Drainage Design - Planning Condition

47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU

Reference: U0639 -Rev - V2

Date: Jun-26

1 **Introduction**

2 **Site Characteristics**

3 **Discharge Arrangement**

4 **Peak Runoff**

5 **Proposed Sustainable Drainage**

6 **Maintenance and Management Plan**

Appendices

A Distribution Existing and Proposed Areas

B Site Characteristics

C Drainage Calculations

D Drainage System General Arrangement

London Office
5th Floor, 167, 169 Great Portland St, London
W1W 5PF

Oxford Office
Oxford Innospace, Old Music Hall, 106-108 Cowley Road, Oxford, OX4 1JE

info@urban-water.co.uk

Urban Water is a Trading name of RIDA Reports Ltd registered in England and Wales number 10590566

Drainage Design - Planning Condition

47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU

Reference: U0639 -Rev - V2

Report Limitations

© 2025 RIDA Reports Limited t/a Urban Water . All Rights Reserved.

This document has been prepared by Urban Water with all reasonable skill, care and diligence for sole use of our client (the owner of 47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU), in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between Urban Water and the Client. Any information provided by third parties and referred to herein has not been checked or verified by Urban Water, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of Urban Water.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Urban Water. This report does not purport to provide definitive legal advice. Current regulations and good practices were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid considering changes in regulation and practice or additional information obtained regarding the site.

Ownership of the copyright of all printed material, including reports, survey data, drawings, and laboratory test results, remains with Urban Water. License is for the sole use of the client and may not be assigned, transferred or given to a third party. This license is only valid once we have been paid in full for this engagement. In the event of non-payment for our services, we reserve the right to retract the license for all project data, preventing their use and any reliance upon such data by the client or any other third party. We may also contact parties other than the client to notify them of this retraction.

Approval

	Name	Position	Date
Prepared By:	JKC	Engineer	28.04.2026
Reviewed By:	CD	Chartered Engineer	28.04.2026
Approved By:	CD	Chartered Engineer	29.04.2026

Revision

Revision Number	Date Issued	Details
V1	29.04.2026	1st Issue
V2	02.06.2026	Update discharge point
-	-	-

Purpose of this report

1.1 The purpose of this statement is to accompany the technical drawings and details showing the proposed Surface Water drainage system which addresses each point relating to relevant planning conditions.

Scope

1.2 This Sustainable Drainage Strategy (SDS) outlines the key drainage principles and requirements for the proposed development at 47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU. It provides a summary of the sustainable drainage system (SuDS) design, based on the specific site conditions and relevant guidelines, including Building Regulations Approved Document Part H and CIRIA C753: The SuDS Manual 2015. As the project progresses and new information becomes available, this strategy will be updated to reflect ongoing changes and the development of the detailed design.

Site Characteristics

2.1 The site background is clearly identified through answers to the questions in table 1 below.

Table 1: Site Characteristics . See appendix B for support documentation

TOPIC	QUESTION	ANSWER
Protected species or habitat	Is the site near to designated sites and priority habitats?	No
Flood Plain	Is the site located in the flood plain?	Yes
Soils and Geology	Soil permeability? - See appendix B for results	No
Space constraints	Space for SuDS components?	No
Topography	Sited on a flat site?	Yes
	Sited on a steep slope (5-15%)	No
	Sited on a very steep slope (>15%)	No
Groundwater	Is the site at groundwater flood risk?	No
Contaminated land	Are there contaminated soils on site?	Yes, refer to report ref. A260310-R02
Source Protection Zone	Is the site within a SPZ 3?	No
Runoff characteristics	Is the development in a high risk flooding area?	No

Existing and Proposed Site

2.2 The distribution of catchment areas for existing and proposed site is as per table 2 below. See appendix A for details

Table 2 : Existing and Proposed catchment areas in hectares

Description		Existing Site	Proposed Site
Impermeable Areas		0.026	0.010
Permeable Areas	Connected to Drainage	0.000	0.000
	Self Draining Areas	0.000	0.011
Areas Draining Away from drainage System		0.000	0.005
	Total Development Area	0.026	0.026

2.3 It has been assumed that the positively drained areas will have different runoff coefficients depending on the type of surface as follow:

Impermeable Surface	1.0
Permeable Surfaces	0.5
Grass Areas	0.3

Evaluation of Discharge Point

3.1 The SuDS design takes into account Building Regulations Section H3 and the National standards for sustainable drainage systems (SuDS). The aim is to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

1. collected for non-potable use
2. infiltrated to ground
3. discharged to an above ground surface water body
4. discharged to a surface water sewer, or another piped surface water drainage system
5. discharged to a combined sewer

3.2 The discharge point has been evaluated following the NPPG and Building regulations. The findings are in table 3 below.

Table 3: Drainage Hierarchy evaluation

Superficial geology classification	The British Geological Society records show that the superficial deposits are Glaciofluvial sheet deposits, Devensian-Sand and gravel.
Bedrock geology classification	The British Geological Society records of the site show that it is located within the Wilmslow Sandstone Formation-Sandstone.
Landis Top Soil Infiltration	The SOILSCAPE's records of the site show that it is located within an area of naturally wet soils.
Groundwater	The British Geological Survey's flood risk susceptibility maps show that the development has limited susceptibility to ground water flooding. The risk from groundwater flood to the site is considered very low.
Is infiltration feasible?	Infiltration is not possible on this site due to the findings on groundwater and soils within the site and due to space constraints within the site boundary not allowing for 5m clearance for positioning of soakaway
Is a discharge to a watercourse feasible?	There is no watercourse near the site.
Is a discharge to a surface water sewer feasible?	There is no surface water sewer in the proximity to the site.
Is a discharge to a combined sewer feasible?	There is a combined water sewer in the proximity to the site. It is possible to connect to the combined water sewer, and it is proposed to discharge into this combined water sewer.

Existing and Proposed Peak Run-off Calculations

4.1 The current site is a Brownfield. The peak runoff rate for the existing site was calculated as per table 4 and discharge rates as per table 5.

Table 4: Peak run-off rate calculation method for existing site

Method Used	Calculation Method
	Report 124 Flood Estimation for Small Catchments method has been used to estimate the site peak flow rates
X	This is a brownfield site, runoff rates are calculated in accordance with best practice simulation modelling and using the modified rational method
	This is a brownfield site where the pre-development drainage isn't known. The runoff rates are calculated using the Greenfield model with soil type 5

4.2 The runoff flow produced by the development will be controlled as per table 5.

Table 5: Runoff discharge rate control

Control Used	Description of runoff discharge
	Water will be discharged into the ground via a SuDS as described in table 6 below
	The peak discharge rate has been reduced to Greenfield Qbar flow
	The peak discharge rate has been taken as 0.7 l/s as it is not possible to reduce it to the Greenfield Qbar rate
	The peak discharge rate has been reduced to Brownfield pre-development 1 in 1 flow
X	The peak discharge rate has been reduced by 60% from the existing Brownfield pre-development 1 in 2 flow rate

Run-off flows

4.3 The size of the SuDS has been calculated for all events up to the 1 in 100 including an allowance for climate change of 45%. As per tables above, it is proposed to discharge at a rate of 1.96 l/s. See table 6 for values and appendix C for calculations.

Table 6: Peak discharge rates for SuDS

Return Period Event	Discharge Rate (l/s)			Infiltration Rate (m/hr)
	Existing Greenfield	Existing Brownfield	Proposed	
Qbar	0.20	N/A	N/A	N/A
1 in 1	0.10	3.80	1.96	N/A
1 in 2	0.10	4.90	1.96	N/A
1 in 30	0.30	8.90	1.96	N/A
1 in 30 + CC	N/A	N/A	1.96	N/A
1 in 100	0.40	11.20	1.96	N/A
1 in 100 + CC	N/A	N/A	1.96	N/A

Proposed Sustainable Drainage System

5.1 The following sustainable drainage systems have been used for this site. The drainage design uses these drainage system through out the site. See table 7 for details.

Table 7: Evaluation of SuDS and Proposed Drainage System

Most Sustainable	SuDS Technique	Feasible	Proposed	Flood Reduction	Pollution Reduction	Lanscape & Wildlife Benefit
	Living Roofs					
	Green Roof	No	No	X	X	X
	Green Blue Roof	No	No	X	X	X
	Basins and Ponds			X	X	X
	Rainwater Gardens	No	No	X	X	X
	Rainwater Planters	No	No	X	X	X
	Constructed Wetlands	No	No	X	X	X
	Balancing Pond	No	No	X	X	X
	Detention Basins	No	No	X	X	X
	Retention Ponds	No	No	X	X	X
	Filters and Swales					
	Filter Strips	No	No	X	X	X
	Swales	No	No	X	X	X
	Infiltration Devices					
	Soakaways Crates	No	No	X	X	X
	Deep Boreholes	No	No	X	X	X
	Infiltration Trenches	No	No	X	X	X
	Infiltration Basin	No	No	X	X	X
	Permeable Surfaces			X	X	
	Permeable Surfaces	Yes	Yes	X	X	
	Filter Drains	No	No	X	X	
	Tanked System					
	Storage Crates	Yes	Yes	X		
	Oversized Tanks	No	No	X		
	Oversized Pipes	No	No	X		
Least Sustainable	Blue Roof	No	No	X		
	Water Harvesting	Yes	Yes	X		

5.2 The location and details of the SuDS can be seen drainage layouts in appendix D. Calculations are in appendix C.

5.3 The drainage calculations demonstrate:
- No flooding occurs for the 1 in 30 storm events.
- Any flooding for the 1 in 100 year + 45% climate change event can be safely contained on site

5.4 The proposed drainage design demonstrates that the development can be sustainably drained to comply with the requirements of the NPPF.

Management of Exceedance Flows

5.5 The drainage network has been designed to attenuate surface runoff for all events up to and including the 1% AEP + CC(1 in 100 years). However consideration has been given to what may happen when the design capacity of the surface water drainage network is exceeded. Surface water will flow to the lowest points within the site. The flood risk to the buildings would therefore remain low. See appendix D.

Water Quality Assessment

5.6 The pollution hazard indices for this development has been taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2. The tables below shows the mitigation measure for the highest pollution hazard indices presented in the development.

Table 8: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. <300 traffic movements/day	Low	0.5	0.4	0.4
	TOTAL	0.7	0.6	0.45

Table 9: SuDS Mitigation Indices for worst case**

Type of SuDS	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable paving	0.7	0.6	0.7
Crate Storage/ Soakaway	0	0	0
TOTAL	0.7	0.6	0.7

** Values already reduced as per CIRIA C753

5.7 It is demonstrated that the proposed sustainable systems exceeds the required pollution indices and provides sufficient treatment as part of the surface water management train in accordance with the 2015 SuDS Manual (CIRIA C753)

Maintenance and Management plan responsibility

6.1 The SuDS will be maintained by The Owner the property

Maintenance and Management plan for proposed SuDS

6.2 The maintenance and Management Plan Guidance from the SuDS Manual, CIRIA C753 (CIRIA, 2015) is to be followed for the effective maintenance of the proposed SuDS techniques outlined above. The maintenance for SuDS structures are as follow:

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	**Frequency**
Inlets, outlets and surface control structures	
Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly
Inspection chambers and below ground control chambers	
Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually
Occasional Maintenance	
Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As necessary
Remedial work	**Frequency**
Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
Repair physical damage if necessary.	As required

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

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

Operation and maintenance requirements for RWH systems		
Maintenance schedule	**Required action**	**Typical frequency**
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

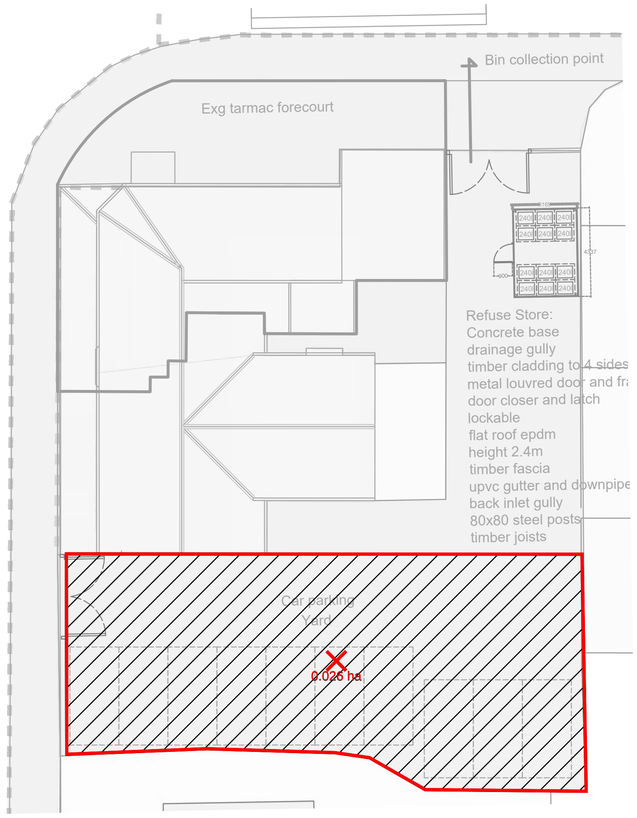
Appendix A

Do not scale from this drawing. Refer to figured dimensions only. RIDA Reports Ltd registered in England and Wales No. 10590566. This drawing is copyright of RIDA Reports Ltd.

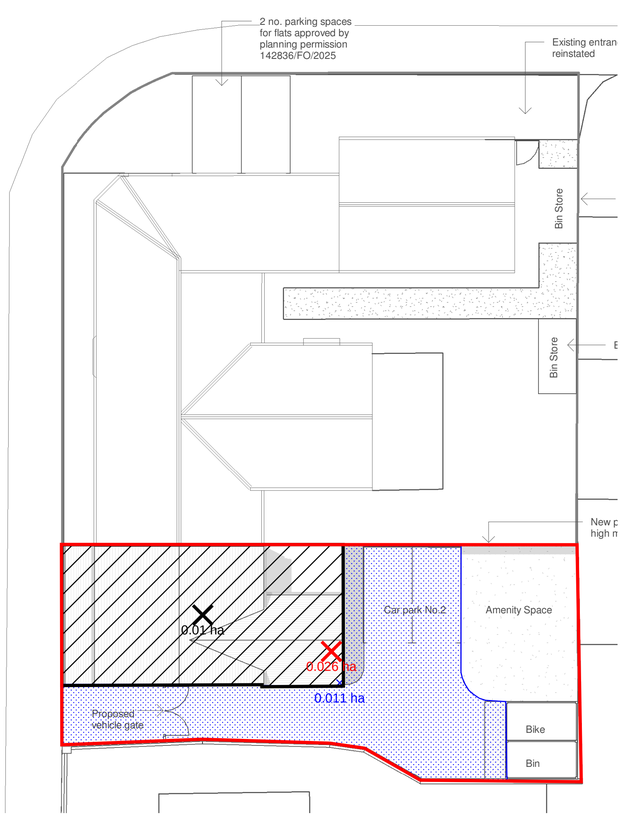
Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres

Measure length of line above for checking of scale



EXISTING SITE 1:150



PROPOSED SITE 1:150

GENERAL NOTES

KEY

PERMEABLE AREAS

IMPERMEABLE AREAS

STUDY AREA

Rev	Details	Date	By	Chd

Drawing Status:

PRELIMINARY

URBANWATER

Client:

Project:

47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU

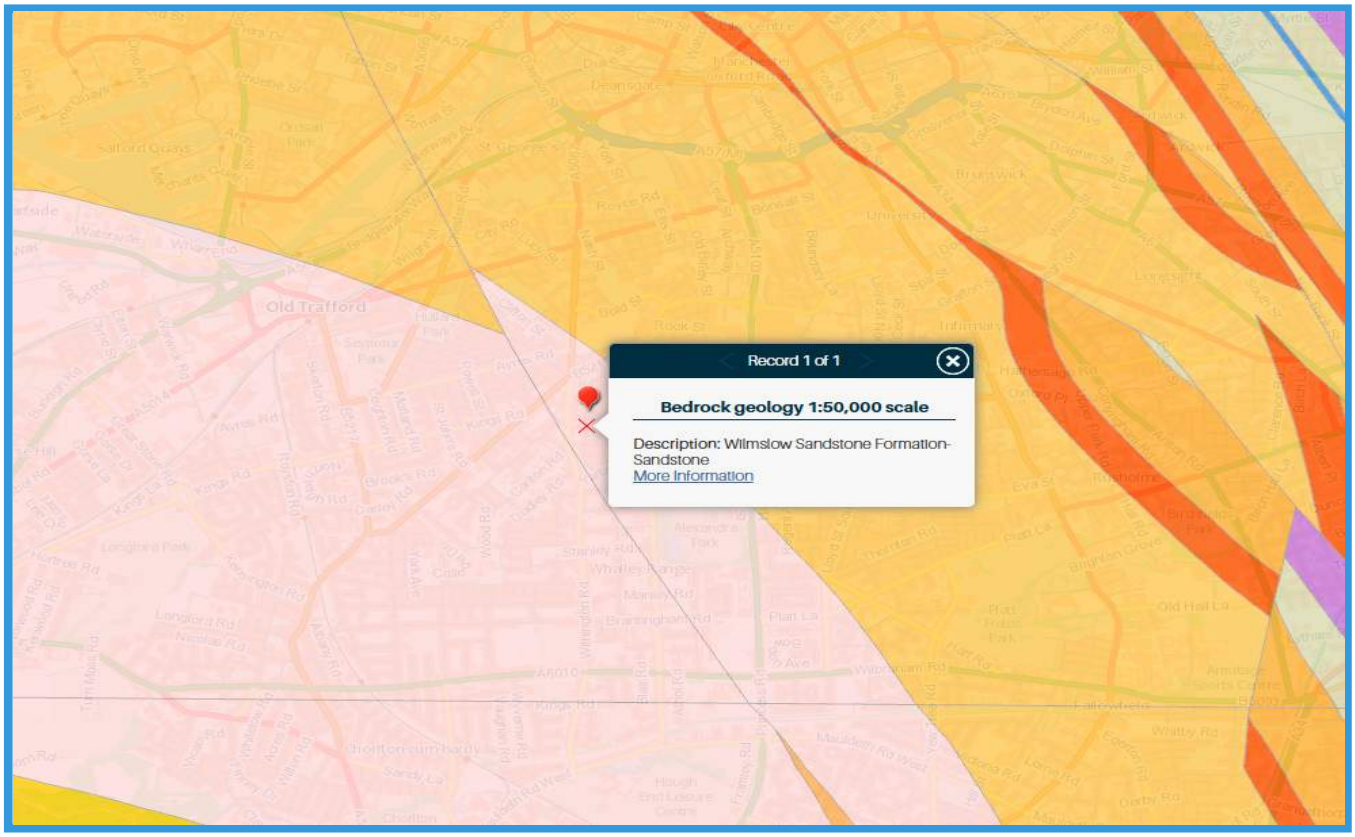
Drawing:

Existing and Proposed Areas
Permeable and Impermeable

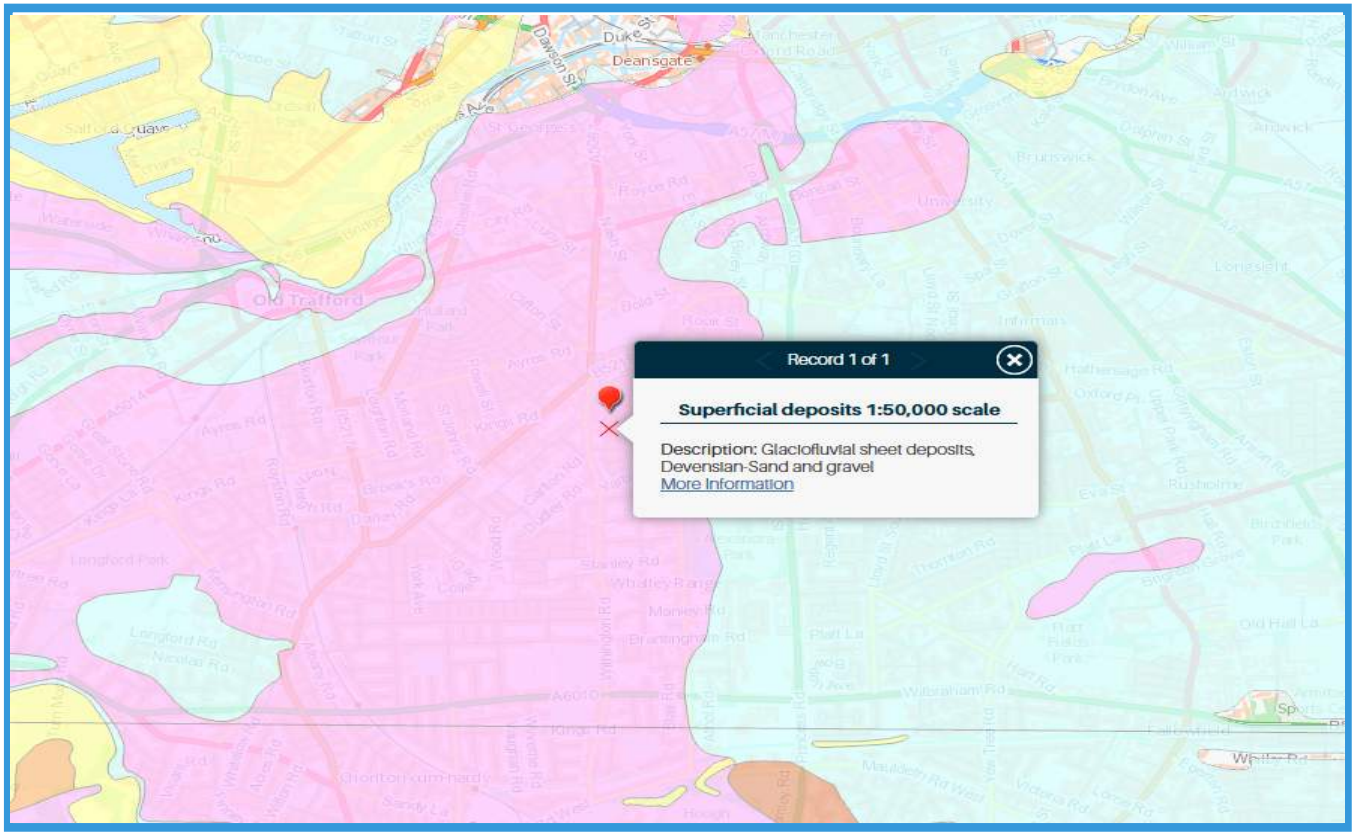
Print Size:	Project No:	Drawing No:	Revision:
A1	U0639	002	P1

Appendix B

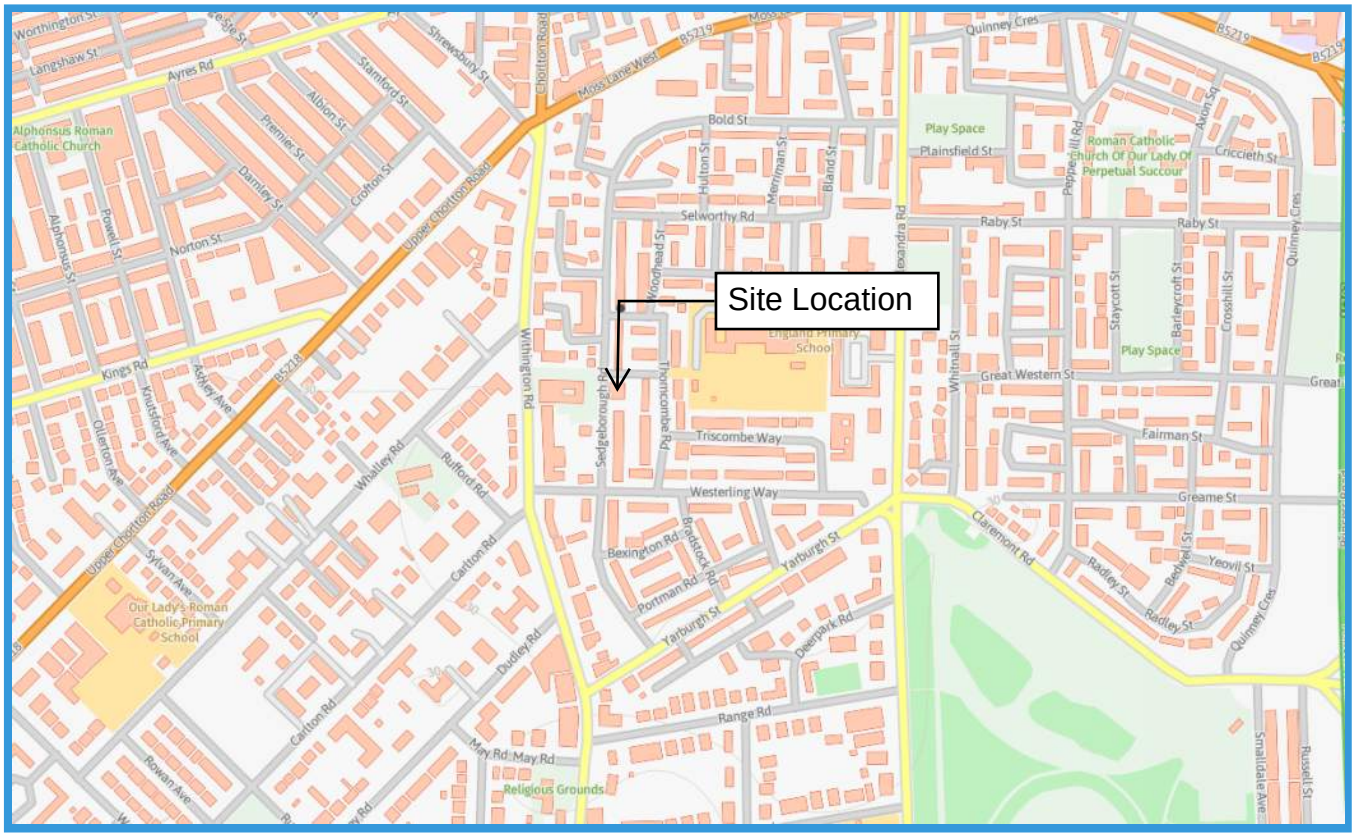
GEOLOGY - BEDROCK - Wilmslow Sandstone Formation-Sandstone



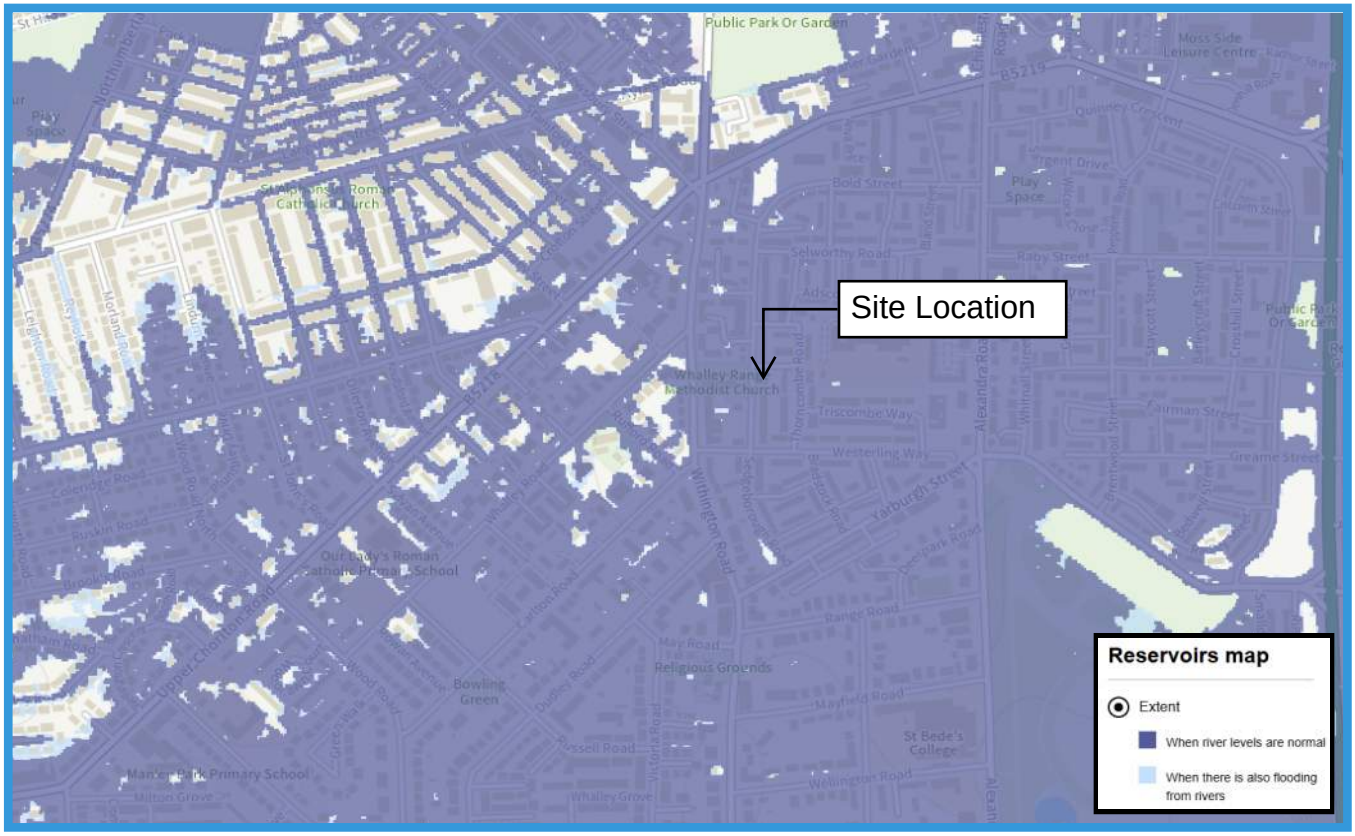
GEOLOGY - SUPERFICIAL DEPOSITS - Glaciofluvial sheet deposits, Devensian-Sand and gravel



Main River Map



Reservoirs Map

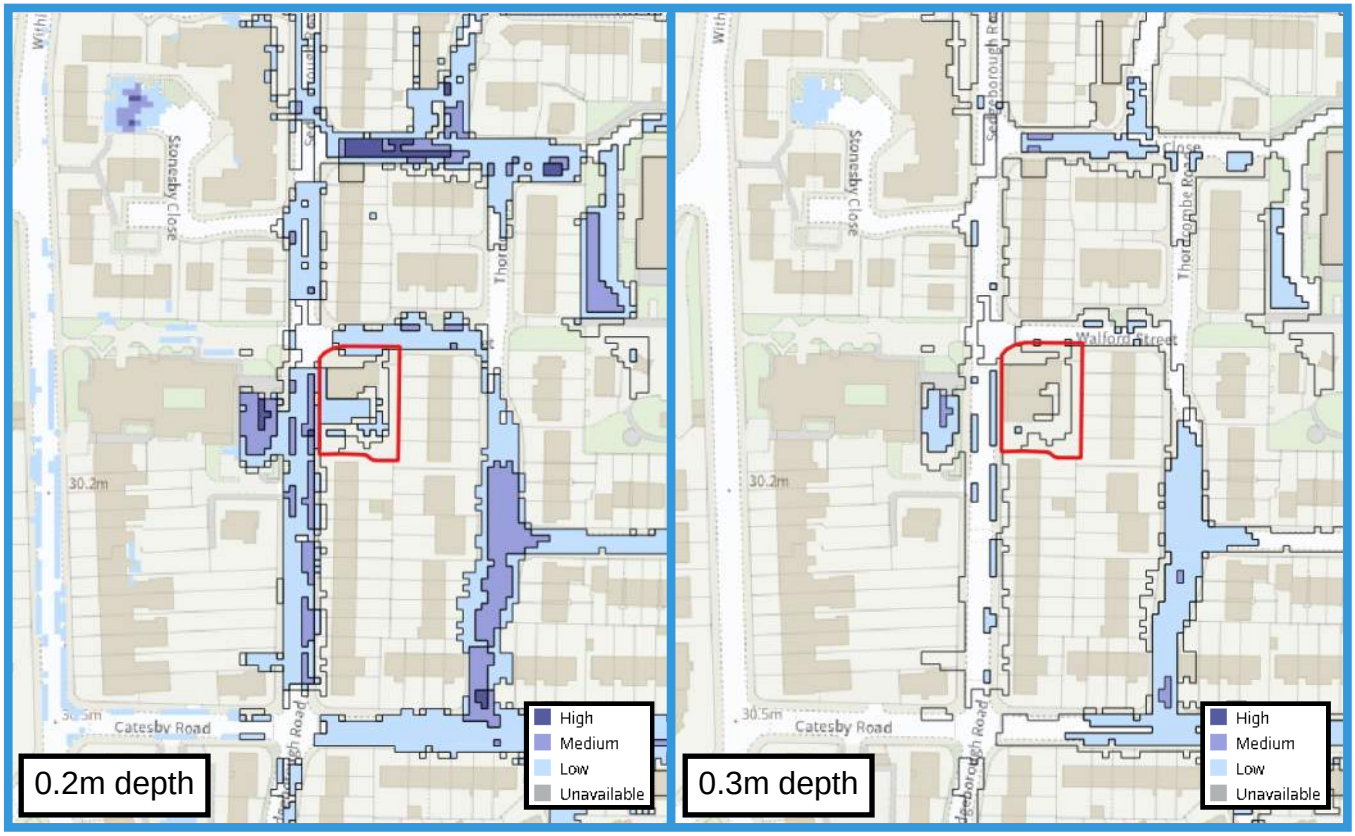


SITE SURFACE WATER FLOOD RISK

High risk means a chance of flooding greater than 3.3% (1:30)
Medium risk means a chance of flooding of btw 1% (1:100) and 3.3%
Low risk means a chance of flooding of btw 0.1% (1:1000) and 1%
Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding



DEPTH

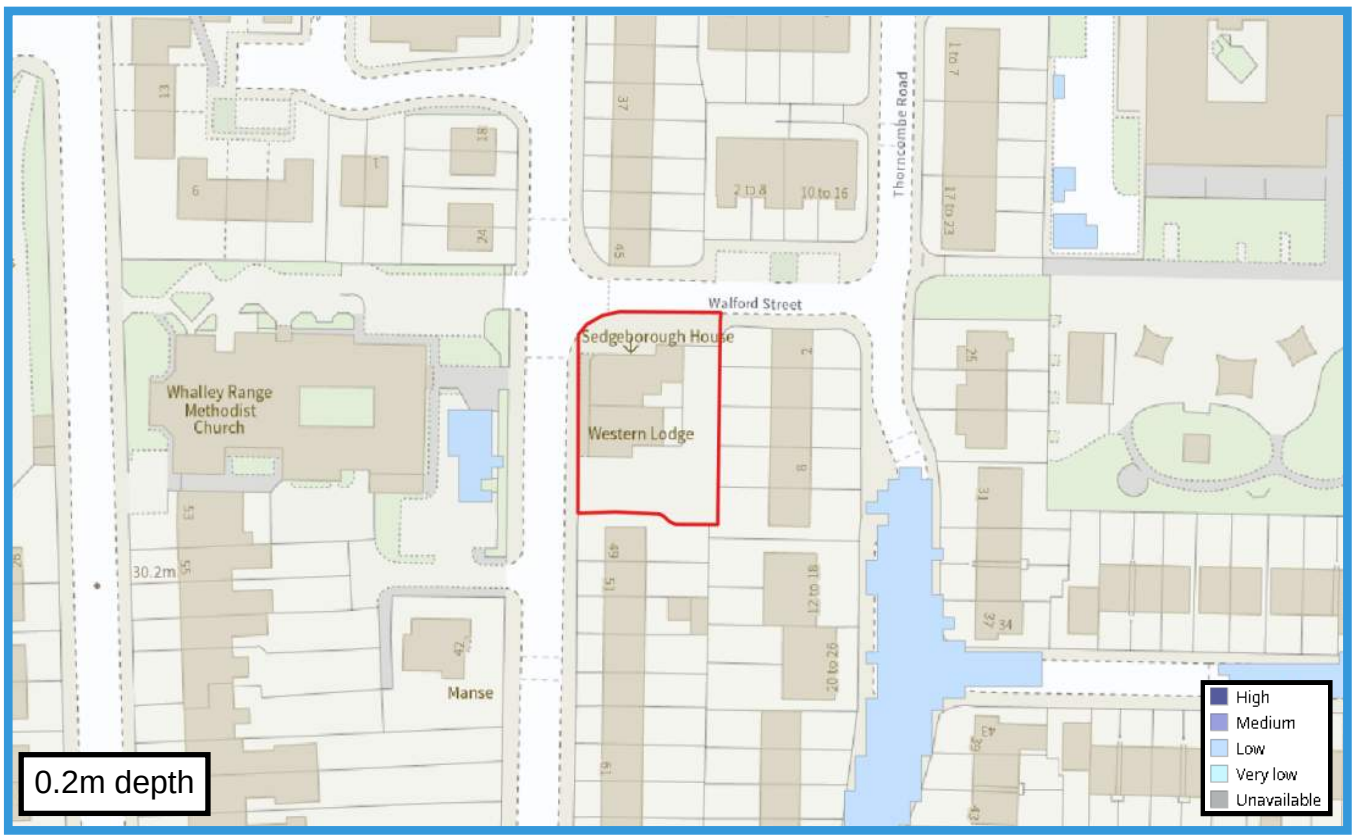


RIVER AND SEA FLOOD RISK MAP

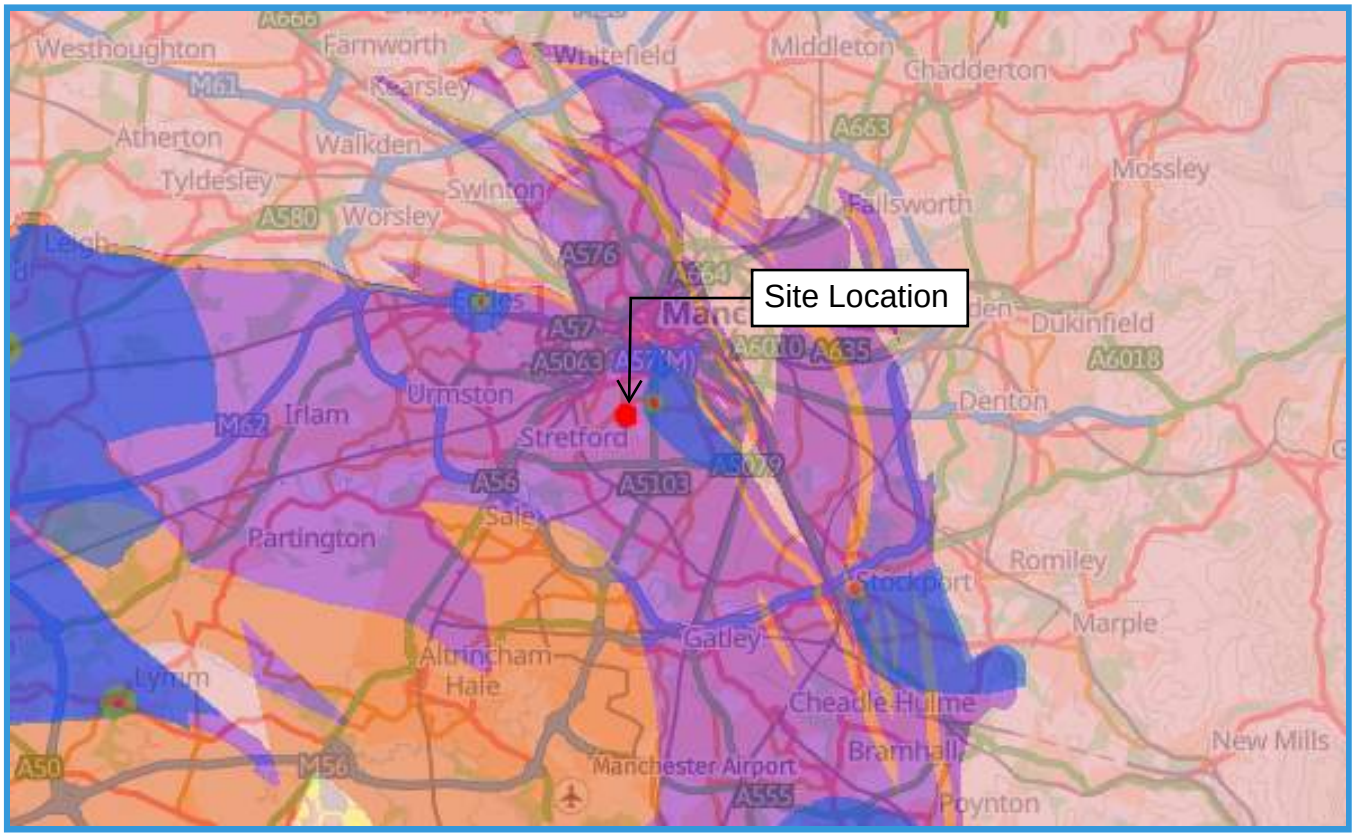
- High - greater than or equal to 1 in 30 (3.3%) chance of flooding in any year
- Medium –Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance of flooding in any given year
- Low –Less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) chance of flooding in any given year
- Very low –less than 1 in 1000 (0.1%) chance of flooding in any given year



DEPTH



MAGIC RESULTS



Site Check Results

Site Check Report generated on Thu Apr 16 2026

The following features have been found in your search area:

You selected the location: Centroid Grid Ref: SJ83039552

Aquifer Designation Map (Superficial Drift) (England)

TYPOLOGY	Secondary A

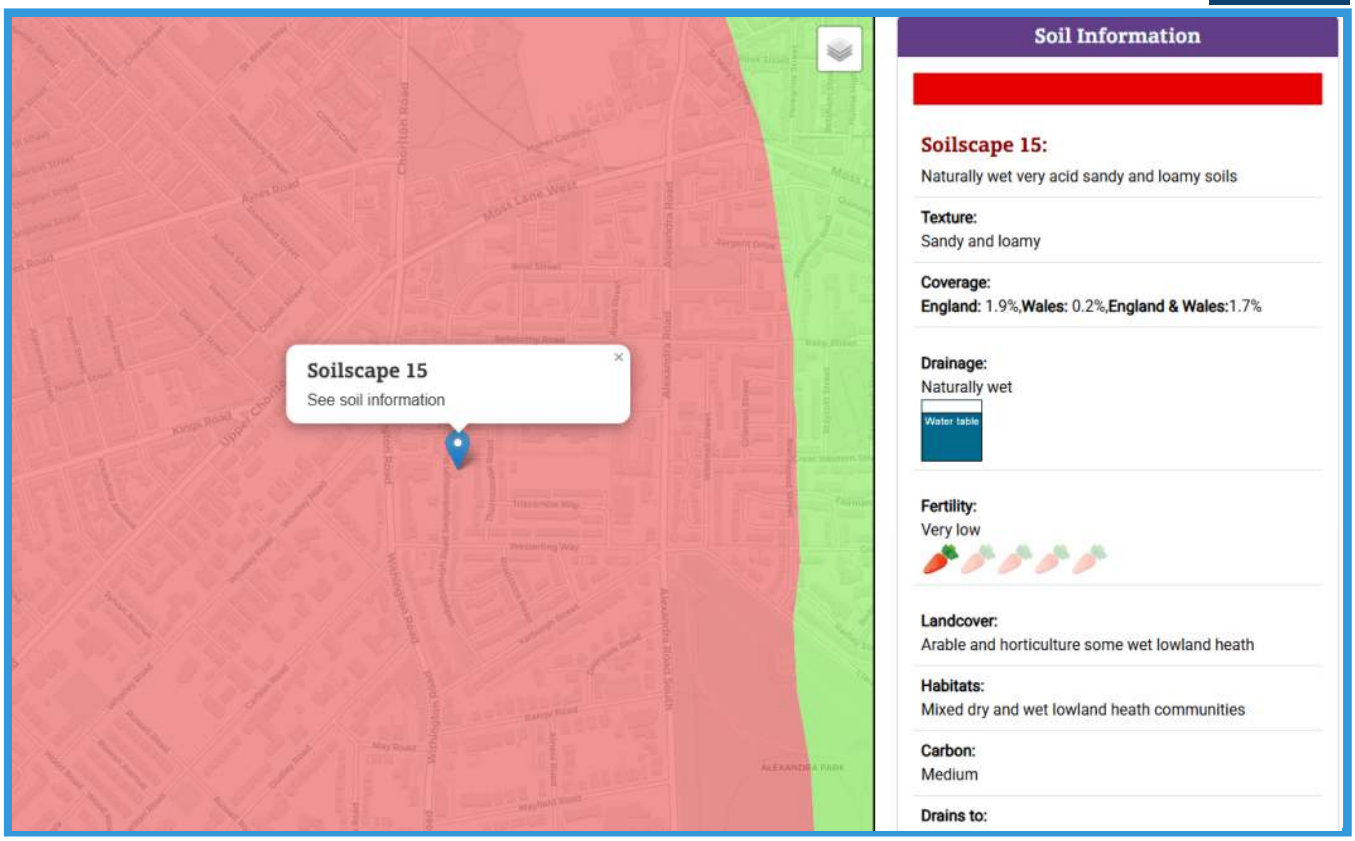
Aquifer Designation Map (Bedrock) (England)

TYPOLOGY	Principal

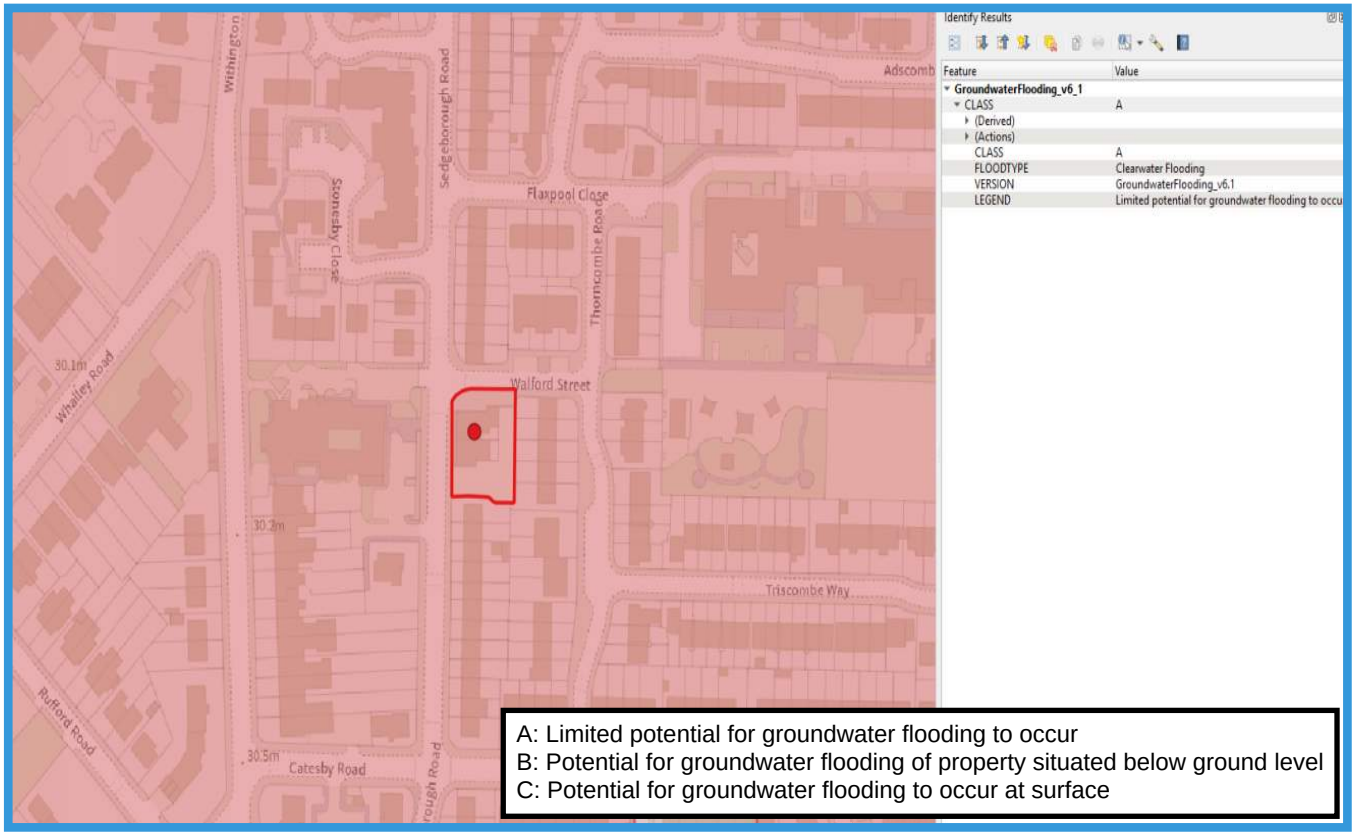
Source Protection Zones merged (England)

No Features found

SOILSCAPES MAP



GROUND WATER FLOOD RISK



Unit C1- C3 Weaste Trading Estate
Manchester M5 5HD
McCann Services Ltd. Company
Registration Number: 11659243. VAT
Number: 308 4983 78
carl@AbsoluteDrainage.co.uk

Invoice

VAT Number:

Invoice # 34035
22nd May 2026

Sedgeborough House
Sedgeborough House
47 Sedgeborough Road
Manchester
M16 7EU

WORK COMPLETED:
Date of attendance: 21/05/2026

Summary: The property was attended by our engineer to carry out a CCTV survey on the drainage system for the property as the owner is planning an extension.

Findings:
1) Both lines shown on the site map heading off boundary from the manholes at the rear of the property contain a combination of foul waste and rainwater.
2) The pipes analysed are all 6 inch in diameter. The engineer found while travelling downstream from the manholes shown on the site map that the 6 inch pipe connects into the nearby sewer on droppers. The dropper connecting from the rear right manhole on the site map goes from 0.7 meters in depth to approximately 2.5 meters. The main sewer line sits at a depth approximately of 2.5 meters.
3) The dropper connecting the manhole at the center rear of the property as shown on the site map could not be

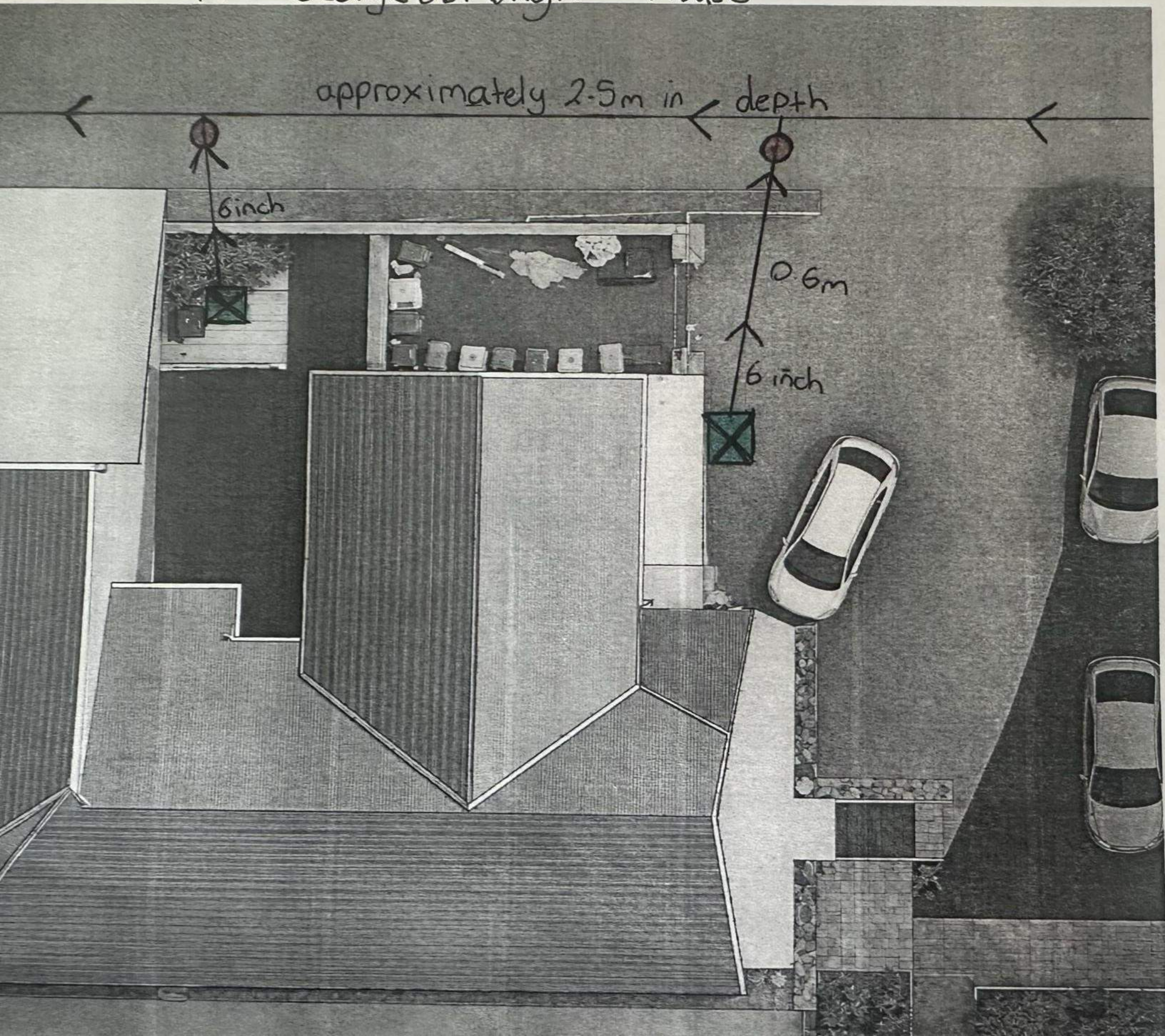
How to Pay

Invoice #34035
£0.00 due by 22nd May 2026

We accept payment by: McCann Services Ltd. Sort Code: 09-01-29. Account Number: 34324073.

Drain Unblocking Guarantee, Terms and Conditions. There will be a 30 day period which will include a free call back visit should the blockage reoccur again on the same drainage line that was initially unblocked. Should this blockage reoccur after the 30 day period, then there will be a charge to reattend the property in order to carry out drain unblocking or surveying services. If there have been any faults found within the drainage system then this will void the 30 day guarantee. Drain Repairs 12 Month Guarantee, Terms and Conditions 12 Month Guarantee is applicable to structural repair work only. Disclaimer The Provider does not provide liability insurance for the protection of individuals, groups, organisations, businesses, spectators, or others who may participate in the activity. In consideration for your participation in said activity, the individual, group, organization, business, spectator, or other, does hereby release and forever discharge the provider and its officers, board, and employees, jointly and severally from any and all actions, causes of actions, claims and demands for, upon or by reason of any damage, loss or injury, which hereafter may be sustained by participating in the activity. This release extends and applies to, and also covers and includes, all unknown, unforeseen, unanticipated and unsuspected injuries, damage, loss and liability and the consequences thereof, as well as those now disclosed and known to exist. Releases shall not extend to claims, demands, injuries, or damages which are known or unsuspected to exist at this time, to the person executing such release, are hereby waived. Continuous Payment Authority Contract of work for drainage services will only be placed on the agreement that the customer gives McCann Services Ltd continuous payment authority. The card details that are used to make the initial payment on account will be stored within a secure card payment system facilitated through Barclay Card. The card details stored within the payment system will be used to clear down the balance on account on completion of the contract of work. Confirmation on payment structure will be prior expressed and agreed via telephone prior to the contract of work commencing. McCann Services Ltd is Payment Card Industry (PCI) Compliant, which a full compliant review is completed annually. McCann Services Ltd DOES NOT accept payment by bank transfer or cheque.

47. Seageborough House



Site key

- Manhole
- dropper
- line + direction of flow

Absolute Drainage
Job #340315
22nd May 2024

Appendix C

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
Rainfall Events	Singular	Additional Storage (m³/ha)	0.0
FSR Region	England and Wales	Starting Level (m)	
M5-60 (mm)	19.000	Check Discharge Rate(s)	✓
Ratio-R	0.280	1 year (l/s)	3.8
Summer CV	1.000	2 year (l/s)	4.9
Winter CV	1.000	30 year (l/s)	8.9
Analysis Speed	Normal	100 year (l/s)	11.2
Skip Steady State	x	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Betterment (%)	0
Brownfield Method	MRM	Q 1 year (l/s)	3.8
Contributing Area (ha)	0.026	Q 2 year (l/s)	4.9
PIMP (%)	100	Q 30 year (l/s)	8.9
CV	1.000	Q 100 year (l/s)	11.2
Time of Concentration (mins)	6.00		

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Inverts
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.280	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	6.00	Enforce best practice design rules	x

Circular Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Development	0.011	6.00	30.500	450	-0.310	14.948	0.650
Permeable	0.006	6.00	30.500	450	1.040	-12.460	0.650
Tank			30.500		39.955	0.000	0.850
Outfall			30.500	450	79.616	-0.169	1.050

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Development	Tank	20.000	0.600	29.850	29.650	0.200	100.0	150	6.33	50.0
2.000	Permeable	Tank	10.000	0.600	29.850	29.750	0.100	100.0	150	6.17	50.0
1.001	Tank	Outfall	20.000	0.600	29.650	29.450	0.200	100.0	150	6.66	49.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.005	17.8	2.0	0.500	0.700	0.011	0.0	34	0.663
2.000	1.005	17.8	1.0	0.500	0.600	0.006	0.0	24	0.544
1.001	1.005	17.8	3.0	0.700	0.900	0.017	0.0	41	0.746

Node Tank Online Orifice Control

Flap Valve	x	Design Depth (m)	1.100	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.9		
Invert Level (m)	29.650	Diameter (m)	0.029		

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	3.0	Invert Level (m)	29.650
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	64

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	14.0	14.0	0.400	14.0	19.3	0.401	0.0	19.3

Approval Settings

Node Size	x	Coordinates	x	Full Bore Velocity	x	Time to Half Empty	✓
Node Losses	x	Crossings	x	Proportional Velocity	x	Return Period (years)	10
Link Size	x	Cover Depth	x	Surcharged Depth	x	Discharge Rates	x
Link Length	x	Backdrops	x	Flooding	x	Discharge Volume	x

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	92.280	26.112	2 year 600 minute winter	8.947	3.582
1 year 15 minute winter	64.758	26.112	2 year 720 minute summer	11.881	3.184
1 year 30 minute summer	63.375	17.933	2 year 720 minute winter	7.985	3.184
1 year 30 minute winter	44.474	17.933	2 year 960 minute summer	10.044	2.645
1 year 60 minute summer	45.726	12.084	2 year 960 minute winter	6.654	2.645
1 year 60 minute winter	30.379	12.084	2 year 1440 minute summer	7.589	2.034
1 year 120 minute summer	30.423	8.040	2 year 1440 minute winter	5.100	2.034
1 year 120 minute winter	20.212	8.040	30 year 15 minute summer	225.590	63.834
1 year 180 minute summer	24.557	6.319	30 year 15 minute winter	158.309	63.834
1 year 180 minute winter	15.963	6.319	30 year 30 minute summer	155.762	44.075
1 year 240 minute summer	20.090	5.309	30 year 30 minute winter	109.307	44.075
1 year 240 minute winter	13.347	5.309	30 year 60 minute summer	110.635	29.238
1 year 360 minute summer	16.015	4.121	30 year 60 minute winter	73.503	29.238
1 year 360 minute winter	10.410	4.121	30 year 120 minute summer	71.168	18.808
1 year 480 minute summer	13.032	3.444	30 year 120 minute winter	47.282	18.808
1 year 480 minute winter	8.658	3.444	30 year 180 minute summer	55.680	14.328
1 year 600 minute summer	10.958	2.997	30 year 180 minute winter	36.194	14.328
1 year 600 minute winter	7.487	2.997	30 year 240 minute summer	44.484	11.756
1 year 720 minute summer	9.986	2.676	30 year 240 minute winter	29.554	11.756
1 year 720 minute winter	6.711	2.676	30 year 360 minute summer	34.554	8.892
1 year 960 minute summer	8.505	2.240	30 year 360 minute winter	22.461	8.892
1 year 960 minute winter	5.634	2.240	30 year 480 minute summer	27.556	7.282
1 year 1440 minute summer	6.486	1.738	30 year 480 minute winter	18.308	7.282
1 year 1440 minute winter	4.359	1.738	30 year 600 minute summer	22.785	6.232
2 year 15 minute summer	119.450	33.800	30 year 600 minute winter	15.568	6.232
2 year 15 minute winter	83.824	33.800	30 year 720 minute summer	20.464	5.485
2 year 30 minute summer	81.804	23.148	30 year 720 minute winter	13.753	5.485
2 year 30 minute winter	57.407	23.148	30 year 960 minute summer	17.010	4.479
2 year 60 minute summer	58.092	15.352	30 year 960 minute winter	11.268	4.479
2 year 60 minute winter	38.595	15.352	30 year 1440 minute summer	12.540	3.361
2 year 120 minute summer	37.874	10.009	30 year 1440 minute winter	8.428	3.361
2 year 120 minute winter	25.163	10.009	30 year +40% CC 15 minute summer	315.827	89.368
2 year 180 minute summer	30.166	7.763	30 year +40% CC 15 minute winter	221.633	89.368
2 year 180 minute winter	19.609	7.763	30 year +40% CC 30 minute summer	218.067	61.705
2 year 240 minute summer	24.474	6.468	30 year +40% CC 30 minute winter	153.029	61.705
2 year 240 minute winter	16.260	6.468	30 year +40% CC 60 minute summer	154.889	40.933
2 year 360 minute summer	19.356	4.981	30 year +40% CC 60 minute winter	102.904	40.933
2 year 360 minute winter	12.582	4.981	30 year +40% CC 120 minute summer	99.635	26.331
2 year 480 minute summer	15.654	4.137	30 year +40% CC 120 minute winter	66.195	26.331
2 year 480 minute winter	10.400	4.137	30 year +40% CC 180 minute summer	77.952	20.060
2 year 600 minute summer	13.095	3.582	30 year +40% CC 180 minute winter	50.671	20.060

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year +40% CC 240 minute summer	62.278	16.458
30 year +40% CC 240 minute winter	41.376	16.458
30 year +40% CC 360 minute summer	48.376	12.449
30 year +40% CC 360 minute winter	31.446	12.449
30 year +40% CC 480 minute summer	38.579	10.195
30 year +40% CC 480 minute winter	25.631	10.195
30 year +40% CC 600 minute summer	31.898	8.725
30 year +40% CC 600 minute winter	21.795	8.725
30 year +40% CC 720 minute summer	28.650	7.679
30 year +40% CC 720 minute winter	19.255	7.679
30 year +40% CC 960 minute summer	23.815	6.271
30 year +40% CC 960 minute winter	15.775	6.271
30 year +40% CC 1440 minute summer	17.557	4.705
30 year +40% CC 1440 minute winter	11.799	4.705
100 year 15 minute summer	290.959	82.331
100 year 15 minute winter	204.182	82.331
100 year 30 minute summer	203.167	57.489
100 year 30 minute winter	142.573	57.489
100 year 60 minute summer	145.356	38.413
100 year 60 minute winter	96.571	38.413
100 year 120 minute summer	93.501	24.709
100 year 120 minute winter	62.120	24.709
100 year 180 minute summer	72.747	18.720
100 year 180 minute winter	47.287	18.720
100 year 240 minute summer	57.765	15.266
100 year 240 minute winter	38.378	15.266
100 year 360 minute summer	44.519	11.456
100 year 360 minute winter	28.939	11.456
100 year 480 minute summer	35.287	9.325
100 year 480 minute winter	23.444	9.325
100 year 600 minute summer	29.029	7.940
100 year 600 minute winter	19.834	7.940
100 year 720 minute summer	25.959	6.957
100 year 720 minute winter	17.446	6.957
100 year 960 minute summer	21.421	5.641
100 year 960 minute winter	14.190	5.641
100 year 1440 minute summer	15.616	4.185
100 year 1440 minute winter	10.495	4.185
100 year +45% CC 15 minute summer	421.890	119.380
100 year +45% CC 15 minute winter	296.063	119.380
100 year +45% CC 30 minute summer	294.592	83.359
100 year +45% CC 30 minute winter	206.731	83.359
100 year +45% CC 60 minute summer	210.766	55.699
100 year +45% CC 60 minute winter	140.028	55.699
100 year +45% CC 120 minute summer	135.576	35.829
100 year +45% CC 120 minute winter	90.073	35.829
100 year +45% CC 180 minute summer	105.483	27.144
100 year +45% CC 180 minute winter	68.567	27.144
100 year +45% CC 240 minute summer	83.760	22.135
100 year +45% CC 240 minute winter	55.648	22.135
100 year +45% CC 360 minute summer	64.553	16.612
100 year +45% CC 360 minute winter	41.961	16.612
100 year +45% CC 480 minute summer	51.166	13.522
100 year +45% CC 480 minute winter	33.993	13.522
100 year +45% CC 600 minute summer	42.092	11.513
100 year +45% CC 600 minute winter	28.760	11.513
100 year +45% CC 720 minute summer	37.641	10.088
100 year +45% CC 720 minute winter	25.297	10.088
100 year +45% CC 960 minute summer	31.060	8.179
100 year +45% CC 960 minute winter	20.575	8.179
100 year +45% CC 1440 minute summer	22.643	6.069
100 year +45% CC 1440 minute winter	15.218	6.069

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	10	29.880	0.030	1.5	0.0048	0.0000	OK
15 minute summer	Permeable	12	29.871	0.021	0.7	0.0033	0.0000	OK
120 minute summer	Tank	80	29.741	0.091	1.3	1.2054	0.0000	OK
120 minute summer	Outfall	80	29.467	0.017	0.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Development	1.000	Tank	1.5	0.738	0.085	0.0757	
15 minute summer	Permeable	2.000	Tank	0.7	0.488	0.039	0.0143	
120 minute summer	Tank	1.001	Outfall	0.5	0.436	0.027	0.0219	2.6

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	9	29.883	0.033	1.9	0.0053	0.0000	OK
15 minute summer	Permeable	11	29.874	0.024	1.0	0.0039	0.0000	OK
120 minute summer	Tank	80	29.766	0.116	1.7	1.5474	0.0000	OK
120 minute summer	Outfall	80	29.468	0.018	0.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Development	1.000	Tank	1.9	0.762	0.107	0.1042	
15 minute summer	Permeable	2.000	Tank	1.0	0.542	0.056	0.0184	
120 minute summer	Tank	1.001	Outfall	0.6	0.455	0.031	0.0242	3.3

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	29.896	0.046	3.6	0.0073	0.0000	OK
15 minute summer	Permeable	11	29.883	0.033	1.8	0.0052	0.0000	OK
120 minute summer	Tank	82	29.882	0.232	3.1	3.0853	0.0000	SURCHARGED
120 minute summer	Outfall	82	29.472	0.022	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Development	1.000	Tank	3.6	0.787	0.203	0.2002	
15 minute summer	Permeable	2.000	Tank	1.8	0.644	0.101	0.0315	
120 minute summer	Tank	1.001	Outfall	0.8	0.511	0.045	0.0315	6.1

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Development	84	29.984	0.134	2.9	0.0213	0.0000	OK
120 minute summer	Permeable	84	29.983	0.133	1.5	0.0212	0.0000	OK
120 minute summer	Tank	84	29.984	0.334	4.4	4.4360	0.0000	SURCHARGED
120 minute summer	Outfall	84	29.474	0.024	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Development	1.000	Tank	2.9	0.625	0.163	0.3418	
120 minute summer	Permeable	2.000	Tank	1.5	0.504	0.084	0.1708	
120 minute summer	Tank	1.001	Outfall	1.0	0.541	0.055	0.0361	8.6

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Development	84	29.960	0.110	2.7	0.0175	0.0000	OK
120 minute summer	Permeable	84	29.960	0.110	1.4	0.0175	0.0000	OK
120 minute summer	Tank	84	29.960	0.310	4.1	4.1200	0.0000	SURCHARGED
120 minute summer	Outfall	84	29.473	0.023	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Development	1.000	Tank	2.7	0.625	0.152	0.3143	
120 minute summer	Permeable	2.000	Tank	1.4	0.523	0.079	0.1572	
120 minute summer	Tank	1.001	Outfall	0.9	0.535	0.053	0.0351	8.1

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

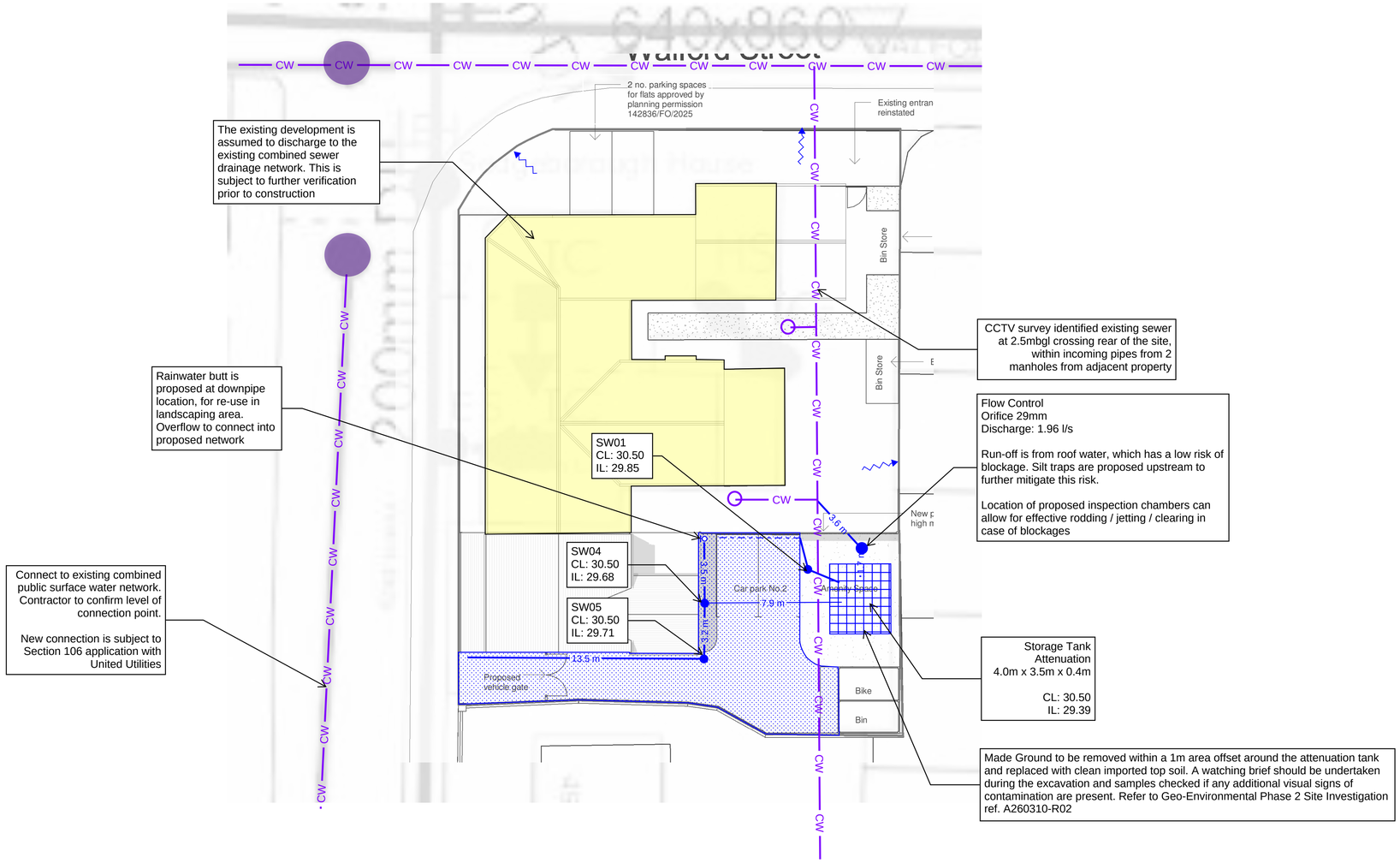
Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Development	82	30.377	0.527	4.0	0.0837	0.0000	FLOOD RISK
120 minute summer	Permeable	82	30.376	0.526	2.0	0.0837	0.0000	FLOOD RISK
120 minute summer	Tank	82	30.376	0.726	5.3	5.3267	0.0000	FLOOD RISK
120 minute summer	Outfall	82	29.479	0.029	1.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Development	1.000	Tank	3.6	0.655	0.205	0.3521	
120 minute summer	Permeable	2.000	Tank	1.7	0.504	0.097	0.1760	
120 minute summer	Tank	1.001	Outfall	1.5	0.609	0.083	0.0481	11.7

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Appendix D



KEY

- Proposed Surface Water Sewer Pipe
- Exceedance Flows
- Linear Drainage Channel
- Permeable Surface as per architect's details Sub-base 350mm Type 3
- Silt Trap
- Existing Combined Sewer Pipe

Do not scale from this drawing. Refer to figured dimensions only. RIDA Reports Ltd registered in England and Wales No. 10590566. This drawing is copyright of RIDA Reports Ltd.

Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres

Measure length of line above for checking of scale

GENERAL NOTES

1. All dimensions are in millimetres and levels in m AOD unless stated otherwise.

2. Do not scale. If in any doubt, consult Engineer.

3. Read in conjunction with the architects and engineers schedule drawings.

4. Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.

5. The location of services is shown as indicative. This drawing should be read in conjunction with the utilities drawings. No warranty to their accuracy can be given. The contractor shall take all necessary measures to satisfy himself as to the location of the existing services and connection points. Excavation should be undertaken in compliance with HSG47.

6. Concrete structures design sulphate class and ACEC concrete class unknown.

7. Pipework to be 150mm Thermoplastics U-PVC (Polypipe or similar) installed at levels marked on this drawing UNO. Pipe bedding should be class Z in pipes within 1.5m of the building or shallower than 700mm below ground level. For all other areas the pipe bedding should be class S.

8. Joints and fittings for gravity sewers shall comply with the relevant provisions of BS EN 1401-1, BS EN 1852 and BS EN 12666-1. Pipes shall have a limit of 6% deformation. Pipes shall be SN8 ring stiffness and stamped accordingly. Pipe sections shall not be longer than 3m.

9. Plastic chambers and rings, including demarcation chambers,shall comply with BS EN 3598-1 or BS EN 13598-2 as appropriate.

10. Inspection chamber covers and frames shall comply with the relevant provisions of BS EN 124 and should be double sealed.

11. All inspection chamber covers shall be the non-ventilating type and shall have closed keyways.

12. Testing of pipelines should be as follow:

Gravity Pipework: Air pipe testing. Pipework should withstand a pressure of 100mm water gauge and this should not fall by more than 25mm in a 5minute period. However where traps or gullies are connected they should withstand a pressure of 50mm water gauge and this should not fall by more than 12mm in a 5minute period. It is recommended that pipework installations are tested in sections rather than waiting to complete in one operation.

13. Manhole covers to be set square to the building. Covers of existing manholes to be adjusted to match final ground levels.

14. Granular Bedding for pipes shall be constructed by spreading and compacting granular bedding material over the full width of the pipe trench. After the pipes have been laid, additional granular material shall, if required, be placed and compacted equally on each side of the pipes and, where practicable, this shall be done in sequence with the removal of the trench supports.

15. The proposed dwelling shall be provided with a rainwater butt with a minimum storage capacity of 260 litres. The water butt shall be connected to a roof downpipe (with an appropriate diverter and an overflow returning to the drainage system) and positioned to allow safe access and routine use by the occupants.

Rev	Details	Date	By	Chkd

Drawing Status:

PRELIMINARY

URBANWATER

Client:

Project:

47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU

Drawing:

Proposed Drainage Strategy

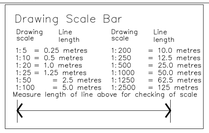
Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	1:150	U0639	003	P1

Do not scale from this drawing. Refer to figured dimensions only. RIDA Reports Ltd registered in England and Wales No. 10590566. This drawing is copyright of RIDA Reports Ltd.

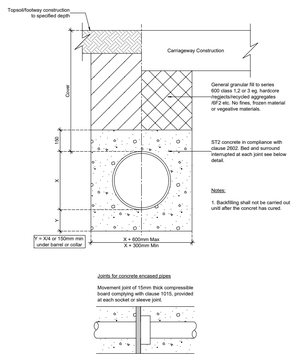
Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5 =	0.25 metres	1:200 =	10.0 metres
1:10 =	0.5 metres	1:250 =	12.5 metres
1:20 =	1.0 metres	1:500 =	25.0 metres
1:25 =	1.25 metres	1:1000 =	50.0 metres
1:50 =	2.5 metres	1:1250 =	62.5 metres
1:100 =	5.0 metres	1:2500 =	125 metres

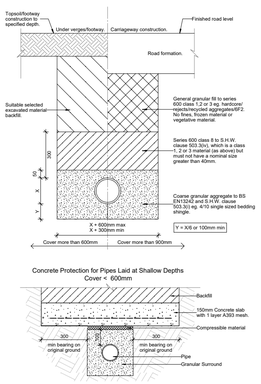
Measure length of line above for checking of scale



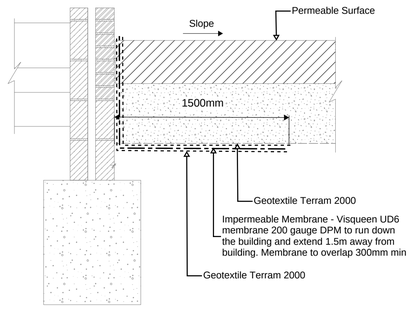
GENERAL NOTES



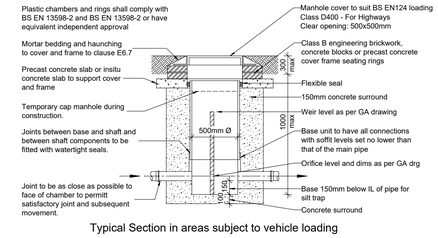
Pipe Bedding Detail Type Z



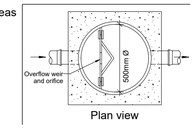
Pipe Bedding Detail Type S



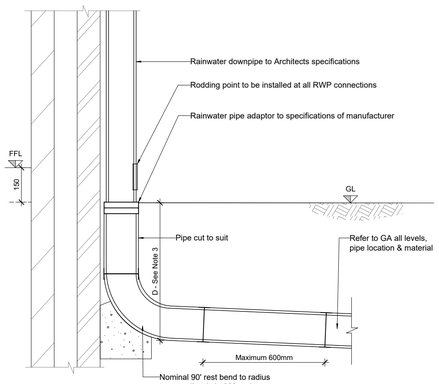
Permeable Surface Against Building



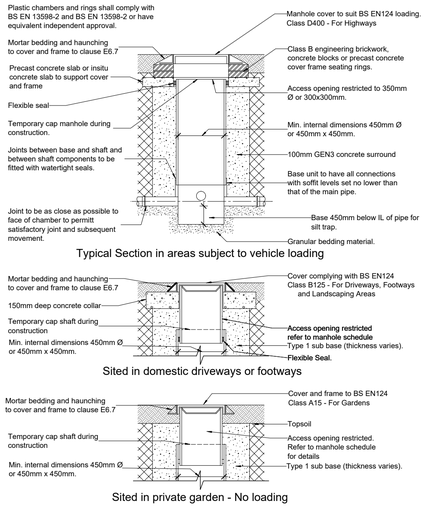
NOTES:
1. Refer to GA drg for pipe layout.
2. Chamber can be fabricated by Selel Environmental UK.



Flow Control -Orifice Plate - Plastic - Type 3

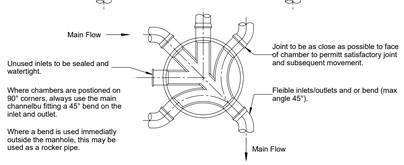


8251 - External Rainwater Pipe Connection Detail

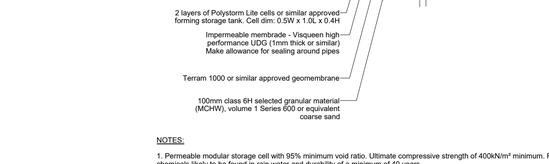


Notes:
1. Refer to drawing 8193 for base layouts.

Silt Trap Plastic



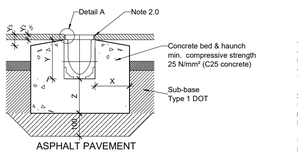
Chamber Type 3 Base Layouts



NOTES:

1. Permeable modular storage cell with 95% minimum void ratio. Ultimate compressive strength of 400kN/m² minimum. Resistant to chemicals likely to be found in rain water and durability of a minimum of 40 years.
2. Dimensions as applicable to the manufacturers recommendations for given storage requirement UNO.
3. Air Vents should be provided as per suppliers recommendations
4. See GA drgs for pipe sizes and layout and IL, ILoS, ToS, GL levels.

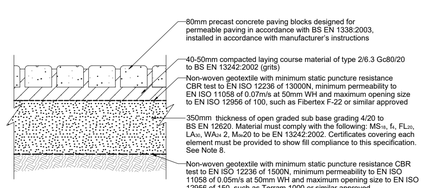
Cellular Attenuation System - Landscape Area



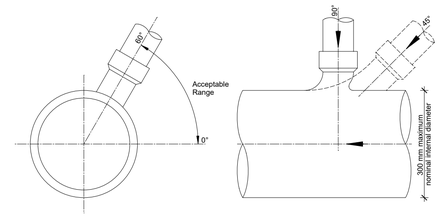
Minimum Dimensions of Concrete Surround

Load Class		A15	B125	C250	D400*	F900
Minimum Dimensions (mm)	X	100	150	150	250	300
	Y	Full Channel Height				(Less Y2 where necessary)
	Z	100	150	150	250	300
Maximum Dimensions (mm)	Y_1	35	35	35	35	35
	Y_2	100	60	60	60	35

8341 - Linear Drainage Channel Detail (Steel)



Permeable Paving - Infiltration

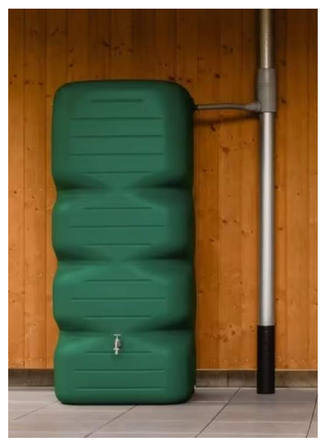


NOTES:

1. The vertical angle between the connecting pipe and the horizontal should be greater than 0° and not more than 60°.
2. Where the connection is being made to a sewer with a nominal internal diameter of 300 mm or less, connections should be made using 45° angle, or 90° angle, curved square junctions.
3. Connections made with junction fittings should be made by cutting the existing pipe, inserting the junction fitting and jointing with flexible repair couplings or slip couplers.
4. Where the connection is being made to a sewer with a nominal internal diameter greater than 300 mm:

a) Where the diameter of the connecting pipe is greater than half the diameter of the sewer, the connection of an access point should be constructed;
or
b) where the diameter of the connecting pipe is less than or equal to half the diameter of the sewer, then the connection should be made using a preformed saddle fitting.

Lateral Connection to public sewer



Rainwater Butt

Rev	Details	Date	By	Ch'd

Drawing Status:

PRELIMINARY

URBANWATER

Client:

Project:

47 Sedgeborough Rd, Whalley Range, Manchester M16 7EU

Drawing:

Standard Details

Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	NTS	U0639	006	P1