



www.coraiht.com

Corporation Street Manchester. Flood Mitigation Report

Final Report for:



May 2023

Adamson House
Towers Business Park
Wilmslow Road
Manchester
M20 2YY

Email: manchester@coraiht.com

Cora IHT Registered in England No 10321930

Infrastructure Highways Transport

Document Control

Document: Flood Mitigation Report
Client: The Arch Company, 140 London Wall, London, EC2Y 5DN
Project Number: 16-2162
Document Number: T001
Status: Final
Issue: 1

Prepared: GE
Checked: TC
Date: 5th May 2023

Issue Number:	Date:	Revision Details:
1	5 th May 2023	Issue 1
2		
3		

CONTENTS

1.0	INTRODUCTION	3
1.1	Overview	3
1.2	Scope of Strategy	3
2.0	SITE DESCRIPTION.....	4
2.1	Existing Site	4
2.2	Geology	5
2.3	Flood Risk Guidance.....	5
3.0	FLOOD MITIGATION.....	10
3.1	Anticipated Water Levels.....	10
3.2	Flood Mitigation Proposals	12

1.0 INTRODUCTION

1.1 Overview

- 1.1.1 This Flood Risk Mitigation Statement provides information on the existing flood risk category of the site and the suitability of the development for inclusion within the identified zone.
- 1.1.2 The proposal includes the construction of a new substation along Corporation Street, Manchester.
- 1.1.3 This report has been based on the information previously submitted as part of the planning application reference 135342/FO/2022, and the drawing package produced by SGP Architects and Masterplanners
- 1.1.4 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, we reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations.

1.2 Scope of Strategy

- 1.2.1 The following information details the measures that the developer will take to ensure the development proposed satisfies the EA requirements for developments that are in Flood Zone 3.

2.0 SITE DESCRIPTION

2.1 Existing Site

- 2.1.1 The substation provision is proposed to be located between the River Irk and Dantzic Street approximately 845m to the north of Arndale Centre, Manchester, at Ordnance Survey grid reference 384434 , 399319.
- 2.1.2 Historically, the existing site has been used for various material storage and vehicle cleaning services. The surrounding area which was predominantly industrial has been subject to a significant amount of redevelopment for residential uses. **Figure 2.1** show the site location.

Figure 2.1: Aerial Photograph

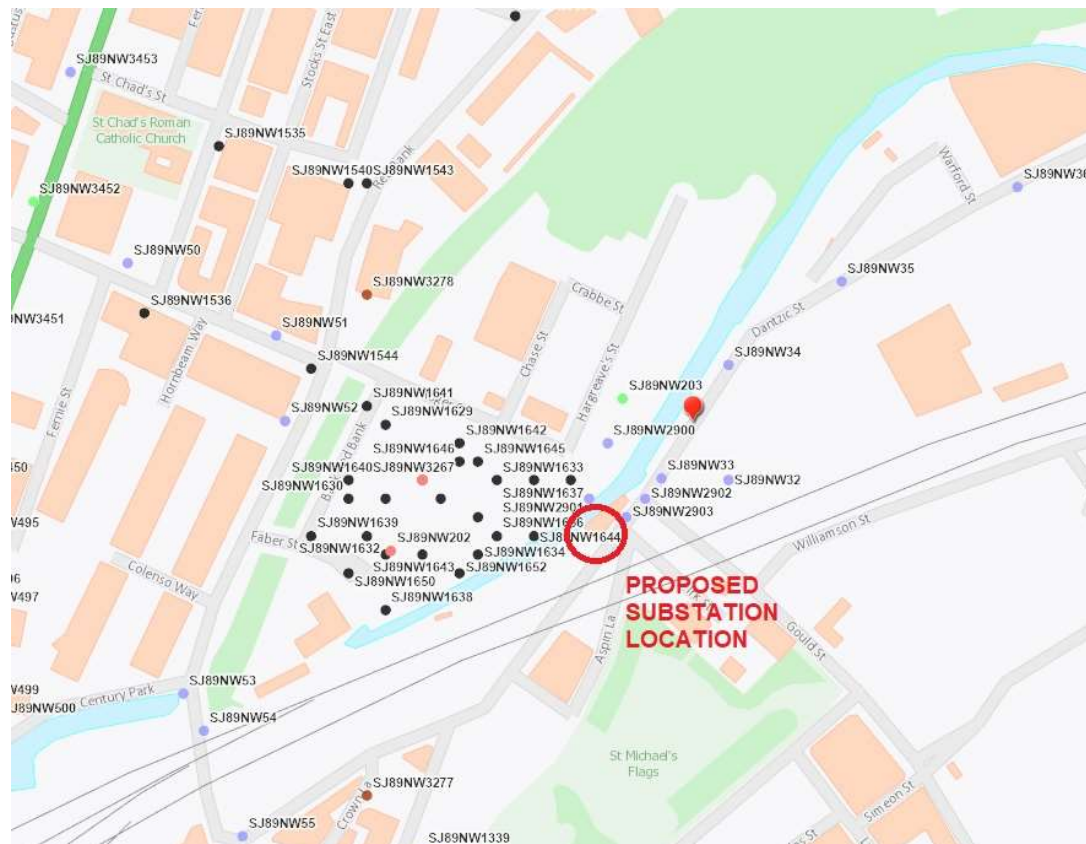


- 2.1.3 The existing site is currently identified as 100% impermeable with existing buildings and external hardstanding's assumed to freely discharge directly to the river, the inclusion of the proposed development does not alter the level of impermeable surface and as such does not increase the current risk of flooding.

2.2 Geology

- 2.2.1 British Geological Survey (BGS) 1:50 000 scale bedrock geology description: Chester Formation - Sandstone. Sedimentary bedrock formed between 250 and 247.1 million years ago during the Triassic period.
- 2.2.2 An historic BGS borehole log is located adjacent to the proposed site referenced as SJ89NW2903 shown in **Figure 2.2**, Borehole log included within **Appendix A**.

Figure 2.2: Borehole Location Plan



2.3 Flood Risk Guidance

- 2.3.1 In March 2012 and further updated in 2018 the Department of Communities and Local Government published National Planning Policy framework document (NPPF) which provides technical guidance on how flood risk should be assessed during the planning and development process.
- 2.3.2 To assess the NPPF flood risk classification for the site the first step was to inspect the Environment Agency web-based flood mapping data for flooding from rivers and seas, surface water and reservoirs. The rivers and sea flood map is used to inform planning of a sites flood zone(s), however the surface water and reservoir flood maps should also be used to identify other flood risks.

- 2.3.3 The Flooding to the site from rivers and seas is shown in **Figure 2.3** below and it can be seen that the proposed site area is located wholly within Flood Zone 3.

Figure 2.3 - Environment Agency Flood Map (Rivers and Sea)



- 2.3.4 From the Environment Agency flooding from rivers and seas map:
- Locations in flood zone 3 have a high probability of flooding. This means in any year land has a 1% or more chance of flooding from rivers, or a 0.5% or more chance of flooding from the sea.*
- 2.3.5 Flood zone 3 developments need to submit a flood risk assessment as part of their planning application.
- 2.3.6 Table 2 within the National Planning Policy Framework Technical Guidance (NPPF) indicates that the proposed substation is designated as Essential Infrastructure see Figure 2.4 below.
- 2.3.7 Table 3 of the NPPF indicates that Essential Infrastructure is acceptable for areas designated as Flood Zone 3 following the inclusion of an exception test.

Figure 2.4 – NPPF TABLE 2

Table 2: Flood risk vulnerability classification

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use³. • Installations requiring hazardous substances consent⁴. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as “essential infrastructure”)⁵.
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non–residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste⁶. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan</i>.⁷
Less vulnerable • Police, ambulance and fire stations which are <i>not</i> required to be operational during flooding. • Buildings used for shops, financial, professional and other services,

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
 × Development should not be permitted.

Notes to table 3:

This table does not show:

- the application of the Sequential Test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3;
- flood risk assessment requirements; or
- the policy aims for each flood zone.

- 2.3.8 Prior to completing an Exception Test it is first required to complete a sequential test, which aims to steer development to the lowest category of flooding as possible.
- 2.3.9 The proposed site could be designated as “**minor development**” which under the current guidance indicates that a sequential test is not applicable.
- 2.3.10 Although a sequential test is not strictly necessary, for completeness a sequential test has been applied to the site and unfortunately due the requirement to locate the substation within a set distance from the end user to avoid voltage drop through the network, there are no viable alternatives in a lower category of flooding, as such current guidance dictates that

If your sequential test shows that it isn’t possible to use an alternative site you’ll need to do another test called the exception test if your development is:

2.3.11 The Exception Test requires two additional elements to be satisfied (as set out in paragraph 164 of the National Planning Policy Framework) before allowing development to be allocated or permitted in situations where suitable sites at lower risk of flooding are not available following application of the sequential test.

It should be demonstrated that:

- *development that has to be in a flood risk area will provide wider sustainability benefits to the community that outweigh flood risk; and*
- *the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*

The above criteria have been satisfied by the evidence below:

Sustainable Benefits

- The existing site has historically been used for the storage of various construction materials together with business premises that have formally been used for Vehicle cleaning and maintenance. Given the flood risk status of the site in combination with the above uses has previously presented the significant opportunity for the various detergents and chemicals used during the cleaning process to potentially enter the River Irk.

The proposed development removes the potential for these liquids to enter the which presents a much wider sustainability benefit to the community which outweighs the flood risk for the site.

Lifetime Safety

- Following installation, the substation will only ever need to be accessed by specialist maintenance engineers, as such the flood risk to its users would be considered extremely low due to the anticipated infrequent nature of ongoing servicing.

Should attendance be required, The Environment Agency are responsible for issuing flood warnings throughout England and Wales, prior to attendance the flood warning service for the next 5 days should be interrogated so safe access can be effectively achieved.

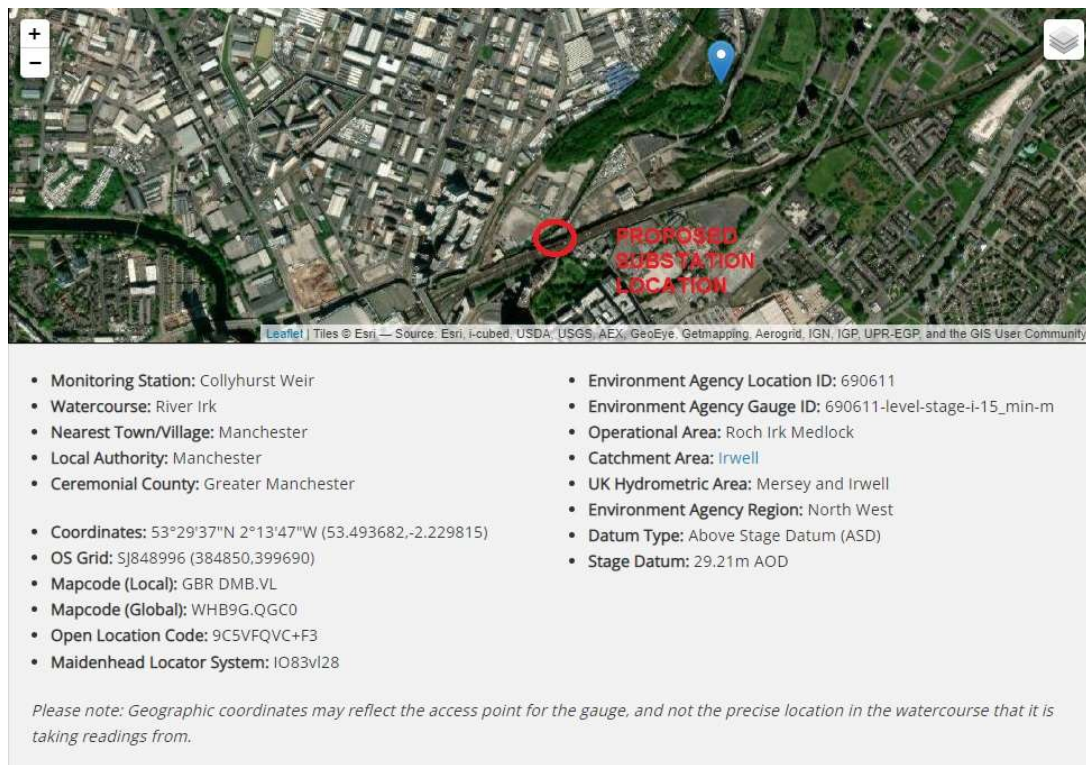
The substation must also will also be constructed with flood resilience guidance provided by the utility operator to protect the internal equipment during times of flood.

3.0 FLOOD MITIGATION

3.1 Anticipated Water Levels

- 3.1.1 In order to establish the maximum water level to be experienced from the adjacent watercourse the information obtained from the Collyhurst Weir Monitoring station, ID number 5034 has been used. The Location is shown in **Figure 3.1**.

Figure 3.1 – Monitoring Station Position



- 3.1.2 The current water level was identified as 0.15 shown in Figure 3.2 below however the top of the normal range was recorded as 0.80m, with the maximum water level ever recorded at the station shown as 1.43m recorded on the 16th March 2019.
- 3.1.3 The level at which property flooding could be realised has been identified as 1.36m

Figure 3.2 – Monitoring Station River Irk Level at Collyhurst Weir

River Irk level at Collyhurst Weir

[View map](#) [Nearby levels](#)

Latest at 11:00pm on 2 May ①

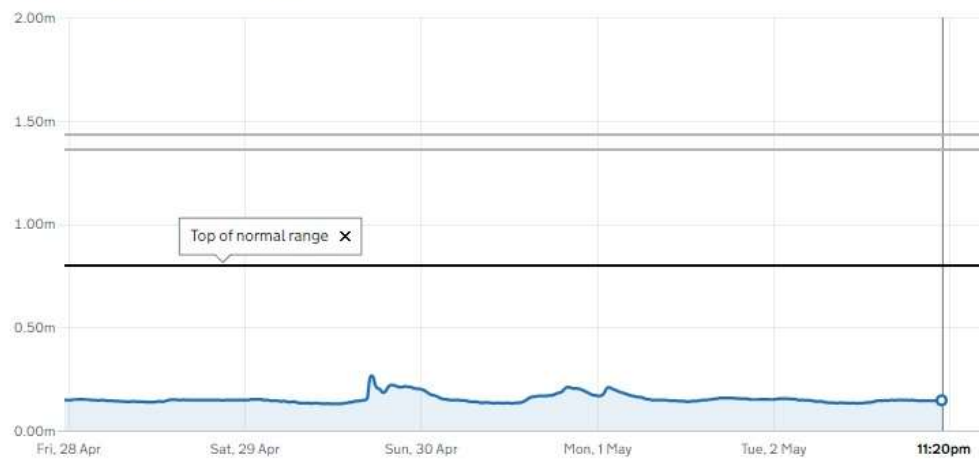
Height
0.15m ①

Trend
Steady ①

State
Normal ①

Normal range 0.12m to 0.80m

Height over the last 5 days



[Download height data CSV \(12KB\)](#)

How levels here could affect nearby areas

1.43m	Water reaches the highest level recorded at this measuring station (recorded on 16 March 2019)	Show on chart
1.36m	Property flooding is possible above this level. One or more flood warnings may be issued	Show on chart
0.80m	This is the top of the normal range	Show on chart
0.15m	Latest level	

No two flood events are the same. Flooding might not happen again at the same historical levels if, for example, flood defences are now in place.

- 3.1.4 The monitoring station is set at a datum of 29.21 AOD shown in Figure 3.3 which would indicate top of water levels in the current, Top of normal range and maximum recorded levels.

Figure 3.3 – Monitoring Station Technical Information

Current Water Level – 29.36

Top of Normal Range – 30.01

Max Recorded Level – 30.64

▼ [View technical information for this measuring station](#)

Site datum	29.21m (Above Ordnance Datum)
Station name	Collyhurst Weir
Normal range	0.12m to 0.80m
Station ID	5034

- 3.1.5 Due to the infrequent nature of the storm experienced during 2019 which has not been experienced again since, the maximum recorded flood level of 1.43m has been excluded from the study, with the top of normal range of 0.8m used to inform the current proposal.
- 3.1.6 The current level of the site shown on SGP drawing reference 19-259-014 included within the Appendix B has been identified as 29.60 with the elevation of the River Irk to the rear of the site estimated at a minimum of 1.5m below at 28.10.
- 3.1.7 Using the estimated level of the River Irk and applying the top of normal range value of 0.80m the top water level to be applied to the site is identified as 28.90.
- 3.1.8 Taking into consideration the anticipated top of normal range water level within the River Irk and the proposed site level, during this event the proposed site level remains 700mm higher which is in excess of the requisite freeboard allowances anticipated as 500mm above the top water level.

3.2 Flood Mitigation Proposals

- 3.2.1 Although the proposed site level is anticipated to exceed the top of normal range level, the inclusion of flood resilient measures in line with the guidance provided should be employed.
- 3.2.2 The use of flood gates to the substation should be considered as an additional level of flood protection as long as this doesn't prevent level access for servicing and maintenance.

Appendices

Appendix A



GROUND TESTS LIMITED		GROUND LEVEL		SITE											
-BOREHOLE RECORD-		WATER OBSERVED AT		JOB REF.											
		STANDING WATER LEVEL		BOREHOLE NO.											
DESCRIPTION OF STRATA		Type & Size of Hole	Depth m	SAMPLES	SYMBOLS	LEVEL	SPT N VALUE	Unconfined Compressive Strength kN/m ²	Penetration Test kN/m ²	Notes on Character of Drilling Water/Air Return	Apparent Cohesion kN/m ²	Angle of Internal Friction °	Bulk Density kg/m ³	Moisture Content %	5 - Shell and Auger
0-0.18 m Road setts with tarmac surfacing	S152 mm					29.37									H - Hand Auger
0.18-1.37 m Clay, stone, cinder, ash and brick rubble FILL						28.18									C - Cored Hole
1.37-2.74 m Soft/loose principally clay FILL with occasional pieces of stone			1.91				4								A - Open Hole Air
2.74-3.50 m Moist to wet silty brown sand FILL with traces of cinder and brick rubble			2			26.81									W - Open Hole Water
3.50-4.06 m Dense to very dense reddish brown silty fine to medium grained partially cemented sand (Bunter Sandstone)			3.55			26.05	80	blows for 0.20 m penetration							Undisturbed Sample Obtained
4.06-7.75 m Very dense partially cemented sand (Bunter Sandstone)			4.06			25.49	80	blows for 0.06 m penetration							Undisturbed Sample Attempted No Recovery
			5												Disturbed or Water Sample Taken
			5.59				80	blows for 0.05 m penetration							B - Bulk Sample
			6												
			7.09				80	blows for 0.08 m penetration							
			7.70			21.80	85	blows for 0.05 m penetration							
Hole terminated at 7.75 m			8												
			9												
			10												

Chisel used in fill for 1 hr.
Drilling in very dense partially cemented sand 1 1/2 hrs.

Appendix B



