

OVG Manchester
Flood Risk Assessment

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27 February 2020

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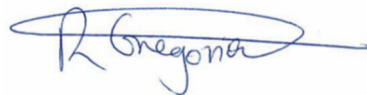
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date **27th February 2020**

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Abbreviations

Term	Definition
CDA	Critical Drainage Area
EA	Environment Agency
FRA	Flood Risk Assessment
LLFA	Lead Local Flood Authority
MCC	Manchester City Council
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SWDS	Surface Water Drainage Strategy
UU	United Utilities

Executive summary

This site-specific Flood Risk Assessment (FRA) has been prepared by BuroHappold Engineering on behalf of OVG Manchester Limited (the Applicant) as part of a full planning application for a new multi-use indoor arena with supporting retail and leisure facilities in Manchester, hereafter referred to as the 'Proposed Development'.

This assessment has been carried out in accordance with the requirements of the Manchester Core Strategy and National Planning Policy Framework (NPPF) and considers the potential flood risk to the application site from the fluvial, surface water, sewer, groundwater and artificial sources.

A summary of the key findings of the FRA are summarised below.

Element		Details
Flood Risk	Historic Events	No historic flood events at the site location have been recorded.
	Fluvial (rivers)	The site is located in Flood Zone 1. River Medlock flows at close proximity to the site through a culvert. The risk of fluvial flooding is considered low.
	Surface Water	The risk of surface water flooding to the north parts of the site is considered to be medium, with the rest of the site lying in areas at very low risk.
	Sewers	The site location is not an area highlighted as at risk from sewer flooding.
	Groundwater	Low risk of groundwater flooding to the development.
	Artificial Sources	No flood risk from reservoirs. Residual risk of flooding from the south bounding Ashton Canal.
Mitigation measures	Surface Water Drainage Strategy	Attenuation tanks and the surface water drainage system are proposed to protect the Site from extreme storm events.
Environmental Permit – Flood Risk Activity		The works proposed near the Medlock culvert are minor works for highways on culverts (partial resurfacing of existing road). This is an excluded activity and an environmental permit will therefore not be required.

This FRA demonstrates that the risk of flooding is reduced where possible and the Proposed Development is safe from flooding for its design lifetime. On this basis, the scheme accords with the relevant national and local planning policies and guidance.

1 Understanding of the project

This site-specific FRA has been prepared by BuroHappold on behalf of the Applicant as part of a full planning application for a new multi-use indoor arena with supporting retail and leisure facilities in Manchester. This assessment has been carried out in accordance with the requirements of the Manchester Core Strategy and National Planning Policy Framework (NPPF) and considers the potential flood risk to the application site from the following sources: fluvial, surface water, sewer, groundwater and artificial sources.

1.1 Existing information about the Site

The Site is approximately 4.46 ha in size and situated in the Etihad Campus, East Manchester, with National Grid Reference SJ868988 (Postcode M11 3DU). It is bound by Sportcity Way to the north, Alan Turing Way to the east, Ashton Canal to the south, and Joe Mercer Way to the west, in the ward of Ancoats and Beswick, Manchester. The site is currently used as an over-spill surface level car park for those attending events associated with the Etihad Stadium. The perimeter of the Site is populated with informal, dense shrubbery and trees and secured with a tall mesh fence. There are no existing buildings on the Site.

The closest natural watercourse is the River Medlock. The River Medlock is heavily modified and culverted for approximately 500m through the Etihad Campus as shown in Figure 1-1. The culvert extents within the site boundary was identified through a CCTV Survey, conducted by Drain Alert on 28th August 2019. The course of the River Medlock through this culvert is assumed to be straight. The Ashton Canal bounds the southern portion of the site. The site boundary and key locations are shown in Figure 1-1.

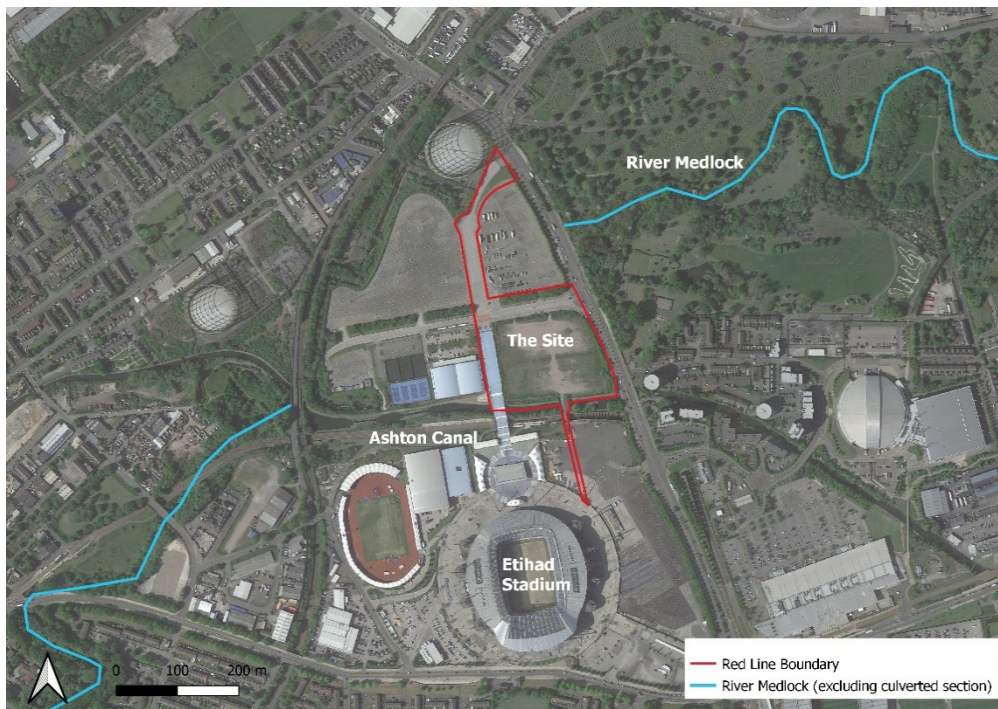


Figure 1-1 Site boundary and key locations (Map data ©2019 Google)

The Site is located within Flood Zone 1, an area at low probability of flooding. It is situated within the Manchester, Salford and Trafford Critical Drainage Area (CDA), as designated in 2011. The Site is largely flat with a variance of 5m across the site. The highest levels are noted in the southwest corner at approximately +61.3m AOD, falling to +55.5m AOD in the northeast corner. A site-specific topographic survey was undertaken on 13th May 2019 by CFG Surveys. Key site levels can be seen in Figure 1-2.

The Site is not within, nor does not contain, any ecological designations. However, it should be recognised that the Ashton Canal to the south of the Site boundary is a non-statutory designated SBI, protected under national and local planning policy.



Figure 1-2 Key site levels obtained from the topography (Map data ©2019 Google)

1.2 The Proposed Development

The Proposed Development is for a new multi-use indoor arena, together with supporting retail and leisure facilities, back-of-house and support functions, public realm, cycle parking, access and associated works. Figure 1-3 shows a plan view of Level 1 of the Proposed arena and the proposed uses.

The Proposed Development also includes a mixture of new and enhanced hard and soft landscaping, whilst creating improved views of the Ashton Canal as well as external seating areas and terraces. A general arrangement plan with the proposed uses as well as the adjacent roads and bridge links can be seen in Figure 1-3.

Figure 1-4 shows the overall elevations for the north, east, south and west sides of the Proposed Development.

A basement plant room is proposed at 51.0m AOD. The ground floor level is at 55.0m AOD, rising to the roof level at 92.6m AOD.

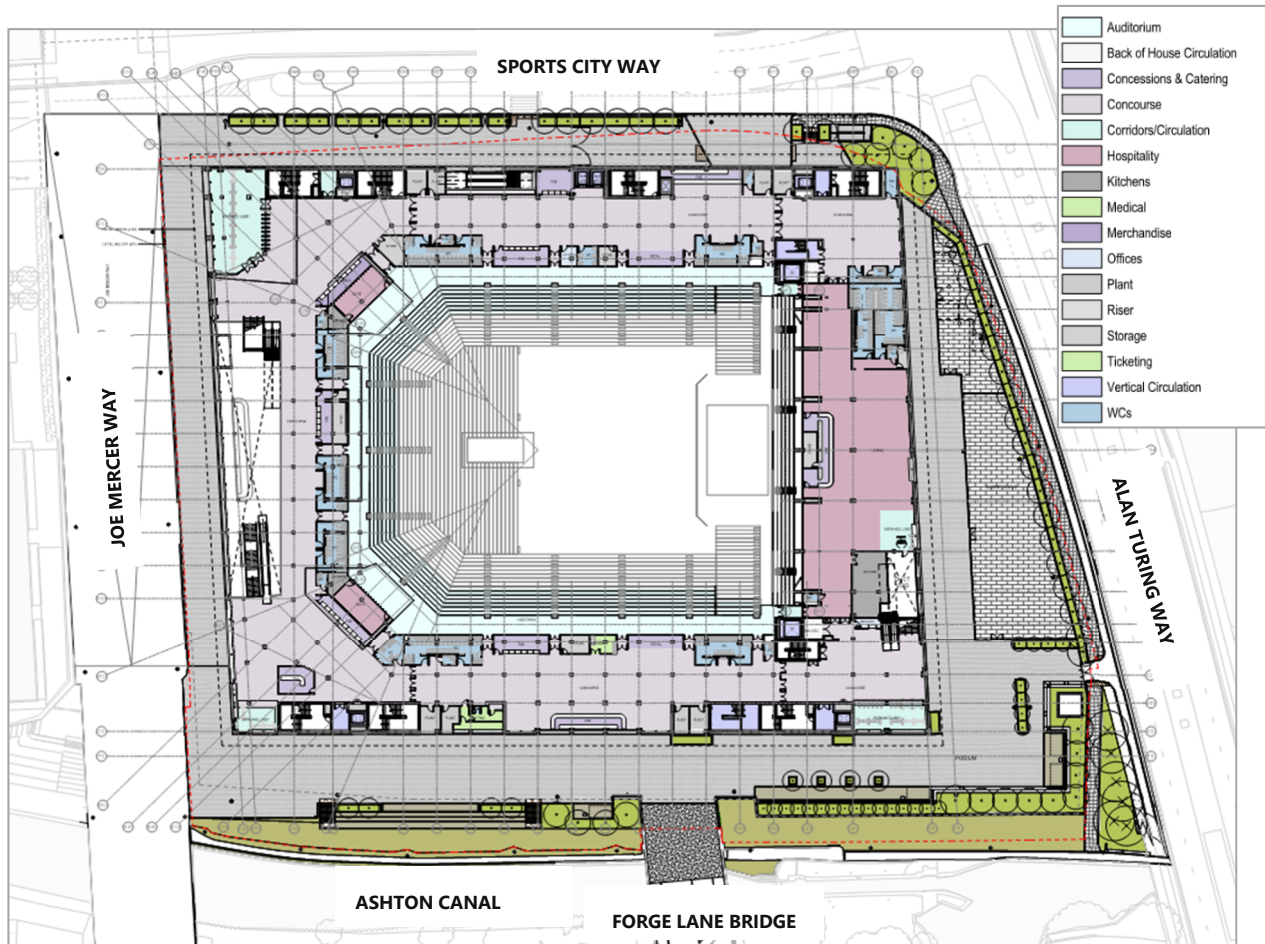
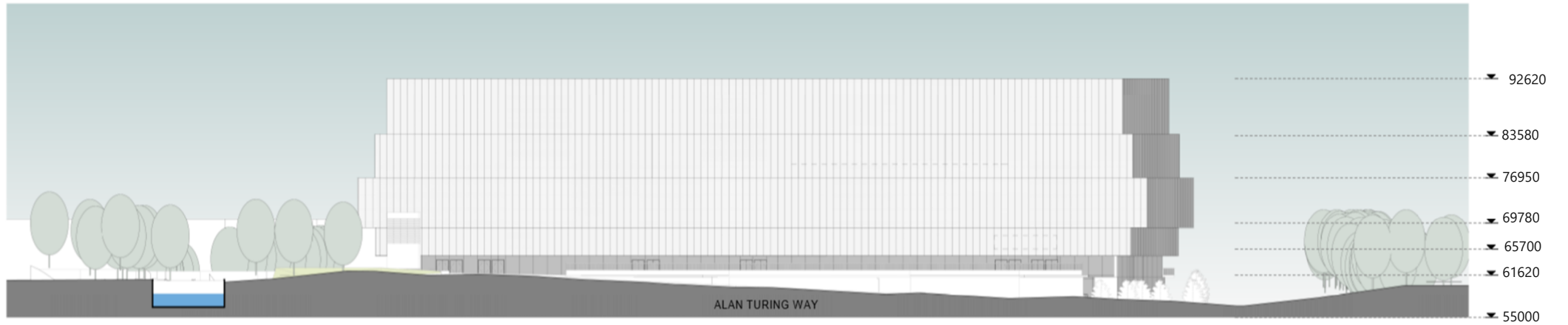
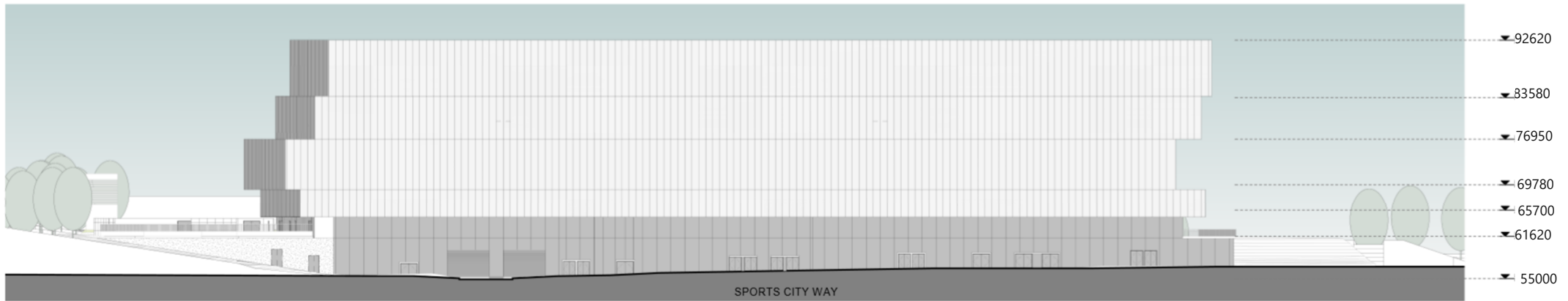


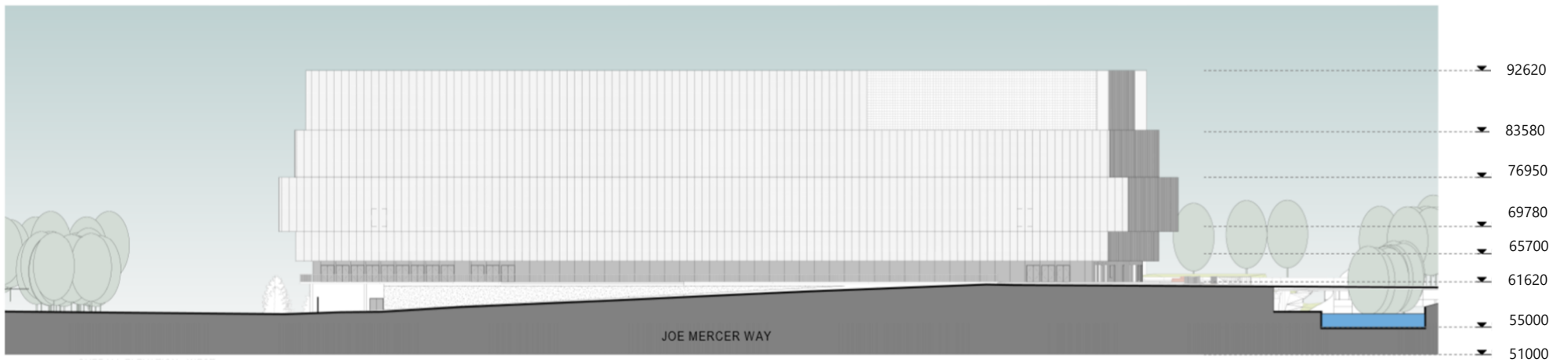
Figure 1-3 General arrangement plan of the Proposed Development with zones, Level 1 (Populous, 19.07.19)



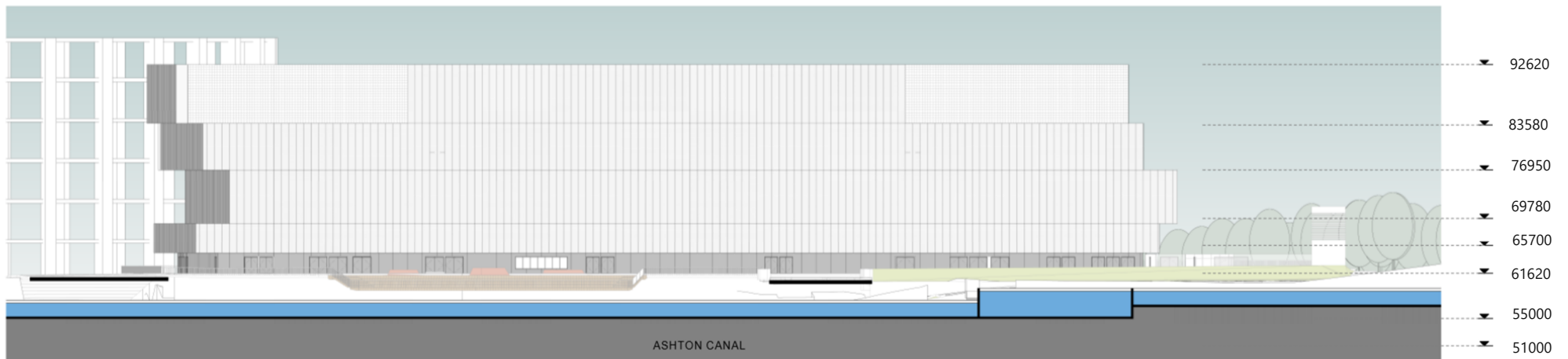
Elevation – EAST (1:250)



Elevation – NORTH (1:250)



Elevation – WEST (1:250)



Elevation – SOUTH (1:250)

Figure 1-4 Overall elevation of the Proposed Development. Elevations shown in mm AOD (Populous, 19.07.2019)

2 Planning context

2.1 Overview

This site-specific FRA has been prepared in accordance with the policies and guidance applicable to the Proposed Development outlined within the following publications:

- National Planning Policy Framework (March 2012, updated in February 2019);
- Planning Practice Guidance; Flood Risk and Coastal Change (March 2014);
- Flood Risk Assessments: Climate Change Allowances (February 2016, updated February 2017);
- Manchester's Local Development Framework, Core Strategy (July 2012);
- Manchester City, Salford City and Trafford Councils Level 1 SFRA (March 2010); and
- Manchester City, Salford City and Trafford Councils Level 2 SFRA (March 2011)

2.2 National Planning Policy Framework

The NPPF sets out the Government's planning policies for England and how these should be applied. It provides a framework within which people and councils can develop local plans and neighbourhood plans, which contribute to the achievement of sustainable development. It defines flood risk and aims to avoid development in areas most vulnerable to flooding. This is attained through the implementation of a Sequential Test, which directs development towards areas with lowest flood risk. Where this is not possible, the NPPF requires that all new developments in flood risk areas are appropriately flood resilient and resistant, include safe access and egress routes where required and that residual risks of flooding are adequately managed.

The NPPF Technical Guidance provides a number of tables aiding the identification of the degree of risk of flooding to a development. These tables provide a land use classification appropriate to the flood risk and the requirements of a FRA within each zone. Specific land use types to each flood risk vulnerability classification is also provided. The proposed land use of the Proposed Development as a music venue is considered *More Vulnerable to flooding* (similar to nightclubs and drinking establishments).

For each flood zone and flood risk vulnerability classification, NPPF categorises where development is appropriate and whether the Exception Test is required. Where the Exception Test is required, development may only be permitted if it can show to provide wider sustainability benefits that outweigh flood risk without increasing the risk of flooding elsewhere.

The flood zones refer to the probability of river and sea flooding without the inclusion of flood defences. The flood zones are defined by the NPPF Technical Guidance as follows:

Table 2-1 Flood Zones definition for probability of river and sea flooding

Flood Zone	Probability	Definition
1	Low Probability	Land having a less than 1 in 1000 annual probability (<0.1%) of river or sea flooding
2	Medium Probability	Land having between a 1 in 1000 and 1 in 100 annual probability (0.1% - 1%) of river flooding; or having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding
3a	High Probability	Land having a 1 in 100 or greater annual probability (>1%) of river flooding
3b	The Functional Floodplain	This zone comprises of land where water has to flow or be stored in times of flood. Land having a 1 in 20 or greater annual probability (>5%) of flooding any year

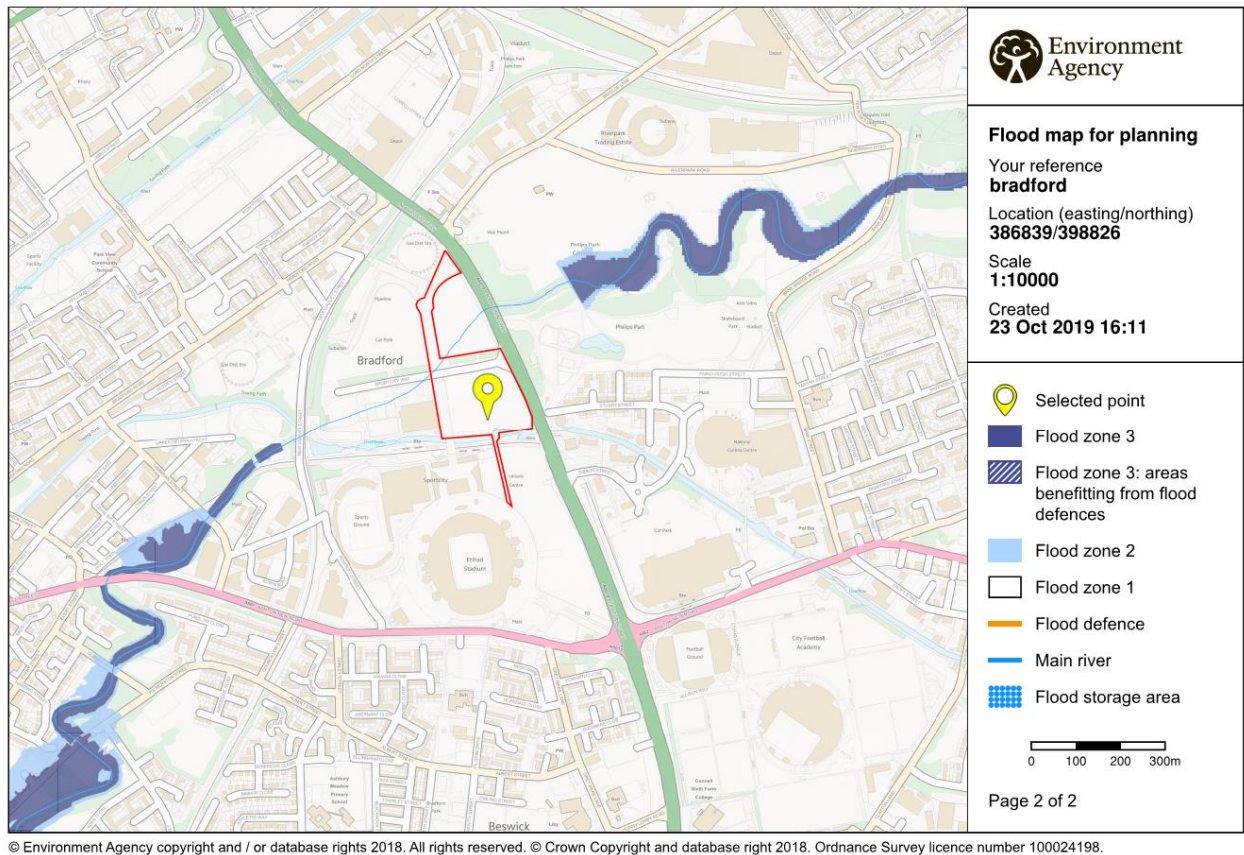


Figure 2-1 Flood Zone map of the Site © Environment Agency copyright and/or database right 2018. All rights reserved (accessed 18.10.19)

The site is entirely within Flood Zone 1, an area at low risk of flooding. According to the NPPF, any type of development is compatible within Flood Zone 1 and the Exception Test is not required.

2.3 Sequential Test

The Sequential Test is a tool used to achieve the aims of the NPPF by steering the most vulnerable development towards areas with the lowest probability of flooding. The Sequential Test is not required for Flood Zone 1 developments unless there are flooding issues in the area.

2.4 Local planning policy

2.4.1 Manchester Core Strategy

The Core Strategy 2012-2027 was adopted in July 2012 to guide development within Manchester. It sets the out the long-term strategic policies for Manchester's future development and will form the framework that planning applications will be assessed against.

Policy EN8 describes the expected measures to be taken to ensure development is adaptable to climate change. These include minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rain water permeability and provision of linked and diverse green infrastructure.

Policy EN14 focuses on reduction of flood risk and references PPS25 (now superseded by the NPPF PPG Flood risk and coastal change). In addition, all new development should minimise surface water run-off, including through Sustainable Drainage Systems (SuDS). Where feasible and appropriate, developments should seek to open up culverted sections of river to reduce flood risk and any danger of collapse.

Policy EN17 is about water quality. Development should minimise surface water run-off from development and associated roads and maximise the use of SuDS.

2.4.2 Strategic Flood Risk Assessment (SFRA)

Manchester City Council (MCC) are the Lead Local Flood Authority (LLFA) for the Proposed Development. A Level 2 Hybrid SFRA was produced in conjunction with Salford City and Trafford Councils due to the intricate and well-connected network of rivers, streams, sewers and canals within Greater Manchester. This includes both the Level 1 SFRA (2010) and Level 2 SFRA (2011).

These reports consider flooding from fluvial, tidal, surface water, groundwater, sewers and artificial sources for the whole Manchester area. They summarise existing and proposed flood risk management whilst outlining recommendations relating to local and national policy on flooding and development. Findings from the SFRAs have been considered within this assessment and the following items highlighted for consideration:

- SuDS are the preferred method for managing the surface water flood run off for developed sites and managing the associated risk. These should be considered using the SuDS hierarchy;
- Development should not increase flood risk on the site or elsewhere.

2.5 Consultations

Consultations have been undertaken with the statutory consultees to understand their requirements for the scheme and seek their in-principle agreement to the proposals. These include the EA, MCC as the LLFA and United Utilities (UU). The Greater Manchester Ecology Unit (GMEU) and the Canal and River Trust (CRT) have also been consulted.

The pre-application response of the EA is included in Appendix A. Further correspondence with the EA regarding the River Medlock culvert can be found in Appendix B.

Table 2-2 Information from key consultees

Stakeholder	Subject	Comment
EA	Flood Risk	The EA has provided links to Government's 'Open data' for access to flood risk information.

Stakeholder	Subject	Comment
EA	River culvert	The designated "main river", Medlock, flows via a culvert within the site boundary. A full structural survey was recommended by the EA to establish the culvert condition and the exact depth, size and location of the culvert, if works were anticipated near/over the culvert. Due to the construction works being more than 8m away from the culverted Medlock, it is not considered that there will be any impact on the culvert. The EA have noted that a visual survey of the culvert was carried out in December 2019. Survey information has been requested from GMMC and MCC, as advised by the EA. Both GMMC and MCC were not able to provide any recent information on the condition of the culvert downstream of Alan Turing Way.
	Environmental Permits	Some activities may require a permit under the Environmental Permitting (England and Wales) Regulations 2016 from the EA for any proposed works or structures, in, under, over or within eight metres either side of the River Medlock culverted watercourse.
	Ashton Canal	The Site adjoins Ashton Canal, a Site of Biological Importance (SBI) and artificial waterbody. Any development proposals preserve and where feasible enhance the environmental quality of this key green infrastructure asset. Consultation has taken place with the Greater Manchester Ecology Unit (GMEU) and Canal and Rivers Trust (CRT) over development proposals adjoining this local wildlife site.
	Drainage Strategy	LLFA advice on the rates of runoff should be followed. If an existing connection to the Medlock cannot be proven, the proposed discharge rates should mimic greenfield runoff rates with attenuation provided following SUDs guidance.
MCC (LLFA)	Drainage Strategy	MCC have advised to assess the suitability of sustainable drainage systems in accordance with the revised NPPF. Sustainable drainage systems should be designed in line with national Non-Statutory Technical Standards for SuDS and local policies DM1, EN08, EN14 and EN17 of the Core Strategy. The use of green infrastructure to manage surface water runoff is encouraged. It is advised to assess surface water attenuation requirements that offer a reduction in surface water runoff rate in line with the Manchester City SFRA. All new connections to the watercourses should comply with reduction of flows to Greenfield runoff rates. Hydraulic calculations and drawings should be submitted to support the design along with proposed standards of operation and maintenance in accordance with the NPPF. Evidence must be given that runoff volume in the 1 in 100-year, 6 hour's rainfall shall be constrained to a value as close as possible to the Greenfield runoff volume for the same event.
United Utilities	Sewers	Information from United Utilities Asset maps indicate 3 main combined sewers running under the site.

3 Flood risk appraisal and management

3.1 Historic flood events

Records of historic flooding are useful for looking at the sources, seasonality, frequency and intensity of flooding. Although historic records can be incomplete, they provide useful background information. The site location is not within the Environment Agency's recorded historic fluvial flood extent. The SFRA also did not record any historic flood events for the area of interest. The MCC has suggested that regular ponding was recorded on site after each rainfall event, indicating that a lot of rainfall does not drain into the drainage system. Please refer to Flooding from surface water below.

3.2 Flooding from rivers and the sea

The flood zone map produced by the EA shows that the site is located entirely in Flood Zone 1 (refer to Figure 3-1).

The River Medlock is heavily modified and culverted through the Etihad Campus. Flood Zone 1 is defined as a low probability of flooding from rivers and the sea, which is an area that has a less than 1 in 1000 year annual probability of flooding. The risk of fluvial and tidal flooding is therefore considered low.

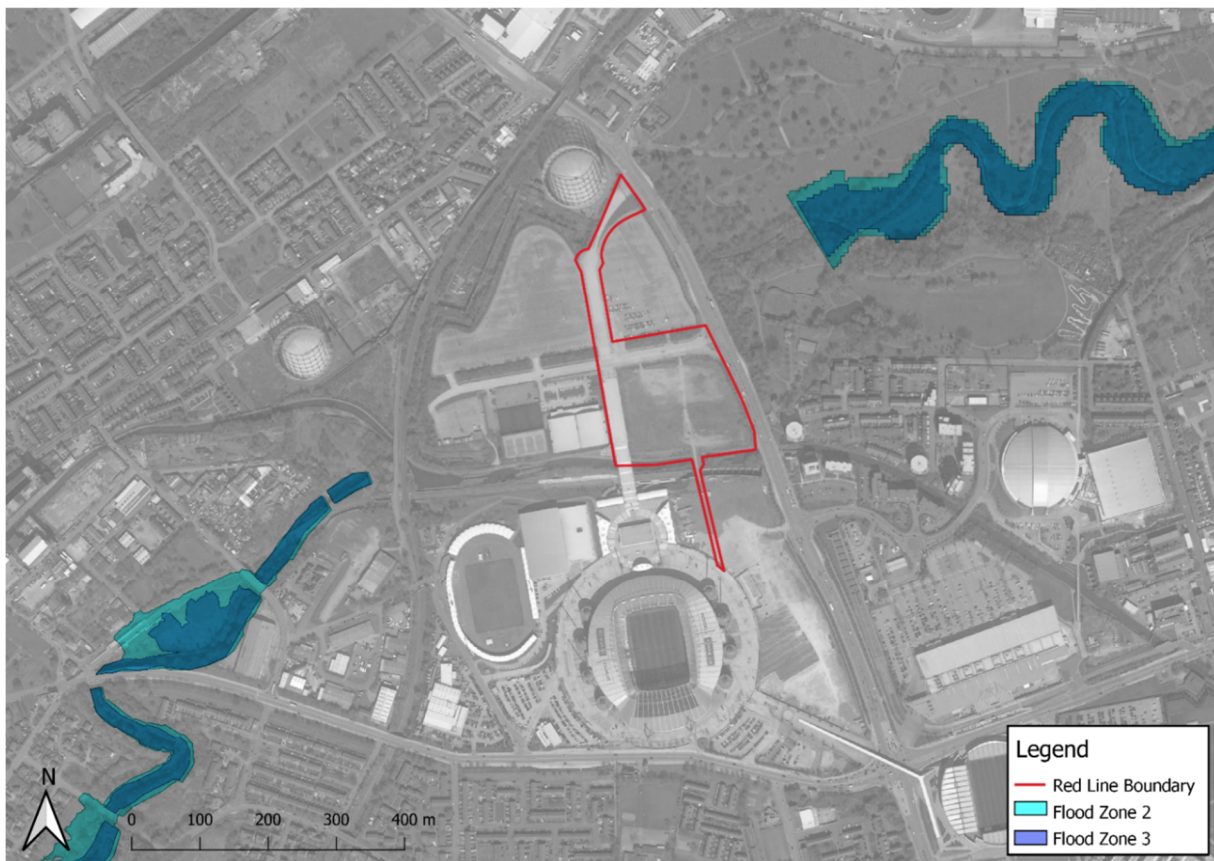


Figure 3-1 Flood Zone Map showing the location of the proposed development

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3.2.1 River Medlock culvert

The red line boundary extends over the River Medlock culvert. The Drain Alert drainage survey (28/08/19) identified the River Medlock approximately 60m north of the arena's northeastern boundary. The alignment of the Medlock is shown in blue in the figure below. Based on the location of the Medlock culvert, any construction works for the arena are likely to be more than 40m from the southern edge of the culverted Medlock. It is therefore considered that the works for the arena are not likely to have a significant impact on the culvert.

No works are proposed over, around or in close proximity (less than 8m) to the culvert. As such it is not considered that any environmental permits are required for the development works.

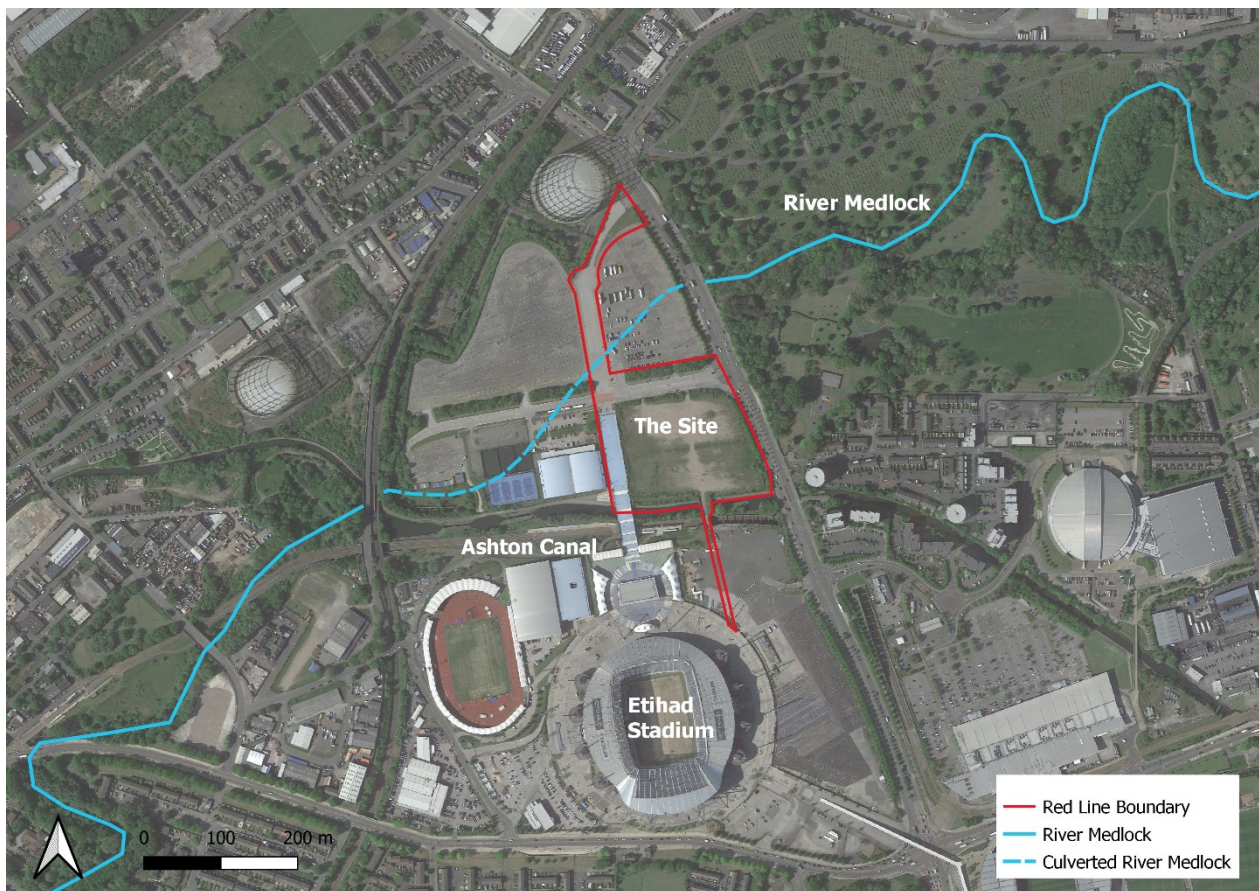


Figure 3-2 Site boundary and key locations including River Medlock and culverted section of the River Medlock (Map data ©2019 Google)

3.3 Flooding from surface water

Surface water flooding can occur when the infiltration capacity during a storm event is low or when drainage systems do not have sufficient capacity to drain away rainwater. This results in water lying on or flowing over the ground surface. The excess water can develop pathways through built-up areas and open space and ponding in lower lying areas. This type of flooding is usually localised and associated with short duration heavy downpours or rain.

3.3.1 Baseline flood risk

The SFRA identifies part of the site to have a low to intermediate susceptibility to surface water flooding. According to the SFRA, the site is located in a Critical Drainage Area; an area particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development.

BuroHappold visited the site on the 6th June 2019. Drainage trenches were located within the site parameters including a 30-60cm trench along the northern and north-western boundaries. A brick / coarse gravel filled ditch running across the centre of the site from east to west was also located. Surface water pooling was observed on site, although the weather was dry at the time of visiting, the days leading up to 6th June saw approximately 11mm of rain.

MCC has suggested that regular ponding was recorded on site after each rainfall event, indicating that a lot of rainfall does not drain into the drainage system. As the site ground conditions consist mainly of made ground with very low permeability, it is believed that the made ground is the main cause of localised ponding on site.

Surface water runoff modelling undertaken by the EA is presented in Figure 3-3 in a surface water flood extent map. The map shows surface water flooding in the northwest part of the site for both the 1 in 100 and 1 in 1000 year flood events. Areas within the 1 in 1000 year flood extent are considered to be low risk areas (area at risk of surface water flooding between 0.1% and 1% in any given year). Areas within the 1 in 100 year flood extents are considered to be at medium risk (area at risk of surface water flooding between 1% and 3.3% in any given year).

Using the information provided by the EA, the observations of localised ponding during the BuroHappold site visit and historic records provided by MCC, the risk of surface water flooding to the site is considered *moderate*.

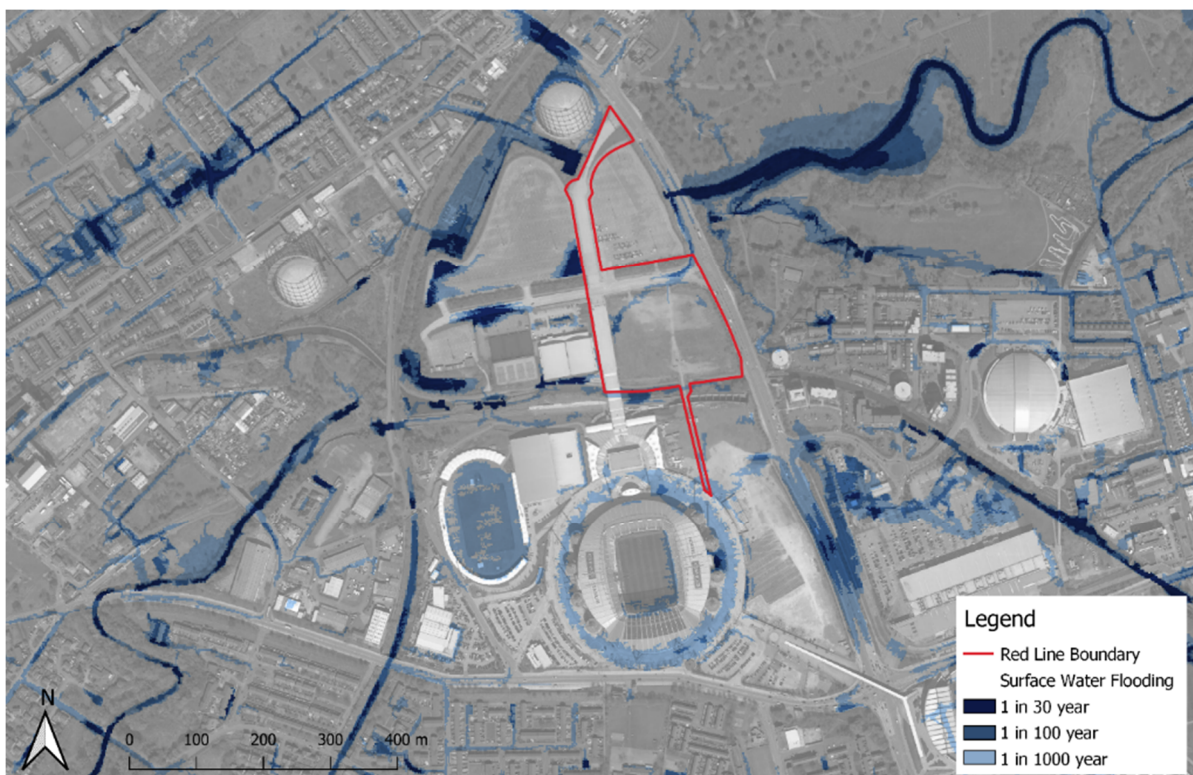


Figure 3-3 Flood Map showing surface water flooding © Environment Agency copyright and/or database right 2018. All rights reserved. Some features of this map are based on digital spatial data from the Centre for Ecology & Hydrology, © NERC (CEH)

3.3.2 Surface water management strategy

The surface water management strategy for the arena aims to protect the site from extreme storm events to maintain business continuity and deliver visitor comfort in the most adverse weather conditions. The drainage network to dispose surface water runoff will be designed to mitigate the impact of a 1 in 100 year storm event including an allowance for 40% increase in the intensity of rainfall due to climate change.

The proposed surface water drainage strategy is based on the initial correspondence with the LLFA that indicated surface water runoff from the site will have to provide a min. 50% betterment over the capacity of the existing pipework serving the site. Attenuation tanks will be required to provide this discharge runoff betterment.

It is proposed that surface water storage tanks are positioned below the ground floor slab in the service yard area and sized to store the 1 in 100 year rainfall event with 40% increase in rainfall intensities due to climate change. To maximise water re-use, the surface water attenuation tanks will be combined to function as rainwater harvesting tanks to allow collected surface water to be utilised for non-potable uses such as toilet flushing within the arena building.

Recently undertaken CCTV survey data has verified that the existing site drains to the highway network in Sportcity Way, which later discharges to the River Medlock culvert.

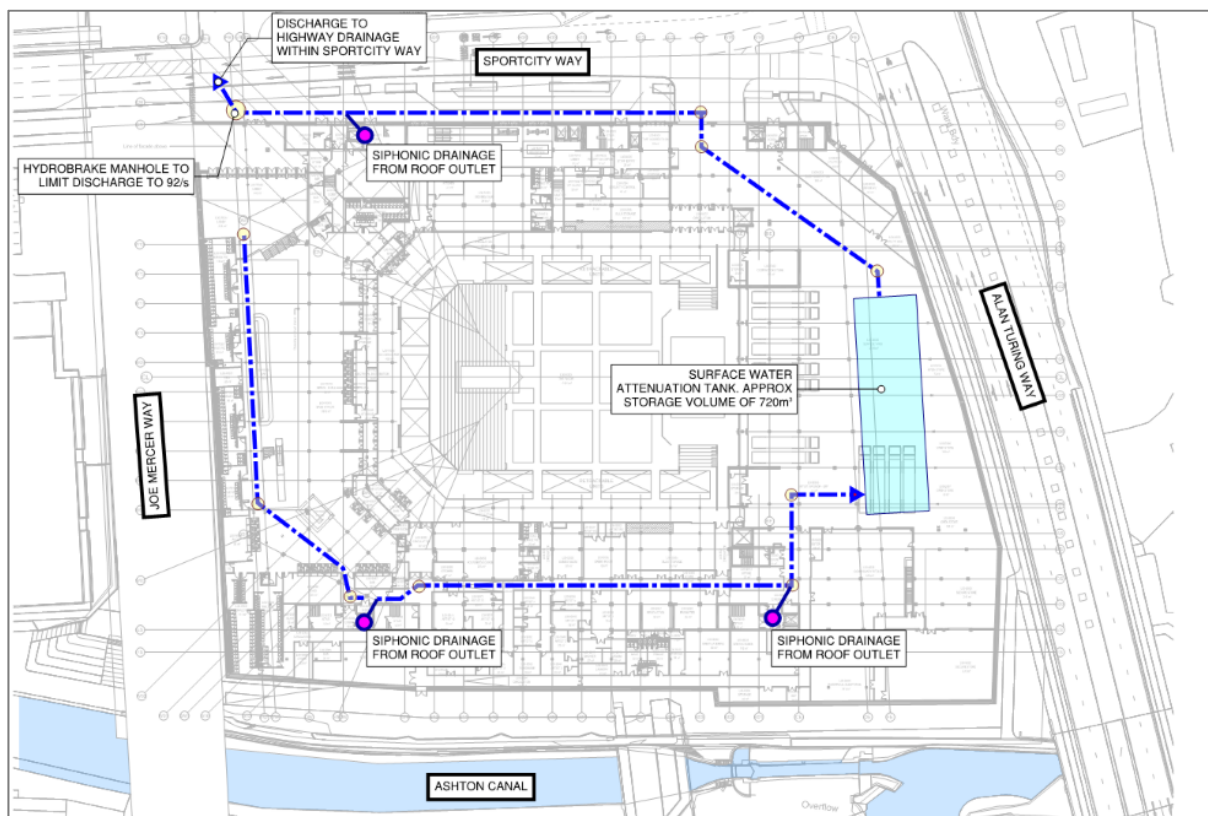


Figure 3-4 Proposed drainage strategy (Background image: Populous)

The surface water system will also aim to provide measures to improve the quality of runoff where possible; done through the guidance provided in the SuDS Manual (2015). Based on the surface water drainage strategy, the implementation of natural systems of sustainable drainage are unlikely to be suitable for the site, with more engineered physical methods needed to improve runoff quantities. The viability and inclusion of SuDS features is discussed further in the surface water drainage strategy.

Existing risk of surface water flooding from Sportcity Way has been identified, as discussed in Section 3.3.1. The road is proposed to be realigned, in accordance with landscaping and transport strategies, potentially creating a risk of water ingress to the building from localised surface water ponding. A concrete channel is proposed to capture exceedance flows from Sportcity Way and discharge unrestricted to the downstream highway pipe.

With the above measures in place, the risk from surface water flooding to the Proposed Development is reduced to low.

3.4 Flooding from groundwater

Flooding from groundwater occurs when the water table in permeable strata such as chalk and limestone rises to enter underground spaces such as basements and cellars or reaches a sufficient level to rise above the ground surface. Groundwater flooding is not necessarily directly linked to a specific rainfall event and is generally of longer duration than other causes of flooding. There is limited information held by the EA and local authorities on historic groundwater incidents.

3.4.1 Baseline flood risk

The SFRA (2010) shows the proposed development to be located in an area with limited risk of groundwater flooding. The greater Manchester sub-regional SFRA also records no reports of groundwater flooding in the area.

A ground investigation was undertaken by Structural Soils Ltd between 9th September to 29th October 2019. The site is underlain by a sequence of Made Ground, River Terrace Gravels and Alluvium (in the north west area), Glacial Till (to the east and south) and the Coal Measures. Perched groundwater was encountered occasionally at the base of site Made Ground sitting above the largely impermeable Glacial Till. Groundwater was also encountered within the Coal Measures which underlie the Glacial Till.

Groundwater monitoring is currently undertaken at 18 boreholes within the site. The measurements are taken from the Deep (Coal measures) and Shallow (Made Ground / Glacial Till) strata. Groundwater measurements have been taken six times (25th October, 30th October, 7th November 2019, 14th November 2019, 20th November 2019, 25th November 2019 and 5th December 2019).

Shallow groundwater was encountered at levels between 50.15 – 53.4m AOD in the southern parts of the site where the ground levels are approximately at 60m AOD, while groundwater was encountered between 43.5 – 50.3m AOD in the northern parts (ground levels at 57m AOD). This is believed to be perched water sitting within the Made Ground that show no signs of continuity across the site; water perched on top of the Glacial Till (predominantly impermeable strata) at the base of the Made Ground; and pocket within the Glacial Till, sandy/gravelly pockets.

Groundwater was also encountered within the Coal Measures sitting between 39m and 37mOD. This is likely to have some continuity with the River Medlock.

3.4.2 Proposed flood risk and management

The Proposed Development's Ground Level is set at 55.0m AOD, generally higher than the measured groundwater levels.

Although ground water levels are recorded below the Ground Level Slab, evidence of local perched water, potential seepage from rain or a burst water main and potential leakage from the canal could impose a risk of groundwater ingress. A bonded gas and waterproofing membrane may be required for all below ground concrete. The basement plant room and stormwater attenuation tank, as well as underground services will also be designed to withstand any uplift forces.

The risk of groundwater flooding to the Proposed Development with the mitigation measures in place is considered to be low.

3.4.3 Minewater rebound

According to the Geoenvironmental and Geotechnical Desk Study (BuroHappold, June 2019), deep mining took place across the site. The Coal Mining Authority report the site could be affected by underground mining of six seams of coal at 50m to 900m depth, last worked in 1961. There are three mine entries located on the site known to the Coal Authority. Two of the shafts (Shafts A and B) were drilled, grouted and capped in 1986 by Ward Ashcroft and Parkman. Shaft B was further grouted in October 2010. A third shaft (Shaft C) was located and grouted in 2010. Other unrecorded shafts could be present on site. More information can be found in the Desk Study.

Minewater rebound could be a potential groundwater flooding issue at historic mine workings. It occurs when groundwater levels rise following cessation of mine dewatering and the Coal Authority is responsible to monitor the levels. According to the Level 1 SFRA (2010), 'the Coal Authority considers minewater levels in Manchester, Salford and Trafford to have recovered or almost recovered. Some areas are likely to experience slight rebound, but the effects of this will be minimal.'

The waterproofing measures described above and incorporation of uplifting forces when designing below ground structures could mitigate any risk of flooding from minewater rebound.

3.5 Flooding from sewers

There is an intricate and well-connected network of rivers, streams, sewers and canals within Greater Manchester, however limited information exists in the SFRA regarding flooding from sewers. The site location is not an area highlighted as at risk from flooding from sewers. Asset maps from the United Utilities show three main combined sewers running under the site. The upstream flows to these sewers appear to have been abandoned and detailed CCTV drainage survey undertaken in December 2019 ascertained that this sewer can be classed as being abandoned.

As new drainage networks will be constructed and surface or foul water from other sites will not flow through the Site, the risk of flooding from sewers to the Site is considered low.

3.6 Flooding from artificial sources

Artificial sources include ponds, lakes, canals, and reservoirs. These can flood in the event of a structural failure or during peak storm events. The EA flood extent maps suggest no significant flood risk from reservoirs.

Ashton Canal bounds the site to the south; it is a controlled water body so the flow is regulated, therefore does not present a direct flood risk. There is however a residual risk of flooding from overtopping or breaching of the canal from blockages or high inflows during flood conditions. The SFRA indicates a low risk for the overtopping of Ashton Canal but that the majority of the site is located in Canal Breach Zone B, which is defined as a 'less likely breach location'. The probability of a breach is managed by continued maintenance by the respective canal owners.

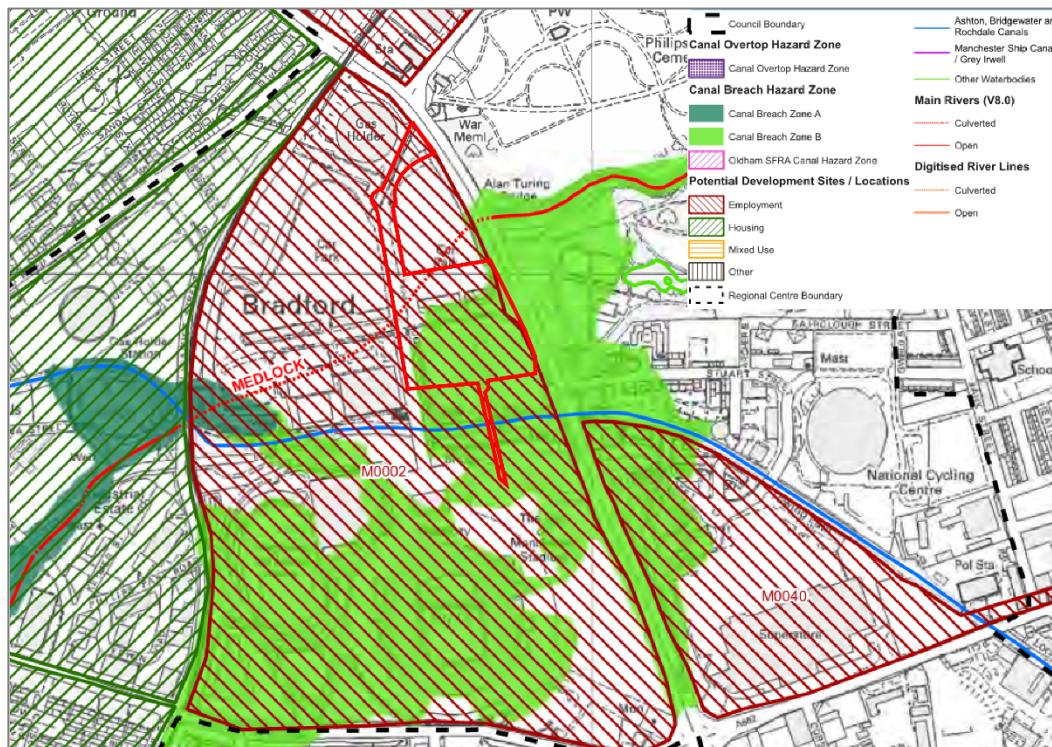


Figure 3-5 Flood risk from artificial sources (SFRA, 2011)

4 Conclusion

This Flood Risk Assessment has been prepared by BuroHappold on behalf of the Applicant to support the planning application for the Proposed Development at Etihad Campus. The assessment has taken the following current and future sources of flooding into consideration: fluvial, tidal, groundwater, artificial sources, surface water and sewers.

The assessment has found that there is very low risk of flooding from sewers, low risk from fluvial, groundwater flooding and breach of the Ashton canal and medium risk of flooding from surface water.

The Surface water drainage strategy has led to a reduction in the overall flood risk to the site by providing underground tanks to store the 1 in 100 year rainfall event with 40% increase in rainfall intensities, while providing 50% reduction in discharge rates. A concrete channel is proposed in parallel to Sportcity way to convey exceedance flows from the road and reduce the existing risk of surface water ponding.

If, following the completion of further groundwater monitoring, the levels are found to be in the vicinity of the Ground Level slab, then waterproofing will be required. The basement plant room and stormwater attenuation tank, as well as underground services will be designed to withstand any uplift forces and prevent water ingress.

This FRA demonstrates that, through the careful design of the Proposed Development and the incorporation of the above mitigation measures, the risk of flooding is reduced where possible and the Proposed Development is safe from flooding for its design lifetime. The development of the Site will not lead to increased flood risk to other sites. On this basis, the scheme accords with the relevant national and local planning policies and guidance.

Appendix A Response from the Environment Agency

Buro Happold Limited
230 Lower Bristol Road
Bath
Avon
BA2 3DQ

Our ref: SO/2019/119398/01-L01
Your ref: 0042841/F34/01
Date: 26 June 2019

FAO: Rodoula Gregoriou

Dear Ms Gregoriou

**PRELIMINARY OPINION - PROPOSED DEVELOPMENT AT ETHIAD CAMPUS.
[DEVELOPMENT PROPOSALS AND EXACT LOCATION ARE NOT FINALISED AT
THIS STAGE]**

ETIHAD CAMPUS, MANCHESTER

Thank you for requesting preliminary advice on the above proposal. This referral was received in office on the 11th June 2019.

Please see outlined below our initial commentary regarding the indicated development site area.

Environment Agency Commentary

Flood Risk

The designated "main river", Medlock, flows via a culvert within the site boundary please see below a link to our flood map for planning which shows indicative "main river" lines: <https://flood-map-for-planning.service.gov.uk/>. Any development proposal must be safe and should not increase the risk of flooding.

You can view a site's flood zone on the Flood Map for Planning on our website: <http://apps.environment-agency.gov.uk/wiyby/37837.aspx>

If your proposed development is located within flood zone 2 or 3 you should consult the Flood Risk and Coastal Change pages of the National Planning Policy Guidance (NPPG) <http://planningguidance.communities.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

From here you can determine whether the flood risk vulnerability of your proposed development and the flood zone are compatible. You can also establish if there are flood risk sequential test and exception test requirements for your proposed development.

If your proposed development is located within flood zone 2 or 3 and its vulnerability and flood zone are considered acceptable under the NPPG then a site specific Flood Risk Assessment (FRA) is required to support any subsequent planning application. This is required by the National Planning Policy Framework (NPPF)

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

Environment Agency
Richard Fairclough House Knutsford Road, Warrington, WA4 1HT.
Customer services line: 03708 506 506
www.gov.uk/environment-agency

Cont/d..

Guidance on the content of a site specific FRA can be found on the NPPG and the government website: <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

We would also recommend the applicant to carry out a full structural survey to establish the culvert condition and the exact depth, size and location of the culvert. Our asset performance team (Asset ID 62861) carry out visual inspection once a year; the last inspection for this site was carried out on 08/10/2018, the primary purpose of these investigations is to check for visual defects or blockages. Any issue identified during this survey will have been reported to the landowner to rectify.

Some activities may require a permit under the Environmental Permitting (England and Wales) Regulations 2016 from the Environment Agency for any proposed works or structures, in, under, over or within eight metres (either side of the center line) of the River Medlock culverted watercourse, designated a 'main river'. This was formerly called a Flood Defence Consent. Some activities are also now [excluded](#) or [exempt](#). A permit is separate to and in addition to any planning permission granted.

Further details of this permit and guidance are available via the GOV.UK website: <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>.

The Environment Agency has discretionary powers to carry out maintenance works on the channels of "main river" watercourses to remove blockages and ensure the free flow of water. Information on riparian landowner's rights and responsibilities can be found at <https://www.gov.uk/guidance/owning-a-watercourse>.

WFD / Biodiversity

The River Medlock is a Water Framework Directive (WFD) classed waterbody (Ref: GB112069061152). The Agency would welcome any opportunities to integrate, and where feasible, to enhance the currently failing WFD waterbody as part of any future development of riparian site; and also the possibility to link with River Medlock restoration proposals identified for the adjoining Philips Park site.

Where appropriate, a WFD Assessment should assess any potential impacts on the watercourse and demonstrate that the required enhancements will be delivered. In some cases the requirements of a WFD assessment can be incorporated into an Environmental Impact Assessment. Any development that has the potential to cause deterioration in classification under WFD or that precludes the recommended actions from being delivered in the future is likely to be considered unacceptable to us;

<http://planningguidance.communities.gov.uk/blog/guidance/water-supply-wastewater-and-water-quality/water-supply-wastewater-and-water-quality-considerations-for-planning-applications/>

The identified site also adjoins the Ashton Canal, a Site of Biological Importance (SBI) and artificial waterbody (WFD ref: GB71210219), we strongly recommend any development proposals preserve and where feasible enhance the environmental quality of this key green infrastructure asset. Consultation is also recommended with the Greater Manchester Ecology Unit (GMEU) and Canal and Rivers Trust (CRT) over development proposals adjoining this local wildlife site.

Contaminated Land

The NPPF takes a precautionary approach to land contamination. Before the principle of development can be determined, land contamination should be investigated to see whether it could preclude certain development due to environmental risk or cost of remediation.

Where contamination is known or suspected, a desk study, site investigation, remediation and other works may be required to enable safe development. The minimum requirements for submission with a planning application are a preliminary risk assessment, i.e. a site walkover or desk top study.

Site investigation and remediation strategy reports may be required for submission with a planning application for sensitive land use types or where significant contamination, or uncertainty, is found. When dealing with land affected by contamination, developers should follow the risk management framework provided in the CLR11, Model Procedures for the Management of Land Contamination:

<https://www.gov.uk/government/publications/managing-land-contamination>

In this instance, we have not undertaken a detailed review of the risk posed to controlled waters from land contamination and would therefore advise that you refer to our published [Guiding Principles for Land Contamination](#) which outlines the approach we would wish to see adopted to managing risks to the water environment from this site.

We also recommend that you consult with the relevant planning authorities Environmental Health / Environmental Protection Department for further advice on generic aspects of land contamination management. Where planning controls are considered necessary we would recommend that you seek to integrate any requirements for human health protection with those for protection of the water environment. This approach is supported by Paragraph 170 of the National Planning Policy Framework.

Waste Material

The CL:AIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/or land development works is waste or has ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be reused on-site providing they are treated to a standard such that they are fit for purpose and unlikely to cause pollution
- treated materials can be transferred between sites as part of a hub and cluster project
- some naturally occurring clean material can be transferred directly between sites

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on-site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

We recommend that developers should refer to:

- the [position statement](#) on the Definition of Waste: Development Industry Code of Practice
- The [waste management](#) page on GOV.UK

Waste to be taken offsite

Contaminated soil that is (or must be) disposed of is waste. Therefore, its handling, transport, treatment and disposal are subject to waste management legislation, which includes:

- Duty of Care Regulations 1991
- Hazardous Waste (England and Wales) Regulations 2005
- Environmental Permitting (England and Wales) Regulations 2016
- The Waste (England and Wales) Regulations 2011

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

If the total quantity of hazardous waste material produced or taken off-site is 500kg or greater in any 12 month period, the developer will need to register with us as a hazardous waste producer. Refer to the [hazardous waste](#) pages on GOV.UK for more information.

Further advice / technical review

Should you wish us to review any technical documents or want further advice to address the environmental issues raised, we may do this as part of our charged for planning advice service.

Further engagement will provide you with the opportunity to discuss and gain our views on potential options, before formally submitting your planning application. It should also result in a better quality and more environmentally sensitive development.

As part of our charged for service we will provide a dedicated project manager to act as a single point of contact to help resolve any problems. We currently charge £100 per hour, plus VAT. We will provide you with an estimated cost for any further discussions or review of documents. The terms and conditions of our charged for service are available [here](#).

If you would like more information on our planning advice service, including a cost estimate, please contact us at SPPlanning.RFH@environment-agency.gov.uk

Should you have any queries regarding this response, then please do not hesitate to contact me.

Yours sincerely

Mr Andy Davies
Sustainable Places Advisor

Direct dial 02077140640

Direct e-mail andy.davies1@environment-agency.gov.uk

Appendix B Consultations

Gabriella Panteli

From: Gabriella Panteli
Sent: 07 February 2020 16:32
To: Gabriella Panteli
Subject: FW: Project Bradford ES scoping opinion

From: Davies, Andy <Andy.Davies1@environment-agency.gov.uk>
Sent: 03 February 2020 14:37
To: Rodoula Gregoriou <Rodoula.Gregoriou@BuroHappold.com>
Cc: Gabriella Panteli <Gabriella.Panteli@BuroHappold.com>; Duncan Ker-Reid <Duncan.Ker-Reid@BuroHappold.com>
Subject: RE: Project Bradford ES scoping opinion

**** External Email ****

Good morning Rodoula,

I've spoken to our flood risk officer and they have advise that if you deem / believe that the proposed development will not be affected by a total or partial collapse due to site topography / character / proximity to the culvert then this can be written into the relating FRA provided that sufficient justification and evidence for this approach is given.

As part of this justification we would recommend that an up to date culvert condition survey report is obtained. A check of any information the EA holds in this regard can be done via GMMC Info Requests InfoRequests.GMMC@environment-agency.gov.uk.

Ultimately the responsibility for the maintenance and repair of a watercourse channel and associated structures remain with the riparian landowner. Information on riparian landowner's rights and responsibilities can be found at <https://www.gov.uk/guidance/owning-a-watercourse>.

I hope the above helps. Any questions or queries as always please don't hesitate to ask.

Regards,

Andy

Andy Davies, BSc (Hons)

Planning Advisor, Sustainable Places Team | Greater Manchester, Merseyside, Cheshire
Environment Agency | Richard Fairclough House, Knutsford Road, Latchford, Warrington WA4 1HT
Email: SPPlanning.RFH@environment-agency.gov.uk
Phone: **0207 7140 640** Internal Phone: 40640 Mobile: **0739 379 8325**



From: Davies, Andy
Sent: 31 January 2020 13:00
To: Rodoula Gregoriou <Rodoula.Gregoriou@BuroHappold.com>
Cc: Gabriella Panteli <Gabriella.Panteli@BuroHappold.com>; Duncan Ker-Reid <Duncan.Ker-Reid@BuroHappold.com>

Reid@BuroHappold.com>

Subject: RE: Project Bradford ES scoping opinion

Afternoon Rodoula,

Thanks for your email and apologies for missing your earlier call.

We appreciate the further clarification on works to be undertaken for the project in relation to FRAP requirements / exemptions.

Regarding the points raised under (b) I have asked for further clarification of the flood risk assessment requirements from our PSO officer in light of the information provided. I should hopefully have an update on this matter for you shortly.

Regards,

Andy

Andy Davies, BSc (Hons)

Planning Advisor, Sustainable Places Team | Greater Manchester, Merseyside, Cheshire

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From: Rodoula Gregoriou [<mailto:Rodoula.Gregoriou@BuroHappold.com>]

Sent: 29 January 2020 10:52

To: Davies, Andy <Andy.Davies1@environment-agency.gov.uk>

Cc: Gabriella Panteli <Gabriella.Panteli@BuroHappold.com>; Duncan Ker-Reid <Duncan.Ker-Reid@BuroHappold.com>

Subject: Project Bradford ES scoping opinion

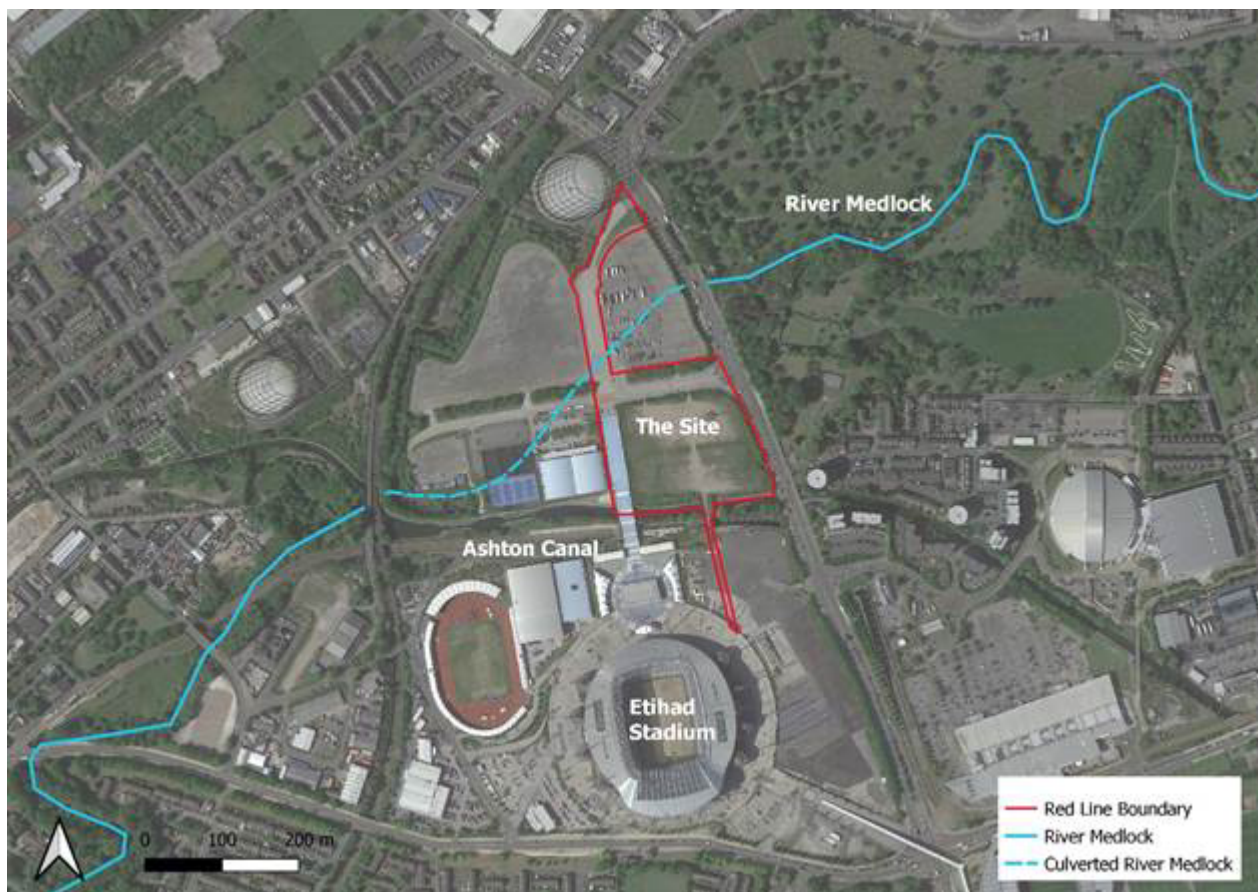
Dear Andy,

We have received the EA's opinion on the ES scoping report (attached). The items raised involve the culverted section of the Medlock, and in particular a) a structural survey of the culvert and b) assessment of flood risk in the instance of collapse of the culvert. We would be grateful if you could provide some clarification on the items.

a) Structural survey of culvert

The red line boundary extends over the River Medlock culvert. The Drain Alert drainage survey (28/08/19) identified the River Medlock 43m north of the arena building's northwestern corner and sections of the culvert provided by Atkins for the Environment Agency in 2008 indicate that the culvert soffit is approximately 4.5m below the ground surface. The alignment of the Medlock is shown in the figure below.

The distance between the arena and the culvert suggests that the likely impact of arena construction on the culvert is not considered to be significant. Any construction works for the arena are anticipated to be more than 8m away from the culverted Medlock and will therefore not require an Environmental Permit.



Some minor works are proposed over and around the culvert, include:

- Replacement of gravel path along the northbound lane of the Joe Mercer Way with a drop-off lay-by; and
- Addition of bicycle racks on the gravel path along the southbound lane.

The proposed works are not intrusive to the culvert and replacement of surfacing and provision of street furniture are not considered to provide a significant burden on the culvert. The works are considered minor works for highways and rights of way on culverts (Environmental Permit information). This is an excluded flood risk activity and an environmental permit is not required.

A structural survey of the culvert is therefore not considered necessary due to the low impact nature of the work at the proximity of the culvert.

b) Consideration of flood risk as a result of a collapse of the culvert

Considering the minor works undertaken at the proximity of the culvert, could you please clarify whether an assessment of the flood risk in the instance of collapse of the culvert is still required and what the scope of that would be?

I would appreciate if you could let me know when is best to call to discuss this further.

Regards,
Rodoula

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