Upper Brook Street

Condition 61 Statement

REPORT ISSUE TABLE

Purpose of Issue	Revision	Date	Prepared By	Checked By
Drainage Statement relating to Condition 61	P03	11.09.25	JT	JC

This drainage statement has been prepared in relation to condition 61 and relates to the flood mitigation measures, with respect to Civic Engineers Flood Risk and Drainage Assessment - 2584-CIV-XX-XX-R-C-30001, received and approved by the City Council as the Local Planning Authority.

The development is within Flood zone 2 on account of flood mapping from rivers or the sea and surface water. The extent of flooding to the site in both scenarios shows the majority of the site to be flood zone 1 or low / very low risk with the areas of flood zone 2 or medium risk in the external area between the two new builds. This area will remain external and be used for public realm. The EA provided product 4 flood level data for the development which indicates the flood risk develops from the Cornbrook, circa 140m south of the development. The anticipated 1:100 + 35% flood level for the site is 38.497m. The finished flood levels for the building has been set with consideration for the existing site levels and tying into the off-site highway, as well as for mitigation of flood risk. The FFL has been set at 38.600m, with no basement and with falls away from the building around the extremity. The external areas are proposed to be lower than the FFL with low points within the landscaping used as SuDS features to direct any potential surface water flooding away from buildings. As such, the risk to buildings was identified within the planning approved Flood Risk Assessment at low risk.

Roscoe confirms that all forms of other flood risk associated with the proposed development, as assessed and reported in the planning-approved Flood Risk and Drainage Assessment (Ref: 2584-CIV-XX-XX-R-C-30001), have been determined to be either very low or low. The details contained within this report represent the full and final flood assessment. As such, no further flood risk mitigation measures are considered necessary.



January 2024

Civic Engineers

Flood Risk Assessment and Drainage Strategy

Upper Brook Street Masterplan (McLaren / Kadans)

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Flood Risk Assessment

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Civic Job No.	2584
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1. Introduction

1.1 *Scope and Objectives*

This report has been prepared by Civic Engineers Ltd on behalf of McLaren Property Ltd. and Kadans Science Partner, to support a full planning application for a Sci-Tech and purpose-built student accommodation scheme (PBSA) scheme (hereafter referred to as the 'Proposed Development') on Phase One of the Upper Brook Street Masterplan (hereafter referred to as the 'Site'). This scheme would bring forward development on a Previously Developed site which is earmarked for commercial and PBSA uses in the Oxford Road Corridor SRFG 2019. This application has been accompanied by a suite of technical documents, reports, and plans.

Civic Engineers Ltd has been appointed by McLaren Property to prepare a Flood Risk Assessment to support a full planning application for the redevelopment of Phase 1 of Upper Brook Street Masterplan. This Flood Risk Assessment applies to the northern section of the site, where the PBSA building will be located.

The Flood Risk Assessment presented herein will demonstrate that the proposed development will be safe from flooding and will not pose a flood risk to sites elsewhere. This Flood Risk Assessment will:

- Investigate all potential risks of flooding to the site.
- Consider the impact the development may have elsewhere with regards to flooding.
- Consider proposals to mitigate any potential risk of flooding determined to be present; and
- Consider drainage proposals to mitigate flood risk from the site.

This report reviews the following information:

- Environment Agency Online Flood mapping
- UK Government Long Term Flood Risk Information for surface water flooding and reservoir flooding.
- United Utilities Asset Maps
- A2 Phase 1 Desk Study

1.2 *Development Proposals*

The proposed development is to consist of:

"Full planning permission for the demolition of existing buildings and erection of a single 6 to 9 storey block for Sci-Tech use (Use Class E (g)(ii) and 267sqm of a café/bar (Use Class E (b), and a single 9 to 23 storey block to be used for Purpose Built Student Accommodation (Use Sui Generis), comprising 737 bedrooms in total and 293sqm of community use (Use Class F2 (b) and 80sqm of commercial floorspace (Use Class E) on Phase one of the Upper Brook Street Masterplan."

"Purpose Built Student Accommodation (PBSA) - The proposed building provides 737 student bedrooms (288 studios and 449 cluster bedrooms arranged in a variety of cluster sizes), student

amenities, management suite, commercial/ community spaces and supporting ancillary areas. The proposed PBSA scheme is arranged in two parallel building blocks with central cores, which are linked on the ground floor to form spaces for indoor and outdoor student amenities. The block facing Upper Brook Street has 23 storeys and the block facing Kincardine Road has 9 storeys."

The development involves the demolition of the existing Citroen Car dealership to allow the construction of a new 9 - 23 storey PBSA building comprising of 737 rooms.

There are two developments proposed within the overall boundary of the planning application for Phase 1 of the upper Brook Street Masterplan. Both sites are adjoined via public realm spaces at ground level, which allow foot and cycle travel from Upper Brook Street through to Kincardine Road.

This report focuses on the site northbound of the wider site (site 1, Figure 1).

The surface water drainage proposals will consist of permeable paving and an attenuation tank along with soft landscaped areas.

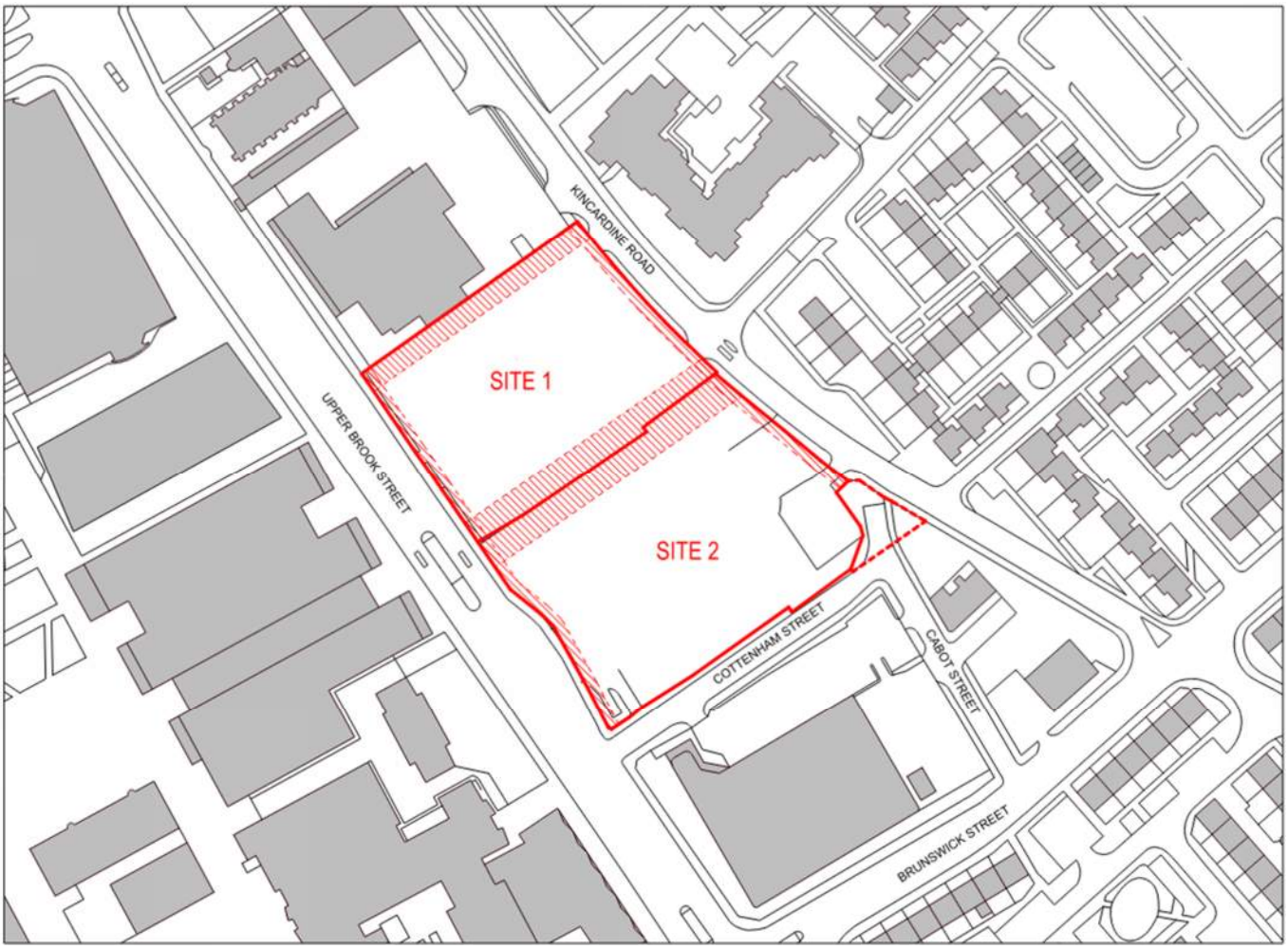


Figure 1: Site locations

2. Existing Site Details

2.1 *Location*

The site is located at 53-57 Upper Brook Street (A34), Manchester, less than 1 mile from the city centre. The approximate post code is M13 9JA. It is located directly opposite the Alan Turing Building and the Manchester Institute for Mathematics. To the east of the site is residential street Kincardine Road.

"The Site extends to 1.084 hectares (ha) and is partially in use as a temporary paid car park. The paid car park is located on a section of the Site which was formerly in use as a Citroën car dealership and is accessed from both Upper Brook Street (UBS) to the west and Kincardine Road to the east. The remainder of the Site comprises the former Elizabeth Yarwood Court residential complex, which is accessed from Kincardine Road to the east of the Site. The Site is identified for redevelopment within the Oxford Road Corridor SRF with mixed commercial uses in-line with the SRF being a priority for the UBS site. The Proposed Development forms one element of the wider Upper Brook Street Illustrative Masterplan which can be seen within the submitted Supporting Planning Statement. The masterplan proposals are being brought forward by Kadans Science Partner, McLaren Property, Property Alliance Group and Moda Living. The masterplan intends to transform the currently vacant sites, re-establishing their important role in the area by reintroducing permeability, public realm, and active community-facing uses at ground floor. The emerging masterplan includes over 2 acres of new public realm and green spaces, a new public square, as well as a series of high-quality new buildings of varying heights to provide for approximately 700,000ft2 of sci-tech accommodation, 1,800 purpose-built student accommodation beds, and 25,000ft2 of active ground floor uses.

The existing land uses surrounding the site are as follows:

• To the north of the Site is a vacant single-storey commercial building (also identified for redevelopment within the Oxford Road Corridor SRF) and the Grade II listed 'Former Unitarian Chapel' which now functions as student accommodation.*

• To the east of the Site is Kincardine Road; beyond which is a 4 to 6-storey student accommodation building and 2-storey residential dwellings that form a part of the wider Brunswick Estate. The Brunswick Estate is an area currently undergoing extensive urban regeneration (see Cumulative Scheme 1 (Brunswick Neighbourhood)).

• To the south of the Site is Cottenham Street; beyond which is the Tai Wu restaurant and W.H. Lung Supermarket.

• To the west of the Site is UBS, on the opposite side of which is the University of Manchester's Main Campus, which includes the National Graphene Institute, the Manchester Engineering Campus and the Sir Henry Royce Institute, with buildings ranging from 4-storeys to 10-storeys in height."

This report focuses on the site northbound of the wider site (site 1, Figure 1). The site is approximately 0.45ha. The OS grid coordinates at the approximate centre of the site are 384820, 396905.



Figure 2: Site Location Plan Google Maps

2.2 *Current and Historic Use*

A phase 1 desk study carried out by A2 found that the current car dealership on site was built in 1999 along with the associated parking to the north. Prior to this there were residential properties with gardens, followed by a timber yard. An extract of the historical on-site uses can be seen in **Figure 3**.

The Citroen car dealership closed permanently circa 2017. The dealership building is unoccupied, however, outdoor space within the property that was previously used to store and exhibit cars is now a Pay & Display car park owned by SiP. The existing 1-storey building will be demolished to make way for the new development.

Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
	On-Site			
Semi-detached residential properties with large gardens	-	1848	1860	Yes
Terraced residential properties with small gardens alongside the original semi-detached properties	-	1891	1960	Yes
Robert Street runs along the northern boundary of the site	-	1891	1983	Yes
Timber Yard in the centre of the site	-	1891	1891	Yes
Multiple works across the site	-	1948	1960	Yes
Auction Rooms	-	1969	1969	No (It is assumed that this is merely a repurpose of an existing works building and therefore not a source of contamination)
Works	-	1978	1978	Yes
Large commercial property and associated parking to the north of the site	-	1999	Present	Yes
Car dealership structure on the south-eastern border of the site	-	1999	Present	Yes
Elizabeth Yarwood Court to the south of the site	-	1960	Present	No (Residential use – unlikely source of contamination)

Figure 3: On-site History extract from A2 phase 1 desk study

2.3 *Existing Watercourse and Waterbodies*

The river Medlock, classified as a main river by the EA, is approximately 610m north of the site.

Following our initial predevelopment enquiry (PDE) to UU, they informed us of a culvert located approximately 140m south of the site, shown in Figure 5. This is under investigation with LLFA to confirm existence.



Figure 4: EA Statutory Main River Map

2.4 *Existing Drainage*

Plans provided by United Utilities (UU) which indicate the sewer network within the vicinity of the site are included in Appendix A of this report, along with the CCTV survey.

The UU asset maps indicate the following public infrastructure:

- Existing 525 DIA UU vitrified clay combined public sewer pipe running along Whitekirk Close, north of the site.
- A combined manhole located within the eastern corner of the development.
- The 525 DIA combined sewer continues along the north-eastern perimeter of the site and exits to the north.
- A 600x750 combined sewer manhole located near the northern corner of the site with the downstream pipe connecting into a manhole located within Upper Brook Street. This sewer will be abandoned as part of the proposed works through an S185 agreement with UU.
- Distribution water main running along Upper Brook Street
- Trunk water main running along Kinkardine road.

A sewer easement (tbc with UU) will need to be applied to these assets if they are to remain.

Layer Surveys CCTV survey identified a surface water network within the site boundary starting in the south and north corners running to a downstream manhole located in the northeast corner of the site. This network is likely to be private and serving the existing building. Reuse of these existing runs are to be explored as an option. The invert levels provided within the CCTV survey indicate depths ranging from 1.3m to 1.88m. Review of the condition highlights jetting of the system will be required.

Following our initial predevelopment enquiry (PDE) to UU, they advised their preference would be for surface water to be discharged to the culverted Cornbrook located approximately 140m south of the site, shown in Figure 5. Due to the distance from the site, it may not be feasible to introduce an off-site sewer to convey surface water to this watercourse. A request was submitted to the LLFA to understand the feasibility of connection further.



Figure 5: Location of Culvert provided by UU

2.5 *Topography*

A topographical survey, included in Appendix B, was undertaken by ND Oliver in April 2022. The existing site surface is generally flat with the highest level sitting at 38.93mAOD along Kincardine Road boundary with the lowest point of 38.53m AOD along the southern boundary.

2.6 *Geology*

Manchester overlies a complex mixture of numerous bedrock formations, predominantly sandstone. A geology map extract from the phase 1 desk study, shown in Figure 6, indicates the site is underlain by superficial deposits of glacial till. Below ground strata is to be clarified following receipt of the intrusive investigation report.

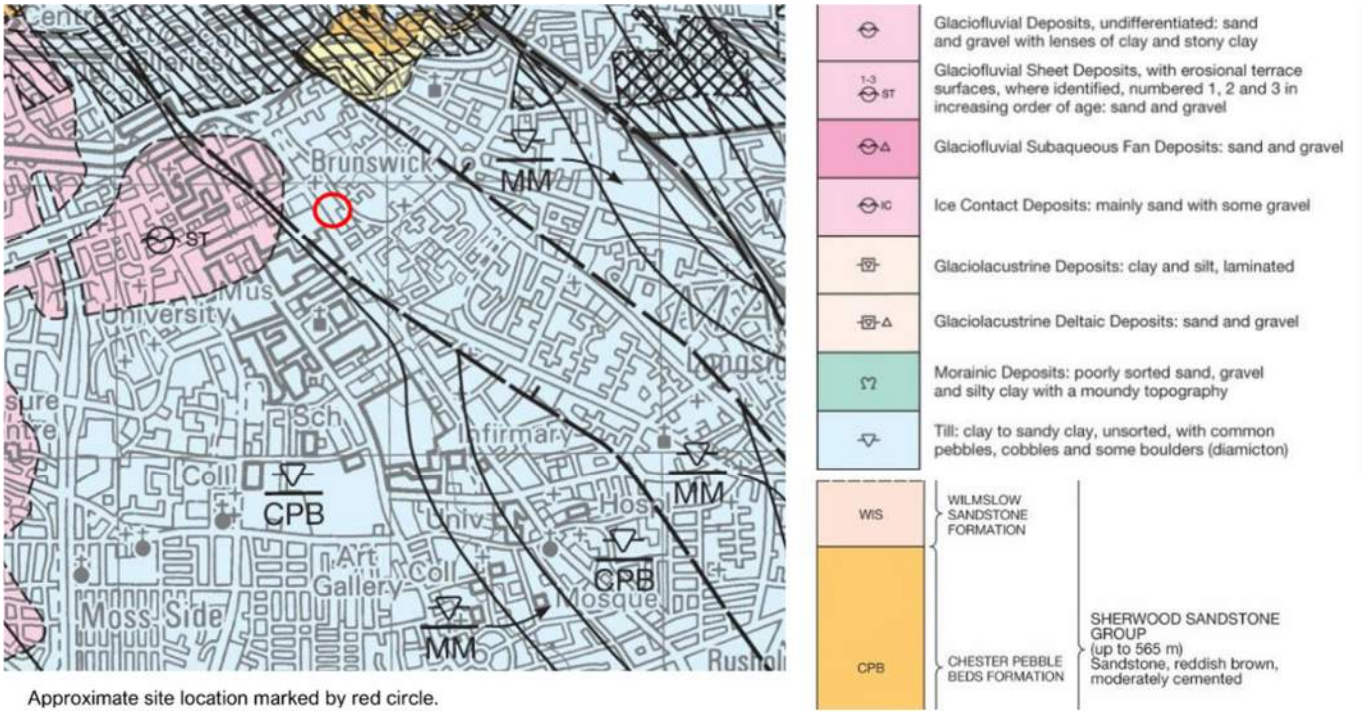


Figure 6: Geology map extract from phase 1 desk study

The British Geological Survey (BGS) Geology of Britain web map services provides access to the geographic locations and logs of historical borehole investigations. Historical boreholes within and surrounding the site are shown in Figure 7.

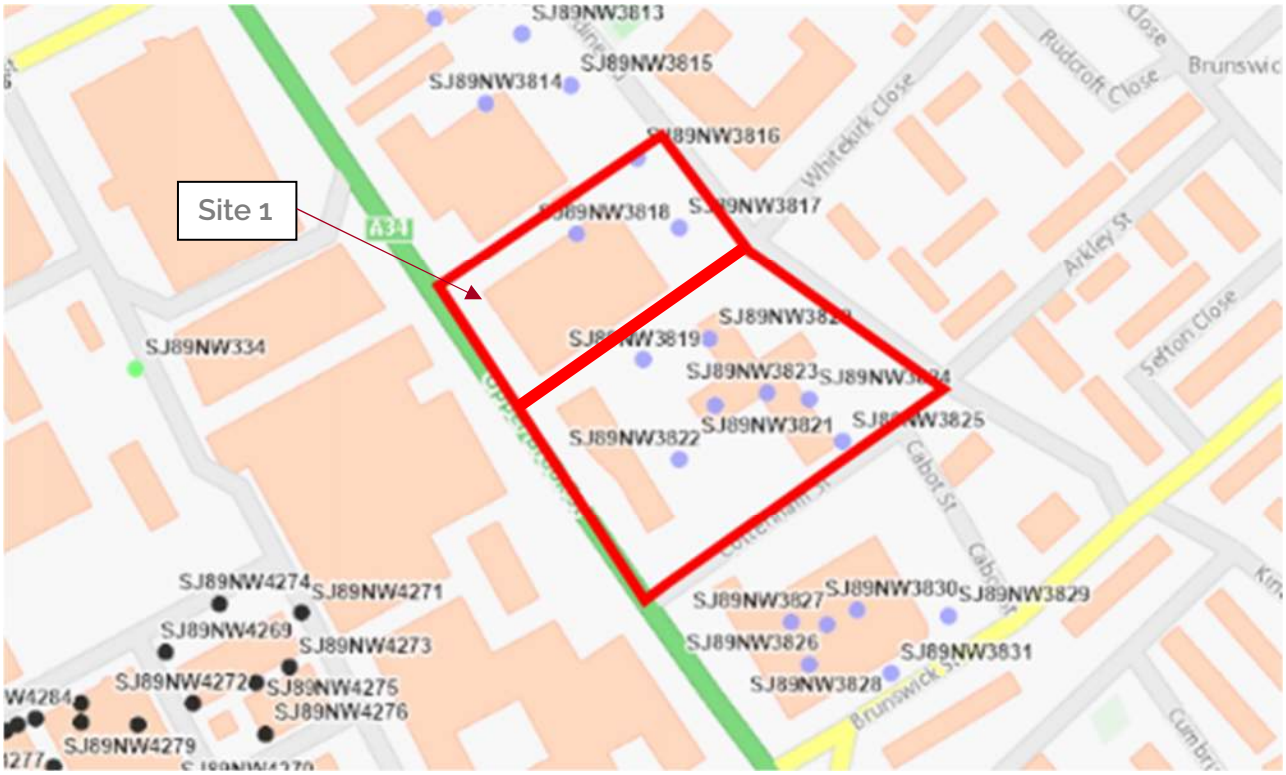
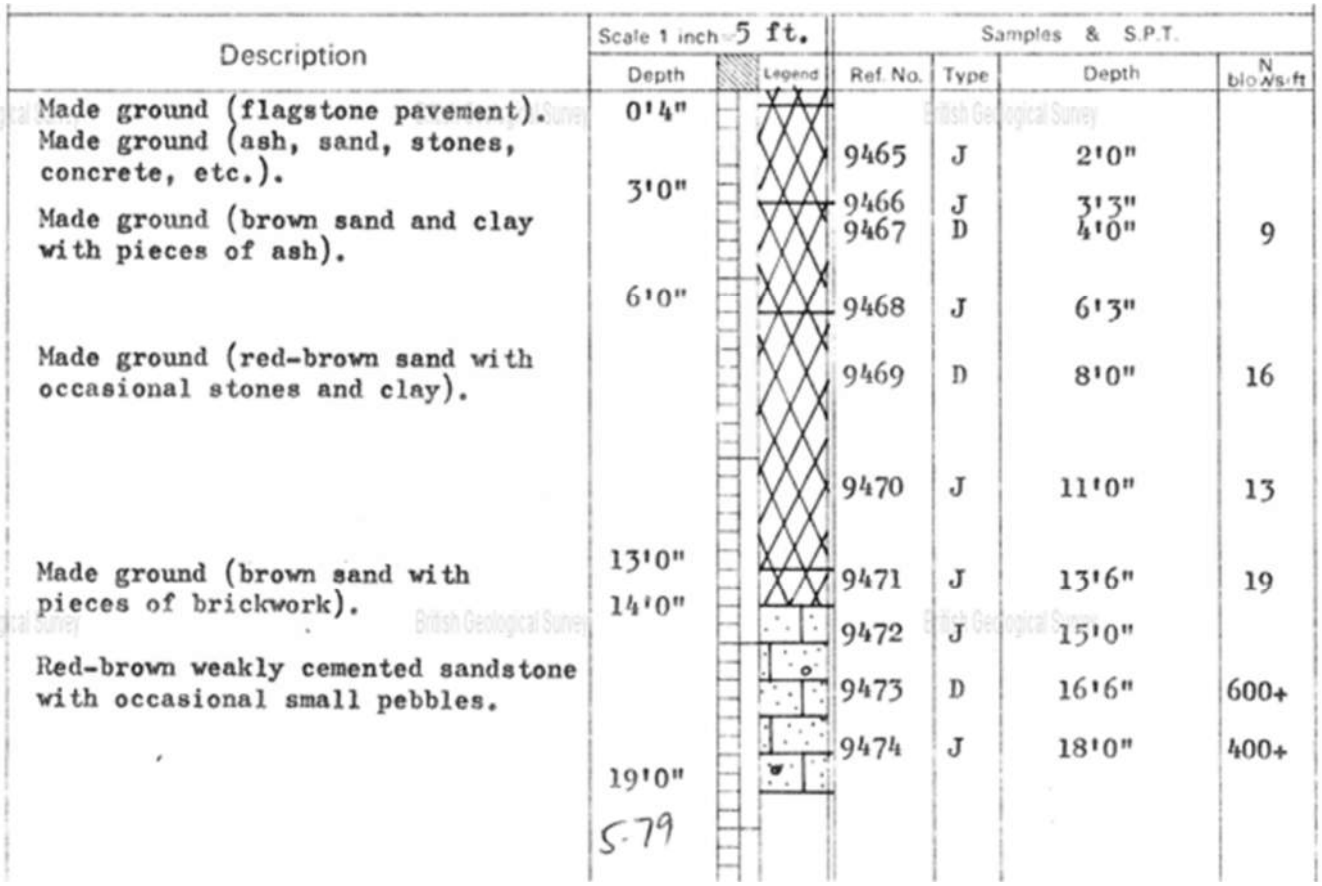


Figure 7: Locations of BGS boreholes in close proximity to the site boundary

The borehole scans of the two logs located within the site 1 boundary (logs SJ89NW3818 and SJ89NW3817) indicate deep made ground above sandstone. An extract of the borehole log SJ89NW3818 can be seen in Figure 8.



Description	Depth	Legend	Ref. No.	Type	Depth	N blows/ft
Made ground (flagstone pavement).	0'4"					
Made ground (ash, sand, stones, concrete, etc.).	3'0"		9465	J	2'0"	
Made ground (brown sand and clay with pieces of ash).			9466	J	3'3"	
			9467	D	4'0"	9
	6'0"		9468	J	6'3"	
Made ground (red-brown sand with occasional stones and clay).			9469	D	8'0"	16
			9470	J	11'0"	13
Made ground (brown sand with pieces of brickwork).	13'0"		9471	J	13'6"	19
	14'0"		9472	J	15'0"	
Red-brown weakly cemented sandstone with occasional small pebbles.			9473	D	16'6"	600+
			9474	J	18'0"	400+
	19'0"					
	5.79					

Scale 1 inch = 5 ft.

Samples & S.P.T.

Figure 8: BGS Borehole SJ89NW3818 log

3. Relevant Policy and Guidance

3.1 *National Planning Policy Framework (NPPF)*

In July 2021, the Ministry of Housing, Communities and Local Government revised the National Planning Policy Framework document (NPPF) and the Planning Practice Guidance which provides guidance on how flood risk should be assessed during the planning and development process.

The NPPF refers to the Flood Zones which are shown on the Environment Agency Flood Map, and establishes the range of uses which are appropriate, or compatible, land uses for each Flood Zone.

The Flood Zones can be summarised as follows:

Zone 1: Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year. (<0.1%)

Zone 2: Medium Probability. This zone comprises land assessed as having between 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

Zone 3a: High Probability. This zone comprises land assessed as having 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Zone 3b: Functional Flood Plain. This zone comprises land where water must flow or be stored in times of flood. Strategic Flood Risk Assessments should identify this zone.

Annex 3 of the National Planning Policy Framework (NPPF) 2021 defines the type and nature of different development classifications in the context of their flood risk vulnerability. The following extract below outlines the NPPF Flood Risk Vulnerability Classifications.

HIGHLY VULNERABLE

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (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'.)

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 waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

LESS VULNERABLE

- Police, ambulance and fire stations which are not required to be operational during flooding.

- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

WATER-COMPATIBLE DEVELOPMENT

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

The flood risk vulnerability and flood zone 'compatibility' has been summarised in Table 1 below. The EA presents a set of recommendations based on the level of vulnerability of a proposed structure and its Flood Zone.

The site is within the 'more vulnerable' category for development, meaning it meets the criteria for the development without the need for an exception test.

Table 1: Flood Risk vulnerability and Flood Zone compatibility from NPPF Technical Guide

Flood Risk Vulnerability Classification		Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
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	×	×	×	√
	√ Development is appropriate		× Development should not be permitted.			

3.2 *Site Specific NPPF Flood Risk Categorisation*

To assess the NPPF flood risk classification for the site, the Government web based 'Flood Map for Planning' is reviewed, the flood map identifies the probability of flooding from rivers or sea (not taking into account the presence of flood defences). The Government web based 'Long Term Flood Risk Assessment for Locations in England' was also used to identify the flood risks from rivers and seas, surface water and reservoirs. The Flood Map for Planning and surrounding areas is shown as Figure 9.

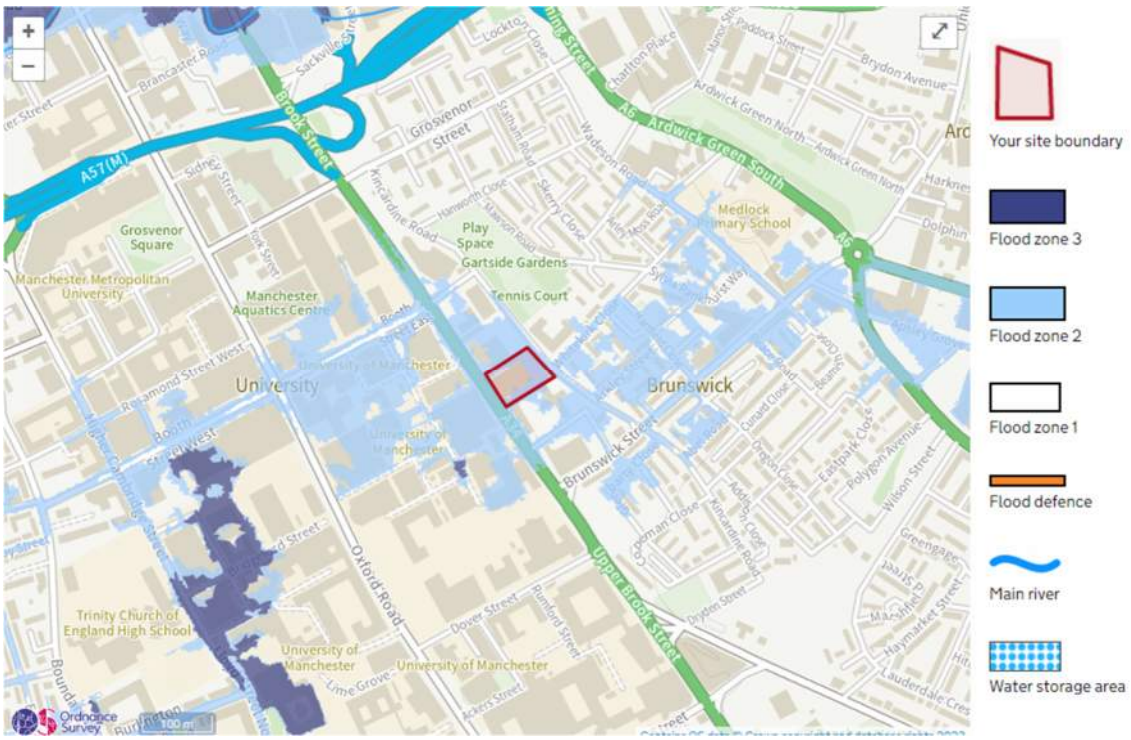


Figure 9 EA Flood Map

3.3 *Manchester City Council Strategic Flood Risk Assessment (SFRA) and Manchester Core Strategy 2012*

Manchester City Council SFRA states:

"Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates 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."

Policy EN 14 (Flood Risk) of the Manchester Core Strategy requires that:

- In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.

- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SuDS) and the appropriate use of Green Infrastructure.

- Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

The City of Manchester contains many sections of rivers which are culverted or 'hidden'. Where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.

4. Flood Risk Assessment

The potential sources of flooding to the development have been assessed and are discussed below.

4.1 *Tidal/ Fluvial Flooding (Rivers and Sea)*

From the Government flood map for planning:

- Where a site is located in a dark blue shaded zone, this indicates that the site is within Flood Zone 3 where there is a chance of flooding of 1 in 100 (1%) or greater.

- Where a site is located in a light blue shaded zone; this indicates that the site is within Flood Zone 2 where there is a chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%).

- Where a site is located in a white (unshaded) area, it is generally deemed to be classified as Flood Zone 1 where there is a chance of flooding of less than 1 in 1000 (0.1%).

The 'Flood Map for Planning', shown in Figure 10 indicates a medium probability of annual flooding from rivers and sea. The proposed developments ground floor level will be built up from the flood levels of the site. This will reduce the risk of flooding from rivers and sea to low.

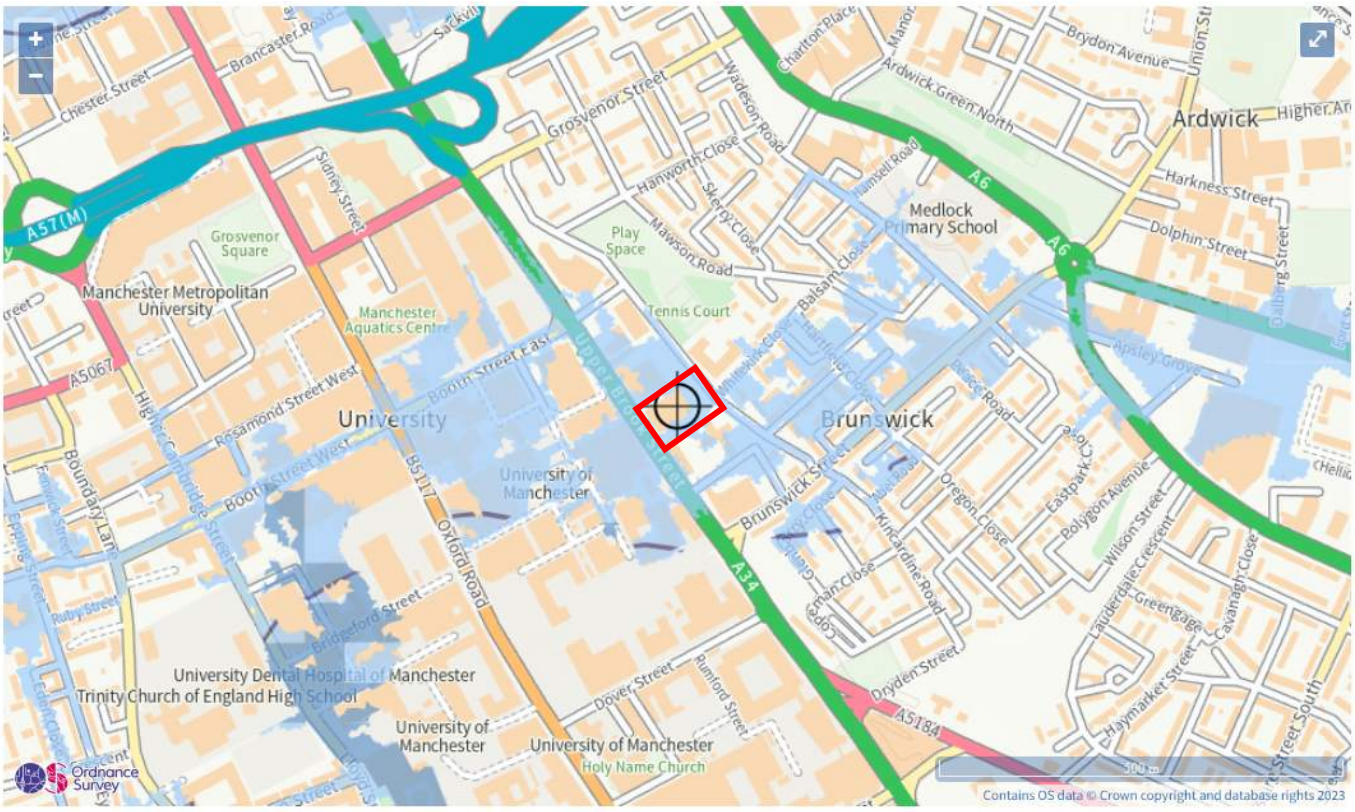


Figure 10: Flood Risk Map from rivers or sea

4.2 *Reservoir Flooding*

The closest reservoir to the development is Gorton Lower Reservoir, located approximately 4.6km east of the site. An area is considered at risk if people's lives could be threatened in the event of a dam or reservoir failure, and the site would be vulnerable in the event of reservoir breach. Owing to the fact that the maintenance of reservoirs is extremely stringent, flooding is extremely unlikely to happen. There has also been no recorded loss of life in the UK from reservoir flooding since 1925.

Therefore, the risk of flooding by reservoir failure is deemed to be very low risk.

4.3 *Groundwater Flooding*

The Manchester Level 2 SFRA Groundwater Flooding map, in Appendix A, shows the site to be situated within an area that is not at risk of groundwater flooding. No basements are proposed for the development, therefore there will be no impact on the nominal flow of groundwater beneath the site.

As such the risk of groundwater flooding to the development is deemed to be low.

4.4 *Public Sewers, Highway Drainage Flooding, and Infrastructure Failure*

UU are unable to disclose if there has been previous flooding of their assets within the vicinity of the site. In following the SuDS Hierarchy, if it is deemed necessary to connect to the existing UU network, UU have recommended keeping the proposed network shallow and backdropping into the existing network.

Providing United Utilities and Manchester City Council maintain their drainage assets in the surrounding area of the site, the risk of flooding to the proposed development site from public sewer or highway drainage is low.

4.5 *Surface Water Flooding to the site*

Surface water flooding can be caused when rainwater, during extreme rainfall events, does not drain away through the normal drainage system or soak into the ground. Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.

Surface water flooding is dependant primarily on topography which dictates either the flow path of overland flow which is not contained within public sewers, or areas in which ponding may occur. Surface water flooding is more difficult to predict than the risk of flooding from Rivers or Sea as it is dependent on the amount of rain which will fall in a very localised area, the specific topography of that region and the capacity and functionality of the drainage network within that section.

From the UK Government's Flood Risk from Surface Water (extent of flooding) map.

- Where a site is in a dark blue shaded zone, this indicates that the site is at high risk of flooding where there is a chance of flooding of greater than 1 in 30 (3.3%).
- Where a site is in a mid-blue shaded zone, this indicates that the site is at medium risk of flooding where there is a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%).
- Where a site is in a light blue shaded zone; this indicates that the site is at low risk of flooding where there is a chance of flooding between 1 in 1000 (0.1%) and 1 in 100 (1%).
- Where a site is in a white (unshaded) area; this indicates that the site is at very low risk of flooding where there is a chance of flooding of less than 1 in 1000 (0.1%).

The extent of flooding to the site from surface water is indicated in Figure 11. It shows the majority of the site to be at low/very low risk with areas of medium risk of flooding from surface water between the proposed PBSA and Sci Tech sites. As this area will remain external and be used for public realm, the risk of surface water flooding to buildings would be low. Further measure in relation to developing the site wide levels are proposed in Section 6.0.

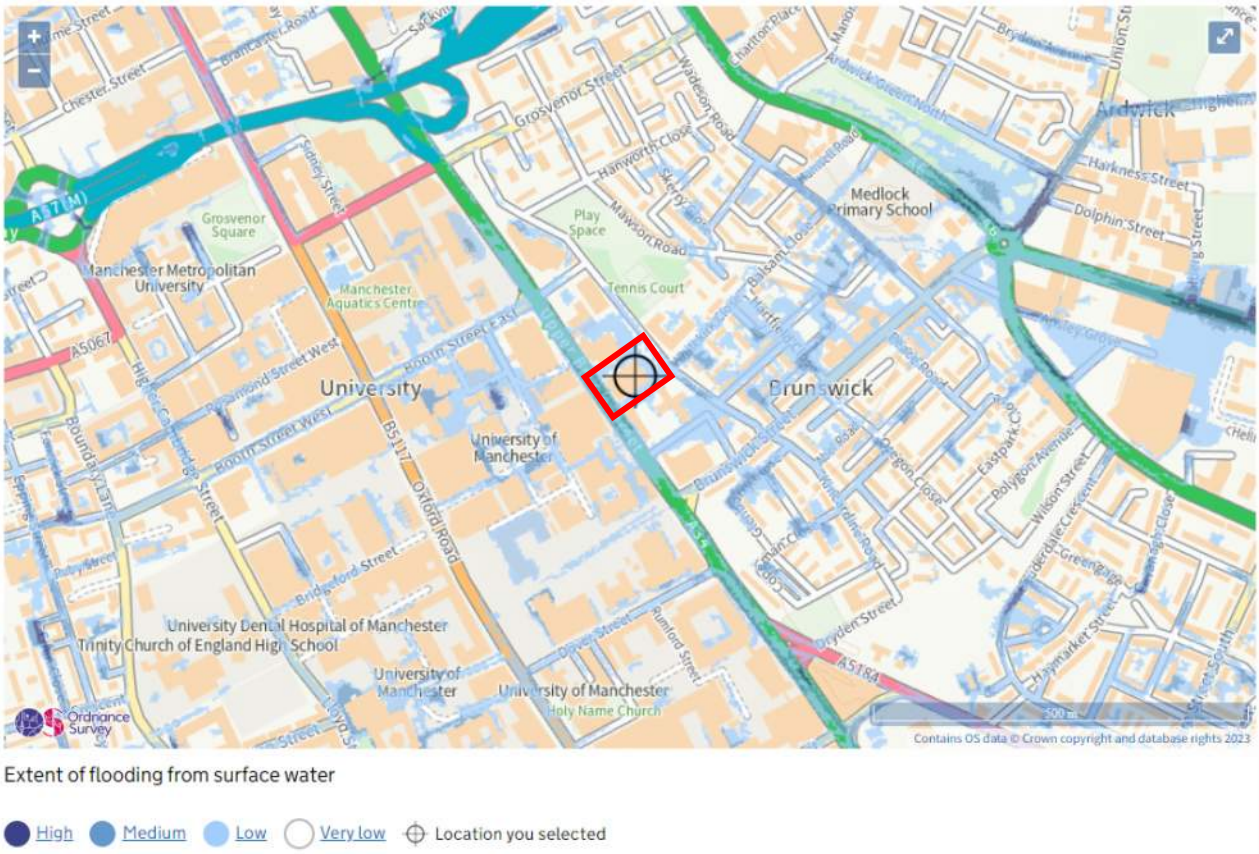


Figure 11: Surface Water Flood Risk Map

4.6 *Surface Water Flooding from the Site*

Developers are responsible for ensuring that a new development does not increase the flood risk elsewhere. The proposed surface water drainage network shall be designed to not flood for the critical 1 in 30-year storm event and flood water generated up to the critical 1 in 100-year plus climate change storm event shall be constrained within areas on site so as not to cause damage to buildings, essential services or adjoining developments and services.

With the addition of soft planted areas, the proposed site has a reduced impermeable area of 11% compared to the existing site as you can see in Table 2.

Table 2 Site impermeable areas

	Existing	Proposed	Change
State Impermeable Area (Ha)	0.45Ha	0.40 Ha	-0.05 Ha

4.7 *Summary of Flood Risk*

From the evidence collated and subsequent negotiations, the flood risk proposed to the development can be summarised as follows:

- Rivers and Sea – Low risk
- Reservoir – Low Risk
- Groundwater – Low risk
- Public Sewers – Low risk
- Surface Water – Low Risk

4.8 *Sequential and Exception Testing*

The proposed development sits within flood zone 1 and 2. Meaning there is a low to medium probability of annual flooding from rivers (and sea).

The former use of the site was a car showroom with external forecourts and as such would be deemed as less vulnerable based on the NPPF development classification for flood risk (see 3.1).

The proposed development includes student accommodation which would be classified as more vulnerable. However, residential use is proposed for first floor and above with ground floor use predominantly amenity space and building facilities / servicing. As such the ground floor use would be classified as less vulnerable. Therefore there is no increase in the site vulnerability as a result of the development.

Reference is also made to the Manchester, Salford and Trafford strategic Flood Risk assessment (SFRA), which identifies sites for suitable regeneration use. The development area to the east of Upper Brook Street is identified as lying between the Oxford Road Corridor site (M0042) earmarked for Employment use, and the Brunswick site (M0011) earmarked for housing. Therefore, as the site is allocated for development, we would assume that the sequential test has already been passed.

In accordance with the NPPF less vulnerable use is appropriate within Zone 2 and the exception test is not required.

5. Surface Water Management Strategy

5.1 *Existing Site/Pre-development Runoff*

The existing drainage around the development includes a public combined network along the front and rear of the site within Upper Brook Street and Kincardine Road. Within the site is a private surface water network. A CCTV survey carried out by Layer Surveys indicated the existing runs to be in a good condition but not all the runs were able to be surveyed.

5.2 *Drainage Hierarchy Points of Discharge*

The NPPF Planning Practice Guidance Paragraph 080 states that:

"Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. into the ground (infiltration).
2. to a surface water body.
3. to a surface water sewer, highway drain, or another drainage system.
4. to a combined sewer."

Infiltration Potential Sustainable Drainage Systems (SuDS) Features to be Considered.

Infiltration tests are being carried out on site at the time of writing this report to confirm if infiltration is feasible. Due to the presence of superficial clay soils and made ground it is likely that infiltration will not be feasible.

Water Body

The nearest main river is located approximately 610m due north of the site on the southern edge of Manchester City Centre. Connection to the river Medlock is not feasible mainly due to the distance but because of the need to negotiate significant highways infrastructure.

There is also an existing culverted watercourse, Cornbrook, located approximately 140m south of the site. A discharge rate of 5ls to the culvert has been agreed by UU. An enquiry to the LLFA has been submitted to confirm the location and feasibility of connecting to the culvert. A response is pending at time of issue.

Surface Water Sewer

There is a highway drain situated within Upper Brook Street, indicated on the sewer records. Highways have confirmed we cannot connect to their system (response received on 12.01.23)

There is also an existing private surface water network within the site. The existing conditions and levels indicate reuse of the network could be a possibility. However, the network connects to the combined manhole located in the eastern corner of the site.

Combined Sewer

Two public manholes are located within and on the boundary of the site. UU have confirmed connection to the manholes for foul water and for surface water, if connection to the culvert is ruled out, at a surface water discharge rate of 26l/s.

5.3 *Proposed Surface Water Drainage Design*

As the site was previously developed, surface water drainage from the site will be restricted such that it does not exceed the pre-development run off rates, with the aim of achieving at least a 50% reduction in accordance with the recommendations as set out in the Manchester, Salford & Trafford SFRA. However, in addition to this requirement, guidance within the northwest SuDS proforma, introduces a requirement to achieve greenfield run-off rates where a site is to be developed entirely, even if classified as brownfield.

In February 2016, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Figure 12 demonstrates the climate change allowances with central and upper end allowances being considered.

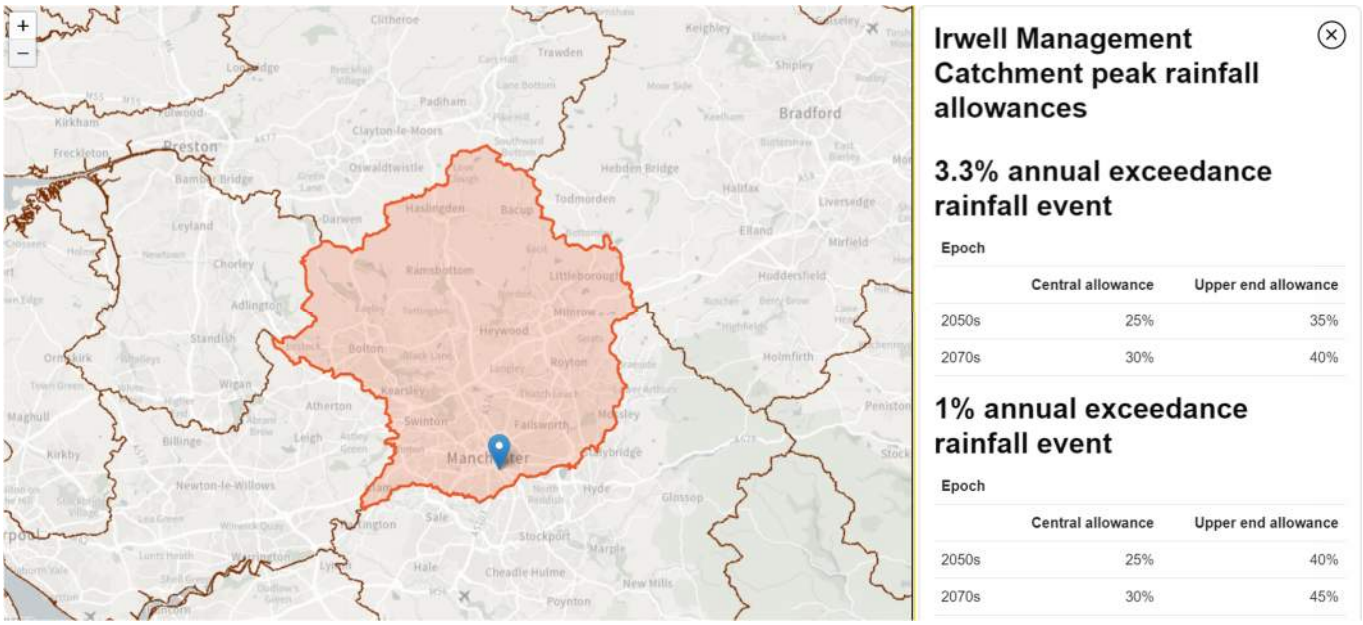


Figure 12: Climate change allowances for peak rainfall intensities for the site

Based on the nature of the development, a lifespan in excess of 60 years is anticipated. The potential climate change allowance for 2070 an onwards ranges between 30% for the central allowance and 45%. For the upper end allowance. As such the design will consider an allowance of 45% climate change on peak rainfall intensity calculations.

It is proposed to restrict the surface water runoff rate to greenfield in order to discharge to the culvert. 5l/s for the 100 year + 45% climate change allowance has been proposed to reduce the risk of blockages within the system. Approval from the LLFA is still required as we wait for a response.

Based on this requirement, surface water storage features will need to be designed to accommodate the restricted surface water flows. These will be in the form of permeable paving and an attenuation tank designed in accordance with CIRIA suds manual.

The necessary on-site attenuation volume in order to achieve the restricted rate of 5l/s is:

1. 154 m^3 Storage provided by the permeable paving.

2. 101 m^3 storage provided by an attenuation tank.

A drainage strategy has been produced showing indicative drainage connection points and layouts incorporating attenuation. It can be found within Appendix C, along with the proposed catchment plan.

5.4 *Sustainable Urban Drainage Systems (SuDS)*

Where possible the site drainage will look to utilise SuDS features. Section 1.1 of the SuDS Manual (Ciria C753) states the following:

"Sustainable drainage systems (SuDS) can deliver multiple benefits.

Surface water is a valuable resource, and this should be reflected in the way it is managed and used in the built environment. It can add to and enhance biodiversity, beauty, tranquillity and the natural aesthetic of buildings, places and landscapes and it can help make them more resilient to the changing climate.

The philosophy of sustainable drainage systems is about maximising the benefits and minimising the negative impacts of surface water run-off from developed areas.

The SuDS approach involves slowing down and reducing the quantity of surface water runoff from a developed area to manage downstream flood risk and reducing the risk of that runoff causing pollution. This is achieved by harvesting, infiltrating, slowing, storing, conveying and treating runoff on site and, where possible, on the surface rather than underground. Water then becomes a much more visible and tangible part of the built environment, which can be enjoyed by everyone."

The SuDS Manual describes the four pillars of SuDS design as Water Quality, Water Quantity, Amenity and Biodiversity as illustrated in **Figure 13**.

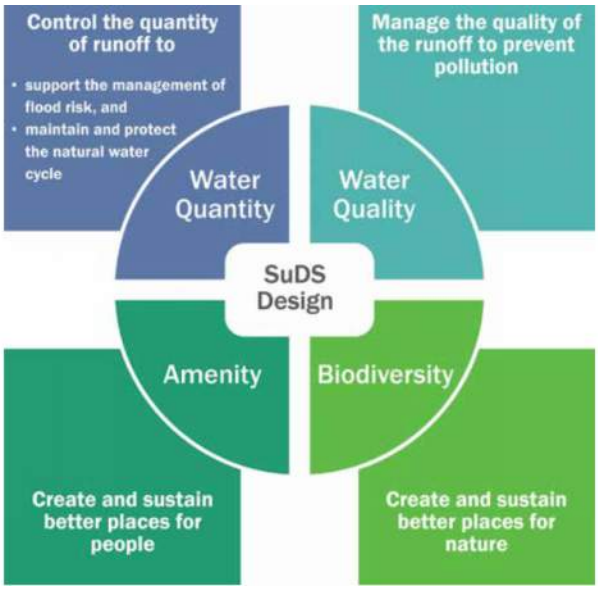


Figure 13: Sustainability Development Objectives (Representation of figure 2.1 of the SuDS Manual)

Where possible SuDS are to be incorporated into the post development design to reduce the surface water run-off rates. Various SuDS methods have been summarised in Table 1 below to assess and establish which are most feasible for the proposed post development site.

Table 3: SuDS Sustainability Assessment

Feature	Type	Advantages with this site
Currently Proposed		
Permeable Paving	At Surface	Permeable Paving removes the requirement to provide entry points (gullies etc.), provides pollution treatment and allows water to be stored within aggregate sub-base.
Tanked/Geocellular Attenuation systems	Below Ground	Tanked attenuation systems provide high storage capacity and can be incorporated within road pavements and under landscaping
Rain Gardens	At Surface	Rain gardens will help to provide a betterment on the existing site rate.
To Be Considered		
Basins and Ponds – Above Ground storage	At Surface	Basins and ponds increase biodiversity and amenity of the area; provide attenuation; and improve water quality. This method does occupy large areas of developable land and needs to be constructed at the lower levels of the site. Due to the flat topography and minimal external space, basins and ponds are unlikely to be feasible with the site proposals.
Swales	At Surface	Swales can be used adjacent to any impervious surfaces to collect surface water run off at source. They also provide additional benefits such as amenity and biodiversity opportunities
Green roofs	Above Ground	Green roofs would provide a simple solution to the requirement of surface water attenuation for the site. They could form part of the building structure and store any runoff from the large roofs. Generally, they also provide benefits such as energy saving in terms of temperature control within buildings, noise reduction, biodiversity, and improved air quality. They also have the ability to remove up to 80% of rainwater through evapotranspiration.
Blue Roofs	Above Ground	Blue roofs have the availability to potentially store higher volumes than green roofs.
Rain Gardens	At surface	Rain Gardens provide amenity, biodiversity, treatment, and small amounts of attenuation benefits.

Tree pits	At surface	Tree pits provide amenity, biodiversity, treatment, and small amounts of attenuation benefits.

The surface water run-off from the site will be from roofs and residential streets and as such the risk of contamination and suspended silts/debris being present within surface water will be low.

Maintenance of SuDS will be the responsibility of the developer/operator of the development.

The external paved areas will drain towards the proposed rain gardens across the site. The design of the rain gardens along Thorburn walk will be led by Civic and coordinated with the Site 2 development proposals.

5.5 *Water Quality Assessment*

The SuDS design for the development site will ensure that the quality of any receiving water body is not adversely affected and preferably enhanced in accordance with CIRIA SuDS Manual C753, Chapter 4. The "CIRIA SuDS Manual (C753) Simple Index Approach to Proprietary/ Manufactured Stormwater Treatment Devices" will be used to show that the proposed SuDS features will provide adequate water treatment in terms of total suspended solids (TSS), hydrocarbons and metals.

	Mitigation indices[1]		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return		

Land use	**Pollution hazard level**	**Total suspended solids (TSS)**	**Metals**	**Hydro-carbons**
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

The above figures have been extracted from the CIRIA Report C753 Suds Manual to assess the pollution indices relative to the proposed development. Given the proposed development use is classified as residential, the corresponding pollution hazard level is determined to be 'low'.

Assessments have been carried out to determine SuDS pollution mitigation indices for the TSS, metals and hydrocarbons for the proposed development. In order to deliver suitable treatment, selected SuDS components should have a total pollution index that equals or exceeds the pollution hazard index.

i.e. Total SuDS mitigation index ≥ pollutions hazard index.

Total SuDs mitigation index = mitigation index, + 0.5 (mitigation index)

As previously discussed, the proposed attenuation features for this development are an attenuation tank and permeable paving.

The SuDS pollution mitigation for the proposed permeable paving has been evaluated in the tables below.

SuDS mitigation indices for discharge to surface water (TTS)		Total SuDS mitigation index	Pollution hazard indices For different land use Classification (Low) TTS (≥0.5)
			≥0.5
Permeable Paving	0.7	0.7	✓

SuDS mitigation indices for discharge to surface water (Metal)		Total SuDS mitigation index	Pollution hazard indices For different land use Classification (Low) Metals (≥0.4)
			≥0.4
Permeable Paving	0.6	0.6	✓

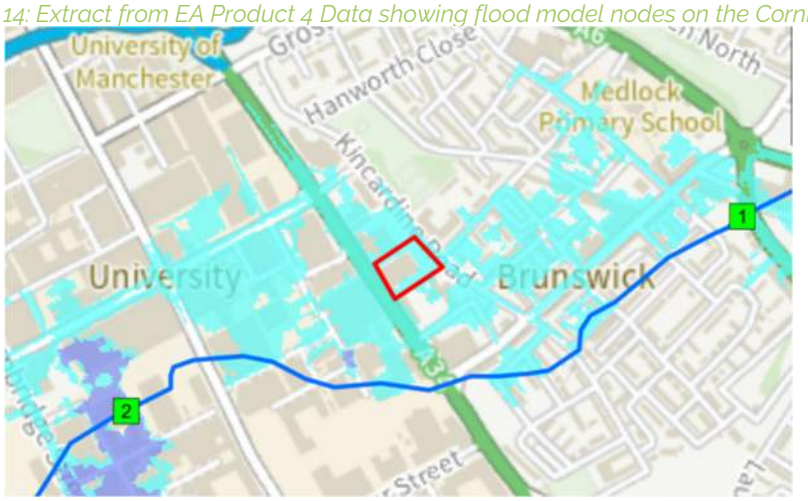
SuDS mitigation indices for discharge to surface water (Hydrocarbons)		Total SuDS mitigation index	Pollution hazard indices For different land use Classification (Low) Hydrocarbons (≥0.4)
			≥0.4
Permeable Paving	0.7	0.7	✓

6. Proposed Site Level Strategy

The Product 4 flood level data was obtained from the Environment Agency and can be found within Appendix A. This data indicates flood risk from the site from the Cornbrook which is located circa 140m south of the development area.

The site lies roughly between Node 1 and 2 of the EA's flood model for the Cornbrook

Figure 14: Extract from EA Product 4 Data showing flood model nodes on the Cornbrook



2D flood level data has been provided from the EA's flood model based on a 1:1000 year event. Flood level data has also been provided for return period within the Cornbrook and we have extrapolated this data to obtain the 1:100 + 35% flood level within the site.

Table 4 shows the extrapolated flood levels from the EA Product 4 data which was undertaken to identify the anticipated 1:100 + 35% flood levels within the site, taking into account the dispersal of flood water between the Cornbrook and the development site.

Step 1 was to compare the modelled Cornbrook Node 1 and 2 1:1000 data to the maximum 2D level provided by the EA for the site itself. This identified site flood levels were some 1.48% lower than the Cornbrook node flood levels.

The 1.48% reduction was then applied to the equivalent Node data for the 1:100 + 35% flood event to identify the 1:100 + 35% flood level for Site 1 itself.

Table 4: Extrapolated levels from the EA's Product 4 data

	Annual Flood Probability		
	1:1000	**1:1000 + 30%**	**1:100 + 35%**
Avg flood level Node 1 and 2	39.54	39.71	39.075
2D Max Site level (from EA data)	38.96	39.13	N/A
% difference	-1.489%	-1.482%	-1.48%
Level difference	0.590m	0.580m	0.578m
2D Max Site level (extrapolated)	N/A	N/A	38.497

The anticipated 1:100 + 35% flood level for site 1 is 38.497m. Therefore, with the consideration to the topography of the existing Site 1 (Appendix B), the development would not be affected by the 1:100 + 35% flood event given the lowest site level is circa 38.53m AOD.

The finished floor level for the proposed PBSA building has therefore been developed with consideration for the existing site levels and tying into the off-site highway. The existing Upper Brook Street footway levels are in the region of 38.25 to 38.41m AOD along the western boundary of the site. Due to the proximity of the proposed building to the Upper Brook Street footway, the building FFL has been set at 38.600m AOD which sits 350mm to 190mm above Upper Brook Street along this boundary. This allows for good pedestrian access, particularly for those who are mobility impaired.

Within the site, external areas are proposed to be generally lower than the finished floor level such that paving crossfalls away from the building as far as possible. Low points within the landscaping are intended to be used as SuDS features such as raingardens, providing attenuation and aiming to direct any potential surface water flooding away from buildings.

7. Proposed Foul Water Drainage

Foul water drainage disposal is set out in Part H of the Building Regulations in order of priority the preferred methods are;

1. Public sewer

2. Septic tank

3. Cesspool.

The foul water system shall be designed in accordance with;

- BS EN 752:2008 (Drain and sewer systems outside buildings)
- Sewerage Sector Guidance – Design Construction Guidance
- Technical Guidance to the National Planning Policy Framework document (Department for Communities and Local Government, March 2012).
- BS EN 12056-2:2000 (Drainage systems inside buildings)
- Building Regulations Approved Document H, Drainage and waste disposal. (Office of the Deputy Prime Minister, December 2010).

Any connection to the public sewer is subject to formal agreement with United Utilities under Section 106 of the Water Industry Act 1991.

UU have confirmed their preferred points of connection for the foul water drainage to be either the combined manhole located within the eastern corner of the site or the combined manhole within Upper Brook Street. The connection point will be confirmed once the layout is finalised.

8. Conclusions

The site currently hosts a vacant car dealership building, the outdoor space within the property that was previously used to store and exhibit cars is now a Pay & Display car park owned by SiP.

From research attained by the British Geological Survey website, borehole data from within the site suggests the below ground strata consists of superficial clay soils with deep made ground and underlying sandstone. Therefore infiltration is not

The development is located within Flood Zone 2 and is within the low-risk area for reservoir, groundwater, public sewers and surface water flooding. Flood level data obtained from the EA, broadly aligns with the Flood Zone 2 categorisation but data extrapolated indicates the site would not be at risk of flooding from a 1:100 + 35% (design flood event). The finished floor level is therefore dictated by the general site levels and coordination with the perimeter levels.

Form the evidence collated, the summary of flood risk to the site is as follows:

- Rivers and Sea – Low risk
- Reservoir – Low Risk
- Groundwater – Low risk
- Public Sewers – Low risk
- Surface Water – Low Risk

The site impermeable area will be reduced from 0.45Ha to 0.40Ha with the addition of soft landscape areas.

A discharge rate of 5l/s has been proposed and approved by UU to discharge surface water to the culverted Cornbrook. The proposed discharge rate is yet to be agreed with the LLFA. If connection to the Cornbrook is not feasible then an alternative connection to the public combined sewer localled to the site has been agreed in principal with UU.

Appendix A

UU asset maps

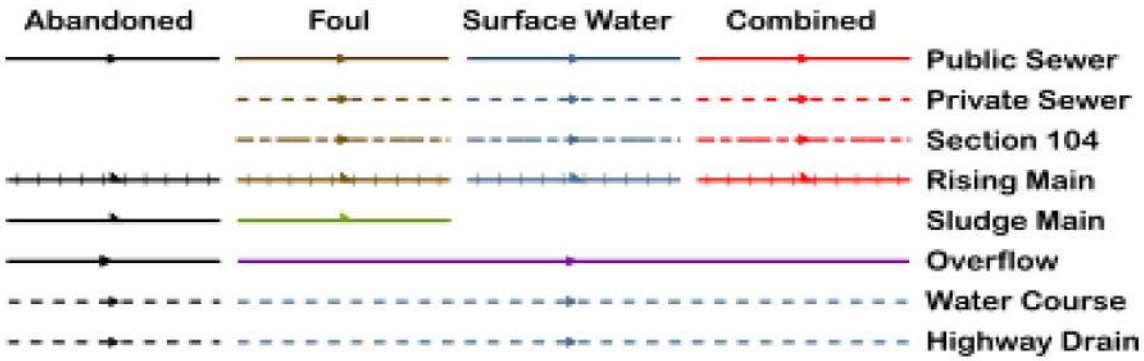
CCTV Survey

EA Flood Level Information

Manchester SFRA Ground Water Flooding Map

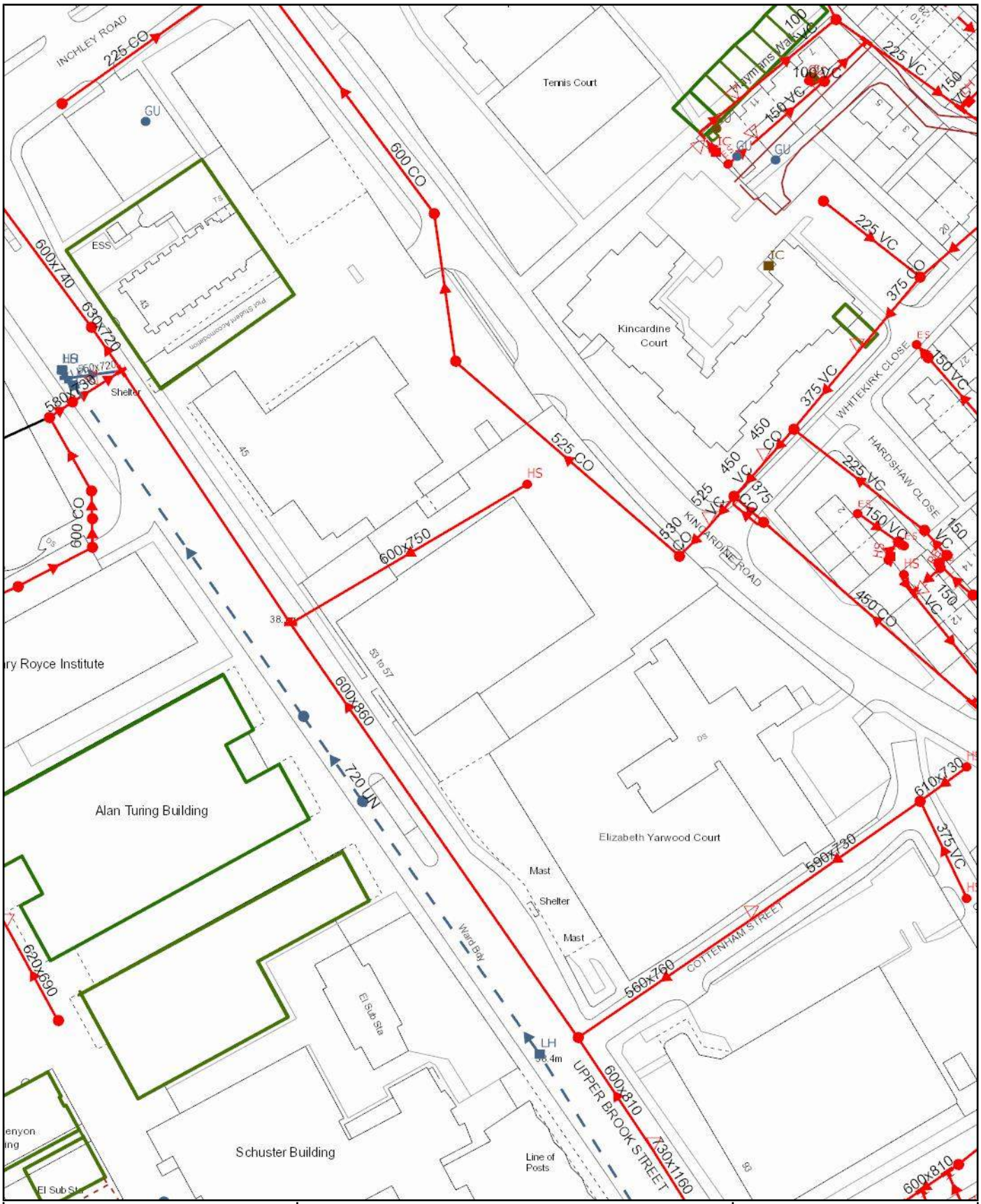
United Utilities
Water for the North West

Wastewater Symbology



All point assets follow the standard colour convention: red – combined, brown - foul, blue – surface water, purple - overflow

- Manhole
- HS Head of System
- ES Extent of Survey
- RE Rodding Eye
- IN Inlet
- DP Discharge Point
- HY Vortex
- PE Penstock
- WO Washout Chamber
- VA Valve
- AV Air Valve
- NRV Non Return Valve
- SO Soakaway
- GU Gully
- CA Cascade
- FM Flow Meter
- HA Hatch Box
- OI Oil Interceptor
- SM Summit
- DS Drop Shaft
- OP Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- IC Inspection Chamber
- Bifurcation Chamber
- LH Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- T Network Storage Tank
- V Sewer Overflow
- WwTW Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- CK Control Kiosk
- Change of Characteristic



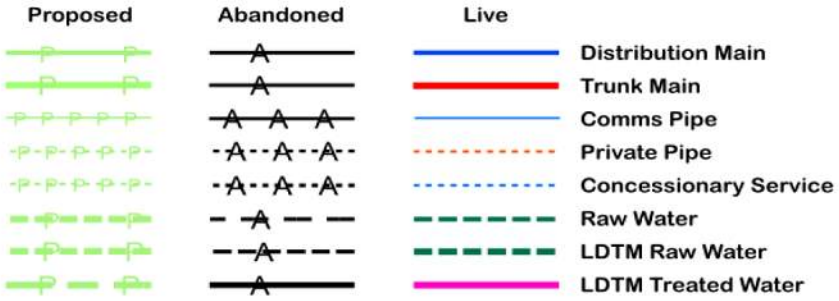
Scale:	1:1250	**SEWER RECORDS**	United Utilities Water for the North West
Date:	09/11/2022		
Address or Site Reference:	2584		
Printed by:	Property Searches		

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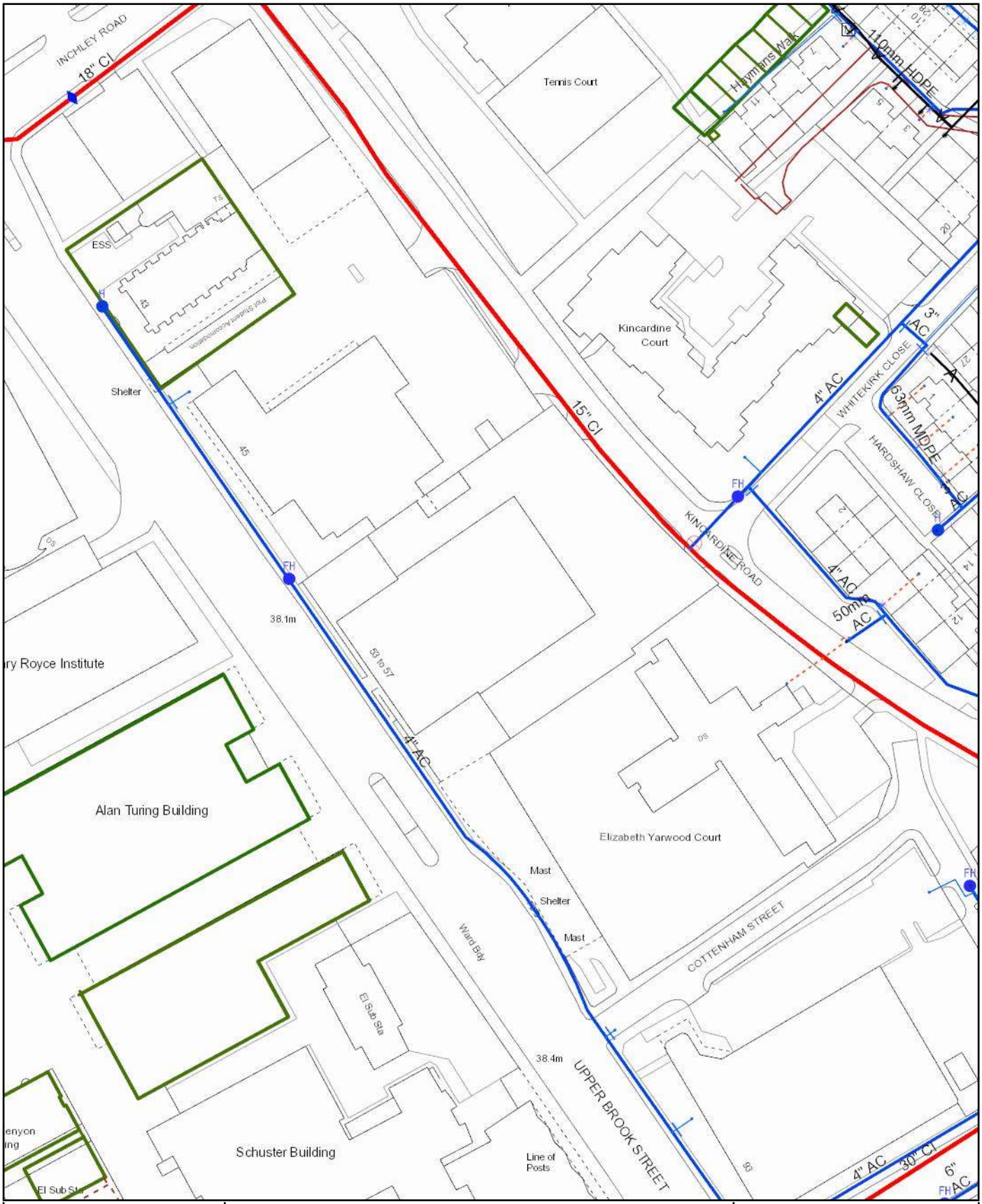
United Utilities
Water for the North West

Clean Water Symbology





Symbology for proposed assets is the same as above, but shown in green
Symbology for abandoned assets is the same as above, but shown in black



Scale:	1:1250
Date:	09/11/2022

WATER MAINS RECORDS

United Utilities
Water for the North West

Address or Site Reference: 2584

Printed by: Property Searches

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PLAN GRID NORTH

File Name: Layer Surveys Ltd. Survey

NOTES:

All levels relate to Existing Site Datum, Orientated to Existing Site Grid.

Services shown as 'From Statutory Authority Plans' line styles are taken from Statutory Authority Plans and are not to be relied upon by Statutory Authority. These services were not located and are shown for indicative purposes only.

Please note survey control established for mapping only. Control shouldn't be used by third parties without confirmation from Layer Surveys.

Utility and CCTV surveys added to drawing (11/5/23) not supplied by client.

Only manholes and services visible at time of survey shown.

Drainage information must be checked and verified with local authority records prior to work commencing.

Please note all drainage information and chamber position have be taken from CCTV condition survey.

LEGEND:

BT	BT MH	PP	PERIOD POINT
CB	CB MANHOLE/ COVER	RP	RODDING EYE
CCTV	CCTV MANHOLE	SC	SCAFFOLD POLE
COM	COMMUNICATIONS MH	SCP	SCAFFOLD POLE
CV	CABLE TV COVER	TB	TELEPHONE CALL BOX
DR	DRAIN MANHOLE	TC	TELEPHONE MH
EA	EARTH PIT	TP	TELEPHONE POST
EL	ELEC MANHOLE/ COVER	WO	WATER HYDRANT
FB	FIBRE MH	WM	WATER METER
GV	GAS VALVE	WV	WATER VALVE
HP	HANDHOLE/ POST	WVP	WATER VALVE POST
LP	LAMP POST	WW	WATER WELL
TM	TRAFFIC MANHOLE	STM	SPOT STAKE
TP	TRAFFIC POST	TRE	TREE (DIAMETER AT 1M)
UT	UNKNOWN	CL	CLIMBING
VC	VENT/ AIR VALVE	CO	CONIFER
VP	VENT PIPE	DE	DECIDUOUS
WV	WATER VALVE	SH	SHRUB
X	MARKER POST	HE	HEDGE
XP	MARKER POST	NC	NO CARTOGRAPHIC CONTENTS
XT	MARKER POST	NT	NO TARGET PEG
VPT	VENT PIPE	OT	OTHER
WPT	WATER	ECP	ECP STAKES
WT	WATER TANK		

ELEC KIOT	
CABLE TV	
TELECOMS	
TRAFFIC STOP	
GAS	
WATER MAIN	
FIBRE LINE	
DIRECTION LINE	
ELEC LINE	
BOND WATER	
SEWER FM	
SEWER FM	
SEWER RISING MAIN	
SEWER RISING MAIN	
UNIDENTIFIED CABLE	
UNIDENTIFIED PIPE	
UNIDENTIFIED VEHICLE DETECTION LOOP	

Imagery DVA Surface 25 cm, 25 cm New Delivery Authority Tolerances per Standard 1 Imagery per Date

DISCLAIMER:

All Layer Surveys we use skilled and experienced staff, modern up to date equipment and follow recognised survey procedures and industry techniques to locate and trace sub-surface utilities. However the performance of the equipment employed in non-invasive surveys can be affected by many factors including ground and weather conditions. Therefore Layer Surveys cannot guarantee that all utilities present on site have been located. It is the responsibility of the Client to consult with the relevant utility companies prior to any excavation commencing.

Where utilities services run in close proximity it may be impossible to separately trace individual services as the trace signal can experience 'cross-coupling' from one service to the next. Where this is encountered incl. the disclosed depth will refer to the indicated depth only.

Successful tracing of non-conductive materials may be limited. Drainage gullies are also tested where possible to prove connectivity but it is not always possible to do so. Therefore the whole due to narrow pipe runs ensure non-connection.

Depth information of underground services/features are generally accurate to within +/- 10% (i.e. a pipe at 2m deep may be accurate to between 1.8m and 2.2m) unless otherwise stated and only relevant at the top of the service. Correct sewer and drain depths are usually to invert (base of drainage channel) unless otherwise stated.

Layer Surveys cannot be responsible for any services within the line of survey, it is not always possible to operate the Ground Penetrating Radar in areas including, but not limited to, dense vegetation, rubble, debris, standing water and deep soil.

Adding to any information that we may make available to Layer Surveys by the Client or by the statutory utility provider should be regarded only as an indication and cannot be guaranteed.

No position in the vicinity of services shown should be carried out with hand digging (HSE GS47).

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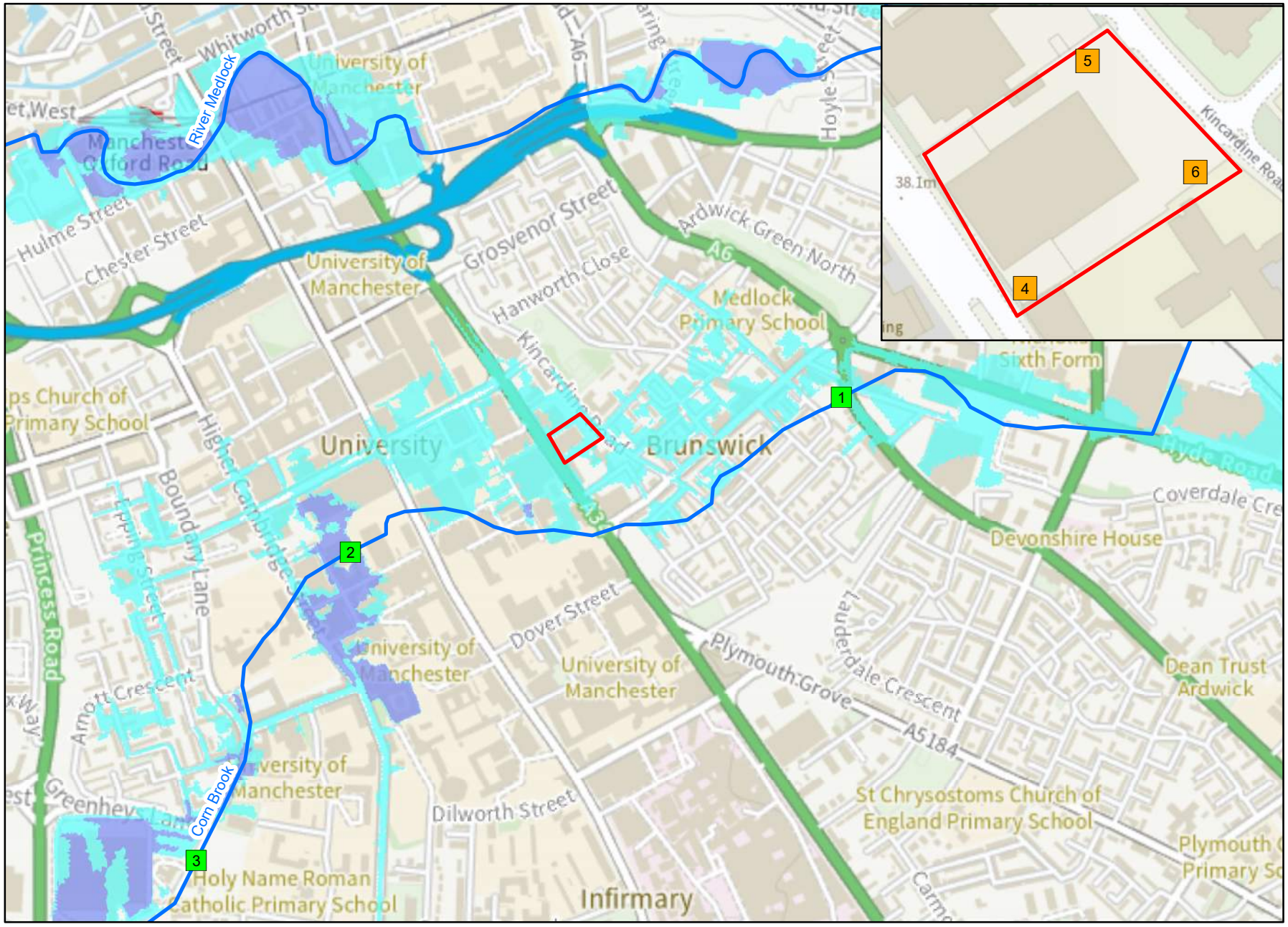
Client
Civic Engineers
Carvers Warehouse
77 Dale Street
Manchester M1 2HG

Project Title
53-57 Upper Brook Street
Manchester
M13 9TA

Drawing Ref.	Surveyed	Checked
1.556	T.W	Layer Surveys

Scale	Date	Drawn	No.	Size	Rev
1:200	Jan 23	I.T	01	A0	

Detailed Flood Map Centred on Kincardine Road, Manchester, M13 9SY.
Created 25/04/2023 [GMMC307680SW]



Environment Agency

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N

Legend

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

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

					Undefended													
Map Reference	Model Node Reference	Easting	Northing	Data	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
1	ea013_0249_corn5676	385306	396967	Modelled Water Level (m aodN)	38.62	38.70	38.75	38.80	38.83	39.03	39.65	40.33	40.73	40.76	40.94	40.80	41.42	41.65
				Modelled Flow (cumecs)	0.46	0.66	0.81	0.95	1.09	1.78	2.26	2.66	3.46	3.59	4.52	3.78	7.77	10.10
2	ea013_0249_corn4653	384401	396681	Modelled Water Level (m aodN)	34.75	34.99	35.19	35.44	35.77	36.89	37.13	37.27	37.38	37.39	37.47	37.41	37.66	37.77
				Modelled Flow (cumecs)	0.28	0.39	0.48	0.57	0.67	1.20	1.56	1.84	2.40	2.49	3.13	2.65	5.49	7.13
3	ea013_0249_corn3908	384117	396113	Modelled Water Level (m aodN)	32.15	32.28	32.37	32.44	32.51	32.77	33.26	33.47	33.75	33.79	34.02	33.83	34.34	34.46
				Modelled Flow (cumecs)	0.19	0.27	0.34	0.39	0.47	0.81	1.03	1.21	1.57	1.63	2.05	1.70	3.47	4.51

					Undefended	
Map Reference	Model Node Reference	Easting	Northing	Data	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
4	2D Levels	384798	396855	Modelled Water Level (m aodN)	38.92	39.04
5		384818	396927	Modelled Water Level (m aodN)	38.93	39.06
6		384852	396891	Modelled Water Level (m aodN)	38.96	39.13

Model data taken from Corn Brook 2017

AEP - Annual Exceedence Probability

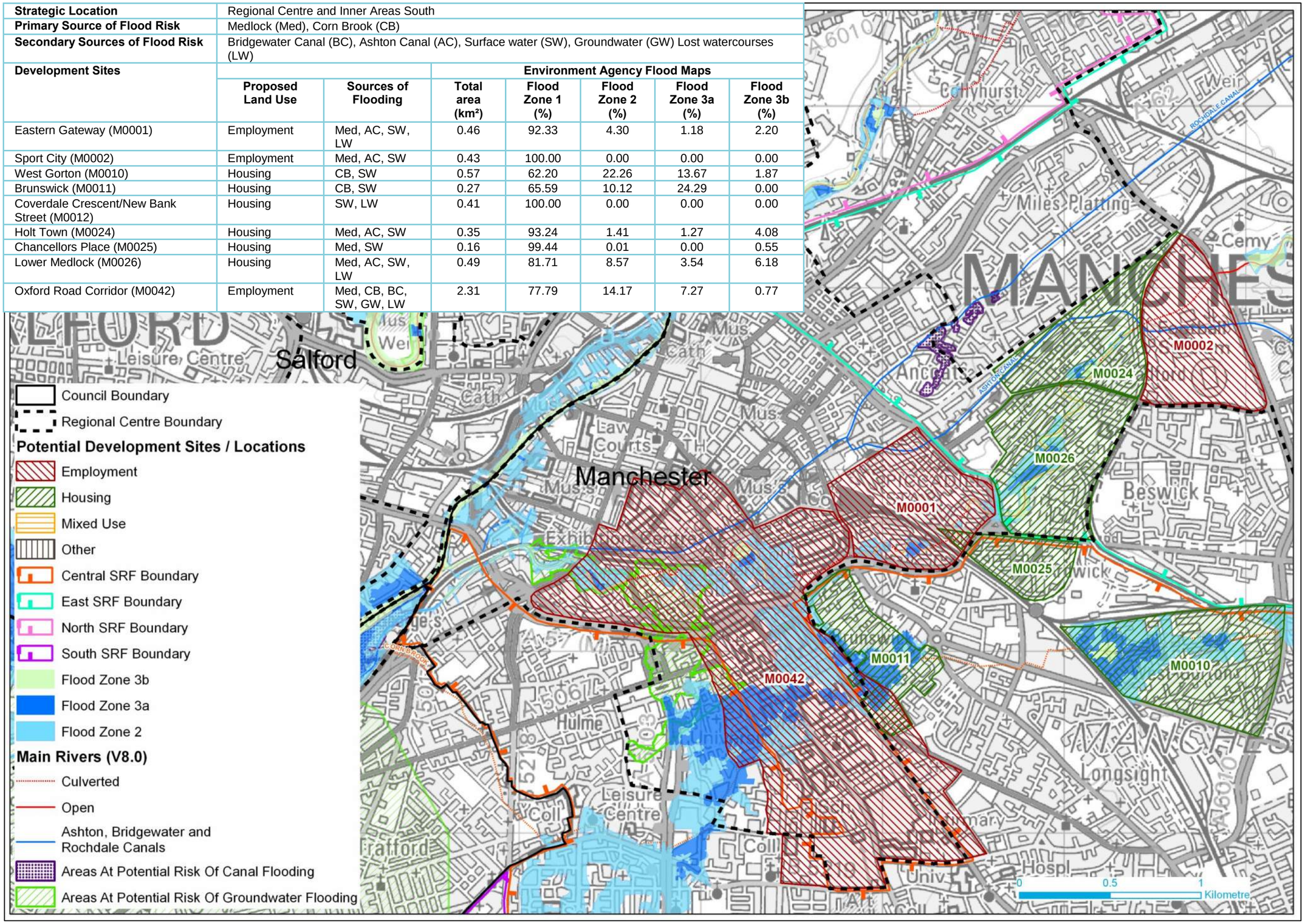
m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080'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.

Strategic Location	Regional Centre and Inner Areas South						
Primary Source of Flood Risk	Medlock (Med), Corn Brook (CB)						
Secondary Sources of Flood Risk	Bridgewater Canal (BC), Ashton Canal (AC), Surface water (SW), Groundwater (GW) Lost watercourses (LW)						
Development Sites			**Environment Agency Flood Maps**				
	Proposed Land Use	**Sources of Flooding**	**Total area (km²)**	**Flood Zone 1 (%)**	**Flood Zone 2 (%)**	**Flood Zone 3a (%)**	**Flood Zone 3b (%)**
Eastern Gateway (M0001)	Employment	Med, AC, SW, LW	0.46	92.33	4.30	1.18	2.20
Sport City (M0002)	Employment	Med, AC, SW	0.43	100.00	0.00	0.00	0.00
West Gorton (M0010)	Housing	CB, SW	0.57	62.20	22.26	13.67	1.87
Brunswick (M0011)	Housing	CB, SW	0.27	65.59	10.12	24.29	0.00
Coverdale Crescent/New Bank Street (M0012)	Housing	SW, LW	0.41	100.00	0.00	0.00	0.00
Holt Town (M0024)	Housing	Med, AC, SW	0.35	93.24	1.41	1.27	4.08
Chancellors Place (M0025)	Housing	Med, SW	0.16	99.44	0.01	0.00	0.55
Lower Medlock (M0026)	Housing	Med, AC, SW, LW	0.49	81.71	8.57	3.54	6.18
Oxford Road Corridor (M0042)	Employment	Med, CB, BC, SW, GW, LW	2.31	77.79	14.17	7.27	0.77



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Appendix B

Topographical Survey

NOTES

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OSBM - ORDNANCE SURVEY BENCH MARK
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SI - SIGN
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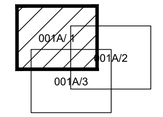
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HEDGE
GATE
BUILDING
TREE CANOPY
CONTROL STATION
TREE

SHEET LAYOUT



Rev	Date	Drawn	Description	Ch'k'd	App'd
A	26.10.22	JP	Contours Added	AM	NDO

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Client

McLAREN PROPERTY
3rd FLOOR EAST
LECONFIELD HOUSE
CURZON STREET
LONDON W1J 5JA

Title

UPPER BROOK STREET
MANCHESTER
M13 9YD

TOPOGRAPHICAL SURVEY
SHEET 1 OF 3

Surveyed	PG	Drawn	PG	Drawn Date	07/04/2022
Checked	AM	Approved	NDO		
Scale	1:250 @ A1	Project	11766	Status	REV
		CAD File	\\NDO-5800\Projects\ZCDRAWINGS\ZE_XE.DWG		
Drawing No	11766/ 001A / 1			Rev	A

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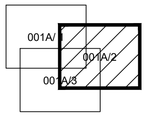
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TREE CANOPY
CONTROL STATION
TREE

SHEET LAYOUT



Rev	Date	Drawn	Description	Ch'k'd	App'd
A	26.10.22	JP	Contours Added	AM	NDO

N D OLIVER & CO
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Jupiter House, 21 Roebuck Lane, Sale, Manchester, M33 7SY
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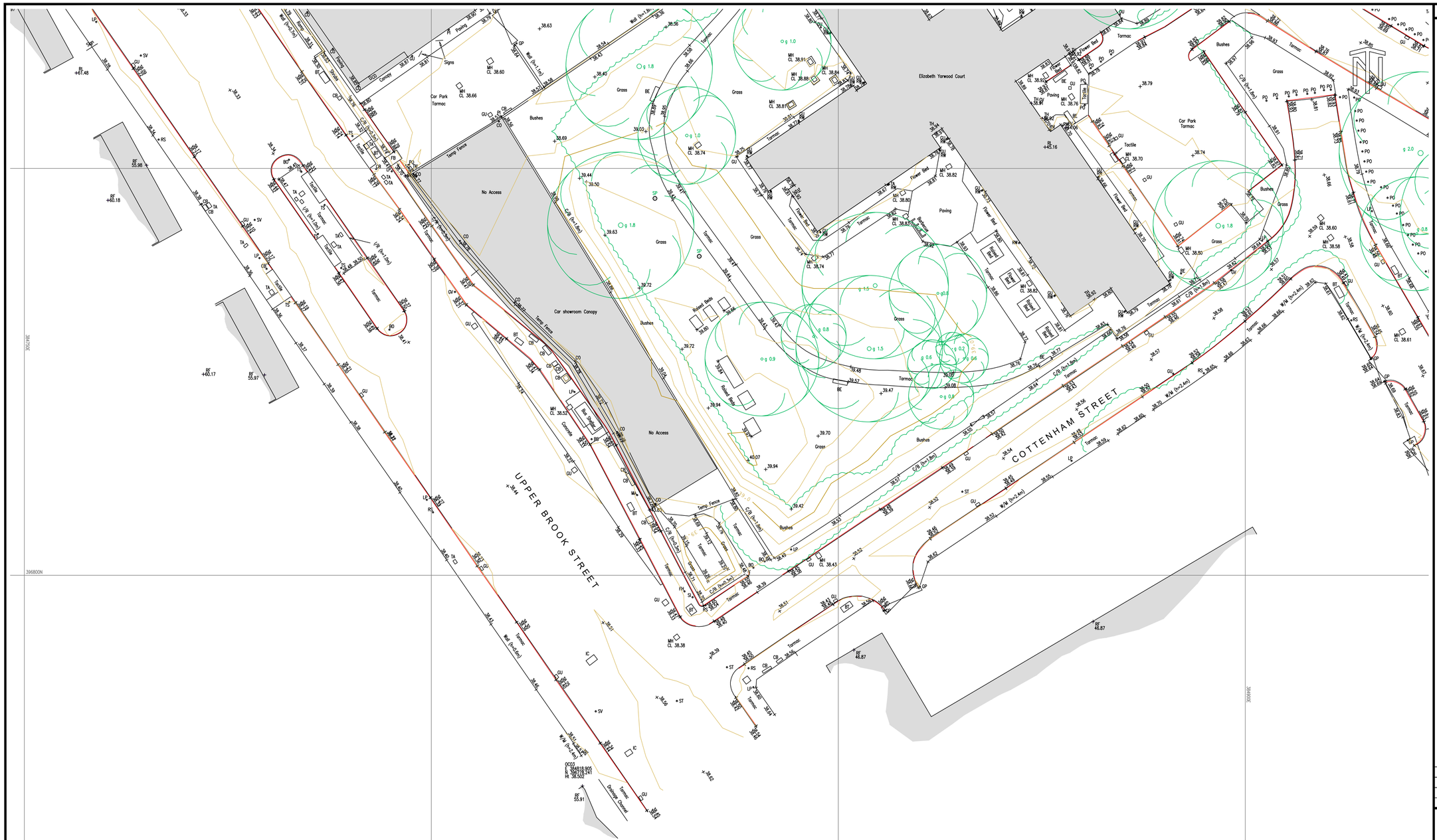
Title

UPPER BROOK STREET
MANCHESTER
M13 9YD

TOPOGRAPHICAL SURVEY
SHEET 2 OF 3

Surveyed	PG	Drawn	PG	Drawn Date: 07/04/2022
Checked	AM	Approved	NDO	

Scale 1:250 @ A1
Project 11766
CAD File INDO-5665\Projects\ZDRAWINGS\ZE_XE.DWG
Status REV
Drawing No 11766/ 001A / 2
Rev A



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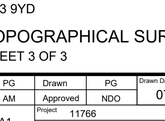
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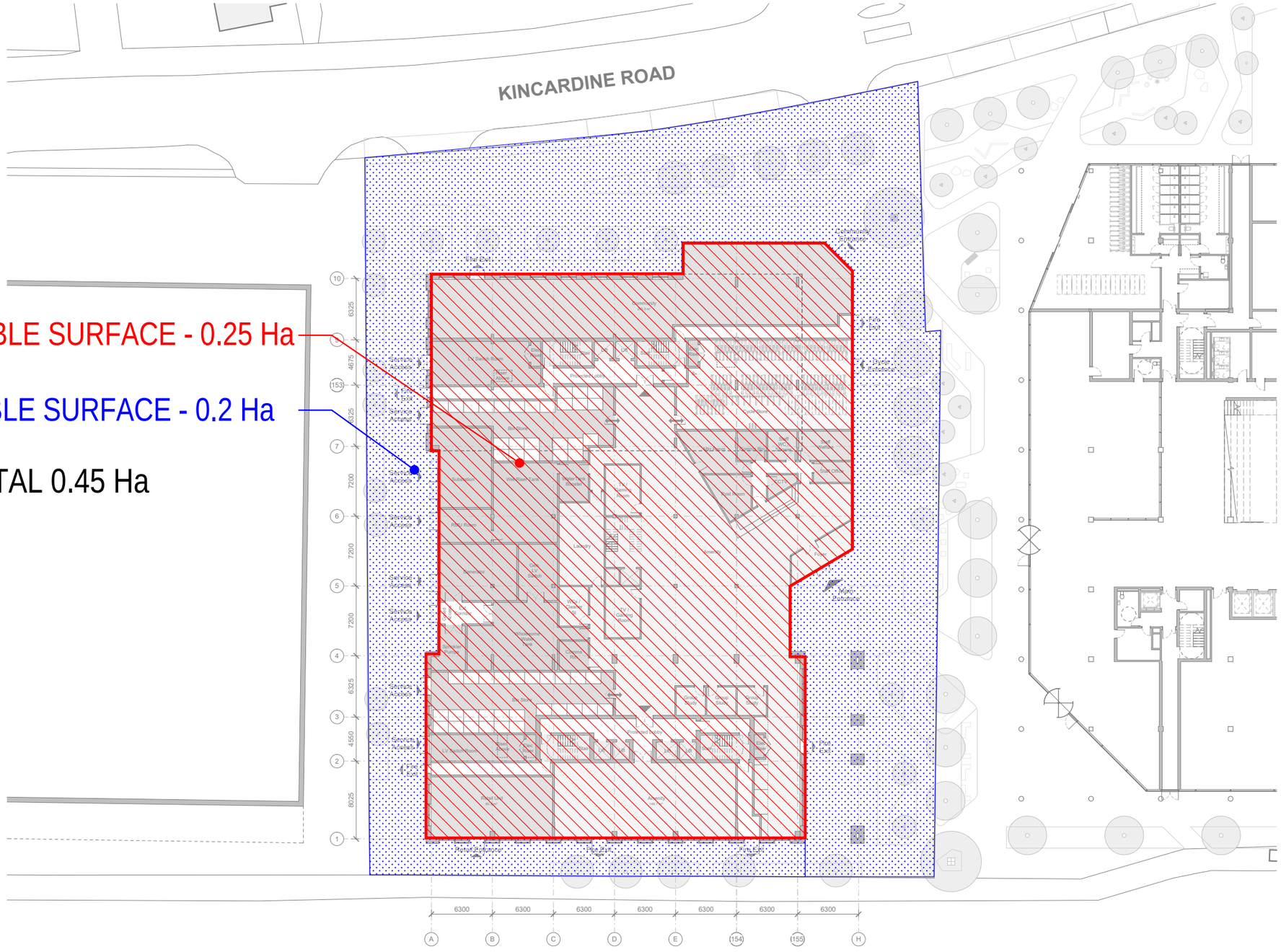
TOPOGRAPHICAL SURVEY
SHEET 3 OF 3

Surveyed	PG	Drawn	PG	Drawn Date: 07/04/2022
Checked	AM	Approved	NDO	
Scale 1:250 @ A1		Project 11766		Status REV
		CAD File \NDO-SBS\Projects\ZCORAWING\SIZE_A1.DWG		
Drawing No 11766/ 001A / 3				Rev A

Appendix C

2584-CIV-XX-XX-S-C-30001 - Drainage Strategy

2584-CIV-XX-S-S-10001 – Through Road Rain Garden Proposal



IMPERMEABLE SURFACE - 0.25 Ha

PERMEABLE SURFACE - 0.2 Ha

TOTAL 0.45 Ha

DATE	REV	DESCRIPTION	DRAWN	CHKD
13/04/23	P01	INFORMATION	NH	CR

Civic Engineers

MANCHESTER / LONDON / LEEDS /GLASGOW
www.civicengineers.com

PROJECT
UPPER BROOK STREET

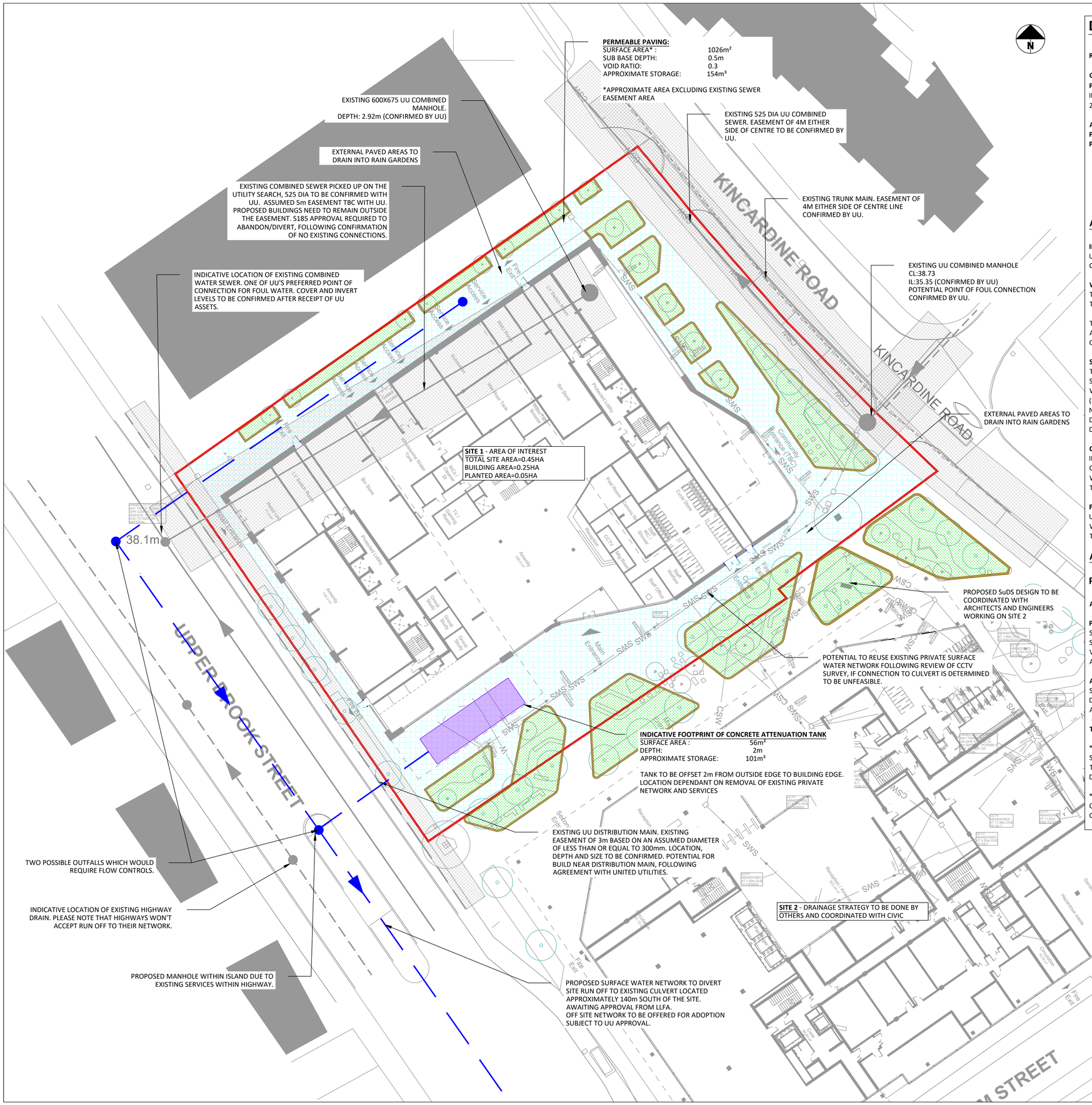
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SITE PERMEABLE/IMPERMEABLE SURFACES

DRAWING STATUS	STATUS CODE
INFORMATION	-

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2584	NTS	APRIL 23	NH	CR

DRAWING No.	REV
SK-0010	P01

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DRAINAGE NOTES

RED LINE BOUNDARY (RLB) AREA: **0.45Ha**

GREENFIELD RUNOFF RATE: **2.45l/s**
PROPOSED DISCHARGE RATE: **5l/s (TO PREVENT BLOCKAGES)**
IF DISCHARGE TO THE CULVERT IS RULED OUT UU HAVE CONFIRMED A DISCHARGE RATE OF 26L/S TO DISCHARGE TO THE COMBINED SEWER.

ATTENUATION STORAGE TO UTILISE STRATEGIC NATURE BASED FEATURES WHERE POSSIBLE.
POSSIBLE ABOVE GROUND SuDs FEATURES INCLUDE:
- **GREEN/BLUE ROOFS**
- **RAIN GARDENS**
- **TREE PITS**
- **RAINWATER HARVESTING BUTTS**
- **PERMEABLE PAVING WILL BE CONSIDERED (REDUCES RUN-OFF AS WELL AS PROVIDING A FORM OF ATTENUATION**

ADDITIONAL NOTES:

INFILTRATION:
UNLIKELY DUE TO THE PRESENCE OF MADE GROUND AND THE POTENTIAL RISK OF CONTAMINATION INDICATED ON THE ONLINE BGS MAPS

WATERCOURSE:
THE CLOSEST WATERCOURSE IS THE RIVER MEDLOCK, LOCATED 650m NORTH OF THE SITE. THEREFORE SURFACE WATER DISCHARGE BY MEANS OF WATERCOURSE IS UNFEASIBLE.

THERE IS AN EXISTING CULVERT LOCATED APPROXIMATELY 140m SOUTH OF THE SITE. WE ARE AWAITING CONFIRMATION FROM THE LLFA WITH REGARDS TO THE FEASIBILITY OF CONNECTING TO THE CULVERT.

SURFACE WATER SEWER NETWORK:
THERE IS A HIGHWAY DRAIN SITUATED WITHIN UPPER BROOK STREET, INDICATED ON THE SEWER RECORDS AND SHOWN INDICATIVELY ON THE PLAN. HIGHWAYS HAVE CONFIRMED WE CANNOT CONNECT TO THEIR SYSTEM LOCATED WITHIN UPPER BROOK STREET (RESPONSE RECEIVED ON 12.01.23). THERE IS AN EXISTING PRIVATE SURFACE WATER NETWORK WITHIN THE SITE. CONNECTION TO THIS SYSTEM IS A POSSIBILITY AND IS DEPENDANT ON THE FINALISED SITE LAYOUT. IT IS IMPORTANT TO NOTE THAT THIS SYSTEM DISCHARGES TO THE EXISTING COMBINED UU NETWORK.

COMBINED SEWER NETWORK:
IF WE ARE UNABLE TO CONNECT TO THE CULVERT THEN UNITED UTILITIES HAVE CONFIRMED THEIR PREFERRED POINT OF CONNECTION IS TO THE PUBLIC COMBINED SEWER WITHIN THE SITE (LOCATION TO BE CONFIRMED FOLLOWING RECEIPT OF UU ASSETS) OR THE 600X860 COMBINED SEWER WITHIN UPPER BROOK STREET.

FOUL WATER
UNITED UTILITIES PREFERRED POINT OF CONNECTION IS THE PUBLIC COMBINED SEWER WITHIN THE SITE (LOCATION TO BE CONFIRMED FOLLOWING RECEIPT OF UU ASSETS) OR THE 600X860 COMBINED SEWER WITHIN UPPER BROOK STREET.

ATTENUATION:

PERMEABLE PAVING AND ATTENUATION TANK

ATTENUATION STORAGE REQUIRED: **245m³**

PERMEABLE PAVING*:
SURFACE AREA: 1026m²
SUB BASE DEPTH: 0.5m
VOID RATIO: 0.3
APPROXIMATE STORAGE 154m³

ATTENUATION TANK:**
SURFACE AREA: 56m²
DEPTH: 2m
APPROXIMATE STORAGE: 101m³

TOTAL ATTENUATION PROVIDED: 255 m³

*PERMEABLE PAVING DEPTH IS SUBJECT TO CHANGE DUE TO THE PRESENCE OF SHALLOW SERVICES. ENQUIRIES WILL NEED TO BE ISSUED TO THE COMPANIES WITH ASSETS WITHIN THE SITE TO INFORM THEM OF THE WORK AND TO UNDERSTAND IF THEY WILL REQUIRE A DIVERSION OF THEIR ASSETS.

**NOTE THAT THE LOCATION AND SIZE OF THE ATTENUATION TANK WILL BE SUBJECT TO CHANGE FOLLOWING FINALISED SITE LAYOUT AND CONSULTATION WITH UTILITY COMAPNIES REGARDING THEIR ASSETS WITH THE SITE BOUNDARY

ADDITIONAL NOTES:

A. ABANDONMENT, DIVERSIONS AND EASEMENTS TO BE CONFIRMED FOR REMAINING EXISTING SEWERS.
B. ADEQUATE ALLOWANCE BETWEEN THE BUILDINGS AND PLANTED AREAS SHOULD BE ALLOWED FOR THE LOCATION OF THE PRIMARY NETWORK TO AVOID BELOW GROUND CLASHES.
C. UU PROVIDED DEPTHS FOR EXISTING COMBINED MANHOLES, HOWEVER THEY ALSO REQUEST SITE INVESTIGATIONS TO GAIN ACCURATE INFORMATION.
D. PERMEABLE PAVING AND PROPOSED TREES MUST NOT ENTER EASEMENT ZONE.
E. POSSIBILITY OF A COMBINED SURFACE WATER APPROACH BETWEEN THE TWO SITES TO BE EXPLORED.
F. STRATEGY HAD BEEN DESIGNED BASED ON EXISTING SITE LEVELS

STANDARD NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A./E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

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NOTES:

1. FIGURES ARE APPROXIMATE AND SUBJECT TO CHANGE AS LAYOUT AND MASTERPLAN DEVELOPS
2. SITE PLAN AND SITE BOUNDARY PROVIDED BY SHEPPARD ROBSON IN FEBRUARY 2023.
3. THE TOPOGRAPHICAL SURVEY WAS CARRIED OUT BY ND OLIVER IN APRIL 2022, PROVIDED BY SHEPPARD ROBSON IN NOVEMBER 2022.
4. EXISTING DRAINAGE LOCATIONS HAVE BEEN COLLECTED FROM SEARCHES CARRIED OUT BY LAYER SURVEYS AND CORNERSTONE.
5. LAYER SURVEYS CCTV SURVEY SEARCH WAS RECEIVED IN JANUARY 2023.
6. CORNERSTONE UTILITY SEARCH WAS PROVIDED NOVEMBER 2022.
7. ARCHITECTS LAYOUT HAS BEEN MOVED TO THE NATIONAL GRID REFERENCE BASED ON TOPOGRAPHICAL INFORMATION. ACCURATE SETTING OUT INFORMATION SHOULD BE PROVIDED BY THE ARCHITECTS.
8. DRAINAGE STRATEGY IS DEPENDENT ON CONFIRMATION OF THE FOLLOWING:
- INVERT LEVELS
- LEVELS DESIGN
- CATCHMENT AREAS
- CONSULTATION WITH THE LEAD LOCAL FLOOD AUTHORITY (LLFA)
- CONFIRMATION ON ADOPTABLE AND NON ADOPTABLE AREAS.

LEGEND:

- INDICATIVE RED LINE BOUNDARY
- PROPOSED PERMEABLE PAVING
- PROPOSED ATTENUATION TANK
- PROPOSED SURFACE WATER NETWORK
- PROPOSED RAIN GARDEN
- DRAINAGE EASEMENT
- EXISTING SURFACE WATER SEWER (IDENTIFIED ON THE CCTV SURVEY)
- EXISTING COMBINED SEWER (IDENTIFIED ON THE CCTV SURVEY)
- EXISTING FOUL WATER SEWER (IDENTIFIED ON THE CCTV SURVEY)
- EXISTING DISTRIBUTION MAIN (IDENTIFIED ON UU ASSET MAP)
- EXISTING TRUNK MAIN (IDENTIFIED ON UU ASSET MAP)
- EXISTING HIGHWAY DRAIN
- EXISTING UNITED UTILITIES COMBINED NETWORK
- EXISTING MANHOLES

DATE	REV	DESCRIPTION	DRAWN	CHKD
04.05.23	P04	UPDATED DRAINAGE	CER	CK
20.04.23	P03	UPDATED DRAINAGE STRATEGY	CER	AMG
16.03.23	P02	UPDATED SITE LAYOUT	CER	AMG
01.12.22	P01	DRAFT	CER	AMG

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PROJECT
UPPER BROOK STREET
MANCHESTER

TITLE
SURFACE WATER DRAINAGE STRATEGY

DRAWING STATUS	STATUS CODE
SKETCH	S0

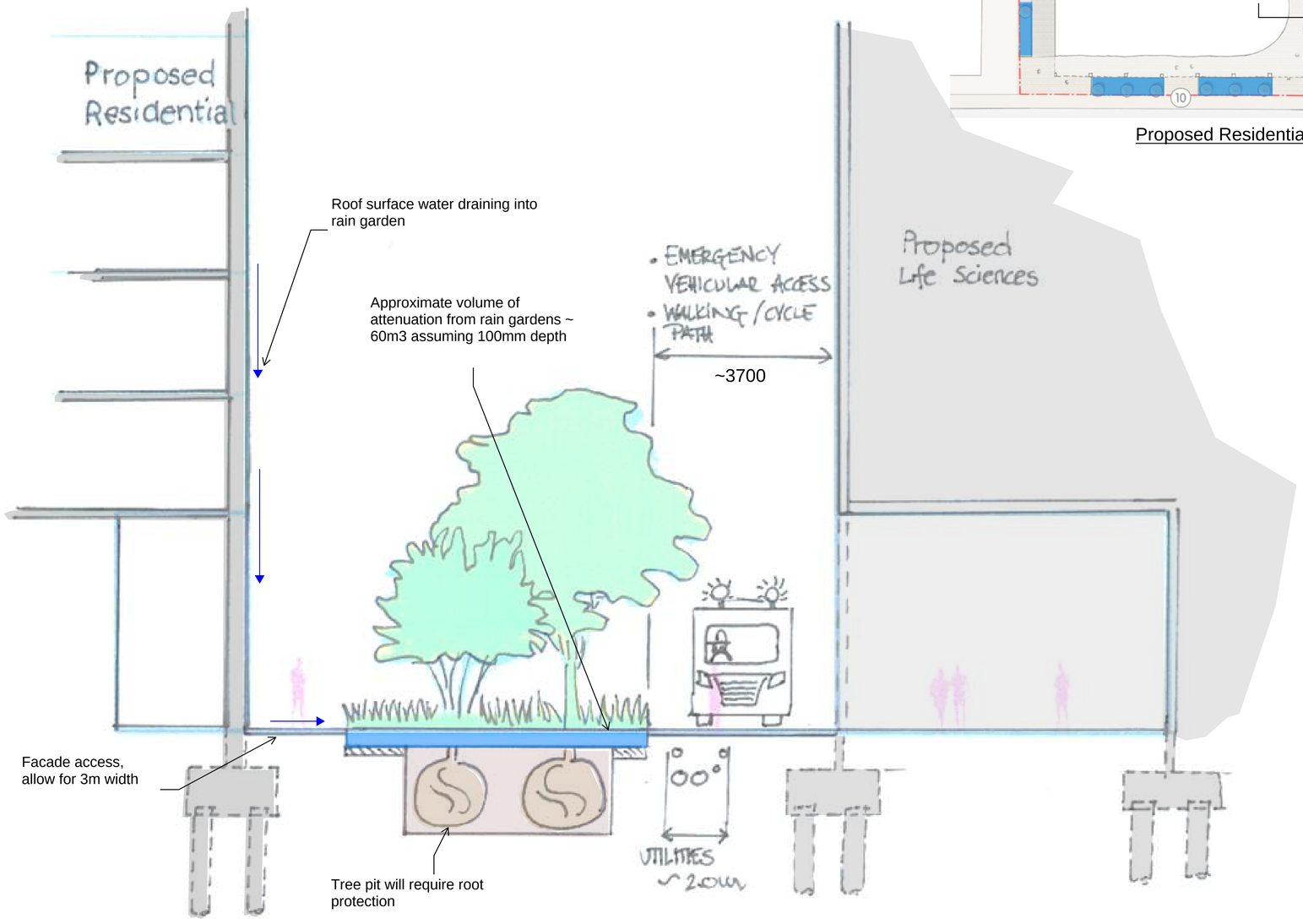
CE PROJECT No.	SCALE @ A1	DATE CREATED	DRAWN	CHECKED
2584	1:150	29.11.22	CER	AMG

DRAWING No. 2584-CIV-XX-XX-S-C-30001
REV P04

Extent of rain gardens on residential site. Approx area = 600m2



Proposed Residential and Life Sciences Landscape Plan



Section A-A



Precedent photograph showing roof surface run of draining into SUDS

STANDARD NOTES

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DATE	REV	DESCRIPTION	DRAWN	CHKD
21.02.23	P01	FOR INFORMATION	TL	

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PROJECT
UPPER BROOK STREET

TITLE
THROUGH ROAD - RAIN GARDEN PROPOSAL

DRAWING STATUS	STATUS CODE
INFORMATION	-

CE PROJECT No.	SCALE @ A1	DATE CREATED	DRAWN	CHECKED
2584	1:200	31/01/23	NH	TL

DRAWING No.	REV
2584-CIV-XX-XX-S-S-10001	P02

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