

# Aldi Ruthin Development

Flood Consequence Assessment

## Final Report

February 2019

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## Revision History

Revision Ref/Date	Amendments	Issued to
November 2017	Draft Report	Bryn Richards
February 2019	Updated Site Boundary	Bryn Richards

## Contract

This report describes the work commissioned by Tom Robinson, on behalf of JLL, by an email dated 28 January 2019. Josh Rutherford of JBA Consulting carried out this work.

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## Abbreviations

ABD .....	Area Benefiting from Defences
AEP .....	Annual Exceedance Probability
DAM .....	Development Advice Maps
DCC .....	Denbighshire County Council
FFL .....	Finished Floor Level
FCA .....	Flood Consequence Assessment
FWA .....	Flood Warning Area
LPA .....	Local Planning Authority
NRW .....	Natural Resources Wales
SAB .....	SuDS Approval Body
SuDS .....	Sustainable Drainage Systems
TAN15.....	Technical Advice Note (TAN) 15: Development and Flood Risk (2004)

## Definitions

Development Advice Zone	Description of Zone
Zone A	Considered to be little or no risk of fluvial or tidal/coastal flooding.
Zone B	Areas known to have flooded in the past evidenced by sedimentary deposits.
Zone C	Based on Environment Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal).
Zone C1	Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.
Zone C2	Areas of the floodplain without significant flood defence infrastructure.

# 1 Introduction

## 1.1 Overview

This Flood Consequence Assessment (FCA) has been prepared following instruction from Jones Lang LaSalle (JLL) via an email dated 28 January 2019. The FCA will assess the flood risk to the proposed development on A525, Lon Gwernydd, in accordance with Technical Advice Note 15. This FCA will inform a hybrid planning application for the site, with full and outline planning permission sought across the site. Section 2 covers the planning application associated with the site.

This is a desktop review of flood risk to the site, based on available information. No new modelling has been undertaken as part of this assessment. This report is an updated version of the FCA completed by JBA Consulting for the Aldi Ruthin site, this version is based on an increased site area and development plan.

## 1.2 Flood Consequence Assessment requirements

This FCA follows Welsh Government guidance on development and flood risk set out in TAN15: Development and Flood Risk (TAN15).

The following key flood risks have been appraised with flood risk being appraised for the lifetime of the development:

- The likely mechanisms of flooding including flood extents
- Consideration of the likely sources of flooding and the impacts on development
- The depths of flooding through the site
- The speed of inundation of the site
- The rate of rise of flood water through the site
- The likely impact of climate change, which has been based on NRW's breach modelling
- Velocities of floodwater across the site
- The impacts of the development in terms of flood risk on neighbouring properties and elsewhere on the flood plain.

## 2 Development Location and Description

### 2.1 Location

The proposed development is greenfield land, located north west of Ruthin town centre. Figure 2-1 displays the relative position of the development in relation to the town centre.

**Table 2-1 Site Description Table**

Site Name	Aldi Development Ruthin
Site Area (ha)	3.62 ha (total application area)
Existing land use	Greenfield.
Proposed land use	Commercial and retail development.
Proposed vulnerability classification	Less vulnerable development.
OS-NGR	SJ 11511 58913
Local Planning Authority	Denbighshire County Council (DCC)

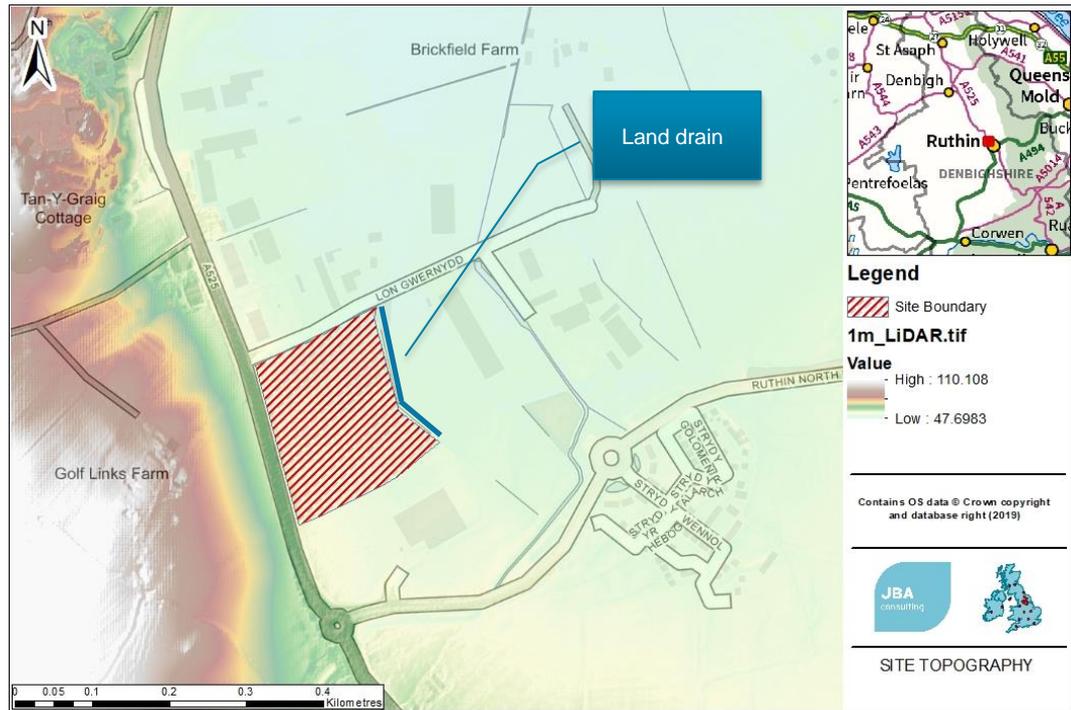


## 2.2 Description

The proposed site is greenfield land, bounded to the north and east by existing warehousing and industrial yards. The A525 runs along the west of the site and would provide the primary access road away from the site.

The River Clwyd is approximately 600m east of the proposed development and is not envisaged to impact upon flood risk to the site due to its general proximity. Land drains located near the site eventually outfall into the River Clwyd, north-east of the development.

## 2.3 Topography



**Figure 2-2 Site Topography**

The west of the site is generally much higher in elevation than the site itself and is displayed in Figure 2-2 which shows the 1m LiDAR for the area. The land drain, located east of the site, is lower in elevation and the site generally falls in this direction.



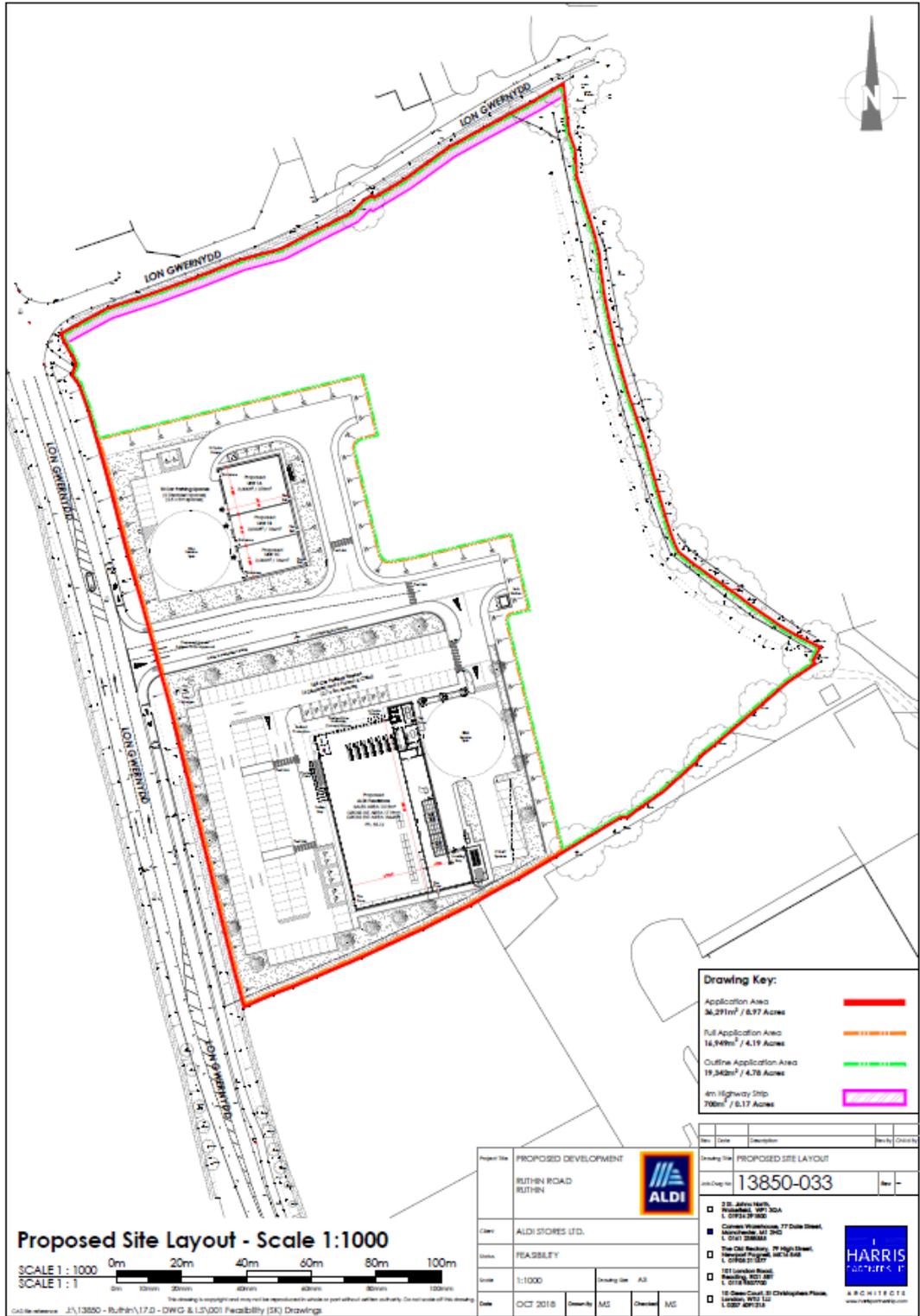
**Figure 2-3 Flow Direction Grid**

Figure 2-3 displays the flow direction grid based on a 1m LiDAR Digital Terrain Model (DTM) which was freely accessed via Natural Resources Wales (NRW) online spatial data catalogue. It shows that the typical fall across the site is from west to east and from south to north. Resulting in flows being channel towards the existing land drain, east of the site area.

## 2.4 Planning Application

The application site shown in Figure 2-3 shows the full application area which covers 3.62ha. This FCA will inform a hybrid planning application with full planning permission sought for the orange dashed boundary and outline planning permission for the green dashed boundary area.

Application Type	Area (ha)
Full Application	1.69
Outline Application	1.93



**Figure 2-4 Site Application Area**



Figure 2-5 1:5,000 Scale Location Plan

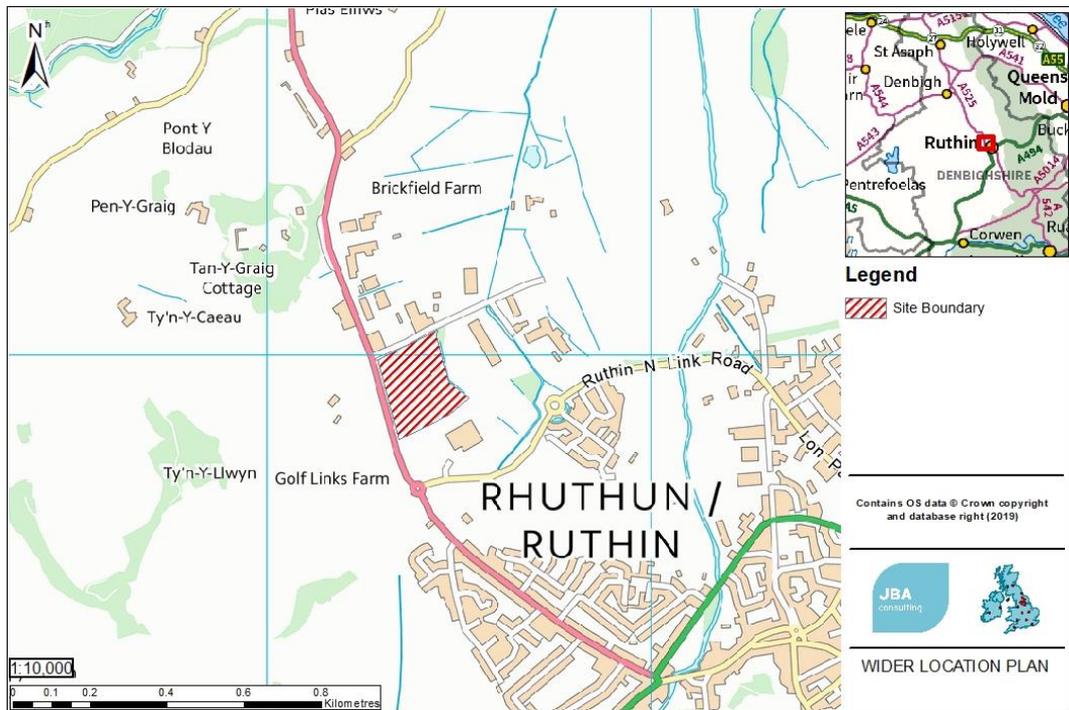


Figure 2-6 1:10,000 Scale Location Plan



Figure 2-7 Proposed Site Plan

### 3 Flood Risk

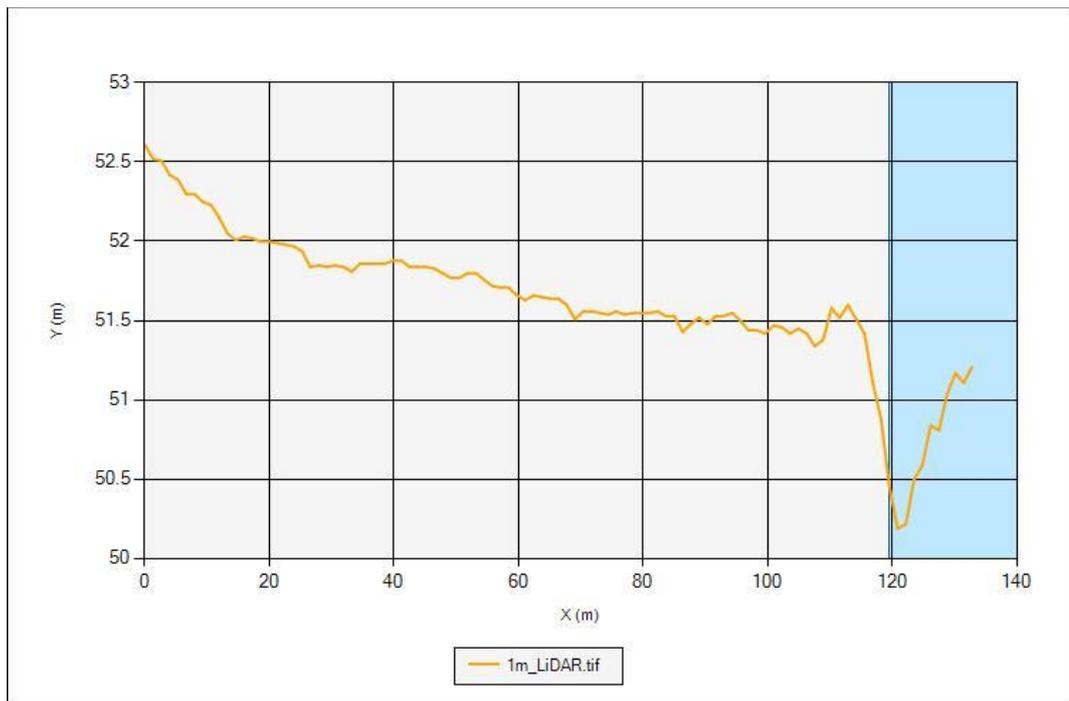
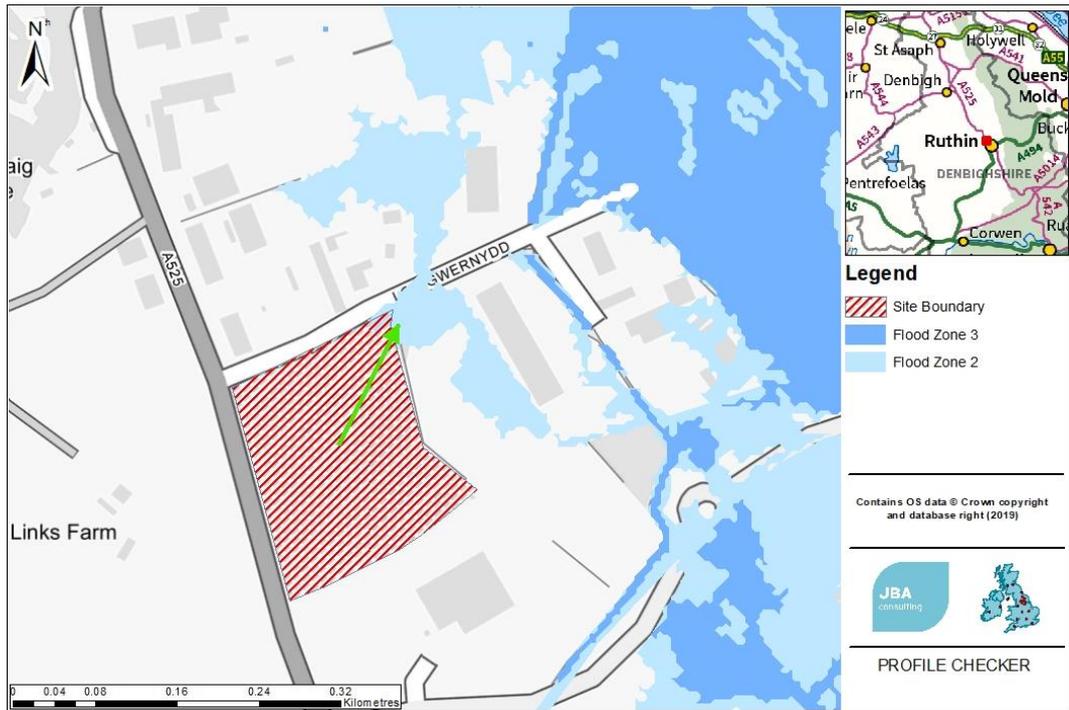
A review of the existing data available for flood risk has been undertaken as part of this FCA. Table 3-1, below, summarises these findings and these are discussed in more depth within this chapter.

**Table 3-1 Summary of Flood Risk**

Source of Flooding	Onsite Presence	Description
Fluvial/Tidal	* (see 3.1)	Some sections of the site within DAM Zone B. Discussed in Section 3.1.
Surface Water (Pluvial)	* (see 3.2)	No areas of the site within the published surface water mapping.
Reservoirs	* (see 3.3)	Site is not at risk from reservoir flooding.
Groundwater	* (see 3.4)	Not at risk from flooding due to groundwater emergence.
Canals	* (see 3.5)	Site is not at risk from canal flooding.
Historic Flooding	* (see 3.6)	Not within historic flood mapping events.

#### 3.1 Fluvial/Tidal Flood Risk

The published Development Advice Maps indicate that sections of the site are within the Natural Resources Wales (NRW) Development Advice Maps (DAMs). TAN15 provides guidance related to flood risk dependent on the corresponding zone. DAM Zone B indicates a precautionary measure by checking the site levels against the 0.1% Annual Exceedance Probability event. Flood Zone 2 provides the worst extent of the outline for the 0.1% AEP, so, levels should be checked for Flood Zone 2. If site levels are above the levels defined by the Flood Zone, then flood risk does not need to be considered further for this mechanism of flooding.

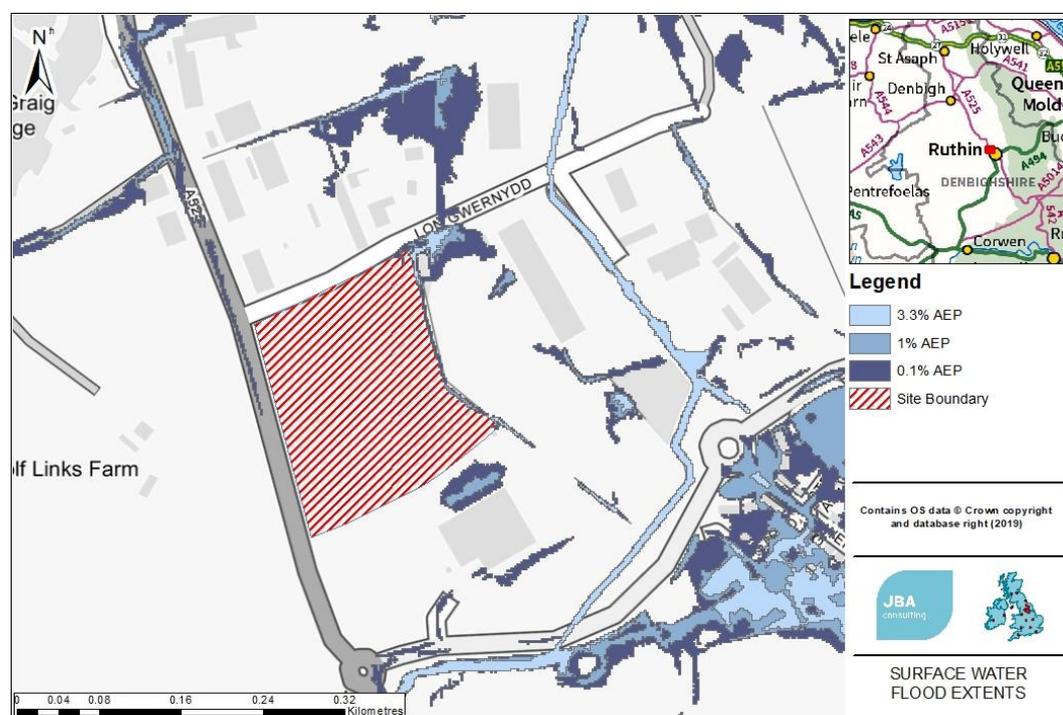


**Figure 3-1 Flood Zone 2 Levels**

Figure 3-1 displays the ground levels of the proposed development compared to the land within Flood Zone 2. As can be seen from the figure, the maximum elevation for the area within Flood Zone 2 is approximately 51.3m AOD. Whereas, site levels are set at approximately 55.1m AOD. Therefore, site levels are above the extreme 0.1% AEP event and the site is not at risk from fluvial or tidal inundation.

### 3.2 Surface Water Flood Risk

The publicly available surface water mapping extents, published by NRW, indicates that the site is not at risk from surface water flooding for all of the modelled events; 3.3%, 1% and 0.1% AEP events. Therefore, the site is not at risk from surface water inundation.



**Figure 3-2 Surface Water Flood Risk**

Figure 3-2 displays the surface water flood risk to the site. It shows that the site is not contained within the surface water flood extents and therefore, the site is not considered to be at specific of risk from surface water flooding.

### 3.3 Reservoirs

There are no nearby reservoirs which may pose a risk to the site from inundation. Reservoir flood maps are not publicly available for analysis within a GIS package, however, the NRW online map viewer indicates the maximum flood extents for the reservoirs in Wales and this indicates no flood risk from reservoirs.

Map viewer accessed 8 February 2019:

[https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood\\_Risk/viewers/Flood\\_Risk/virtualdirectory/Resources/Config/Default&layerTheme=0](https://maps.cyfoethnaturiolcymru.gov.uk/Html5Viewer/Index.html?configBase=https://maps.cyfoethnaturiolcymru.gov.uk/Geocortex/Essentials/REST/sites/Flood_Risk/viewers/Flood_Risk/virtualdirectory/Resources/Config/Default&layerTheme=0).

### 3.4 Groundwater

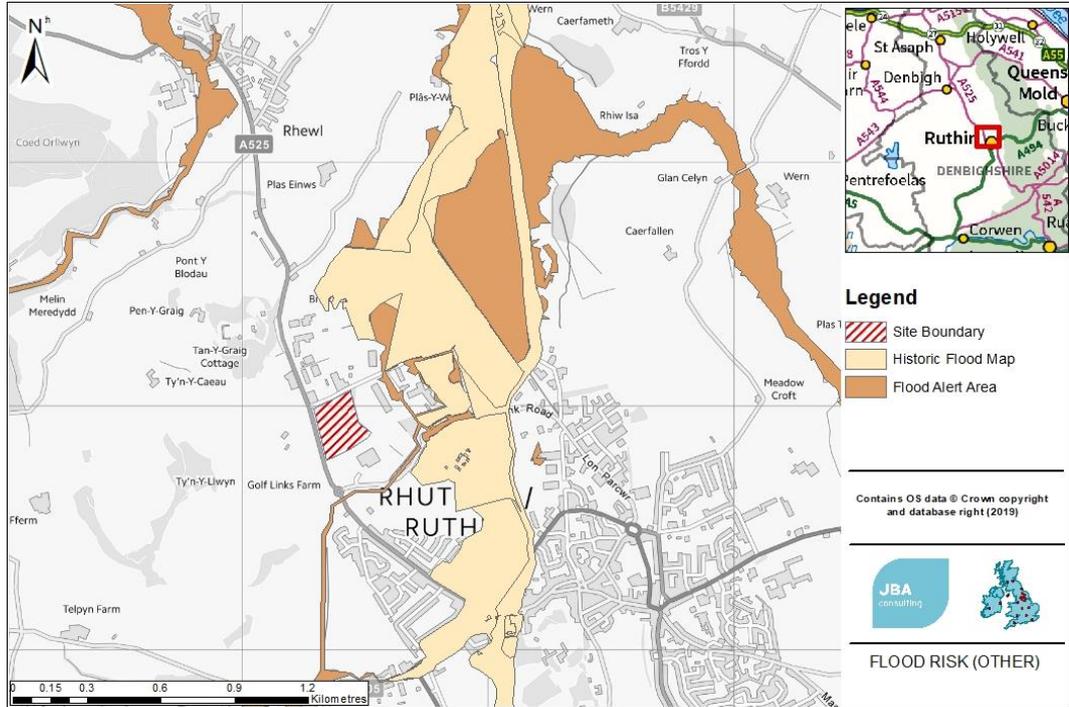
There is a land drain located directly east of the site boundary which is within the extents of the surface water flood map. Groundwater levels typically follow topography so it is anticipated that the risk of groundwater emergence may be moderate. However, no subsurface development is envisaged so this should not negatively affect the overall flood risk to the site.

### 3.5 Canals

There are no canals in Denbighshire so flood risk from this source does not need to be considered further as part of this assessment.

### 3.6 Historic Flooding

The site is not within the historic flooding extents as published by NRW and as such, flood risk from this source is not considered to be a significant issue.



**Figure 3-3 Historic Flood Map**

## 4 Surface Water Management

An assessment of the volume of surface water runoff likely to be generated by the proposed development has been undertaken. Proposals for surface water management are made to ensure any increased runoff does not cause flood risk elsewhere.

In accordance with new Welsh SuDS guidance, developers are required to use sustainable drainage systems (SuDS) (particularly infiltration drainage) for surface water disposal. For infiltration drainage to operate satisfactorily the ground must be sufficiently permeable, the water table must be relatively deep, the ground should be uncontaminated, and percolating water must not cause ground instability or problems elsewhere. There must also be sufficient open space to accommodate the infiltration facilities. Ground investigations and percolation tests would, therefore, be required to explore the feasibility of using infiltration drainage.

It should be noted that the proposed works will result in an increase in impermeable area. Additional volumes of surface water runoff will therefore need to be attenuated on site.

Exceedance flows up to the 1% AEP event including climate change will need to be effectively contained within car parking and landscape areas so that overland flows resulting from the development do not impact on existing infrastructure and development.

### 4.1 Outline Drainage Strategy

The drainage strategy for this site is to be completed by SWF Consulting. It is understood that the preferred method of discharge from the site is to be via a soakaway option. The design of the aforementioned soakaway will be carried out by SWF Consulting and approval for the SuDS design will need to be sought from the relevant SuDS Approval Body (SAB).

### 4.2 SuDS Approval Body (SAB)

The following elements will need to be considered for the scheme:

#### Standard 1 - Drainage priority/hierarchy

The following hierarchy will need to be considered and we will need to review with you how each Level is to be considered and introduced into your development proposals.

- Level 1 – Rainwater collected for use
- Level 2 – Discharge of surface water into the ground (preferred approach for the site)
- Level 3 – Discharge to a surface water body
- Level 4 – Discharge to a surface water sewer or highway drain
- Level 5 – Discharge to a combined sewer

#### Standard 2 – Hydraulic control

- Interception required where Levels 3 to 5 are proposed
- Zero runoff for the first 5mm for 80% summer / 50% winter events
- Compliance includes methods which should be maximised through Levels 1 & 2 e.g:
  - o All rainwater harvesting with regular daily demand
  - o All green roofs
  - o All permeable paving for the paved area, good infiltration capacity allows up to an additional 5 times the paved area.

o Detention basins – Draining impermeable areas up to 5 times the surface area (any conditions), or up to 25 times the base area (good infiltration)

#### Standard 3 – Water Quality

- Need to ensure water quality is not reduced
- Water Framework Directive requirements (must not prevent waterbody improvement measures required for WFD)
- Vegetated SuDS preferred for treatment

#### Standard 4 – Amenity

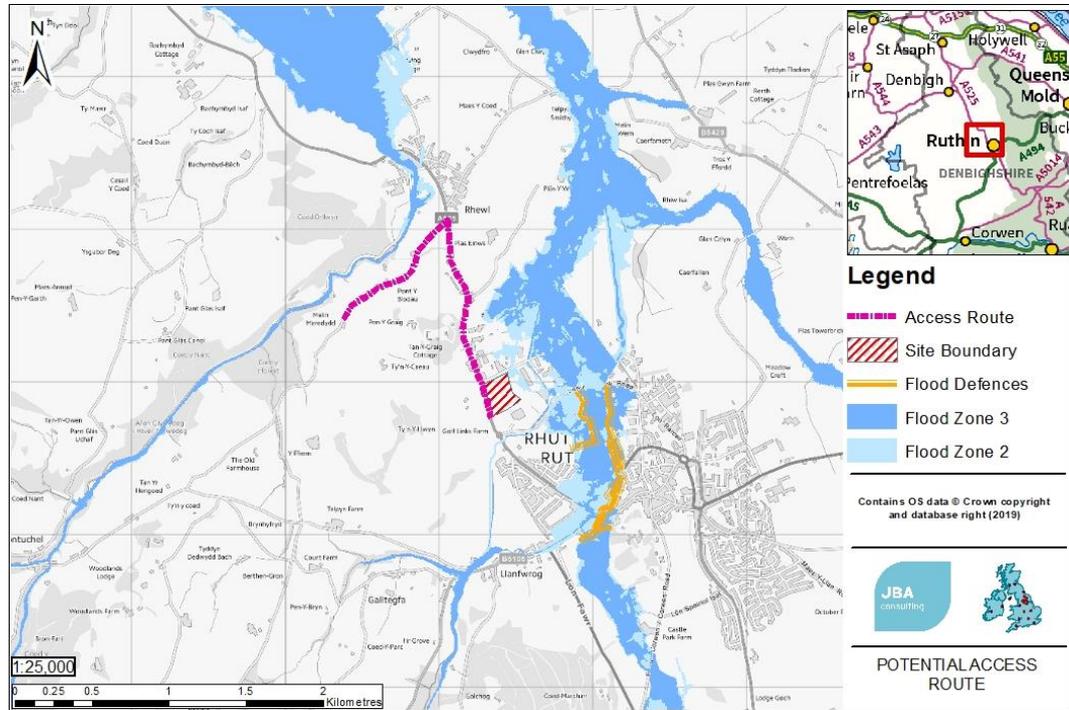
#### Standard 5 – Biodiversity

#### Standard 6 – Design of drainage for Construction, Operation and Maintenance

- SuDS elements should be easily and cost-effectively constructed and maintained
- Phasing of construction may be important with the use of some SuDS components changing during the process
- Future maintenance plans are important – SAB needs to be able to ensure ongoing performance after adoption
- Surface SuDS preferred for easy inspection and maintenance

## 5 Emergency Access / Egress

In accordance with TAN15, it is necessary to consider the likely access/egress issues during event of a flood. Figure 5-1 indicates the likely access/egress route to be used during a flood event.



**Figure 5-1 Potential Access Route**

As displayed in Figure 5-1, a dry (i.e. outside of the Flood Zone extents) access route will exist during a 1% AEP event which will allow for safe evacuation, if required.

The town centre of Ruthin, and its access roads, are within the Flood Zone 3 so it is expected that this area will be inundated and not accessible during a 1% AEP event.

## 6 Conclusions

This Flood Consequence Assessment report was prepared following an initial email request of 28 January 2019 for the purposes of a Flood Consequence Assessment for a proposed retail development with an Aldi foodstore.

An FCA for the proposed development has been prepared in accordance with TAN15 as the development will be over 1ha in size and in order to ensure that flood risk is not increased off-site. In order to manage flood risk from the development, discharge rates will need to be restricted to existing greenfield runoff rates.

The proposed development is situated in DAM Zone A, with a small proportion of the site being situated in DAM Zone B. The areas designated as Flood Zone A are at little to no risk from fluvial flood events. However, the small extent of the site that is in Flood Zone B is defined as being at risk from the 'extreme' flood event (0.1% AEP event). In line with current guidance, site levels were checked against the extreme flood event (0.1% AEP event) to ensure that development would be set above safe levels. From the provided site plan, Finished Floor Levels (FFLs) were set at approximately 55.1m AOD, with the extreme flood outline flooding to depths at around 51.8m AOD. Therefore, the site is not at risk from fluvial or tidal inundation.

The site was not at risk from groundwater, canals, surface water or had any historical flooding.

Flooding will not impede access event during the design flood event.

Attenuation and discharge rates for infiltration systems will be dependent on ground investigation and detailed design by SWF Consulting, subject to approval by SAB.

Provided surface water is fully attenuated on site then development will not result in increased flood risk to surrounding areas. Existing ground levels are significantly higher than the surrounding floodplain and the development will not, therefore, be at risk from inundation.

## Appendices

### A Maps

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