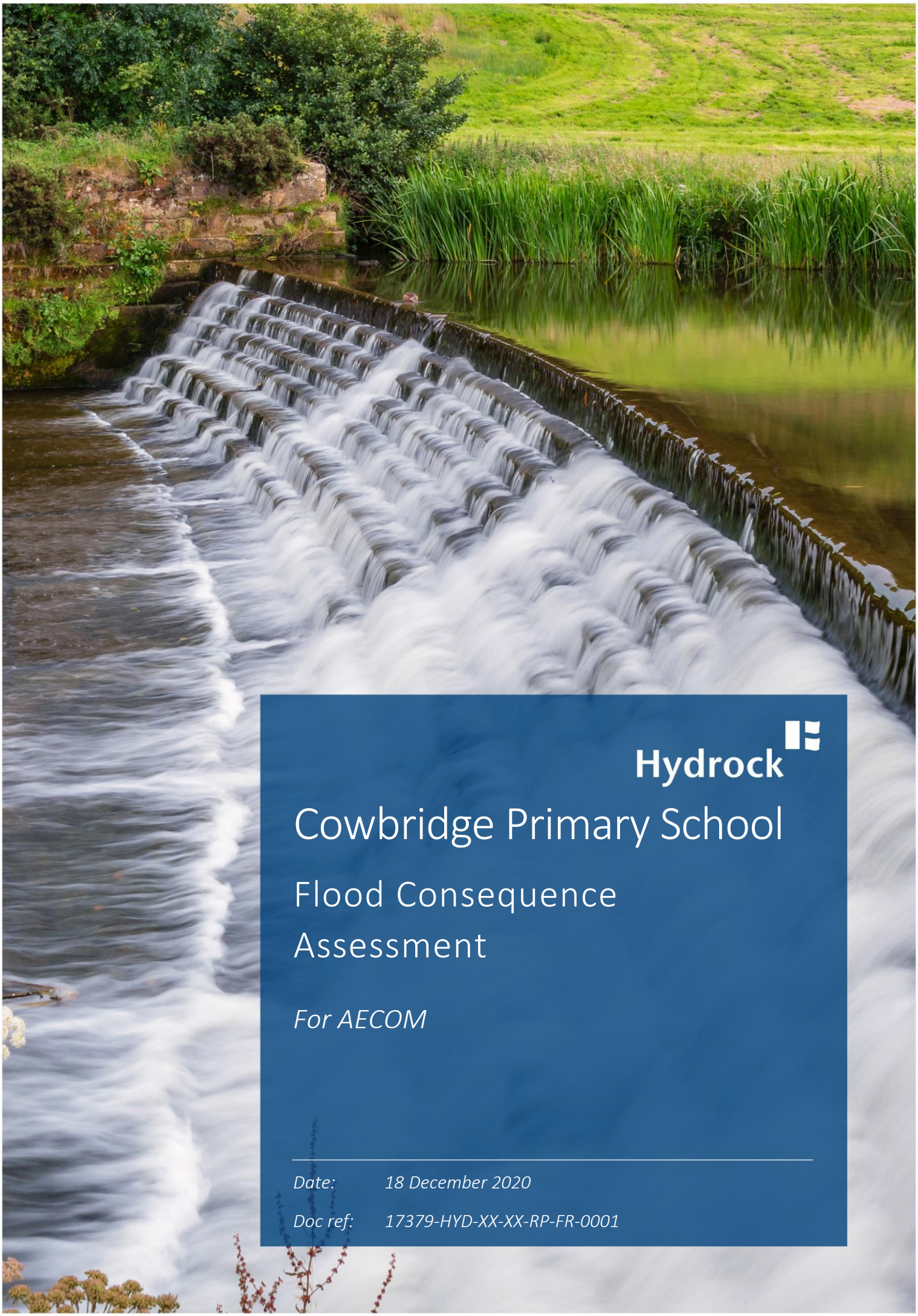

Hydrock

Cowbridge Primary School

Flood Consequence Assessment

For AECOM

Date: *18 December 2020*

Doc ref: *17379-HYD-XX-XX-RP-FR-0001*

DOCUMENT CONTROL SHEET

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1. INTRODUCTION

This report has been prepared by Hydrock Consultants Limited (Hydrock) on behalf of AECOM in support of a Planning Application to be submitted to the Vale of Glamorgan Council for the proposed development of Cowbridge Primary School at Ysgol Gyfun Y Bont Faen, Aberthin Road, Cowbridge.

This Flood Consequence Assessment report has been prepared to address the requirements of Technical Advice Note 15: Development and Flood Risk (TAN15), through:

- Assessing whether the site is likely to be affected by flooding.
- Assessing whether the proposed development is justified in the proposed location
- Presenting any flood risk mitigation measures necessary to ensure that the proposed development and occupant will be safe, whilst ensuring flood risk is not increased elsewhere.

2. SITE INFORMATION

2.1 Location

The site, measuring approximately 0.6ha, is situated on the Cowbridge Comprehensive School campus in the north east of Cowbridge approximately 18km west of Cardiff.

The site is bounded by the main school building to the north east, another school building, car park and Aberthin Road to the east, a football pitch to the south and fields with dense vegetation and grasslands to the west and north west.

The approximate site location is shown in Figure 1, with the full address and Ordnance Survey Grid Reference provided in Table 1.

Site Referencing Information	
Site Address	Cowbridge Comprehensive School, Aberthin Road, Cowbridge, Vale of Glamorgan, CF71 7EN
Grid Reference	ST002748 300200, 174823

Table 1. Site Referencing Information.

Figure 1. Site Location Map

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2.2 Topography

A site-specific topographical survey has been included in Appendix A. The survey shows that ground levels generally fall from south east to north west, the high point being approximately 29.96mAOD on the border with the asphalt road, falling to 27.64mAOD where the site becomes densely vegetated. The levels continue to fall to the west of the vegetated area (see topographical survey - Appendix A) to a low of 25.66mAOD on the western boundary at a wooden path.

2.3 Existing Site Use

The site is currently used as open playing fields for the existing Cowbridge Comprehensive School and is entirely undeveloped

2.4 Proposed Development

A new primary school is proposed at the site, with the building located in the higher elevated eastern section of the site and a Multi-Use Games Area (MUGA) in the northern corner. The remainder of the site will remain grassed sports fields.

3. ASSESSMENT OF FLOOD RISK

3.1 Fluvial Flooding

Natural Resources Wales (NRW) Flood Risk mapping (Figure 2) shows the majority of the site to be at 'Very Low / Negligible' risk of flooding from rivers (un-shaded area), however an area parallel with the north west border of the site is shown to be at 'Medium' risk (between 1 in 100 (1%) and 1 in 30 (3.3%) chance of fluvial flooding) and 'High' risk (>1 in 30 (3.3%) chance of fluvial flooding).

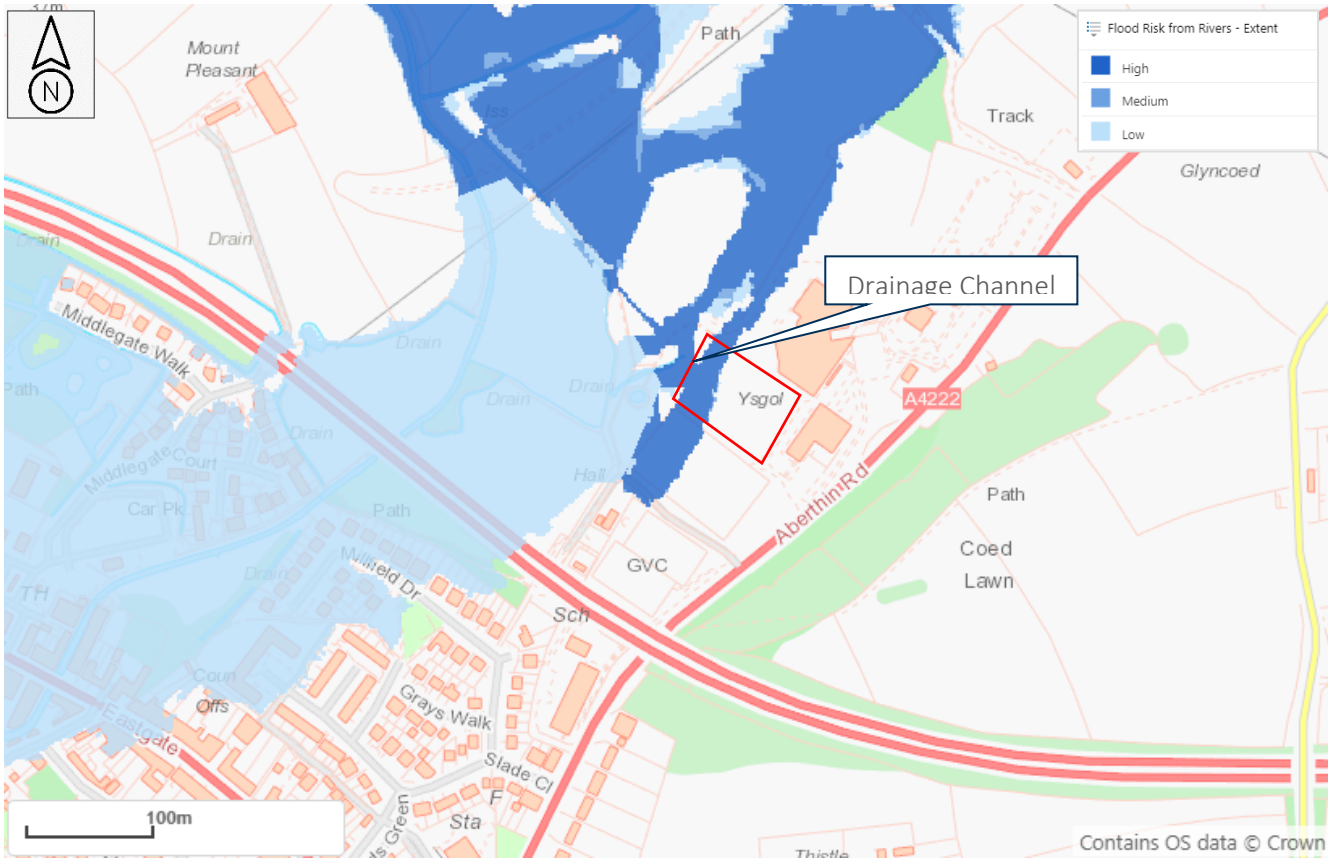

Figure 2. NRW Flood Risk from Rivers Map

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The closest watercourse to the site is the River Thaw which is approximately 150m to the west and flows in a south westerly direction parallel to the north western boundary of the site. Immediately west of the site is a drainage channel running west from the north western boundary and leading into the River Thaw. A further watercourse, the Nant Aberthin is around 400m to the north of the site.

This ditch is shown by the NRW Flood Risk mapping (Figure 2) as being the approximate limit of the areas of predicted 'High' risk area (>1 in 30 (3.3%) chance of flooding) and the Zone C2 areas (floodplain without significant flood defence infrastructure)(Figure 3) and thus limits the extent entering the site

The Welsh Assembly Development Advice mapping (Figure 3) shows the site as being predominantly within Zone A (considered to be at little or no risk of fluvial or coastal/tidal flooding) but shows an area of Zone B (areas known to have flooded in the past) in the north of the site and Zone C2 (areas of the floodplain without significant flood defence infrastructure) in an area running parallel to the north west boundary.

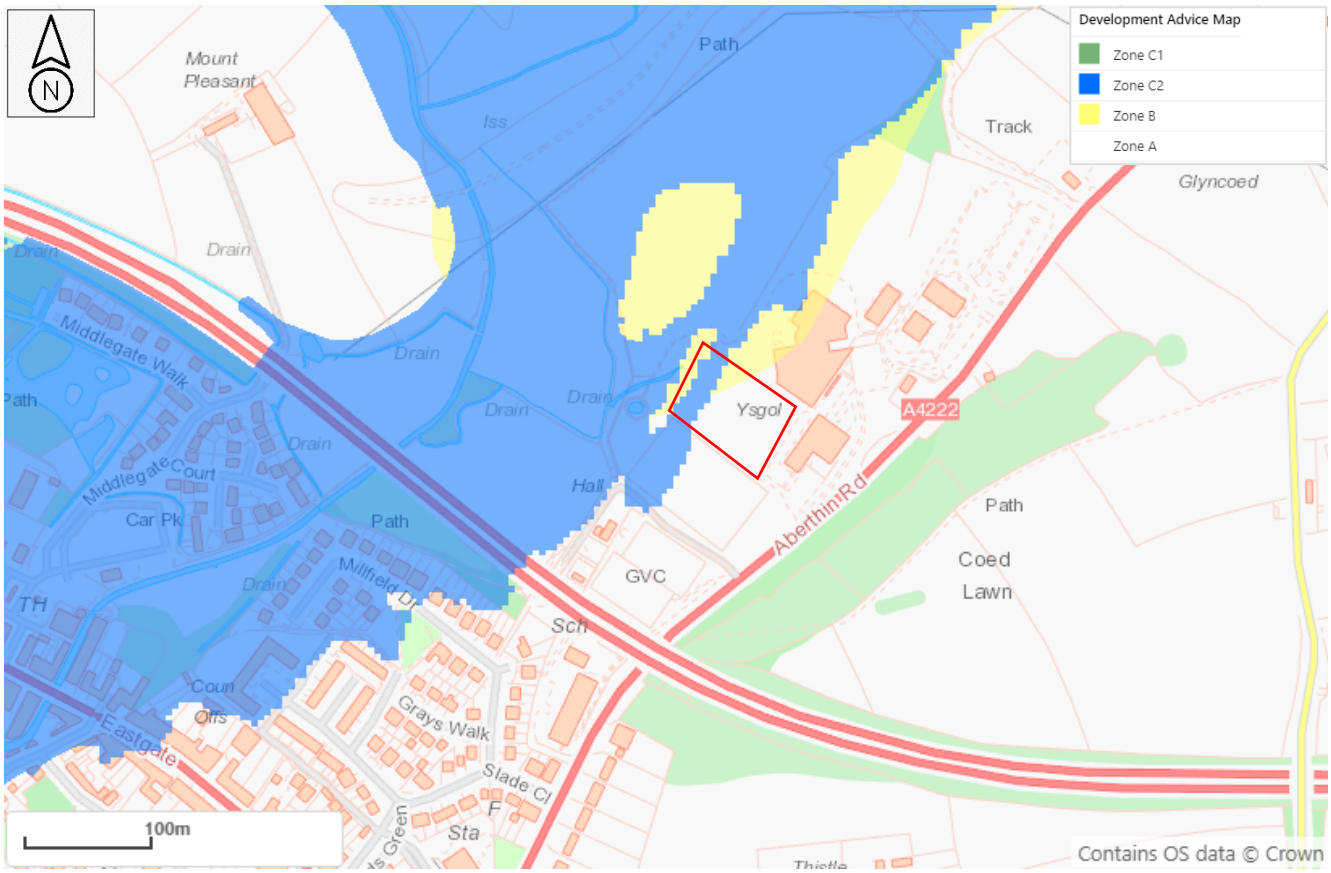

Figure 3. NRW Development Advice Map

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(It is noted that Cowbridge (downstream of the site) benefits from a flood alleviation scheme with a Flood Storage Area located 200m to the north west of the site (Figure 4). The source of 'High' risk (Zone C2) is likely from Nant Aberthin. The mechanism of flooding from this watercourse is considered to be a result of flows backing up against a disused railway line and flowing south towards the site.

There are no records showing the site to have been flooded, however there is an area of the site classified as Zone B (areas known to have been flooded in the past as evidenced by sedimentary deposits).

Owing to the level different across the site, it is considered that the majority of the site is elevated above predicted flood levels but the lower western portion is concluded as being within the outer limit of the 1 in 100 year event.

Based on the above, the location of the proposed building in the eastern half of the site is considered to be at 'low' risk of fluvial flooding, but the western portion of the site is at an increased ('high') risk.

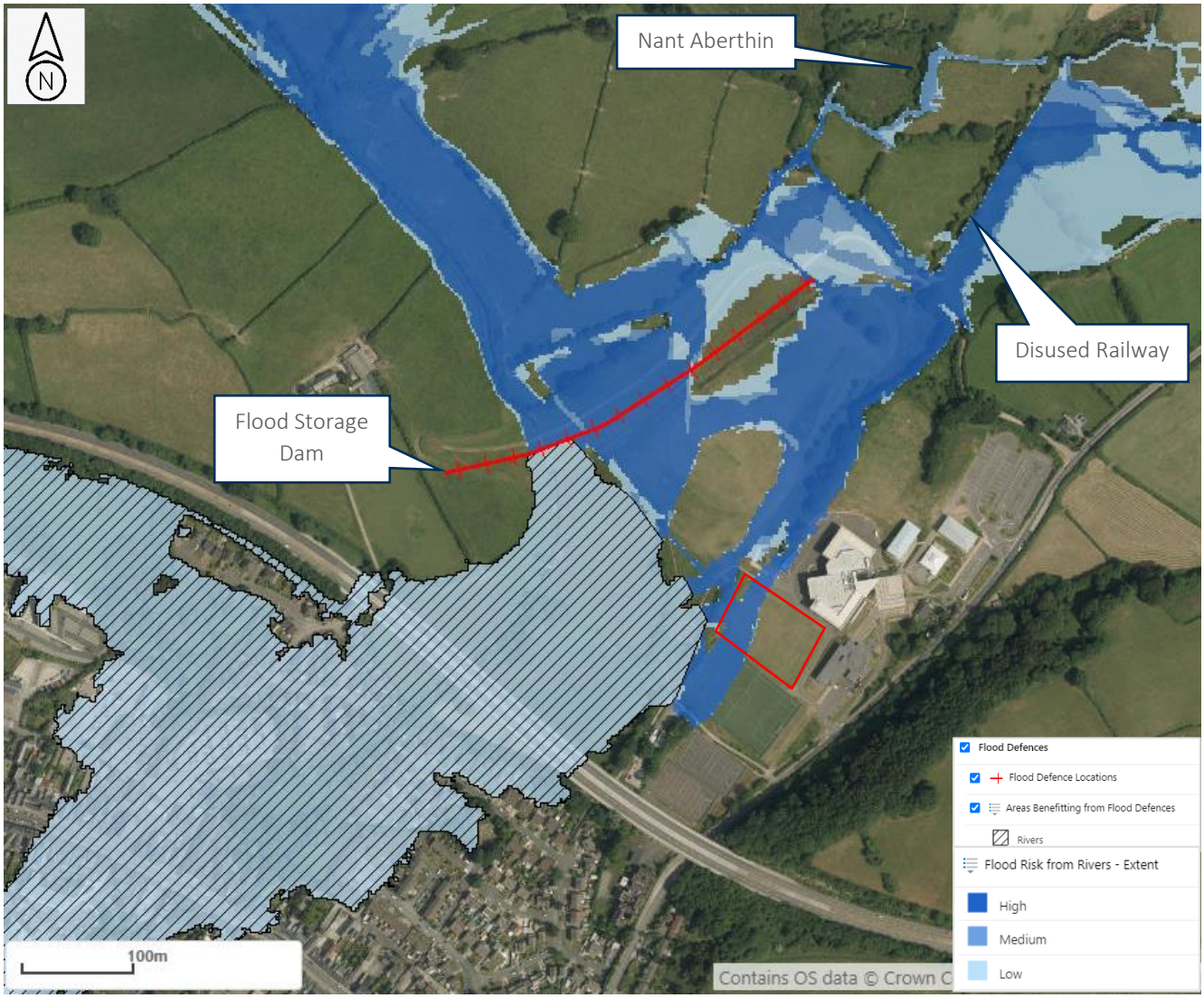

Figure 4. NRW Flood Defence and Flood Risk from Rivers Map

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3.2 Tidal Flooding

NRW Flood Risk from the Sea mapping shows the closest area at risk of tidal flooding as being around 6km downstream, and as such the site is concluded to be at 'negligible' risk of tidal flooding.

3.3 Surface Water Flooding

Surface water flooding occurs as the result of an inability of intense rainfall to infiltrate to ground. This often happens when the maximum soil infiltration rate or storage capacity is reached. Such flows either enter existing land drainage features or follow the general topography which can concentrate flows and lead to localised ponding/flooding.

NRW Surface Water Flood Risk mapping (Figure 5) shows the majority of the site as being at low risk of flooding from surface waters. There is, however, a channel of 'medium' and 'high' risk surface water flooding running parallel with the north western border. This is consistent with the topography and confirms the location of a local low point which can be addressed by the development if necessary.

The risk from surface water flooding in the area of the proposed new building is concluded to be 'low'.

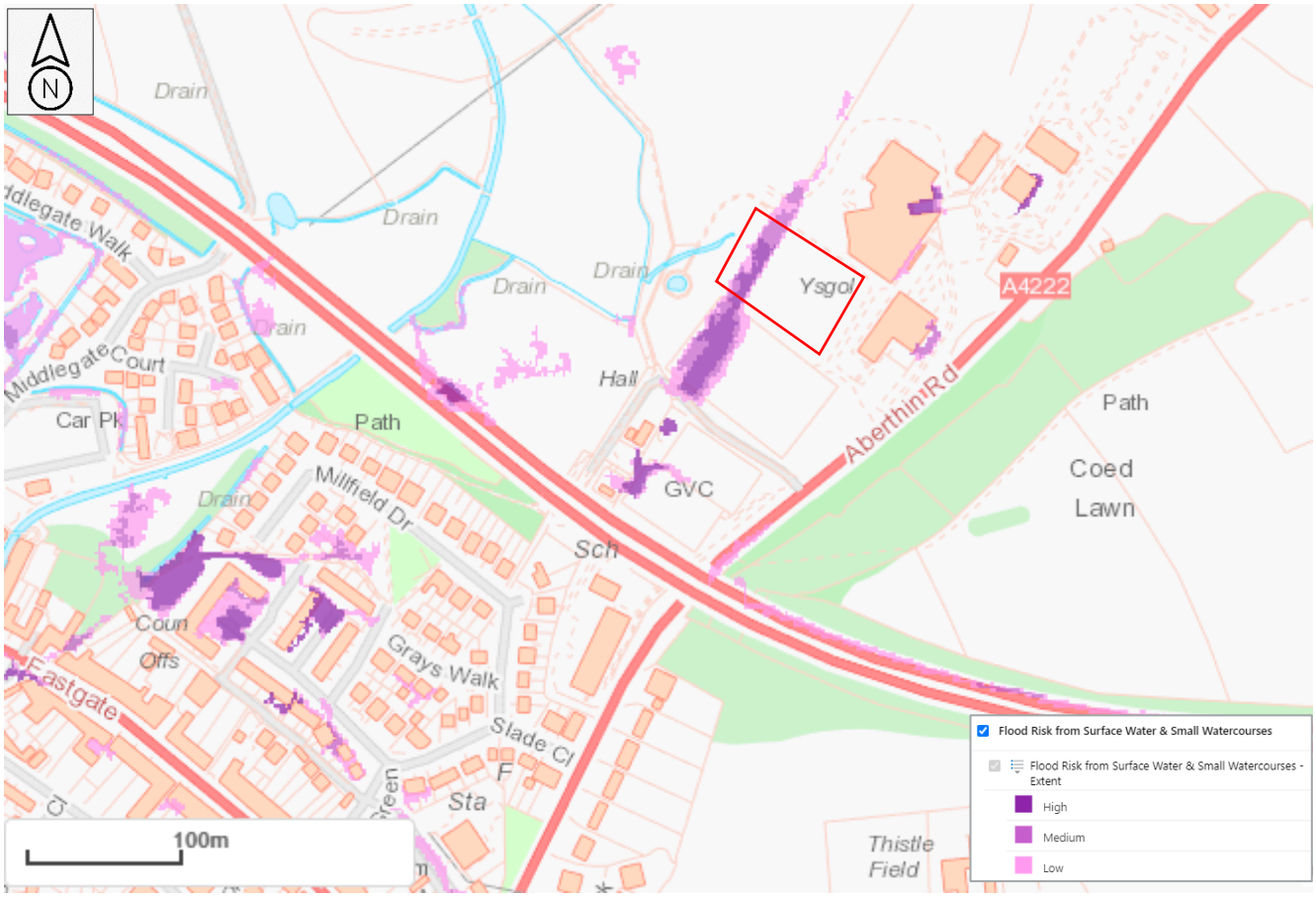

Figure 5. NRW Surface Water Flood Risk map

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3.4 Groundwater Flooding

British Geological Survey (BGS) mapping shows the entirety of the site to be underlain by Mercia Mudstone group with Alluvium deposits in the north and north west of the site and Glaciofluvial deposits comprising sand and gravel in the rest of the site.

Noting such a geological sequence, there is considered to be the potential for a perched groundwater table within the permeable superficial deposits.

Given the presence of the adjacent River Thaw, the groundwater table level will likely be influenced by water levels within the River i.e., fluctuating groundwater table related to channel water level. As such, the fluvial flood risk indicated at the site (as assessed in Section 3.2) is considered to be representative of the 'worst-case' groundwater flooding scenario at the site.

Vale of Glamorgan Local Flood Risk Management Strategy (Capita, 2013) (LFRMS) reported no areas of localised groundwater flooding at the specified site. The Vale of Glamorgan LFRMS showed the site to be in an area with <25% susceptibility to groundwater flooding. As such, it can be concluded that the risk of groundwater flooding at the site is 'low'.

BGS borehole data on site found the water level to be at approximately 1m depth, whilst this does not pose a risk of groundwater flooding, it is worth noting there may be some interaction during the construction phase of the development.

3.5 Sewer and Infrastructure Failure Flooding

As with the assessment of surface water flooding, if the sewer network were to fail / surcharge any flows will likely drain to the lower lying area to the west of the site.

As such, the site is therefore concluded to be at 'low' risk of sewer flooding.

As highlighted in Section 3.1, a 'dammed' Flood Storage Area is located approximately 200m north west of the site. The probability of a catastrophic failure of a dam is low, given the ongoing monitoring and maintenance of the assets. However, in the unlikely event that the dam was to fail, NRW's Reservoir flood risk mapping (Figure 6) shows the north western boundary to be impacted.

Reservoir failure is a 'residual' / low probability event and as the proposed primary school building is outside the affected area of site and would not be impacted, the risk to site from reservoir failure can be concluded to be 'low'.

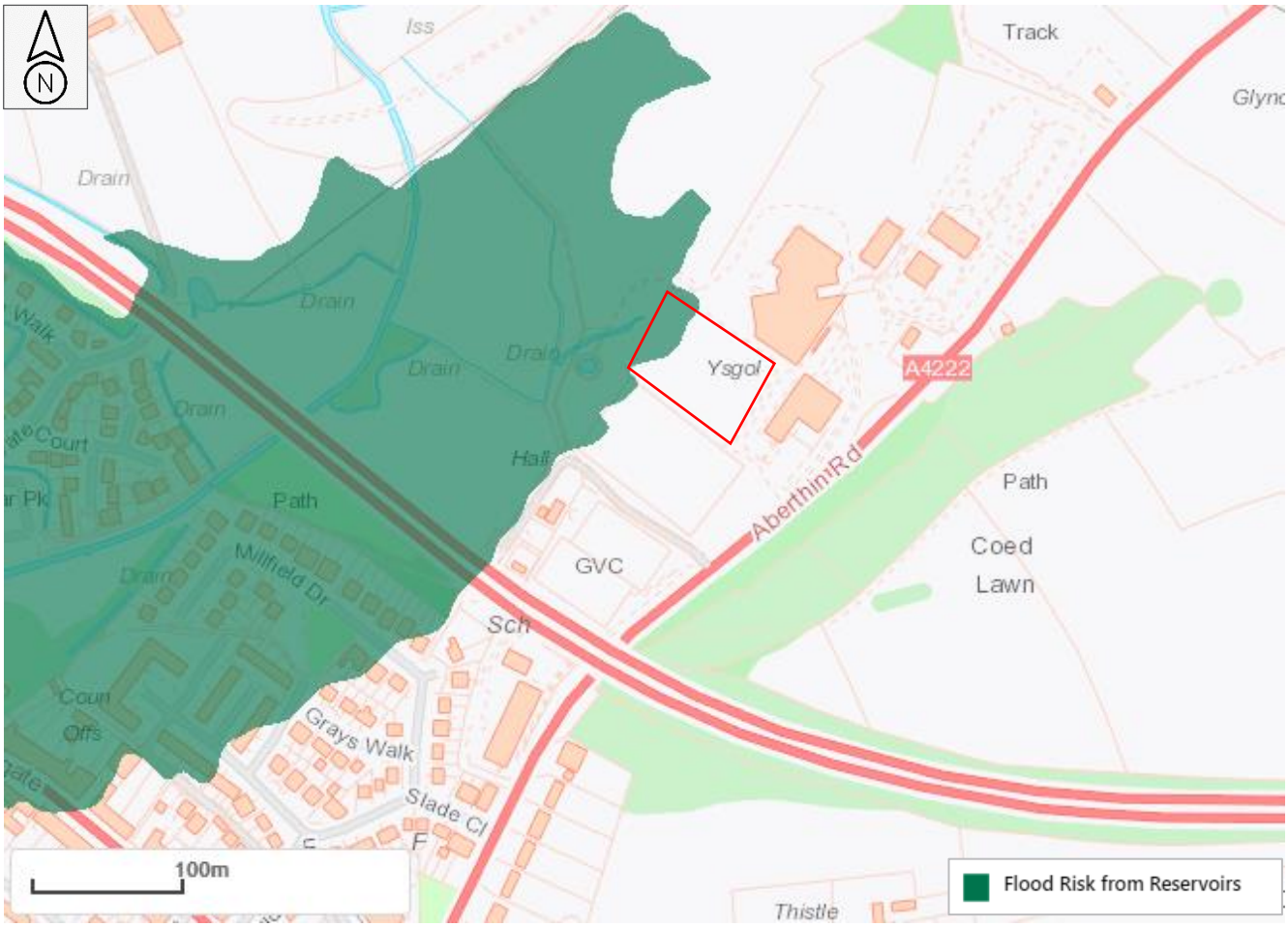

Figure 6. NRW Reservoir Failure Flood Risk map

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4. TAN15 REQUIREMENTS

4.1 Justifying the Location of the Development

It is acknowledged that the application boundary includes areas of Zone C2, however the proposals adopt a sequential approach within the site, all buildings being located within areas at 'Low' risk and within Zone A. Only grassed areas are within the higher risk Zone C2/B.

The proposed primary school is ancillary to the existing Cowbridge Comprehensive School and is required to complement and sustain the existing school and education provision within the region, as opposed to representing a ‘stand-alone’ development.

Subject to confirmation by the Local Planning Authority that it is acceptable to adopt a sequential approach within the site as has been proposed, the location of the proposed development is considered to be appropriate.

4.2 Assessing Flooding Consequences

4.2.1 Flood Resistance and Resilience

In line with TAN15, it is recommended that the finished floor level of the proposed building is ‘flood free’ in the 1 in 100 year +25% ‘design’ flood. This is considered as being achieved owing to the location of the building being entirely within the 'low risk' zone. As such, and where practicable, it would be recommended for FFLs to be set 150mm ‘above immediately surrounding ground levels to mitigate against any residual flood risk.

4.2.2 Flood Warning and Evacuation

The functional part of the site is in an area of low risk with access to the site, off Aberthin Road, not at risk from any source of flooding. As there will be safe access and egress to the proposed primary school and it is only the MUGA and playing fields at risk of flooding, a flood warning and evacuation plan is not deemed to be necessary.

4.2.3 Floodplain Storage

Due to the addition of the MUGA which may result in a minor loss of flood plain storage, it is recommended that land along the western site boundary be lowered to off-set the loss of storage.

4.2.4 Surface Water Management

A comprehensive Drainage Strategy, presented separately, has been prepared to ensure surface water will be appropriately managed, and accordingly this should be consulted in relation to the proposed means of surface water management at the site.

5. CONCLUSIONS

This Flood Consequence Assessment (FCA) report has been prepared by Hydrock on behalf of AECOM in support of a planning application for the proposed Primary School at Cowbridge Comprehensive School, Cowbridge.

The majority of the site is shown to be within a 'low' risk area / Zone A. There is a corridor of Zone B and Zone C2 running through the western portion of the site parallel to the north west boundary.

Site-specific analysis has identified potential fluvial, surface water, groundwater and infrastructure failure flood risks.

In accordance with TAN15, it should be confirmed with the Local Planning Authority that it is acceptable to adopt a sequential approach to locating buildings and facilities within the site.

Owing to the proposed building being within the 'low' risk Zone it considered that the finished floor level of the proposed building is 'flood free' in the 1 in 100 year +25% 'design' flood. It would, however, be recommended that a further 150mm 'freeboard' be provided above immediately surrounding ground levels where practicable to mitigate against any residual flood risk.

A comprehensive Drainage Strategy, presented separately, has also been prepared to ensure surface water will be appropriately managed.

This report therefore demonstrates that, in respect of flood risk, the proposed scheme:

- Is justified in the location proposed.
- Will be adequately flood resistant and resilient.
- Will offer a means of flood warning and evacuation.
- Will not increase flood risk elsewhere through the loss of floodplain storage.
- Will put in place measures to ensure surface water is appropriately managed.

As such, the Application is concluded to meet the flood risk requirements of TAN15.

Hydrock Consultants Limited

6. REFERENCES

References		
Author	Date	Description
Capita	December 2013	Vale of Glamorgan Council Local Flood Risk Management Strategy (https://www.valeofglamorgan.gov.uk/Documents/_Committee%20Reports/Cabinet/2014/14-04-28/VoGC-LFRMS----Vol-1-Main-Report.PDF)

Appendix A – Topographical Survey

Reference	Title
ALS/3162 CHS/01	Topographical Survey at Cowbridge High School page 1
ALS/3162 CHS/02	Topographical Survey at Cowbridge High School page 2
ALS/3162 CHS/03	Topographical Survey at Cowbridge High School page 3

Rev	Amendments	Date	By

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NOTES:

1. SITE GRID AND LEVELS ARE BASED UPON ORDNANCE SURVEY VIA THE ACTIVE GPS NETWORK.

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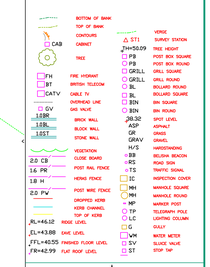

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PROJECT
TOPOGRAPHICAL SURVEY AT
COWBRIDGE HIGH SCHOOL
VALE OF GLAMORGAN

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Drawn	TH	Date	16/07/2020
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KEY

BOTTOM OF BANK
TOP OF BANK
CONTOURS
CABINET
TREE
FIRE HYDRANT
BRITISH TELECOM
CABLE TV
OVERHEAD LINE
GAS VALVE
BRICK WALL
BLOCK WALL
STONE WALL
VEGETATION
CLOSE BOARD
POST RAIL FENCE
HEDGE FENCE
POST WIRE FENCE
DROPPED KERB
KERB CHANNEL
TOP OF KERB
RIDGE LEVEL
EAVE LEVEL
FINISHED FLOOR LEVEL
FLAT ROOF LEVEL
VERGE
SURVEY STATION
TREE HEIGHT
POST BOX SQUARE
POST BOX ROUND
GRILL SQUARE
GRILL ROUND
BOLLARD ROUND
BOLLARD SQUARE
BIN SQUARE
BIN ROUND
SPOT LEVEL
ASPHALT
GRASS
GRAVEL
HARDSTANDING
BELGIAN BEACON
ROAD SIGN
TRAFFIC SIGNAL
INSPECTION COVER
MANHOLE SQUARE
MANHOLE ROUND
WATER POST
TELEGRAPH POLE
LIGHTING COLUMN
TACILY
WATER METER
SLUICE VALVE
STOP TAP

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1.8 PR POST RAIL FENCE
1.8 H HERAS FENCE
2.0 PW POST WIRE FENCE
GRIDPOINTS KERB CHANNEL
TOP OF KERB
RL=46.12 RIDGE LEVEL
EL=43.88 EAVE LEVEL
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