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Flood risk, water and environment

Flood Risk Assessment AEG02958_M26_Manchester_01

Site Address: 21 Church Street East
Radcliffe
Manchester
M26 2PG

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

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Flood risk, water and environment

Document Issue Record

Project: Flood Risk Assessment

Prepared for: Robert Heaton

Reference: AEG02958_M26_Manchester_01

Site Location: 21 Church Street East, Radcliffe, Manchester, M26 2PG

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Summary

Development Description	Existing	Proposed
Development Type	Commercial premises	change of use to HMO at ground floor change of use to provide first floor flat (2 bedroom) extension to rear to facilitate associated works
EA Vulnerability Classification	Less Vulnerable	More Vulnerable
Ground Floor Level	The maximum ground elevation at the site is approximately 66.99m AOD, whereas the minimum ground elevation at the site is approximately 64.68m AOD based off EA LiDAR data (1m resolution).	No Change
Level of Sleeping Accommodation	First Floor	Ground Floor
Surface Water Drainage	N/A ¹	Proposed to manage runoff via existing surface water drains on site. Small scale SuDS recommended in external areas.
Site Size	Approximately 332m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zones 1 and 2	
Flood Source	Fluvial	River Irwell and Crows Trees Brook
SFRA Available	Level 1 Strategic Flood Risk Assessment for Greater Manchester - Update (Greater Manchester Combined Authority, 2019)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	Yes	Liaison with the EA has confirmed that the site is not at risk of fluvial flooding for the

		design event (1.0%AEP plus climate change).
Safe Access/Egress Route	Yes	Due to the location of fluvial flood risk, safe access/ egress should be sought to the rear (north) of the existing building as this is located in Flood Zone 1.
Flood Resilient Design	Yes	The building should be constructed in flood resilient manner in accordance with <i>CLG Report Improving the Flood Performance of New Buildings – Flood Resilient Construction¹ (2007)</i> .
Site Drainage Plan	N/A ¹	Runoff from extension could be discharged via existing system. Betterment could be provided through small-scale SuDS such as rainwater planters and water butts.
Flood Warning & Evacuation Plan	Yes	Site owners should sign up to nearby Flood Warning Area – River Irwell at Radcliffe and Redvales wider area
Offsite Impacts		Summary
Displacement of floodwater		
Increase in surface run-off generation	Negligible	Liaison with the EA demonstrates that the site is not at risk of fluvial flooding for the design event (1.0%AEP plus climate change). Therefore, fluvial flood water will not be displaced as a result of the proposed development.
Impact on hydraulic performance of channels	N/A	The nearby rivers are not within distance to be impacted by the proposed development.

¹ not required for this assessment ² data not available.

1 https://assets.publishing.service.gov.uk/media/602d673ee90e0709e8d085d8/Improving_the_Flood_Resilience_of_Buildings_Through_Improved_Materials__Methods_and_Details_Technical_Report.pdf

1. Introduction

- 1.1. Aegaea were commissioned by Robert Heaton to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

- 1.3. The site of the proposed development is 21 Church Street East, Radcliffe, Manchester, M26 2PG (Figure 1).

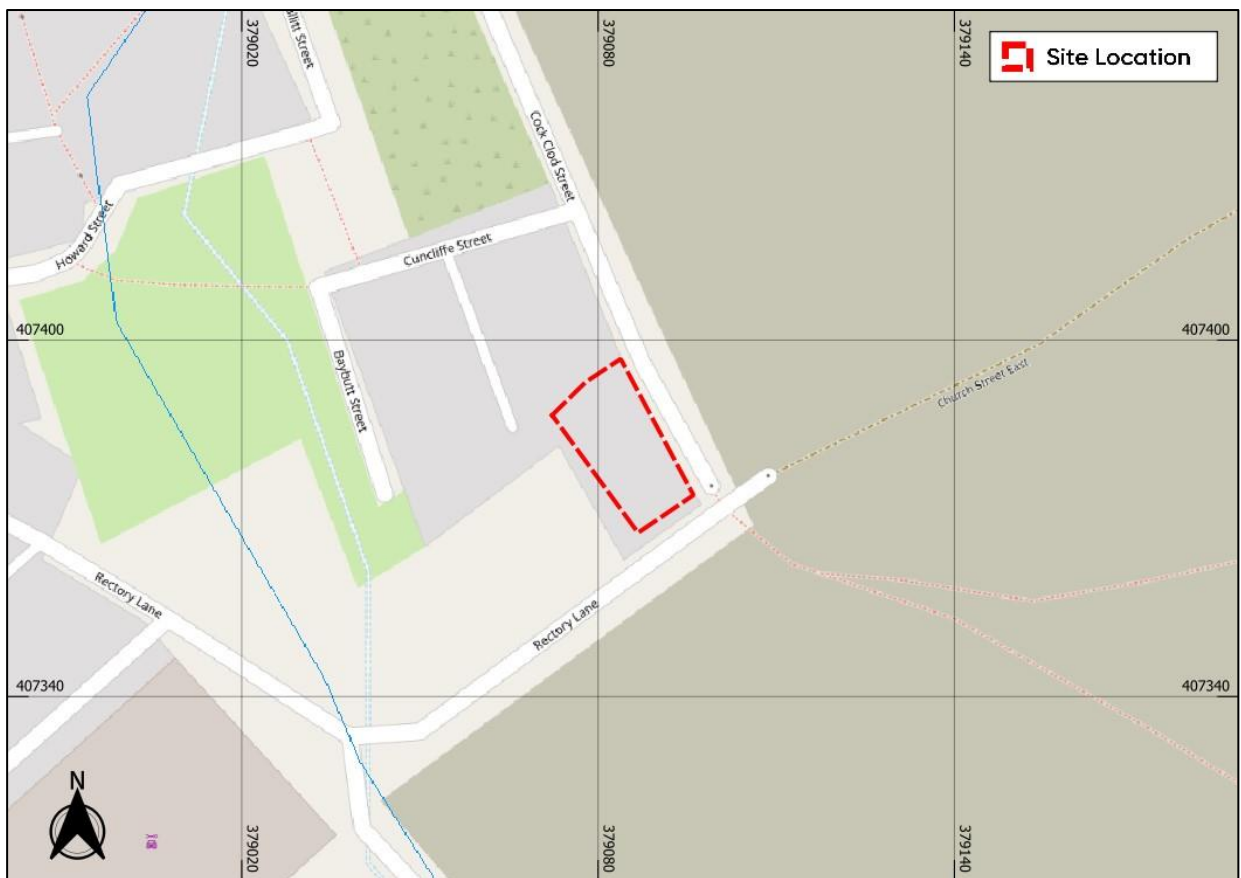


Figure 1. Site Location (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors)

- 1.4. The existing site is commercial premises. The proposed development is for;

- change of use to HMO at ground floor
- change of use to provide first floor flat (2 bedroom)
- extension to rear to facilitate associated works

1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model has been used to review the topography of the site. Based on Figure 2, the maximum ground elevation at the site is approximately 66.99m Above Ordnance Datum (AOD) to the northwest, whereas the minimum ground elevation at the site is approximately 64.68m AOD in the southeast.

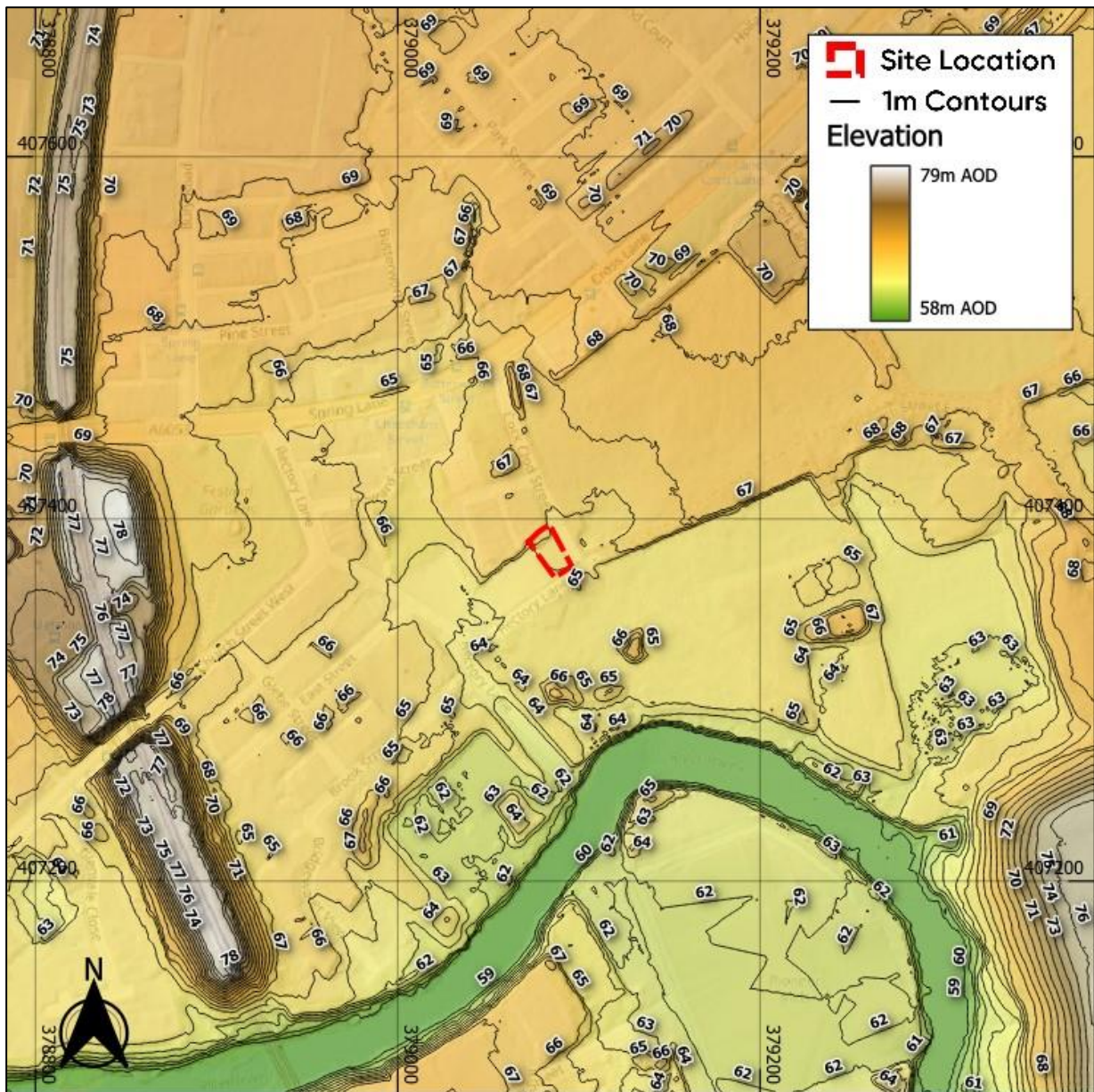


Figure 2. Site Topography (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 1.6. Bury Council is the Local Planning Authority (LPA) for the site, and also the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Greater Manchester Merseyside and Cheshire region.

Planning Policy and Guidance

- 1.7. UK government planning guidance states² that an FRA is required for developments which are:

- *in flood zone 2 or 3 including minor development and change of use*
- *more than 1 hectare (ha) in flood zone 1*
- *less than 1 ha in flood zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs)*
- *in an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency*

- 1.8. The site is located within Flood Zone 2 and therefore an FRA is required in accordance with the NPPF.

- 1.9. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial flood risk
- Surface water flood risk
- Risk of flooding from other sources

² <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

2. Planning Policy

- 2.1. Inappropriate development in a flood risk area could pose significant risk in terms of personal safety and damage to property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

National Planning Policy Framework (NPPF)

- 2.2. The National Planning Policy Framework³ (NPPF) (DLUHC, 2021) which includes UK Government policy on development and flood risk states:

"159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

³ <https://www.gov.uk/guidance/national-planning-policy-framework>, last updated July 2021

- d) any residual risk can be safely managed; and
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55. "

2.3. Footnote 55 of the NPPF states:

"A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."

2.4. Flood Zones in England are defined as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding (all land outside Zones 2 and 3).
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:

land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or

land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

- 2.5. An FRA should be appropriate to the scale, nature, and location of the development. It should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.
- 2.6. An assessment of hydrological impacts should be undertaken, including to surface water runoff and impacts to drainage networks in order to demonstrate how flood risk to others will be managed following development and taking climate change into account.
- 2.7. The Planning Practice Guidance, which was substantially revised in March 2015 in relation to drainage, requires that sustainable drainage systems (SuDS) should be considered and included where practicable, in line with Defra Technical Standards⁴.

Local Plan

- 2.8. The Local Plan prepared by the Local Planning Authority, Bury Council, sets out the policies for development in the local area.
- 2.9. Policy EN5 Flood Protection and Defence outlines the requirements for new development within the area. It states:

The Council will seek to control development in a manner consistent with flood protection and the maintenance of flood defence systems.

4 Technical Standards Accessed Online

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

- 2.10. Policy EN5/1 New Development and Flood Risk outlines the requirements for new development within the area. It states:

The Council will not permit new development, including the raising of land and the intensification of development, where such development would be at risk from flooding, would be likely to increase the risk of flooding elsewhere, or would adversely affect river flood defences. When assessing proposals against this policy, the following criteria will apply: - the impact on the floodplain; - the increase in surface water run-off as a result of the proposal; - the impact on fluvial flood defences; - the incorporation of mitigating works.

Sequential and Exception Tests

- 2.11. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.
- 2.12. Under the NPPF all new planning applications should undergo a Sequential Test unless a minor household development or a change of use application in accordance with paragraph 168 and footnotes 55 and 56.
- 2.13. However, the proposed development is for a change of use with minor extensions a, therefore it is viewed that the sequential and exception tests are not applicable.

Summary

- 2.14. This flood risk assessment has been prepared with due consideration to the above local and national policy.

3. Consultation and Review

Consultation

- 3.1. The site is within the remit of Bury Council as Lead Local Flood Authority (LLFA). Product 4 data was requested and received from the EA. This data has been reviewed in Section 4 of this report and a full copy of the data received is included in Appendix B of this report.

Documents and Online Mapping

- 3.2. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.
- 3.3. The following sources of information have been reviewed for this assessment:
- Flood Map for Planning on the Environment Agency website <https://flood-map-for-planning.service.gov.uk/>
 - Long Term Flood Risk Information on the Environment Agency website <https://www.gov.uk/check-long-term-flood-risk>
 - National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2021)
 - Planning Practice Guidance - Flood Risk and Coastal Change (Department for Levelling Up, Housing and Communities, 2022)
 - Geoindex Onshore (British Geological Survey, 2022)⁵
 - Greater Manchester Level 1 Strategic Flood Risk Assessment (Greater Manchester Combined Authority – Manchester City Council, 2019)⁶

⁵ <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

⁶ <https://www.salford.gov.uk/planning-building-and-regeneration/salfords-natural-environment/flood-risk/strategic-flood-risk-assessment/>

- Bury Council Preliminary Flood Risk Assessment (2011)⁷

Preliminary Flood Risk Assessment (PFRA)

- 3.4. The PFRA, published in 2011, is a high-level appraisal of flood risk across Lead Local Flood Authority Bury Council. The flood risk from all sources, including fluvial, surface water, groundwater and surcharged sewers is evaluated. It is the basis upon which the Local Flood Risk Management Strategy is produced.
- 3.5. The PFRA summarises historical flood incidents in Bury Council. The site is not recorded as having been affected by any flood event.

Strategic Flood Risk Assessment (SFRA)

- 3.6. The SFRA, published in 2019, provides the evidence base for the Local Planning Authority Bury Council Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk taking into account current flood risk, future flood risk, and the effect a proposed development would have on the risk of flooding.
- 3.7. The SFRA mapping provided by Greater Manchester Council's has been used throughout production of this report as a source of information, particularly pertaining to historical flood incidents.

Local Flood Risk Management Strategy (LFRMS)

- 3.8. The Local Flood Risk Management Strategy sets out roles and responsibilities for flood risk management, assesses the risk of flooding in the area, where funding can be found to manage flood risk, and the policies, objectives and actions of the Lead Local Flood Authority. The Bury Council LFRMS is used within this report to identify any flood management infrastructure and historical incidences of flooding.
- 3.9. The objectives of the strategy are to;

- *Gain a strategic understanding of flood risk from all sources in Bury;*

⁷ <https://www.bury.gov.uk/asset-library/bury-preliminary-flood-risk-assessment-may-2011.pdf>

- *Manage the likelihood of flooding within the Borough;*
- *Help Bury residents to manage their own risk;*
- *Ensure that new development in Bury reduces rather than increases flood risk;*
- *Improve flood preparation, warning and post flood recovery;*
- *Endeavour to balance environmental, social and economic benefits*

4. Sources of Flood Risk

Fluvial

- 4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.

Main Rivers and Ordinary Watercourses

- 4.2. The nearest EA main river to the site is the River Irwell approximately 100m to the southeast of the site. The river flows west away from Radcliffe before confluencing the River Croal approximately 4.5km further west.
- 4.3. According to EA Product 4 data (see Appendix B) shows the Crows Trees Brook approximately 42m west of the site, flowing south into the River Irwell. The watercourse appears to become culverted to the north of the site at Spring Lane, to pass through the residential development towards to River Irwell.
- 4.4. There are no other watercourses in the vicinity of the site.

EA Flood Map for Planning

- 4.5. The EA Flood Map for planning (Figure 3) shows the site is located within Flood Zone 2 (medium risk) and Flood Zone 1 (low risk). The Flood Zones are defined as follows;
- Flood Zone 2 is denoted as land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding.
 - Flood Zone 1 is denoted as land having less than 1 in 1,000 (0.1%) annual probability of river or sea flooding.
- 4.6. The proposed development is located within Flood Zone 2, however, the yard to the rear of the building is located within Flood Zone 1.

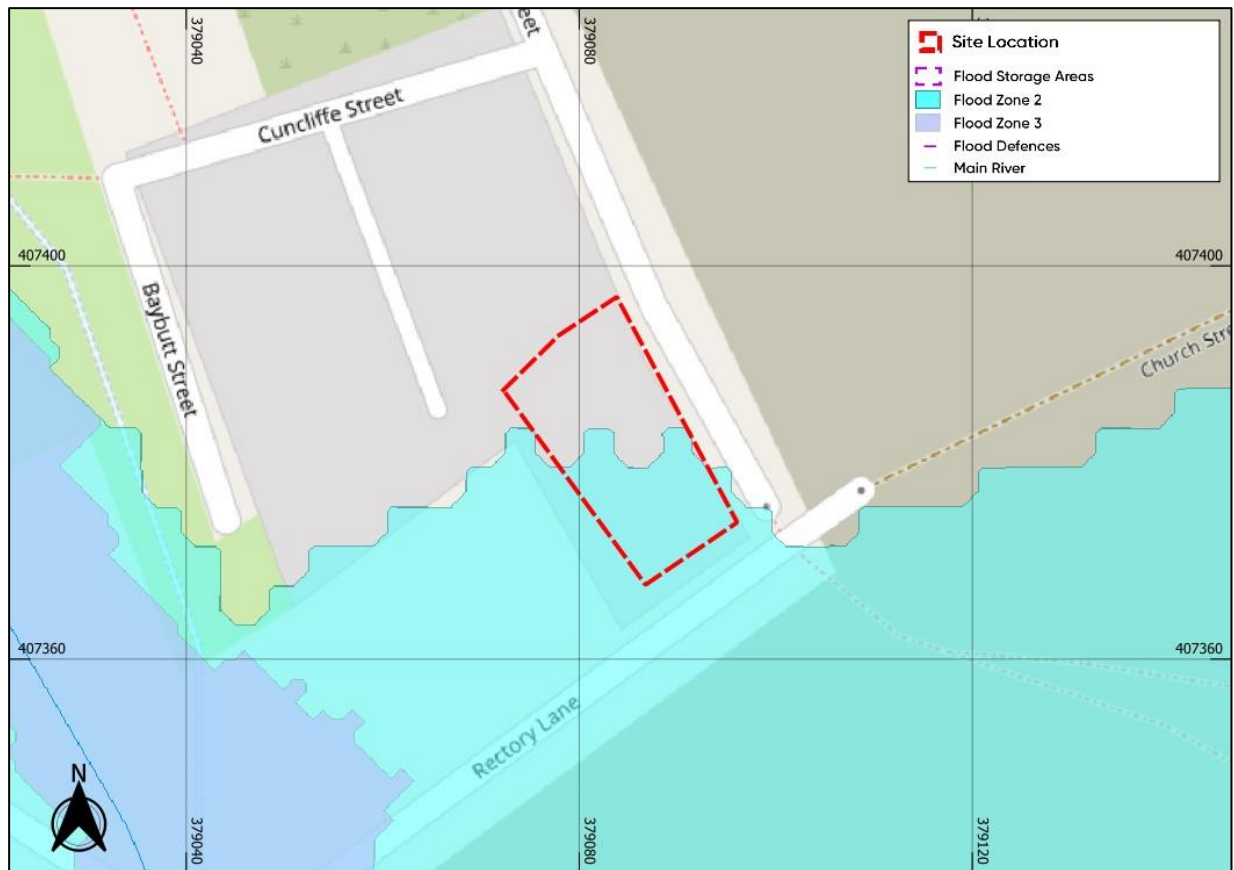


Figure 3: EA Flood Map for Planning (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

Climate Change

- 4.7. The site is located within the Irwell Management Catchment, which has updated central peak flow river allowances of 12% for the 2020s, 19% for the 2050s, and 35% for the 2080s. As the proposal is for a more vulnerable development and that the design life is understood to reach at least until 2080s, a peak flow allowance of 35% would be required for fluvial flood flows.

EA Product 4 Data

- 4.8. The EA have provided detailed modelling results for the site location in the form of Product 4 information extracted from the Radcliffe & Revalves (2016) and the Crow Trees Brook (2016) fluvial models.

- 4.9. Figure 4 shows the location of the modelled 1D in channel nodes and 2D nodes. 2D flood level nodes (8 and 9) lie within the curtilage of the site with node 9 located where the existing building is located.
- 4.10. The existing building, from review of Google Earth, has a step up to the site entrance which could be in excess of 300mm high. The LiDAR data shows that the ground level of the pavement adjacent to the dwelling is approximately 64.86mAOD. Therefore, with the addition of a minimum 300mm the approximate existing Finished Floor Levels (FFLs) are approximately 65.16m AOD.
- 4.11. The data includes several return periods for the 1D nodes including the 0.1% AEP storm event. However, there is no 1D/2D, 1.0% AEP plus climate change event (considered the design event).
- 4.12. Analysis of the topography between the 1D nodes and the site shows that it is unlikely that flood water would reach the site. Ground elevations between 1D node 7 reach 67.39m AOD on Cunliffe Street to the north of the site, which is 1.07m higher than the water level at node 7. Ground elevations between 1D node 3 and the site reach 65.89m AOD on land between the site and node 3, which is 1.25m higher than the water level at node 3. As such, the 1D nodes are not considered representative of the fluvial flood risk at the site.
- 4.13. No 2D node for the 1% or 1% + CC climate change flood levels have been provided. The flood level for 2D node 8 for the 0.1%AEP event is 66.20m AOD, therefore, flood depths at the location of the proposed development could range up to 1.04m.
- 4.14. The flood depth for 2D node 9 during the 0.1%AEP event is 66.15m AOD, therefore, flood depths at the location of the proposed development could range up to 0.99m.
- 4.15. It is understood from liaison with the Environment Agency that the 1.0% AEP plus climate change (considered the design event) flood extent does not impact the proposed development. An email from the EA confirming this has been appended to this document (Appendix B).
- 4.16. The site is therefore viewed to not be at risk of the 1 in 100 + climate change event.
- 4.17. Due to the residual risk to the site, safe access/ egress should be sought to the rear (north) of the existing building as this is located in Flood Zone 1.

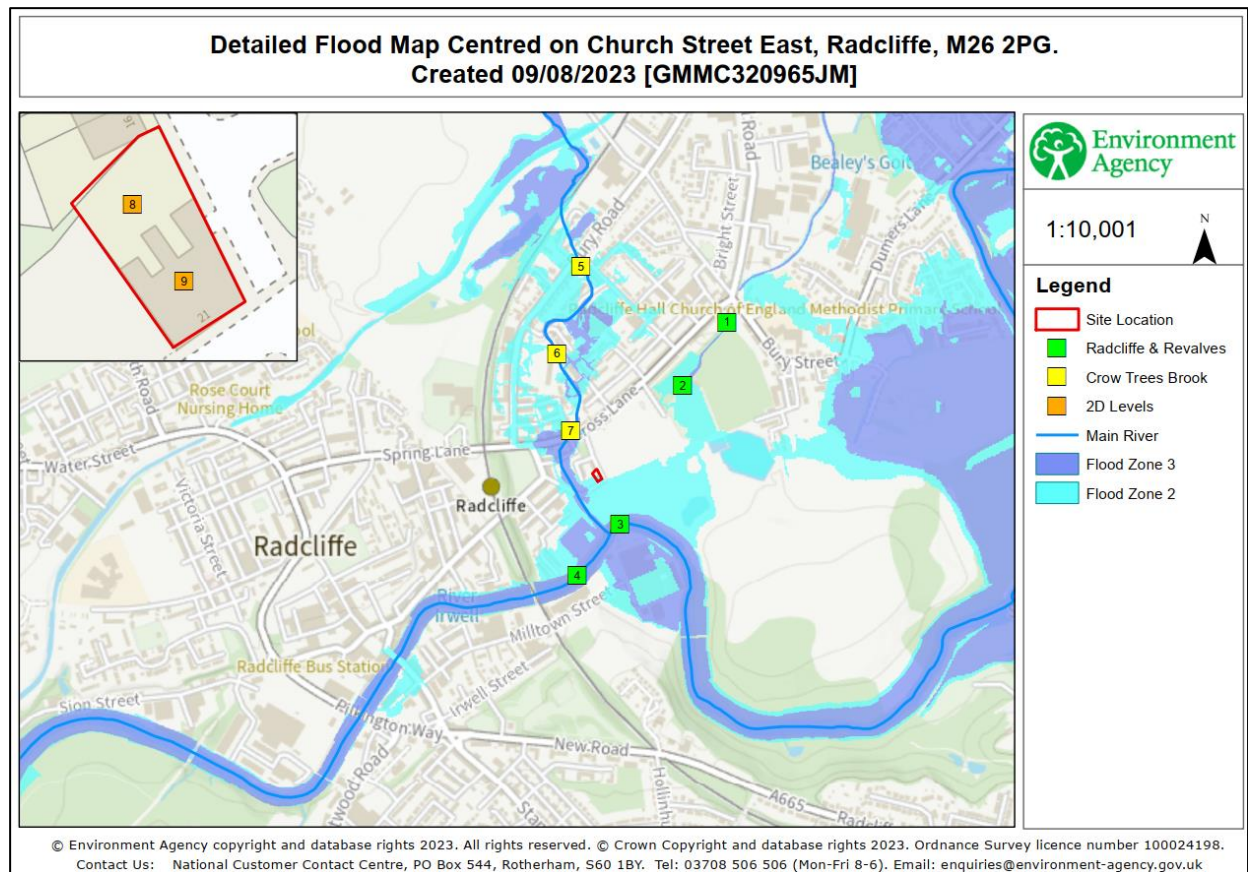


Figure 4. EA Model Node Locations (Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2023 Ordnance Survey 100024198)

Historical Fluvial Flooding

- 4.18. The EA Recorded Historical Flood Outlines show that there is no record of historical fluvial flooding on-site.

Fluvial Flood Risk Summary

- 4.19. Based on the information above, the site is not impacted by fluvial flooding during the 1.0% AEP event plus Climate Change (considered the design event), however, in the unlikely 0.1% AEP event the site could be affected.
- 4.20. Therefore, the flood risk to the site is considered to be low to moderate and flood mitigation measures will be recommended in Section 5.

Tidal

- 4.21. Tidal flooding occurs when a high tide and high winds combine to elevate sea levels. An area behind coastal flood defences can still flood if waves overtop the defences or break through them. Tidal flooding can also occur a long way from the coast by raising river levels. Water may overtop the river bank or river defences when tide levels are high. The site is a significant distance from any tidal source and above the anticipated extreme tidal levels, even when considering the impacts of climate change. The risk of flooding from tidal sources is low.
- 4.22. There is no record of historical tidal or sea flooding.

Canals

- 4.23. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders, and boreholes and manages water levels by transferring it within the canal system.
- 4.24. The site is approximately 615m from the Manchester Bolton and Bury Canal.
- 4.25. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. Control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 4.26. Flooding can occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 4.27. Water levels within the canal will be maintained as described above.
- 4.28. Mitigation measures may be implemented to reduce the effects of any flooding which may occur.

Pluvial

- 4.29. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.

4.30. Annual surface water flood risk is labelled by the EA as:

- 'High Risk'; >3.3% AEP (annual probability greater than 1 in 30).
- 'Medium Risk'; 1.1% to 3.3% AEP (annual probability between 1 in 100 and 1 in 30).
- 'Low Risk'; 0.1% to 1% AEP (annual probability between 1 in 1000 and 1 in 100).
- 'Very Low Risk'; <0.1% AEP (annual probability less than 1 in 1000).

4.31. Examination of the EA's Flood Risk from Surface Water mapping (Figure 5) for High Risk, Medium Risk, and Low Risk AEP flood events shows the site is at risk of flooding in 'Low Risk' surface water flood events.

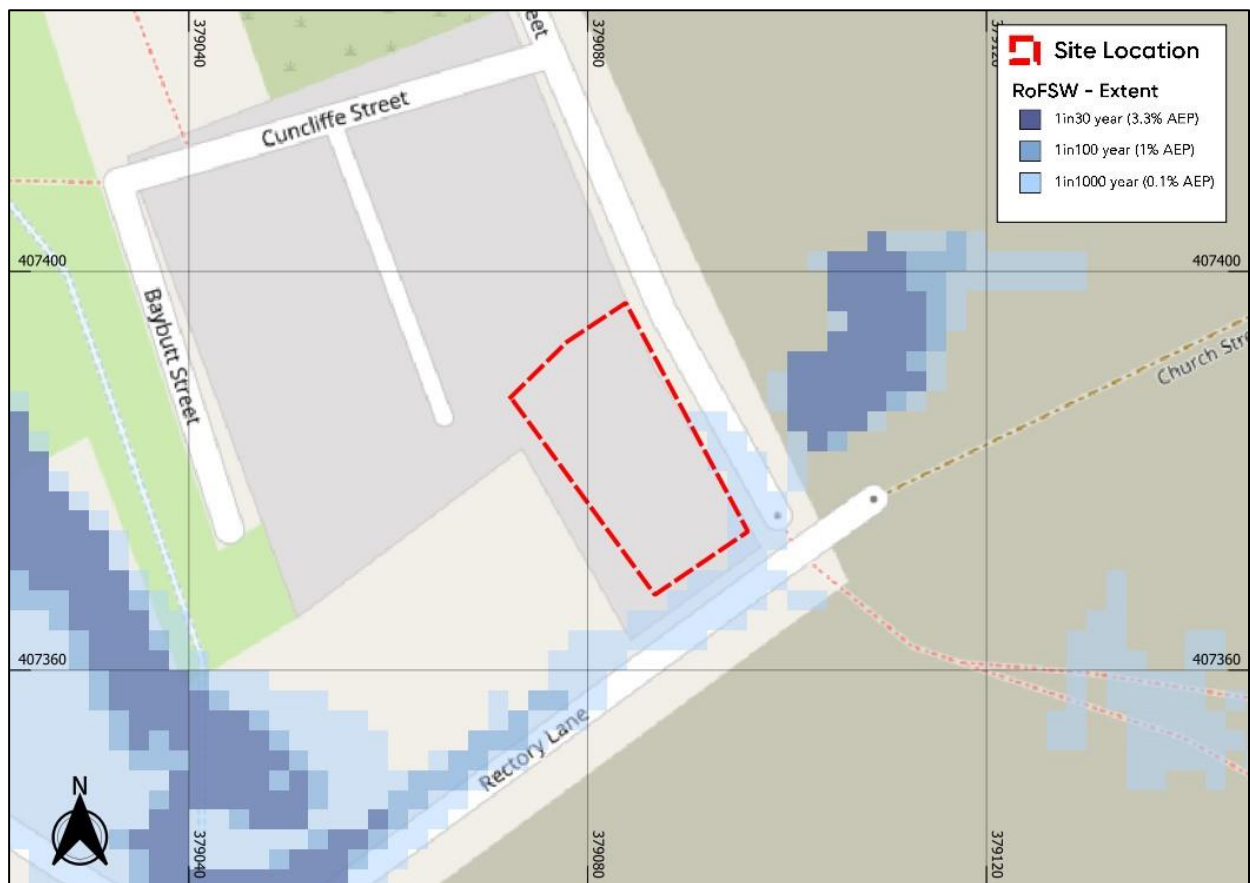


Figure 5. EA Surface Water Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

4.32. Review of the EA low risk (0.1% AEP) surface water event (Figure 6) shows that that the site could be affected by flooding up to depths of 150mm in a very small section of the southeast corner of the site.

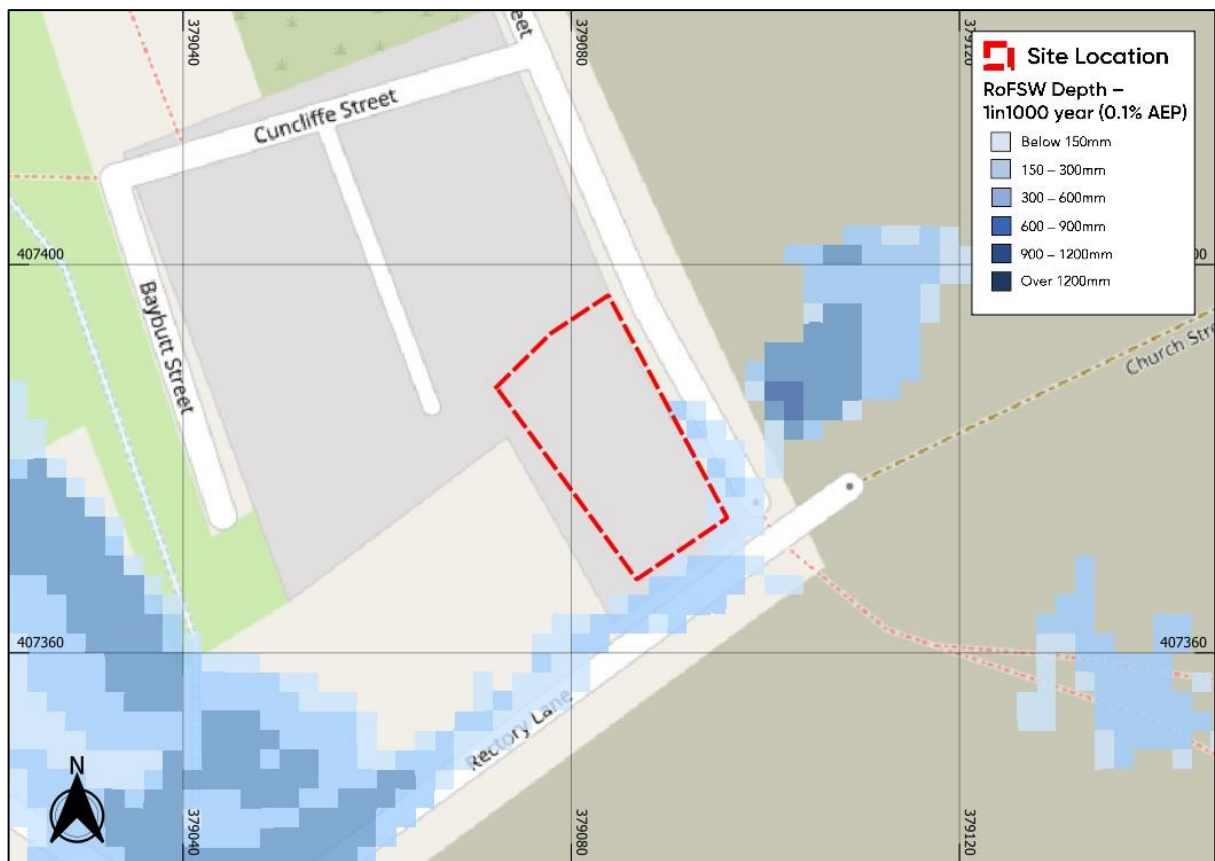


Figure 6. EA Surface Water Depth map (1in1000Year) - (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). © <https://www.openstreetmap.org> and contributors). EA RoFSW: © Environment Agency copyright and/or database right 2015.

Pluvial Flood Risk Summary

- 4.33. Based on the information above, the risk of flooding from pluvial source is considered to be low.

Reservoirs

- 4.34. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain floodwater. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 4.35. According to the EA's Flood Risk from Reservoirs mapping the site is at risk of flooding in the event of a breach at multiple reservoirs (Figure 7). The worst reservoir failure model is a 'wet day' scenario meaning that it would have to happen at the same time as other flooding for there to be enough water to reach the site.

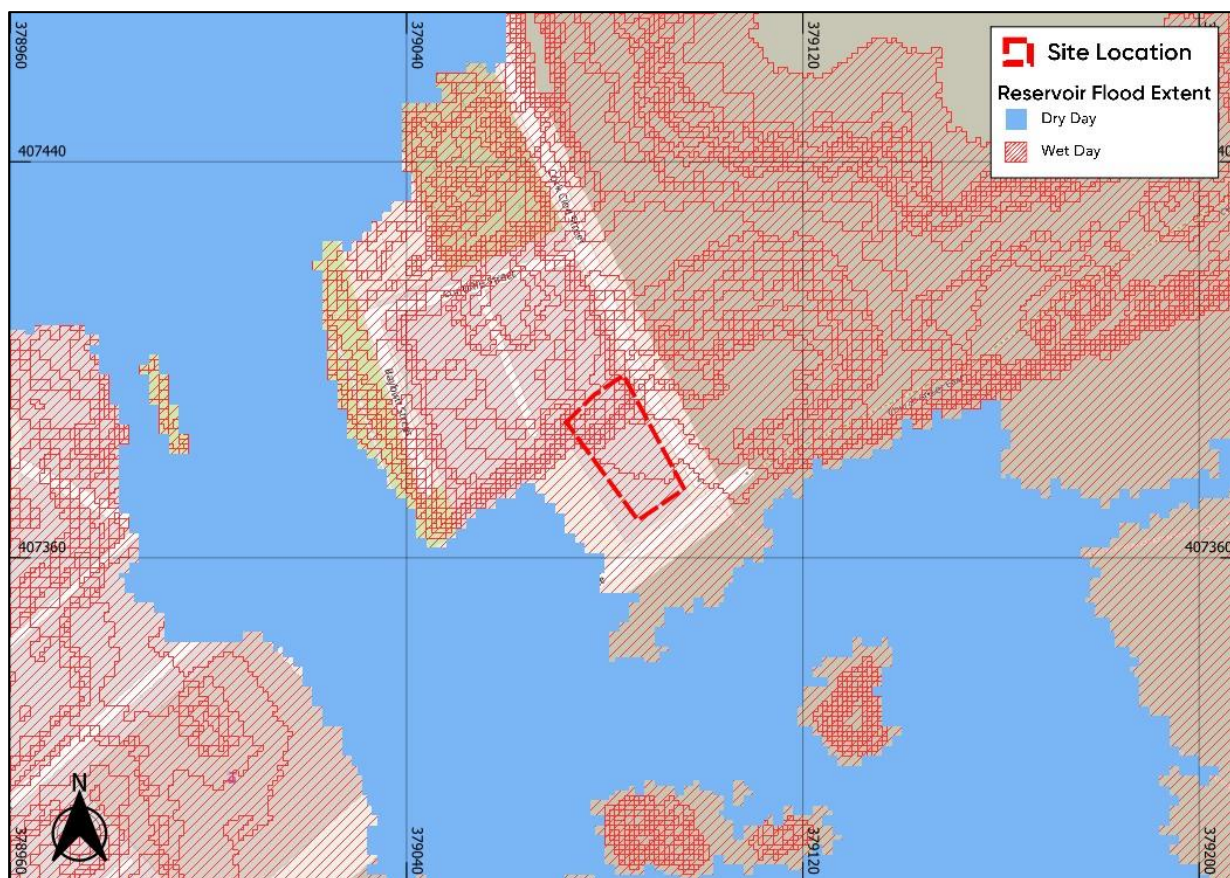


Figure 7. EA Reservoir Flood Risk Mapping (Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA). ©<https://www.openstreetmap.org> and contributors. Contains public sector information licensed under the Open Government Licence v3.0)

- 4.36. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the Reservoirs Act 1975 in England and Wales. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoirs are highly managed the maximum flood extent provided in the EA Risk of Flooding from Reservoirs mapping is considered a worst-case scenario. As reservoir flooding is unlikely and the modelled flood depths are based on the worst-case scenario, flooding from this source may be considered as a relatively low risk. Although to be precautionary flood resilient design and building practices could be implemented to further reduce risk.

Groundwater

- 4.37. Groundwater flooding occurs in areas where underlying geology is permeable, and water can rise within the strata sufficiently to breach the surface.

- 4.38. The British Geological Survey's (BGS) mapping shows Glaciofluvial Sheet superficial deposits comprising sand and gravel underlying the site, which are designated as 'Secondary A' Aquifers. These are permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases, they form an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 4.39. The bedrock underlying the site is Pennine Middle Coal Measures Formation comprising mudstone, siltstone and sandstone.
- 4.40. The nearest borehole record (ref: SD70NE94) containing recorded groundwater levels, states that the groundwater level at 0.6m Below Ground Level (BGL).
- 4.41. However, as the proposals do not include any proposed basements, the risk from groundwater flooding is considered to be low.

Sewers

- 4.42. Foul or surface water sewers can be a cause of flooding if the drainage network becomes overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.
- 4.43. The SFRA provides mapping of historical sewer flood incident records kept by the local authority (Figure 8). No incidents have been recorded in the vicinity of the site.

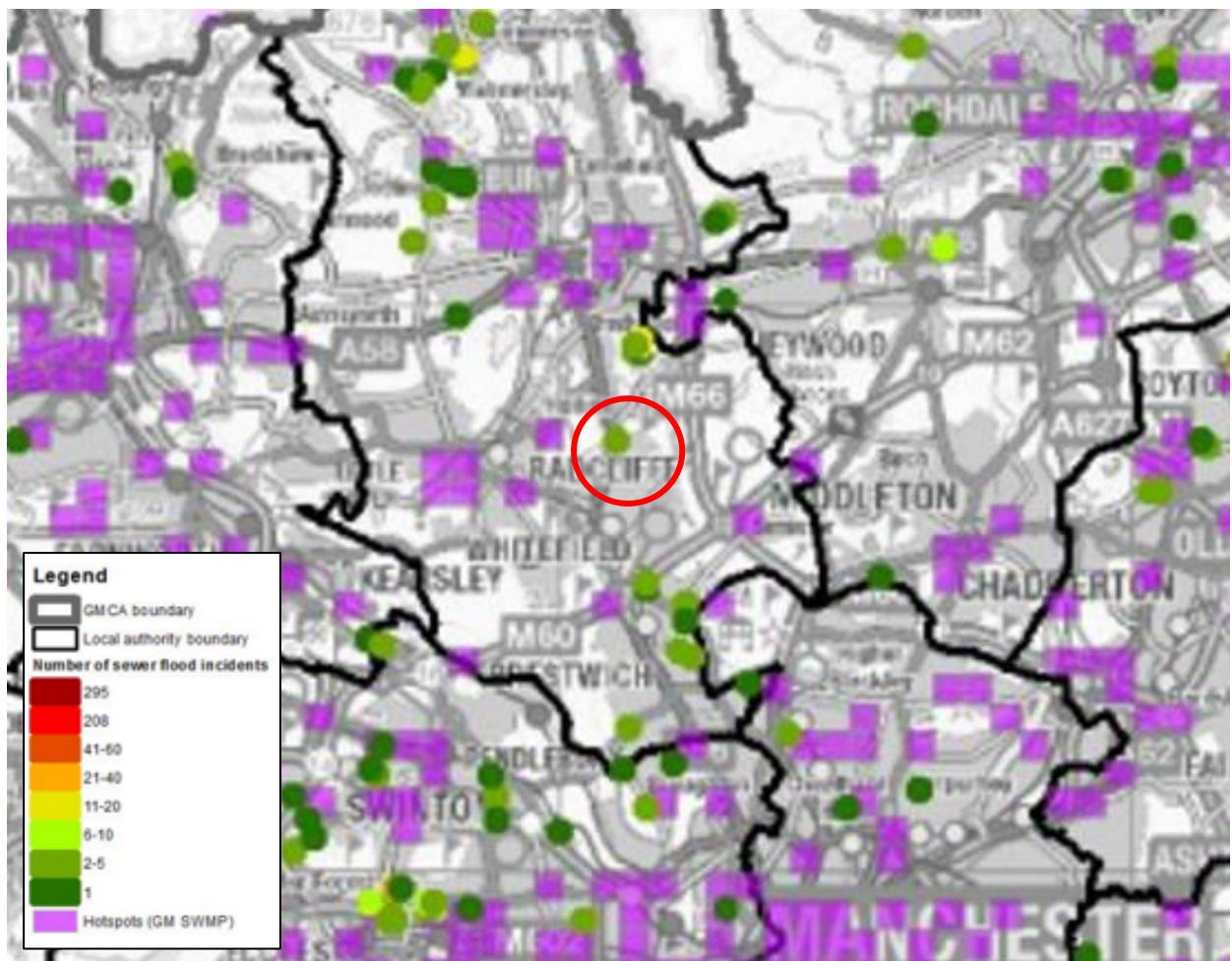


Figure 8. Flooding Hotspots (source; Greater Manchester SFRA; the approximate location of the site is indicated by the red circle)

4.44. The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial

- 5.1. Based on the information above, the flood risk to the site is considered low to moderate, as the site is not impacted during the 1.0% plus Climate Change event (considered the design event). however, in the unlikely 0.1% AEP event the site could be affected.
- 5.2. Furthermore, given the residual risk of flooding, the building should be constructed in a flood resilient manner in accordance with the CLG Report, *Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007)* including, where practical, measures such as the below:
- Solid (i.e. concrete floors) with waterproof screed.
 - Raised wiring and power outlets at ground level.
 - Units to be raised on legs above plinth.
 - Waterproof plasterboard used at ground floor.
 - Air brick covers to be installed (if applicable).
 - Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors.
 - Patio doors may be susceptible to ingress of flood water. Any PVC window/door sills should be adequately sealed. Double glazing should be used to provide resistance against external flood water pressure.
 - Non-return valves to be installed (if applicable)

Canals

- 5.3. Mitigating measures above will also mitigate the risk of canal flooding.

Pluvial, Reservoirs, Groundwater, and Sewers

- 5.4. Flood risk from other sources is deemed to be low, therefore mitigation is not required.

Increase to Flood Risk Elsewhere

- 5.5. The existing site is commercial premises. The proposed development is for change of use to a house of multiple occupation with an extension at the rear of the existing building. The proposed extension is located on the boundary between Flood Zone 1 and 2. However, the fluvial section of this report and the correspondence with the EA has confirmed that the site is not at risk during the 1.0% AEP plus climate change event, which is considered the design event.
- 5.6. Therefore, fluvial flood water will not be displaced as a result of the proposed development.

EA Flood Warning Service

- 5.7. As a further precaution and risk reduction, the owner of the site should sign up the EA flood warning service for River Irwell at Radcliffe and Redvales wider area. This service allows site owners to register an address, which is at risk of flooding, along with contact details so that in the event of a flood being forecast, the site owner will be sent an alert directly to their chosen method of contact.
- 5.8. Flood warnings/alerts can be enforced at any time of the day or night. Signing up for this service provides site owners some notice before a flood event. The amount of time afforded before a flood occurs depends on the site-specific location (e.g. proximity to the source of flooding, topography of the surrounding area) and the flood mechanism (e.g. bank over topping versus a breach event). Flood alerts and warnings provide site managers with time to take necessary action, e.g. communication of the risk of flooding to occupants/employees etc, evacuation of occupants offsite or to a safe level, removal of valuable items out of reach of flooding and the mounting of site-specific flood defences.

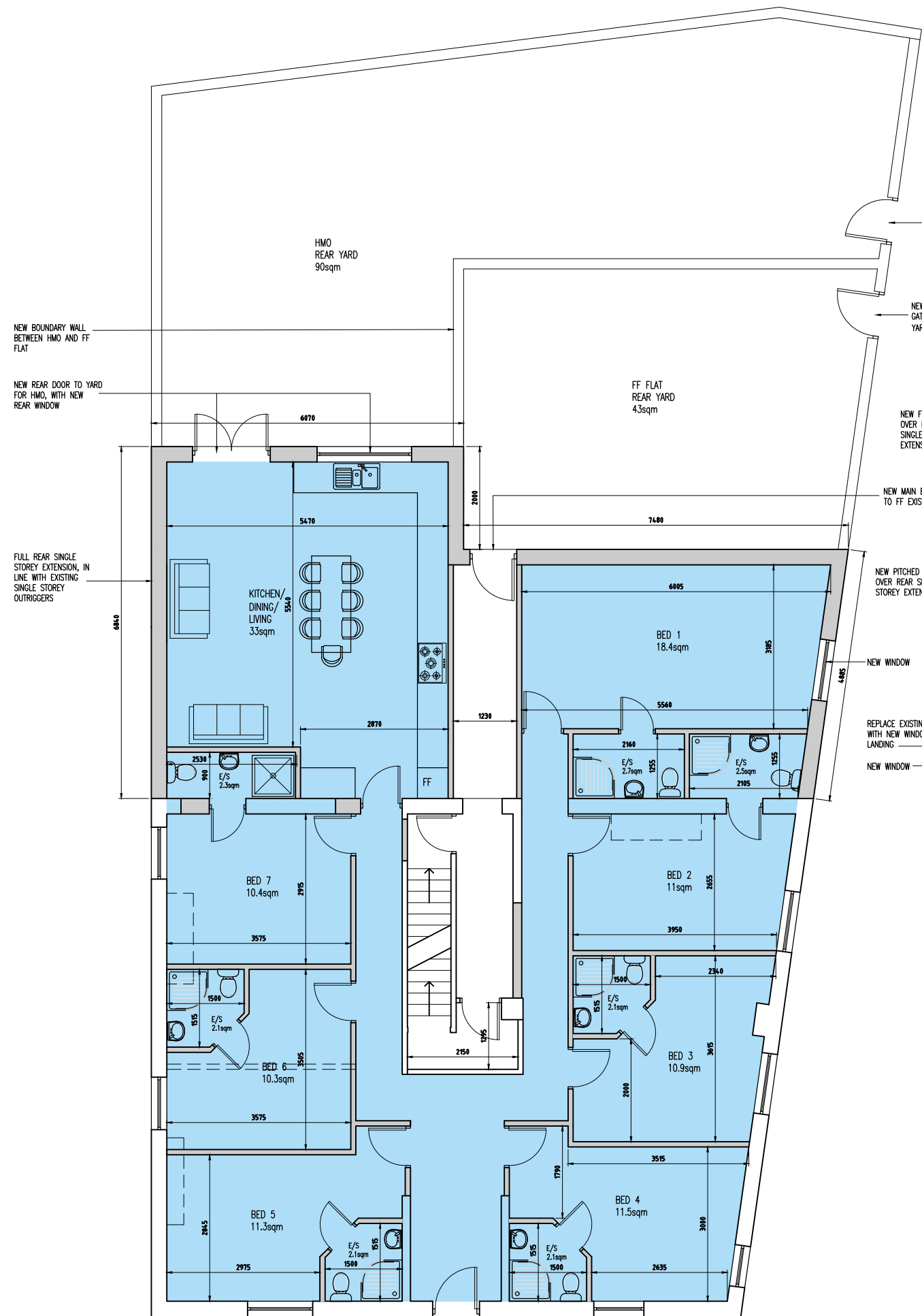
6. Conclusions

- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 21 Church Street East, Radcliffe, Manchester, M26 2PG. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 6.2. An assessment of the risk of flooding from all sources has been undertaken and is summarised in the table below:

Source of Flooding	Flood Risk Summary
Fluvial	Based on liaison with the EA and the Product 4 data provided, the site is considered to be at a low to moderate risk of fluvial flooding. The EA have confirmed that the site is not at risk of flooding from the 1 in 100 + CC event. As such flood mitigation measures are recommended in section 5.
Canals	The mitigation measures above will mitigate the risk from canals.
Tidal Reservoirs Groundwater Sewers Pluvial	The site is considered to be at low risk from other sources.

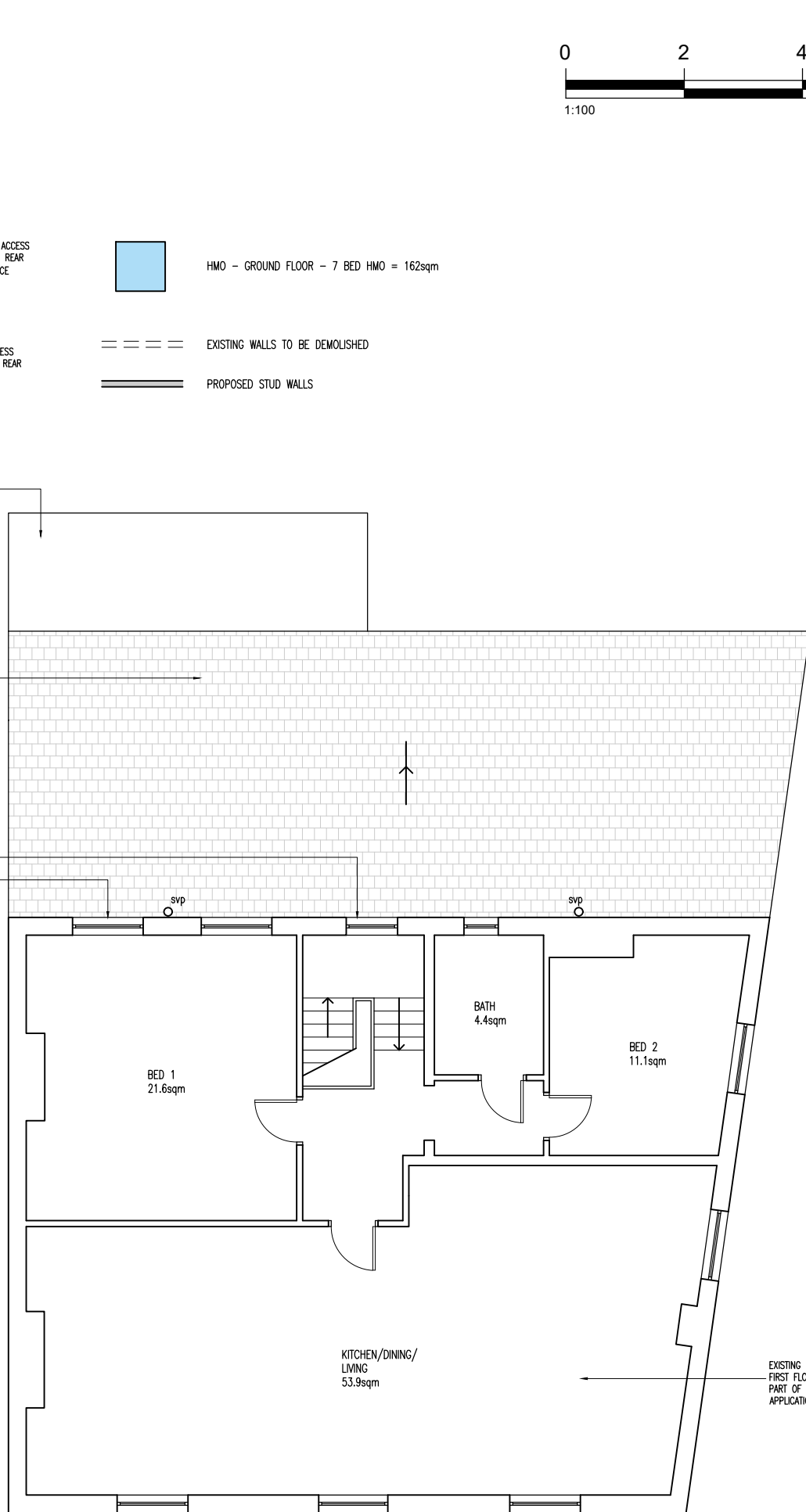
- 6.3. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.
- 6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A - Development Proposals



PROPOSED GROUND FLOOR PLAN
1:100 @ A3

- NEW SECURE ACCESS GATE TO HMO REAR YARD/ENTRANCE
 - NEW SECURE ACCESS GATE TO FF FLAT REAR YARD/ENTRANCE
 - NEW FLAT ROOF OVER EXTENDED SINGLE STOREY EXTENSION
 - NEW MAIN ENTRANCE TO FF EXISTING FLAT
 - NEW PITCHED TILED ROOF OVER REAR SINGLE STOREY EXTENSION
 - NEW WINDOW
 - REPLACE EXISTING DOOR WITH NEW WINDOW TO LANDING
 - NEW WINDOW
- HMO - GROUND FLOOR - 7 BED HMO = 162sqm
- EXISTING WALLS TO BE DEMOLISHED
- PROPOSED STUD WALLS



PROPOSED FIRST FLOOR PLAN
1:100 @ A3



Rev	Amendments	Date	Ints
Mark Gordon Design + Associates			
Project			
21 CHURCH STREET EAST RADCLIFFE, M26 2PG			
Drawing Title			
PROPOSED PLAN LAYOUTS			
Drawn TW		Checked -	
Date JULY 2023		Scale A3 1 : 100	
Drawing No.		Rev.	
21STE/205/PL			

Appendix B - Consultation

Map Reference	Model Node Reference	Easting	Northing	Data	Undertended										Defended									
					50 % AEP (1 in 2 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	50 % AEP (1 in 2 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)		
1	ea013_0185_HUTC01_0004	379390	407747	Modelled Water Level (m aodN)	68.78	68.78	68.80	68.82	68.83	68.84	68.86	69.21	68.78	68.78	68.78	68.80	68.97	68.09	69.10	69.10	69.20			
				Modelled Flow (cumecs)	0.14	0.20	0.55	0.61	0.66	0.66	0.68	0.72	1.77	0.14	0.14	0.38	0.52	0.92	1.16	1.23	1.22	1.78		
				Modelled Water Level (m aodN)	67.99	68.06	68.42	68.49	68.51	68.55	69.00	67.99	67.99	68.24	68.35	68.75	68.92	68.93	68.98	68.92	68.93	68.98		
				Modelled Flow (cumecs)	0.14	0.20	0.54	0.61	0.66	0.66	0.68	0.72	0.86	0.14	0.14	0.38	0.51	0.91	0.95	0.94	0.96	0.96		
2	ea013_0185_HUTC01_0005	379283	407593	Modelled Water Level (m aodN)	61.21	61.97	62.37	62.49	62.88	63.15	63.35	63.82	64.80	61.22	61.99	62.39	62.50	62.95	63.17	63.36	63.83	64.64		
				Modelled Flow (cumecs)	201.62	281.24	327.20	340.67	377.90	403.10	420.47	478.45	892.98	203.18	282.05	323.88	342.20	379.61	404.09	423.59	477.69	890.90		
				Modelled Water Level (m aodN)	60.99	61.74	62.17	62.30	62.67	62.82	63.10	63.55	64.66	61.00	61.75	62.19	62.31	62.68	62.94	63.14	63.58	64.54		
				Modelled Flow (cumecs)	201.71	282.14	331.34	346.24	390.78	422.26	444.05	500.58	682.72	203.27	282.95	334.16	347.65	393.88	424.38	446.31	504.66	598.19		

Map Reference	Model Node Reference	Easting	Northing	Data	Defended
					0.1 % AEP (1 in 1000 year)
8	20 Levels	379080	407387	Modelled Water Level (m aodN)	66.20
9		379086	407376	Modelled Water Level (m aodN)	66.15

Model data taken from Raddcliffe and Redwales 2016

AEP - Annual Exceedance Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: Climate Change Scenario - We do not hold climate change measurements at this location. For further guidance on climate change please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Map Reference	Model Node Reference	Easting	Northing	Data	Undertended									
					50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
5	034_EA13_0226_CROTD1_00762	379044	407878	Modelled Water Level (m aodN)	69.89	70.02	70.13	70.16	70.16	70.19	70.20	70.21	70.23	70.41
				Modelled Flow (cumecs)	2.15	2.73	2.96	3.08	3.13	3.40	3.31	3.43	3.52	3.75
6	034_EA13_0226_CROTD1_00474	378988	407671	Modelled Water Level (m aodN)	67.92	68.01	68.05	68.08	68.08	68.11	68.13	68.14	68.17	68.29
				Modelled Flow (cumecs)	2.35	2.97	3.21	3.43	3.49	3.68	3.80	3.88	4.12	5.02
7	034_EA13_0226_CROTD1_00270	379021	407487	Modelled Water Level (m aodN)	65.28	66.05	66.10	66.13	66.14	66.16	66.18	66.19	66.22	66.32
				Modelled Flow (cumecs)	2.39	2.53	2.54	2.54	2.54	2.55	2.55	2.55	2.55	2.57

Model data taken from Crow Trees Farm Brook 2016

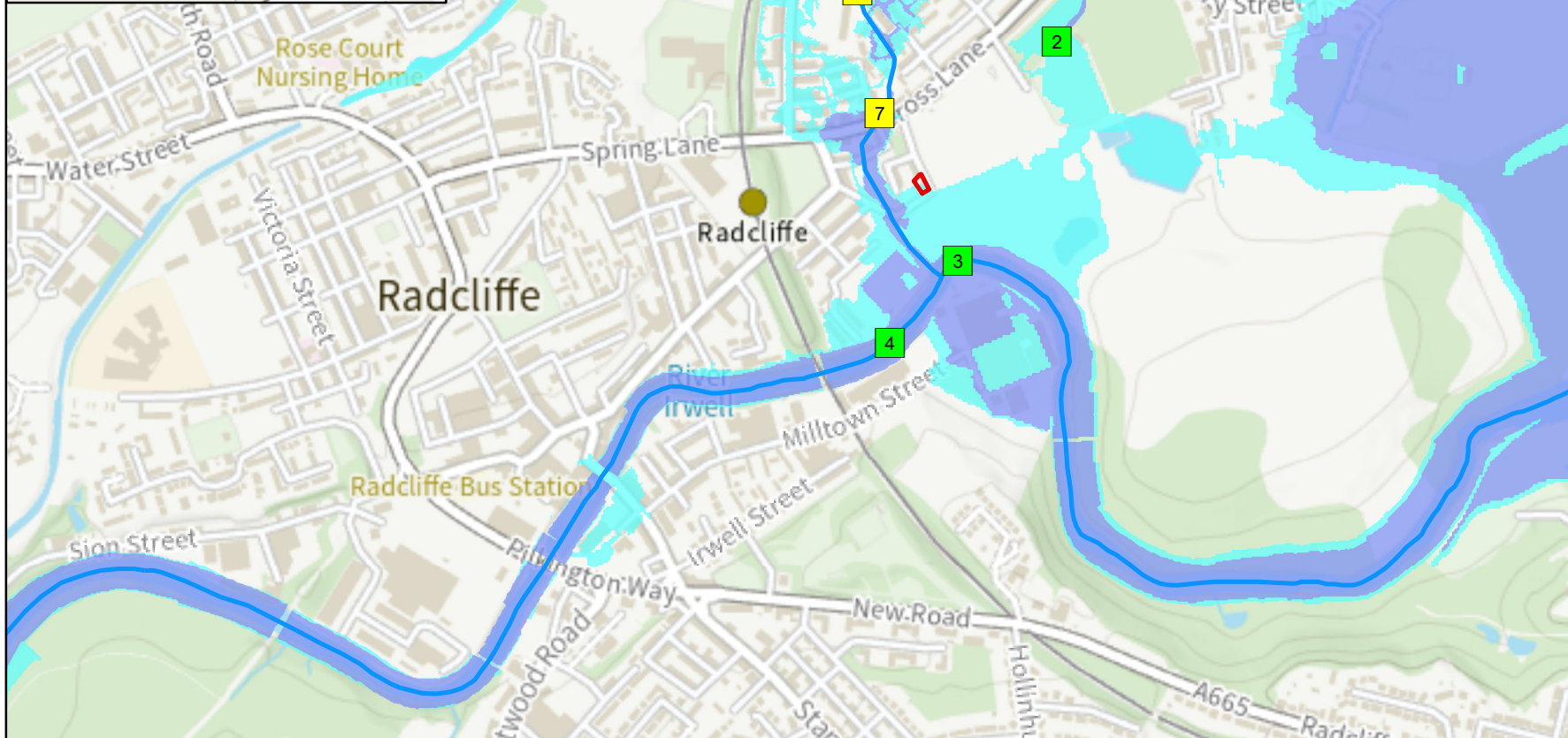
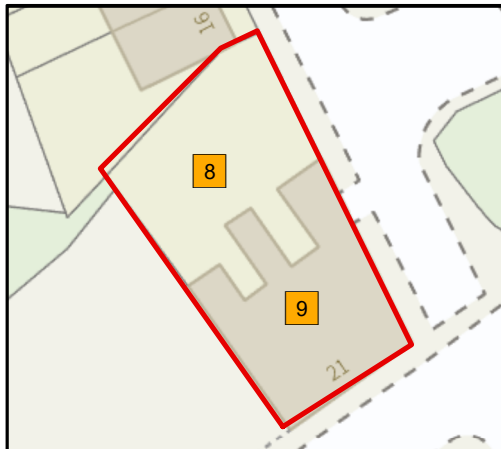
AEP - Annual Exceedance Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: Climate Change Scenario - We do not hold climate change measurements at this location. For further guidance on climate change please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Detailed Flood Map Centred on Church Street East, Radcliffe, M26 2PG. Created 09/08/2023 [GMMC320965JM]



1:10,001



Legend

- Site Location
- Radcliffe & Revalves
- Crow Trees Brook
- 2D Levels
- Main River
- Flood Zone 3
- Flood Zone 2

From: Nick Darling-Drewett <nick@aegaea.com> on behalf of Nick Darling-Drewett
Sent: 07 September 2023 12:45
To: Daniel Cook; Jack Allen
Subject: FW: GMMC320965JM follow on response 7HN1CGT3VX6B

FYI for 2958 – site not affected in CC , only in 1000 yr

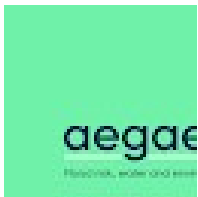
Kind regards

Nick Darling-Drewett BSc (Hons) MCIWEM

Principal Flood Risk Consultant and Flood Risk Lead

t: +44 (0) 20 8164 0550

e: nick@aegaea.com



From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: Thursday, September 7, 2023 12:43 PM
To: Nick Darling-Drewett <nick@aegaea.com>
Subject: RE: GMMC320965JM follow on response 7HN1CGT3VX6B

Dear Nick,

With regards to your email below, our officer has advised that this is correct yes, only the 1000 year event is modelled to hit the site.

Kind regards,

Anne Ball - Customer and Engagement Officer

Greater Manchester, Merseyside and Cheshire

Please note I am part-time and work on Tuesday, Thursday and Friday.

Direct email: InfoRequests.GMMC@environment-agency.gov.uk

Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA4 1HT

Please accept my thanks for your email in advance – it is estimated that each UK adult sending one less ‘thank you’ email a day would save more than 16,400 tonnes of carbon a year. Equivalent to over 811,522 flights to Madrid or taking 33,343 diesel cars off the road.

From: Nick Darling-Drewett <nick@aegaea.com>
Sent: 04 September 2023 14:58
To: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Cc: daniel@aegaea.com; Jack Allen <jack@aegaea.com>
Subject: RE: GMMC320965JM Response from Environment Agency - 7HN1CGT3VX6B
Importance: High

Good Afternoon

Thank you for providing this Product 4. We have a quick question.

Why has only a 0.1% AEP event been provided for the 2D nodes? Is that because the site is unaffected in the 1% AEP +CC events?

Kind regards

Nick Darling-Drewett BSc (Hons) MCIWEM

Principal Flood Risk Consultant and Flood Risk Lead

t: +44 (0) 20 8164 0550

e: nick@aegaea.com



From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>

Sent: Wednesday, August 9, 2023 12:09 PM

To: daniel@aegaea.com

Subject: GMMC320965JM Response from Environment Agency - 7HN1CGT3VX6B

Dear Daniel,

Thank you for your enquiry which was received on 08/8/23.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

I enclose the Product 4 Data.

We have no records of flooding affecting the site.

However, this does not mean flooding has not occurred in the past or that it will not flood in future.

We recommend that you also contact United Utilities and Bury Council

Who may hold additional information (the former especially in relation to sewer flooding).

There are no flood defences in the vicinity of the site.

Bury Council is responsible for issues relating to surface water and hold information on surface water flooding.

Please be aware you can check your risk of flooding on our external website <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

Here are some useful links below:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

James McCabe

Customer and Engagement Officer

Greater Manchester, Merseyside and Cheshire

Email: Inforequests.gmmc@environment-agency.gov.uk

Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA14 4UW

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