



The Relocation of The Limes,
Fallowfield Campus
Flood Risk Assessment
University of Manchester

Date 24 October 2024

Doc ref LIMES-HYD-XX-XX-RP-WENV-0001

Document control sheet

Issued by	Hydrock Consultants Limited Second Floor 172 Edmund Street Birmingham B3 2HB United Kingdom T +44 (0)121 7525197 E birmingham@hydrock.com hydrock.com	Client	University of Manchester
		Project name	The Relocation of The Limes, Fallowfield Campus
		Title	Flood Risk Assessment
		Doc ref	LIMES-HYD-XX-XX-RP-WENV-0001
		Project number	LIMES
		Status	S2
		Date	24/10/2024

Document production record		
Issue number	P01	Name
Prepared by	Bethan Williams BSc (Hons)	
Checked by	Isobel Randall BSc (Hons)	
Approved by	Connor Henderson BEng (Hons)	

Document revision record			
Issue number	Status	Date	Revision details
P01	S2	24/10/2024	First Issue - for comment

Hydrock Consultants Limited has prepared this report in accordance with the instructions of the above named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

Contents

1. Introduction 1

2. Existing Site Conditions 1

2.1 Site location 1

2.2 Topography..... 1

2.3 Hydrology.....2

2.4 Geology and Hydrogeology 2

3. Proposed Development 3

4. Planning Policy 3

4.1 National Planning Policy Framework (Updated December 2023).....3

4.2 Planning Practice Guidance (Updated February 2024) 4

4.3 Greater Manchester Strategic Flood Risk Assessment (SFRA) (March 2019).....4

4.4 Greater Manchester Surface Water Management Plan (2012).....4

5. Sources of Flood Risk 5

5.1 Tidal and Fluvial Flooding 5

5.2 Surface Water Flooding 5

5.3 Groundwater Flooding 6

5.4 Sewer Flooding 6

5.5 Artificial Sources Flood Risk 6

5.6 Summary..... 6

6. Sequential and Exception Tests 7

6.1 The Sequential Test.....7

6.2 The Exception Test.....7

7. Conclusions..... 7

Tables

Table 1: Site Referencing Information.....1

Table 2: NPPG Flood Risk Vulnerability and Flood Zone Incompatibility matrix.....3

Figures

Figure 1: Site Location.....1

Figure 2: Site Topography 2

Figure 3: EA's Flood Map for Planning 5

Figure 4: EA's Surface Water Mapping Extents.....5

Appendices

Appendix A Topographic Survey

Appendix B Proposed Site Layout

Appendix C SFRA Opportunity Area for Further Critical Drainage Management Map

Appendix D The Greater Manchester's Combined Sewer Overflow (CSO) Map

Appendix E EA Reservoir Failure Extent Map

1. Introduction

Hydrock Consultants Limited (Hydrock), now Stantec have been commissioned by University of Manchester to undertake a Flood Risk Assessment (FRA), to be submitted with a detailed planning application for the 'The Limes Relocation' site.

This report has been completed in accordance with the National Planning Policy Framework (NPPF), updated November 2023 and its accompanying Planning Practice Guidance (PPG), updated February 2024. This report is an assessment of flood risk to the development, from on and off-site sources, and to off-site receptors arising from development at the site.

The report has been prepared to consider the requirements of the NPPF through:

- » Assessing whether the proposed development is likely to be affected by flooding;
- » Assessing whether the proposed development is appropriate in the suggested locations; and
- » Detailing measures necessary to mitigate any flood risk identified, to ensure that the proposed development and occupants would be safe, and that flood risk would not be increased.

2. Existing Site Conditions

2.1 Site location

The application boundary comprises an existing hard-ground landscaped area currently used as a car park, and is situated within the Fallowfield Campus of the University of Manchester.

The site address and Ordnance Survey Grid Reference is provided in **Table 1**, with a site location plan provided in **Figure 1**.

Table 1: Site Referencing Information

Site Referencing Information	
Site Address	University of Manchester, Fallowfield Campus, M14 6HE
Grid Reference	SJ 85916 94333
	385916, 394333



Figure 1: Site Location

2.2 Topography

A topographic survey was prepared for the site in 2022. The site is shown to be relatively flat at 45.4m AOD, sloping gently in a northern direction to 44.54m AOD. The topographic Survey is available as **Appendix A**. A Topographic map has been derived from a 1 metre (m) resolution EA composite Light Detecting and Ranging (LiDAR) DTM and is shown in **Figure 2** for representation.

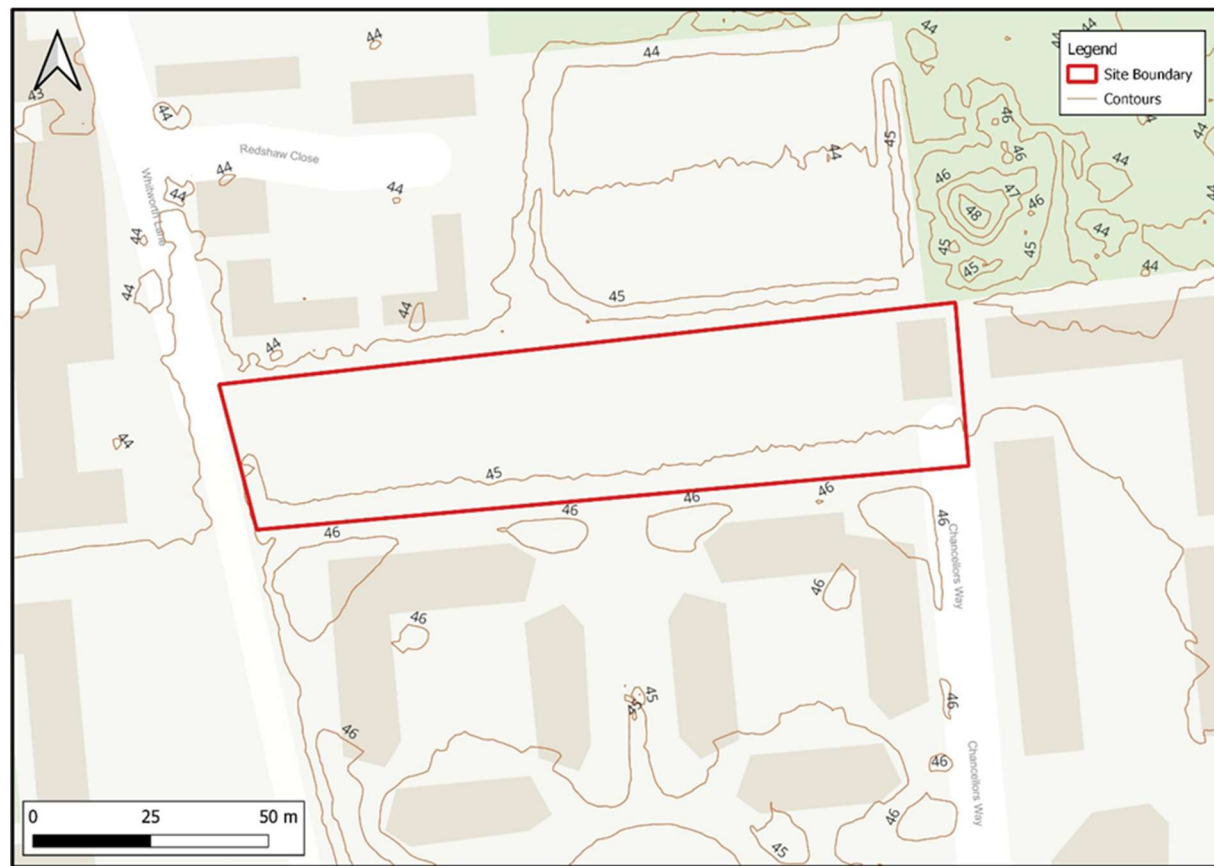


Figure 2: Site Topography

2.3 Hydrology

The closest watercourse to the proposed site is the Gore Brook, a main river under EA jurisdiction, flowing in a westerly direction approximately 400m north of the site. There are no other watercourses in the vicinity of the site.

2.4 Geology and Hydrogeology

According to British Geological Survey (BGS)¹ geology mapping (accessed April 2024) the site is underlain by superficial geology comprising Devensian Till. The superficial deposits are wholly underlain by bedrock geology described as Chester Formation (Sandstone).

According to Soilscape² mapping, the site is located within 'slowly permeable seasonally wet acid loamy and clayey soils', which has impeded drainage. The site is also located within a Critical Drainage Area (CDA) according to the Environment Agency (EA).

According to the Department for Environment, Food and Rural Affairs (Defra) MAGIC mapping³, the underlying bedrock geology at the site is identified as a Principal Aquifer. Principal aquifers are defined as having the capability to support water supplies at a local rather than strategic scale, in some cases forming an important source of base flow to rivers. The superficial geology on site is identified as a Secondary Aquifer (undifferentiated). Secondary undifferentiated aquifers are defined as aquifers where it is not possible to apply either Secondary A or B definition due to the variable characterise of the rock type.

¹ BGS Geology Viewer (BETA)

² LandIS - Land Information System - Soilscape soil types viewer

³ MAGIC (defra.gov.uk)

3. Proposed Development

The Proposed Development will combine the University's Catering Central Processing Unit (CPU), Maintenance Services Unit (MSU), Environmental Services Unit (ESU) and Residences Team to form a facility consisting of facility management stores and workshops, catering facilities, staff workspaces and storage facilities.

The site is divided into two main sections: the western part is designated for parking, while the eastern section houses the building, which is split into the main building and the external stores.

The proposed site layout is presented in **Appendix B**.

The site vulnerability classification of 'less vulnerable' in accordance with Table 2: Flood Risk Vulnerability Classification of the PPG remains as existing. As the proposed development is located in Flood Zone 1, the development is shown to be appropriate in accordance with Table 2: Flood risk vulnerability and flood zone 'incompatibility' of the PPG.

Table 2: NPPG Flood Risk Vulnerability and Flood Zone Incompatibility matrix

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	X	X	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	X	X	✓	✓

4. Planning Policy

4.1 National Planning Policy Framework (Updated December 2023)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies, and how these policies should be applied. Planning Practice Guidance (PPG) is available online and provides additional guidance to the NPPF, as well as providing links to relevant detailed documents. Section 4.2 provides further detail on the PPG.

Paragraph 159 of the NPPF states "inappropriate development in areas at risk of flooding should be avoided by directing development away from areas of highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."

Paragraph 161 of the NPPF states "All plans should apply a sequential, risk-based approach to the location of development - taking into account all sources of flood risk and the current and future impacts of climate change - so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk by:

- » Applying the sequential test and then, if necessary, the exception test as set out below;
- » Safeguarding land from development that is required, or likely to be required, for current or future flood management;
- » Using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and
- » where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more suitable locations.

Paragraph 167 of the NPPF states "when determining planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- » Within the site, the most vulnerable development is located in areas of lowest flood risk unless there are overriding reasons to prefer a different location;
- » The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
- » It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- » Any residual risk can be safely managed; and
- » Safe access and egress routes are included where appropriate, as part of an agreed emergency plan.

In accordance with the NPPF, a site-specific FRA is required for sites within the following categories:

- » In Flood Zone 1, all proposals involving:
 - » Sites of 1 hectare or more.
 - » Land which has been identified by the EA as having critical drainage problems.
 - » Land identified in a strategic flood risk assessment (SFRA) as being at increased flood risk in the future.

- » Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- » All proposals for development in Flood Zone 2 and 3.

4.2 Planning Practice Guidance (Updated February 2024)

The PPG provides additional direction to the NPPF, with details provided in each section of the document on how to conform to the NPPF.

All land in England is classified as falling into one of three main flood zones, with the zones referring to the probability of river or sea flooding, ignoring the existence of defences. The PPG identifies and describes the EA flood zones as:

- » Flood Zone 1 (Low Risk) comprises land assessed as having a $\leq 0.1\%$ AEP of fluvial flooding in any given year, equivalent to the 1 in 1,000-year return period flood event.
- » Flood Zone 2 (Moderate Risk) comprises land assessed as having a 0.1-1% AEP of fluvial flooding in any given year, equivalent to the 1 in 1,000- 1 in 100-year return period flood event.
- » Flood Zone 3 (High Risk) comprises land assessed as having a $\geq 1\%$ AEP of fluvial flooding in any given year, equivalent to the ≤ 1 in 100-year return period flood event.
 - » Flood Zone 3 a (High Risk) comprises land assessed as having a 1-3.33% AEP of fluvial flooding in any given year, equivalent to the 1 in 100 - 1 in 30-year return period flood event.
 - » Flood Zone 3 b (Functional Floodplain) comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the EA. Flood zone 3b is defined as land that has a 3.33% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or land that is designed to flood (such as a flood attenuation scheme, even if it would only flood in more extreme events).

4.3 Greater Manchester Strategic Flood Risk Assessment (SFRA)⁴ (March 2019)

The Greater Manchester Level 1 Strategic Flood Risk Assessment (SFRA) identifies areas at risk of flooding from all sources including the likely impact of climate change and the preparation of appropriate policies for the management of flood risk.

The SFRA provides an overview of the planning context in the county and presents available data on flood risk across Greater Manchester from each of the sources of flooding outlined in the NPPF.

It is identified within the SFRA that the site was previously located within a Critical Drainage Area (CDA) and within the SFRA therefore referred to as an 'Opportunity Area for Further Critical Drainage Management' (OAFCDM) a map of these areas is included within **Appendix C**.

This map was constructed based on:

- » Historic surface water and sewer flooding records held by the local authorities and United Utilities;
- » The surface water flooding hotspots dataset, developed through the Greater Manchester Surface Water Management Plan; and
- » United Utilities Drainage Area Zones dataset, which shows the areas of Greater Manchester that drain to specific Wastewater Treatment Works.

4.4 Greater Manchester Surface Water Management Plan (2012)

The Greater Manchester Surface Water Management Plan⁵ was produced in 2012 to identify and comment on a strategic assessment of surface water flood risk across Greater Manchester. This identified 'hotspots' within the region at a significant surface water flood risk.

The Surface Water Management Plan allowed the preparation of an Action Plan to identify actions to be integrated through Local Flood Risk Management Strategies into frameworks which would be managed by Lead Local Flood Authorities (LLFA).

⁴ JBA Consulting Report Template 2015 (greatermanchester-ca.gov.uk)

⁵ Greater-Manchester-Surface-Water-Management-Plan-Stage-1-Report (bury.gov.uk)

5. Sources of Flood Risk

The NPPF requires flood risk from the following sources to be assessed:

- » Tidal and fluvial sources (sea and river flooding);
- » Pluvial sources (flooding resulting from overland flows);
- » Groundwater sources; and
- » Artificial sources, canals, reservoirs etc.

Each of these sources are addressed within this section of the report.

5.1 Tidal and Fluvial Flooding

According to the current Environment Agency (EA) Flood Map for Planning (**Figure 3**), the site and its immediate surrounding land are wholly located within Flood Zone 1 (Low Probability). The nearest area at Medium to High Risk of fluvial flooding is located 400m to the north of the site in association with the Gore Brook.

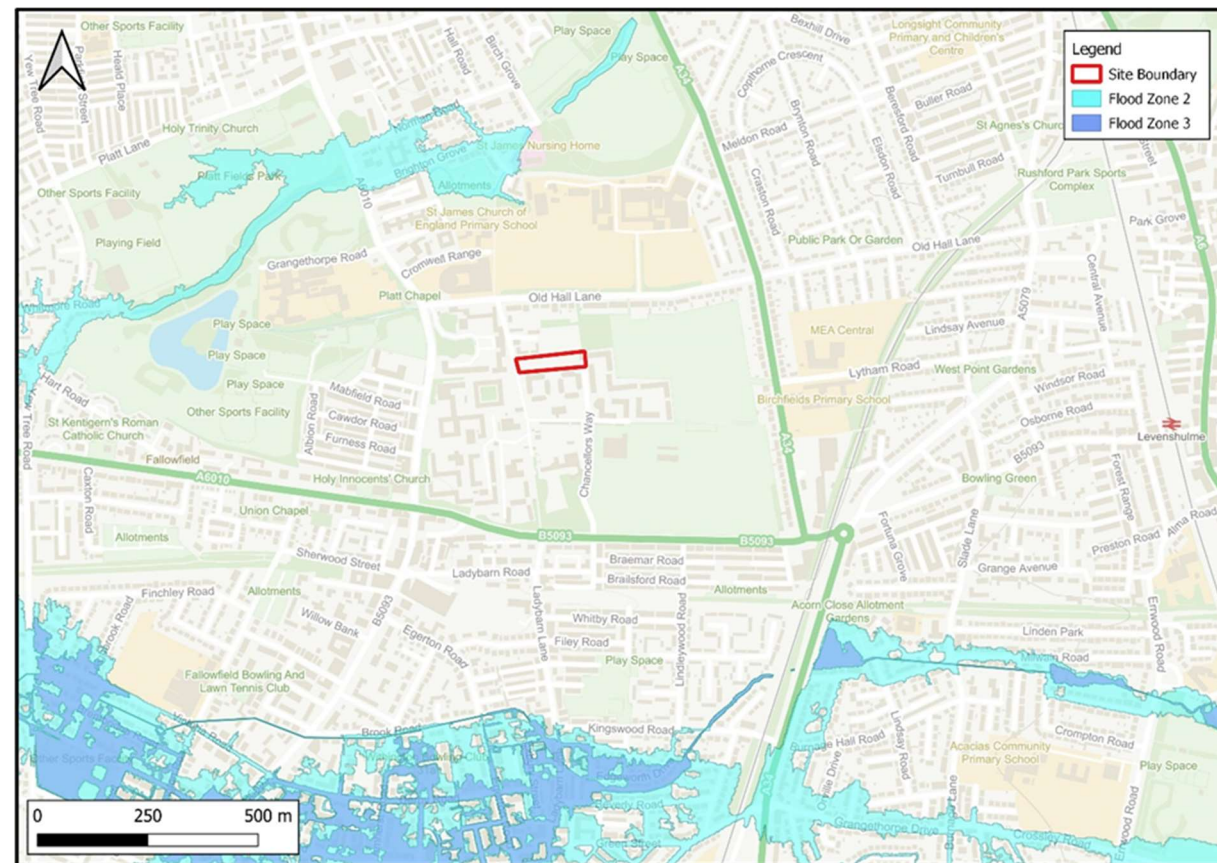


Figure 3: EA's Flood Map for Planning

According to the 'Recorded Flood Outlines' dataset provided by the EA, the site is shown to be outside the extents of historical flood events.

It is not expected that any increase in flood risk associated with climate change would be likely to be of a magnitude which would result in a significant increase in the risk to the site given the distance from the site to the nearest watercourse, and the difference in elevation between the watercourse and the site boundaries.

Therefore, the site is not considered to be at risk of flooding from fluvial or tidal sources.

5.2 Surface Water Flooding

Surface water (pluvial) flooding is caused by rainfall levels exceeding the natural infiltration properties of the surrounding soils. Flooding can occur where there is a lack of a formalised drainage system, or as a result of a poorly designed or maintained sewer system. Flooding can also occur owing to the absence of a natural method of drainage such as watercourses or ditches, or where soil infiltration rates are low. Flooding often results in ponding of water at topographic low points or when surface water flow routes are blocked by an obstruction.

In urban areas, such as Manchester City Centre, surface water flooding usually occurs quite rapidly when heavy rainfall overwhelms the capacity of the drainage network. This water then collects at topographic low points on the surface or infiltrates through permeable soils.

According to the EA Long Term Flood Risk Map (Surface Water) in Figure 4, the site is at 'Very Low' risk of surface water flooding (<0.1% annual probability).

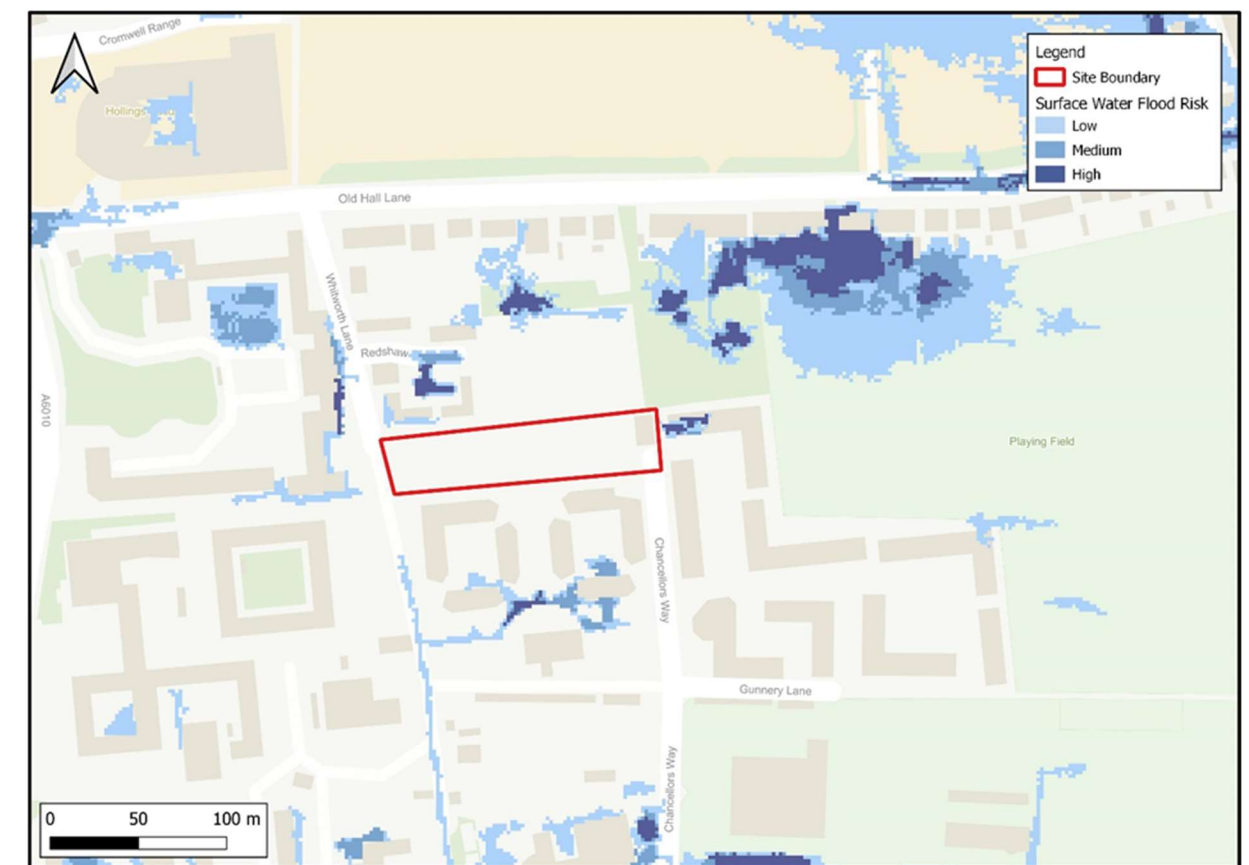


Figure 4: EA's Surface Water Mapping Extents

As per the Greater Manchester Surface Water Management Plan, the site is located within a CDA, this is identified as an area sensitive to surface water runoff. It is identified within the SFRA that the site was previously located within a CDA and within the SFRA is therefore referred to as an OAFCDM. A map of these areas is included within Appendix C. The Greater Manchester Surface Water Management Plan contains recommendations for the management of surface water through the development planning system and the policy approach for local plans, however, as noted above, the site is shown to be at 'very low' risk of surface water flooding.

Whilst the potential effects of climate change could increase the frequency, depth and extent of on-site surface water flooding, any increase in flood risk is considered unlikely to be of a magnitude which would

result in a significant increase in the risk of on-site surface water flooding, as any surface water run-off will likely to continue to be directed overland as shallow 'sheet-flow' within localised lower-lying portions of the site.

As such, the site is considered to be at 'low' risk of flooding from surface water.

5.3 Groundwater Flooding

Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A groundwater flood event results from a rise in groundwater level sufficient for the water table to intersect the ground surface and inundate low lying land. Periods of prolonged rainfall may also be a cause of groundwater flooding, with aquifers and soils becoming saturated.

As identified within **Section 2.4** the geology of the site indicates a generally low permeability with impeded drainage. The site and the surrounding area are currently developed, with impermeable surface covering the majority of the area. As such, the risk of groundwater flooding is likely to be limited as the impermeable surface will act as an aquitard, restricting groundwater emergence. Furthermore, given the elevated position of the site, groundwater would be likely to emerge at lower elevations to the north of the site in the event of high groundwater levels.

There is no information contained within the SFRA to indicate that the site is at any adverse risk to groundwater flooding.

Therefore, the site is considered to be at low risk of flooding from groundwater.

5.4 Sewer Flooding

Sewer flooding can occur owing to the failure of existing foul or surface water drainage infrastructure. If flows within the drainage system exceed the designed capacity or foreign matter causes blockages, overflow to the surface can occur, leading to flooding.

According to the SFRA, United Utilities is responsible for the management of the adopted sewerage system, this is inclusive of both surface water and foul sewerage. The Greater Manchester's Combined Sewer Overflow (CSO) map (**Appendix D**) indicates that the site is within an area least sensitive to future catchments pressures.

According to the current uses of the surrounding site, it is assumed that there is an existing private foul system serving the site. The site is believed to be outside of the immediate extents of this risk due to the sloping topography away from the site, sewer surcharge is likely to follow this land and be retained within the roads.

Therefore, the site is considered to be at low risk of flooding from this source.

5.5 Artificial Sources Flood Risk

There are no recorded canals in close proximity to this site. Due to this, it is unlikely that any infrastructure failure related to canals would result in a flood event affecting the site.

The EA Reservoir Failure Extent mapping (**Appendix E**) shows the site to lie outside of the extents of potential reservoir flooding. In addition, the EA state that reservoir flooding is extremely unlikely to happen. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the EA ensure that reservoirs are inspected regularly, and essential safety work is carried out.

Therefore, risk to the site from artificial sources of flood risk is considered to be low.

5.6 Summary

Based on the above information, the site is considered to be at low risk of flooding from fluvial, tidal, surface water, groundwater, sewer and artificial sources. However, the site is identified to be within a CDA and so monitoring of the site's classification and flood risk should be on-going.

While the site is concluded to be at low risk of flooding, it is recommended that, where possible, the ground floor thresholds are set above the adjacent ground levels by a minimum of 150mm as per building standards. It is also recommended to design land to slope away from buildings, and to ensure, where applicable, overland surface water flow routes are directed away from and around buildings and entrances in order to manage any residual risks.

As there are no surface water or fluvial flow routes on site, it can be concluded that there are no direct impacts of proposals to the surrounding land.

Access and egress to the site will be provided by Whitworth Lane to the west and Chancellors Way to the south east. Both of these access routes are indicated to be at 'low' or negligible risk of flooding from all assessed sources and therefore safe access and egress is concluded to be achievable.

6. Sequential and Exception Tests

6.1 The Sequential Test

The NPPF requires that a sequential, risk-based approach is followed to steer new developments to areas with the lowest probability of flooding (i.e. Flood Zone 1, then 2, then 3). As the site is entirely in Flood Zone 1 and is at low risk of flooding from other sources, a Sequential Test will not be required for this site.

6.2 The Exception Test

The Exception Test is used where no suitable development areas can be found in low-risk areas, the risk of flooding is clearly outweighed by other sustainability factors, and the development will be safe for its lifetime, taking climate change into account. Paragraph 102 of the NPPF states that for the Exception Test to be passed:

- » It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh the flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and
- » A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Again, as the site is in Flood Zone 1 and at low risk of flooding from other sources, an Exception Test is not required for the site.

7. Conclusions

Hydrock, now Stantec have been commissioned by University of Manchester to undertake a FRA, to be submitted with a detailed planning application for the 'The Limes Relocation' site.

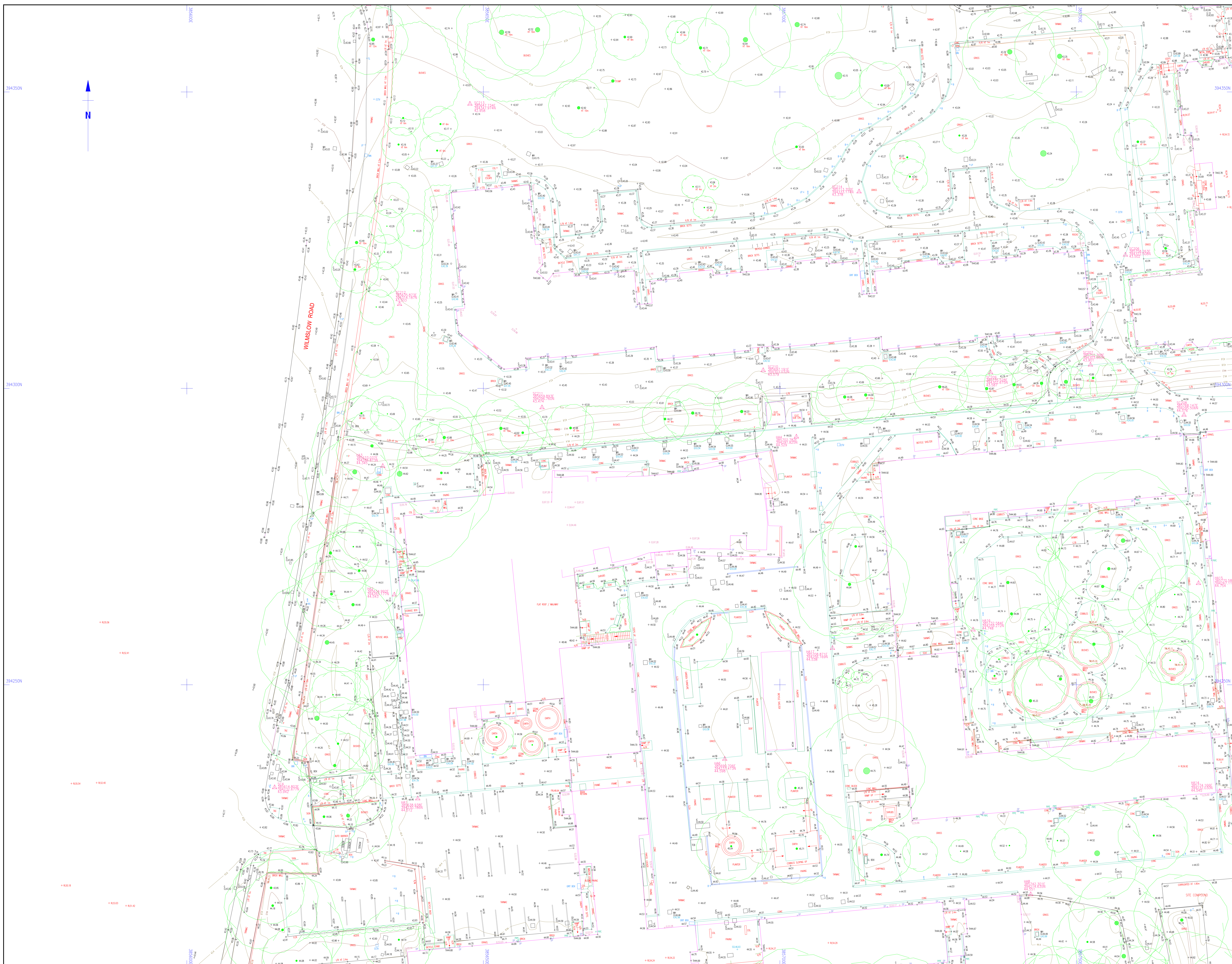
The site lies entirely within Flood Zone 1, and is therefore classified as having a low risk of flooding from tidal and/or fluvial sources. The site is considered to be at low risk of flooding from surface water and all other assessed sources.

This report therefore demonstrates that, in respect to flood risk, the proposed development:

- » Is suitable in the location proposed;
- » Will be adequately flood resistant and resilient;
- » Will not place additional persons at risk of flooding;
- » Will not increase flood risk elsewhere as a result of the proposed development through the loss of floodplain storage or impedance of flood flows; and
- » Will put in place measures to ensure surface water is appropriately managed.

This report concludes that in flood risk context, the proposals are safe and appropriate and do not increase flood risk.

Appendix A Topographic Survey



Survey Notes
Grid: Local Plane Metric related to National Grid at survey control SC1
Levels: OS Datum from GNSS positioning converted using the National Geoids Model OSGM15

Notes

[illegible][illegible]

**MALCOLM
HUGHES**

**CHARTERED
LAND SURVEYORS**

65 Cross Street, Sale, Manchester
M33 7HF. Tel: 0161 905 1205
www.malcolmhughes.co.uk
survey@mh.co.uk

Accreditations








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

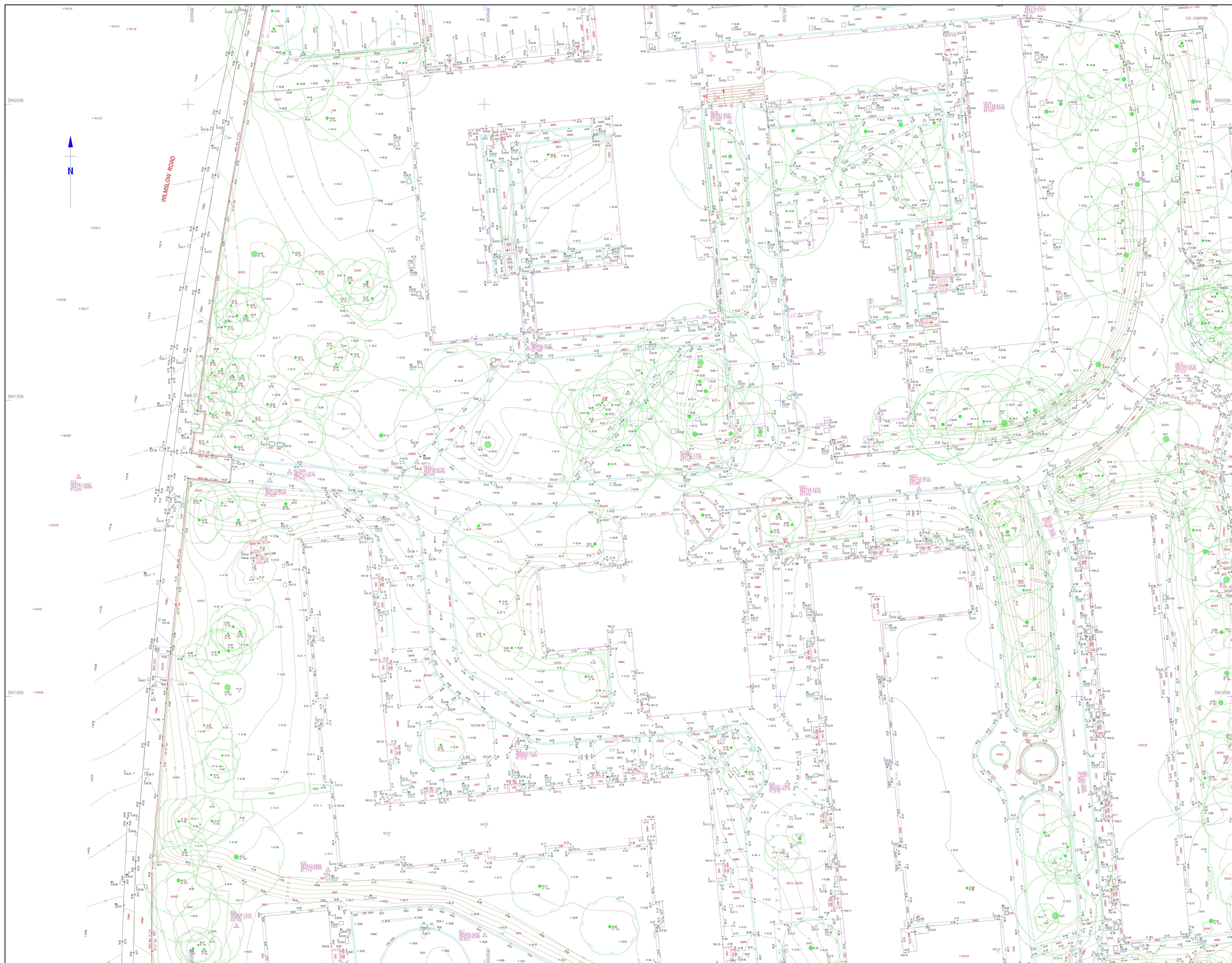
Project

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 59252/2	
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 Geoids Model OSGM15

Notes

Topographical Survey Legend

BUILDINGS AND WALLS		GENERAL INFORMATION	
Building		Water Pump	W/P
Rain Gutter Sided		Rooster Light	R/L
Rails		Fridge	F/R
Passage		Dish Type Channel	$\pm \frac{D}{2} \pm D$
		Sink Type Channel	$\pm \frac{D}{2} \pm D$
Roll sets length	<u>Sheet 161.7m</u>	Coke Type Channel	$\pm \frac{D}{2} \pm D$
Matching Roll	<u>0.7m</u>	Traction Paving	NAC
		Gravel	G/R
		Concrete	C/O
		Brick	B/R
		Iron Sheet	I/S
		Plastic Pipe	P/C
		Aluminum	A/R
		Trough	T/R
		Clay Pipe	C/P
		Telephone Cord Box	T/CB

FENCE TYPES AND DESCRIPTIONS	
Cross Boarded	C/B
Corrugated Iron	C/I
Decorative Fencing	D/F
Chainlink	C/L
Wrought	W/R
Interwoven	I/W

Light Fixtures	Q/R	OVERHEAD FEATURES
Lattice	L/T	
Miscellaneous	Misc	

Pulstide	PM		
Post & Chain	P/C	Electricity Pylon	
Post & Rail	P/R		
Post & Wire	P/W	Electricity	
Post & Barbed Wire	P/W	Telephone	
Wire mesh	W/M		

Shade		
Gate		
Fence, freestyle		
		WATER FEATURES

ROADS		Contd.
Kerbs	-----	Contd.
Edge of Surfacing	-----	Streams
Pedestrian Crossing	-----	Trains
Track	-----	Drain
Footpath	-----	Water
	-----	Culvert
	-----	Grip (Land Drain)
	-----	Spring

STREET FURNITURE	RELIEF AND VEGETATION
------------------	-----------------------

Bush Shrub	= BS
Rue Shrub	= R
Bolton	= B
Cake Tree	= CC
Golf Course	= GC
Closed Circuit TV	= CCTV
Ditch	= D
Electricity Poles	= EP
Fence Line	= FL
Flag Staff	= FS
Lamp Post	= LP
Mature Tree	= MT
Name Plate (street)	= NP
Mourning Ring	= MR
Mile Post or Mourning Post	= MP
Social Marker	= MS
Mile Stone	= MSt
Hedge	
Edge of road/bushes	
Stump	 STUMP
Individual Tree	
Slopes with Height Greater than 1m	
Grass Face	
Marsh	
Pavels	

Post	• P	LEVEL AND HEIGHT INFORMATION
Parking Meter	• PM	
Reflector, Green	• RS	

[illegible]

Down Pipe	o DP	SURVEY INFORMATION SIGNS
Rain Water Pipe	o RWP	
Soil Pipe	o SP	

Gas Pipe	= G-PDC	Permanent Ground Marker	
Unable to lift cover	UTL		
Step Tap	= ST	0.5' Trig Station	
Step Valve	= SV		
Lamp Hole	= LH	0.5' Bench Mark	
Hydrant	= HYD		
Earth Road	= ER		
Gas Inlet	= GI		
Water Meter	= WM		
Washout	= WO		
Roading Eye	= RE		

GEOTECHNICAL INFORMATION
1. Soil type (see Table 1) 2. Soil description (see Table 2) 3. Soil strength (see Table 3) 4. Soil compressibility (see Table 4) 5. Soil permeability (see Table 5) 6. Soil consolidation (see Table 6) 7. Soil settlement (see Table 7) 8. Soil erosion (see Table 8) 9. Soil liquefaction (see Table 9) 10. Soil frost (see Table 10) 11. Soil acid sulfate (see Table 11) 12. Soil radon (see Table 12) 13. Soil contamination (see Table 13) 14. Soil remediation (see Table 14) 15. Soil monitoring (see Table 15) 16. Soil research (see Table 16) 17. Soil education (see Table 17) 18. Soil conservation (see Table 18) 19. Soil restoration (see Table 19) 20. Soil management (see Table 20) 21. Soil planning (see Table 21) 22. Soil design (see Table 22) 23. Soil construction (see Table 23) 24. Soil operation (see Table 24) 25. Soil maintenance (see Table 25) 26. Soil repair (see Table 26) 27. Soil replacement (see Table 27) 28. Soil removal (see Table 28) 29. Soil disposal (see Table 29) 30. Soil reuse (see Table 30) 31. Soil recycling (see Table 31) 32. Soil reclamation (see Table 32) 33. Soil revegetation (see Table 33) 34. Soil restoration (see Table 34) 35. Soil remediation (see Table 35) 36. Soil monitoring (see Table 36) 37. Soil research (see Table 37) 38. Soil education (see Table 38) 39. Soil conservation (see Table 39) 40. Soil restoration (see Table 40) 41. Soil management (see Table 41) 42. Soil planning (see Table 42) 43. Soil design (see Table 43) 44. Soil construction (see Table 44) 45. Soil operation (see Table 45) 46. Soil maintenance (see Table 46) 47. Soil repair (see Table 47) 48. Soil replacement (see Table 48) 49. Soil removal (see Table 49) 50. Soil disposal (see Table 50) 51. Soil reuse (see Table 51) 52. Soil recycling (see Table 52) 53. Soil reclamation (see Table 53) 54. Soil revegetation (see Table 54) 55. Soil restoration (see Table 55) 56. Soil remediation (see Table 56) 57. Soil monitoring (see Table 57) 58. Soil research (see Table 58) 59. Soil education (see Table 59) 60. Soil conservation (see Table 60) 61. Soil restoration (see Table 61) 62. Soil management (see Table 62) 63. Soil planning (see Table 63) 64. Soil design (see Table 64) 65. Soil construction (see Table 65) 66. Soil operation (see Table 66) 67. Soil maintenance (see Table 67) 68. Soil repair (see Table 68) 69. Soil replacement (see Table 69) 70. Soil removal (see Table 70) 71. Soil disposal (see Table 71) 72. Soil reuse (see Table 72) 73. Soil recycling (see Table 73) 74. Soil reclamation (see Table 74) 75. Soil revegetation (see Table 75) 76. Soil restoration (see Table 76) 77. Soil remediation (see Table 77) 78. Soil monitoring (see Table 78) 79. Soil research (see Table 79) 80. Soil education (see Table 80) 81. Soil conservation (see Table 81) 82. Soil restoration (see Table 82) 83. Soil management (see Table 83) 84. Soil planning (see Table 84) 85. Soil design (see Table 85) 86. Soil construction (see Table 86) 87. Soil operation (see Table 87) 88. Soil maintenance (see Table 88) 89. Soil repair (see Table 89) 90. Soil replacement (see Table 90) 91. Soil removal (see Table 91) 92. Soil disposal (see Table 92) 93. Soil reuse (see Table 93) 94. Soil recycling (see Table 94) 95. Soil reclamation (see Table 95) 96. Soil revegetation (see Table 96) 97. Soil restoration (see Table 97) 98. Soil remediation (see Table 98) 99. Soil monitoring (see Table 99) 100. Soil research (see Table 100) 101. Soil education (see Table 101) 102. Soil conservation (see Table 102) 103. Soil restoration (see Table 103) 104. Soil management (see Table 104) 105. Soil planning (see Table 105) 106. Soil design (see Table 106) 107. Soil construction (see Table 107) 108. Soil operation (see Table 108) 109. Soil maintenance (see Table 109) 110. Soil repair (see Table 110) 111. Soil replacement (see Table 111) 112. Soil removal (see Table 112) 113. Soil disposal (see Table 113) 114. Soil reuse (see Table 114) 115. Soil recycling (see Table 115) 116. Soil reclamation (see Table 116) 117. Soil revegetation (see Table 117) 118. Soil restoration (see Table 118) 119. Soil remediation (see Table 119) 120. Soil monitoring (see Table 120) 121. Soil research (see Table 121) 122. Soil education (see Table 122) 123. Soil conservation (see Table 123) 124. Soil restoration (see Table 124) 125. Soil management (see Table 125) 126. Soil planning (see Table 126) 127. Soil design (see Table 127) 128. Soil construction (see Table 128) 129. Soil operation (see Table 129) 130. Soil maintenance (see Table 130) 131. Soil repair (see Table 131) 132. Soil replacement (see Table 132) 133. Soil removal (see Table 133) 134. Soil disposal (see Table 134) 135. Soil reuse (see Table 135) 136. Soil recycling (see Table 136) 137. Soil reclamation (see Table 137) 138. Soil revegetation (see Table 138) 139. Soil restoration (see Table 139) 140. Soil remediation (see Table 140) 141. Soil monitoring (see Table 141) 142. Soil research (see Table 142) 143. Soil education (see Table 143) 144. Soil conservation (see Table 144) 145. Soil restoration (see Table 145) 146. Soil management (see Table 146) 147. Soil planning (see Table 147) 148. Soil design (see Table 148) 149. Soil construction (see Table 149) 150. Soil operation (see Table 150) 151. Soil maintenance (see Table 151) 152. Soil repair (see Table 152) 153. Soil replacement (see Table 153) 154. Soil removal (see Table 154) 155. Soil disposal (see Table 155) 156. Soil reuse (see Table 156) 157. Soil recycling (see Table 157) 158. Soil reclamation (see Table 158) 159. Soil revegetation (see Table 159) 160. Soil restoration (see Table 160) 161. Soil remediation (see Table 161) 162. Soil monitoring (see Table 162) 163. Soil research (see Table 163) 164.

Borehole	BH
Trist. Pit	TP
Monitor Pin	MPN
Probe Hole	PH
Window Sample	WS

Sheet Index

A 3x3 grid with numbers 1 through 7. The cell containing the number 4 is highlighted with a thick pink border.

[illegible]

MALCOLM HUGHES

**CHARTERED
LAND SURVEYORS**

65 Cross Street, Sale, Manchester
M33 7HF. Tel: 0161 905 1205
www.malcolmhughes.co.uk
survey@mh.co.uk

Accreditations








Client _____

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

UNIVERSITY OF MANCHESTER

FALLOWFIELD

FALLOWFIELD

Drawing Title

TOPOGRAPHICAL SURVEY

[illegible]

Created by	AS	01/12/22	Survey Date	October 2022
Classified by			Scale	

Created by ED 01/12/22 Scale 1 : 200

Drawing No	59252/4	Revision
------------	---------	----------

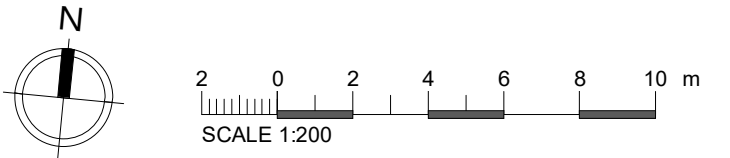
99202/4	
---------	--

Appendix B Proposed Site Layout



Buttress
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.

NOTE:
All information is based on external survey information. Further information required in terms of existing and extent of retained car parking spaces, bike shelter, trees, planters, gas/groves/meter enclosure, TBS. Extent of red line boundary may need to be adjusted to suit proposed road access, turning heads and radius.



Project Boundary

- Key:**
- Area for new planting/trees (Refer to Turley's details)
 - Area for new hard landscaping (Refer to Turley's details)
 - Secure rated Steel PPC perimeter fence compound. With integral lockable sliding gate and Swing Gates. Vehicle & Pedestrian, 2.5m high
 - Acoustic Wall Barrier (Refer to Acoustician details)
 - CPU
 - ESU
 - Residences
 - Ancillary Spaces/Plant

P01 18/10/24 PLANNING
Rev Date Info Details
© The total rights of the author are hereby reserved.
This drawing and design is the sole property of Buttress Ltd and it will not be reproduced without permission.
Buttress Ltd is registered in England and Wales 208273

Buttress
Manchester Leeds
41 Bengal Street Clockwise, Yorkshire House
Manchester Greet Street, Leeds
M4 6AF LS1 5SH
0161 256 3303 0113 539 7965
www.buttress.net



Project Title The Limes Relocation
Client Rider Levett Bucknall
Location Fallowfield Campus, Manchester
Drawing ref Proposed Site Plan (Complete)

Date 03/10/2024 14:25:25 **Scale** As indicated
Checker MB **Size** A0
Job No: 9774 **Status** S4
Project Design Value Level Type Risk Number Rev

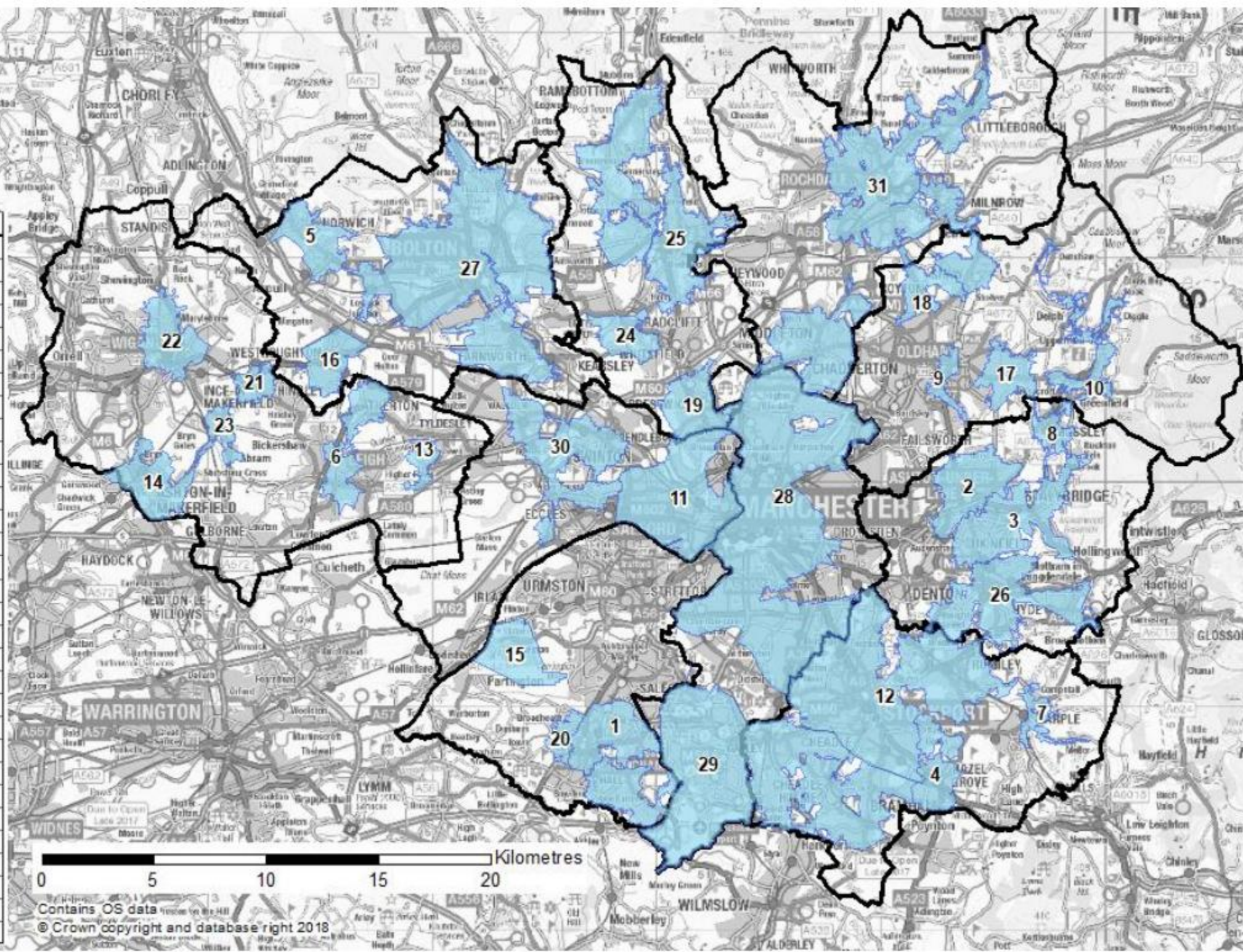
LIMES-BUT-MS-R3-DR-A-04101-P01

*Appendix C SFRA Opportunity Area for Further Critical
Drainage Management Map*

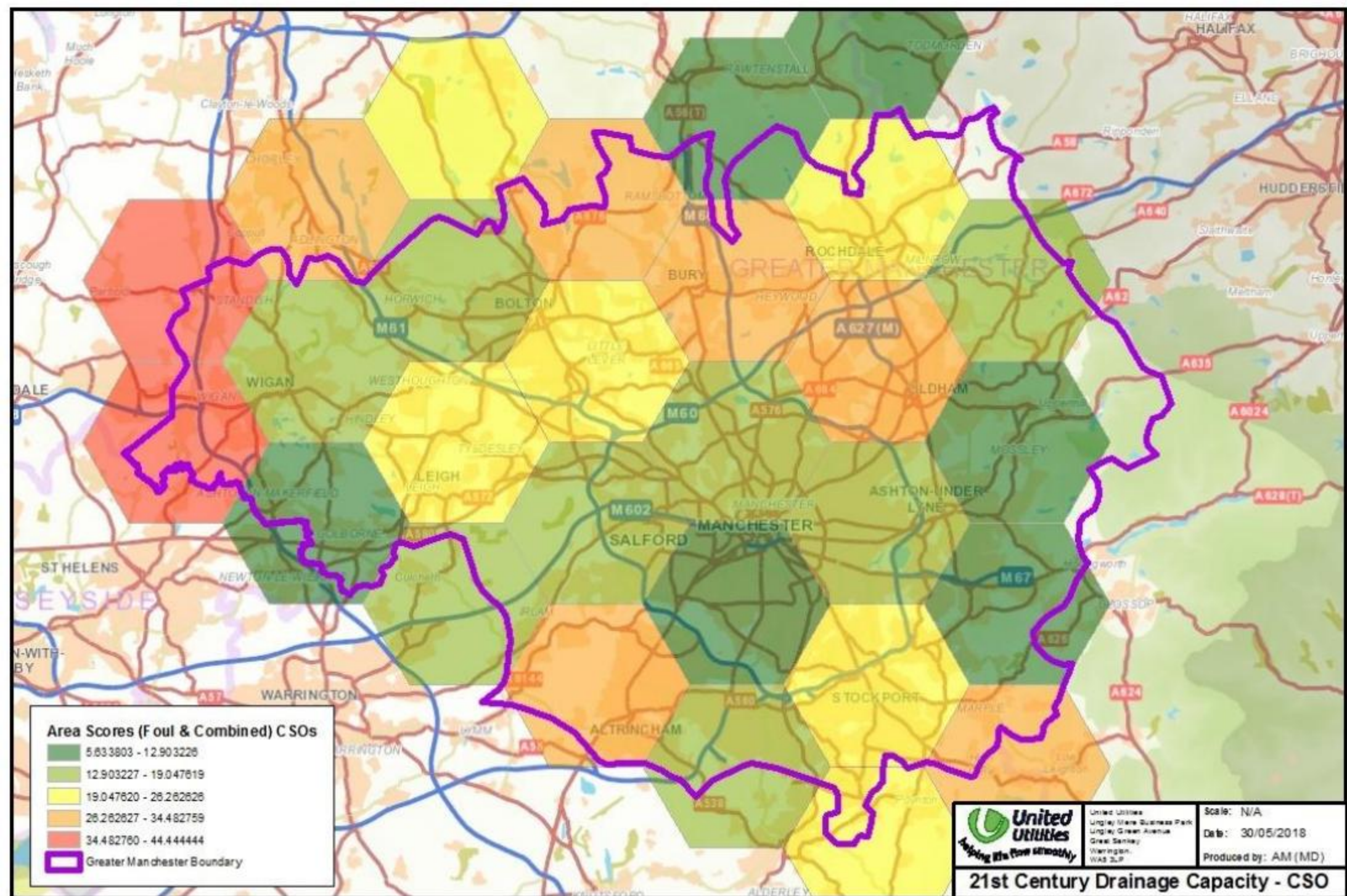
Legend

 OAFCDM

ID	OAFCDM
1	Altrincham
2	Ashton-Under-Lyne
3	Dukinfield
4	Hazel Grove and Foggbrook
5	Horwich
6	Leigh
7	Marple Bridge
8	Mossley
9	Oldham
10	Saddleworth
11	Salford
12	Stockport
13	Tyldesley
14	Ashton-In-Makerfield
15	Carrington
16	Westhoughton
17	Lees
18	Thorpe
19	Prestwich
20	Oldfield Brow
21	Hindley
22	Wigan
23	Platt Bridge
24	Radcliffe
25	Bury
26	Hyde
27	Bolton
28	Manchester
29	South Manchester
30	Swinton and Walkden
31	Rochdale



*Appendix D The Greater Manchester's Combined Sewer
Overflow (CSO) Map*



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.
 Crown copyright and database rights 2017 Ordnance Survey 100022432.

Appendix E EA Reservoir Failure Extent Map



Hide advanced options

Key

Surface water

- Extent
- Depth
- Velocity

Rivers and the sea

- Extent

Reservoirs

- Extent
- When river levels are normal
- When there is also flooding from rivers

Map details

- ☒ Show flooding
- ☐ Selected address

Pause to updates of flood risk data
We have [paused updates to information about flood risk](#) from rivers and the sea and surface water while we get ready for new data.