



RIDGE

**FLOOD RISK ASSESSMENT
THE MANCHESTER COLLEGE,
CITY CENTRE CAMPUS,
MANCHESTER**

MARCH 2023

THE MANCHESTER COLLEGE, CITY CENTRE CAMPUS

March 2023

Prepared for

THE MANCHESTER COLLEGE

Prepared by

Ridge and Partners LLP
7 Brewery Place
Brewery Wharf
Leeds
LS10 1NE

Tel: 01132421672

Contact

Luke McCabe
Senior Civil Engineer
lukemccabe@ridge.co.uk

VERSION	DATE	DESCRIPTION	CREATED BY	REVIEWED BY
1.0	15.03.23	Planning Issue	L McCabe	P Barrett
1.1	16.03.23	Revised Planning Issue	L McCabe	P Barrett

[illegible]

CONTENTS

1. EXECUTIVE SUMMARY	4
2. INTRODUCTION	6
3. DEVELOPMENT DESCRIPTION AND LOCATION	7
3.1. Site Location	7
3.2. Existing Site Description	7
3.3. Development Proposals	8
4. PLANNING POLICY AND CONSULTATION	9
4.1. Planning Policy Framework	9
4.2. Strategic Flood Risk Assessment (SFRA)	9
4.3. Statutory Authority Correspondence	10
5. DEFINITION OF FLOOD HAZARD	11
5.1. Sources of Information	11
5.2. Flooding from Rivers (Fluvial)	11
5.3. Flooding From Land (Overland Flow)	12
5.4. Flooding from Sewers and Private Drainage	13
5.5. Flooding from Artificial Sources	14
6. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)	15
6.1. Summary	15
7. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)	16
7.1. Flooding from the River Irwell	16
8. CONTRACTOR OUTLINE EMERGENCY PLANNING STATEMENT	17
8.1. Fluvial Flood Risk Assessment	17
8.2. Flood Duration	17
8.3. Environment Agency Services	17
8.4. Safe Access and Egress	17
8.5. Reoccupation of the Site	18
9. OUTLINE DRAINAGE STRATEGY	19
10. MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK	20
10.1. Flood Risk Management Measures	20
10.2. Off Site Impacts	20
10.3. Residual Risk	21

1. EXECUTIVE SUMMARY

We set out below a summary update:

The proposal is for the construction of a City Centre Campus, providing facilities for film, performing arts and media studies students, on land off Trinity Way, Manchester.

The information from the Environment Agency Indicative Flood Maps has determined that the site is located within medium risk Flood Zone 2, i.e. land defined as having between a 1 in 100 and 1 in 1000 annual probability of flooding in any one year (1% - 0.1%). This is due to the surcharging of the adjacent River Irwell. Therefore, to address the requirements of the National Planning Policy Framework (NPPF) a Flood Risk Assessment is appropriate. The site has been assessed against the NPPF 'Sequential Test'. Taking into consideration that the application is for a College Campus in Flood Zone 2, Tables 1, 2 & 3 of the NPPF Technical Guidance have been appraised to confirm that the development is 'Appropriate'. The 'Exception Test' is consequently not required. However, a full assessment of flood risk is still required. The site is found to be at low risk of flooding from all other sources.

Environment Agency (EA) Flood Data confirmed that the modelled water level of the River Irwell for the undefended 1 in 1000-year event is 30.460mAOD. When reviewing this level against the site topographical survey it is evident that the majority of the site is currently below this level, with only the southeast corner above. Consultation with the EA, LLFA and LPA have confirmed that setting the minimum finished floor level (FFL) at the 100-year + 35% CC Flood level (28.160mAOD) plus 600mm freeboard would comply with the requirements of NPPF; this equates to a FFL of 28.760mAOD. To ensure that all entrances to the site tie-in with the surrounding existing levels a minimum FFL for this development will be set at **30.000 AOD**.

During the extreme flood events a safe dry access route is assured to the south and east of the development site. Safe access for the Emergency Services and egress for the occupiers is assured for higher order storm events up to and including the 1000-year event due to the increased ground levels to these sides. Although the FFL of the building is being raised, it is still some 0.66m below the 1 in 1000 year flood level and at a continued risk of flooding. Therefore, flood resilient mitigation measures will be followed during the detailed design and construction phases; this will be discussed further in Section 6.

The site is currently used as a car park and is predominantly surfaced with tarmac. After production of the Phase 1 masterplan FRA, consent was obtained directly with United Utilities for a surface water discharge into the combined sewer network at a rate of 15 l/s. As a result of this discharge agreement with United Utilities, it is proposed that this will remain unaltered and the whole site (Phase 1 and Phase 2) will continue to discharge at a maximum rate of 15 l/s. Attenuation in the form of a geocellular tank was installed as part of Phase 1 with additional capacity to allow for surface water runoff from Phase 2.

There is no residual flood risk from the development site to the surrounding district due to the restricted discharge rates. Therefore, the development does not increase the risk of flooding to other adjacent neighbourhoods.

Foul water generated by the Phase 2 development will be discharged into the as built Phase 1 foul network. The Phase 2 additional foul flows fall within the unrestricted outflow agreement for foul discharge with United Utilities. The foul discharge does not present an increased flood risk to the surrounding district.

2. INTRODUCTION

Ridge and Partners have been appointed by Manchester College to prepare this Flood Risk Assessment to support a planning submission for Phase 2 of the new City Centre Campus, providing facilities for film, performing arts and media studies students. The assessment has been undertaken in line with the new 'National Planning Policy Framework' (NPPF), plus the accompanying 'Flood Risk and Coastal Change' chapter of the National Planning Practice Guidance.

This Flood Risk Assessment (FRA) has been commissioned by Manchester College and is specific to their interests in the development proposals as described by the Architectural plan in Appendix A. This report may not be assigned.

The report has been commissioned to identify any flood related issues associated with the proposed development and any likely constraints that could be imposed plus to consider the drainage strategy for it. The following issues have been suggested by the Environment Agency (EA) & Manchester City Council (MCC) and subsequently addressed within this report:

- Identify available data relating to flood risk at the site.
- Determine whether the site is at risk from flooding from all sources, including from breach or overtopping of any existing flood defences, surface water flooding and/or groundwater flooding.
- Consider the flood risk from all other sources.
- Determine the current surface water drainage regime and assess any potential increase in surface water runoff as a result of the proposed development.
- Discuss Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk.
- Devise an appropriate outline surface water drainage strategy (including calculation where appropriate) to deal with any potential increase in surface water runoff and include for climate change.
- Consider the recommendations of the Manchester City Council Strategic Flood Risk Assessment (SFRA).
- Assess mitigation measures & off-site impacts and define any residual risks.

3. DEVELOPMENT DESCRIPTION AND LOCATION

3.1. Site Location

The site is referenced in Table 1, and a site location map is provided in Appendix A.

Table 1: Site Referencing Information

Item	Brief Description
Site name	The Manchester College, City Centre Campus
Site address and location	The Manchester College, City Centre Campus, Great Ducie Street, Manchester M3 1LT
Council Area	Manchester City Council
Approximate Grid Reference	OS: 383804, 399220
General Locality	The site is situated in the north of the City Centre, to the north of Manchester Arena, adjacent to the inner ring road.

3.2. Existing Site Description

The site currently comprises of tarmac car parking, bike storage and soft landscaping.

The site is bound to the south by Trinity Way, beyond which is the Manchester Arena. Great Ducie Street is located to the west, with further car parking and Dutton Street situated to the east. There is also a large retaining wall to the east of the site. A Travelodge borders the site to the north.

The River Irwell lies approximately 175m to the west and flows in a southerly direction through Manchester City Centre, before turning west and merging with the River Mersey.

Figure 1 below identifies the overall site location details. Further details of the existing layout can be seen on the Topographical Survey in Appendix B. Topographical information indicates that the site levels generally range between 29.000m AOD and 30.000m AOD.

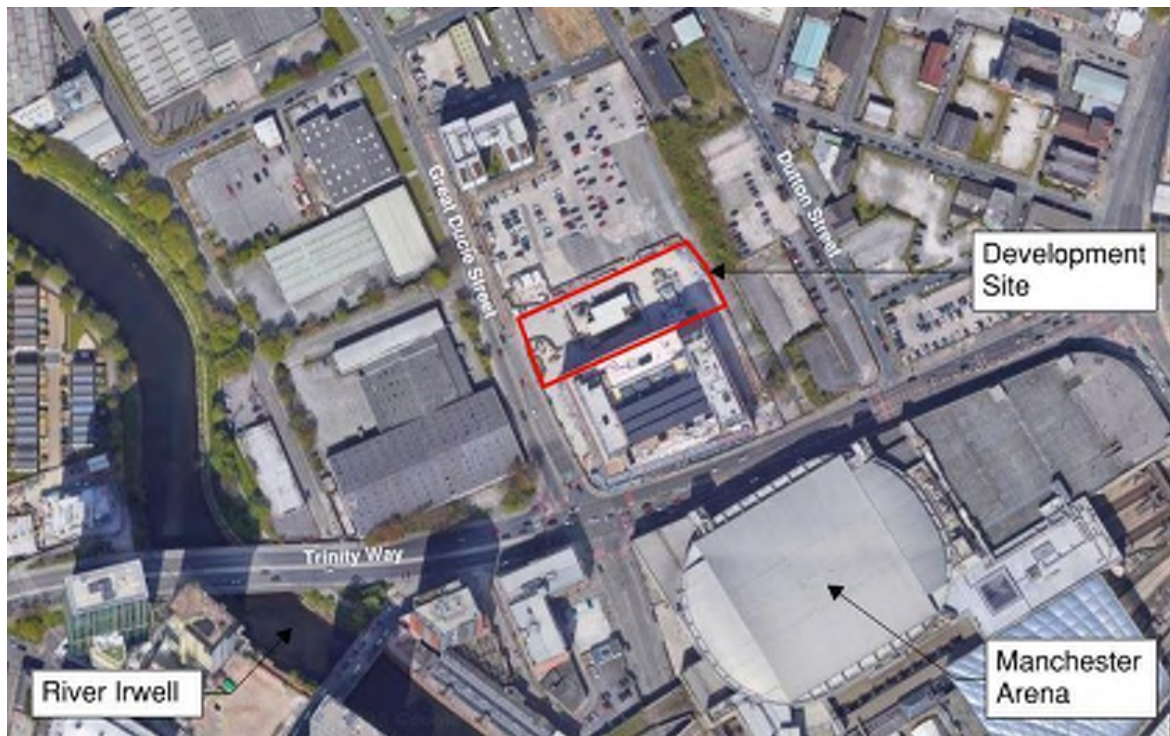


Figure 1: Site Location

3.3. Development Proposals

As discussed in the earlier sections, the report is prepared to support a planning application for Phase 2 of the development of a City Centre Campus for Manchester College, providing facilities specifically for Film, Media and Performing Arts students.

The outline Site Layout and Ground Floor Layout as indicated in Appendix A provides details of the proposed development intent.

4. PLANNING POLICY AND CONSULTATION

4.1. Planning Policy Framework

The flood maps provided by the Environment Agency (EA) locate the site within Flood Zone 2, i.e. land defined as having between a 1 in 100 and 1 in 1000 annual probability of flooding in any one year (1% - 0.1%). As a requirement of the NPPF (2022), Annex D, the proposed development has to satisfy the requirements of the Sequential Test and where applicable the Exception Test.

Sequential Test:

Under the NPPF (2022), Zone 2 is defined as medium probability flood risk. The proposal is for a new teaching facility, which in line with Annex 3 is classified as 'More Vulnerable'.

Placing both these criteria into Table 2 (Flood Risk Vulnerability and Flood Zone 'Incompatibility'), More Vulnerable development in Flood Zone 2 determines that 'Development is Appropriate'.

Exception Test:

As the Sequential test is passed, the Exception test is therefore not required.

4.2. Strategic Flood Risk Assessment (SFRA)

SFRA's assess the risk associated with all types of flooding and provide the information required to identify the amount of development permitted in an area; how drainage systems in the area should function and also how risks in vulnerable areas can be reduced and/or mitigated. The NPPF states that regional planning bodies (RPB's) or local planning authorities should prepare SFRA's in consultation with the EA.

In May 2009 JBA Consulting were commissioned by Manchester City, Salford City and Trafford (MST) Councils to update a Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) for the area, following on from the Greater Manchester Sub-Regional SFRA completed in August 2008. The purpose of the SFRA is to assess and map all known sources of flood risk including fluvial, surface water, sewer, groundwater and all impounded water bodies, taking into account future climate change predictions.

A summary of the main elements from the SFRA associated with the development sites are detailed below. The full report can be obtained from the Manchester City Council website.

- SFRA provides a detailed understanding of flood risks across the borough from all sources.
- Development should aim to deliver greenfield runoff rates on greenfield sites up to a 1 in 100 year storm event, considering climate change.
- Development should be designed so that there is no flooding to the development in a 1 in 30 year event and so that there is no property flooding in a 1 in 100 year plus climate change event.
- For all sites, development proposals should look at opportunities to incorporate SuDS to reduce the risk of surface water flooding.

- All proposed developments must ensure that foul and surface water are kept separate.

4.3. Statutory Authority Correspondence

Anne Ball, Customer and Engagement Officer from the Environment Agency (EA), confirmed that they have no records of flooding affecting the site. However, Manchester Council and United Utilities may hold further information on non-fluvial flood events affecting the site. The EA also provided the most up-to-date flood modelling data for the River Irwell to the west of the site. See Appendix E for further details.

Sandrine Thomas, Flood Risk Officer Flood and Coastal Risk Management for the Environment Agency confirmed that they would accept a minimum FFL of the 100year + 35% Climate Change level plus 600mm freeboard.

Easter Ainsworth, Flood Risk Management Officer for Manchester City Council confirmed that raising the FFL in accordance with EA advice is acceptable, and any FFL should be set at or above 28.760mAOD. It was also confirmed that ground levels over the rest of the site must not be raised to ensure there is no increased risk of flooding to others.

5. DEFINITION OF FLOOD HAZARD

5.1. Sources of Information

The NPPF requires the developer to consider the impact of runoff generated by the proposed development onto the downstream catchment, and to assess the risk of runoff from the surrounding district impacting on the development footprint. Further, the report is to consider flood risk from all other sources. The following section defines the flood risk receptors and anticipated flood risk. Section 5 then discusses in further detail the probability of flooding and the likely impacts.

Table 2: Sources of information used in the identification of flood risk

Source of Information	Details
Environment Agency	Indicative Flood Maps and Modelled Flood Data for the River Irwell.
United Utilities	Sewer Records
Historic Maps	From various websites

5.2. Flooding from Rivers (Fluvial)

The River Irwell lies approximately 175m to the west of the site, flowing in a southerly direction.

Figure 2 below locates the site on the Environment Agency's indicative floodplain map. It is clear from this that the red line boundary sits within medium risk Flood Zone 2 i.e. land defined as having between a 1 in 100 and 1 in 1000 annual probability of flooding in any one year (1% - 0.1%). Therefore, the site is at medium risk of fluvial flooding. Section 6 of this report will assess this in more detail.

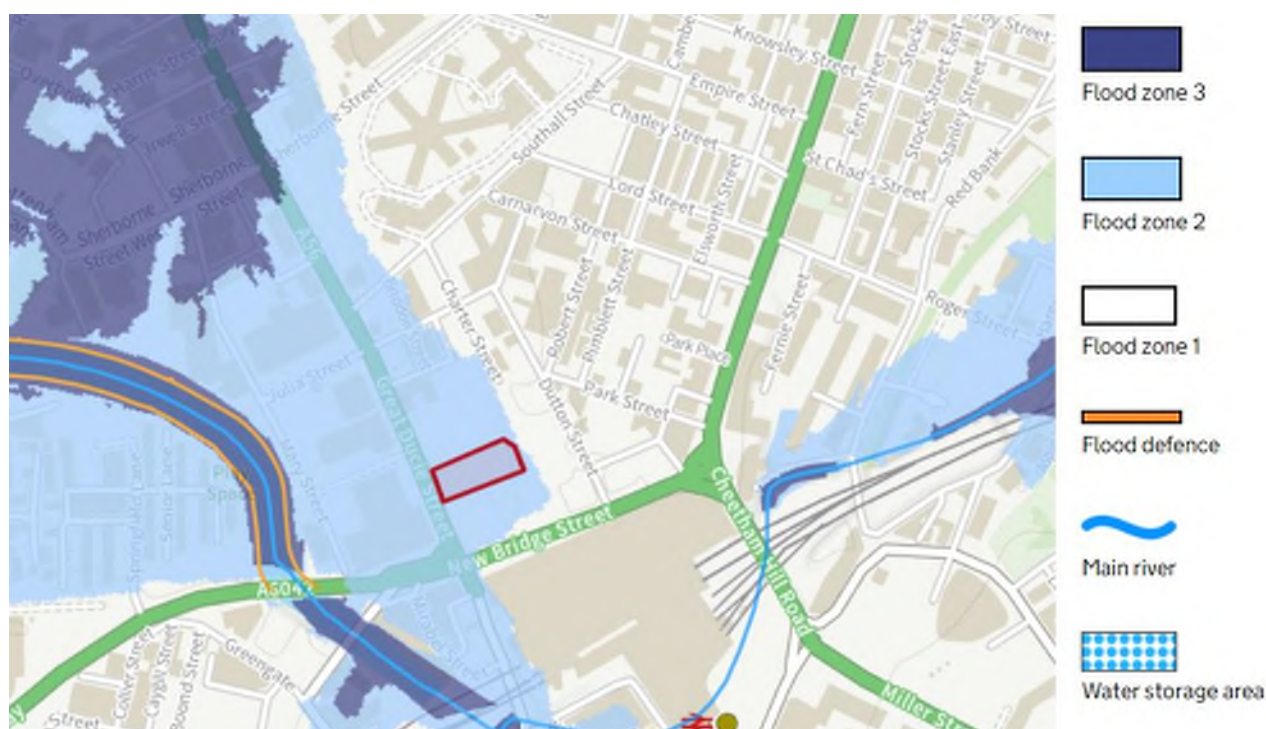


Figure 2 – The EA's Indicative 100-year Floodplain Map

5.3. Flooding From Land (Overland Flow)

The site is relatively flat with a localised high point in the southeast. There are existing gullies on the site that direct any surface water runoff into the existing drainage system and convey water away from the site. Any surface water runoff from the surrounding area will be intercepted by surrounding network of highway drainage and conveyed away from the site.

A review of the Environment Agency Surface Water Flood Risk maps indicates that the site is predominantly at low risk of surface water flooding and there are no surface water flow routes through the site. However, there is a small area of medium/high risk in the southwest of the site associated with a localised topographical low point (see Figure 3 below). The proposed building will remove this low point due to the raising of levels and new surface water drainage system will follow best practice guidance to ensure there is no risk of surface water ponding.

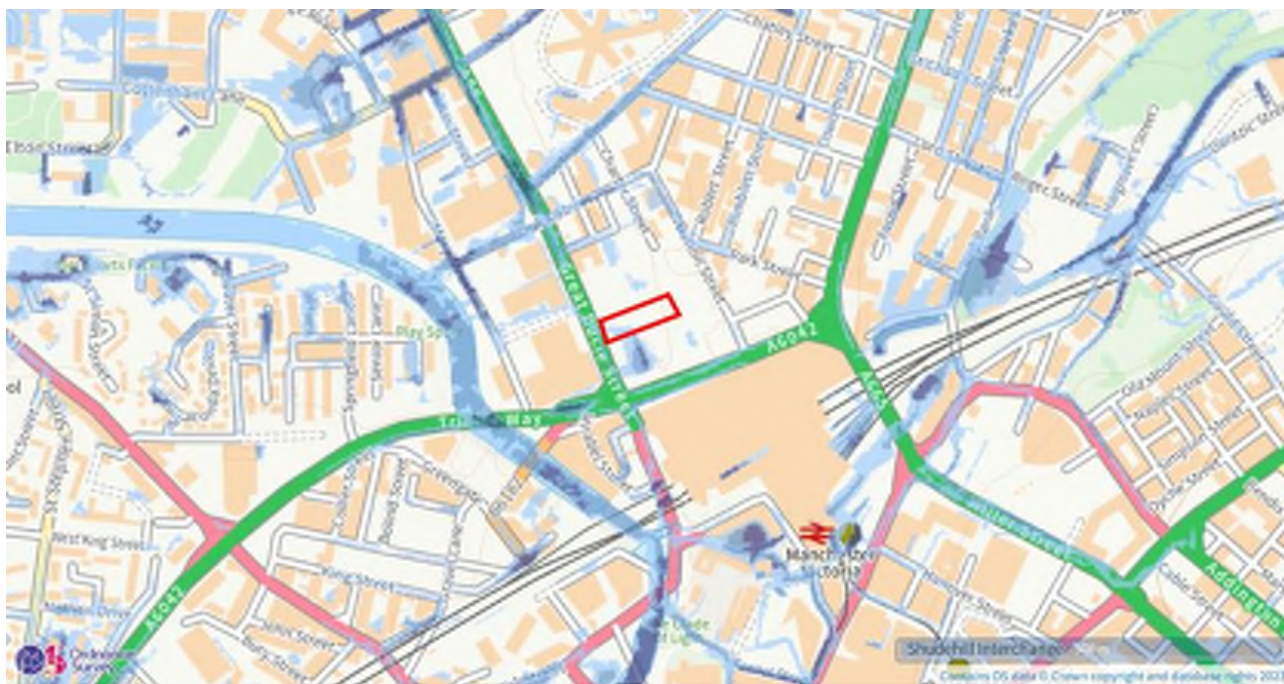


Figure 3 – The EA's Indicative Surface Water Flood Map

5.4. Flooding from Sewers and Private Drainage

The United Utilities (UU) sewer records have been reviewed and confirm that there are two combined sewers in Great Ducie Street to the west, namely a 600X600mm BR and 1000mm BR. There is also a 375mm diameter combined sewer in Trinity Way to the south, which becomes 650x650mm to the southwest of the site. An extract of the sewer records is shown in Figure 4 below.

Although there are no UU sewers on the site, the previous drainage system from the former Boddingtons Brewery may still exist with gullies and manholes shown on the topographical survey, and which are assumed to connect into the combined sewers in the surrounding highways.

The extensive UU adopted drainage network serving the surrounding urban district ensures that the development footprint is protected from the impact of both upstream and downstream runoff. It is speculated that complete protection may well exist beyond a storm event equivalent to the 30-year statistical event. Beyond this projection, there may be a small degree of peripheral 'Exceedance' flooding within the highway areas above the sewers. However, this is expected to be localised and restricted to the location of specific manhole covers located outside the development footprint.

Thus flood risk to the site from sewers is diminished to acceptable levels.



Figure 4 – The EA's Indicative Surface Water Flood

The British Geological Survey mapping indicates that the superficial geology of the site is comprised of Glacial Till. The bedrock geology of the site is the Chester Formation. The bedrock geology of the site is classified as a Principal Aquifer and are layers of rock or drift deposits that have high intergranular and/or fracture permeability, meaning they usually provide a high level of water storage. They may support water supply and/or river base flow at a strategic scale.

Based on the available information, the site is deemed to have a low susceptibility to groundwater flooding.

5.5. Flooding from Artificial Sources

The EA flood maps indicate that the north and northwest of the site are within an area that could be affected by reservoir flooding. These maps represent a worst-case scenario. Therefore, the risk of flooding from artificial sources is deemed to be low.

6. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)

6.1. Summary

Section 4 has defined the anticipated flood risks from all sources. Table 3 below considers each of the sources and defines in tabular format the Probability of Flood Risk associated to each and the likely impacts.

Below is a table summary of the flood risks associated with the development site. *Table 3 – Flood Risk Summary*

Source	Flood Risk	Likely Impacts	Remarks
Tidal	Low	Low	Site not tidally influenced.
Fluvial (Watercourse)	Medium	Medium (with mitigation measures)	EA flood data shows that the site is within Flood Zone 2. A minimum FFL has been set and mitigation measures proposed.
Surface (Overland Flood Flow)	Low	Low	EA maps show that the site is predominantly at low risk of surface water flooding.
Sewers	Low	Low	Public sewers are not located within the boundary.
Groundwater	Low	Low	No indication through SFRA or local borehole records that site at risk of groundwater flooding.
Artificial Sources	Low	Low	No artificial sources in close proximity to the site.

7. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)

7.1. Flooding from the River Irwell

It is evident from the EA flood zone maps that the cause of any potential flooding to the site can be attributed to the adjacent River Irwell. As discussed in previous sections, the EA maps suggest the development site could lie within the current statistical fluvial floodwater model footprint generated for the River Irwell during the 1000-year flood event (0.1% probability of occurrence).

Environment Agency Flood Data (table 4 below) details the modelled flood levels for the River Irwell, located to the west of the site.

Table 4 – Environment Agency modelled flood levels River Irwell

Return Period	Flood Level (mAOD)
100yr	26.570
100yr + 35% CC	28.160
1000yr	30.460

From the existing ground levels indicated on the topographical survey, it is evident that the site lies outside of the influence of the 100-year + 35% CC event. However, when comparing the 1000-year flood levels with existing ground levels on the the topographical survey, it can be determined that the majority of the site is below the level of this event.

Consultation with the EA have confirmed that setting the minimum finished floor level (FFL) at the 100-year + 35% CC Flood level (28.160mAOD) plus 600mm freeboard would comply with the requirements of NPPF; this equates to a FFL of 28.760mAOD. To ensure that all entrances to the site tie-in with the surrounding existing levels a minimum FFL for this development will be set at **30.000m AOD**. Furthermore, there is no habitable accommodation situated on the ground floor of the development, ensuring all users are situated on higher ground in case of an emergency.

As the building FFL is at a lower level than the 1 in 1000 year flood event, additional protection measures are required to protect the building and such measures that should be considered, among others, are as follows:

1. Power sockets and incoming service points to be raised above the extreme flood level and as high as reasonably practicable.
2. Electrical equipment e.g. stage equipment will be fed from high level supplies above the extreme flood level.
3. Blockwork walls and stud partitions will be protected with water resilient finishes.

Consideration to be given to lining ground floor levels as high as reasonably practical.

8. CONTRACTOR OUTLINE EMERGENCY PLANNING STATEMENT

8.1. Fluvial Flood Risk Assessment

Manchester Planning Guidance asks that for all Flood Risk Assessments where the site is found to be in Flood Zone 2 or 3 that an Emergency Planning Statement outlining flood warning and evacuation measures be included.

The minimum FFL of the Manchester College City Centre Campus has been set at 29.800mAOD, therefore the building has a continued risk of flooding.

8.2. Flood Duration

Once the peak flood has passed the area could remain affected by flooding for up to several days, depending upon the nature of the event. Flood waters would leave the site via the site drainage network, drainage networks in the surrounding area, soaking into the ground and running over land into the River Irwell to the west.

8.3. Environment Agency Services

The Environment Agency operates a free flood warning service which provides warnings by phone, email or text when specific areas are at risk of flooding. The service can be signed up to online through links at <https://www.gov.uk/sign-up-for-flood-warnings> or by calling the Environment Agency Floodline service on 0345 988 1188.

There is an Environment Agency Flood Warning system for the River Irwell which would give an indication of when flooding may be likely to occur in the area around the site. Although users are unlikely to need to leave the site, such information may prove useful should site users consider the need to journey within the wider area at times of wider area flooding. Current information and a three-day forecast can be found through links at <https://www.gov.uk/check-flood-risk>.

The Environment Agency have also published information on how to make a flood plan and get support during and after a flood event. A full and detailed flood evacuation plan and strategy will be prepared and provided to the future Staff in advance of occupation of the new development.

8.4. Safe Access and Egress

The Environment Agency Flood Zone Map (Figure 2) shows dry access/egress along Trinity Way to the south of the site can be provided during the 100 year + CC and 1000 year events and along Great Ducie Street to the west during the 100 year + CC.

If immediate flooding is forecast and the opportunity to safely evacuate is gone then the occupants must ensure they remain/move to the higher levels in the building and either await rescue if necessary or wait until the flood levels recede.

It is recommended that a flood plan following the Environment Agency guidelines.

(<https://www.gov.uk/prepare-for-flooding/future-flooding>) is developed for the site and, both staff

and pupils are made aware of the procedures for safe evacuation during a fluvial flood event should this ever prove necessary.

Occupants should not wade through flood water to escape the area; there can be hidden dangers such as dislodged manhole covers and health issues from polluted water.

During a serious and widespread event when large numbers of people require rescue, it could take several hours for the building to be evacuated; priority will be given to rescuing vulnerable people first.

8.5. Reoccupation of the Site

Reoccupation of the building will be a decision taken by the key stake holders such as the emergency services, Manchester CC and the Environment Agency.

Key checks will be carried out to establish whether there is any damage to power supply etc. If all the checks confirm that there has been no damage to the building infrastructure and the flood incident has now passed, the building will be reopened.

Restoration of services shall commence at the earliest opportunity subject to all requirements regarding health and safety being met.

9. OUTLINE DRAINAGE STRATEGY

Refer to Manchester College Phase 2 Drainage Strategy Report ref. CCPH2-ACM-Z0-XX-RP-5202 prepared by AECOM.

10. MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK

10.1. Flood Risk Management Measures

The report has found the site to be at low risk of flooding from most sources. The risk of fluvial flooding discussed further in sections 4 and 6 of the report and has confirmed that by raising levels of the new building and flood resilient design and construction, the flood risk is diminished to acceptable levels.

The surface water drainage strategy for the new development site will be to discharge surface water into the as built Phase 1 surface water network. Attenuation has been installed during Phase 1 in the form of geocellular storage, with additional capacity to accommodate surface water flows from Phase 2. The new surface water networks will be designed in line with current British Standard and SSG Design and Construction Guidance up to the 100-year storm return period including an allowance for climate change.

The use of SuDS in the form of Prevention and Site Control measures, with controlled (restricted) outflow, in line with the required reduction in runoff rates, will help to minimise the flood risk impact to the surrounding sewer networks.

There will be a site management health and safety document prepared in respect of the final development. This will include the required maintenance regime for the on-site drains and drainage facilities such as the channels, gullies, pipes, manholes and all SUDS facilities.

A management company will be responsible for site cleanliness, gully emptying and drain cleansing to ensure that the surface water drainage system will always operate at its maximum efficiency.

Should any flooding occur from the new sewers and drains it will be directed away from the building to external areas and soft landscaping areas.

10.2. Off Site Impacts

Up to and including the 100-year plus increase in rainfall allowance due to climate change (CC) event, the report has justified that there is no risk of flooding.

The development footprint does not cross or cover any existing or declared future catchment flood defences. Consequently, the Applicant does not propose to augment or compromise any existing catchment defences.

Surface water runoff will reduce from the pre-development regime and utilises SuDS solutions to satisfy the site constraints.

By reducing the pre-development peak runoff at its point of discharge by the inclusion of SuDS, this will reduce surface water flooding impact onto the downstream sewer network.

As there is no flood displacement or increased rate of runoff as part of this proposal into the adjacent sewers, the proposed development will therefore not increase flood risk onto its locality.

10.3. Residual Risk

With careful design of the drainage elements as described above there will be no residual flood related risks that will remain after the development has been completed.

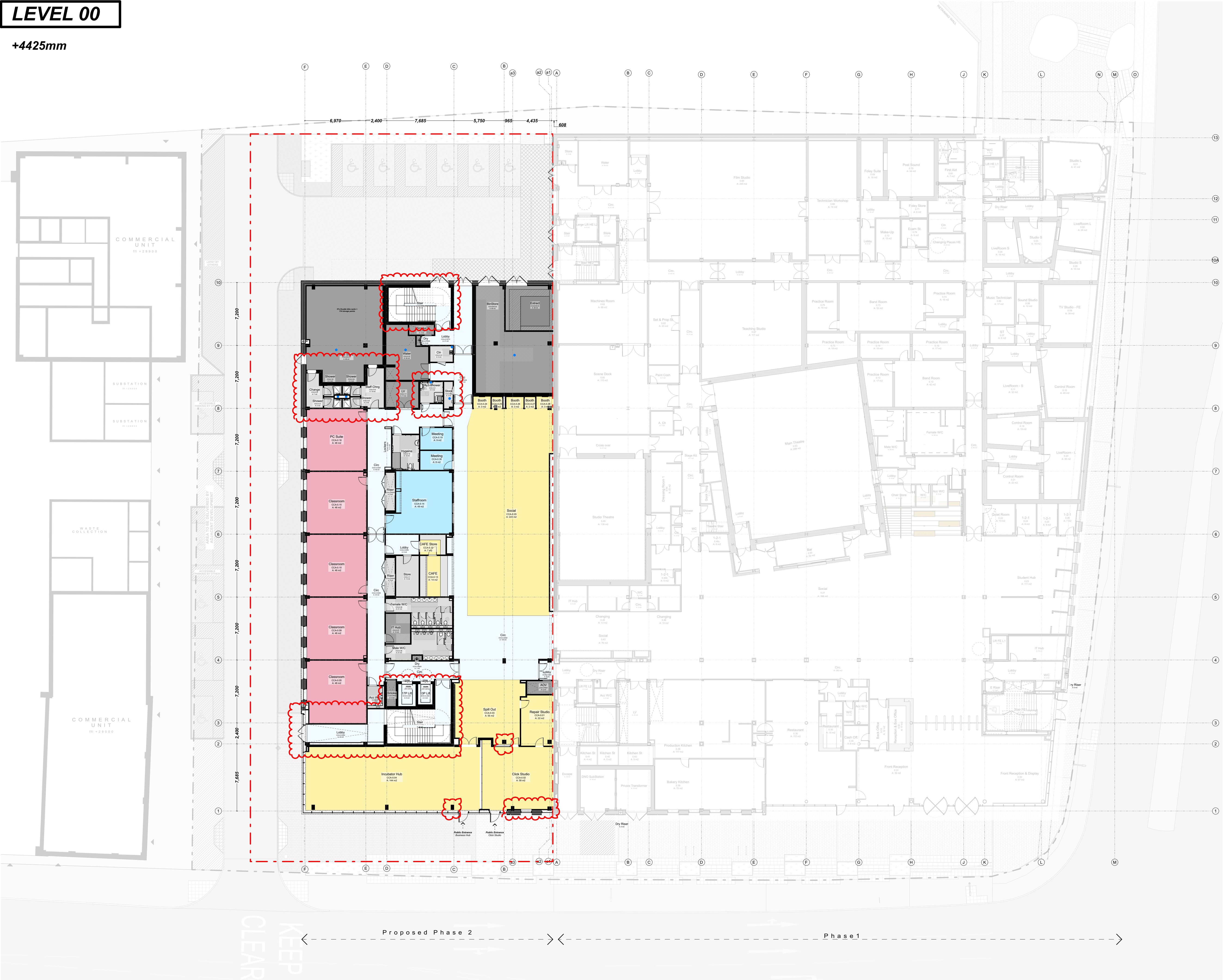
Flood risk to people and property can be managed but it can never be completely removed; a residual risk remains after flood management or mitigation measures have been put in place. A residual risk of flooding to the site remains during the 1000-year flood event.

The only other known flood related risk that will remain will be the risk of out of manhole flooding within both the existing private and public sewer network beyond the 30 year design criterion. Should exceedance occur, out of chamber flood water will be directed to the external hard standing areas and roads but will not be a flood risk generator.

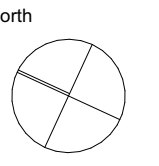
APPENDIX A – ARCHITECTURAL SITE LAYOUT

LEVEL 00

+4425mm



This document is © Bond Bryan Architects Ltd. & © SimpsonHaugh and Partners. If in doubt ASK. Drawing measurements shall not be obtained by scaling. Verify all dimensions prior to construction. Immediately report any discrepancies on this document to the Originator. This document shall be read in conjunction with associated models, specifications and related consultant's documents.



Notes

P08	General Updates as shown; including changes to cycle store & new changing provision. GL A3 relocated.	RM	RM	27.01.23
P07	Stage 3 Submission	TP	RM	18.11.22
P06	General updates following college review for Stage 3. Core 1 toilets updated to traditional M/F	RM	JW	24/10/22
P05	SmokeShaft updated with additional General layout changes including riser positions following DT comments	RM	JW	22/03/22
P04	Core's layouts updated & additional plant added. General layout changes	RM	JW	09/02/22
P03	General update	RM	JW	13/01/22
P02	CW updated to remove entrance and provide future flexibility	RM	JW	16/12/21
P01	First Issue - draft submission	RM	JW	30/10/21

rev	description	drawn	checked	date
-----	-------------	-------	---------	------

BOND BRYAN

The Church Studio Springvale Road Sheffield S10 1LP

t 0114 266 2040

e TMC-City@bondbryan.co.uk

w www.bondbryan.co.uk

City Centre Phase 2
City Centre Site

The Manchester College

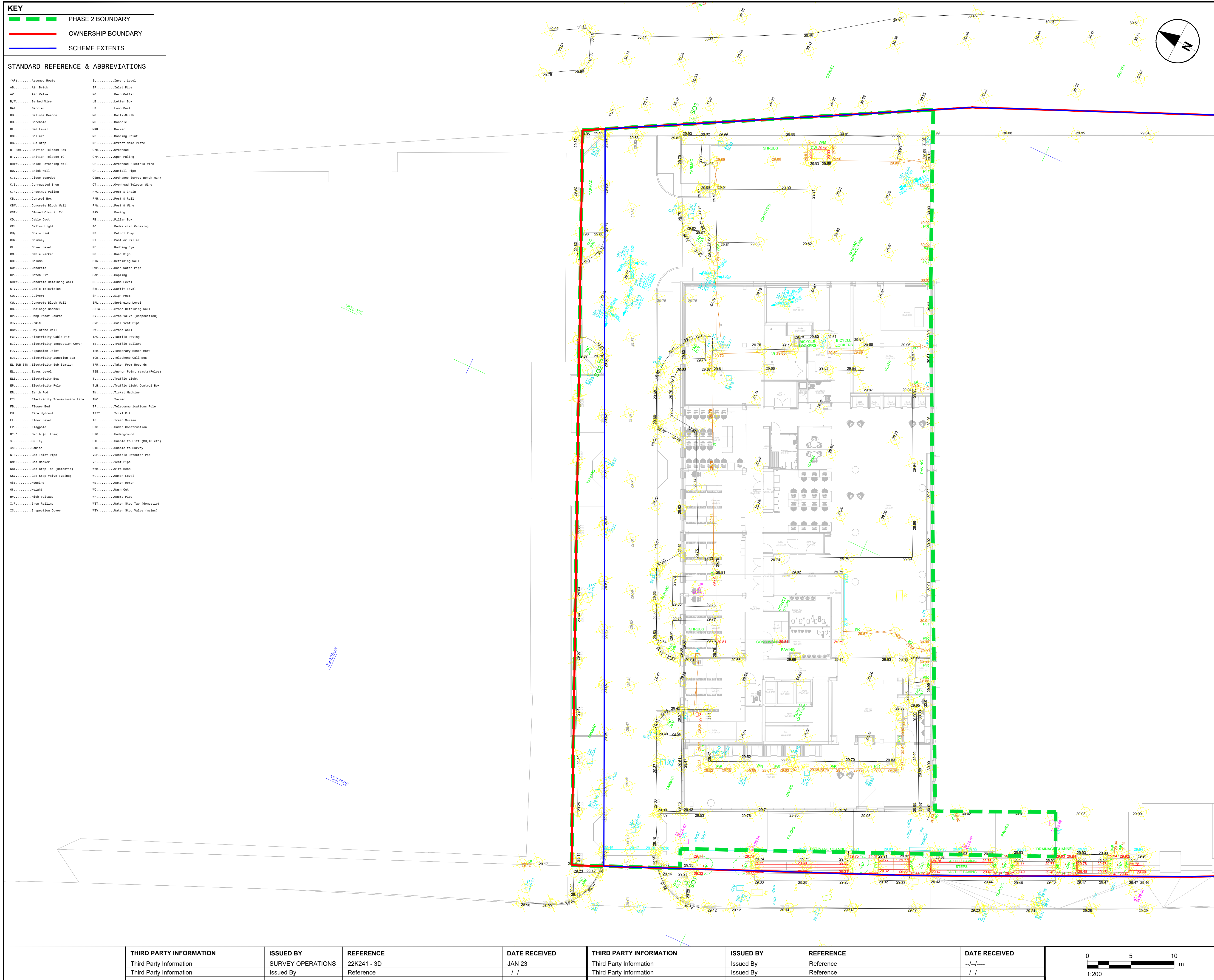
The Manchester College

UCEN

GROUND FLOOR CAMPUS GA PLAN

project	originator	volume	level	type	role	number
CCPH2	BBA	ZZ	00	DR	A	2001
Originator project ref	21187	Purpose of Issue:	DESIGN	scale(s)	status :	S4
1:200	SUITABLE FOR STAGE	APPROVAL	revision :	P08	PRELIMINARY	
original paper size	A1					

APPENDIX B – TOPOGRAPHICAL SURVEY



APPENDIX C – ENVIRONMENT AGENCY FLOOD DATA

Flood risk assessments: Climate change allowances

Application of the allowances and local considerations

Greater Manchester, Merseyside & Cheshire

1) The climate change allowances

The [National Planning Practice Guidance](#) refers planners, developers and advisors to the Environment Agency guidance on considering climate change in Flood Risk Assessments (FRAs). This guidance was updated in February 2016 and is available on [Gov.uk](#) and should be read in conjunction with this document. The guidance can be used for planning applications, local plans, neighbourhood plans and other projects. It provides climate change allowances for peak river flow, peak rainfall, sea level rise, wind speed and wave height. The guidance provides a range of allowances to assess fluvial flooding, rather than a single national allowance. It advises on what allowances to use for assessment based on vulnerability classification, flood zone and development lifetime.

2) Assessment of climate change impacts on fluvial flooding

Table A below indicates the level of technical assessment of climate change impacts on fluvial flooding appropriate for new developments depending on their scale and location. This should be used as **a guide only**. Ultimately, the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. **For these reasons we recommend that applicants and / or their consultants should contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis.** **Table A** defines three possible approaches to account for flood risk impacts due to climate change, in new development proposals:

- **Basic:** Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts. The allowance should be derived and agreed locally by Environment Agency teams.
- **Intermediate:** Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- **Detailed:** Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

Table A – Indicative guide to assessment approach

VULNERABILITY CLASSIFICATION	FLOOD ZONE	DEVELOPMENT TYPE		
		MINOR	SMALL-MAJOR	LARGE-MAJOR
ESSENTIAL INFRASTRUCTURE	Zone 2	Detailed		
	Zone 3a	Detailed		
	Zone 3b	Detailed		
HIGHLY VULNERABLE	Zone 2	Intermediate/ Basic	Intermediate/ Basic	Detailed
	Zone 3a	Not appropriate development		
	Zone 3b	Not appropriate development		
MORE VULNERABLE	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Detailed	Detailed
	Zone 3b	Not appropriate development		
LESS VULNERABLE	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Basic	Detailed
	Zone 3b	Not appropriate development		
WATER COMPATIBLE	Zone 2	None		
	Zone 3a	Intermediate/ Basic		
	Zone 3b	Detailed		

NOTES:

- Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches
- Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches
- Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non residential building or development over 1000 sq m.

The assessment approach should be agreed with the Environment Agency as part of pre-planning application discussions to avoid abortive work.

3) Specific local considerations

Where the Environment Agency and the applicant and / or their consultant has agreed that a 'basic' level of assessment is appropriate the figures in Table B below can be used as a precautionary allowance for potential climate change impacts on peak 'design' (i.e. 1% annual probability) fluvial flood level rather than undertaking detailed modelling.

Table B – Local precautionary allowances for potential climate change impacts

Watercourse	Central	Higher Central	Upper
All	0.15m	0.24m	0.48m

Use of these allowances will only be accepted after discussion with the Environment Agency.

4) Fluvial food risk mitigation

Read the guidance on [Gov.uk](https://www.gov.uk) to find out which allowances to use to **assess** the impact of climate change on flood risk.

For planning consultations where we are a statutory consultee and our [Flood risk standing advice](#) **does not** apply we use the following benchmarks to inform flood risk **mitigation** for different vulnerability classifications. **These are a guide only. We strongly recommend you contact us at the pre-planning application stage to confirm this on a case by case basis. Please note you may be charged for this advice.** For planning consultations where we are not a statutory consultee or our [Flood risk Standing advice](#) applies we recommend local planning authorities and developers use these benchmarks but we do not expect to be consulted.

- For development classed as '[Essential Infrastructure](#)' our benchmark for flood risk mitigation is for it to be designed to the '**upper end**' climate change allowance for the epoch that most closely represents the lifetime of the development, including decommissioning.
- For [highly vulnerable](#) in flood zone 2, the '**higher central**' climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **upper end** allowance.
- For [more vulnerable developments](#) in flood zone 2, the '**central**' climate change allowance is our minimum benchmark for flood risk mitigation, and in flood zone 3 the '**higher central**' climate change allowance is our minimum benchmark for flood risk

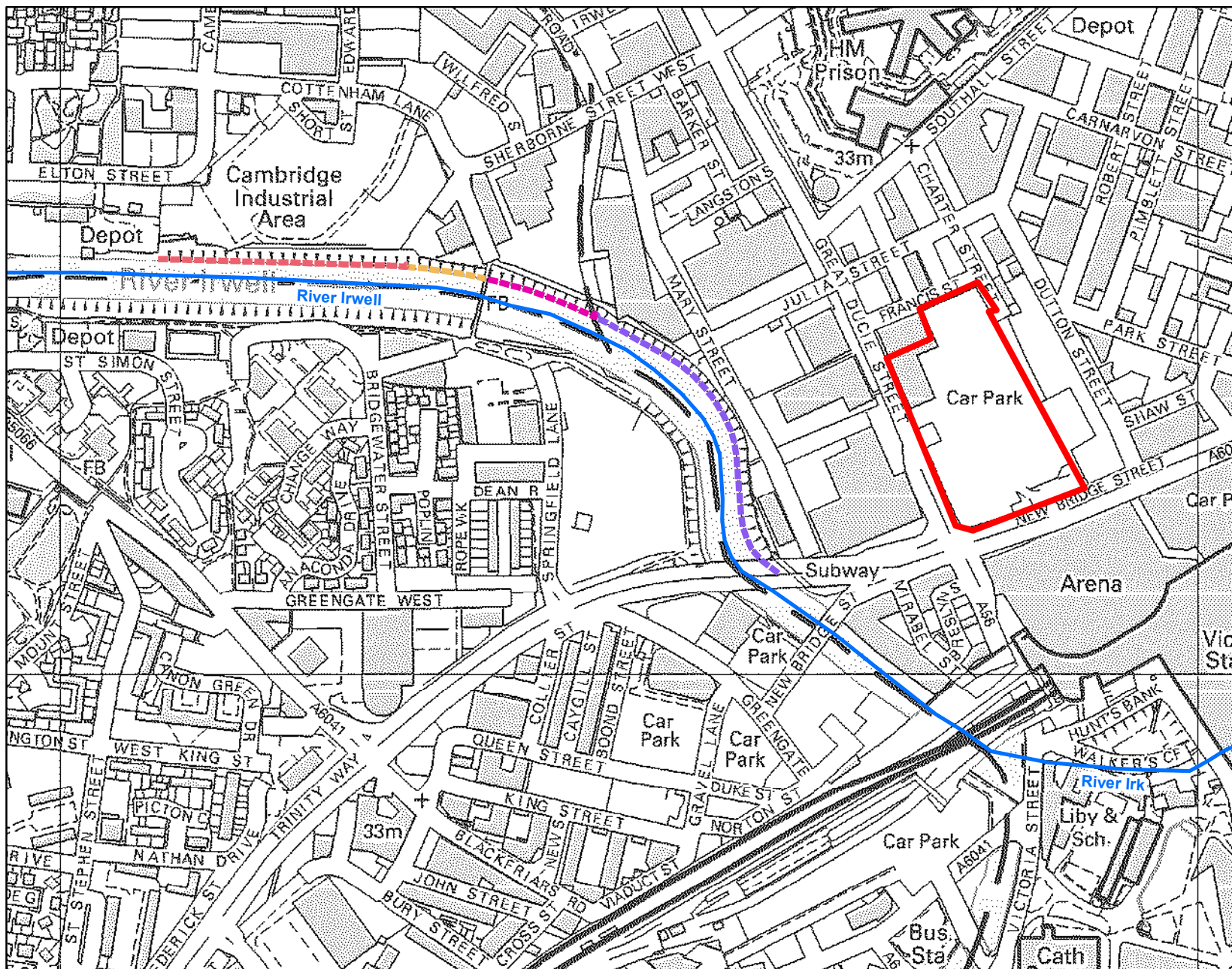
mitigation. In sensitive locations it may be necessary to use the **higher central** (in flood zone 2) and the **upper end** allowance (in flood zone 3).

- For [water compatible](#) or [less vulnerable](#) development (e.g. commercial), the 'central' climate change allowance for the epoch that most closely represents the lifetime of the development is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (particularly in flood zone 3) to inform built in resilience.

There may be circumstances where local evidence supports the use of other data or allowances. Where you think this is the case we may want to check this data and how you propose to use it.

END.

Flood Defence Map centred on Trinity Way, Manchester, M3 1AR. Created 11/03/2019 [GMMC119011BF]



1:5,000



Legend

Site Location

Defences (EA maintained)

Asset ID

88831

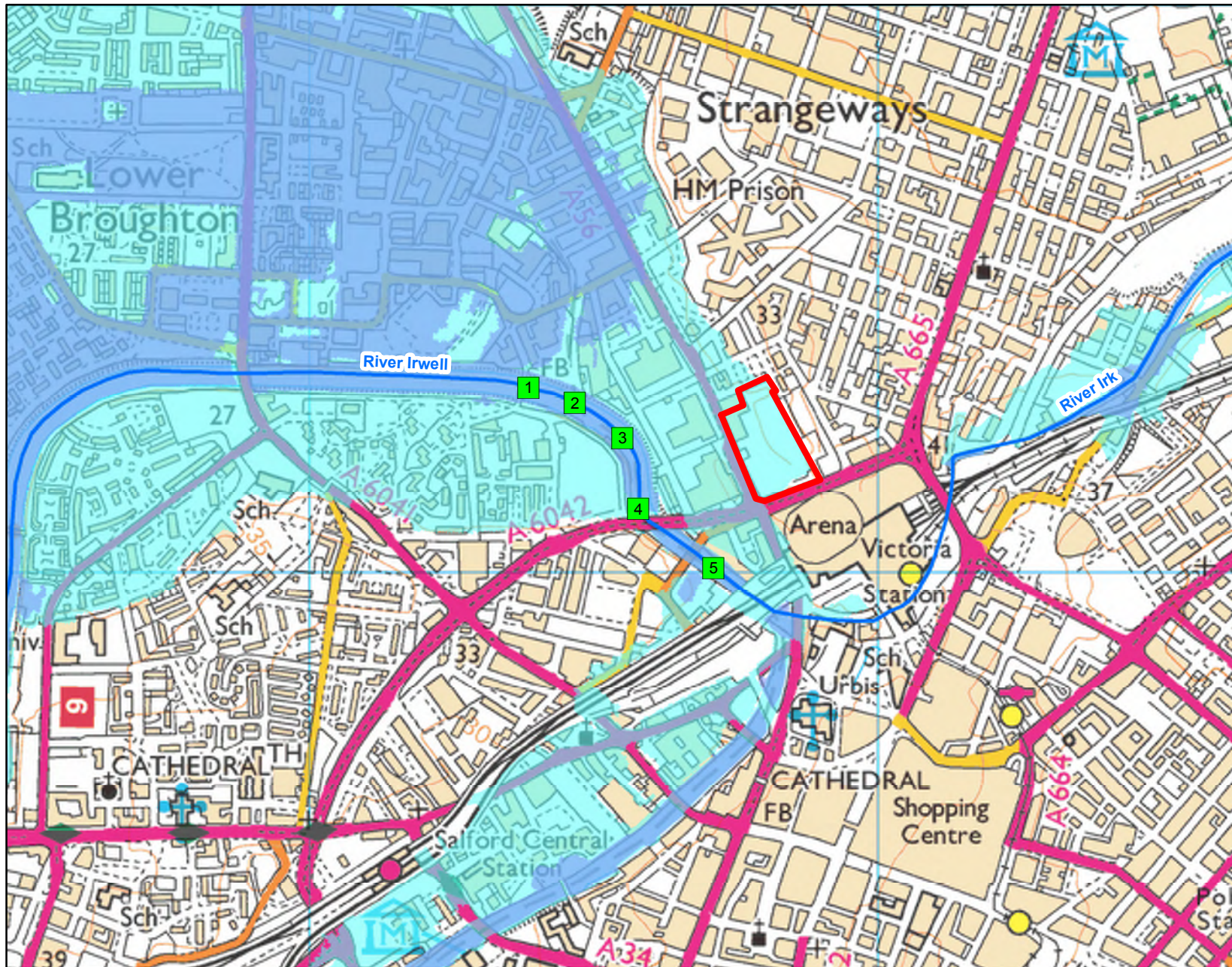
88893

181081

452758

Main River

Detailed Flood Map centred on Trinity Way, Manchester, M3 1AR. Created 11/03/2019 [GMMC119011BF]



1:10,001



Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

Map Reference	Model Node Reference	Easting	Northing	Data	Defended										Un defended										
					20 % AEP (1 in 5 year)	33 % AEP (1 in 33 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)	2 % AEP (1 in 50 year) 2.50% increase in flow	1 % AEP (1 in 100 year) 2.50% increase in flow	0.5 % AEP (1 in 200 year) 7.50% increase in flow	0.33 % AEP (1 in 300 year)	20 % AEP (1 in 5 year)	33 % AEP (1 in 33 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)	2 % AEP (1 in 50 year) 2.50% increase in flow	1 % AEP (1 in 100 year) 2.50% increase in flow	0.5 % AEP (1 in 200 year) 7.50% increase in flow	0.33 % AEP (1 in 300 year)	
44053_0208_HW133802	383432	399275	Modelled Water Level (in aodR)	25.54	25.52	26.28	26.48	26.61	26.88	27.62	27.69	29.93	49.38	25.32	25.64	26.18	26.48	26.61	26.83	26.18	26.44	29.95	27.26	30.60	
			Modelled Flow (cumecs)	318.42	286.75	387.29	406.85	417.61	425.33	518.71	518.61	509.23	472.52	474.40	494.54	333.05	388.01	458.78	433.39	467.32	508.89	506.19	480.96	498.71	486.21
44053_0208_HW133605	383485	399266	Modelled Water Level (in aodR)	25.52	25.62	26.24	26.47	26.59	26.86	27.50	27.66	29.96	30.24	25.30	25.62	26.15	26.46	26.59	26.80	26.16	26.42	29.95	27.32	30.59	
			Modelled Flow (cumecs)	318.43	286.77	387.18	406.88	417.65	425.36	518.40	523.37	472.53	464.47	494.55	333.09	388.03	458.79	438.26	460.16	507.63	502.09	507.54	489.19		
44053_0208_HW133711	383575	399205	Modelled Water Level (in aodR)	25.28	25.77	26.11	26.34	26.47	26.55	27.38	27.53	29.45	30.19	25.17	25.48	26.02	26.23	26.48	26.67	26.02	26.30	29.89	27.18	30.55	
			Modelled Flow (cumecs)	318.47	286.83	387.40	406.98	417.76	425.47	528.87	536.41	541.44	472.59	518.73	494.60	333.04	388.06	458.74	434.26	460.28	548.53	545.82	530.38	509.27	517.88
44053_0208_HW133813	383608	399068	Modelled Water Level (in aodR)	25.27	25.85	26.02	26.25	26.38	26.46	27.28	27.42	29.27	28.74	30.07	29.05	26.37	25.81	26.23	26.37	26.57	27.80	29.16	27.08	30.45	
			Modelled Flow (cumecs)	318.63	297.08	387.83	407.25	418.08	425.14	533.13	547.08	554.46	472.74	564.75	493.13	333.11	388.18	458.66	434.36	460.29	561.44	550.73	536.14	509.14	
44053_0208_HW133814	383749	399095	Modelled Water Level (in aodR)	25.21	25.59	25.94	26.17	26.30	26.37	27.13	27.28	28.75	29.63	29.65	25.00	25.30	25.83	26.14	26.28	26.46	27.71	27.92	29.14	28.96	29.89
			Modelled Flow (cumecs)	318.65	297.04	387.86	407.31	418.12	425.81	533.13	547.07	578.74	472.77	674.11	494.78	333.12	388.19	458.68	434.38	460.37	587.64	556.72	531.87	512.80	

Model data taken from Lower Inverclyde 2012 Study

AEP - Annual Exceedance Probability

m aodR - metres above ordnance datum Newlyn

cumecs - cubic metres per second

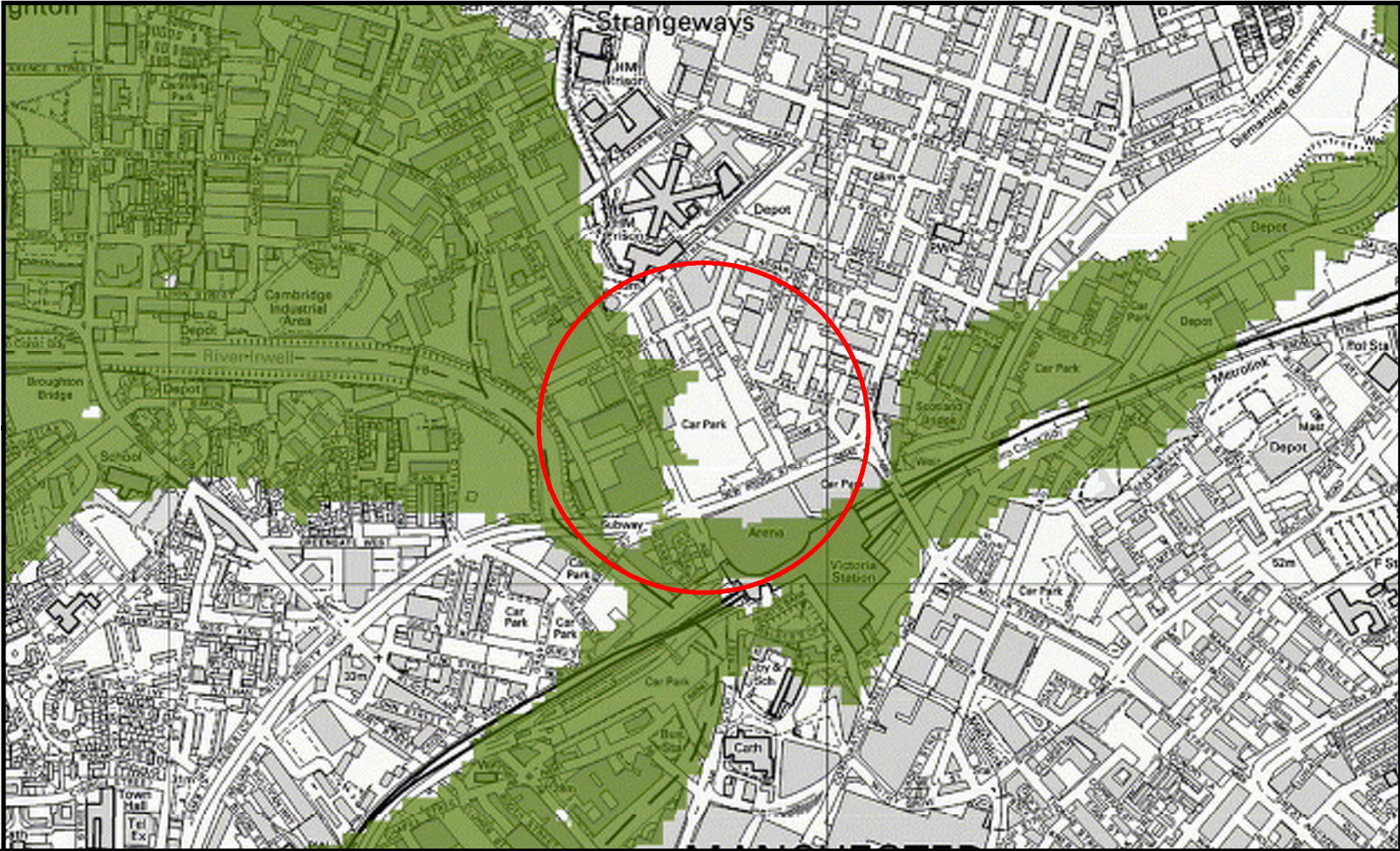
Notes:

*Climate Change Scenario - 30%, 25% and 70% increases in flow calculated for the 2050's (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

Asset Database						
Start Date	Asset Type	Asset ID	Standard of Protection	Overall Condition Grade	Upstream Asset Crest Level (m aod)	Downstream Asset Crest Level (m aod)
14/12/2018	High Ground	88851	75	3	27.66	27.44
14/12/2018	High Ground	88853	75	2	27.44	27.20
14/12/2018	WAF	881083	75	3	27.86	27.87
14/12/2018	Embankment	892769	75	3	27.28	27.28

1 Overall condition of the asset based on the (weighted) condition of each element of the latest inspection of the asset. See the attached document "Visual Condition Grading of FORM Assets" for interpretation of score given.

Reservoir Flood Map



Note - this map provides a general indication of the largest area that might be flooded if a reservoir were to fail and release the water it holds. It is taken from a national assessment and displays a worst case scenario. The map is only intended as a guide and is not a prediction of what will happen.

Important

- This map has been produced for emergency planning purposes and displays a worst case scenario.
- It is not suitable for use at an individual property scale due to the method used.
- This map does not give any information on the likelihood of reservoir flooding or on the depth or speed of floodwaters. It also does not include any smaller reservoirs (which hold less than 25,000 cubic metres of water) or reservoirs commissioned or registered after Spring 2009.
- The information should not be interpreted as stating that the location you are interested in will or won't actually flood, but simply that it is in or not in an area that could be affected by reservoir flooding as shown on the maps

The area within the red circle could be at risk of flooding from the following reservoirs:

Reservoir Name	Reservoir Owner	Location	Local Authority	Environment Agency Office
Naden Higher	United Utilities Water plc	385266, 417051	Rochdale	Environment Agency - Greater Manchester, Merseysid
Naden Middle	United Utilities Water plc	385460, 416914	Rochdale	Environment Agency - Greater Manchester, Merseysid
Shore Top	Lee	376628, 406453	Bury	Environment Agency - Greater Manchester, Merseysid
Heaton Park Open	United Utilities Water plc	383120, 404990	Manchester	Environment Agency - Greater Manchester, Merseysid
Hollingworth Lake	United Utilities Water plc	394020, 415140	Rochdale	Environment Agency - Greater Manchester, Merseysid
Greenbooth	United Utilities Water plc	385528, 415160	Rochdale	Environment Agency - Greater Manchester, Merseysid
Entwistle	United Utilities Water plc	372360, 417220	Blackburn with Darwen	Environment Agency - Greater Manchester, Merseysid
Littleton Road FSR	Environment Agency	381330, 400760	Salford	Environment Agency - Greater Manchester, Merseysid
Delph	United Utilities Water plc	370270, 415240	Blackburn with Darwen	Environment Agency - Greater Manchester, Merseysid
Wayoh	United Utilities Water plc	373660, 416280	Blackburn with Darwen	Environment Agency - Greater Manchester, Merseysid
Jumbles	United Utilities Water plc	373496, 413824	Bolton	Environment Agency - Greater Manchester, Merseysid

Maximum extent of flood

1:10,000

Reservoir Flood Map

This text must be read with the extract from the Reservoir Flood Map which we have sent to you

How to use the maps

Reservoir flood maps are available to help you find out if you could be affected by reservoir flooding. Even though reservoir flooding is very unlikely it may be helpful to you to find out if you live or work in an area that could be affected. If you do, you might want to think about what you would do if an emergency did happen.

For more information on what to do if you live or work near a reservoir, including some frequently asked questions, visit our website at <http://www.environment-agency.gov.uk/flood>.

The maps have been prepared for emergency planning purposes and for this reason they reflect a credible worst case scenario – this means that if a reservoir failure did occur it would most likely be far less severe than the scenario shown in the maps. We've mapped a credible worst case scenario so that emergency planners have all the information they might need to increase public safety.

Reservoir safety

Reservoirs in the UK have an extremely good safety record with no failures resulting in the loss of life since 1925. Reservoirs are more carefully maintained now. This means reservoir flooding is very unlikely to happen.

The Environment Agency is the enforcement authority for the Reservoirs Act 1975 in England. All large reservoirs that we think could endanger human life must be inspected and supervised by reservoir engineers. We ensure that reservoirs are regularly inspected and essential safety work is carried out.

For more information on reservoir safety visit our website at:

<https://www.gov.uk/guidance/reservoirs-owner-and-operator-requirements>.

Emergency planning

Lead Local flood authorities are responsible for coordinating emergency plans for reservoir flooding and ensuring communities are well prepared. Lead Local flood authorities work with other members of the Local Resilience Forum (LRF) to develop generic and site-specific emergency plans, depending on local circumstances and priorities.

If you want to find out about local emergency plans you should contact the responsible lead local flood authority as identified on the map.

Visual Condition Grading of FCRM Assets

The Environment Agency has a risk-based programme for the regular inspection of flood defence assets. We record the results of these inspections in our Asset Information Management System (AIMS).

Inspecting and checking individual flood defence assets helps us understand their likely performance, which is essential for effective flood risk management. We need to understand the asset's failure mechanisms, exposure to loading, construction materials, present condition and likely future deterioration.

The condition grading and descriptions given below are the standards adopted by the Environment Agency. The five condition grades range from 'very good' to 'very poor', and the descriptions reflect condition according to flood defence performance.

Rating System:

Grade	Rating	Description
1	Very Good	Cosmetic defects that will have no effect on performance
2	Good	Minor defects that will not reduce the overall performance of the asset
3	Fair	Defects that could reduce performance of the asset
4	Poor	Defects that would significantly reduce the performance of the asset. Further investigation needed
5	Very Poor	Severe defects resulting in complete performance failure

We inspect and assign a condition grade to each element of the asset, and calculate the overall grade from these values.

The table on the following pages outlines some of the key features our inspectors look for when assessing the assets.

Issued by: Environment Agency Flood & Coastal Risk Management, Horizon House, Deanery Road, Bristol, BS1 5AH.
February 2013.

Key Features of asset inspections

Foreign objects Foreign objects include trees, outfalls, pipes and any other fixed structure that is placed on top of or behind the defence asset.	Minor	Examples include small trees or authorised outfalls.
	Severe	Examples include large trees or an unauthorised outfall.
Loading Could be residential development, industrial storage etc.	Minor	Some additional loading occurring behind or on top of structure.
	Severe	Heavy loading causing deformation and/or cracking of ground.
Weight of foreign objects	Light	A light object is unlikely to significantly affect the performance of the structure should it collapse or move.
	Heavy	A heavy object would cause significant damage to the structure if it was to collapse and likely to affect the performance of the structure.
Erosion and evidence of overtopping	Minor	Small sections of outer slope slightly eroded.
	Severe	Large section(s) of slope eroded possibly leading to further slippage of material.
Low points on crest	Minor	Partial erosion/rutting of some crest width.
	Severe	Erosion/rutting across entire crest width and of a significant depth.
Cracking (earth embankment)	Significance	The definition of crack significance has to be based on the inspectors judgement on site. Significant cracks or fissures are likely to be of considerable depth or length in relation to the embankment. If the inspector is unsure as to the significance of any cracking found then this should be reflected in their assessment of confidence in the condition assigned.

Cracking (Earth embankment)	Extent	The extent of cracking should reflect the quantity and depth of the cracks/fissures. Cracks of high quantity but little depth, such as those caused by the drying out of clay, should be classed as minor. A small number of deep cracks or fissures extending well into the embankment body should be classed as severe.
Cracking (Masonry/concrete)	Minor	Cracking present, often diagonal, but localised.
	Severe	Large, often diagonal cracks running from the bottom almost to the top of the structure.
Movement (Gabion)	Minor	Small gaps appearing between gabions. Signs of misaligned gabions.
	Severe	Gabions displaced or slipped creating gaps between gabions.
Horizontal sliding (Gravity walls)	Minor	Only observable on close inspection.
	Severe	Obvious on cursory inspection.
Condition of wall material (Gravity walls)	Missing material - Minor	Some reduction in material thickness due to general deterioration. No signs of holes completely through structure.
	Missing material - Severe	Major and extensive loss of material due to deterioration. Some holes or gaps in material could be present exposing backfill.
	Damage	Examples of signs of damage included cracking of masonry or concrete, spalling of concrete and corrosion or damage to gabion baskets.
State of joints (Gravity walls)	Joint misalignment - Minor	Some evidence of movement at the joints under close inspection and loss of joint material.
	Joint misalignment - Severe	Obvious total loss of joint material leading to movement of wall material at joints.
State of joints (Sheet piles)	None	Sheets are in perfect alignment. No gaps visible even under close inspection.
	Minor	Small gaps evident at the clutches under close inspection.
	Severe	Obvious gaps evident at the clutches. Indications of movement of sheets.



RIDGE



www.ridge.co.uk