Weetwood
Development • Planning • Environment

FORMER WREXHAM MUSICAL THEATRE, 1 SALOP ROAD,
WREXHAM, LL13 7AF

FLOOD CONSEQUENCES ASSESSMENT

Final Report v2.0
April 2024

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Report Title	**Former Wrexham Musical Theatre, 1 Salop Road, Wrexham, LL13 7AF** Flood Consequences Assessment Final Report v2.0
Client	Carbana Limited
Date of issue	19 April 2024

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1 INTRODUCTION

1.1 Purpose of Report

Weetwood Services Ltd ('Weetwood') has been instructed by Carbana Limited to prepare a Flood Consequences Assessment (FCA) report to accompany a planning application for the proposed redevelopment of the former Wrexham Musical Theatre, 1 Salop Road, Wrexham ("the site").

Weetwood prepared a FCA in June 2021 (ref: 5113/FCA/Final/v1.1/2021-06-03) to accompany a planning application for a unit for fitting tyres and car wash at the former Wrexham Musical Theatre, 1 Salop Road, Wrexham (ref: P/2021/0306). This was granted planning permission in September 2021 and no objection was raised by Natural Resources Wales within its consultation response dated 14 June 2021 (ref: CAS-153502-P1K3). However, the proposals have since been amended.

An updated FCA has subsequently been prepared to accompany an amendment to the planning application.

The assessment has been undertaken in accordance with the requirements of Technical Advice Note 15 (TAN15) dated July 2004 and taking into account the revised (draft) version of TAN15 (January 2023).

1.2 Structure of the Report

The report is structured as follows:

Section 1 Introduction and report structure
Section 2 Provides background information relating to the development site
Section 3 Presents national and local flood risk planning policy
Section 4 Assesses the potential risk of flooding to the development site
Section 5 Presents a summary of key findings and the recommendations

1.3 Relevant Documents

The assessment has been informed by the following documents:

- Wrexham Local Development Plan 2013-2028, Wrexham County Borough Council, December 2023
- Dee Preliminary Flood Risk Assessment, Natural Resources Wales, December 2018
- Preliminary Flood Risk Assessment Addendum, Wrexham County Borough Council, November 2017
- Flood Risk Management Plan 2016-2021, Wrexham County Borough Council, July 2016
- Local Flood Risk Management Strategy, Wrexham County Borough Council, April 2013

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The approximately 0.14 ha site is located east of Salop Road (A525) at Ordnance Survey National Grid Reference SJ 337 499, as shown in **Figure 1**.

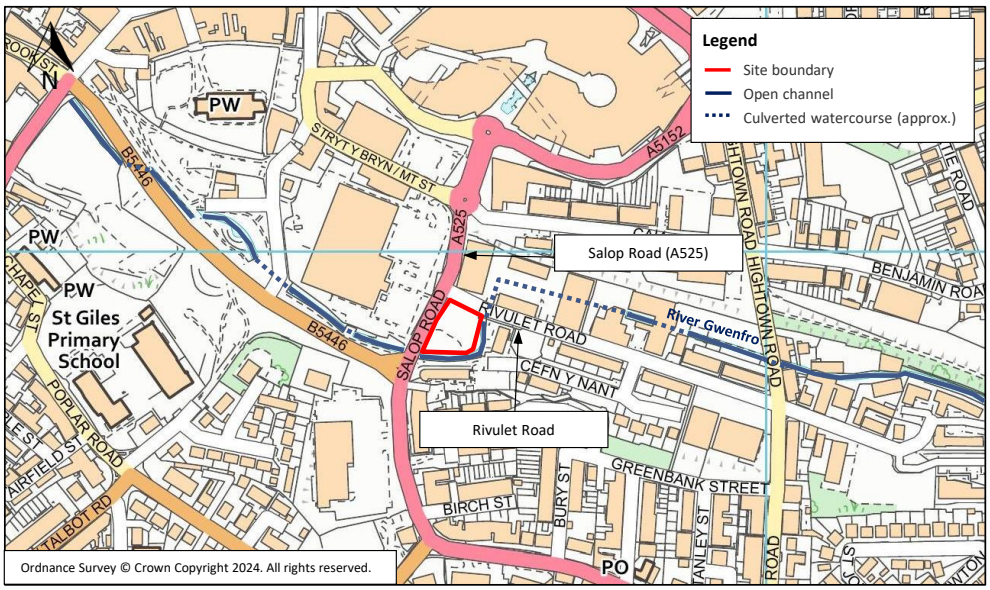


Figure 1: Site Location and Location of Surface Waterbodies

2.2 Existing and Proposed Development

The site was previously occupied by the former Wrexham music theatre. Up until its closure the building continued to house performances from the Wrexham Musical Theatre Society, along with the venue also being used for lecture space[1]. The building has since been demolished in preparation for the redevelopment of the site.

Proposals are for the siting of a prefabricated unit for fitting tyres and a car wash facility. Vehicular access will be provided via Rivulet Road to the north of the site. The proposed site plan is provided in **Appendix A**.

The previous use of the site, a theatre, is not specifically classified under TAN15; however, this is considered to be a public building, which is classified as Highly Vulnerable to flood risk, whereas the proposed commercial development is classified as Less Vulnerable to flood risk. The proposals would therefore reduce the flood risk vulnerability classification of the site.

2.3 Surface Waterbodies in the Vicinity of the Site

The River Gwenfro flows in an open channel in an easterly and then northerly direction adjacent to the southern and eastern site boundaries. Throughout the existing built-up area of Wrexham, the watercourse flows in both open channel and culvert (**Figure 1**) and is classified as an ordinary watercourse.

2.4 Topographic Levels

A topographic survey of the site was undertaken by Battlefield Land Survey Ltd in 2016 (**Appendix B**) and LiDAR data has been used to develop a digital terrain model of the site and surrounding area as illustrated in **Figure 2**.

Site levels are indicated to be in the region of 71.8 - 72.9 m AOD falling to the north-east. There is a low spot in the north of the site at an existing gully which is indicated to be at a level of 71.65 m AOD.

[1] As stated at http://www.wrexham.com/news/demolition-begins-on-former-wrexham-music-theatre-space-109169.html

Ground levels on Salop Road adjacent to the site are indicated to be in the region of 72.0 - 73.5 m AOD, rising to the south.



Figure 2: Digital Terrain Model from LiDAR Data

2.5 Ground Conditions

According to the Soilscapes soils dataset produced by the Cranfield Soil and AgriFood Institute[2], soil conditions at the site and within the surrounding area are described as freely draining slightly acid loamy soils.

British Geological Survey mapping of surface geology[3] indicates the underlying bedrock formation comprises mudstone, sandstone and conglomerate (Salop Formation), overlain by clay, silt, sand and gravel (Alluvium superficial deposits).

According to the British Geological Survey and Natural Resources Wales aquifer designation dataset[4] the superficial deposits at the site and the underlying bedrock are classified as Secondary A. The site is not shown to be located within a designated groundwater source protection zone[5].

2 www.landis.org.uk/soilscapes/
3 https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
4 https://www.bgs.ac.uk/map-viewers/geoindex-onshore/
5 https://datamap.gov.wales/layers/inspire-nrw:NRW_Source_Protection_Zones

3 PLANNING POLICY AND GUIDANCE

3.1 National Planning Policy and Policy Guidance

Future Wales - the national Plan 2040 sets out the national development framework for Wales with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities.

Policy 8 - Flooding states that *"flood risk management that enables and supports sustainable strategic growth and regeneration in National and Regional Growth Areas will be supported. The Welsh Government will work with Flood Risk Management Authorities and developers to plan and invest in new and improved infrastructure, promoting nature-based solutions as a priority. Opportunities for multiple social, economic and environmental benefits must be maximised when investing in flood risk management infrastructure. It must be ensured that projects do not have adverse impacts on international and national statutory designated sites for nature conservation and the features for which they have been designated"*.

Planning Policy Wales (PPW) sets out government's planning policies for Wales and how these are expected to be applied. TAN15 provides technical guidance which supplements the policy within PPW and seeks to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

The general approach of TAN15 is to set out a precautionary framework to guide planning decisions in areas at high risk of flooding. The overarching aim of the framework is, in order of preference, to:

- Direct new development away from those areas which are at a high risk of flooding.
- Where development has to be considered in high risk areas (i.e. zone C) only those developments which can be justified should be located in such areas.

In accordance with paragraph 6 of TAN15, development will only be justified if it can be demonstrated that:

i. Its location in zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; **or**,
ii. Its location in zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;

and,

iii. It concurs with the aims of PPW and meets the definition of previously developed land (PPW Figure 2.1); and,
iv. The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in sections 5 and 7 and appendix 1 found to be acceptable.

A revised version of TAN15 and updated Flood Map for Planning are due to be published in the near future (albeit the timing is yet to be confirmed by Welsh Government). The Flood Map for Planning currently holds no formal weight as it is not yet national policy, but Welsh Government advise that this best available information may be regarded as a material consideration.

3.2 Local Planning Policy

The Wrexham County Borough Local Development Plan 2013 - 2028 was adopted by Wrexham County Borough Council in December 2023. The following policies are relevant in respect of 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 considered 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*

Policy DM1 Development Management Considerations

Development proposals, where relevant, must:

vii. *Not increase the risk of flooding but makes adequate provision for sustainably dealing with foul and surface water drainage and not result in an unacceptable impact upon the water environment.*

3.3 Water Framework Directive

The Water Framework Directive (WFD) provides a legal framework for the protection, improvement and sustainable use of inland surface waters, groundwater, transitional waters, and coastal waters across Wales, and seeks to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters
- Achieve at least 'good' status for all waterbodies by 2015
- Promote the sustainable use of water as a natural resource
- Conserve habitats and species that depend directly on water
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The WFD applies to any proposed development which has the potential to impact on a waterbody. Where this is the case, the Natural Resources Wales may require evidence demonstrating that the proposed development does not compromise the aims of the WFD.

3.4 Land Drainage Consent

If the location of an activity is on an ordinary watercourse that lies within an Internal Drainage District, land drainage consent may be required from Natural Resources Wales.

Undertaking activities controlled by local byelaws also requires the relevant consent.

4 REVIEW OF FLOOD RISK

4.1 Historical Records of Flooding

The Flood Map for Planning - Recorded Flood Extents and associated database[6] indicates that there are no records of flooding at or within the immediate vicinity of the site.

Video footage from September 2012[7] indicates shallow flooding within the site whilst clearing works to the River Gwenfro were undertaken.

In addition, Figure 1-4 of the River Gwenfro Model Update (Wrexham County Borough Council, December 2016) indicates that the site was affected by flooding in May 2013 due to a capacity issue with the Rivulet Road culvert causing water to overtop the left bank and flood the theatre car park and nearby industrial units.

The Rivulet Road culvert inlet structure is noted to have a history of blockage and flooding within the Flood Risk Management Plan 2016-2021 (July 2016). However, it is understood that Wrexham County Borough Council replaced the trash screen at the culvert inlet after it was damaged during a high flow event in 2019.

Details regarding extents and depths of flooding at the site during the aforementioned events are unavailable.

4.2 Flood Risk from Rivers (Fluvial)

Figure 1 of TAN15 defines three development advice zones as follows:

- Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding
- Zone B: Areas known to have been flooded in the past evidenced by sedimentary deposits
- Zone C: Based on the Natural Resources Wales flood outline, equal to or greater than 0.1% (river, tidal or coastal). Zone C is subdivided into the following two zones:
    - 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

The development advice zones are shown on the Development Advice Map[8] and are defined by the predicted extent of the 1 in 1,000 (sea and rivers) annual exceedance probability (AEP) event (zone C) and British Geological Survey drift data (zone B). The zones do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

The Development Advice Map (**Figure 3**) indicates that most of the site is located in zone C2, with the south-western corner in zone B.

The Flood Map for Planning - Rivers (**Figure 4**) indicates the site to be located in flood zone 2 (rivers) and flood zone 3 (rivers).

The flood zones are defined as follows and include the effects of climate change:

- Flood zone 1 (Rivers): Less than a 1 in 1,000 chance of flooding from rivers in a given year
- Flood Zone 2 (Rivers): Areas with a 1 in 1,000 to 1 in 100 chance of flooding from rivers in a given year
- Flood Zone 3 (Rivers): Areas with more than a 1 in 100 chance of flooding from rivers in a given year
- TAN15 Defended Zones: Areas that benefit from Risk Management Authority flood defences with a present day 1 in 100 AEP standard of protection for rivers

6 https://datamap.gov.wales/layers/inspire-nrw:NRW_HISTORIC_FLOODMAP
7 https://youtu.be/8GSdzwkuzfU accessed on 17 May 2021
8 https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en

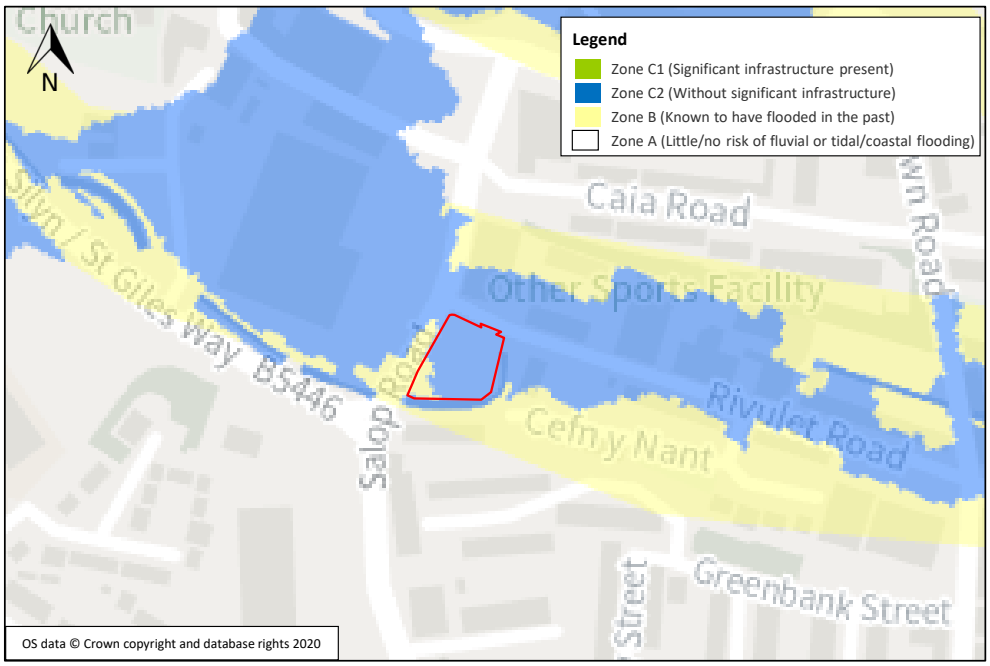


Figure 3: Development Advice Map
Source: Natural Resources Wales website; Accessed: April 2024

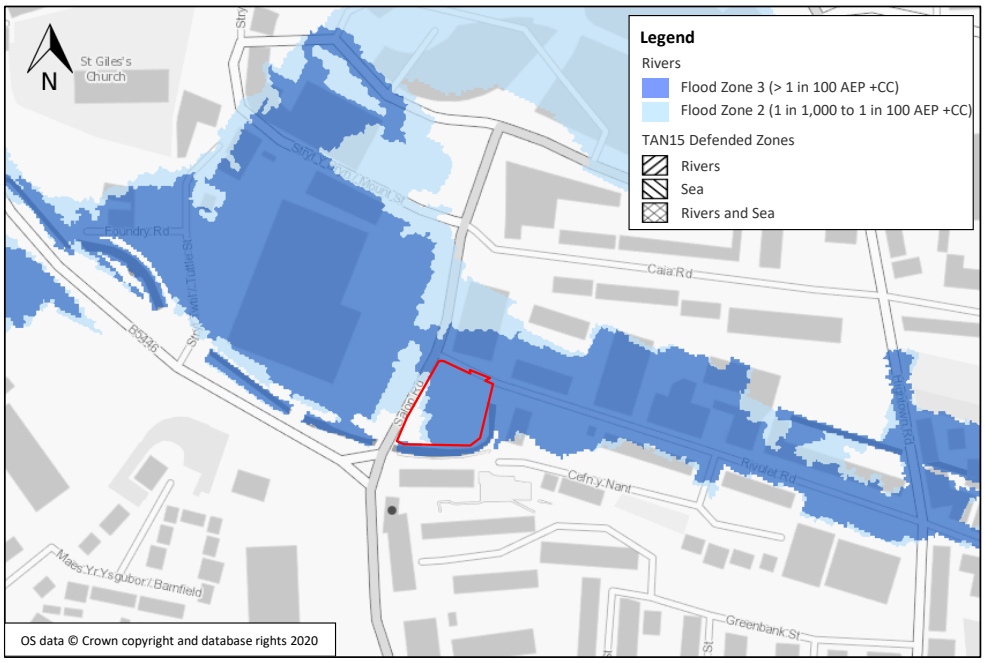


Figure 4: Flood Map for Planning - Rivers
Source: Natural Resources Wales website; Accessed: April 2024

A 1D-2D ISIS-TUFLOW hydraulic model of the River Gwenfro was developed by Wrexham County Borough Council as part of the River Gwenfro Model Update (December 2016). This assesses the risk of flooding from the River Gwenfro for the present day 1 in 100 and 1 in 1,000 AEP events and the 1 in 100 AEP event +20% climate change.

The modelled outputs are provided in **Figure 5**.

Table 1 summarises the maximum level, depth and velocity of floodwaters expected at the site during the aforementioned scenarios.

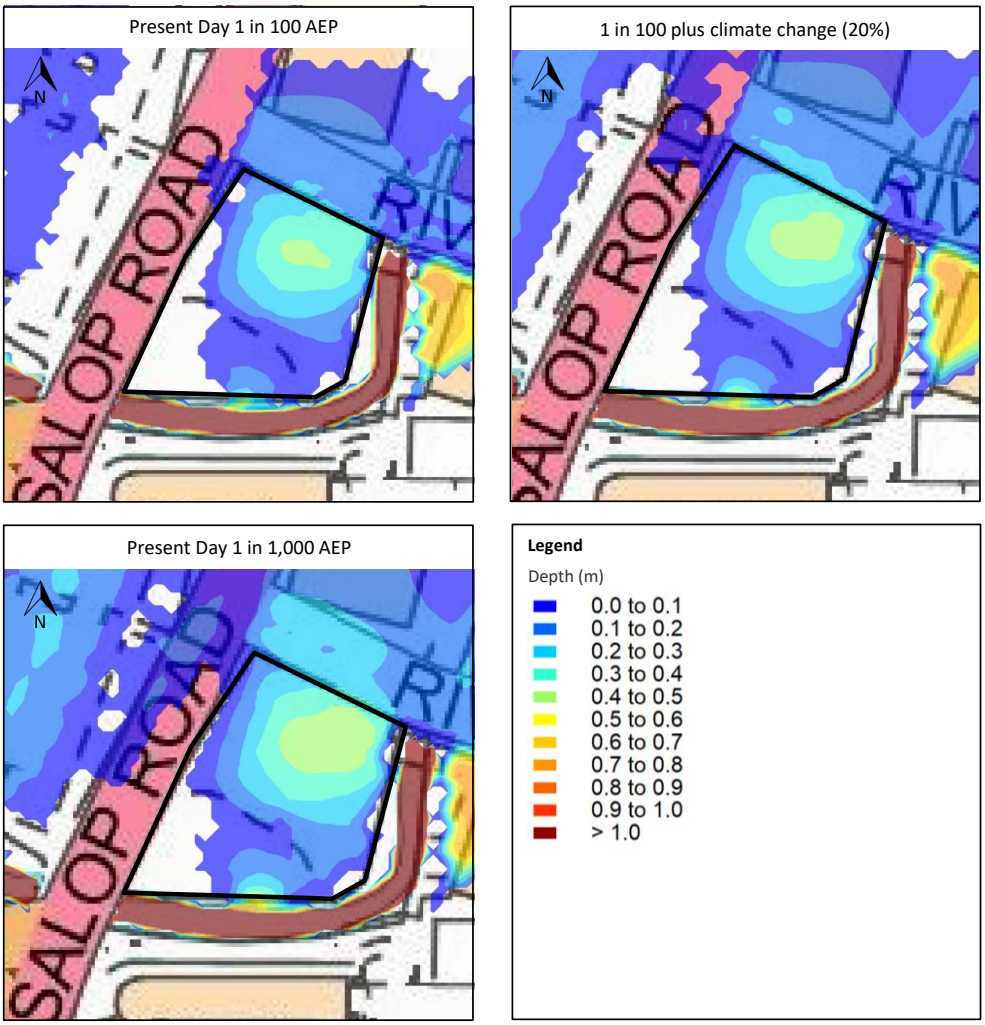


Figure 5: River Gwenfro Modelled Flood Extents and Depths - Baseline Scenario
Source: River Gwenfro Model Update, Wrexham County borough Council, December 2016

Table 1: Site Flood Information (Baseline)
Source: River Gwenfro Model Update, JBA Consulting, December 2016

AEP Event	Max Level (m AOD)	Max Depth (m)		Max Velocity (m/s)	
		Highest	Mean	Highest	Mean
Present day 1 in 100	72.28	0.44	0.19	0.43	0.07
1 in 100 +20% climate change	72.31	0.46	0.20	0.50	0.09
Present day 1 in 1,000	72.36	0.50	0.22	0.60	0.10

The lowest recorded ground level on site of 71.65 m AOD (refer to **Section 2.4**) does not appear to have been accounted for within the modelling and maximum flood depths presented in **Table 1**. Based on the peak modelled flood levels, this would be expected to result in a maximum flood depth of 0.63, 0.66 and 0.71 m for the present day 1 in 100 AEP, 1 in 100 AEP +20% climate change and present day 1 in 1,000 AEP events respectively; however, this is within an isolated area of the site and does not represent maximum flood depths across most of the site.

The proposed tyre-changing unit is the only building proposed on site and will be located outside the modelled present day 1 in 1,000 AEP flood extent in **Figure 5**.

Some flooding of Rivulet Road is indicated; however, flood depths are not expected to exceed 80 mm in up to a present day 1 in 1,000 AEP event and are therefore relatively shallow. Furthermore, at a distance of approximately 28 m from the proposed site entrance, dry access is provided via Salop Road leading south.

A 30%, 67% and 100% blockage of the Rivulet Road culvert was also modelled as part of the River Gwenfro Model Update (December 2016) as a sensitivity assessment for the 1 in 100 AEP event +20% and the present day 1 in 1,000 AEP event.

Table 2 summarises the maximum level and depth of floodwater expected on site during the respective blockage scenarios, together with the increase in flood level compared to the equivalent baseline 'free-flowing' scenarios. These indicate that there is limited impact on flood levels at the site during the 30% and 67% culvert blockage scenarios, with flood levels increasing by 0.35 and 0.31 m during the 1 in 100 AEP +20% climate change and 1 in 1,000 AEP events respectively for the 100% blockage scenario.

The proposed tyre-changing unit is shown to be partially located within the present day 1 in 1,000 AEP flood extent during the 67% and 100% blockage scenario with maximum flood levels of 72.22 m AOD and 72.50 m AOD in the area respectively.

Table 2: Site Flood Information (Blockage)
Source: River Gwenfro Model Update, JBA Consulting, December 2016

Scenario	AEP Event	Max Level (m AOD)	Max Depth (m)		Increase in flood level compared to 'free-flowing' scenario (m)
			Highest	Mean	
30% blockage	1 in 100 +20% climate change	72.32	0.46	0.20	0.01
	Present day 1 in 1,000	72.38	0.50	0.22	0.02
67% blockage	1 in 100 +20% climate change	72.35	0.48	0.21	0.04
	Present day 1 in 1,000	72.40	0.52	0.23	0.04
100% blockage	1 in 100 +20% climate change	72.66	0.76	0.44	0.35
	Present day 1 in 1,000	72.67	0.77	0.45	0.31

4.3 Flood Risk from Small Watercourses and Surface Water (Pluvial)

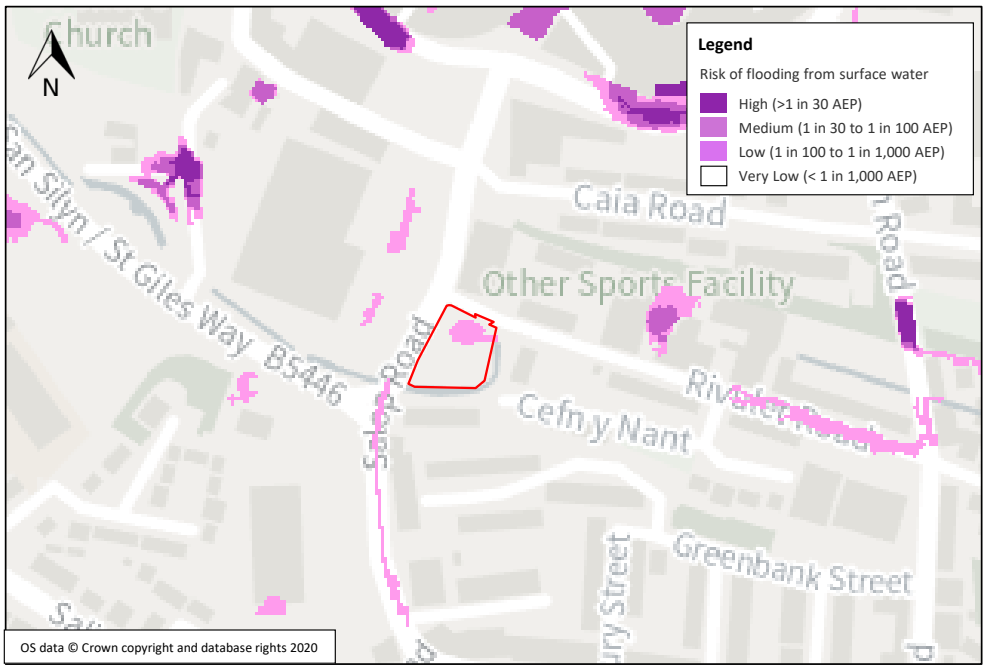
There are no small watercourses located within the vicinity of the site.

The Flood Risk Assessment Wales Map - Flood Risk from Surface Water and Small Watercourses (**Figure 6**) indicates that the majority of the site is at a very low risk of pluvial surface water flooding with an area of low risk in the north-eastern corner.

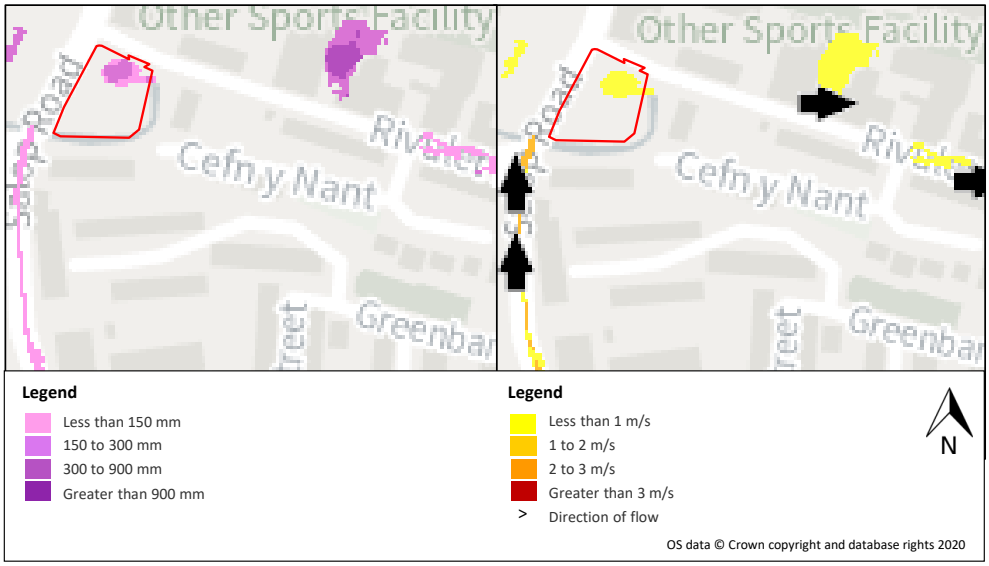
The flood depth and velocity indicated within this area is expected to remain below 0.3 m and 1 m/s respectively. Furthermore, the topographic survey indicates the presence of a gully and manhole at this location (refer to **Appendix B**) and as such is expected to be served by an existing drainage system which is unlikely to be accounted for within the associated modelling. The risk of flooding to this area of the site may therefore be overestimated.

Salop Road and Rivulet Road are shown to be at a very low risk adjacent to the site and a low risk to the south and east of the site respectively. Potential flood depths and velocities along Salop Road and Rivulet Road are expected to remain below 0.15 m and 2 m/s and 1 m/s respectively.

The Flood Map for Planning - Surface Water and Small Watercourses (**Figure 7**) accounts for climate change and indicates that the flood extents are the same as the present-day scenario.



(a) Extent



(b) Depth and Velocity

Figure 6: Flood Risk Assessment Wales Map - Flood Risk from Surface Water and Small Watercourses
Source: Natural Resources Wales website; Accessed: April 2024

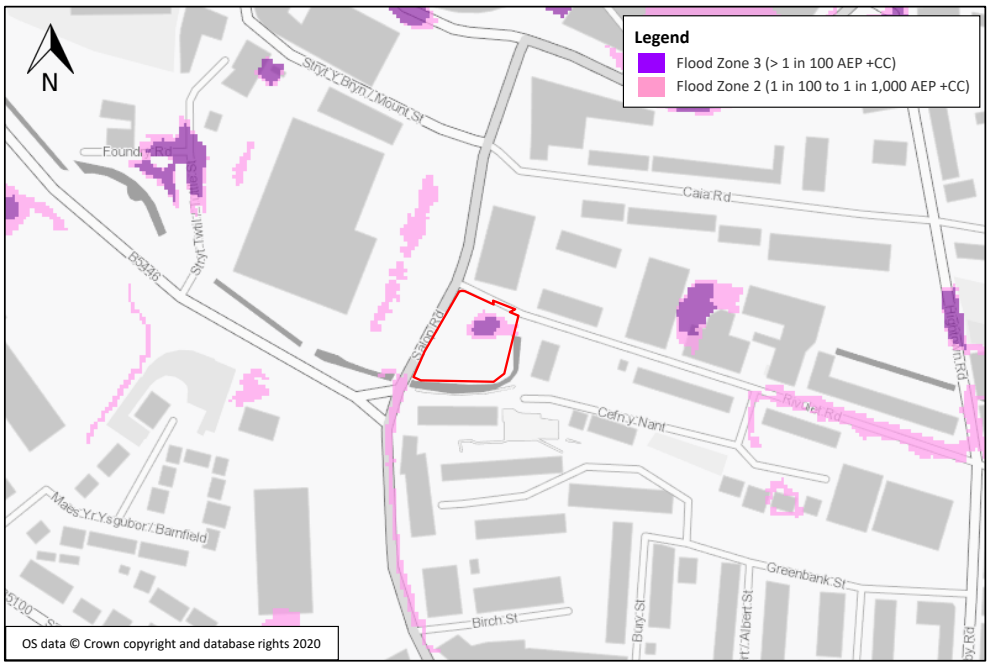


Figure 7: Flood Map for Planning - Surface Water and Small Watercourses
Source: Natural Resources Wales website; Accessed: April 2024

4.4 Flood Risk from Reservoirs, Canals and Other Water Impounding Structures

There are no canals or other impounded waterbodies located within the immediate vicinity of the site. The Flood Map for Planning - Flood Risk from Reservoirs (not shown) indicates that the site is not at risk of flooding from such sources.

4.5 Flood Risk from Groundwater

The JBA Groundwater Flood Risk Indicator map (**Figure 8**) indicates that the site is at a Negligible risk during a 1 in 100 AEP groundwater flood event.

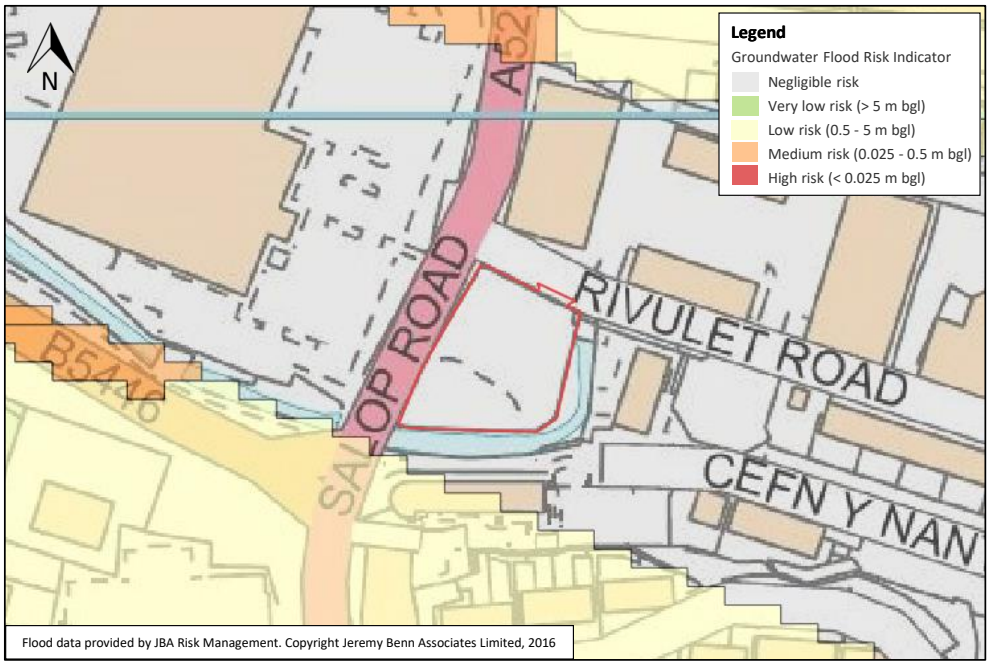


Figure 8: JBA Groundwater Flood Risk Indicator Map
Source: Blue Sky Maps; Accessed: April 2024

4.6 Flood Risk Mitigation

The risk of flooding to the proposed development from all identified sources is assessed to be low, with the exception of the River Gwenfro (fluvial) which presents a high risk.

The proposed mitigation measures should be assessed in the context that the proposed commercial development (i.e. Less Vulnerable to flood risk) provides betterment over the existing/previous use of the site, a theatre/public building (i.e. Highly Vulnerable to flood risk).

Given the proposed use of the site, level access will be required and it would be unfeasible to raise the site.

The tyre-changing unit will be required to have level access at ground level for operational reasons so it would be unfeasible for it to be significantly raised. The finished floor level of the unit should be set at a minimum level of 72.50 m AOD, which is the modelled flood level during a present day 1 in 1,000 AEP event including a 100% blockage of the Rivulet Road culvert.

The tyre-changing unit should have designed in resilience to flooding. e.g. raised power sockets, non-return valves on ground floor drainage, in line with CIRIA guidance[9] and adopt a water entry strategy.

A Flood Warning and Evacuation Plan should be prepared in consultation with Wrexham County Borough Council emergency planning team. The Site is included in a Natural Resources Wales flood alert area. This provides the opportunity for the relevant response procedures set out in the plan to be invoked in response to receipt of a flood alert from Natural Resources Wales.

In accordance with Building Regulations Approved Document C[10], the finished floor level of the tyre-changing unit should also be set at a minimum of 0.15 m above adjacent ground levels following reprofiling of the site.

4.7 Flood Risk Elsewhere

In accordance with A1.2 of TAN15 developers must ensure there will be no loss of flood flow or flood storage capacity for floods up to the severity of the 1 in 1,000 AEP event. Whilst not specified by TAN15, Natural Resources Wales generally recommends that this should consider blockage where necessary.

There will be no land raising at the site. Furthermore, many of the proposed structures on site are open, which would allow the free passage of water during flood conditions.

The proposed tyre-changing unit will be located outside the modelled present day 1 in 1,000 AEP flood extent during the 'free-flowing' scenario and as such will not impede flows during this event.

The north-eastern corner of the proposed tyre-changing unit is shown to be located partially within the modelled present day 1 in 1,000 AEP event flood extent when allowing for a 67% and 100% blockage of the Rivulet Road culvert.

However, according to historic satellite imagery, the previous building at the site was approximately 380 m^2 in area, which has already been demolished to facilitate redevelopment. The proposed tyre-changing unit and security container will be located within the same location as the previous building but only equates to an area of 110 m^2, indicating that the impact on the floodplain in terms of flood flows would be similar to the previous development and the impact on flood storage will be significantly less than the previous development. It should also be noted that the proposed tyre-changing unit is significantly smaller than the currently consented development, which equated to 207 m^2.

It is proposed to remove the existing walls that are located adjacent to Rivulet Road and Salop Road. Given that there is an existing large permeable gate into the site off Rivulet Road, it is unlikely that these walls act as *de facto* flood defences as water can currently penetrate the wall via the gate. Moreover, these existing walls are not accounted for within the River Gwenfro Model Update (December 2016).

Recognising the above, the proposed development is not expected to have an adverse impact on flood risk elsewhere.

[9] Guidance on the Code of Practice for Property Flood Resilience, Edition 2, C790B. CIRIA London 2020.
[10] Approved Document C - Site preparation and resistance to contaminants and moisture, 2004 edition (with 2010 and 2013 amendments)

4.8 Justification Test

It is considered that the redevelopment of the site will help sustain the existing settlement, meeting point (i) of the Justification Test. Point (iii) of the Justification Test is met as the site can be regarded as 'previously developed land'. This report addresses point (iv) of the Justification Test.

It should also be noted that the proposed development will reduce the flood risk vulnerability classification at the site compared to its previous use.

5 SURFACE WATER MANAGEMENT

There will be no increase in impermeable areas at the site following redevelopment and given the nature of the proposed units, which are prefabricated, it is assumed the site will (partly) continue to drain as existing. However, recognising that the site will generate polluted flows from the car washing facilities, large portions of the site may be required to discharge runoff into the public foul water sewer network.

6 SUMMARY AND RECOMMENDATIONS

This report has been prepared on behalf of Carbana Limited and relates to the proposed redevelopment of the former Wrexham Musical Theatre, 1 Salop Road, Wrexham.

The Development Advice Map indicates that most of the site is located in zone C2, with the south-western corner in zone B.

The Flood Map for Planning - Rivers indicates the site to be located in flood zone 2 (rivers) and flood zone 3 (rivers).

The risk of flooding to the proposed development from all identified sources is assessed to be low, with the exception of the River Gwenfro (fluvial) which presents a high risk.

It is considered that the redevelopment of the site will help sustain the existing settlement, meeting point (i) of the Justification Test. Point (iii) of the Justification Test is met as the site can be regarded as 'previously developed land'. This report addresses point (iv) of the Justification Test. It should also be noted that the proposed development will reduce the flood risk vulnerability classification at the site compared to its previous use.

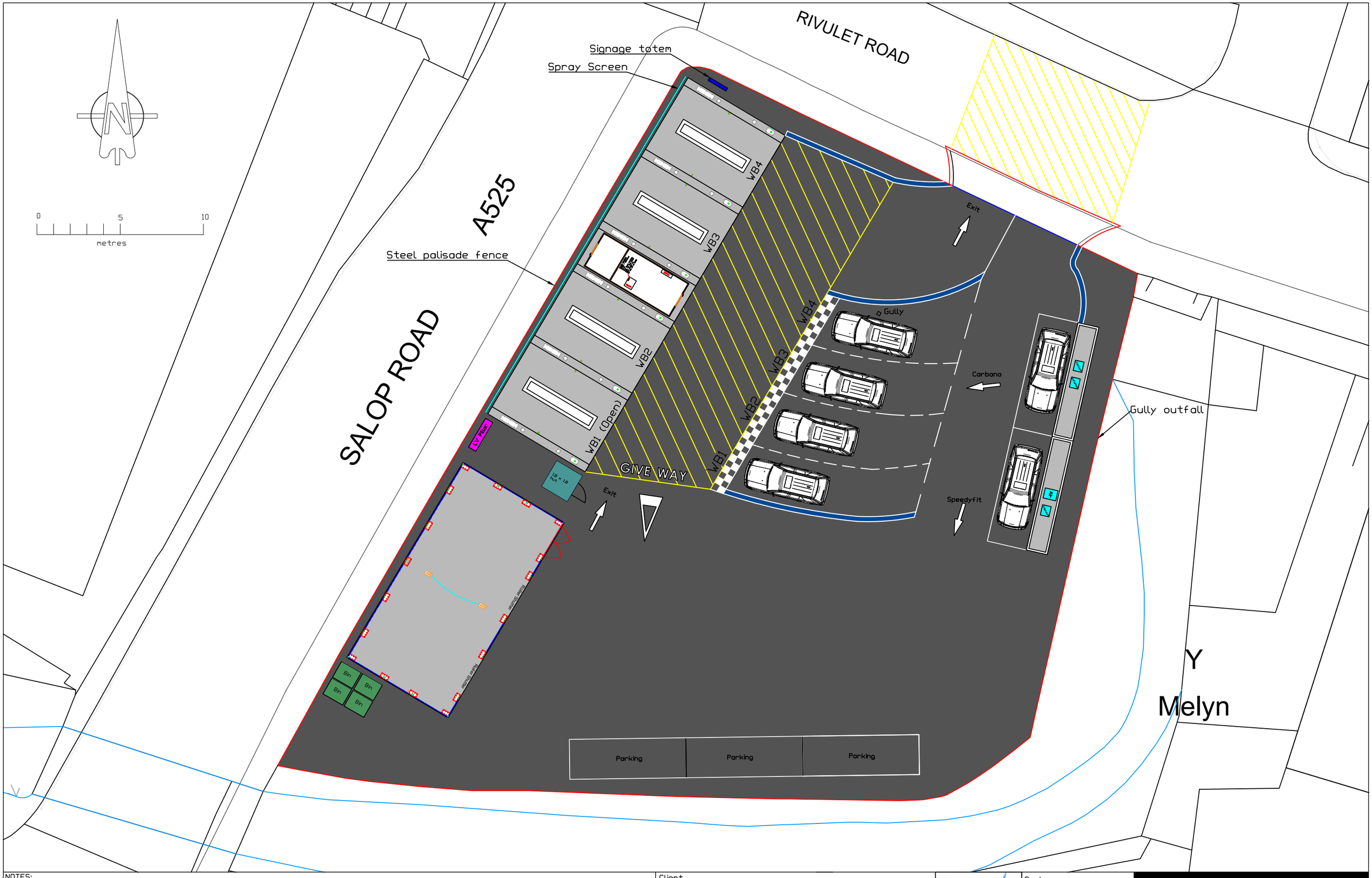
Given the proposed use of the site, level access will be required and it would be unfeasible to raise the site. The proposed development may be completed subject to the following:

- Finished floor level of the proposed tyre-changing unit to be set at a minimum of 72.50 m AOD and at least 0.15 m above adjacent ground levels following any reprofiling of the site, with ground levels sloping down from the building.
- The proposed tyre-changing unit should have designed in resilience to flooding. e.g. raised power sockets, non-return valves on ground floor drainage.
- Flood Warning and Evacuation Plan to be developed in consultation with Wrexham County Borough Council

The proposed development is not expected to have an adverse impact on flood risk elsewhere.

APPENDIX A

Proposed Site Plan



NOTES:

Finished floor level as existing +-200mm.

Client: Carbana

Job Title: Wrexham, Salop Road

CARBANA
CLEAN CAR, CLEAN CONSCIENCE

Scale: 1 in 200 A3

Drawn by:

Date: 26/03/2024

Drawing Title: Block Plan

Drg No.: P2

Rev: .

APPENDIX B

Topographic Survey



NOTES:
Finished floor level as existing +-200mm.

Client	Carbana
Job Title	Wrexham, Salop Road
Scale	1 in 200 A3
Drawn by	
Date	26/03/2024
Drawing Title	Block Plan w/ Topo
Drg No.	P2T
Rev	.

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