



First Street Block C, Manchester

DRAINAGE STRATEGY REPORT



24th November 2023

First Street Block C, Manchester

Drainage Strategy Report

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PREPARED BY JAMES ROGERS



First Street Block C, Manchester

Drainage Strategy Report

Downing Living (Manchester South) Limited Partnership Incorporated
- First Street Block C Manchester



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Alan Johnston Partnership Ltd.

Company No. 13204766

First Street Block C, Manchester

Drainage Strategy Report

1.0 INTRODUCTION

This drainage strategy report has been prepared on behalf of Downing Living (Manchester South) Limited Partnership Incorporated in connection with a planning application for a ground + 28 storey purpose built student accommodation development.

The purpose of this report is to present the surface water and foul water outline drainage strategies for the site which have been developed by the Alan Johnston Partnership Ltd. To demonstrate how the specific drainage requirements are to be met, the report should be read in conjunction with the relevant drawings and supporting information, included within the appendices.

The drainage strategies outlined within this report, have been prepared in accordance with BS EN 752:2017 (Drain and sewer systems outside buildings), Sewers for Adoption, Building Regulations Approved Document H (Drainage and waste disposal), the Planning Practice Guidance and the National Planning Policy Framework document (Department for Communities and Local Government, March 2014).

The site is located within Flood Zone 1, with a total site area under 1.0ha. Therefore, in accordance with DEFRA guidance, a Flood Risk Assessment (FRA) is not required.



2.0 SITE DESCRIPTION

The existing site is situated to the south of Hulme Street and west of Newcastle Street, Manchester and is located at National Grid reference SJ 83806 97142. The location of the existing site is illustrated in Appendix A and the extent of the area to which the application relates is shown on the enclosed aerial photo, attached in Appendix B.

The existing site covers a total area of 0.234ha and is a brownfield site. The site currently consists of the site offices for the construction of a surrounding development. The site is bounded by the highway along Medlock street and blocks A/B and D, Plot 11, under construction.

The site generally falls from south to north, with levels falling from approximately 35.20mAOD in the south to approximately 33.98m on the north. A topographical and utility survey of the existing site is attached in Appendix C and an aerial photo is included in Appendix B to illustrate the site at the present day.



3.0 PROPOSED DEVELOPMENT

The proposed development is to construct a ground + 28 storey purpose built student accommodation development. The site is to include green space and public footpaths to also tie into the existing developments.

To enable a viable scheme, the proposed site levels are constrained by the proposed levels of the extant development and the public roads surrounding the site. Therefore, site levels will be adjusted to tie into the existing levels. The proposed site plan indicating the proposed site layout is attached in Appendix D.



4.0 ASSESSMENT OF FLOOD RISK

Even though a Flood Risk Assessment is not required under the Planning Practice Guidance and National Planning Policy Framework, a basic site-specific flood risk assessment has been completed below.

4.1 Flooding from Rivers

The Flood Risk map is included as Appendix E. As can be seen from the Flood Risk map, the site is located within Flood Zone 1 and therefore, the sites are all located in Flood Zone 1 with a chance of flooding of less than 0.1% (or 1 in 1000).

The nearest watercourse is the River Medlock, which is located approximately 230m north of the site. As such, the risk of flooding to the new development from rivers is considered to be low.

4.2 Flooding from the Sea

The sites are not at risk of flooding from the sea. The lowest floor level across the site is approximately 35.20mAOD, i.e. well above tidal flood levels.

4.3 Flooding from Land

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding.

The Surface Water Flooding map is included in Appendix E. It can be seen from the map that the site is classified as having a very low risk of surface water flooding, and as such the risk of flooding from overland flows due to surface water flooding is considered to be low.

4.4 Flooding from Groundwater

The Groundwater Flooding Map contained within the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) Report indicates that the site is in an area which is at risk of groundwater flooding.

An intrusive site investigation was completed in June 2016 by Cundall and is contained within the Cundall Geotechnical and Geoenvironmental Assessment Report, 1011906.RPT.GL.004. The report has indicated that groundwater strikes as shallow as 2.60mbgl were encountered during the site investigation. However, subsequent groundwater monitoring has indicated that the shallowest groundwater level is 3.92mbgl, with the majority of groundwater levels being reported as between 4.00mbgl - 5.00mbgl.

As such, due to the depths of the groundwater encountered by the site investigation it is envisaged that the site has a negligible risk of groundwater flooding. Therefore, due to the depths of the groundwater encountered by the site investigation, the site is considered to be at low risk of flooding from groundwater.

4.5 Flooding from Sewers

A record of public sewers surrounding and serving the development site is included in Appendix F. As can be seen from the public sewer map there are no public sewers located within the site boundary.

Due east of site was a varying sized combined water sewer travelling south to north along Newcastle street. However, as a part of a previous development, this sewer was abandoned. Outside of the site boundary is a 600x900mm combined water brick sewer traveling west along Chester street which transitions into 590x920mm combined water brick sewer traveling south along Newcastle Street.

There are existing private sewers within the site boundary as part of the extant development. These include a 225mm surface water and 150mm foul water sewer travelling south along the east side of the site boundary with both out falling into a combined water manhole, as we were involved and designed the drainage for the extant development.

Therefore, as the proposed drainage networks for the proposed site will be suitably designed and the fact that the surrounding public sewers are all located within the surrounding highways and are maintained by United Utilities, leads to the conclusion that the site itself is considered to have a low risk of flooding from sewers.

4.6 Flooding from Reservoirs, Canals and Other Artificial Sources

The Reservoir Flood Risk map is included in Appendix E and the closest artificial waterbody or reservoir is Audenshaw Reservoir which is located approximately 7.5km east of the site. As such, it can be seen from the map that the site is not at risk of flooding from reservoirs, canals or other artificial sources.

Therefore, the proposed development has a low risk of flooding from reservoirs, canals and other artificial sources.



5.0 PROPOSED DEVELOPMENT

5.1 Effect of Proposed Development

As previously outlined in Section 2.0, the existing site covers a total area of 0.234ha. The pre and post development impermeable areas for the 0.234ha development area have been assessed and are indicated on the attached drawing in Appendix G. The comparison between the pre and post development impermeable areas is also summarised below;

Total Development Area (ha)	Pre-Development Impermeable Area (ha)	Post Development Impermeable Area (ha)
0.234	0.180	0.184

As can be seen the proposed development will results in minimal changes to the overall impermeable areas across the site and therefore will have minimal changes to the;

- Volume of surface water ponding on the site.
- Volume of surface water runoff leaving the site or discharging into surrounding areas.
- Peak discharge rate from the site.

None the less, drainage systems will need to be designed to sufficiently drain the foul and surface water flows arising from the proposed development. Where possible, any existing drainage networks should be utilised. Appropriate design and construction of these systems as set out in Section 5.3 should ensure that there is no increase in offsite flood risk that would otherwise impact downstream areas.

5.2 Existing Drainage Systems

As mentioned in section 4.5 there are combined water public sewers within the public roads surrounding the site. This being a 600x900mm combined water brick sewer traveling west along Chester street which transitions into 590x920mm combined water brick sewer traveling south along Newcastle Street. As also mentioned in section 4.5 the public combined water sewer travelling north along Newcastle Street has since been abandoned.

As part of the previous development a 150mm foul and a 225mm surface water were installed on the east side of the site as outfall routes for block D. These both outfall into a private combined water sewer before discharging east into the public combined water sewers mentioned above via United Utilities manhole UUMH8102.

As all of the public sewers are located outside of the site and are not being affected by the proposed works, it is envisaged that no public sewer diversions or reduced easement agreements will be required with United Utilities.

5.3 Proposed Drainage Strategy

As outlined above in Section 5.1, site-wide drainage systems are required to drain the foul and surface water flows arising from the proposed development. The proposed drainage systems must ensure that there is no increase in offsite flood risk that would otherwise impact downstream areas.

5.3.1 Surface Water Drainage

The Planning Policy Guidance and the CIRIA SuDS Manual detail that surface water runoff from a development should be disposed of as high up the following hierarchy as reasonably practicable:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system;
- to a combined sewer.

Considering the hierarchy above, the surface water network for the proposed development should infiltrate where possible. The Cundall Geotechnical and Geoenvironmental Assessment Report, 1011906.RPT.GL.004, did not undertake any BRE365 complaint infiltration tests but it has indicated that the site is underlain by large depths of made ground, up to 3.75mbgl and also a number of buried obstructions.

The made ground and glaciofluvial deposits are then underlain by a substrate of firm to stiff clays. Even though no BRE 365 compliant soakaway tests were completed as part of the intrusive site investigation, it is envisaged that infiltration is not suitable across the proposed site. This is due to the potential for inundation settlement resulting from infiltration through the large depths of made ground and buried obstructions and also due to the low permeability of firm to stiff clays.

As the large depths of made ground and underlying impermeable clay strata has ruled out the use of infiltration, the intention for the development would be to discharge to watercourse. The nearest watercourse is the River Medlock, which is located approximately 230m north of the site. However, due to the distance through developed third-party land, discharging to watercourse has been deemed impractical.

As such, the only practical solution for discharge of the surface water is discharge to public sewer. As mentioned in Section 5.2, there is existing private drainage which was developed as part of the previous development. Included in that is a combined water manhole which outfalls into the public combined water sewer where Newcastle Street meets Chester Street into UUMH8102. Given the lack of surface or foul public sewers in the area, this would be the most appropriate outfall for the proposed network

While every effort to use the existing systems should be made, the drainage systems should be designed to suit the proposed site layout and topography which aims to provide an efficient design.

In line with Sewers for Adoption (7th Edition), the requirements for the design of a new surface water drainage systems are as follows:

- Below ground piped drainage to be sized to accommodate the 1 in 2-year (50% AEP) design storm without surcharge.
- System to be designed not to flood any part of the site in a 1 in 30-year (3% AEP) design storm.
- For events in exceedance of the 1 in 30-year design storm and up to and including the 1 in 100-year event, site drainage and topography should be designed where practicable to route surface water run-off away from buildings to safe above-ground storage areas on site, thereby preventing this run-off from leaving the site and increasing flood risk elsewhere.

For each design case described above, the design storm is the critical storm duration for the site conditions. In the case of the 1 in 100-year design storm, a 45% increase in the peak rainfall intensity is applied to allow for the estimated worst-case impacts of climate change. This is in accordance with advice, issued by the Environment Agency, which updates previous climate change allowances outlined in the National Planning Policy Framework.

Suitable systems of below ground drainage will be required to contain as a minimum requirement, the 1 in 30-year event. Additionally, any surface water run-off from events that exceed the design capacity of the new drainage system, up to and including the 1 in 100-year (+45%) event, will be retained on-site in safe storage areas.

As the site area consists mainly of roof areas and small pedestrianized spaces, the risk of pollution has been deemed to be minimal and therefore in line with the requirements of Pollution Prevention Guidelines 3 (PPG3), no measures to prevent oil and other contaminants being passed forward to the existing combined water sewer are required. In line with common practice. It is proposed the surface water discharge from the proposed development should mimic that from the existing site.

Prior correspondence with United Utilities has been conducted prior to this publishing of this report to confirm the maximum flow rate for the proposed site. It is stated that “United Utilities request that any agreed rate does not exceed 5 l/s”. As such the proposed surface water network will be restricted to 5.0L/s up to and including the 1 in 100 year storm event + 45% climate change allowance. The full correspondence with United Utilities can be found in Appendix H.

The 5.0 L/s discharge restriction is also generally accepted as the minimum discharge rate to avoid the need for orifices less than 100mm in diameter which due to their minimal size are prone to blockage. The 5.0 L/s discharge rate is in compliance with the Environment Agency document; ‘Rainfall runoff management for developers’, Report SC030219.

This is further supported by United Utilities, as the guidance notes within the United Utilities Section 104 adoption agreement states that for any flow control device, “The minimum acceptable orifice size is 100mm.” and to achieve this minimum orifice diameter a maximum discharge rate of 5.0 L/s is required.

Given the compliance with both Manchester City Council and United Utilities guidelines, it is anticipated that the proposed drainage strategy will be accepted.

As seen in from the Outline Drainage Strategy Drawing attached in Appendix J, it is anticipated that the attenuation storage will be provided via a cellular attenuation tank as well as surface water drainage network itself, with a vortex flow control device used to restrict the discharge rate to the required 5.0 L/s discharge rate, as indicated above.

The surface water drainage calculations have also been included within Appendix J and as can be seen the proposed surface water drainage and attenuation storage prevent any flooding for all rainfall events up to and including the 1 in 100 year + 45% climate change event and also meet the required 5.0 L/s discharge restriction. This is summarised in the table below.

Rainfall Return Period (years)	Discharge Rate (L/s)
1 Year	4.2
30 Year	5.0
100 Year	5.0

As can be seen from the Outline Drainage Strategy Drawing attached in Appendix J, the surface water drainage collects the runoff from the site area via rainwater downpipes and areas of permeable paving and conveys the surface water run off to the north east of the proposed site. Although the permeable paving is continuous through Newcastle Street and across multiple blocks, our network only drains areas within the site boundary.

Here the surface water runoff is restricted via a vortex flow control prior to discharging into the existing private surface water network from the previous development. This ultimately outfalls into United utilities public combined water manhole UUMH8102. The vortex flow control device restricts the runoff to the required 5.0 L/s discharge rate, for all rainfall events up to and including the 1 in 100 year +45% climate change event. As the surface water network for the initial First Street development was built with anticipation of Block C being built, the existing network was upsized prior to provide sufficient capacity for run off produced by Block C.

It should be noted that the proposed surface water drainage network and attenuation tank provides sufficient storage to prevent any flooding for all rainfall events up to and including the 1 in 100 year +45% climate change event and therefore the exceedance flow paths are for use in exceptional circumstances only.

The surface water drainage strategy and discharge rate should be confirmed via more detailed discussions with Manchester City Council and United Utilities prior to the commencement of any works.

5.3.2 SuDS Summary

As outlined below, all other SuDS techniques have been considered for this development;

SuDS Technique	Suitable for This Development?	Reasoning
Green Roof	✓	Minimal areas available but utilised where suitable.
Rainwater Harvesting	✗	Impractical due to lack of demand for greywater.
Basins & Ponds	✗	Unsuitable due to lack of available space and site levels.
Filter Strips & Swales	✗	Unsuitable due to lack of available space and site levels.
Bio-retention Areas	✗	Unsuitable due to lack of available space.
Infiltration Techniques	✗	Unsuitable due existing impermeable strata and lack of space for a soakaway.
Permeable Surfaces	✓	Suitable and incorporated.
Tanked/Piped Systems	✓	Suitable and incorporated.

Green roofs have been considered and are suitable to include in the development, despite minimal areas to do so. Rainwater harvesting was also considered but due to a lack of greywater demand it has been deemed as impractical to include a rainwater harvesting system.

Due to the slope across the site provided by the existing site levels and lack of available space across the site, the use of detention basins and/or ponds has also been discounted. Filter drains/strips, swales and bio-retention areas have also been deemed as impractical due to the lack of available space within the site and proposed site levels not providing sufficient falls to areas suitable for these SuDS techniques.

Permeable surfaces have been included within public walkways on the east side of the development.

As previously discussed in Section 5.3.1 infiltration is deemed as not feasible across the site and therefore the use of infiltration SuDS techniques is not possible. Below ground attenuation storage has been included and stores water to prevent any flooding for the 1-in-100 year storm event.

5.3.3 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 752:2017 (Drain and sewer systems outside buildings)

- Sewers for Adoption (7th Edition)
- National Planning Policy Framework document (Department for Communities and Local Government, March 2012).
- Planning Practice Guidance
- 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 2015).

As can be seen from the Outline Drainage Strategy Drawing attached in Appendix J, the proposed foul water drainage will collect the foul flow from the proposed building and convey the foul water to the north east of the proposed site.

It is proposed that the foul water is to discharge into the existing private foul water network built as part of the previous development onto existing private combined water manhole CW02 due east of site.

It is anticipated that the foul water can discharge into the existing private sewer at unrestricted rates. Similar to the surface water network, the initial first street development foul water network was designed in anticipation of Block C being constructed. As such the network was upsized to allow for sufficient pipe capacity for both developments.

The foul water drainage strategy and unrestricted discharge rate should be confirmed via more detailed discussions with Manchester City Council and United Utilities prior to the commencement of any works.

6.0 FUTURE MANAGEMENT & MAINTENANCE

The proposed drainage solution uses SUDS techniques in accordance with the CIRIA SUDS Manual C753. The surface water run-off from the proposed development is restricted using a vortex flow control device and the attenuated run-off is stored using a below ground cellular attenuation tank.

It is envisaged that the following components have been or will be included within the drainage strategy for the proposed development site:

- Inspection chambers, manholes and catchpits
- Pipes
- Drainage channels and gullies
- Vortex flow control device
- Cellular Attenuation Tank
- Permeable Paving
- Green Roof

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

It is assumed that the proposed drainage will remain private and therefore maintenance of the surface and foul water drainage systems will be the responsibility of Downing Living (Manchester South) Limited Partnership Incorporated or an on-site facilities management team and therefore a copy of the final construction drainage layout should be provided in the final Operations and Maintenance Manual.

As such, the maintenance of the specified SuDS should be included within the developments Operation and Maintenance Manual and should be detailed in accordance with the CIRIA SuDS Manual C753, as per the operation and maintenance guidance outlined below.

6.1 General Maintenance & Inspection Requirements

- No work shall be carried out on the drainage system without permission from a nominated person, who has access to information/a working knowledge of the system.
- Maintenance/inspection work shall be carried out in a safe/planned manner.
- All work is to be carried out by competent persons suitably trained and equipped in accordance with current statutory safe working policies.
- Entry into confined spaces shall be kept to a minimum and be restricted to suitably qualified/equipped persons working in accordance with current statutory safe working policies.
- Drainage systems shall be inspected on a regular basis or should any problems be suspected. Any debris/defects discovered shall be recorded and a programme of cleaning/ repair initiated. Urgent repairs/cleaning shall be actioned as soon as practicable.
- It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.
- Clearing of the drainage system can be achieved by a number of methods depending on the nature of the work;
 - Rodding - Manual/Mechanical with flexible rods.

- Jetting - High pressure water jetting.
- Plunging.

6.2 Inspection Chambers, Manholes and Catchpits

The appropriate health and safety equipment must be used when accessing manholes/catchpits. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access. The following operations should be carried out annually.

- Covers of inspection chambers and manholes shall be removed and the sides, benchings and channels cleared.
- Accumulated deposits of silt in inspection chambers, catchpits and manholes shall be removed. Any traps shall then be plunged and thoroughly flushed out with clean water. This should be completed in Autumn, after leaf fall.
- Main and branch drains shall be cleared as required and flushed with clean water. Any obstructions found shall be removed and not flushed down the system.
- Covers of inspection chambers, manholes and catchpits shall be replaced, bedded in suitable grease or other sealing material as required and bolted/locked down as appropriate. Missing bolts and broken items shall be replaced in accordance with the manufacturer's details.

6.3 Pipes

Regular inspection and maintenance are important to identify areas which may have become obstructed/clogged and may not be draining correctly, as failure to do so would expose the development to a greater level of flood risk.

Pipes are proprietary products and therefore the materials used can vary across the site. As such, where used the manufacturer's recommendations should be followed. Access for maintenance of the pipes is provided through inspection chambers and manholes. The below table sets out the maintenance schedule for the pipe components of the proposed drainage systems.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for evidence of poor operation via water levels. If required take remedial action.	Monthly for 3 months, then six-monthly intervals. Also, 48 hours after large storms.
	Check and remove large debris and/or vegetation growth near pipe runs.	Monthly or as required.
Remedial Actions	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue.	As required, if above actions do not improve performance.
Monitoring	Initial Inspection should be provided as post construction CCTV survey.	N/A
	Inspect/check all inlets, outlets and overflows to ensure they are in good condition and operating as designed.	Monthly for 3 months, then six-monthly intervals. Also, 48 hours after large storms.

6.4 Drainage Channels and Gullies

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating. The below table sets out the maintenance schedule for the drainage channel and gullies components of the proposed drainage systems.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Litter and debris removal.	Monthly or as required.
	Check and remove large debris and/or vegetation growth near pipe runs.	Monthly or as required.
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies.	Monthly for 3 months, then six-monthly intervals. Also, 48 hours after large storms.
Remedial Actions	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue.	As required, if above actions do not improve performance.
Monitoring	Initial Inspection including channel outlet boxes and gully sumps.	Monthly for 3 months, then six-monthly intervals. Also, 48 hours after large storms.

6.5 Vortex Flow Control Device

Regular inspection and maintenance is important to identify if the vortex flow control device has become obstructed/clogged and may not be functioning correctly, as failure to do so would expose the development to a greater level of flood risk.

Vortex flow control devices are proprietary products and therefore can vary from manufacturer to manufacturer. As such, where used the manufacturer's recommendations should be followed.

- Normally, little maintenance is required as there are generally a vortex flow control device has no moving parts.
- If blockages occur they tend to do so at the intake of the vortex flow control device.
- Vortex flow control devices are generally fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur.
- The smaller type conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

- Following installation of the vortex flow control device it is vitally important that any extraneous material i.e. Building materials are removed from the unit and the chamber.
- After the system is made live, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. Units should also be inspected within 48 hours after large storms.

It should be noted that the Main Contractor should provide a Verification Report, including photographic evidence, to demonstrate that the drainage has been constructed as per the design drawings. As-built drawings should as be supplied by the Main Contractor, where the construction of the drainage varies from the design construction status drawings.

6.6 Cellular Attenuation Tank

Regular inspection and maintenance is important to identify if the inlets/outlets have become obstructed/clogged and may not be functioning correctly, as failure to do so would expose the development to a greater level of flood risk.

The maintenance requirements for cellular attenuation tanks are outlined within Table 21.3 of the CIRIA SUDS Manual C753. An extract of that table is given below to set out the maintenance schedule for the cellular attenuation tank component of the proposed drainage systems.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

6.7 Permeable Paving

The maintenance requirements for permeable/porous paving is covered under the pervious pavements section within the CIRIA SUDS Manual C753. As such, the maintenance requirements for permeable/porous tarmac are outlined within Table 20.15 of the CIRIA SUDS Manual C753. An extract of that table is given below to set out the maintenance schedule for the permeable/porous tarmac component of the proposed drainage systems.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

It should be noted that the Main Contractor should provide a Verification Report, including photographic evidence, to demonstrate that the drainage has been constructed as per the design drawings. As-built drawings should be supplied by the Main Contractor, where the construction of the drainage varies from the design construction status drawings.

6.8 Green Roof

Regular inspection and maintenance is important to identify if the inlets/outlets have become obstructed/clogged and may not be functioning correctly, as failure to do so would expose the development to a greater level of flood risk. The maintenance requirements for green roofs are outlined within Table 12.5 of the CIRIA SUDS Manual C753. An extract of that table is given below to set out the maintenance schedule for the green roof components of the proposed drainage systems.

TABLE 12.5 Operation and maintenance requirements for green roofs

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unobstructed runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually, or as required
	During establishment (ie year one), replace dead plants as required	Monthly (not usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

7.0 CONCLUSIONS

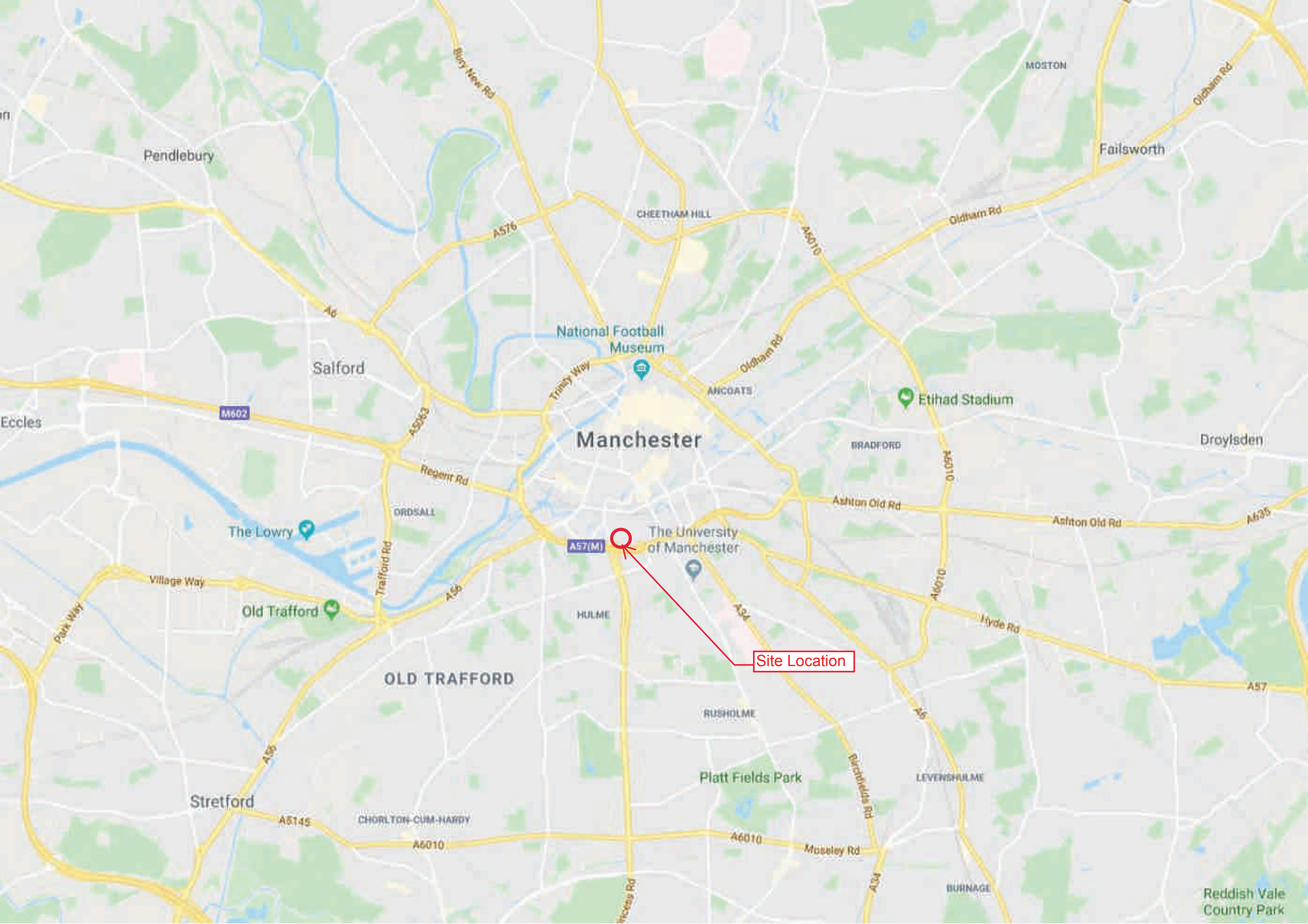
- The site is located within Flood Zone 1 and therefore is classified as having a low probability of flooding from rivers or sea. The site is also at a low risk of flooding from surface water flows and all other sources.
- An intrusive site investigation has been completed but this does not include BRE365 compliant infiltration tests. However, the site investigation has indicated that the site is underlain by large depths of made ground and buried obstructions and also firm to stiff clays. Therefore, due to the potential for inundations settlement of the made ground and buried obstructions and also the likely low permeability of the clay stratum, infiltration is not considered to be viable across the site and therefore these tests are not required.
- The nearest watercourse is the River Medlock, which is located approximately 230m north of the site. However, due to the distance through developed third-party land, discharging to watercourse has been deemed impractical. Therefore, the only practical solution for the discharge of the surface water is discharge to public sewer.
- There are no public surface water sewers within close vicinity of the site and as such the only viable option for the disposal of the surface water runoff from the proposed development is to the surrounding public combined water sewers.
- The surface water network is proposed to outfall into the existing private surface water network constructed as a part of First Street's extant development. This then outfalls into United Utilities public combined water manhole UUMH8102 along Newcastle Street.
- The surface water discharge rate is to be restricted to 5.0 L/s to comply with LLFA requirements, United Utilities guidelines and previously agreed run off rates. The proposed surface water drainage design meets these criteria and also ensures there is no flooding for all rainfall events up to and including the 1 in 100 year +45% climate change design storm.
- Again, as the surface water discharge is to be restricted, the surface water runoff will surcharge the proposed drainage network. Therefore, attenuation storage will be provided in the form of a below ground cellular attenuation tank.
- The foul water drainage is to discharge via gravity into the existing private foul water network constructed as a part of First Street's initial development. This foul runoff eventually outfalls into United Utilities public combined water manhole UUMH8102; the same as the surface water network. It is anticipated that the foul water can discharge into the private sewer at unrestricted rates.

8.0 RECOMMENDATIONS

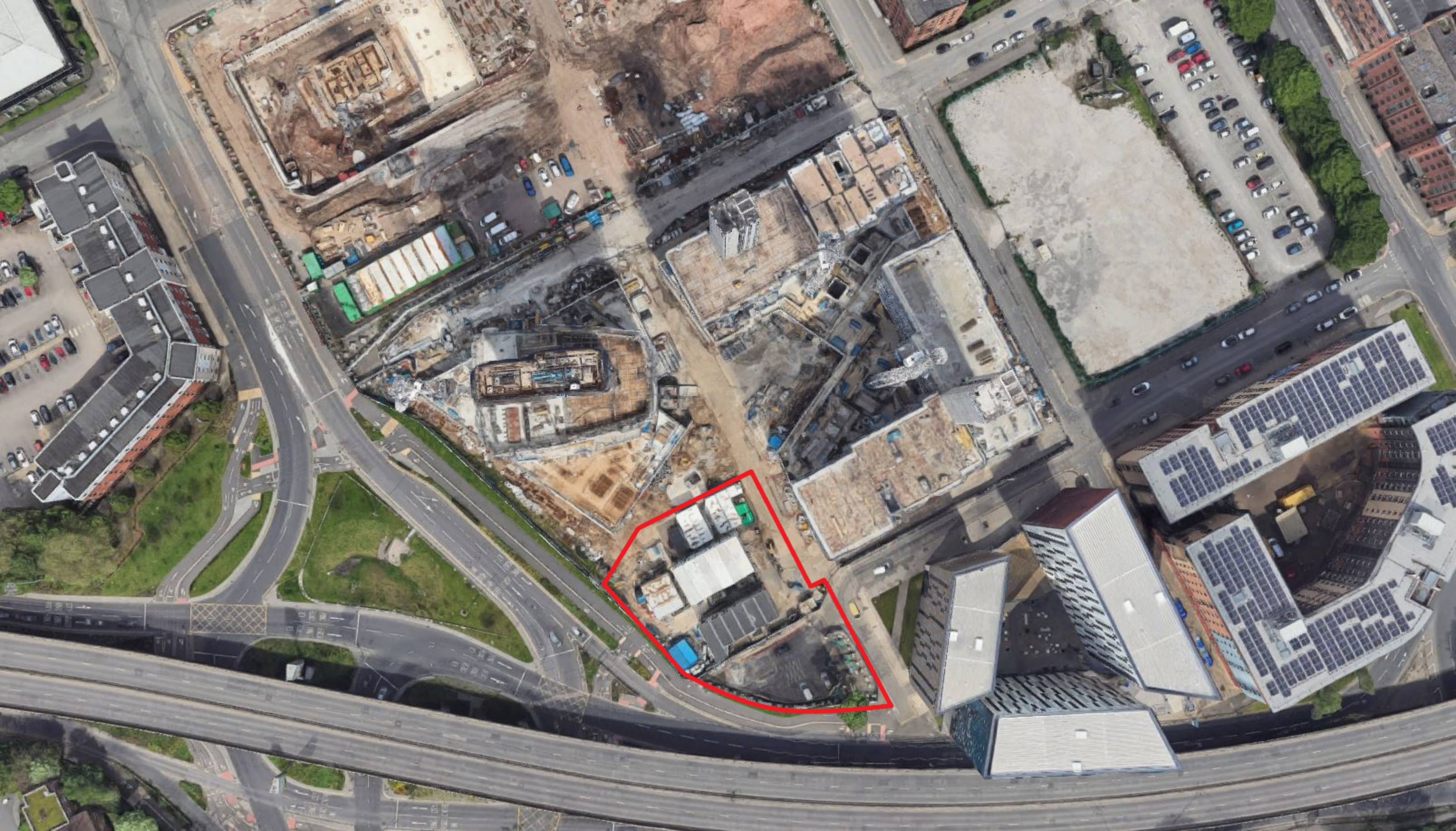
- The invert level of the existing private waters sewers at the proposed points of outfall should be confirmed prior to the commencement of any work.
- The surface water drainage strategy and discharge rate should be confirmed via more detailed discussions with Manchester City Council and United Utilities prior to the commencement of any works.
- The foul water drainage strategy and unrestricted discharge rate should be confirmed via more detailed discussions with Manchester City Council and United Utilities prior to the commencement of any works.



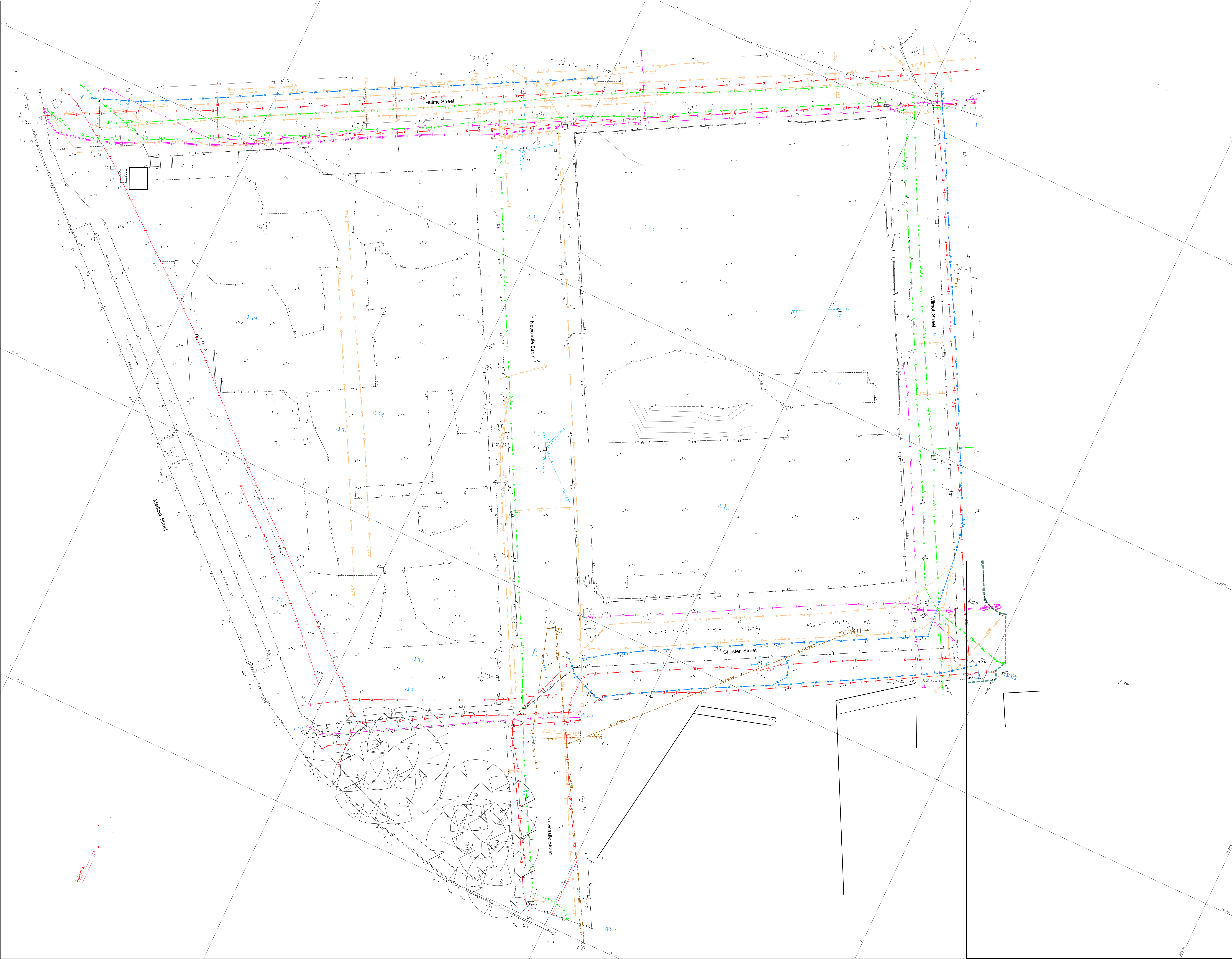
Appendix A – Site Location Plan



Appendix B – Aerial Photo



Appendix C – Topography



Topographical Survey Legend

Symbol	Description	Symbol	Description	Symbol	Description
...	...	...	...	...	...

Drainage/Services Legend

Symbol	Description	Symbol	Description	Symbol	Description
...	...	...	...	...	...

Survey Station Coordinates

STN	EASTING	NORTHING	LEVEL
J501	383788.78	397112.93	34.52
J502	383787.05	397175.47	34.53
J503	383715.43	397188.33	34.31
J504	383784.81	397229.75	33.15
J505	383984.74	397272.28	32.64
J506	383725.55	397196.24	33.54
J507	383944.46	397255.74	32.64
J508	383889.11	397218.38	33.70
J509	383811.19	397131.54	34.70
J510	383761.34	397172.35	34.36
J511	383829.11	397141.66	34.67
J512	383812.75	397164.06	34.60
J513	383787.47	397207.70	33.74
J514	383859.08	397172.49	34.44
J515	383812.20	397126.52	34.75
J516	383815.96	397174.32	33.81
J517	383787.62	397166.65	34.14
J518	383815.96	397174.32	33.81
J519	383812.20	397126.52	34.75
J520	383815.96	397174.32	33.81
J521	383787.62	397166.65	34.14
J522	383815.96	397174.32	33.81
J523	383812.20	397126.52	34.75
J524	383815.96	397174.32	33.81
J525	383787.62	397166.65	34.14
J526	383815.96	397174.32	33.81
J527	383812.20	397126.52	34.75
J528	383815.96	397174.32	33.81
J529	383787.62	397166.65	34.14
J530	383815.96	397174.32	33.81
J531	383812.20	397126.52	34.75
J532	383815.96	397174.32	33.81
J533	383787.62	397166.65	34.14
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J535	383812.20	397126.52	34.75
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J541	383787.62	397166.65	34.14
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J543	383812.20	397126.52	34.75
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J545	383787.62	397166.65	34.14
J546	383815.96	397174.32	33.81
J547	383812.20	397126.52	34.75
J548	383815.96	397174.32	33.81
J549	383787.62	397166.65	34.14
J550	383815.96	397174.32	33.81
J551	383812.20	397126.52	34.75
J552	383815.96	397174.32	33.81
J553	383787.62	397166.65	34.14
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J555	383812.20	397126.52	34.75
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J567	383812.20	397126.52	34.75
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J569	383787.62	397166.65	34.14
J570	383815.96	397174.32	33.81
J571	383812.20	397126.52	34.75
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J587	383812.20	397126.52	34.75
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J590	383815.96	397174.32	33.81
J591	383812.20	397126.52	34.75
J592	383815.96	397174.32	33.81
J593	383787.62	397166.65	34.14
J594	383815.96	397174.32	33.81
J595	383812.20	397126.52	34.75
J596	383815.96	397174.32	33.81
J597	383787.62	397166.65	34.14
J598	383815.96	397174.32	33.81
J599	383812.20	397126.52	34.75
J600	383815.96	397174.32	33.81

Please note:

Any discrepancy found between an Ordnance Survey benchmark and an OSGB15 computed orthometric height is likely to be due to bench mark subsidence or uplift and, assuming precise GPS survey has been carefully carried out, the orthometric height given by OSGB15 should be considered correct in preference to archive benchmark heights. OSGB15 converts GPS ellipsoid heights to orthometric heights above mean sea level.

Levels are related to OSGB15
Value m/a

Coordinates are related to National Grid (GPS)

Scale 1:200

The accuracy of this survey is commensurate with the drawing scale specified within the title block.

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Check all dimensions on-site.
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Title
Topographical & Utility Survey
First Street South
Manchester M15 6HF
Surveyor: SS JS AD DB RL NB CM Draw: AG
Date: October 2019 Checked: MIT
File name: 19700
Drawing No: SSL:19700:200:1:1

Head and Registered Office
Survey Systems Ltd
Wilow Bank House
Old Road
Hartford - Wilmslow
Cheshire, SK9 4JZ
Tel: 01625 534444
Fax: 01625 536816
mail@surveys.co.uk
www.surveys.co.uk

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Appendix D – Proposed Site Plan



This drawing is copyright.
Do not scale off dimensions.
All dimensions to be checked on
site by contractor.
Contractor to report any
dimensional discrepancies,
errors or omissions prior to
commencing on site.

Student Accommodation			Amenity/ Circulation		Storage/Riser/Corridor
Planning boundary	Ownership boundary				
Studio Bedroom	Cluster Bedroom	Cluster Kitchen	Accessible Studio	Accessible Cluster	Management
			Core	Amenity/Entrance	
			Plant/BOH		



First Street South, Block C, Manchester

PLANNING

General Arrangement Plan
Ground Floor

10474-SHP-ZC-A-B5D8-G200-PL-00-001

November 2023

P01

10474

1 : 200 @A3

simpsonhaugh

Manchester
+44 (0)161 835 2345

London
+44 (0)20 7549 4000

Appendix E – Flood Risk Maps

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
383807/397134

Created
11 Oct 2023 9:24

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

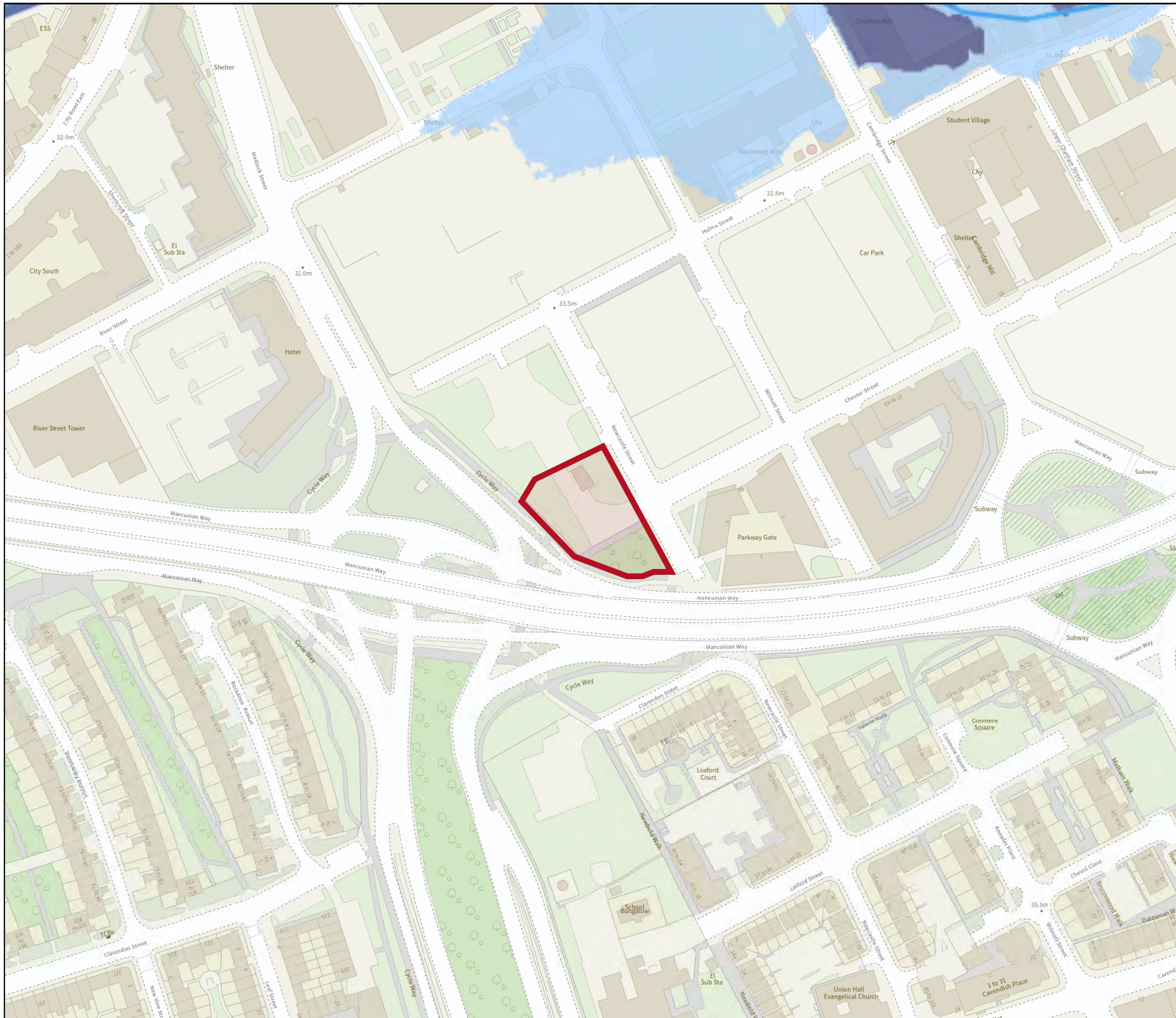
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
383807/397134

Scale
1:2500

Created
11 Oct 2023 9:24

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m



Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected



Extent of flooding from surface water

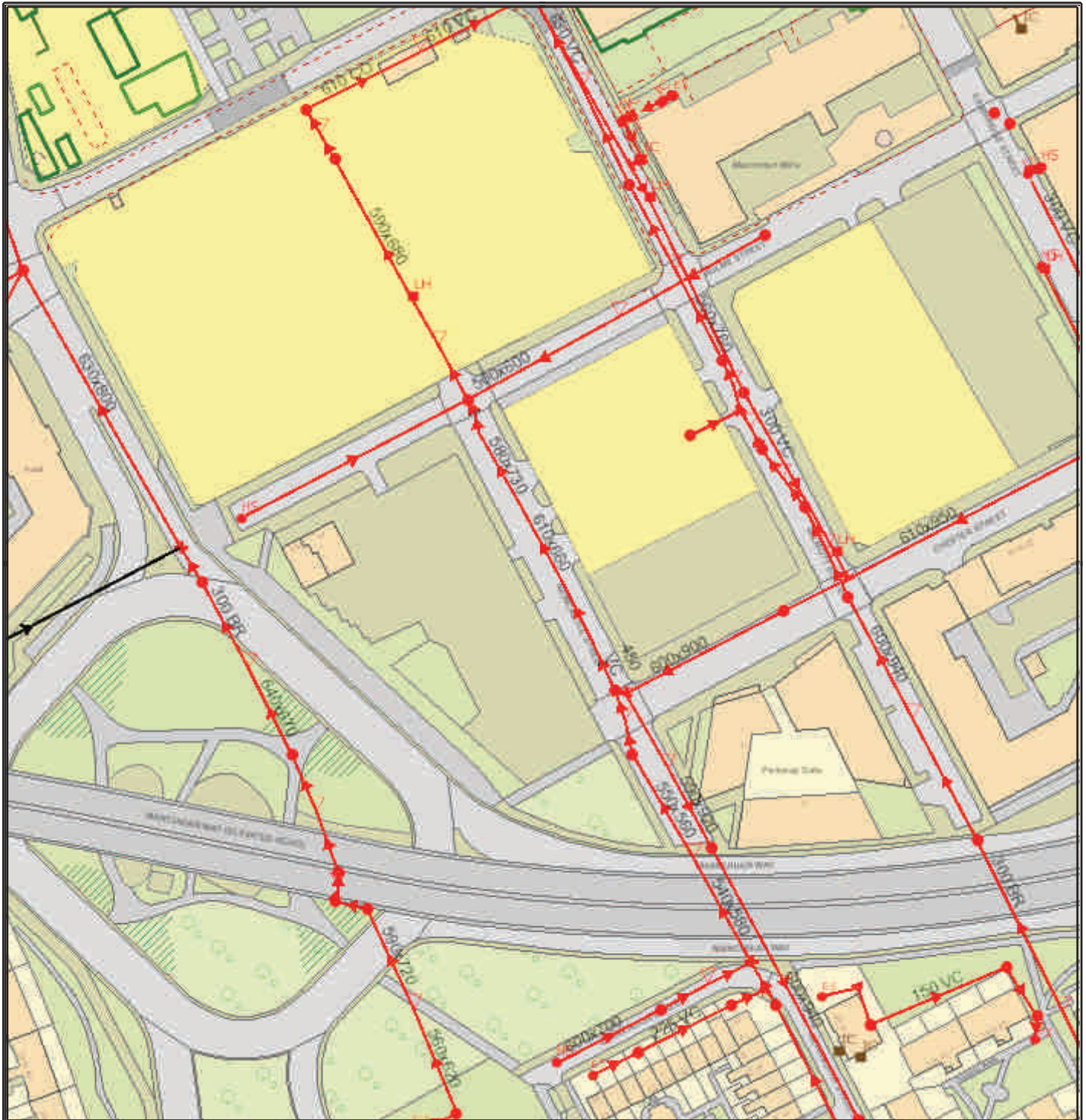
 High  Medium  Low  Very low  Location you selected



Maximum extent of flooding from reservoirs:

■ when river levels are normal
 ▨ when there is also flooding from rivers
 ⊕ Location you selected

Appendix F – Public Sewer Map

SEWER RECORD LAND ON THE NORTH SIDE OF HULME STREET MANCHESTER


The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water Limited will not accept any liability for any damage caused by the actual positions being different from those shown.

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Waste Water Symbolology

Combined	Foul	Surface	Overflow					
				Manhole				WW pumping station
				Manhole, side entry				Inspection chamber
				Public sewer				Extent of survey
				Private sewer				Head of system
				S104 sewer				Soakaway
				Rising main, public				Rodding eye
				Rising main, private				Lamp hole
				Rising main, S104				T junction/saddle
				Highway drain, private				Gulley
				Screen chamber				Air valve
				Discharge point				Non return valve
				Outfall				Sewer overflow
				Control kiosk				Cascade
				Sludge main				Flow meter

Abandoned pipe

Public sewer

Rising main

Private sewer

Sludge main

Manhole function

FO

Foul

SW

Surface Water

CO

Combined

OV

Overflow

Sewer shape

CI

Circular

EG

Egg

OV

Oval

FT

Flat top

RE

Rectangular

U

Unspecified

SQ

Square

TR

Trapezoidal

AR

Arch

BA

Barrel

HO

Horse shoe

Sewer material

AC

Asbestos cement

BR

Brick

CO

Concrete

CSB

Concrete segment

CSU

Concrete segment

CC

Concrete box culverted

PSC

Plastic

GR

Glass reinforced

GRP

Glass reinforced

PVC

Polyvinyl chloride

PE

Polyethelene

DI

Ductile iron

VC

Vitrified clay

PP

Polypropylene

PF

Pitched fibre

MA

Masonary, coursed

MA

Masonary, random

RP

Reinforced plastic

CI

Cast iron

SI

Spun iron

ST

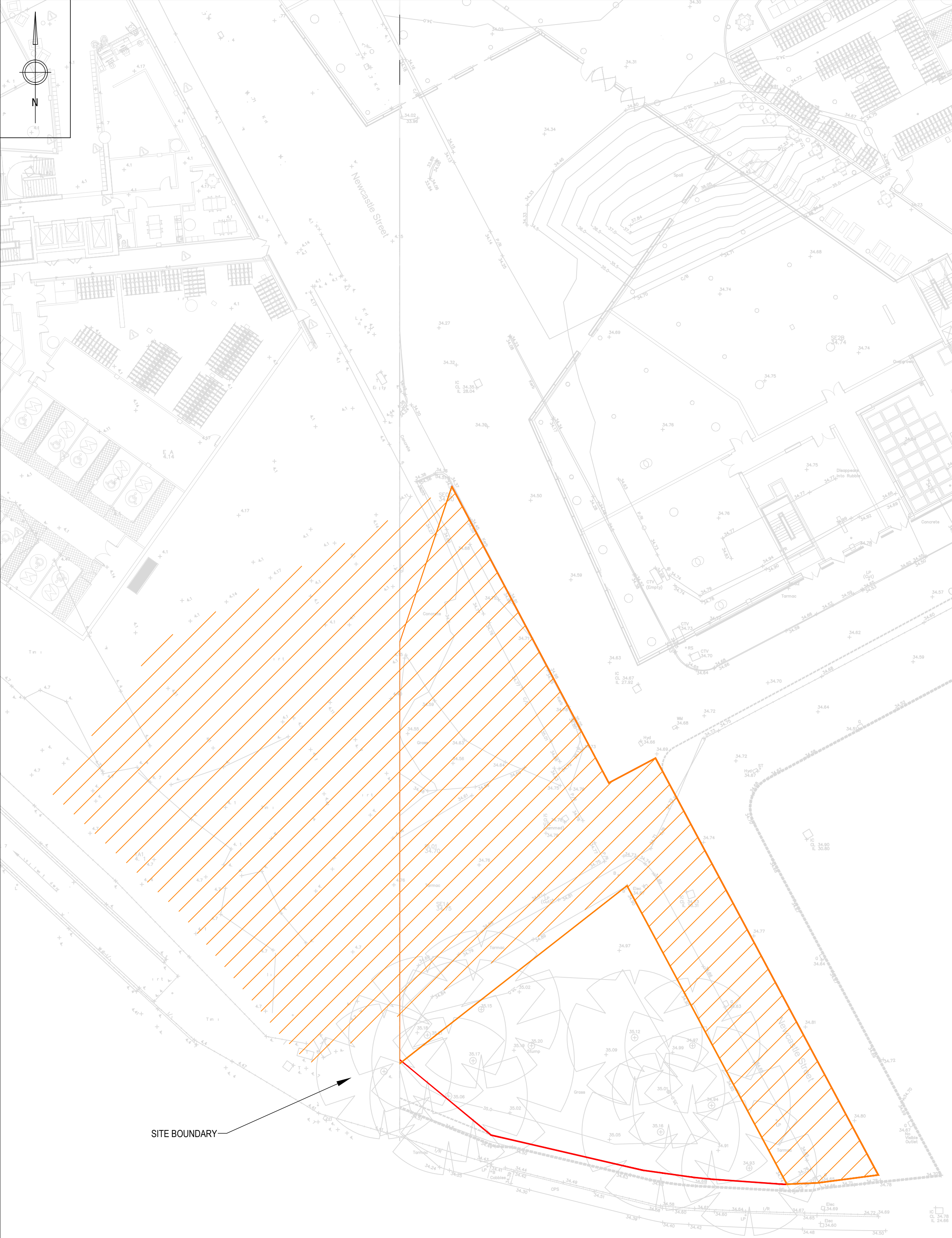
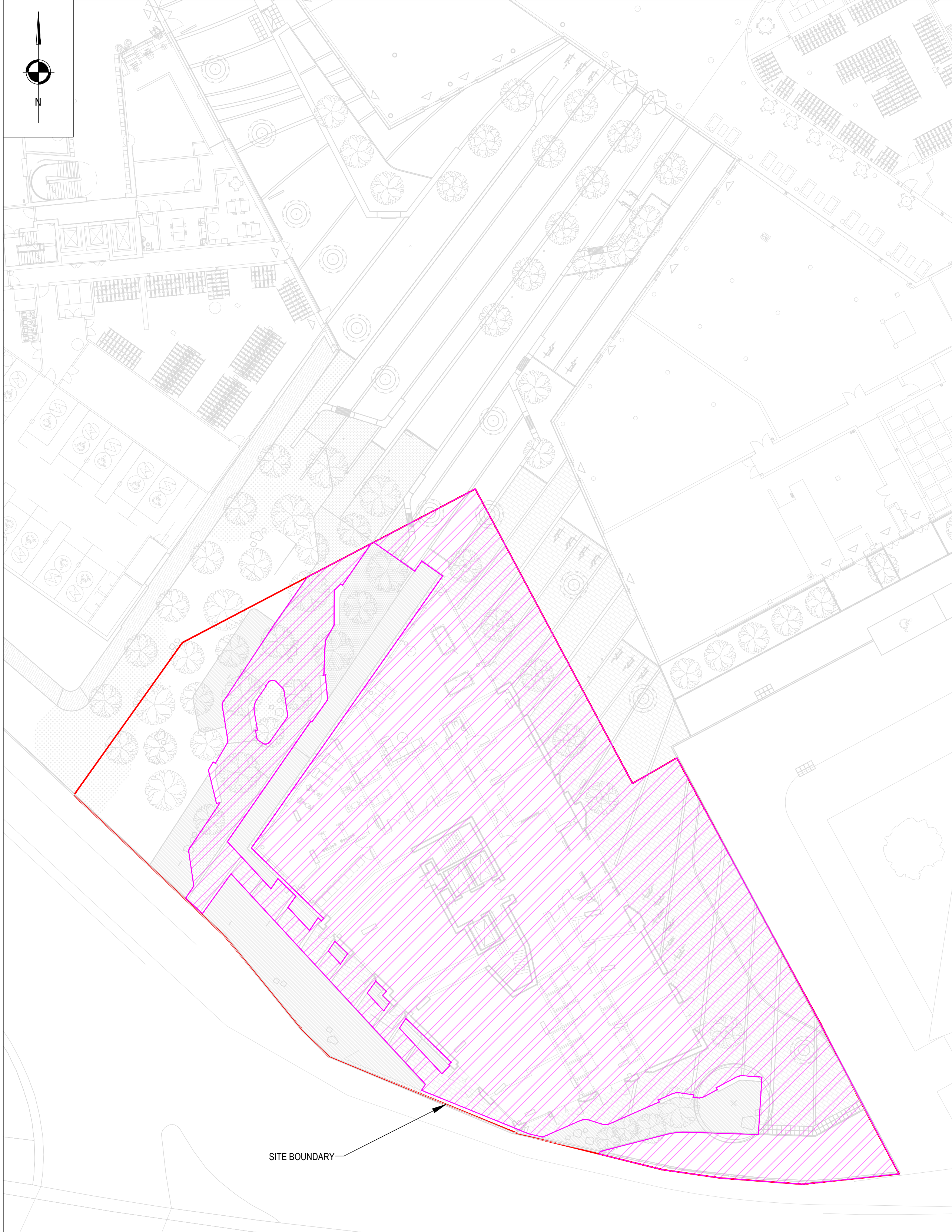
Steel

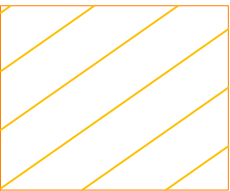
U

Unspecified

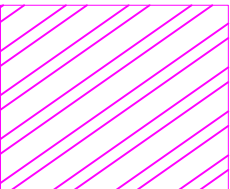
			WW pumping station
			Inspection chamber
			Extent of survey
			Head of system
			Soakaway
			Rodding eye
			Lamp hole
			T junction/saddle
			Gulley
			Air valve
			Non return valve
			Sewer overflow
			Cascade
			Flow meter
			Hatch box
			Hydrobrake
			Inlet
			Bifurcation
			Catchpit
			Oil interceptor
			Penstock
			Summit
			Valve
			Valve chamber
			Washout chamber
			Drop shaft
			WW treatment works
			Septic tank
			Vent column
			Network storage tank
			Orifice plate
			Vortex chamber
			Penstock chamber

Appendix G – Pre & Post Development Impermeable Areas Drawing





PRE DEVELOPMENT
IMPERMEABLE AREAS = 1,798m²



POST DEVELOPMENT
IMPERMEABLE AREAS = 1,837m²

SITE BOUNDARY

SITE BOUNDARY

P02	10.11.2023	UPDATED TO SUIT LATEST SITE LAYOUT					JJR	DJS	DJS
P01	20.10.2023	PRELIMINARY ISSUE					JJR	DJS	DJS
REV	DATE	DESCRIPTION					BY	CHK	APP

DRAWING STATUS:

PRELIMINARY

CLIENT:

DOWNING

ARCHITECT:

SIMPSON HAUGH & PARTNERS

PROJECT:

FIRST STREET SOUTH, BLOCK C
MANCHESTER

TITLE:

PRE & POST DEVELOPMENT
IMPERMEABLE AREAS

STATUS:	PROJECT No:	PROJECT	ORIGINATOR	VOL	SYS	LEVEL	TYPE	ROLE	DRAWING No.	REV:
S2	223-074	FSS - AJP - ZZ - 00 - SK - C - 0002								P02

SCALE @ A1:	DESIGNED:	DRAWN:	CHECKED:	APPROVED:	DATE:
N.T.S	JJR	JJR	DJS	DJS	OCT 2023



Appendix H – United Utilities Correspondence

From: seweradoptions@uuplc.co.uk
Sent: 12 October 2023 15:22
To: Charles Bate
Subject: Pre Development Enquiry for: First Street, Block C M15 5FJ UU Reference Number : 04764547

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon Charles
[Pre Development Enquiry for: First Street, Block C M15 5FJ UU Reference Number : 04764547](#)

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.
If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:
<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water
Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.
Our preferred point of discharge would be to the 500 x 600mm diameter public combined sewer within Hulme Street located to the north of your proposed development at an unrestricted rate.
In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water
All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.
Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.
This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The [North West SuDS Pro-Forma](#) provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.
The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).
The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration
Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.
A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.
Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:
<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>
If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency’s approach to Groundwater Protection. Information on this is available via the link below:
<https://www.gov.uk/government/publications/groundwater-protection-position-statements>
Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Highway Drainage
If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer
In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.
Once evidence is provided as outlined above, United Utilities will consider a connection to the 500 x 600mm diameter public combined sewer within Hulme Street located North of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.
As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels
For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the pubic sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:
<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:
<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>
We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.
If we can be of any further assistance please don't hesitate to contact us further.

Sewer Adoptions

You have indicated on your application form that you intend to put the sewers forward for adoption (including any SuDS components that can come within the meaning of a sewer).
United Utilities assess adoption applications based on the current Design & Construction Guidance and local practices which have now replaced 'Sewers For Adoption 6th Edition'.
We recommend that you submit a pre design assessment to the sewer adoption mailbox (SewerAdoptions@uuplc.co.uk) stating pre design assessment in the title
Please refer to links below to obtain further guidance:
<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-adoptions/>
Site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.
If you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements set out in the Design & Construction Guidance. The proposed design should give consideration to long term operability and give United Utilities a safe and cost effective proposal for the lifetime of the assets. In these cases, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 application, has been assessed and accepted in writing by United Utilities. Any work carried out prior to the technical assessment being approved is done entirely at the developer's own risk and could be subject to change.

SuDS

If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.
Section 104 Pre application form (1b)
As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Codes For Adoption

The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:
<https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/>
A free copy of the new Design & Construction Guidance can be downloaded via the link below:
<https://www.water.org.uk/sewerage-sector-guidance-approved-documents/>

Kind regards,



Lewis Barr
Assistant Developer Engineer
Developer Services & Metering
Customer Services
07827286541
unitedutilities.com

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----- Original Message -----
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 11/10/2023 13:59
To: charlesbate@ajpltd.co.uk
Subject: PDE CA28, First Street Block C - 04764547

Good Afternoon,

PRE DEVELOPMENT APPLICATION AT First Street Block C: – UU Ref 04764547

Please accept this email as receipt of your application received on 10/10/2023 for the above development. This has now been logged on our system and the job reference

is 04764547 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Eireann for technical assessment. You will receive their response within 8 working days.

Kind regards,



Katie Houghton
Customer Advisor Advanced
Developer Services & Metering
Customer Services

Tel: 0345 072 6067 (option 4)
unitedutilities.com

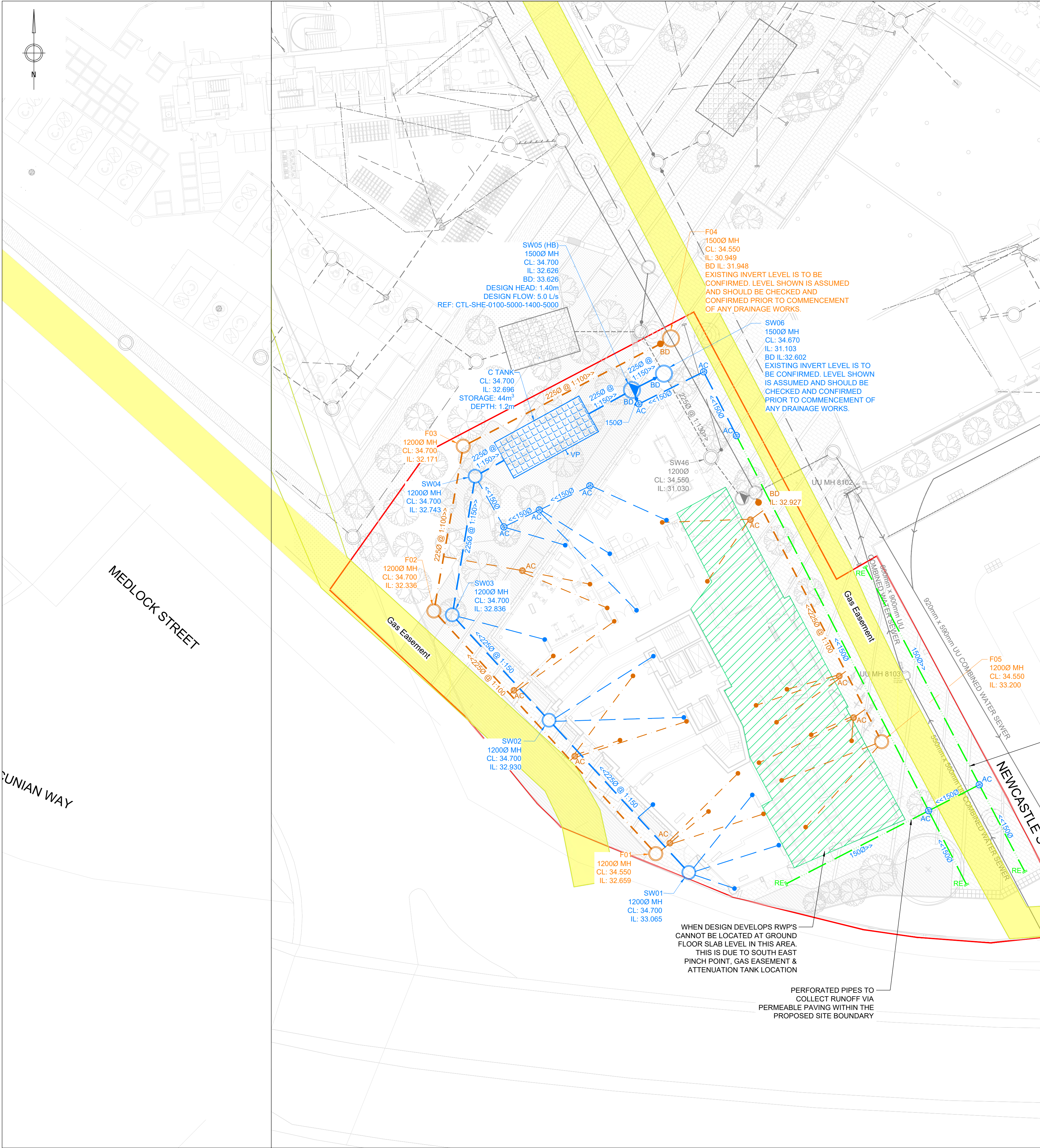


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Appendix I – Outline Drainage Strategy Drawing & SW Calcs



PRELIMINARY SUBJECT TO CONFIRMATION
OF PROPOSED SITE LEVELS AND ALL FOUL
WATER POP UP AND RAINWATER
DOWNPIPE LOCATIONS AND FLOW RATES

PRELIMINARY SUBJECT TO CONFIRMATION
OF PROPOSED SITE LAYOUT,
FOUNDATIONS AND SITE LEVELS

- DRAINAGE NOTES**
- FOUL AND SURFACE WATER CONNECTIONS ARE TO BE CONFIRMED
 - ALL POP-UP SETTING OUT IS TO BE PROVIDED BY THE ARCHITECT
 - ALL SURFACE / FOUL WATER CONNECTIONS ARE TO HAVE RODDABLE ACCESS FROM ABOVE GROUND
 - ANY 6000 ACCESS CHAMBERS GREATER THAN 1.2m DEEP WILL REQUIRE A REDUCED ACCESS SHAFT

KEY

- SURFACE WATER SEWER
- FLOW CONTROL CHAMBER
- SURFACE WATER ACCESS CHAMBER
- PERFORATED UNDERDRAIN WITH RODDING EYE
- FOUL WATER SEWER
- FOUL ACCESS CHAMBER (MIN 600 CHAMBER)
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWER
- EXISTING COMBINED
- GAS EASEMENT
- ATTENUATION CRATES WITH VENT PIPE. VENT PIPE LOCATION TO BE CONFIRMED BY ARCHITECT
- RWP's EXCLUSION ZONE
- BLOCK C SITE BOUNDARY
- AREAS OF PERMEABLE PAVING

- GENERAL NOTES**
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
 - ALL RELEVANT DIMENSIONS TO BE OBTAINED/CHECKED AGAINST ARCHITECT'S DRAWINGS AND BY SITE MEASUREMENT PRIOR TO THE COMMENCEMENT OF WORKS OR ORDERING OF MATERIALS. DISCREPANCIES BETWEEN THE DRAWINGS AND SITE CONDITIONS TO BE NOTIFIED TO THE ENGINEER.
 - DO NOT SCALE FROM THIS DRAWING.
 - THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION OF ALL UNDERGROUND SERVICES THAT MAY EXIST AND TO DIVERT THEM IF NECESSARY PRIOR TO THE COMMENCEMENT OF THE WORKS.
 - MATERIALS OR WORKMANSHIP NOT COMPLYING WITH THE ENGINEERS DRAWINGS AND SPECIFICATION SHALL BE DEEMED UNACCEPTABLE AND REMOVED FROM SITE AND REPLACED WITH WORK CORRECTLY MANUFACTURED, DELIVERED AND ERECTED.
 - ALL EXISTING INVERT LEVELS TO BE CHECKED BY THE CONTRACTOR AT THE START OF WORKS AND ANY OTHER DISCREPANCIES NOTIFIED TO THE ENGINEER. ALL LEVELS ARE BASED ON TOPOGRAPHICAL SURVEY INFORMATION PROVIDED BY OTHERS.
 - ALL OPENING NOTICES ETC. AS REQUIRED UNDER HIGHWAYS ACTS ETC. ARE TO BE OBTAINED PRIOR TO COMMENCEMENT OF WORKS. ALL WORKS ARE TO BE INSPECTED BY L.A, NHBC OR YORKSHIRE WATER AS APPLICABLE.
 - ALL MATERIALS TO BEAR THE RELEVANT B.S. KITEMARK AND COMPLY FULLY WITH THE SPECIFICATIONS. ALL CONCRETE & CONCRETE PRODUCTS MUST USE SULPHATE RESISTANT CEMENT (UNLESS THE SITE INVESTIGATION REPORT PROVES THAT SULPHATE ATTACK FROM SOILS AND GROUNDWATER WILL NOT OCCUR TO WITHSTAND A CLASS 3 CONDITION).
 - WHERE "ULTRA RIB" UPVC PIPES (OR SIMILAR APPROVED) ARE USED IN ADOPTABLE DRAINAGE THEY SHALL STILL BE HANDLED AND LAID IN ACCORDANCE WITH THE SPECIFICATION AND GUIDANCE ISSUED BY THE HIGH PERFORMANCE PIPE ASSOCIATION. A CLASS S BED AND SURROUND MUST BE USED FOR SUCH PIPES.
 - TRENCH BACKFILL IN HIGHWAYS / CAR PARKS TO WITHIN 1M OF HIGHWAY SHALL BE A SUITABLE GRANULAR MATERIAL ALL IN ACCORDANCE WITH SEWERS FOR ADOPTION CL 3.3.4. BACKFILL MATERIAL IN OTHER AREAS SHALL BE SELECTED EXCAVATED MATERIAL FREE FROM STONES LARGER THAN 40mm, LUMPS OF CLAY OVER 100mm, TIMBER, FROZEN MATERIAL OR VEGETABLE MATTER.
 - UPVC PIPES AND FITTINGS SHALL COMPLY WITH WIS 4-35-01. CLAY PIPES AND FITTINGS SHALL BE EXTRA STRENGTH TO BSEN 295 AND BS 85. CONCRETE PIPES AND FITTINGS SHALL COMPLY WITH BS 5911. PIPES SHALL BE CLASS H.
 - A CLASS S BED MUST BE PROVIDED TO UPVC PIPES, A CLASS B BED MAY BE USED FOR V.C. AND CONCRETE PIPES.
 - BACKFILL TO DRAINAGE TRENCHES ABOVE PIPE BEDDING AND SURROUND WITHIN ROAD AND CAR PARK AREAS TO BE GRANULAR FILL COMPLYING WITH CLASS 6F2 OR DOT TYPE 1 OR QUARRY SCALPING GRADED FROM 75mm DOWN.
 - A CONCRETE SURROUND IS NOT NORMALLY REQUIRED TO MANHOLES UNLESS INSTALLED IN AREAS OF UNSTABLE GROUND. UNDER CONDITIONS OF FLOATATION OR WHERE SUBJECTED TO EXCEPTIONAL OR ECCENTRIC LOADS, IN WHICH CASE A 150mm SURROUND OF AT LEAST 20N/mm2 CONCRETE SHOULD BE PROVIDED. ANY JOINTS SHOULD BE STAGGERED WITH THE PRECAST CONCRETE JOINTS.
 - DOUBLE STEPS SHALL BE PLASTIC ENCAPSULATED CARBON TO BS EN 1247-2 MANHOLE STEPS. STEP IRONS AT 300cfs. HORIZONTALLY & VERTICALLY MAY BE USED AS AN ALTERNATIVE TO DOUBLE STEPS.
 - ALL WORK TO BE IN ACCORDANCE WITH "SEWERS FOR ADOPTION SEVENTH EDITION" AND YORKSHIRE WATER WATER STANDARD CONSTRUCTION DETAILS.
 - TOP OF FOUNDATIONS ARE TO BE A MIN 450mm FROM FINISHED EXTERNAL LEVELS.
 - FOUNDATIONS WITHIN CLOSE PROXIMITY TO PROPOSED DRAINAGE WILL NEED TO BE AT THE SAME DEPTH AS DRAINAGE TO AVOID THE POTENTIAL FOR UNDERMINING.

P03	10.11.23	UPDATED TO REFLECT FROZEN ARCHITECTURAL PLANNING INFORMATION	JJR	DS	DS
P02	23.10.23	EXISTING LANDSCAPE LAYOUT ADDED	JJR	DS	DS
P01	06.10.23	RIBA STAGE 2 (CONCEPT DESIGN)	CLB	DS	DS
REV	DATE	DESCRIPTION	BY	CHK	APP

DRAWING STATUS: **PRELIMINARY**

CLIENT: **DOWNING**

ARCHITECT: **SIMPSON HAUGH & PARTNERS**

PROJECT: **FIRST STREET SOUTH, BLOCK C MANCHESTER**

TITLE: **OUTLINE DRAINAGE STRATEGY**

STATUS:	PROJECT No:	PROJECT	ORIGINATOR	VOL/SYS/LEVEL	TYPE	ROLE	DRAWING No:	REV:
S2	223-074	FSS - AJP - ZZ - 00 - DR - C - 1000						P03

SCALE @ A1:	DESIGNED:	DRAWN:	CHECKED:	APPROVED:	DATE:
1:200	CLB	CLB	CLB	CLB	06.10.23

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.072	4-8	0.022

Total Area Contributing (ha) = 0.094

Total Pipe Volume (m³) = 2.784

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	20.272	0.135	150.2	0.034	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	14.068	0.094	149.7	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	13.824	0.093	149.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	6.997	0.047	148.9	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	10.610	0.071	150.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	1.525	0.074	20.5	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	3.568	0.024	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.32	33.065	0.034	0.0	0.0	0.0	1.06	42.3	6.1
1.001	50.00	5.54	32.930	0.064	0.0	0.0	0.0	1.07	42.4	11.6
1.002	50.00	5.75	32.836	0.064	0.0	0.0	0.0	1.07	42.5	11.6
1.003	50.00	5.86	32.743	0.094	0.0	0.0	0.0	1.07	42.5	17.0
1.004	50.00	6.03	32.696	0.094	0.0	0.0	0.0	1.06	42.3	17.0
2.000	50.00	5.01	33.700	0.000	0.0	0.0	0.0	2.23	39.5	0.0
1.005	50.00	6.08	32.626	0.094	0.0	0.0	0.0	1.07	42.4	17.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
SW01	34.700	1.635	Open Manhole	1200	1.000	33.065	225				
SW02	34.700	1.770	Open Manhole	1200	1.001	32.930	225	1.000	32.930	225	
SW03	34.700	1.864	Open Manhole	1200	1.002	32.836	225	1.001	32.836	225	
SW04	34.700	1.957	Open Manhole	1200	1.003	32.743	225	1.002	32.743	225	
Tank	34.700	2.004	Open Manhole	1200	1.004	32.696	225	1.003	32.696	225	
AC	34.700	1.000	Open Manhole	600	2.000	33.700	150				
SW05	34.700	2.074	Open Manhole	1200	1.005	32.626	225	1.004	32.626	225	
								2.000	33.626	150	925
Ex. MH	34.670	2.068	Open Manhole	1500		OUTFALL		1.005	32.602	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SW01	383813.691	397108.366	383813.691	397108.366	Required	
SW02	383799.977	397123.295	383799.977	397123.295	Required	
SW03	383790.459	397133.655	383790.459	397133.655	Required	
SW04	383792.711	397147.294	383792.711	397147.294	Required	
Tank	383798.924	397150.512	383798.924	397150.512	Required	
AC	383808.819	397154.400	383808.819	397154.400	Required	
SW05	383808.142	397155.766	383808.142	397155.766	Required	
Ex. MH	383811.251	397157.516			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW01	34.700	33.065	1.410	Open Manhole	1200
1.001	o	225	SW02	34.700	32.930	1.545	Open Manhole	1200
1.002	o	225	SW03	34.700	32.836	1.639	Open Manhole	1200
1.003	o	225	SW04	34.700	32.743	1.732	Open Manhole	1200
1.004	o	225	Tank	34.700	32.696	1.779	Open Manhole	1200
2.000	o	150	AC	34.700	33.700	0.850	Open Manhole	600
1.005	o	225	SW05	34.700	32.626	1.849	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	20.272	150.2	SW02	34.700	32.930	1.545	Open Manhole	1200
1.001	14.068	149.7	SW03	34.700	32.836	1.639	Open Manhole	1200
1.002	13.824	149.0	SW04	34.700	32.743	1.732	Open Manhole	1200
1.003	6.997	148.9	Tank	34.700	32.696	1.779	Open Manhole	1200
1.004	10.610	150.1	SW05	34.700	32.626	1.849	Open Manhole	1200
2.000	1.525	20.5	SW05	34.700	33.626	0.924	Open Manhole	1200
1.005	3.568	150.0	Ex. MH	34.670	32.602	1.843	Open Manhole	1500

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

1.005	Ex. MH	34.670	32.602	0.000	1500	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 1
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.360		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW05, DS/PN: 1.005, Volume (m³): 2.7

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	32.626
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0	Kick-Flo®	0.855	4.0
Flush-Flo™	0.416	5.0	Mean Flow over Head Range	-	4.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	0.800	4.3	2.000	5.9	4.000	8.2	7.000	10.7
0.200	4.6	1.000	4.3	2.200	6.2	4.500	8.6	7.500	11.0
0.300	4.9	1.200	4.7	2.400	6.4	5.000	9.1	8.000	11.4
0.400	5.0	1.400	5.0	2.600	6.7	5.500	9.5	8.500	11.7
0.500	5.0	1.600	5.3	3.000	7.1	6.000	9.9	9.000	12.0
0.600	4.9	1.800	5.6	3.500	7.7	6.500	10.3	9.500	12.3

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Storage Structures for Storm

Cellular Storage Manhole: Tank, DS/PN: 1.004

Invert Level (m) 32.696 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	38.0	0.0	1.200	38.0	0.0	1.201	0.0	0.0

Porous Car Park Manhole: AC, DS/PN: 2.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 6.5
Membrane Percolation (mm/hr) 1000 Length (m) 69.9
Max Percolation (l/s) 126.2 Slope (1:X) 100.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 34.250 Cap Volume Depth (m) 0.300

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 1
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.360 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 45

US/MH		Return Climate		First (X)		First (Y)		First (Z)		Overflow	Water Level	Surcharged
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.			(m)	Depth
1.000	SW01	15 Summer	1	+0%	100/15 Summer						33.120	-0.170
1.001	SW02	15 Summer	1	+0%	100/15 Summer						33.006	-0.149
1.002	SW03	15 Summer	1	+0%	30/60 Summer						32.911	-0.150
1.003	SW04	15 Summer	1	+0%	30/15 Summer						32.845	-0.123
1.004	Tank	30 Summer	1	+0%	30/15 Summer						32.806	-0.115
2.000	AC	240 Summer	1	+0%	100/120 Summer						33.728	-0.122
1.005	SW05	30 Summer	1	+0%	30/15 Summer						32.800	-0.050

Flooded		Pipe		Level	
US/MH	Volume	Flow / Overflow	Flow	Status	Exceeded
PN	Name	(m³)	Cap. (l/s)	(l/s)	
1.000	SW01	0.000	0.13	5.1	OK
1.001	SW02	0.000	0.24	9.0	OK
1.002	SW03	0.000	0.24	9.0	OK
1.003	SW04	0.000	0.42	12.8	OK
1.004	Tank	0.000	0.13	4.6	OK
2.000	AC	0.000	0.08	1.3	OK
1.005	SW05	0.000	0.15	4.2	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 1
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.360 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 45

US/MH			Return Climate		First (X)		First (Y)		First (Z)		Overflow	Water Level	Surcharged Depth
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.				(m)	(m)
1.000	SW01	15 Summer	30	+0%	100/15 Summer							33.155	-0.135
1.001	SW02	120 Summer	30	+0%	100/15 Summer							33.114	-0.041
1.002	SW03	120 Summer	30	+0%	30/60 Summer							33.112	0.051
1.003	SW04	120 Summer	30	+0%	30/15 Summer							33.109	0.140
1.004	Tank	120 Summer	30	+0%	30/15 Summer							33.106	0.185
2.000	AC	60 Winter	30	+0%	100/120 Summer							33.757	-0.093
1.005	SW05	120 Summer	30	+0%	30/15 Summer							33.105	0.254

Flooded			Pipe		Level	
PN	US/MH Name	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	0.000	0.33		12.6	OK
1.001	SW02	0.000	0.31		11.3	OK
1.002	SW03	0.000	0.30		11.0	SURCHARGED
1.003	SW04	0.000	0.50		15.3	SURCHARGED
1.004	Tank	0.000	0.15		5.3	SURCHARGED
2.000	AC	0.000	0.28		4.8	OK
1.005	SW05	0.000	0.18		5.0	SURCHARGED

The Alan Johnston Partnership		Page 8
1 Dale Street Liverpool L2 2ET	223-074 First Street Block C SW Network	
Date 08/11/2023 11:48 File SW NETWORK.MDX	Designed by CLB Checked by JP	
XP Solutions	Network 2019.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

 Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 1
 Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 1.000
 Region England and Wales Ratio R 0.360 Cv (Winter) 1.000

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US/MH		Return Climate		First (X)		First (Y)		First (Z)		Overflow	Water	Surcharged
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.			Level	Depth
											(m)	(m)
1.000	SW01	120 Winter	100	+45%	100/15 Summer						34.052	0.762
1.001	SW02	120 Winter	100	+45%	100/15 Summer						34.050	0.895
1.002	SW03	120 Winter	100	+45%	30/60 Summer						34.047	0.986
1.003	SW04	120 Winter	100	+45%	30/15 Summer						34.045	1.076
1.004	Tank	120 Winter	100	+45%	30/15 Summer						34.042	1.121
2.000	AC	120 Winter	100	+45%	100/120 Summer						34.041	0.191
1.005	SW05	120 Winter	100	+45%	30/15 Summer						34.039	1.188

Flooded		Pipe		Level	
PN	US/MH	Volume	Flow / Overflow	Flow	Exceeded
	Name	(m³)	Cap. (l/s)	(l/s)	Status
1.000	SW01	0.000	0.18	7.0	SURCHARGED
1.001	SW02	0.000	0.34	12.6	SURCHARGED
1.002	SW03	0.000	0.33	12.1	SURCHARGED
1.003	SW04	0.000	0.59	18.0	SURCHARGED
1.004	Tank	0.000	0.15	5.2	SURCHARGED
2.000	AC	0.000	0.44	7.5	SURCHARGED
1.005	SW05	0.000	0.18	5.0	SURCHARGED