BURO HAPPOLD

Fallowfield Campus Redevelopment Project

Drainage Strategy

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1 Executive Summary

This drainage strategy has been prepared in support of the outline planning application and to set the principles for the drainage design to serve redevelopment of the University of Manchester Fallowfield Campus. The exact configuration and nature of the drainage is to be determined at the detailed design (reserved matters) stage and is dependent on any discharge of planning conditions.

The site is circa 9.49 hectares in area and located in south Manchester, approximately 3.7km to the south-east of Manchester Victoria Railway Station and 5.3km to the north-west of Stockport town centre. The site is bounded by Moseley Road (B5093) directly to the south, Wilmslow Road (A6010) directly to the west, existing student accommodation (Sheavyn House and Ashburne Hall) to the north and the Armitage sport centre located directly east of the site.

The drainage strategy will be in accordance with Section H of the Building Regulations, the Manchester City Council Lead Local Flood Authority (LLFA) and United Utilities (UU) requirements. To be in line with UU and the LLFA criteria, it is proposed to discharge surface water from the proposed development in line with the drainage hierarchy. Subject to further investigations, it is proposed to discharge surface water via infiltration. If infiltration is found to not be viable, discharge to the Fallowfield Brook watercourse will be considered. Finally, if further investigations find that a connection to the Fallowfield Brook is not feasible, the proposed development will drain to the public sewer network.

With regards to foul water, the development will be designed with separate systems for both foul and surface water drainage which will remain separate until the point of discharge to the public combined sewer network surrounding the site. Existing connections to the public sewer network will be retained where possible.

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2 Introduction

2.1 Appointment and Brief

This drainage strategy has been prepared in support of the outline planning application relating to the proposed redevelopment of the University of Manchester Fallowfield Campus (herein referred to as the proposed development).

2.2 Limitations

This report is based on the interpretation and assessment of data provided by third parties. It should be noted that the detailed design of the drainage and associated Sustainable Drainage Systems (SuDS) features for the site has not been finalised and the assumptions and information presented here is therefore subject to design development. Operation and maintenance of all SuDS (including proprietary systems) will need to be considered once the proposed development has been finalised with all specific information presented to those responsible for the maintenance of this site. Buro Happold cannot be held responsible for the accuracy of third-party data or the conclusions that come from this information or as a result of changes arising from the developing design. The conclusions and findings of this report may change if the proposed development is amended or updated after the date of publishing.

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3 Site Description

3.1 Existing Site

The site is circa 9.49 hectares in area and located in south Manchester, approximately 3.7km to the south-east of Manchester Victoria Railway Station and 5.3km to the north-west of Stockport town centre. The postcode and grid reference of the site are M14 6HD and SJ 85721 94257. The site is bounded by Moseley Road (B5093) directly to the south, Wilmslow Road (A6010) directly to the west, existing student accommodation (Sheavyn House and Ashburne Hall) to the north and the Armitage sport centre located directly east of the site. Figure 3—1 presents the site boundary and its relative location.

The site is currently occupied by an existing development which consists of student accommodation and Manchester University owned facilities. The immediate surrounding area comprises urban development including residential and commercial facilities.

Based on the Flood Map for Planning the site is located in Flood Zone 1 which is classified as having a less than 0.1% (1 in 1000) annual probability of river (fluvial) or sea (tidal) flooding. The Manchester City, Salford City and Trafford Strategic Flood Risk Assessment (SFRA) identifies the site as being located within the Levenshulme and Fallowfield Critical Drainage Area. The site is located within groundwater Source Protection Zone (SPZ) 3 – Total Catchment. SPZs identify the area around a groundwater abstraction point and identify the level of risk posted to the source from contamination. An SPZ 3 is defined as the area around a supply source within which all the groundwater ends up at the abstraction point. For further details of the flood risk at the site from all sources, please refer to the Flood Risk Assessment (FRA) which accompanies this application.



Figure 3—1 Indicative University of Manchester: Fallowfield Campus site plan (Map data from Google Earth©2023)

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3.2 Existing Topography

The highest point of the site is located towards the north with an approximate elevation of +44.7mAOD. The levels generally fall in a south westerly direction to a minimum elevation of approximately +39.7mAOD. A copy of the topographical survey is provided in Appendix A.

3.3 Existing Waterbodies and Watercourses

There are no known watercourses or waterbodies within the boundary of the site. The nearest charted watercourse to the site is the Fallowfield Brook which recorded as a culvert conduit located within Moseley Road to the south of the site. The culvert is understood to transition to an open section of the Fallowfield Brook approximately 400m south-west of the site. Information received from the LLFA Screening Report (Appendix B), included the 1984 Major Drainage Survey which shows the brook as 1200mm in diameter and crossing Moseley Road at the junction with Whitworth Lane and continuing north-east through the Armitage Sport Centre site. The MCC Structural Records however shows the watercourse continuing east along Moseley Road. The Fallowfield Brook is also partially shown on the United Utilities sewer records originating in Moseley Road. The sewer records indicate that at manhole 7903 the invert level of the culvert is 36.79 with a depth from cover of 2.53m.

Further from the site, Chorlton Platt Gore Brook is an ordinary watercourse located approximately 250m to the north, and Cringle Black Brook is a main river located approximately 400m to the south.

3.4 Existing Drainage

The existing drainage information presented in this section is based on information extracted from United Utilities Asset Records (2023), a GPR survey (2014) and a topographical survey (2022) of the site and surrounding area. A plan of the existing drainage is provided in Appendix F.

3.4.1 Public Drainage

United Utilities sewer records (2023) show that the site is surrounded by an extensive network of combined sewers. Two combined sewers, a 1900mm brick and 500mm concrete (assumed), run from south to north along Wilmslow Road to the west of the site.

To the south of the site, two combined sewers, a 1000mm brick and 525mm vitrified clay (VC), run from east to west along Moseley Road before combining to connect into the 1900mm brick combined sewer in Wilmslow Road.

Within Whitworth Lane to the east of the site, a 375mm VC combined sewer runs south before connecting into the 525mm combined sewer within Moseley Road. A 225mm surface water sewer is also shown to run south within Whitworth Lane and is shown to terminate roughly where the combined sewer commences. Although it is not clear where this length of surface water sewer discharges to, it is assumed to transition into the aforementioned 375mm combined sewer.

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Figure 3—2 United Utilities Sewer Records (2023)

3.4.2 Private Drainage

The vast majority of the existing site is drained by a network of combined drains which are generally 100mm to 300mm in diameter. Based on existing GPR information and a review of the on-site drainage in context with the United Utilities sewers, it is understood that there are currently multiple existing outfall points to the surrounding external public sewer network. The majority of outfalls from the site are located towards the south of the site.

An existing drainage drawing is included within Appendix F.

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4 Proposed Development

The development comprises closure and demolition of the current purpose built student accommodation (PBSA) at Owens Park, Oak House and Woolton Hall and the development of new PBSA (with associated facilities and ancillary uses). Refer to Figure 4—1 for the proposed technical masterplan of the proposed development.

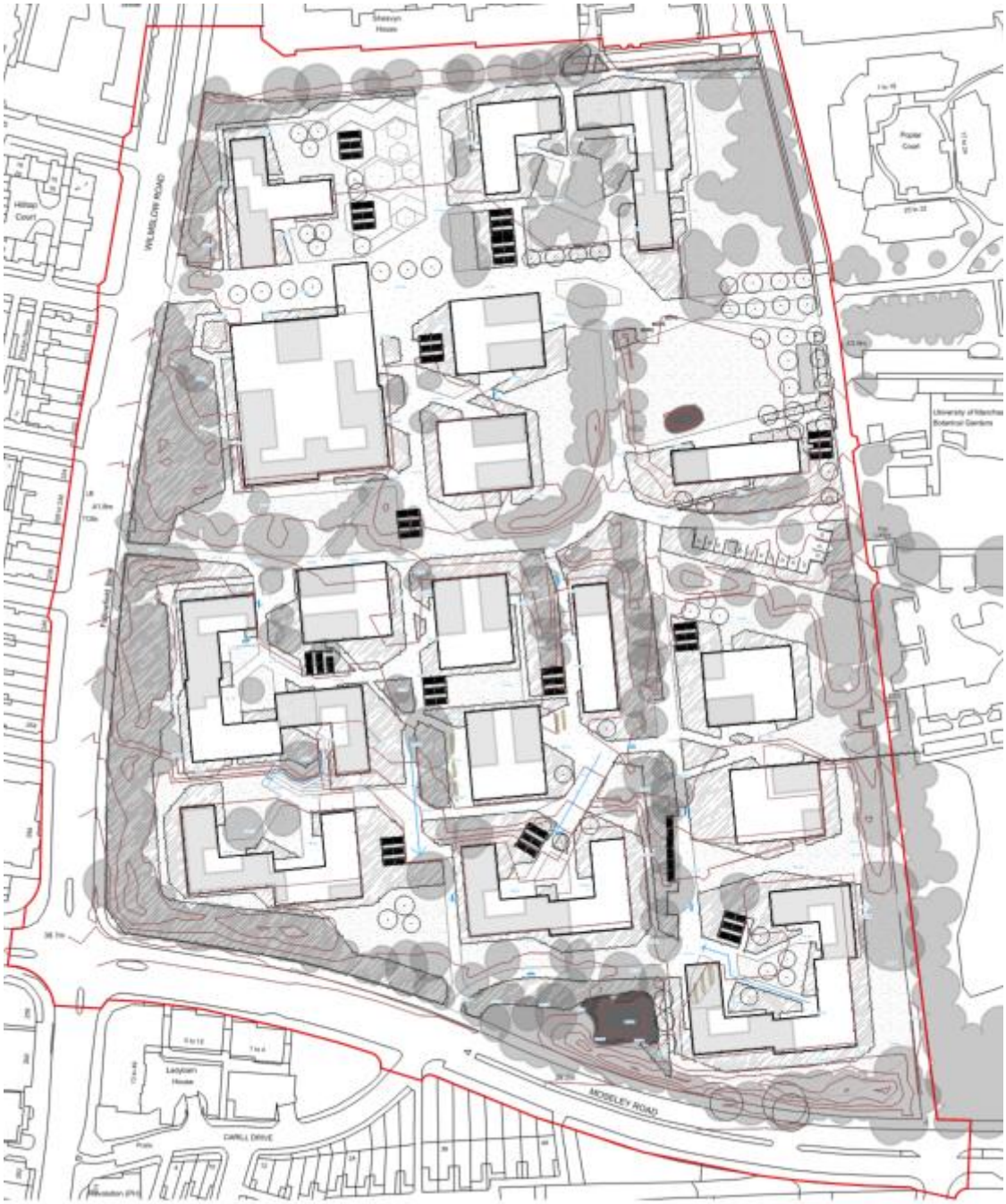


Figure 4—1 Proposed Technical Masterplan

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5 Proposed Surface Water Strategy

5.1 General

New developments are required to cater for all surface water that will be generated within the site, so as not to cause flooding, damage or inconvenience to on-site or off-site areas. In accordance with associated legislation, local policy and general best practice, this will typically require the introduction of a dedicated surface water drainage network that intercepts, treats and stores surface water prior to it being discharged from site.

A surface water drainage system will be provided to collect surface water runoff from hardstanding areas. Primary runoff will be from hard impermeable surfaces such as roofs and any exposed areas of hardstanding. Allowance will be made to include green areas that may fall towards the buildings, particularly where infiltration is not viable in the proposed development.

The aspiration for all new developments is to reduce surface water runoff rates to the equivalent greenfield rate (Qbar) which can equate to a reduction of over 95%. In order to achieve this reduction in discharge rate it is typically necessary to provide stormwater storage in the form of an attenuation basin, buried tank or similar.

Guidance issued by Manchester City Council, in its capacity as the Lead Local Flood Authority (LLFA), acknowledges that such significant reductions in discharge rate may not be achievable on previously developed sites where the necessary attenuation volumes cannot be accommodated. In such cases the guidance recommends pre-application discussions are held with the LLFA to agree an alternative approach.

5.2 Consultation

5.2.1 Manchester City Council (Lead Local Flood Authority)

A meeting with a representative from the Manchester City Council (MCC), in its capacity as the Lead Local Flood Authority (LLFA), was held 08 June 2023. As part of the consultation a data screening was undertaken which identified that the culverted Fallowfield Brook runs in close proximity to the south-east corner of the site. The LLFA stated that where possible, surface water should discharge to Fallowfield Brook at greenfield runoff rates in accordance with the drainage hierarchy.

Refer to Appendix B for LLFA Data Screening and correspondence.

5.2.2 United Utilities (Water Authority)

A Wastewater Pre-development Enquiry was submitted to United Utilities on 11 May 2023 to determine the proposed surface water and foul water discharge rates and potential points of connection. In line with the drainage hierarchy (see below), and the aspirations of the LLFA discussed above, United Utilities (UU) confirmed that surface water flows should look to communicate with the nearby culverts or watercourses before discharge to the combined sewer network is considered, Where discharge to watercourse is not feasible, UU advised that all surface water, and foul water, should look to mimic existing connection points to distribute the impact on the public sewer network.

Refer to Appendix C for United Utilities correspondence.

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5.3 Climate Change

Climate change allowances are based on the Upper Mersey Management Catchment peak rainfall allowances table for the 1% annual exceedance rainfall event produced by the Environment Agency (EA). For the proposed development the design life is considered as more than 50 years and design is considered at the upper end.

Allowance Category	Total potential change anticipated for the 2050's	Total potential change anticipated for the 2070's
Upper End	+40%	+45%
Central	+25%	+30%

Table 5—1 Climate change allowance for peak rainfall in England (1981-2000 baseline)

5.4 Drainage Hierarchy

Best practice for the management of surface water is based on Building Regulations 2010 Part H (2015 edition) and in line with United Utilities guidance states that surface water runoff from a site should discharge in accordance with the drainage hierarchy. Surface water runoff should therefore discharge to one of the following in order of priority:

- To an adequate soakaway or some other adequate infiltration system; or, where that is not practicable,
- A watercourse; or, where that is not practicable,
- A surface water sewer; or, where that is not practicable,
- A combined sewer.

Soakaway

The ground conditions comprise varying depths of Made Ground which is underlain by superficial deposits (clay and sand), underlain by completely weathered sandstone bedrock, in turn underlain by extremely weak sandstone and/or mudstone bedrock (Chester Formation).

The site is also situated within an Environment Agency Source Protection Zone 3 or the "Total Catchment" which is defined as the area around the source within which all groundwater recharge is presumed to be discharged at the source. Consideration should therefore be given to the potential risks associated with infiltrating surface water within the site, including from the potential mobilisation of any contaminants within the made ground.

Watercourse

As identified in the MCC screening report (Appendix B), the LLFA asset register indicates that the culverted Fallowfield Brook is an ordinary watercourse that runs in an easterly direction in close proximity to the south-east of the site. The 1984 Major Drainage Survey shows the brook crossing Moseley Road at the junction with Whitworth Lane and continuing north-east through the Armitage Sport Centre site. The MCC Structural Records however shows the watercourse continuing east along Moseley Road. The culvert is noted as circa 1200mm diameter.

The Fallowfield Brook is partially shown on the United Utilities sewer records originating in Moseley Road. The sewer records indicate that at manhole 7903 the invert level of the culvert is 36.79 with a depth from cover of 2.53m.

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Sewer

Based on existing survey information it is understood that the site currently discharges surface water via several outfalls to the public sewer network surrounding the site. If possible, the existing outfalls to the public sewer should be maintained subject to them being in suitable condition, having adequate capacity, and at a suitable level.

5.5 Proposed Strategy

As discussed with the LLFA, it is agreed that the surface water discharge hierarchy should be followed and that, if a surface water connection to the culverted watercourse is achievable, this should be prioritised over a connection to the public combined sewer (assuming infiltration is also not feasible). In order to determine the feasibility of a connection to the culvert it will be necessary for a detailed assessment of the associated constraints and opportunities to be completed.

As it is not possible to undertake the relevant surveys ahead of the outline planning submission, the results of this assessment will not be available to inform the outline planning application. The results of soakaway testing and investigations into the Fallowfield Brook will therefore be undertaken at the reserved matters stage.

Therefore, this drainage strategy will present a suite of options that reflect the hierarchy, and acknowledges that evidence will be required to determine the chosen approach prior to implementation. The proposed options for the management of surface water within the site are as follows:

Option 1 – Discharge to Soakaway

In line with the drainage hierarchy it is preferable to discharge surface water via soakaway or other infiltration systems where possible. It is proposed to discharge surface water via engineered soakaways at various locations throughout the site, where proximity to building footprints and other constraints permit. Attenuation will be provided primarily in the form of green/blue roofs, permeable paving and underground tanks.

Option 2 – Discharge to Fallowfield Brook

If further investigations indicate infiltration is not viable, discharge to the Fallowfield Brook watercourse located to the south of the site will be considered in line with the drainage hierarchy. As discussed with the LLFA, surface water from the proposed development will be attenuated to restrict discharge to the Fallowfield Brook to greenfield runoff rates. Attenuation will be provided primarily in the form of green/blue roofs, permeable paving and underground tanks.

Option 3 – Discharge to Combined Public Sewer Network

In line with the drainage hierarchy, if discharge via infiltration or to a watercourse is not feasible, surface water from the site will discharge to the public sewer network. The site is surrounded by an extensive network of combined public sewers which are understood to currently serve the existing development. It is proposed to retain the existing connections to the public sewer network where possible. In line with the Manchester, Salford and Trafford Strategic Flood Risk Assessment (2011), the proposed development will discharge to the public sewer network at 50% of the existing brownfield runoff rate as outlined in Section 5.11.2. Attenuation will be provided primarily in the form of green/blue roofs, permeable paving and underground tanks.

Refer to Appendix G for proposed drainage strategy drawings.

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5.6 Water Quality

It is widely recognised that diffuse pollution from urban surface water runoff is a significant factor which compromises receiving waterbodies including watercourses and groundwater. As such there is a requirement to identify and mitigate the impact of poor water quality originating from new developments.

The SuDS Manual (CIRIA C753) provides various methodologies for identifying potential sources of pollution within developments and a means of determining the treatment potential the various SuDS techniques can offer. The Simple Index Approach allocates pollution hazard indices against the proposed land use, along with pollution mitigation indices for each SuDS component. To ensure adequate treatment is being provided, the selected SuDS components must have a total pollution mitigation index equal to or greater than the pollution hazard index associated with the land use of the contributing drainage area.

The pollution hazard indices for the proposed land use within the development are as follows, based on Table 26.2 of the SuDS Manual.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Commercial roofs	Low	0.3	0.2	0.05
Pedestrian areas and low trafficked roads	Low	0.5	0.4	0.4
Commercial yard and delivery areas	Medium	0.7	0.6	0.7

Table 5—2 Pollution Hazard Indices (based on Table 26.2 of the SuDS Manual

Following an initial screening exercise (see Sustainable Drainage Systems section below) the following table presents the mitigation indices for a range of SuDS components which may be appropriate for the proposed development.

SuDS Component	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7
Swale	0.5	0.6	0.6
Green roofs	Not defined, but considered to offer adequate mitigation to treat runoff from commercial roof spaces.		
Proprietary treatment systems	Varies subject to product specifications and certification.		

Table 5—3 Indicative SuDS Mitigation Indices (based on Table 26.3 of the SuDS Manual)

It is currently envisaged that SuDS in combination of proprietary treatment systems will be employed on the development to provide sufficient mitigation to all runoff prior to discharge off site.

5.7 Sustainable Drainage Systems (SuDS)

Sustainable Urban Drainage Systems are used to reduce the impact of surface water from storm events on the existing environment mimicking the natural run-off characteristics of the site and removing pollutants from the urban run-off at source. There are various solutions which are described in the SuDS Manual (CIRIA C753) and include ground level features including swales and ponds, below ground systems (such as tanks, and infiltration techniques like soakaways) and above ground systems like green roofs.

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The proposed development considers the use of sustainable drainage techniques in accordance with local policy. The CIRIA SuDS Manual contains a hierarchy of sustainable methods of capturing and storing rainwater in a descending order: from drainage into the ground to recharging water resources. Where infiltration is not possible, surface water should ideally be stored on site in open water features and then released at a controlled rate. The final option is to store surface water in tanks or cellular storage below ground.

Subject to the ground conditions and infiltration rates, SuDS features that could be considered through the detailed design (reserved matters) stage include permeable paving, underground tanks/cellular crates, green/blue roofs, rainwater harvesting and bioretention systems. Non-infiltration SuDS features will not reduce the amount of surface water discharged, however, it will significantly delay and mitigate the peak flood flows from the site.

The hierarchy of SuDS techniques is shown in Table 5—4.

SUDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	Sustainability for the Proposed development	Comments
Green / blue roofs	✓	✓	✓	Yes	Viability subject to the nature of the buildings and discussion with the client and wider design team.
Basins and ponds				No	Not feasible due to land use, lack of external space and proximity to buildings and site boundary.
Constructed wetlands				No	
Balancing ponds				No	
Retention ponds				No	
Filter stripes and swales	✓	✓	✓	Yes	Viable subject to coordination with existing services and landscape design.
Bioretention systems	✓	✓	✓	Yes	Viable subject to coordination with existing services and landscape design.
Rainwater harvesting	✓			Yes	Viability subject to the nature of the buildings and discussion with the client and wider design team.
Infiltration devices	✓	✓	✓	Yes	To be considered where viable subject to soakaway testing undertaken at a later stage.
Soakaways	✓	✓	✓	Yes	
Infiltration trenches and basins	✓	✓	✓	Yes	
Permeable surfaces	✓	✓		Yes	Access roads and pedestrian areas may be suitable for permeable surfacing.
Tanked systems	✓			Yes	Viable where external space permits.
Over-sized pipes	✓			Yes	
Proprietary treatment devices		✓		Yes	Engineered devices such as media filtration systems, and oil and grit separators, can be used in densely developed areas.

Table 5—4 Hierarchy of SuDS techniques

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5.8 Proposed SuDS Measures

5.8.1 Green / Blue Roof

Green roofs are areas of living vegetation, installed on the top of buildings, for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water runoff. Blue roofs can contribute to increased volumes of stormwater attenuation and can be constructed within a green roof. This is where the blue roof attenuation board is placed below the green roof substrate. This in turn increases total attenuation volume. It is proposed to utilise green / blue roofs on all available roof space where space permits.

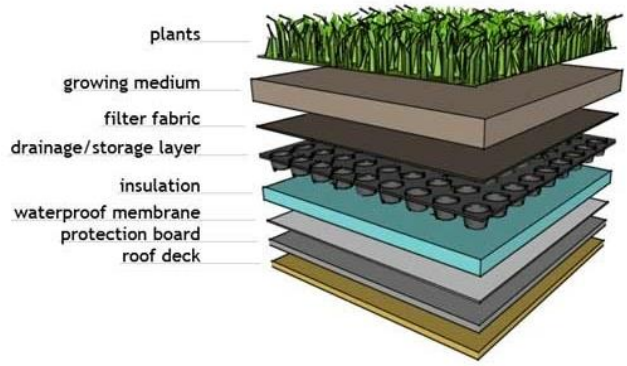


Figure 5—1 Green roof

5.8.2 Permeable Paving

Permeable surfaces are underlain with a pavement construction that allows rainwater to percolate through the surface, be treated and stored in the granular sub-base, and infiltrate into the in-situ ground strata. For permeable paving to be most viable and effective, the area should be near flat. Permeable paving is proposed at ground level for all areas of hardstanding within the development. As infiltration on site is not considered to be viable, the permeable paving will connect to the sitewide drainage network.

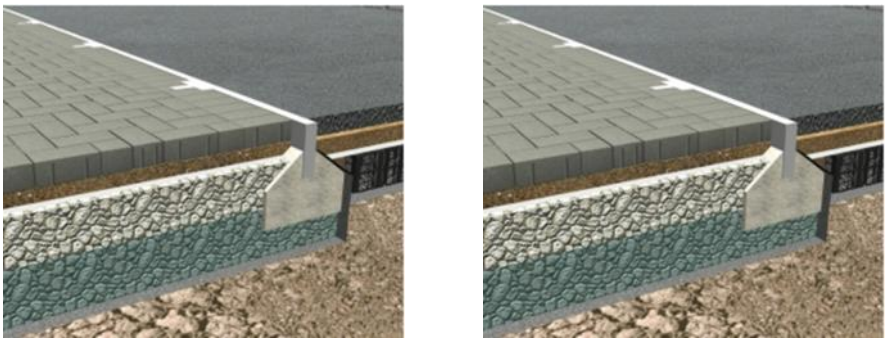


Figure 5—2 Permeable paving

5.8.3 Underground tanks / cellular crates

Tanks and/or cellular crates provide an underground storage structure with a high void ratio that is suitable for attenuating surface water flows. Depending on ground conditions, the flows can be released either into the ground through infiltration or into the public sewer drainage system via flow control devices. Due to the restricted external

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space for other SuDS, underground storage structures will form part of a series of attenuation features which will contribute to attenuating the site.



Figure 5—3 Underground cellular crates

5.8.4 Swales

Swales will capture run off from neighbouring walkways and are proposed to have a filter trench below to provide additional attenuation and water treatment capacity.



Figure 5—4 Swale

5.9 SuDS Operation and Maintenance Plan

Regular maintenance of the sustainable drainage system is essential to maintain its performance and avoid failure of any mechanical/electrical components. It is anticipated that all drainage, including SuDS features will remain within the ownership of the developer and maintenance of the SuDS features will be undertaken by an experienced contractor. An agreed maintenance programme will be prepared in accordance with the CIRIA guidance and will be included within the Operation and Maintenance Manual for the development on completion. An outline maintenance plan is shown in Appendix D for the SuDS features considered within the development.

5.10 Existing and Proposed Impermeable Areas

The total developable area which forms the drainage assessment boundary is 7.588 hectares. The existing and proposed permeable/impermeable areas are summarised in Table 5—5. Refer to Appendix E for details of the existing and proposed impermeable areas.

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	Existing Area (hectares)	Proposed Area (hectares)
Permeable	3.129	4.261
Impermeable	4.459	3.327

Table 5—5 Existing and proposed permeable/impermeable areas

5.11 Proposed Discharge Rate

5.11.1 Greenfield Runoff Rate

In consideration of FEH 2013 point rainfall data and a total drainage assessment boundary of 7.588 hectares, the site's greenfield runoff rate has been calculated using the HR Wallingford Greenfield Runoff Estimation Tool. A copy of the greenfield runoff calculation is included in Appendix G, and results summarised in Table 5—6.

Return Period	Greenfield Rboff Rate (l/s)
Qbar	63.03
1 in 1 year	54.84
1 in 30 year	107.15
1 in 100 year	131.11

Table 5—6 Greenfield runoff rate

5.11.2 Brownfield Runoff Rate

The site's existing brownfield runoff rates have been calculated in accordance with the rational method using an average rainfall intensity of 50mm/hr. Based on an existing impermeable area of 4.459ha the existing pre-development surface water runoff from the site to the public combined sewer network is 619.8 l/s.

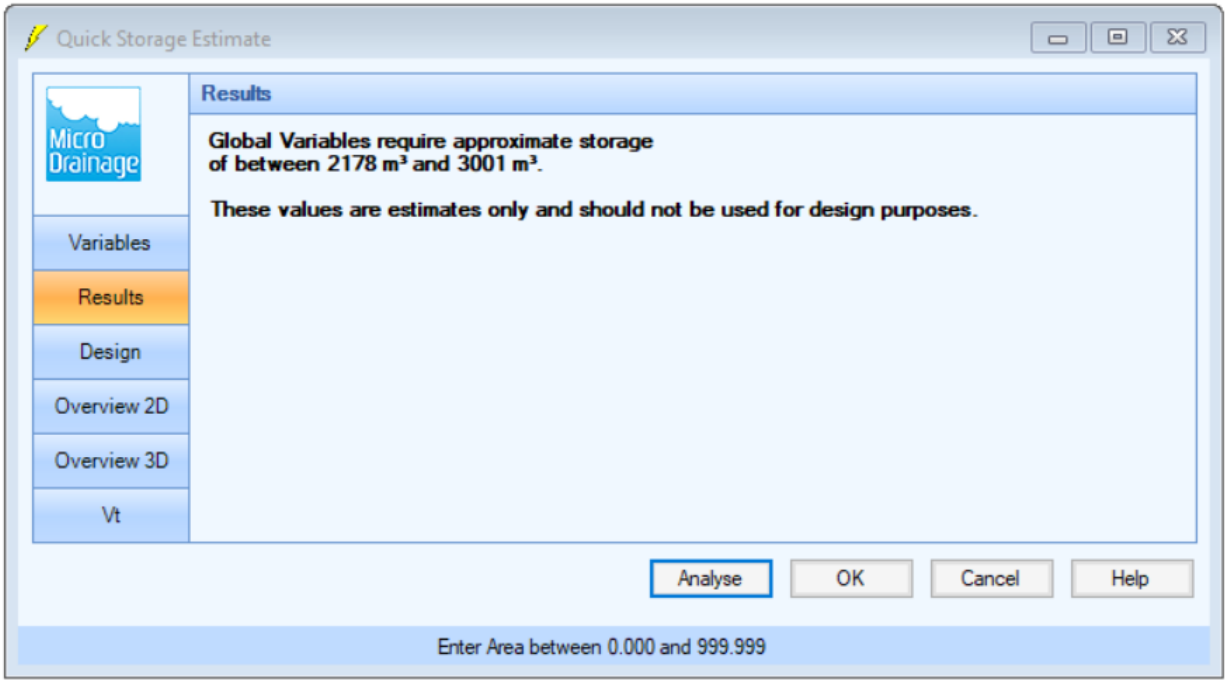
In line with the Manchester, Salford and Trafford Strategic Flood Risk Assessment (2011), proposed developments on brownfield sites are required to achieve least a 50% reduction in the surface water runoff rate compared to the existing rates with the aim of reducing to the Greenfield runoff rates. A 50 % reduction of existing runoff rates would therefore equate to a proposed discharge rate of 309.9 l/s.

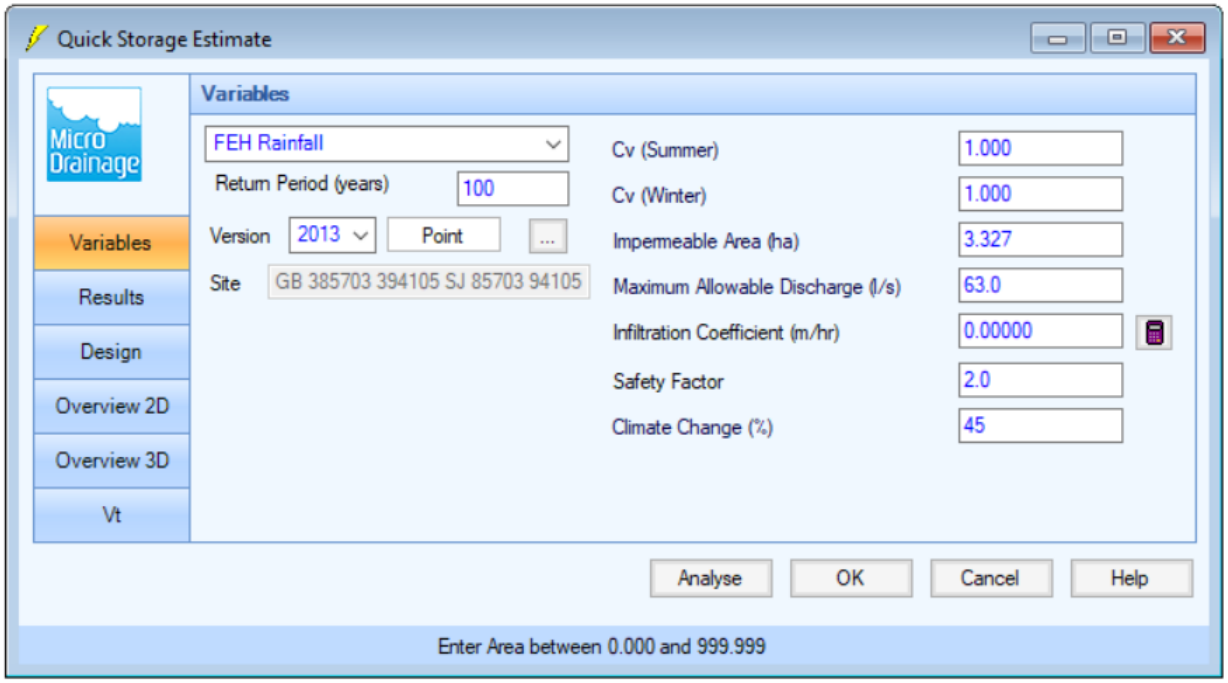
5.12 Proposed Attenuation

To facilitate the reduction in discharge rates from the site, attenuation storage will be required. Using the flow rates calculated in section 5.11, the proposed attenuation volume for the site has been calculated based on the 100-year storm event plus 45% climate change. Using the MicroDrainage Source Control tool, the indicative attenuation volume for the site has been calculated. The surface water discharge rate from the site is dependent on further investigations and the implemented drainage strategy. Therefore, calculations have been undertaken for restricting surface water discharge to greenfield runoff rates (Qbar), and 50% of existing brownfield rates.

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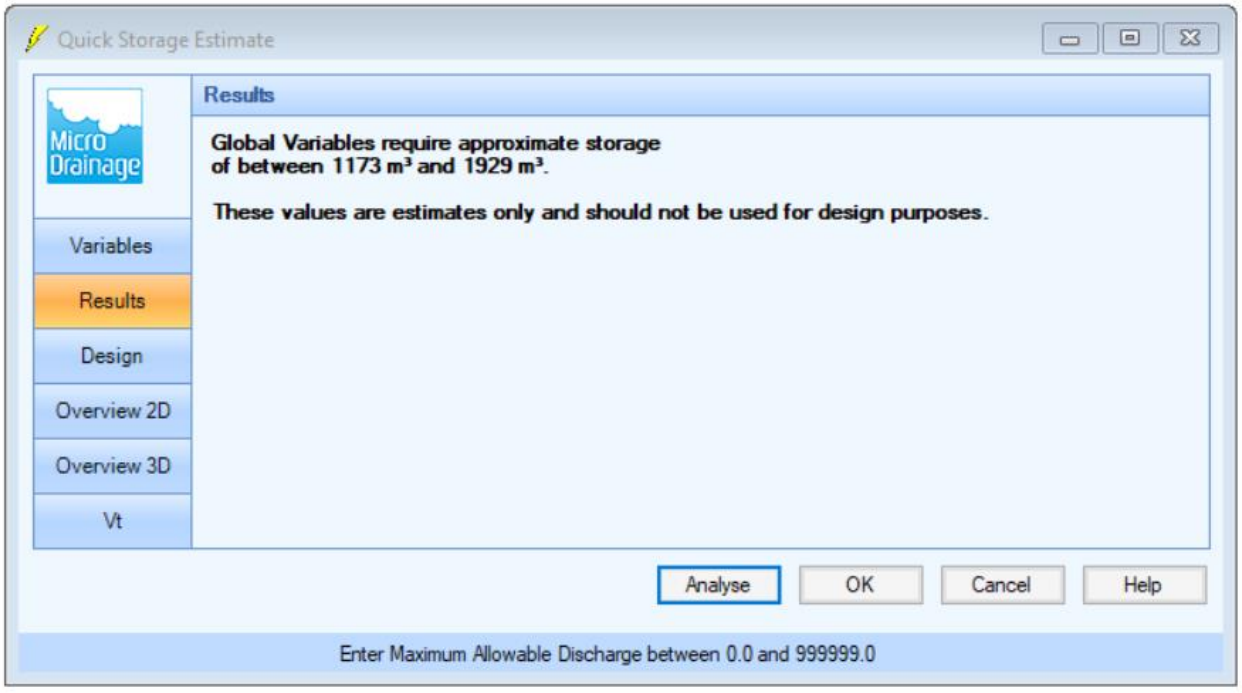
Greenfield Runoff Rate

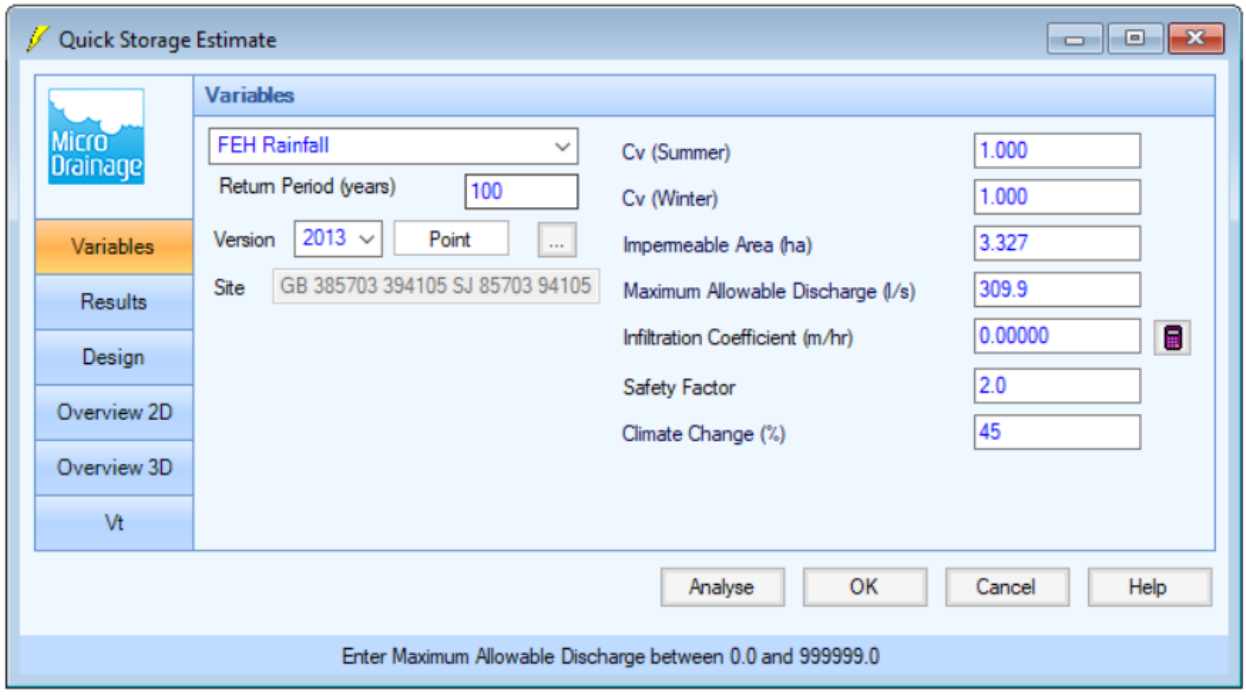




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Brownfield Runoff Rate (50% Betterment)





5.13 Designing for Exceedance

Although the surface water drainage system will be designed to accommodate flows up to the 1 in 100-year storm event, including additional allowances for climate change, there is always a possibility of a storm event occurring which exceeds this design standard. In such an event, potential risks include the exceedance of the surface water

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network and attenuation systems and flooding of the site. It is proposed to design external pedestrian areas to shed water away from the buildings during such exceedance events and direct overland flood flows through the site towards off-site areas following the natural topography. It is anticipated that the local adopted highway network will act as the wider overland flow network.

Exceedance routes are indicated by in Figure 5—5.

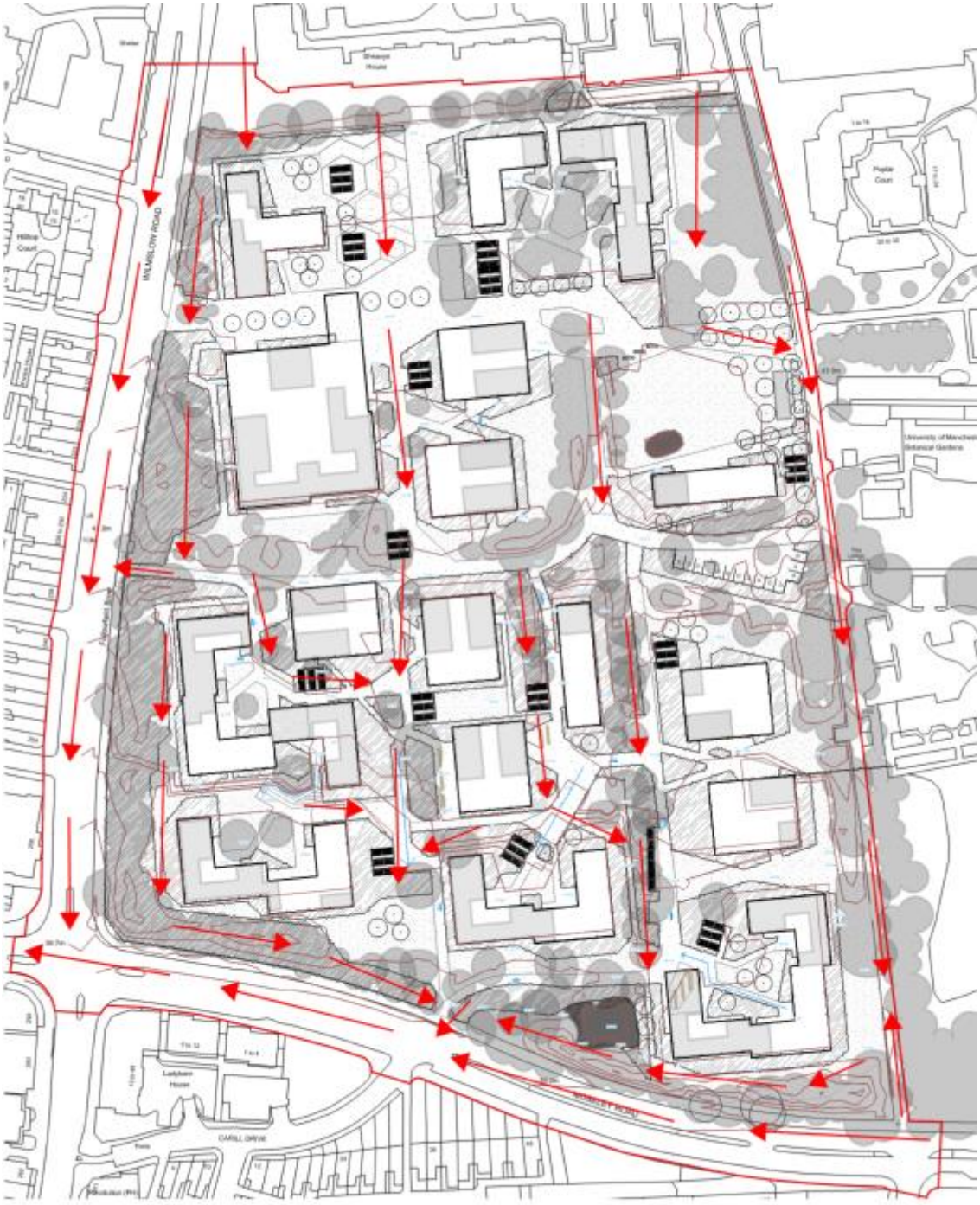


Figure 5—5 Exceedance Routes

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6 Foul Drainage Strategy

6.1 General

Foul water disposal should be in accordance with the Part H "Drainage and Waste Disposal" of the Building Regulations. This document sets requirements for the design and construction of underground foul water drains to the point of connection to an existing sewer.

6.2 Proposed Foul Water Drainage

A separate foul drainage system will be provided to collect all foul water generated from site via gravitational flow (where possible) from below ground floor level and discharge to the existing public sewer. Where gravitational discharge is not possible the proposed foul water shall be pumped.

Under slab foul water drainage will be provided to collect foul water discharge from ground slab installations and soil vent pipes (SVPs) and convey by gravity to an external below ground foul drainage system. External foul water drainage will be provided to collect foul water drainage and convey by gravity to the receiving public sewer. Foul drainage will need to make an allowance for grease traps/interceptors for kitchen areas in the above ground drainage systems.

As discussed with United Utilities, the intention is to reuse existing connections to the public sewer network wherever possible to avoid physical works to United Utilities assets. Where this cannot be avoided, any physical connection works to the public sewer network will need to be designed and constructed under a Section 106 Agreement with United Utilities.

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7 Conclusions

This drainage strategy has been prepared in support of the outline planning application to set the principles for the drainage design to serve the redevelopment of the University of Manchester Fallowfield Campus. The exact configuration and nature of the drainage will be determined at the detailed design (reserved matters) stage and is dependent on any discharge of planning conditions.

It is proposed to discharge surface water from the development in line with the drainage hierarchy as presented in the 3 options within this report, Attenuation storage will be required to facilitate the reduction of the proposed flows, and SuDS will be incorporated wherever practicable.

A separate foul drainage system will be provided to collect all foul water generated from site via gravitational flow from below ground floor level and discharge to the existing public sewer. United Utilities confirmed that the foul water from this site can be drained at an unrestricted rate to the public combined sewer network.

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Appendix A Topographical Survey

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Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Open Sided
Ruin (RUIN)
Passage
Wall with Height (e.g. 1.2m)
Retaining Wall (R/W)

FENCE STYLES AND DESCRIPTIONS

Close Boarded (C/B)
Corrugated Iron (C/I)
Chestnut Paling (C/P)
Chainlink (C/L)
Handrail (H/R)
Interwoven (INTL)
Iron Railings (I/R)
Lattice (LAT)
Miscellaneous (Misc)
Palisade (PAL)
Post & Chain (P/C)
Post & Rail (P/R)
Post & Wire (P/W)
Post & Barbed Wire (B/W)
Wire mesh (W/M)
Wire (WIRE)
Yatha (YATHA)
Yorkie Bradstyle (YORKIE)

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track (TRACK)
Footpath (FP)

STREET FURNITURE

Bollards Beacon (BB)
Bus Stop (BS)
Bollard (B)
Cills Eye (CE)
Coal Chute (CC)
Closed Circuit TV (CCTV)
Drain (DR)
Electricity Pole (EP)
Flood Light (FL)
Flag Staff (FS)
Lamp Post (LP)
Letter Box (C) LB
Name Plate (street) (NP)
Mooring Ring (MR)
Mile Post or Mooring Post (MP)
Service Marker (MK)
Mile Stone (MS)
Post (P)
Parking Meter (PM)
Reflector Post (RP)
Rodding Eye (RE)
Road Sign (RS)
Speed Camera (S/CAM)
Information Sign (SIGN)
Stay (SY)
Traffic Light (TL)
Telegraph Pole (TP)
Traffic Light Push Button Post (T) LP
Traffic Light Control (T/LC)P
Control Box (C) BOX
British Telecom Box (BT BOX)
Electricity Box (EL BOX)
Gas Box (GAS BOX)

INSPECTION CHAMBERS AND PIPES

Inspection Cover (IC)
Inspection Cover (Elec) (IC/EL)
Manhole (MH)
British Telecom Cover (BT)
Inspection Cover (Comms) (IC/COM)
Cable TV (CATV)
Inspection Cover Traffic Signals (IC/TL)
Gully (G)
Kerb Outlet (KO)
Vent Pipe (VP)
Steam Pipe (SP)
Non Water Pipe (NWP)
Soil Pipe (SVP)
Gas Pipe (G-PIPE)
Unable to lift cover (UTL)
Stop Tap (ST)
Stop Valve (SV)
Lamphole (LH)
Hydrant (HYD)
Earth Rod (ER)
Gas Valve (GV)
Water Meter (WM)
Washout (WO)
Rodding Eye (RE)

GEOTECHNICAL INFORMATION

Borehole (BH)
Trial Pit (TP)
Monitor Pin (MON)
Probe Hole (PH)
Window Sample (WS)

GENERAL INFORMATION

Petrol Pump (PP)
Basement Light (BL)
Footbridge (FB)
Dish Type Channel
Slot Type Channel
Grate Type Channel (Ref. 451.3m)
Tactile Paving (TAC)
Crash Barrier (C/BR)
Column (COL)
Stanchion (STAN)
Car Vacuum (VAC)
Offset Pit (OP)
Air Valve (AV)
Trough (TR)
Chimney (CHY)
Telephone Call Box (TCB)

OVERHEAD FEATURES

Electricity Pylon (EPYLON)
Electricity (E)
Telephone (T)

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert
Grip (Land Drain)
Spring (SPR)

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

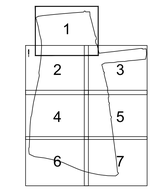
LEVEL AND HEIGHT INFORMATION

Standard Spot Height (+ 123.45)
Precision Spot Height (+ 123.456)
Bridge Level (+ 123.00)
Kerb Level (+ 76.24-52)
Soffit Level (+ 75.25-92)
Threshold Level (+ 74.08-88)
Cover Level (+ 43.26-45)
Invert Level (+ 42.25-13)
Pipe Soffit Level (+ 77.65-00)
Sump Level (+ 75.6-00)
Finished Floor Level (+ 77.76-00)
Top of Tank Level (+ 77.7-00)
Eave Level (+ 63.7-00)
Ridge Level (+ 76.3-00)
Roof Hip Level (+ 74.8-50)
Flat Roof Level (+ 76.7-00)
Top of Canopy Level (+ 109°/77.00)
Underside of Canopy Level (+ 109°/75.00)
Window Sill Level (+ 77.5-00)
Window Head Level (+ 74.5-00)
Springing Level (+ 57.8-50)
Arch Level (+ 62.7-00)
Cable Level (+ 0.478-35)
Top of Wall Level (+ 78.10-00)
Underside of Beam Level (+ 68.8-50)
General Height (+ 479.00)

SURVEY INFORMATION SIGNS

Permanent Ground Marker
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O.S. Bench Mark

Sheet Index



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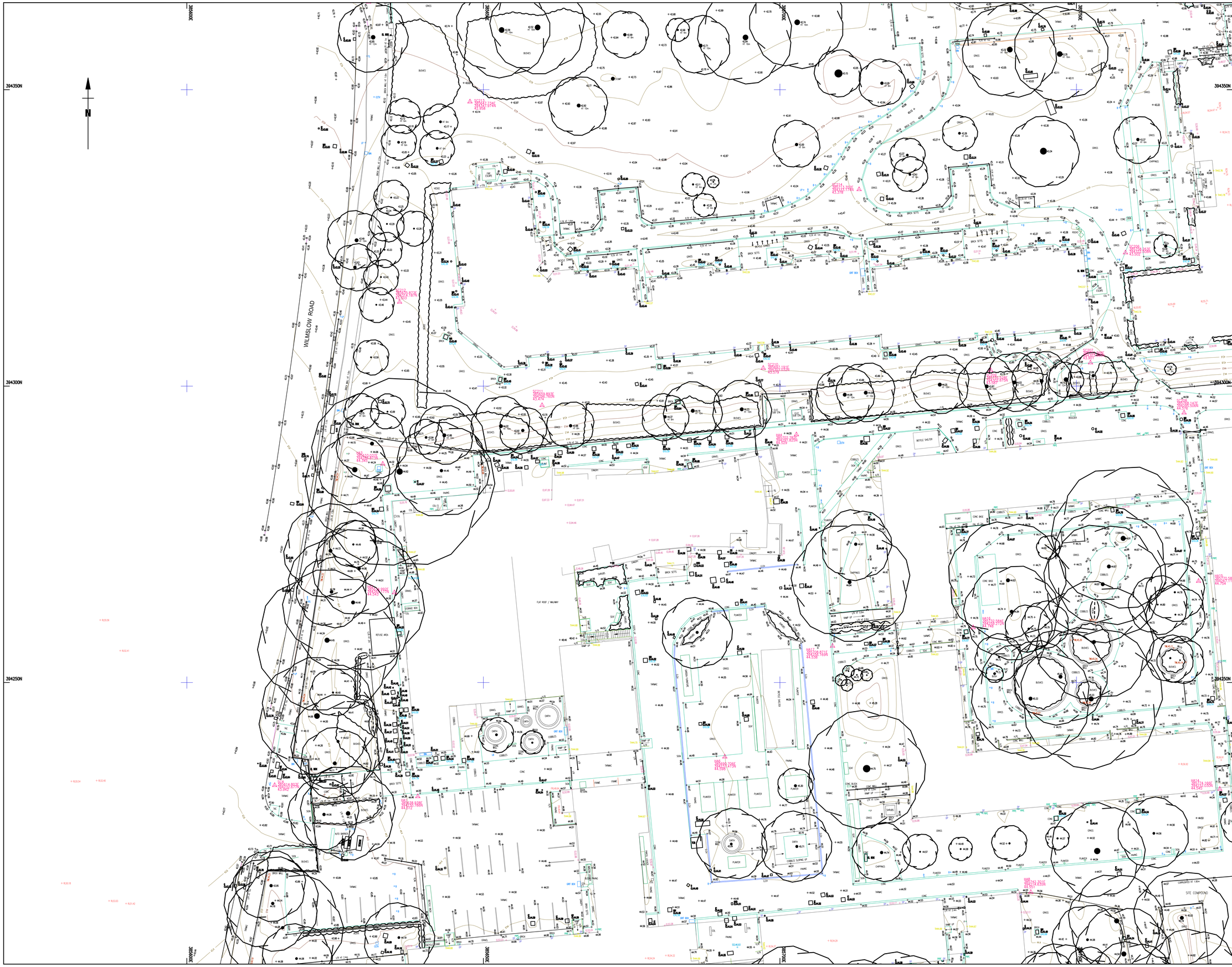
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Project
UNIVERSITY OF MANCHESTER
FALLOWFIELD

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By	Date	Survey Date
AS	01/12/22	October 2022
Checked by	Date	Scale
ED	01/12/22	1 : 200

Drawing No: 59252/1
Revision:



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building - Open Sided
Ruin (RUIN)
Passage
Wall with Height Retaining Wall (R/W)

FENCE STYLES AND DESCRIPTIONS

Close Boarded (C/B)
Corrugated Iron (C/I)
Chestnut Paling (C/P)
Chainlink (C/L)
Handrail (H/R)
Interwoven (INT)
Iron Railings (I/R)
Lattice (L/T)
Miscellaneous (Misc)
Palisade (PAL)
Post & Chain (P/C)
Post & Rail (P/R)
Post & Wire (P/W)
Post & Barbed Wire (B/W)
Wire mesh (W/M)
Gate
Fence Breakpte

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing
Track
Footpath

STREET FURNITURE

Bollards (BB)
Bus Stop (BS)
Bollard (B)
Grille Eye (GE)
Gas/ Drains (GD)
Closed Circuit TV (CCTV)
Drain (DR)
Electricity Pole (EP)
Flood Light (FL)
Flag Staff (FS)
Lamp Post (LP)
Letter Box (LB)
Name Plate (street) (NP)
Mooring Ring (MR)
Mile Post or Mooring Post (MP)
Service Marker (MK)
Mile Stone (MS)
Post (P)
Parking Meter (PM)
Reflector Post (RP)
Rodding Eye (RE)
Road Sign (RS)
Speed Camera (S/CAM)
Information Sign (SIGN)
Stay (SY)
Traffic Light (TL)
Telegraph Pole (TP)
Traffic Light Push Button Post (TLP)
Traffic Light Control (TLC/P)
Control Box (C/BOX)
British Telecom Box (BT BOX)
Electricity Box (EL BOX)
Gas Box (GAS BOX)

INSPECTION CHAMBERS AND PIPES

Inspection Cover (IC)
Inspection Cover (Elec) (IC/EL)
Manhole (MH)
British Telecom Cover (BT)
Inspection Cover (Comms) (IC/COM)
Cable TV (CATV)
Inspection Cover Traffic Signal (IC/TL)
Gully (G)
Kerb Outlet (KO)
Vent Pipe (VP)
Down Pipe (DP)
Rain Water Pipe (RWP)
Soil Pipe (SVP)
Gas Pipe (G-PIPE)
Unable to lift cover (UTL)
Stop Tap (ST)
Stop Valve (SV)
Lamphole (LH)
Hydrant (HYD)
Earth Rod (ER)
Gas Valve (GV)
Water Meter (WM)
Washout (WO)
Rodding Eye (RE)

GEOTECHNICAL INFORMATION

Borehole (BH)
Trial Pit (TP)
Monitor Pin (MON)
Probe Hole (PH)
Window Sample (WS)

GENERAL INFORMATION

Petrol Pump (PP)
Basement Light (BL)
Footbridge (FB)
Dish Type Channel
Slot Type Channel
Grate Type Channel (Add dir'n Arr.)
Tactile Paving (TAC)
Crash Barrier (C/BR)
Column (COL)
Stanchion (STAN)
Car Vacuum (VAC)
Offset Pit (OF)
Air Valve (AV)
Trough (T/R)
Chimney (CHY)
Telephone Call Box (TCB)

OVERHEAD FEATURES

Electricity Pylon (E.PYLON)
Electricity (E)
Telephone (T)

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert
Grip (Land Drain)
Spring (SPR)

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

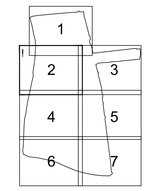
LEVEL AND HEIGHT INFORMATION

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Precision Spot Height (+ 123.456)
Bench Mark (+ 123.00)
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Threshold Level (+ 54.06 M)
Cover Level (+ 43.26 AS)
Invert Level (+ 42.25 I)
Pipe Soffit Level (+ 49.65 O)
Floor Level (+ 49.65 F)
Finished Floor Level (+ 49.96 O)
Electricity Box (+ 117.00 E)
Eave Level (+ 63.7 O)
Ridge Level (+ 69.3 O)
Roof Hip Level (+ 64.8 O)
Flat Roof Level (+ 66.7 O)
Top of Canopy Level (+ 59.9 / 57.00 O)
Underside of Canopy Level (+ 59.9 / 55.00 O)
Window Sill Level (+ 49.6 B)
Window Head Level (+ 54.6 O)
Springing Level (+ 59.8 B)
Arch Level (+ 62.7 B)
Cable Level (+ 24.78 B)
Top of Wall Level (+ 56.14 O)
Underside of Beam Level (+ 48.8 B)
General Height (+ 49.9 O)

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

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FALLOWFIELD

Drawing Title
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AS	01/12/22	October 2022
Checked by	Date	Scale
ED	01/12/22	1 : 200

Drawing No: 59252/2

Revision:



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Open Sided
Ruin (RUIN)
Passage
Wall with Height Retaining Wall (e.g. R/W)

FENCE STYLES AND DESCRIPTIONS

Close Boarded C/B
Corrugated Iron C/I
Chestnut Paling C/P
Chainlink C/L
Handrail H/R
Interwoven WN
Iron Railings I/R
Lattice L/T
Miscellaneous Misc
Palisade PAL
Post & Chain P/C
Post & Rail P/R
Post & Wire P/W
Post & Barbed Wire B/W
Wire mesh W/M
Wire W
Yatha
Yarlow Snakelyte

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track (TRACK)
Footpath (FP)

STREET FURNITURE

Bollards Beacon = BB
Box Stop = BS
Bollard = B
Cats Eye = CE
Coal Chute = CC
Closed Circuit TV = CCTV
Drain = DR
Electricity Pole = EP
Flood Light = FL
Flag Staff = FS
Lamp Post = LP
Letter Box = LB
Name Plate (street) = NP
Mooring Ring = MR
Mile Post or Mooring Post = MP
Service Marker = MK
Mile Stone = MS
Post = P
Parking Meter = PM
Reflector Post = RP
Rodding Eye = RE
Road Sign = RS
Speed Camera = S/CAM
Information Sign = SIGN
Stay = SY
Traffic Light = TL
Telegraph Pole = TP
Traffic Light Push Button Post = TLP
Traffic Light Control = TLC/P
Control Box = C/BOX
British Telecom Box = BT BOX
Electricity Box = EL BOX
Gas Box = GAS BOX

INSPECTION CHAMBERS AND PIPES

Inspection Cover = IC
Inspection Cover (Obs) = IC/OL
Manhole = MH
British Telecom Cover = BT
Inspection Cover (Comms) = IC/COM
Cable TV = CATV
Inspection Cover Traffic Signals = IC/TL
Gully = G
Kerb Outlet = KO
Vent Pipe = VP
Down Pipe = DP
Rain Water Pipe = RWP
Soil Pipe = SVP
Gas Pipe = G-PIPE
Unable to lift cover = UTL
Stop Tap = ST
Stop Valve = SV
Lamphole = LH
Hydrant = HYD
Earth Rod = EX
Gas Valve = GV
Water Meter = WM
Washout = WO
Rodding Eye = RE

GEOTECHNICAL INFORMATION

Borehole = BH
Trial Pit = TP
Monitor Pin = MON
Probe Hole = PH
Window Sample = WS

GENERAL INFORMATION

Petrol Pump = PP
Basement Light = BL
Footbridge = FB
Dish Type Channel = (DISH)
Slot Type Channel = (SLOT)
Grate Type Channel = (GRATE)
Tactile Paving = TAC
Crash Barrier = C/BR
Column = COL
Stanchion = STAN
Car Vacuum = VAC
Offset Pit = OP
Air Valve = AV
Through = THR
Chimney = CHIM
Telephone Call Box = TCB

OVERHEAD FEATURES

Electricity Pylon = E.PYLON
Electricity = ELEC
Telephone = TEL

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert
Grip (Land Drain)
Spring = SPR

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump = STUMP
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

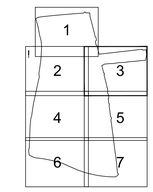
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Precision Spot Height = +123.456
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Kerb Level = +124.62
Soffit Level = +125.82
Threshold Level = +126.98
Cover Level = +126.45
Invert Level = +125.13
Pipe Soffit Level = +116.50
Floor Level = +114.00
Finished Floor Level = +116.00
Top of Tank Level = +117.00
Eave Level = +117.00
Ridge Level = +119.00
Roof Hip Level = +118.50
Flat Roof Level = +118.00
Top of Canopy Level = +109/+117.00
Underside of Canopy Level = +109/+116.00
Window Sill Level = +116.00
Window Head Level = +114.00
Springing Level = +114.50
Arch Level = +117.00
Cable Level = +119.00
Top of Wall Level = +116.00
Underside of Beam Level = +118.50
General Height = +119.00

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



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Accreditations: RICS, The Survey Association, ICES, RICS Registered Firm, Safe Contractor FS 74156

Client
RIDER LEVETT BUCKNALL UK LIMITED
8 PRINCESS PARADE, LIVERPOOL
L3 1DL

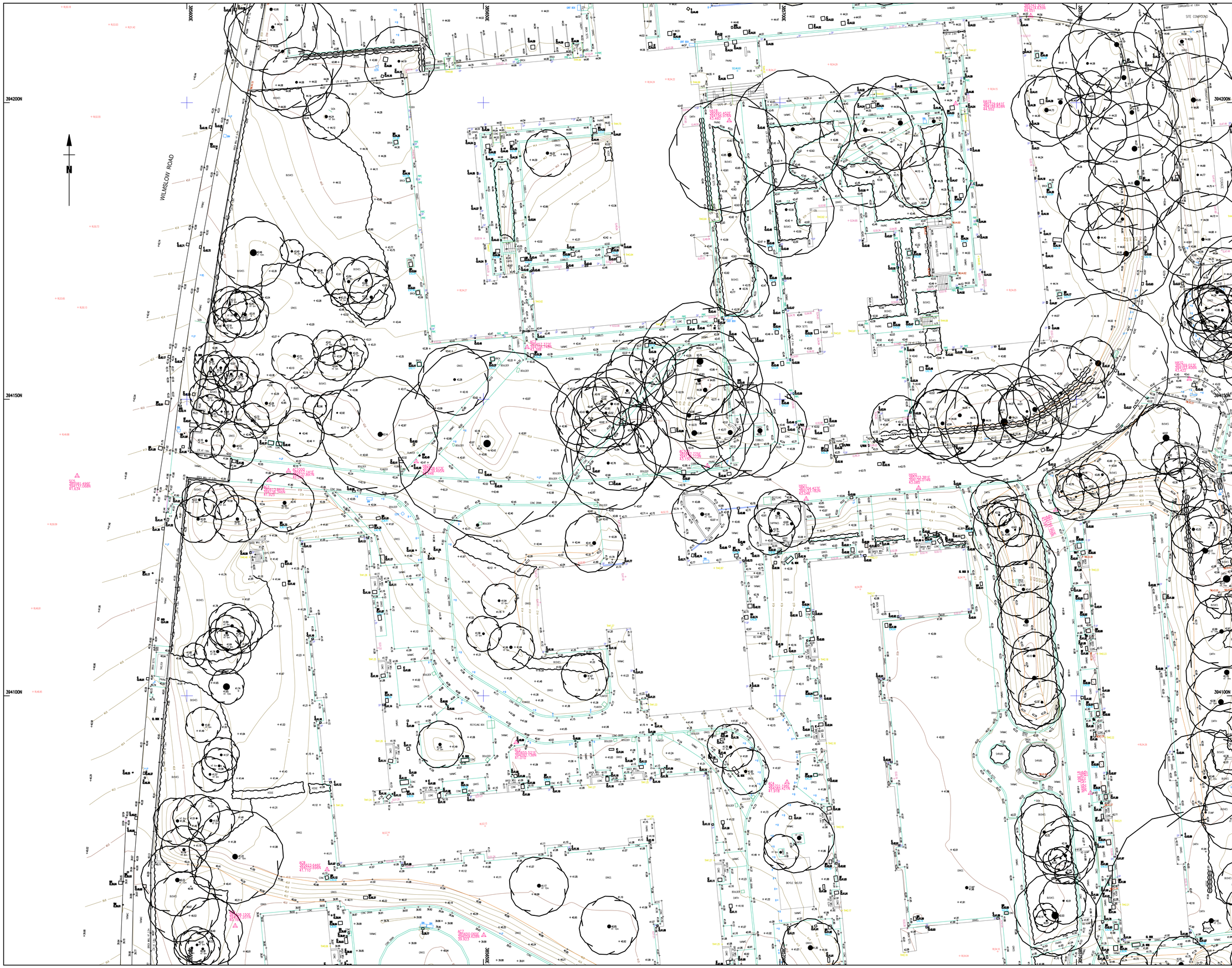
Project
UNIVERSITY OF MANCHESTER
FALLOWFIELD

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By	AS	01/12/22	Survey Date: October 2022
Checked By	ED	01/12/22	Scale: 1 : 200

Drawing No: 59252/3

Revision:



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Open Sided
Ruin
Passage
Wall with Height Retaining Wall

FENCE STYLES AND DESCRIPTIONS

Close Boarded
Corrugated Iron
Chestnut Paling
Chainlink
Handrail
Interwoven
Iron Railings
Lattice
Miscellaneous
Palisade
Post & Chain
Post & Rail
Post & Wire
Post & Barbed Wire
Wire mesh
Wire
Picket
Ranch Sreakyle

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing
Track
Footpath

STREET FURNITURE

Bollards Beacon
Bus Stop
Bollard
Grid Sump
Gas Chute
Closed Circuit TV
Drain
Electricity Pole
Flood Light
Flag Staff
Lamp Post
Letter Box
Name Plate (street)
Mooring Ring
Mile Post or Mooring Post
Service Marker
Mile Stone
Post
Parking Meter
Reflector Post
Rodding Eye
Road Sign
Speed Camera
Information Sign
Stay
Traffic Light
Telegraph Pole
Traffic Light Push Button Post
Traffic Light Control
Control Box
British Telecom Box
Electricity Box
Gas Box

INSPECTION CHAMBERS AND PIPES

Inspection Cover
Inspection Cover (Dec)
Manhole
British Telecom Cover
Inspection Cover (Comms)
Cable TV
Inspection Cover Traffic Signals
Gully
Kerb Outlet
Vent Pipe
Steam Pipe
Non Water Pipe
Soil Pipe
Gas Pipe
Unable to lift cover
Stop Tap
Stop Valve
Lamp-hole
Hydrant
Earth Rod
Gas Valve
Water Meter
Washout
Rodding Eye

GEOTECHNICAL INFORMATION

Borehole
Trial Pit
Monitor Pin
Probe Hole
Window Sample

GENERAL INFORMATION

Petrol Pump
Basement Light
Footbridge
Dish Type Channel
Slot Type Channel
Grille Type Channel
Tactile Paving
Crash Barrier
Column
Stanchion
Car Vacuum
Offset Pit
Air Valve
Trough
Chimney
Telephone Call Box

OVERHEAD FEATURES

Electricity Pylon
Electricity
Telephone

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert
Grip (Land Drain)
Spring

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

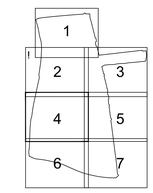
LEVEL AND HEIGHT INFORMATION

Standard Spot Height
Precision Spot Height
Bridge Level
Arch Level
Soffit Level
Threshold Level
Cover Level
Invert Level
Pipe Soffit Level
Floor Level
Finished Floor Level
Top of Tank Level
Eave Level
Ridge Level
Roof Hip Level
Flat Roof Level
Top of Canopy Level
Underside of Canopy Level
Manhole
Window Sill Level
Window Head Level
Springing Level
Arch Level
Cable Level
Top of Wall Level
Underside of Beam Level
General Height

SURVEY INFORMATION SIGNS

Permanent Ground Marker
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O.S. Bench Mark

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Project
UNIVERSITY OF MANCHESTER
FALLOWFIELD

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By	AS	01/12/22	Survey Date: October 2022
Checked By	ED	01/12/22	Scale: 1 : 200

Drawing No: 59252/4

Revision:



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Open Sided
Ruin — RUIN
Passage — P
Wall with Height — Retaining Wall — R/W

FENCE STYLES AND DESCRIPTIONS

Close Boarded — C/B
Corrugated Iron — C/I
Chestnut Paling — C/P
Chainlink — C/L
Handrail — H/R
Interwoven — IW
Iron Railings — I/R
Lattice — L/T
Miscellaneous — Misc
Palisade — PAL
Post & Chain — P/C
Post & Rail — P/R
Post & Wire — P/W
Post & Barbed Wire — B/W
Wire mesh — W/M
Gate
Fence
Hedge treestyle

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing — PC
Track — TRACK
Footpath — FOOTPATH

STREET FURNITURE

Bollards Beacon — BB
Bus Stop — BS
Bollard — B
Grid Gully — GG
Coal Chute — CC
Closed Circuit TV — CCTV
Drain — DR
Electricity Pole — EP
Flood Light — FL
Flag Staff — FS
Lamp Post — LP
Letter Box — C/LB
Name Plate (street) — NP
Mooring Ring — MR
Mile Post or Mooring Post — MP
Service Marker — MK
Mile Stone — MS
Post — P
Parking Meter — PM
Reflector Post — RP
Rodding Eye — RE
Road Sign — RS
Speed Camera — S/CAM
Information Sign — SIGN
Stay — SY
Traffic Light — TL
Telegraph Pole — TP
Traffic Light Push Button Post — TLP
Traffic Light Control — TLC/P
Control Box — C/BOX
British Telecom Box — BT BOX
Electricity Box — EL BOX
Gas Box — GAS BOX

INSPECTION CHAMBERS AND PIPES

Inspection Cover — IC
Inspection Cover (Elec) — IC/EL
Manhole — MH
British Telecom Cover — BT
Inspection Cover (Comms) — IC/COM
Cable TV — CATV
Inspection Cover Traffic Signals — IC/TL
Gully — G
Kerb Outlet — KO
Vent Pipe — VP
Down Pipe — DP
Rain Water Pipe — RWP
Soil Pipe — SVP
Gas Pipe — G-PIPE
Unable to lift cover — U/L
Stop Tap — ST
Stop Valve — SV
Lamphole — LH
Hydrant — HYD
Earth Rod — ER
Gas Valve — GV
Water Meter — WM
Washout — WO
Rodding Eye — RE

GEOTECHNICAL INFORMATION

Borehole — BH
Trial Pit — TP
Monitor Pin — MON
Probe Hole — PH
Window Sample — WS

GENERAL INFORMATION

Petrol Pump — PP
Basement Light — BL
Footbridge — FB
Dish Type Channel
Slot Type Channel
Grate Type Channel — Mod. 441.3m
Tactile Paving — TAC
Crash Barrier — C/BR
Column — COL
Stanchion — STAN
Car Vacuum — VAC
Offset Pill — OF
Air Valve — AV
Through — THR
Chimney — CHY
Telephone Call Box — TCB

OVERHEAD FEATURES

Electricity Pylon — E.PYLON
Electricity — ELEC
Telephone — TEL

WATER FEATURES

Canal — CANAL
Stream — STREAM
Ditch — DITCH
Weir — WEIR
Culvert — CULVERT
Grip (Land Drain) — GRIP
Spring — SPR

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump — STUMP
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

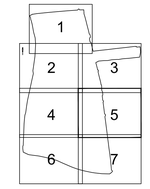
LEVEL AND HEIGHT INFORMATION

Standard Spot Height — + 123.45
Precision Spot Height — + 123.456
Bench Mark — + BM 53.60
Kerb Level — + BK 24.62
Soffit Level — + SL25.82
Threshold Level — + THS8.88
Cover Level — + CL26.45
Invert Level — + IL25.13
Pipe Soffit Level — + PSL5.00
Floor Level — + FL6.00
Finished Floor Level — + FFL6.00
Top of Tank Level — + TT7.00
Eave Level — + EL7.00
Ridge Level — + RL9.00
Roof Hip Level — + RH8.50
Flat Roof Level — + FRL7.00
Top of Canopy Level — + TOP/CT7.00
Underside of Canopy Level — + SOF/CS5.00
Window Sill Level — + WSL8.00
Window Head Level — + WHL9.00
Springing Level — + SPL8.50
Arch Level — + AL7.00
Cable Level — + CHT6.00
Top of Wall Level — + TW.10.00
Underside of Beam Level — + UBL8.50
General Height — + HT9.00

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



Rev.	Date	Description

MALCOLM HUGHES
CHARTERED LAND SURVEYORS
65 Cross Street, Sale, Manchester
M33 7HF, Tel: 0161 905 1265
www.malcolmhughes.co.uk
survey@mhls.co.uk

Accreditations: RICS, The Survey Association, ICES, Construction Line, IfE Nicic

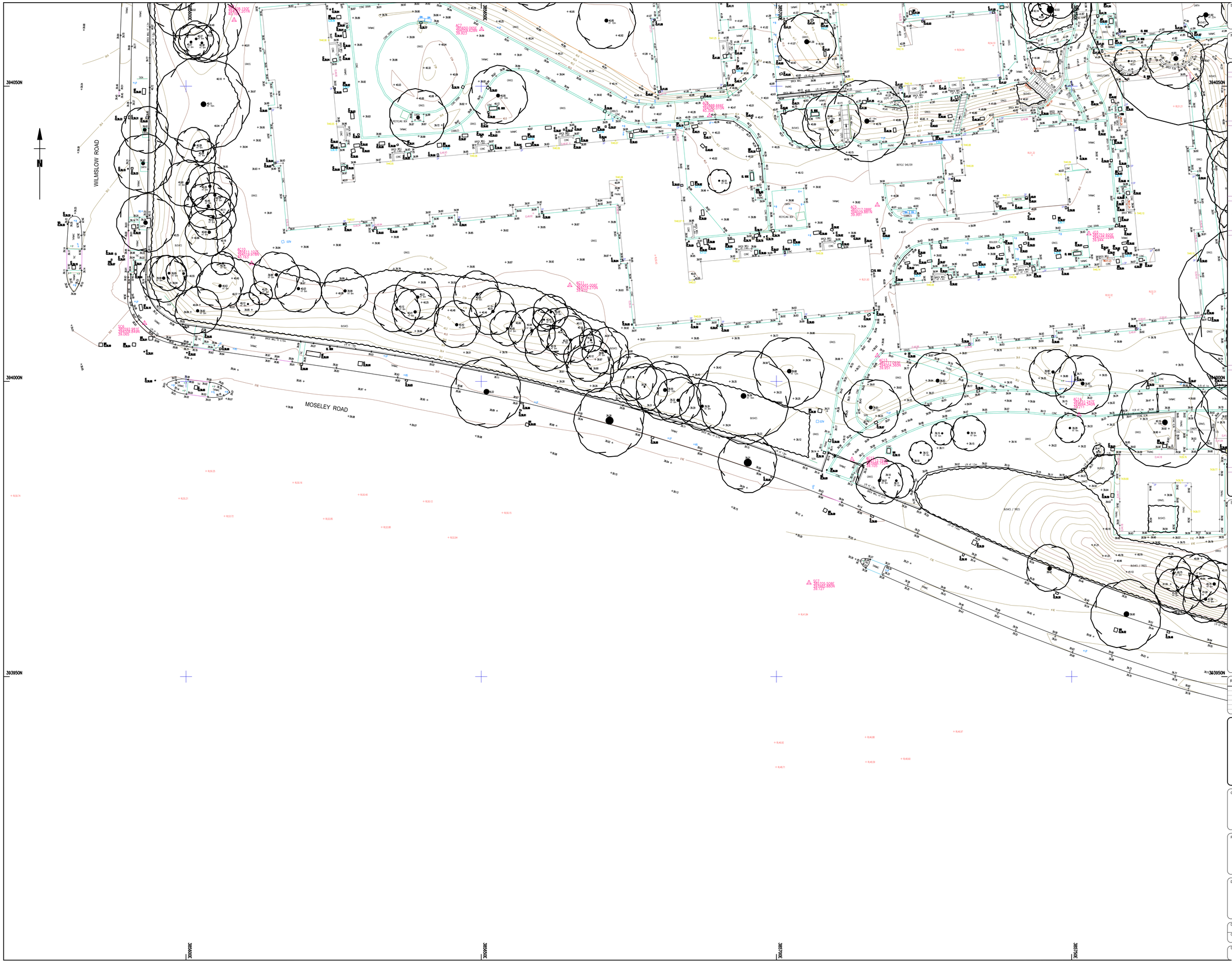
Client
RIDER LEVETT BUCKNALL UK LIMITED
8 PRINCESS PARADE, LIVERPOOL
L3 1DL

Project
UNIVERSITY OF MANCHESTER
FALLOWFIELD

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By			Survey Date	October 2022
	AS	01/12/22		
Checked By			Scale	1 : 200
	ED	01/12/22		

Drawing No: 59252/5
Revision:



Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

Building
Building Open Sided
Ruin (RUIN)
Passage
Roof with Height Retaining Wall (R/W)

FENCE STYLES AND DESCRIPTIONS

Close Boarded (C/B)
Corrugated Iron (C/I)
Chestnut Paling (C/P)
Chainlink (C/L)
Handrail (H/R)
Interwoven (INTL)
Iron Railings (I/R)
Lattice (L/T)
Miscellaneous (Misc)
Palisade (PAL)
Post & Chain (P/C)
Post & Rail (P/R)
Post & Wire (P/W)
Post & Barbed Wire (B/W)
Wire mesh (W/M)
Wire (WIRE)
Fence (FENCE)
Hedge Boundary (HEDGE)

ROADS

Kerbs
Edge of Surfacing
Pedestrian Crossing (PC)
Track (TRACK)
Footpath (FP)

STREET FURNITURE

Bollards Bexicon (BB)
Bus Stop (BS)
Bollard (B)
Grid Eye (GE)
Coal Chute (CC)
Closed Circuit TV (CCTV)
Drain (DR)
Electricity Pole (EP)
Flood Light (FL)
Flag Staff (FS)
Lamp Post (LP)
Letter Box (LB)
Name Plate (street) (NP)
Mooring Ring (MR)
Mile Post or Mooring Post (MP)
Service Marker (MK)
Mile Stone (MS)
Post (P)
Parking Meter (PM)
Reflector Post (RP)
Reading Eye (RE)
Road Sign (RS)
Speed Camera (S/CAM)
Information Sign (SIGN)
Slip (SY)
Traffic Light (TL)
Telegraph Pole (TP)
Traffic Light Push Button Post (TLP)
Traffic Light Control (TLC/P)
Control Box (C/BOX)
British Telecom Box (BT BOX)
Electricity Box (EL BOX)
Gas Box (GAS BOX)

INSPECTION CHAMBERS AND PIPES

Inspection Cover (IC)
Inspection Cover (Elec) (IC/EL)
Manhole (MH)
British Telecom Cover (BT)
Inspection Cover (Comms) (IC/COM)
Cable TV (CATV)
Inspection Cover Traffic Signals (IC/TL)
Gully (G)
Kerb Outlet (KO)
Vent Pipe (VP)
Down Pipe (DP)
Rain Water Pipe (RWP)
Soil Pipe (SVP)
Gas Pipe (G-PIPE)
Unable to lift cover (UTL)
Stop Tap (ST)
Stop Valve (SV)
Lamphole (LH)
Hydrant (HYD)
Earth Rod (ER)
Gas Valve (GV)
Water Meter (WM)
Washout (WO)
Reading Eye (RE)

GEOTECHNICAL INFORMATION

Borehole (BH)
Dup Pit (DP)
Monitor Pin (MON)
Probe Hole (PH)
Window Sample (WS)

GENERAL INFORMATION

Petrol Pump (PP)
Basement Light (BL)
Footbridge (FB)
Dish Type Channel
Slot Type Channel
Grate Type Channel (INVT./ FT.)
Tactile Paving (TAC)
Crash Barrier (C/BR)
Column (COL)
Stanchion (STAN)
Car Vacuum (VAC)
Offset Pit (O/P)
Air Valve (AV)
Trough (TR)
Chimney (CHIM)
Telephone Call Box (CHT)

OVERHEAD FEATURES

Electricity Pylon (L.PYLON)
Electricity (EL)
Telephone (TEL)

WATER FEATURES

Canal (Canal)
Stream (Stream)
Ditch (Ditch)
Weir (Weir)
Culvert (Culvert)
Grip (Land Drain) (Grip)
Spring (SPR)

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

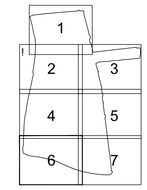
LEVEL AND HEIGHT INFORMATION

Standard Spot Height (+ 123.45)
Precision Spot Height (+ 123.456)
Bridge Level (+ 123.00)
Kerb Level (+ 34.24.50)
Soffit Level (+ 15.25.82)
Threshold Level (+ 74.08.568)
Cover Level (+ 03.26.45)
Invert Level (+ 5.05.13)
Pipe Soffit Level (+ 99.15.00)
Eave Level (+ 15.8.00)
Finished Floor Level (+ 77.16.00)
Top of Tank Level (+ 77.7.00)
Eave Level (+ 15.7.00)
Ridge Level (+ 19.3.00)
Roof Hip Level (+ 99.18.50)
Flat Roof Level (+ 99.7.00)
Top of Canopy Level (+ 109/127.00)
Underside of Canopy Level (+ 109/125.00)
Window Sill Level (+ 99.8.00)
Window Head Level (+ 99.9.00)
Springing Level (+ 99.8.50)
Arch Level (+ 84.7.00)
Cable Level (+ 04.78.00)
Top of Wall Level (+ 196.50.00)
Underside of Beam Level (+ 99.8.50)
General Height (+ 99.9.00)

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



Rev.	Date	Description

MALCOLM HUGHES
CHARTERED LAND SURVEYORS
65 Cross Street, Sale, Manchester
M33 7HF, Tel: 0161 905 1265
www.malcolmhughes.co.uk
survey@mhls.co.uk

Accreditations

Client
RIDER LEVETT BUCKNALL UK LIMITED
8 PRINCESS PARADE, LIVERPOOL
L3 1DL

Project
UNIVERSITY OF MANCHESTER
FALLOWFIELD

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By		Survey Date	
AS	01/12/22	October 2022	
Checked by		Scale	
ED	01/12/22	1 : 200	

Drawing No: 59252/6

Revision:

Survey Notes

Grid: Local Plane Metric related to National Grid at survey control SC1

Levels: OS Datum from GNSS positioning converted using the National Geoid Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS

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Building Open Sided
Ruin (RUIN)
Passage
Wall with Height / Retaining Wall (Wall 0.61.3m / R/W)

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Chainlink C/L
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Lattice L/T
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Palisade PAL
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Post & Barbed Wire B/W
Wire mesh W/M
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Fence
Hurst Greenstyle

ROADS

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Pedestrian Crossing (PC)
Track
Footpath

STREET FURNITURE

Bollard
Cctv Eye
Coal Chute
Closed Circuit TV
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Flood Light
Flag Staff
Lamp Post
Letter Box
Name Plate (street)
Mooring Ring
Mile Post or Mooring Post
Service Marker
Mile Stone
Post
Parking Meter
Reflector Post
Reading Eye
Road Sign
Speed Camera
Information Sign
Slip
Traffic Light
Telegraph Pole
Traffic Light Push Button Post
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Down Pipe
Rain Water Pipe
Soil Pipe
Gas Pipe
Unable to lift cover
Stop Tap
Stop Valve
Lamphole
Hydrant
Earth Rod
Gas Valve
Water Meter
Washout
Reading Eye

GEOTECHNICAL INFORMATION

Borehole
Trial Pit
Monitor Pin
Probe Hole
Window Sample

GENERAL INFORMATION

Petrol Pump
Basement Light
Footbridge (FB)
Dish Type Channel
Slot Type Channel
Grate Type Channel
Tactile Paving
Crash Barrier
Column
Stanchion
Car Vacuum
Offset Fill
Air Valve
Trough
Chimney
Telephone Call Box

OVERHEAD FEATURES

Electricity Pylon (PYLON)
Electricity
Telephone

WATER FEATURES

Canal
Stream
Ditch
Weir
Culvert
Grip (Land Drain)
Spring

RELIEF AND VEGETATION

Hedge
Edge of wood/Bushes
Stump (STUMP)
Individual Tree
Slopes with Height Greater than 1m
Cliff Face
Marsh
Reeds

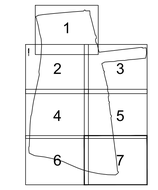
LEVEL AND HEIGHT INFORMATION

Standard Spot Height
Precision Spot Height
Bench Mark
Bridge Level
Soffit Level
Threshold Level
Cover Level
Invert Level
Pipe Soffit Level
Floor Level
Finished Floor Level
Top of Tank Level
Eave Level
Ridge Level
Roof Hip Level
Flat Roof Level
Top of Canopy Level
Underside of Canopy Level
Window Sill Level
Window Head Level
Springing Level
Arch Level
Cable Level
Top of Wall Level
Underside of Beam Level
General Height

SURVEY INFORMATION SIGNS

Permanent Ground Marker
O.S. Trig Station
O.S. Bench Mark

Sheet Index



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L3 1DL

Project
UNIVERSITY OF MANCHESTER
FALLOWFIELD

Drawing Title
TOPOGRAPHICAL SURVEY

Drawn By	AS	01/12/22	
Checked By	ED	01/12/22	
Survey Date	October 2022		
Scale	1 : 200		
Drawing No	59252/7	Revision	

Appendix B LLFA Data Screening

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MANCHESTER
CITY COUNCIL

Lead Local Flood Authority
Highways Service
Growth and Neighbourhoods Directorate
Manchester City Council
PO Box 532
Town Hall
Manchester
M60 2LA
Email: floodriskmanagement@manchester.gov.uk

DATE 08/06/2023

Dear Sir or Madam,

RE: Our Ref: MCC008/06/2023

We acknowledge with thanks your payment received on 02/06/2023 for our LLFA data screen service.

Please find enclosed plan showing the results of the data screen. The position of features shown on this plan is approximate only and is given in accordance with the best information currently available.

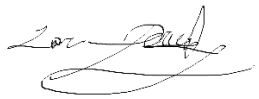
The enclosed plan cannot be used to substitute a competent site investigation.

The enclosed plan is being provided to you subject to Manchester City Council's terms and conditions which are shown attached.

I trust the above meets your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter, please do not hesitate to contact us.

Yours Faithfully,



Laura Peacock, Flood Risk Engineer, Lead Local Flood Authority

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CITY COUNCIL

TERMS AND CONDITIONS – LLFA DATA SCREEN

These provisions apply to LLFA data supplied by Manchester City Council ("MCC").

TERMS AND CONDITIONS:

- This data Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- MCC has taken all reasonable care to compile this data Map. This data Map and any information supplied with it is provided for general guidance only and MCC makes no representation, undertaking or warranty of any kind as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position of any culverted assets shown on the data Map are approximate only. MCC strongly recommends that a comprehensive site investigation is undertaken in addition to reviewing this data Map to determine and ensure the precise location of any assets. The exact location, positions and depths should be obtained by an appropriate survey which may include but shall not be limited to GPR and CCTV.
- The data screened may be modified over time without notice and therefore this data Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the data Map have been made subsequent to issue and prior to any works being carried out.
- This data Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) or for the purpose of determining the suitability of a point of connection to discharge.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising from damages of any kind caused to assets by reason of the actual position and/or existence of assets being different from those shown on the data Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent MCC from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

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DATA SCREEN SYMBOLOGY

Bridge

- Good
- Fair
- Poor
- Very Poor
- Unknown

Trash Screen

- Good
- Fair
- Poor
- Very Poor
- Unknown

Culvert Orifice

- Very Good
- Good
- Fair
- Poor
- Very Poor
- Unknown

Culvert Conduit

- CCTV surveyed
- Not CCTV surveyed
- Ordinary Watercourse Conduit
- MCC SuDS
- MCC Flood Incident Points
- MCC Section 19 Report
- MCC Flood Incident Polygons
- MCC Local Authority Boundary

Supplementary Information where available:

Critical Drainage Area – The site is within the Levenshulme Fallowfield CDA.

Flood Incidents - The nearest flood/drainage incidents on record are along the south-east site boundary Whitworth Lane, dated 15/01/2020 to 11/08/2021, described as “Blocked gully or drain”.

Culvert Conduits – The LLFA asset register indicates that the ca. 1200 dia Fallowfield Brook culverted ordinary watercourse is in close proximity to the Site (below Moseley Road). Varying routes and access chambers are shown in the asset register depending on the data source: **these are summarised below and extracts provided where possible.** Please note the exact route of the culvert has not been verified with survey by the LLFA.

Survey and Design Archive –

1984 major drainage survey: Fallowfield Brook culvert is shown highlighted blue, trending NE through Moseley Road, crossing the junction with Whitworth Lane and projecting NE under land to the N of Moseley Road.

MCC structural records: Fallowfield Brook culvert sketched route beneath Moseley Road, an apparent known access chamber location & photo are attached. There may be unchartered access chambers elsewhere along the culvert; an investigation into other access chambers closer to the site should be considered by the applicant.

MANCHESTER
CITY COUNCIL

UU mapping; and another unverified route (purple dashed line): Shown trending beneath Moseley Road**.**

Any other information identified by LLFA officer during screening – The adherence to the Drainage Hierarchy - option of connection to the culverted watercourse - should be prioritised by the drainage strategy. Survey of the culverted watercourse's route, condition and capacity would be required to support any proposed connection. Land Drainage Consent from the LLFA would be required for any proposed connection.

Records indicate that the culvert runs in close proximity to the southern site boundary, but our records cannot guarantee 100% accuracy for all MCC underground assets. Due diligence should be applied during investigation of the culvert. If the culvert is found to in fact be onsite, the development proposals should take account of the culvert and MCC should be contacted immediately.



MANCHESTER CITY COUNCIL

LLFA DATA SCREEN

Address/Site Ref:

Fallowfield Campus

Our Ref: **MCC008/06/2023**

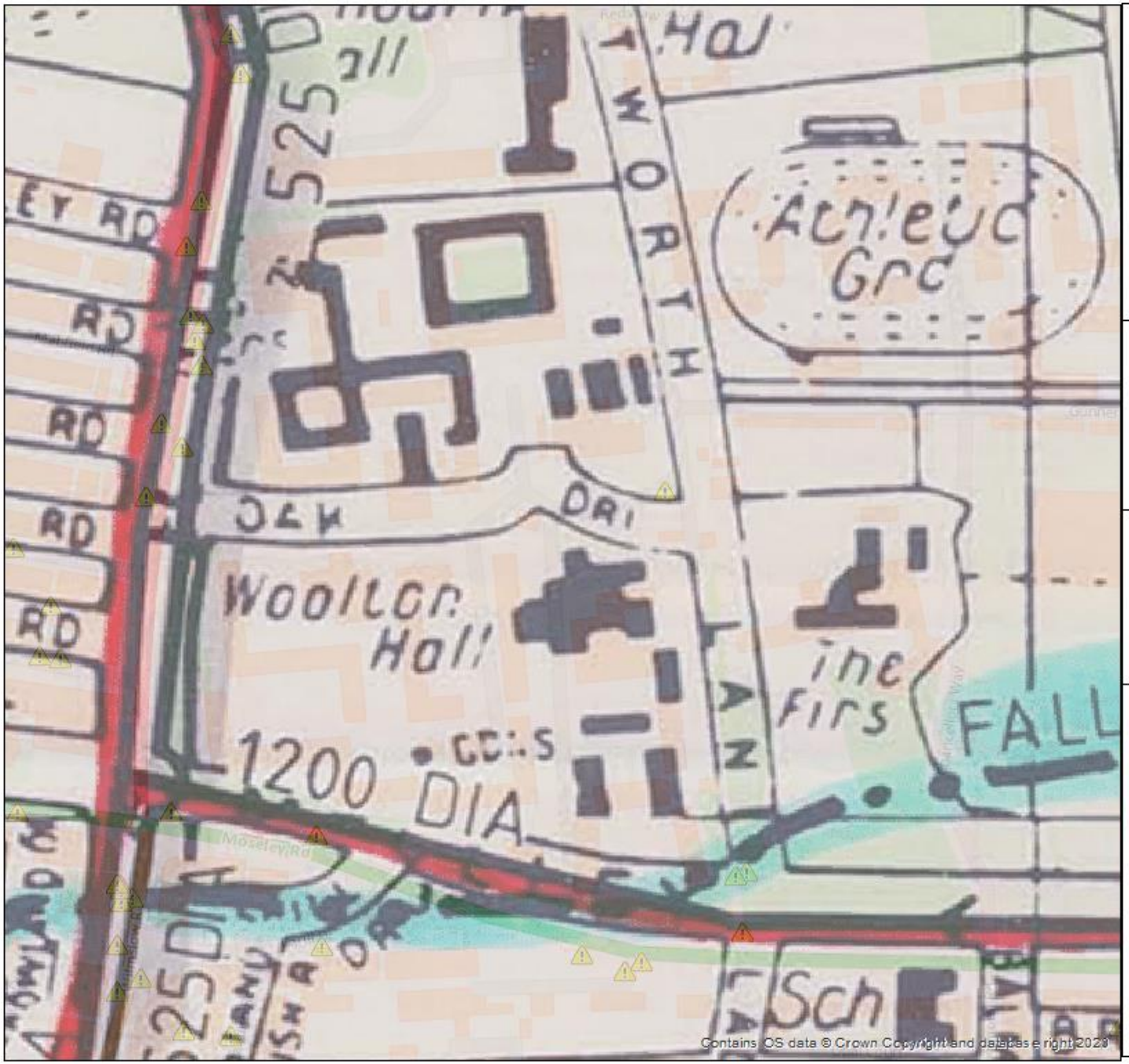
Author: Manchester City Council LLFA
Date: 08/06/2023
Scale: 1:2,155

The position of features shown on this plan is approximate only and is given in accordance with the best information currently available. Manchester City Council will not accept liability for any loss or damage caused by the actual position being different from those shown.

0 15 30 60 Meters

N

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MANCHESTER CITY COUNCIL

LLFA DATA SCREEN

Address/Site Ref:

Fallowfield Campus
1984 Major Drainage Survey

Our Ref: **MCC008/06/2023**

Author: Manchester City Council LLFA
Date: 08/06/2023
Scale: 1:2,500

The position of features shown on this plan is approximate only and is given in accordance with the best information currently available. Manchester City Council will not accept liability for any loss or damage caused by the actual position being different from those shown.

N

0 15 30 60
Meters

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Appendix C United Utilities Correspondence

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Daniel Carroll

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 25 May 2023 16:52
To: Daniel Carroll
Subject: RE: 04043664 - Fallowfield Campus, Manchester University

****External Email. This email originated from outside Buro Happold.****

Good Afternoon Dan,

As promised please see response below:

Fallowfield Campus, Wilmslow Rd, Fallowfield, Manchester, M14 6HD

- Foul flows should look to mimic existing connection points, splitting the site with various connections as opposed to one or two is essential to reduce the impact on the public sewers

- Surface water flows should look to communicate with the nearby culverts or watercourses.

- Once you are in position of a more detailed drainage plan I would welcome a copy so that we can assess the network impact

Regards

Anthony

United Utilities
Water for the North West

Anthony Laithwaite
Ww Lead - ICS / Portal Project
Ww Engineer
Developer Services & Metering
Customer Services

M: 07880 298897
unitedutilities.com

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Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

Daniel Carroll

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 23 May 2023 16:27
To: Daniel Carroll
Cc: Andrew Durber
Subject: RE: 04043664 - Fallowfield Campus, Manchester University

****External Email. This email originated from outside Buro Happold.****

Good Afternoon Daniel,

Thank you for your additional information:

Fallowfield Campus, Wilmslow Rd, Fallowfield, Manchester, M14 6HD

I can confirm I have engaged with our internal teams to discuss connection points and details, this is due to the sheer size and volume……

I shall update you on their response.

Regards

Anthony

United Utilities
Water for the North West

Anthony Laithwaite
Ww Lead - ICS / Portal Project
Ww Engineer
Developer Services & Metering
Customer Services

M: 07880 298897
unitedutilities.com

---------- Original Message ----------
From: Daniel Carroll [daniel.carroll@burohappold.com]
Sent: 19/05/2023 14:48
To: seweradoptions@uuplc.co.uk
Cc: andrew.durber@burohappold.com
Subject: RE: 04043664 - Fallowfield Campus, Manchester University

Hi Anthony,

Thank you for your response. It is understood that the existing drainage network within the site is a combined system with multiple connections to the public sewer network. I have attached a mark-up of a GPR survey indicating where I believe these connections are located. This will be verified with further drainage surveys at a later stage.

The current number of student beds on the site is 2374 and this will be increased up to 3300.

Please let me know if you require any further information.

Thanks,

Dan

Daniel Carroll

Infrastructure Engineer
Buro Happold | Cities - Infrastructure

T: +44 (0)161 819 3426

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: 18 May 2023 13:47
To: Daniel Carroll <daniel.carroll@burohappold.com>
Subject: 04043664 - Fallowfield Campus, Manchester University

****External Email. This email originated from outside Buro Happold.****

Good Afternoon Dan,

Thank you for your Pre Development Enquiry, please see our response to your specific questions below:

Fallowfield Campus, Wilmslow Rd, Fallowfield, Manchester, M14 6HD

I can see you're looking for comments regarding drainage connection points, before replying can you please confirm the below:

1. Where does the existing foul drainage outfall to and how many student beds are currently on the site?
2. Where does surface water currently drain to?

Regards

Anthony

Anthony Laithwaite
Ww Lead - ICS / Portal Project
Ww Engineer
Developer Services & Metering
Customer Services

M: 07880 298897
unitedutilities.com

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Daniel Carroll

From: Daniel Carroll
Sent: 11 May 2023 14:41
To: SewerAdoptions@uuplc.co.uk
Cc: Andrew Durber
Subject: FW: WW Pre-dev Enquiry - Fallowfield Campus
Attachments: Fallowfield - Wastewater Pre-development Enquiry.pdf; Fallowfield - Site Location Plan.pdf; Fallowfield - United Utilities Asset Records.pdf

Good afternoon,

Please find the Wastewater Pre-development Enquiry for the Fallowfield Campus redevelopment attached.

Site Address: Fallowfield Campus, Wilmslow Rd, Fallowfield, Manchester, M14 6HD (site location plan attached)
Easting, Northing: 385715, 394145

It is envisaged that the proposed development will discharge to the public sewer network adjacent to the site. Please advise on the preferred connection points for surface and foul. water

Please let me know if you have any other comments or require any additional information.

Kind regards,
Dan

Daniel Carroll
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Appendix D SuDS Maintenance Plan

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The SuDS Manual (CIRIA C753) provides advice on the maintenance requirements of each SuDS component which is summarised in the table below for the SuDS measures considered within the development.

SuDS technique	Maintenance schedule	Required action	Typical frequency
Permeable paving	Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over the 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
		Stabilise and mow contributing and adjacent areas	As required
	Occasional maintenance	Removal of weed or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required
	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
Underground Tanks/Cellular crates	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	Annually

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		necessary.	
		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
Green/Blue Roofs	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 unrestricted 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 (i.e., year one), replace dead plants as required	Monthly (but 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
Rainwater harvesting	Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps, filters	Annually (and following poor performance)
		Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
	Occasional maintenance	Cleaning and/or replacement of any filters	Three monthly (or as required)
	Remedial actions	Repair of overflow erosion damage or damage to tank	As required
		Pump repairs	As required
Bioretention systems	Regular inspections	Inspect infiltration surfaces for silting and ponding, record dewatering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is	Annually

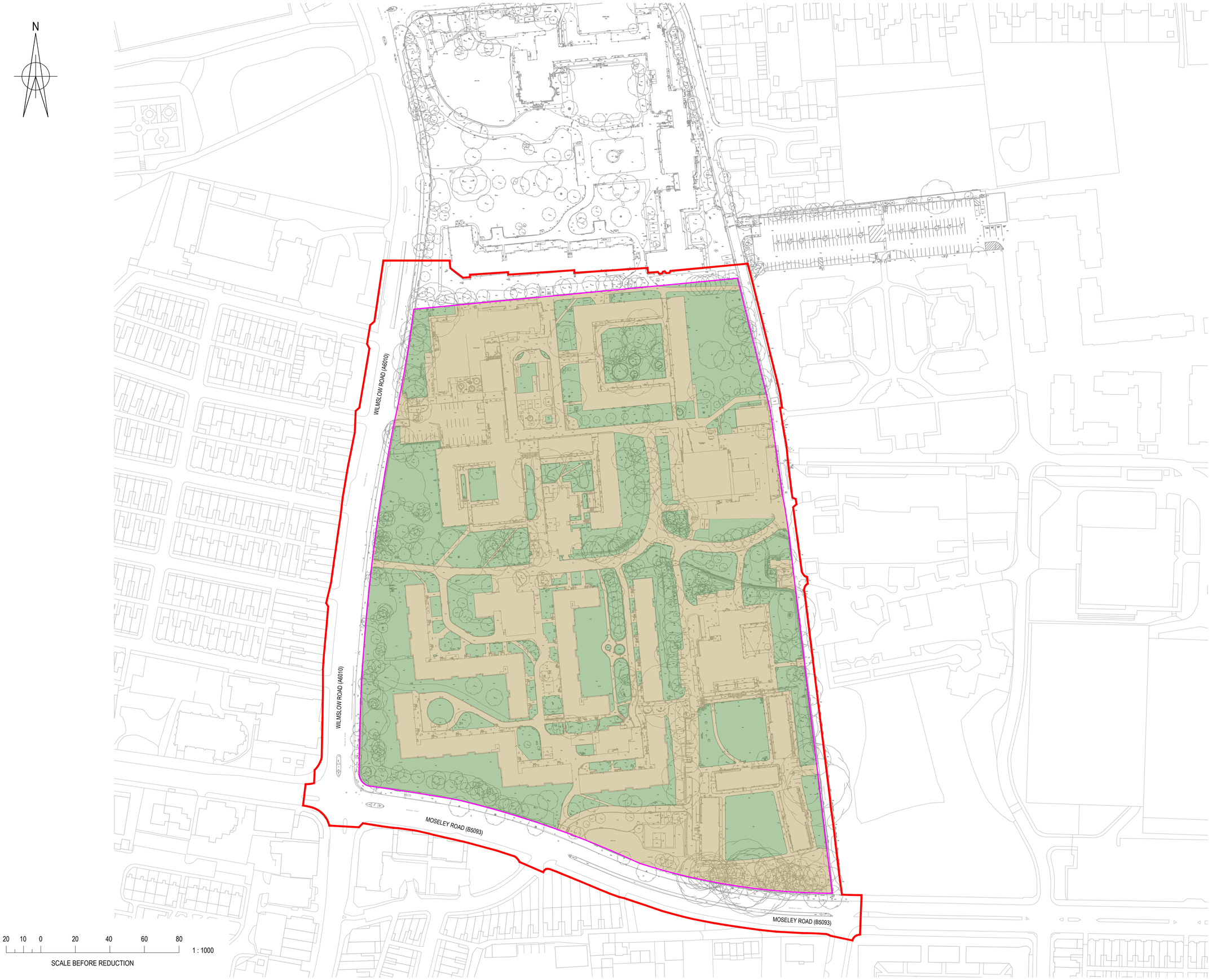
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		necessary	
		Check operation of underdrains by inspection of flows after rain	Quarterly
		Inspect inlets and outlets for blockage	Quarterly
	Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
		Replace and plants, to maintain planting density	As required
		Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
	Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
		Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
	Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be >20 years

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Appendix E Existing and Proposed Impermeable Areas

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LEGEND

- APPLICATION BOUNDARY
- DRAINAGE ASSESSMENT BOUNDARY
- EXISTING PERMEABLE AREA = 3.129 hectares
- EXISTING IMPERMEABLE AREA = 4.459 hectares

Rev	Description	Date	Iss'd	Rev'd	App'd
P01	ISSUED FOR INFORMATION	12.07.2023	WM	DC	AD

PLANNING

Project Stage

INFORMATION

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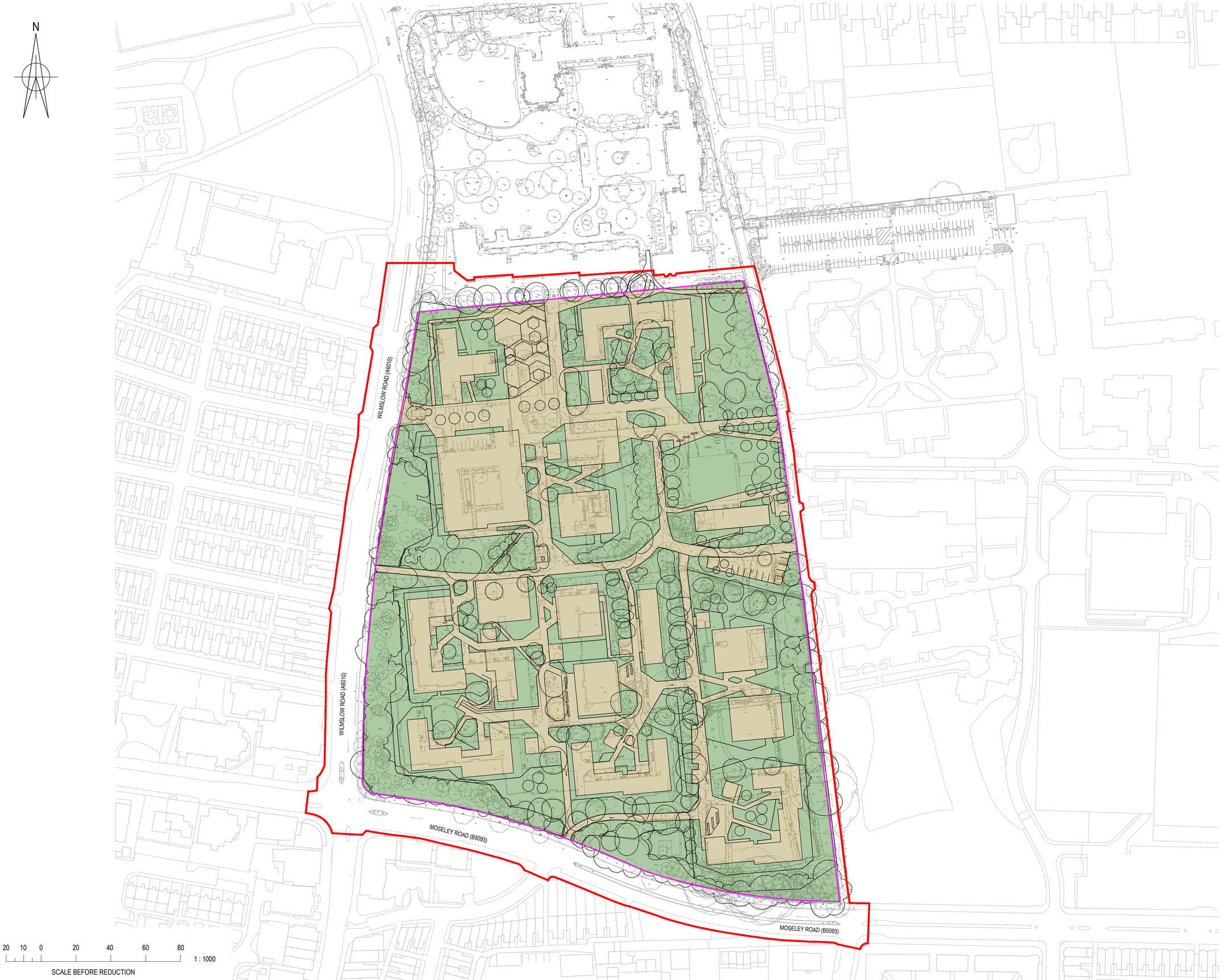
Client	*THE UNIVERSITY OF MANCHESTER*
Architect	*SHEPPARD ROBSON*
Project	**FALLOWFIELD CAMPUS**
Drg Title	EXISTING CONTRIBUTING AREA PLAN

Job No.	Scale@A1
0053454	1:1000

Drawn/Designed By.	Checked By.	Approved By.
WM	DC	AD

Drawing No.	Revision
0053454-BHE-XX-XX-SK-C-0001	P01

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LEGEND

- APPLICATION BOUNDARY
- DRAINAGE ASSESSMENT BOUNDARY
- PROPOSED PERMEABLE AREA = 4.261 hectares
- PROPOSED IMPERMEABLE AREA = 3.327 hectares

Rev	Description	Date	Iss'd	Rev'd	App'd
P01	ISSUED FOR INFORMATION	12.07.2023	WM	DC	AD

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Architect	*SHEPPARD ROBSON*
Project	**FALLOWFIELD CAMPUS**
Drg Title	PROPOSED CONTRIBUTING AREA PLAN

Job No.	Scale@A1
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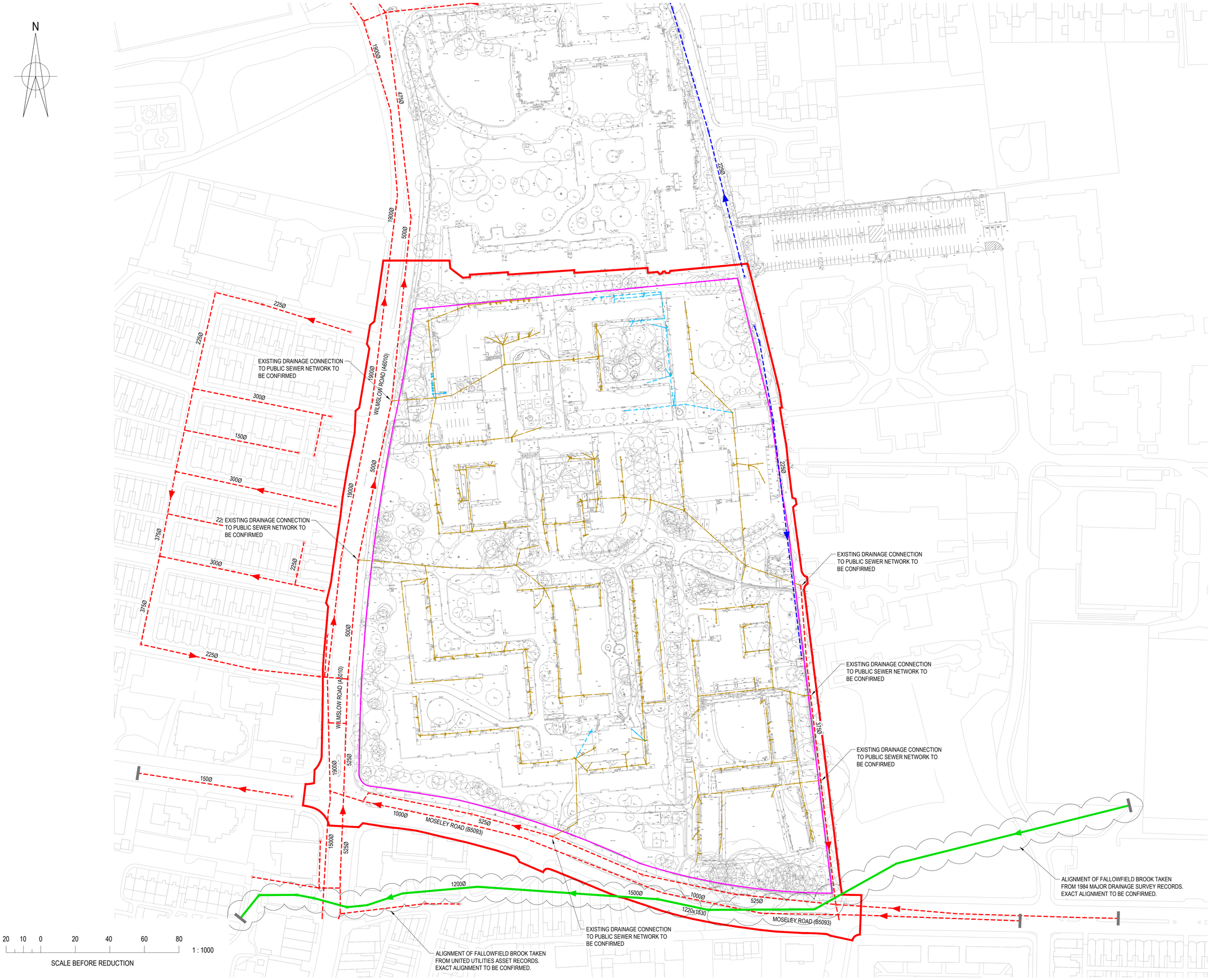
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0053454-BHE-XX-XX-SK-C-0002	P01

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Appendix F Existing Drainage

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   - UTILITY SURVEY '12650G' PRODUCED BY LOCATE SURVEYS LTD (DATED SEPTEMBER 2015)
   - UNITED UTILITIES ASSET RECORDS (DATED 25/04/2023)
   - MANCHESTER CITY COUNCIL LLFA DATA SCREENING (DATED 08/06/2023)

LEGEND

- APPLICATION BOUNDARY
- DRAINAGE ASSESSMENT BOUNDARY
- PUBLIC SURFACE WATER DRAINAGE
- PRIVATE SURFACE WATER DRAINAGE
- PUBLIC FOUL WATER DRAINAGE
- PRIVATE FOUL/COMBINED WATER DRAINAGE
- ORDINARY WATERCOURSE (FALLOWFIELD BROOK)

Rev	Description	Date	Iss'd	Rev'd	App'd
P01	ISSUED FOR INFORMATION	12.07.2023	WM	DC	AD

PLANNING

Project Stage

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Client	*THE UNIVERSITY OF MANCHESTER*
Architect	*SHEPPARD ROBSON*
Project	**FALLOWFIELD CAMPUS**
Drg Title	EXISTING DRAINAGE LAYOUT

Job No.	Scale@A1
0053454	1:1000

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Drawing No. 0053454-BHE-XX-XX-SK-C-0003

Revision P01

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Appendix G Proposed Drainage Strategy

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Daniel Carroll
Site name:	Fallowfield Campus
Site location:	Manchester

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.44335° N
Longitude:	2.2168° W
Reference:	1462233018
Date:	Jul 09 2023 18:52

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 7.588

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.312
Q_{MED} (l/s):	
Q_{BAR} / Q_{MED} factor:	1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	866	860
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

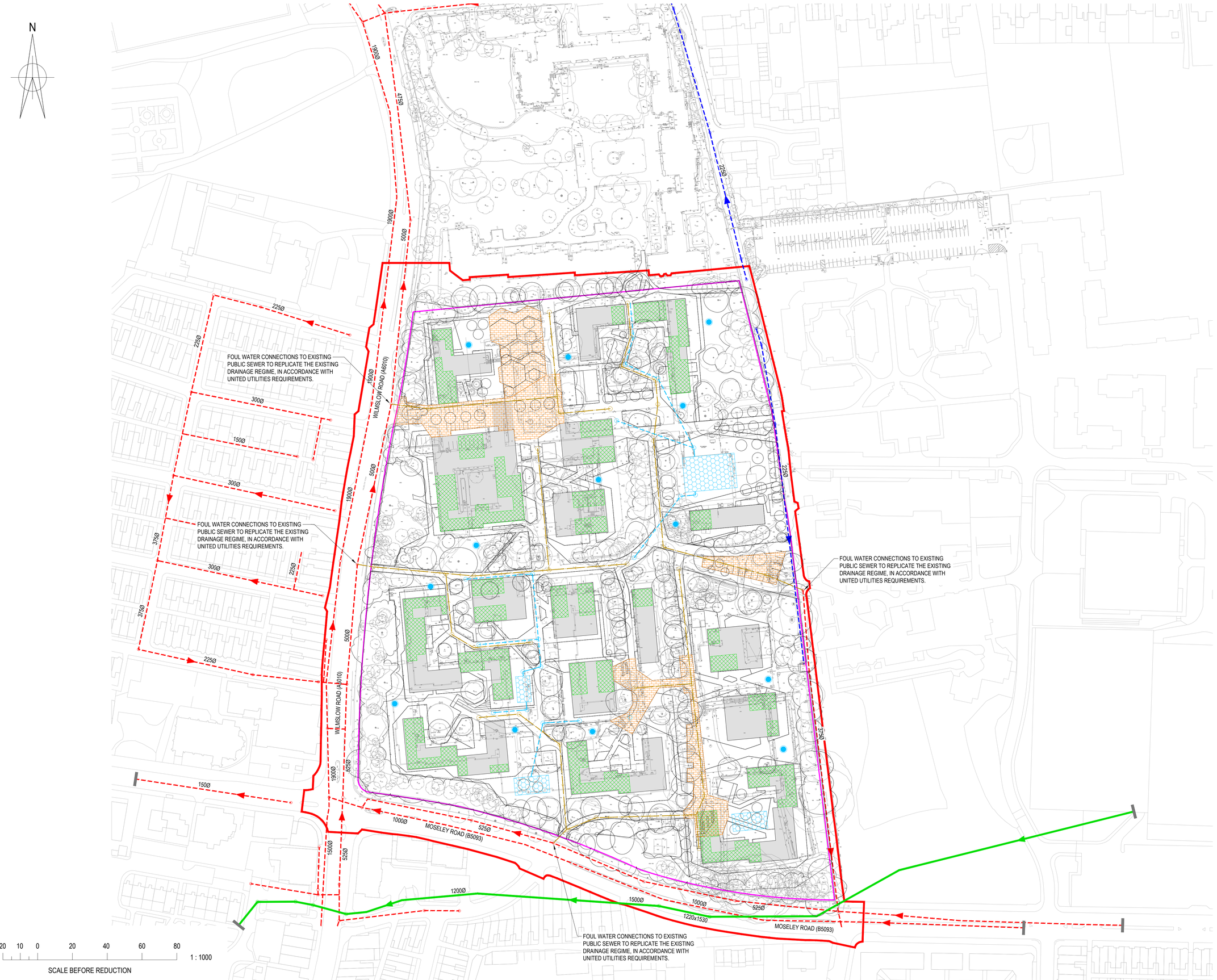
(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):		63.03
1 in 1 year (l/s):		54.84
1 in 30 years (l/s):		107.15
1 in 100 year (l/s):		131.11
1 in 200 years (l/s):		149.39

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



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LEGEND

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- DRAINAGE ASSESSMENT BOUNDARY
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL WATER SEWER
- EXISTING ORDINARY WATERCOURSE
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED PRIVATE FOUL WATER DRAINAGE
- PROPOSED GREEN ROOF
- PROPOSED BELOW GROUND ATTENUATION AND SOAKAWAY STRUCTURE
- PROPOSED PERMEABLE PAVING
- PROPOSED SOAKAWAY CHAMBER
- PROPOSED BUILDINGS

Rev	Description	Date	Iss'd	Rev'd	App'd
P01	ISSUED FOR INFORMATION	29.08.2023	WM	DC	AD

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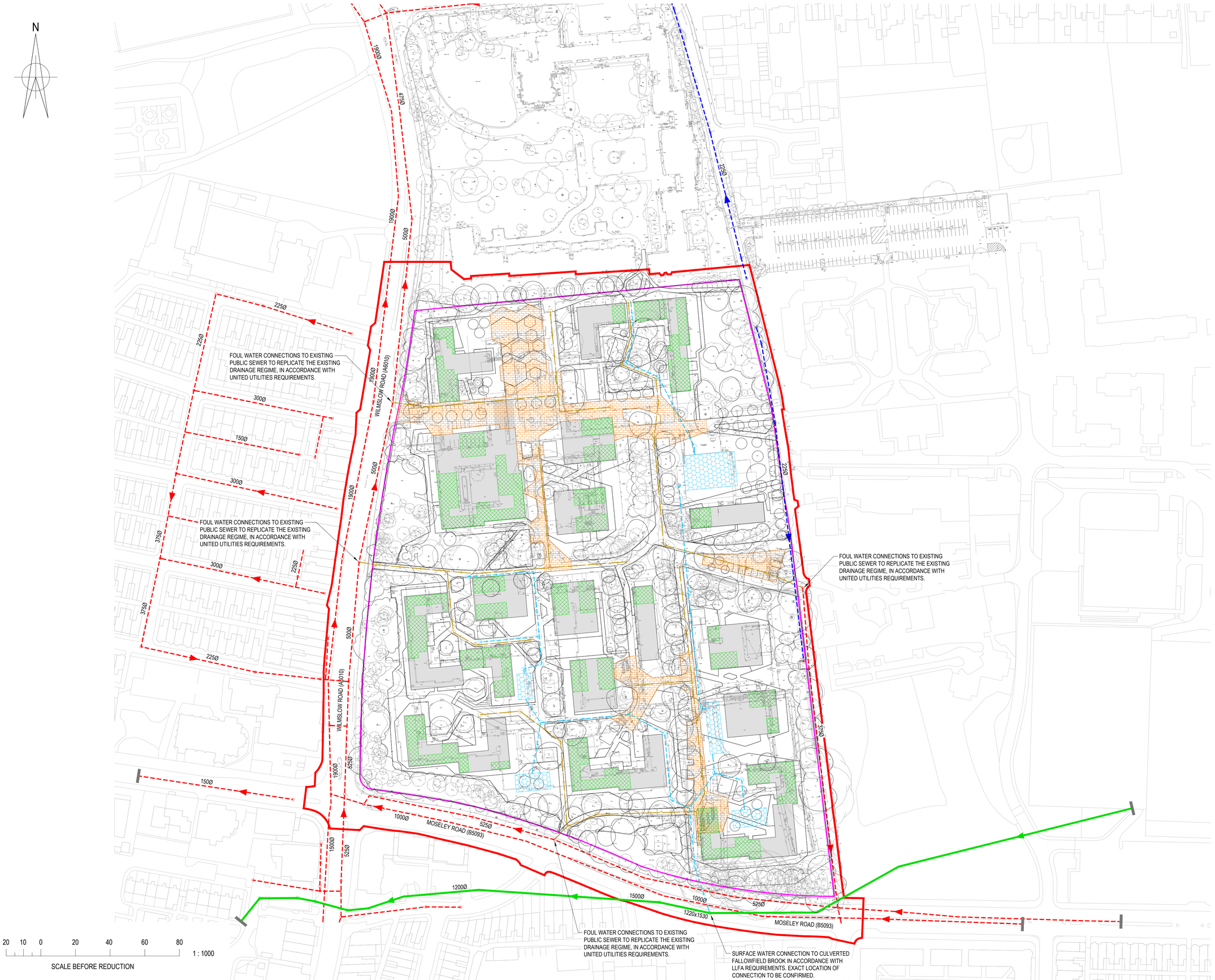
Client	*THE UNIVERSITY OF MANCHESTER*
Architect	*SHEPPARD ROBSON*
Project	**FALLOWFIELD CAMPUS**
Drg Title	PROPOSED DRAINAGE STRATEGY OPTION 1 DISCHARGE TO SOAKAWAY

Job No.	Scale@A1
0053455	1:1000

Drawn/Designed By.	Checked By.	Approved By.
WM	DC	AD

Drawing No.	Revision
0053454-BHE-XX-XX-SK-C-0004	P01

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- PROPOSED PRIVATE FOUL WATER DRAINAGE
- PROPOSED GREEN ROOF
- PROPOSED BELOW GROUND ATTENUATION TANK
- PROPOSED PERMEABLE PAVING
- PROPOSED BUILDINGS

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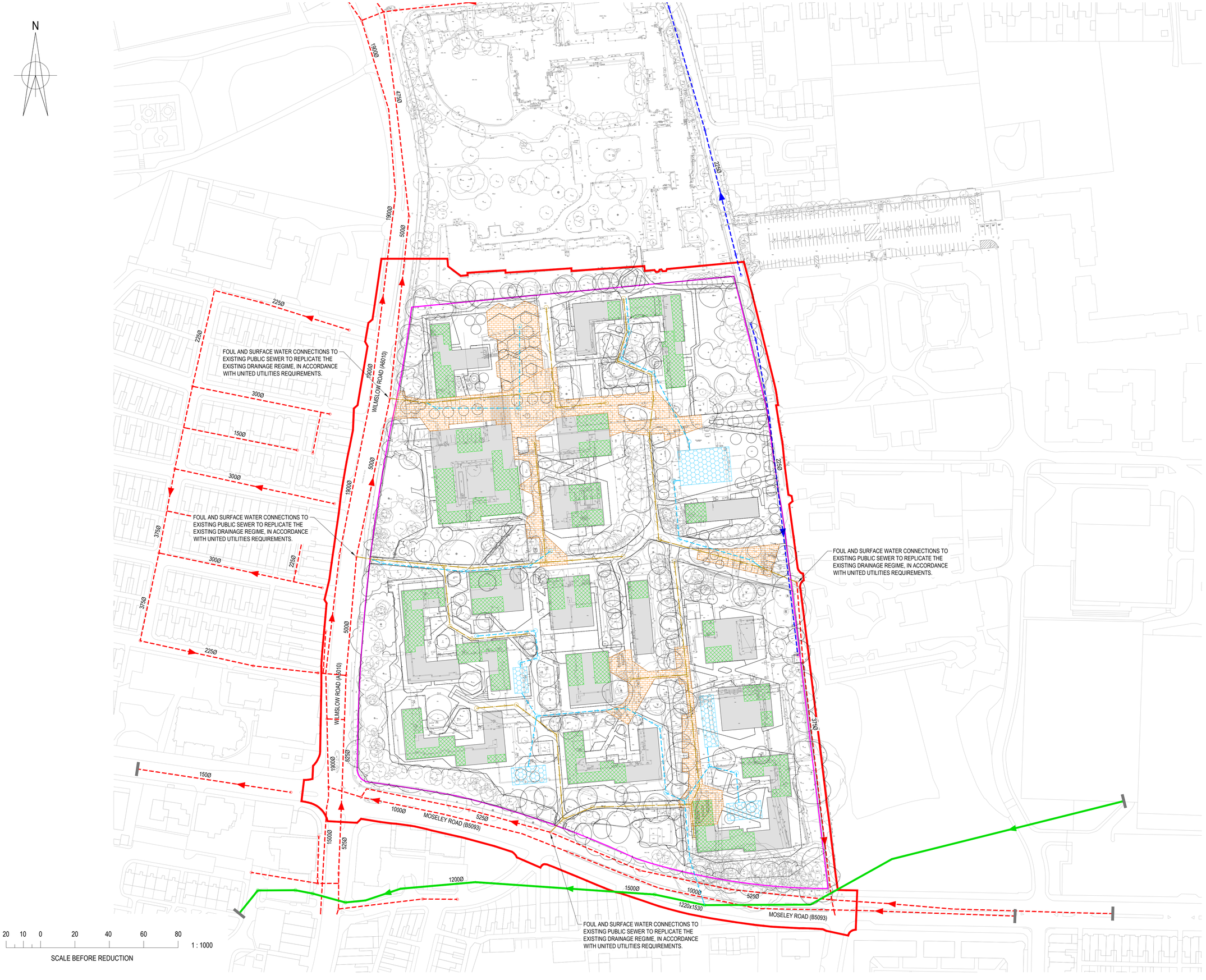
Client	*THE UNIVERSITY OF MANCHESTER*
Architect	*SHEPPARD ROBSON*
Project	**FALLOWFIELD CAMPUS**
Drg Title	PROPOSED DRAINAGE STRATEGY OPTION 2 DISCHARGE TO WATERCOURSE

Job No.	Scale@A1
0053456	1:1000

Drawn/Designed By.	Checked By.	Approved By.
WM	DC	AD

Drawing No.	Revision
0053454-BHE-XX-XX-SK-C-0005	P01

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DO NOT SCALE THIS DRAWING.

HEALTH AND SAFETY INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING

CONSTRUCTION.

MAINTENANCE/CLEANING/OPERATION.

DECOMMISSIONING/DEMOLITION.

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METERS ABOVE ORDINANCE DATUM UNLESS OTHERWISE STATED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS, DETAILS AND SPECIFICATIONS.
4. THIS DRAWING IS BASED ON:
   - LANDSCAPE LAYOUT DRAWING '526F-LP-GF-PLAN' PRODUCED BY LANDSCAPE PROJECTS (DATED 23/06/2023)
   - TOPOGRAPHICAL SURVEY '59252' PRODUCED BY MALCOLM HUGHES (DATED 01/12/2022)
   - UTILITY SURVEY '12650G' PRODUCED BY LOCATE SURVEYS LTD (DATED SEPTEMBER 2015)
   - UNITED UTILITIES ASSET RECORDS (DATED 25/04/2023)
   - MANCHESTER CITY COUNCIL LLFA DATA SCREENING (DATED 08/06/2023)
5. THE DESIGN INFORMATION PRESENTED ON THIS DRAWING IS INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN

LEGEND

- APPLICATION BOUNDARY
- DRAINAGE ASSESSMENT BOUNDARY
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL WATER SEWER
- EXISTING ORDINARY WATERCOURSE
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED PRIVATE FOUL WATER DRAINAGE
- PROPOSED GREEN ROOF
- PROPOSED BELOW GROUND ATTENUATION TANK
- PROPOSED PERMEABLE PAVING
- PROPOSED BUILDINGS

Rev	Description	Date	Iss'd	Rev'd	App'd
P01	ISSUED FOR INFORMATION	29.08.2023	WM	DC	AD

PLANNING

Project Stage

INFORMATION

Status of Drawing

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Client	*THE UNIVERSITY OF MANCHESTER*
Architect	*SHEPPARD ROBSON*
Project	**FALLOWFIELD CAMPUS**
Drg Title	PROPOSED DRAINAGE STRATEGY OPTION 3 DISCHARGE TO PUBLIC SEWER

Job No.	Scale@A1
0053457	1:1000

Drawn/Designed By.	Checked By.	Approved By.
WM	DC	AD

Drawing No.	Revision
0053454-BHE-XX-XX-SK-C-0006	P01

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