



Aldi Store, Straight Mile, Llay Wrexham

Flood Consequences Assessment

October 2020

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Author:	Ceire McGough BSc (Hons)
Checker:	Johanne Williams LLB (Hons) PGDip MCIWEM
Approver:	Aled Williams BSc (Hons) MCIWEM

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Introduction

Waterco has been instructed to prepare a Flood Consequences Assessment (FCA) in respect of a proposed commercial development at Gresford Road / Straight Mile (road), Llay, Wrexham, LL12 0NT.

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. The 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.

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Existing Conditions

The site covers an area of approximately 1.1029 hectares (ha) and is located at National Grid Reference (NGR) 333390, 356307. A location plan and an aerial image are included in Appendix A.

Online mapping (including Google Maps / Google Streetview imagery, accessed March 2019) shows that the site is undeveloped comprising agricultural land. The site is bordered by Straight Mile (road) to the north, agricultural land with planning permission for 362 dwellings to the east (approved under outline planning permission P/2014/0905 and reserved matters application P/2017/1054) and Gresford Road and residential properties to the south and west.

The proposed development site falls within the wider red line boundary of the approved outline planning permission (planning reference: P/2014/0905).

Local Topography

Topographical levels are provided on the 'Existing Site Plan' included in Appendix B. The Existing Site Plan shows that the site slopes from 88 metres Above Ordnance Datum (m AOD) in the north to 85.7m AOD in the south. The topographical survey identifies an isolated low point in the south-western corner of the site. A minimum level of 85.27m AOD is identified in the south-western corner, central to the isolated low point.

Ground Conditions

Reference to 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 Salop Formation consisting of mudstone, sandstone and conglomerate.

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 (March 2019) indicates that the site is underlain by '*Slowly permeable seasonally wet slightly acid but base-rich 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 foul sewer flowing north-west in Gresford Road. There are no other public sewers within the adjoining roads.

Development Proposals

The proposed development is for a new Aldi food store, with associated parking, access, service yard and landscaping. Proposed development plans are included in Appendix D.

An element of ground level modification is proposed. The proposed delivery area / service yard, in the southern extent of the site, will be formed at a lower level (sympathetic to the existing topography). Proposed site levels are included on the 'Proposed Finished Levels' plan 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.

Development Vulnerability Classification

The proposed development is considered to be 'less vulnerable' development in accordance with Figure 2 of the Welsh Government's Technical Advice Note 15 – Development and Flood Risk (TAN15).

TAN15 states that less vulnerable development is considered acceptable within Flood Zone A.

Local Policy

The Wrexham County Borough Council Unitary Development Plan (UDP) 1996 – 2011 was adopted in February 2005 and is the current UDP for the area. The UDP contains the following policies in relation to flood risk:

Policy EC12 Development (including the raising of land) within defined flood plains will only be permitted if it:-

- a) would not be subject to an unacceptable risk of flooding on-site and/or*
- b) does not results in an unacceptable risk of flooding on or off-site; and/or*
- c) does not adversely affect flood management or maintenance schemes.*

Wrexham County Borough Council is preparing the Local Development Plan (LDP) which will replace the current adopted Unitary Development Plan. The LDP will be a long-term land use and development strategy focused on achieving sustainable development. The Deposit Local Development Plan (draft LDP) contains the following policy in relation to flood risk:

Policy SP19: 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:

- i. Reducing carbon emissions;*
- ii. Protecting and increasing carbon sinks*
- iii. Adapting to the implications of climate change at both a strategic and detailed design level;*
- iv. Promoting energy efficiency and increasing the supply of renewable energy; and*
- v. Maintaining ecological resilience*
- vi. Avoiding areas susceptible to flood risk in the first instance in accordance with the sequential approach set out in national guidance; and*
- vii. Preventing development that increases flood risk.*

Local guidance documents including the Wrexham County Borough Council Preliminary Flood Risk Assessment (PFRA) (2011) and its November 2017 addendum have been reviewed for a site-specific information.

Sources of Flooding and Probability

Fluvial

The nearest watercourse is an unnamed watercourse which is located approximately 250m south-west of the site. The unnamed watercourse flows south-east and joins the River Alyn approximately 1.25km south-east of the site.

The site is elevated by a minimum of 10m above the unnamed watercourse to the south-west and approximately 55m above the River Alyn. As such, the site would not be affected by a flood event of these

watercourses.

The site is located within Flood Zone A on the Welsh Government Development Advice Map and has a less than 0.1% annual probability of fluvial flooding.

The NRW 'Historical Flood Map' (Appendix E) indicates that there are no records of historical fluvial flooding at or near to the site.

The site is therefore considered to be at very low risk of fluvial flooding.

Tidal

The site is situated at a minimum of 85.27m 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' map (Appendix E) shows that approximately 60% of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding.

The NRW surface water flood mapping identifies an area of low (between a 1% and 0.1% annual probability), medium (between a 3.3% and 1% annual probability) and high (greater than 3.3% annual probability) risk of surface water flooding in the south-eastern extent of the site.

A review of online NRW mapping shows that during the 'high' risk event, the flooding on site is associated with surface water ponding in a topographical depression. No flow routes are shown to occur during the 'high' risk event. The online NRW surface water depth map shows that during a 'high' risk event, flood depths are estimated between 0.15m and 0.3m.

A review of online NRW mapping shows that during the 'medium' risk event, the flooding on site remains to be associated with surface water ponding in a topographical depression. No flow routes are shown to occur during the 'medium' risk event.

During the 'low' risk event, the surface water flooding on site is mainly influenced by surface water ponding within a topographical low point. However, flow routes are also shown to enter the site from Straight Mile to the north and Gresford Road to the south. The upstream extent of the offsite flow routes is minimal. The online NRW surface water depth map shows that during a 'low' risk event, flood depths in the lower south-eastern corner of the site are estimated between 0.3m and 0.9m.

The NRW surface water flood map identifies a surface water flow route flowing from north to south in the

centre of the site. The flow route originates from a small area of surface water ponding within agricultural land north of Straight Mile. Surface water flows are shown to spill on Straight Mile from agricultural land to the north before entering the site. The flow route is only shown to form during a low risk event. A review of online NRW surface water depth mapping shows that flood depths associated with the flow route are shallow (less than 150mm).

The NRW surface water flood mapping also identifies a flow route entering the site from Gresford Road during a low risk event. The flow route forms approximately 60m south of the site and its extent is minimal. A review of online NRW surface water depth mapping shows that flood depths associated with the flow route are shallow (less than 150mm).

It should be noted that the flow route entering the site from Straight Mile is unlikely to be realised. This is due to the presence of highway gully's on either side of the road (in the location of the flow route) and road kerbing. Should flooding from the agricultural land north of Straight Mile overspill onto the road, and if the highway gully's blocked or exceeded their capacity, surface water would be contained within the road by kerb heights and directed north-east, away from the site, following the topography of the road. The 'Existing Site Plan' (Appendix B) shows the fall of Straight Mile to the north-east and that verge / kerb heights at the northern site boundary are approximately 100mm above the level of the road.

Similar to the surface water flow route identified in Straight Mile, any surface water flooding in Gresford Road would be contained within the road by kerb heights and would be unlikely to enter the site. As shown on the 'Existing Site Plan' (Appendix B), kerb / verge heights at the western site boundary are a minimum of 100mm above road levels.

Flood mapping provided by the LLFA (Appendix F) shows locations of historic surface water flooding. The LLFA map shows records of surface water flooding to the west of the site in Gresford Road.

It can be concluded that the south-eastern extent of the site is at potential risk of surface water flooding. It is unlikely that any offsite flow routes would enter the site and the flood risk is associated with surface water ponding within a topographical low point (fed directly by rainfall). The proposed development will include a surface water drainage system designed to accommodate a 1 in 100 year plus climate change rainfall event. It is therefore considered that rainfall derived surface water ponding will not occur on site during all events up to and including the 1 in 100 year plus climate change event due to the presence of the drainage system. Further mitigation is detailed in the following sections.

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 foul sewer in Gresford Road flowing north-west.

Flooding from foul sewers is rare and any flooding arising in Gresford Road would be contained within the road by kerb heights. Furthermore, the PFRA states *'there were no records of properties affected by sewer*

flooding with significant consequences... within the (Wrexham County Borough Council) area.' There are no distinct flow routes in the area which would direct any potential sewer flooding towards the site.

It can be concluded that the risk of sewer flooding is 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.

The PFRA states *'There were no records of past groundwater flooding within WCBC; this is due to the topography and geology of the area'*. There are no records of groundwater flooding at or near to the site.

The majority of the site will be predominantly hardstanding, limiting the vertical migration of groundwater. Furthermore, no basement levels are identified on development plans.

It can therefore be concluded that the risk of groundwater flooding is low.

Artificial Sources

There are no canals in the immediate vicinity of the site. The NRW 'Risk of Flooding 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 and Mitigation

It can be concluded that surface water flooding is the main potential source of flood risk at the site. Surface water ponding is shown on NRW surface water flood mapping to occur in the south-eastern extent of the site.

Mitigation

The flood risk is associated with surface water ponding within a topographical low point (fed directly by rainfall). The proposed development will include a surface water drainage system designed to accommodate a 1 in 100 year plus climate change rainfall event (drainage designed by others). It is therefore considered that rainfall derived surface water ponding will not occur on site during all events up to and including the 1 in 100 year plus climate change event due to the presence of the drainage system.

Furthermore, the lower south-eastern extent of the site will include a service yard. As shown on the 'Proposed Finished Levels' plan (Appendix D), the proposed finished floor level (86.59m AOD) is over 1m above the level of the service yard. The raised finished floor level will ensure no flooding internally to the proposed store in the unlikely event that flooding occurs i.e. in extreme storm events where the capacity of the drainage system is exceeded.

Impact on Flood Risk Elsewhere

The surface water flooding identified on site is associated with surface water ponding within a topographical low point. The risk of flooding will be removed post development through the inclusion of a sustainable drainage system designed to accommodate the 1 in 100 year plus climate change storm event. As such, the development will not displace floodwater or increase flood risk elsewhere.

A residual risk of flooding arises in the event of drainage system exceedance. In the unlikely event of flooding, flood waters would be contained within the service yard area which forms a low point on site. The development will not displace floodwater to surrounding land.