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Date: **16th April 2025**

Rev: **P2**

Client

**Cube Homes
2a Derwent Avenue
West Didsbury
Manchester
M21 7QP**

Site Address

**Land off High Lane
Chorlton
Manchester
M21 9FA**

Document Title

**Drainage Condition Report
Planning Condition 8**



STOK
43-59 Prince's Street
Stockport
SK1 1RX
www.brennanconsult.com
0161 428 2880

Project Title High Lane, Chorlton, Manchester, M21 9FA
Project Title Drainage Condition Report
Project No 2835-BCL-00-XX-RP-C-0002
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Revision History

Issue	Date	Status	Prepared By	Signature
P1	04.04.25	First Issue	Lee Meadowcroft BSc(Hons) PgDip MScCHE CEng MStructE MICE IHBC	
P2	16.04.25	Minor Amendments – Condition 9 removed	Lee Meadowcroft BSc(Hons) PgDip MScCHE CEng MStructE MICE IHBC	

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1.0 Introduction

- 1.1 In 2023 a planning application was submitted to Manchester City Council (MCC) for the construction of fourteen town houses, six apartments and refurbishment of existing building into two dwellings, with associated access, landscaping and car parking on land off High Lane, Chorlton, Manchester, M21 9FA.
- 1.2 Planning approval was granted on the 2nd April 2025 via application number 137994/FO/2023 and encompassed a number of planning conditions, including Condition 8 which relates to the drainage of the development.
- 1.3 This report has been prepared to remove this drainage related planning condition relevant to the application. The condition is number 8 as noted below: -

Condition 8 No drainage shall be installed until the full details of a surface water drainage scheme has been submitted to and approved in writing by the City Council as local planning authority.

2.0 Drainage Strategy

2.1 Existing Drainage

- 2.1.1 The United Utilities sewer records have been reviewed and indicate a 300mm VC combined water sewer within Acres Road to the east, High Lane to the north and Stockton Road to the west. No surface water sewers have been identified in close proximity. Refer to Figure 1 below.

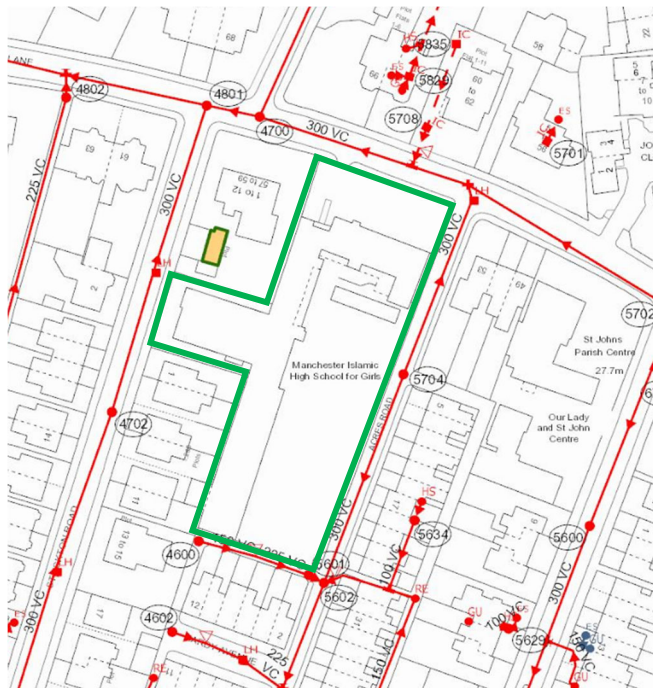


Figure 1 United Utilities Sewer Records

- 2.1.2 A CCTV survey has been completed and indicates a number of small diameter combined water drains outfalling unrestricted to the combined water sewers bounding the site. Refer to Appendix C for details.

2.2 Existing Runoff

- 2.2.1 The site area is fully impermeable with unrestricted outflows to the combined sewers bounding the site. Figure 2 below defines the existing brownfield runoff rates based on a site area of 0.44ha.

Existing Site Area (ha)	1yr Brownfield Rate (30mm/hr)	30yr Brownfield Rate (65mm/hr)	100yr Brownfield Rate (95mm/hr)
0.44	37l/s	79l/s	116l/s

Figure 2 Existing Brownfield Runoff Rates

2.3 Geology

- 2.3.1 A detailed site-specific Phase 2 intrusive investigation has been undertaken at the site by RSK Geosciences in December 2023. The findings from this investigation identified Made Ground to a maximum depth of 1.5m, underlain by glaciofluvial sheet deposits comprising slightly gravelly sand to circa 4m BGL. Three no. BRE 365 soakaway tests were completed in two trial pits within the site. The test results can be found in Figure 3 below with full details in Appendix D. Based on these findings infiltration as a means of draining the site is suitable with a rate of 7.41×10^{-5} m/s used in the hydraulic calculations.

8.5 Infiltration drainage

The results of soakaway testing are summarised in **Table 16**.

Table 16 Infiltration test results

Trial pit	Geological unit	Test result (m/s)
SA01 (TP201)	Glaciofluvial Sand	2.46×10^{-4} , 1.70×10^{-4} , 1.30×10^{-4}
SA02 (TP202)	Glaciofluvial Sand	9.68×10^{-5} , 7.41×10^{-5} , 8.22×10^{-5}

Based upon the results of the soakaway tests presented above, the ground conditions appear suitable from a geotechnical viewpoint for the use of pit soakaways to discharge surface run-off water into the ground.

Figure 3 Existing Brownfield Runoff Rates

2.4 Hydrological Assessment

- 2.4.1 A review of the topographical survey, OS Maps and Environment Agency maps would indicate the closest watercourse to be the Chorlton Brook, located approximately 400m to the south.

2.5 SuDS Hierarchal Approach

- 2.5.1 Based on the existing drainage configuration, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in detail below:

Method	Suitability	Suitability for Development
Infiltration to Ground	Yes	Intrusive site investigation would indicate that the underlying sandy ground is suitable for infiltration.
Connection to Watercourse	No	No watercourse in close proximity.
Connection to Surface Water Sewer	No	No surface water sewer in close proximity.
Connection to a Combined Sewer	No	Higher options available.

Figure 4 SuDS Hierarchal Approach

2.6 Surface Water Drainage Strategy

- 2.6.1 The surface water drainage strategy is to collect the runoff from the roof of the new residential units and outfall in to a geocellular infiltration tank located in the rear garden of each property that will enable the water to infiltrate to the underlying sands. The front rainwater pipes will outfall into the no fines sub base of the permeable driveways and again infiltrate to the underlying sands. BRE 365 infiltration testing has defined the rate used within the calculations.
- 2.6.2 Permeable surfacing will be incorporated to the front driveway.
- 2.6.3 A detailed drainage GA drawing and calculations can be found in the Appendices. This has shown no flooding for the 30-year and extreme 100 year + 45% climate change events.

2.7 Foul Water Strategy

- 2.7.1 The foul water drainage strategy is to construct a new foul water drainage network for each block area that outfalls via gravity to the combined public sewer via the existing connections.
- 2.7.2 The proposed private drainage layout for the new development site will be designed in accordance with BS EN 752: 2017 and Building Regulations Part H guidance.
- 4.11.2 The foul water drainage layout can be found on the drainage GA drawing in Appendix A.

3.0 Management & Maintenance Plan

- 3.0.1 The drainage network encompasses standard pipework, manholes and a flow control. As long as the gullies at the base of the rainwater pipes are kept clear of leaves and detritus by regular inspection by the property owners then this should negate it passing into the network.
- 3.0.2 All management and maintenance of the drainage will be with the property owners. This will involve general maintenance of the drainage network in accordance with best practice. All drainage will remain private and not be adopted by the local sewerage authority.
- 3.0.3 This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints. The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.
- 3.0.4 There are three types of maintenance activities associated with surface water drainage systems. The SuDS Manual, CIRIA C753, defines these as:
- Regular Maintenance – 'basic tasks undertaken on a frequent and predictable schedule' including vegetation management, litter and debris removal, and inspections.'
 - Occasional Maintenance – 'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example.'
 - Remedial Maintenance – 'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.'
- 3.0.5 Specific maintenance needs should be monitored and maintenance schedules adjusted to suit the location and condition of the drainage feature in question.
- Piped Networks, Inspection, Manhole and Catchpit Chambers
- 3.0.6 The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access.
- 3.0.7 Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed.

- 3.0.8 Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.
- 3.0.9 Access for maintenance is provided through access chambers and manholes.
- 3.0.10 Regular inspection and maintenance are important to identify areas which may have been obstructed / clogged and may not be drainage correctly thus exposing the site to a greater level of flood risk.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any features that are not operating correctly. If required, take remedial action	Monthly for three months, then six monthly
	Debris removal from catchment surface / gratings (where may cause risks to performance)	Monthly (and after large storms)
	Remove sediment from trapped sumps, manholes and catchpits.	Annually or as required
Remedial Maintenance	Repair / rehabilitation of gratings, inlets and outlets	As required
Monitoring	Inspect / check all gratings, trapped sumps, manholes and catchpits to ensure that they are in good condition and operating as designed	Annually and after large storm events
Structure Rehabilitation / Repair	Regular Maintenance and Monitoring to identify if repair and / or replacement of features or pipework is required.	As required

Figure 5 Operation and Maintenance Requirements of Piped Networks and Inspection Chambers

Permeable Paving

- 3.0.11 Permeable paving provides a surface suitable for vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying structural layers. The surface itself is impervious to water, but the blocks are laid to provide void space through the surface to the sub-base. The water is temporarily stored within this sub-base before controlled discharge downstream.

- 3.0.12 Permeable surfaces, together with their associated substructures, are an efficient means of managing surface water runoff close to its source – intercepting runoff, reducing the volume and frequency of runoff, and providing a treatment medium. Treatment processes that occur within the surface structure, sub-base and geotextile layers include filtration, absorption, biodegradation and sedimentation.
- 3.0.13 Permeable paving should be inspected regularly, preferably during and after heavy rainfall to check effective operation and identify areas of ponding. Permeable paving needs to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. Evidence suggests that sweeping once per year should be sufficient to maintain an acceptable infiltration rate on most developments.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, or when required during autumn leaf fall
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48hours	Every 3 months, 48 hours after large storms.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Manage other weeds and vegetation and remove nuisance plants	Once a year, or when required
Remedial Actions	Repair erosion of any adjacent soft landscaping adjacent to the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks.	As required
	Rehabilitation of surface and upper sub-structure by remedial sweeping	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Figure 6: Operation and Maintenance Requirements for Permeable Paving

Geocellular Attenuation Tank

- 3.0.14 Geocellular tanks are modular storage systems made with plastic units. These units can be assembled to achieve the required volume and usually on multiple layers. Generally, the units have 95% of voids content and are used to create an efficient below ground structure to store surface water.
- 3.0.15 The geocellular units and geotextile are proprietary products and therefore manufacturer's recommendations should also be taken into consideration.

3.0.16 Access for maintenance should be provided by an access shaft located on the tank and from the manhole chambers downstream of the tank.

3.0.17 Regular inspection and maintenance are important for the effective operation of attenuation tanks as designed. As the feature is buried, a regular inspection regime is very important to ensure the correction functionality of the surface water drainage network.

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 blockages by sediment, algae or other matter; remove and replace surface infiltration medium as required.	Annually.
	Remove sediments from pre-treatment structures and/or internal forebays.	Annually, or as required.
Remedial Actions	Repair/rehabilitate inlets, outlets, 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.

Figure 7 – Operation & maintenance requirements for attenuation storage tanks - Based on CIRIA SuDS Manual 2015

4.0 Drainage Related Planning Condition and Responses

4.1 Planning Conditions

Condition 8 is detailed below in *italics* with the Brennan Consult response beneath in Blue.

Condition 8

No drainage shall be installed until the full details of a surface water drainage scheme has been submitted to and approved in writing by the City Council as local planning authority.

As described in the report, the SuDS hierarchal approach incorporating a number of geocellular infiltration tanks and outfall to the underlying sands has been incorporated. The parking bays are to be constructed in permeable surfacing.

The proposed drainage layout is designed in line with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015), with connection to the underlying sands.

Management and maintenance details have been provided in Section 3.0.

Refer to the drainage GA in Appendix A and the hydraulic calculations in Appendix B. This confirms no flooding for the 100 year + 45% climate change event.

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Appendix A – Brennan Consult Drawings

- 2835 0101 Rev P03 – Drainage GA

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Appendix B – Hydraulic Calculations

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Date 11/06/2024	Designed by paulg	
File high Lane - Plot A Rear...	Checked by	
Innovyze	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.379	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.005	4-8	0.001

Total Area Contributing (ha) = 0.006

Total Pipe Volume (m³) = 0.118

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	5.000	0.100	50.0	0.006	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	10.000	0.171	58.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.08	27.500	0.006	0.0	0.0	0.0	1.09	8.6	0.8
1.001	50.00	5.24	26.600	0.006	0.0	0.0	0.0	1.01	7.9	0.8

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001	dummy	28.000	26.429	26.000	0	0

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot A Rear SW Network	
Date 11/06/2024	Designed by paulg	
File high Lane - Plot A Rear...	Checked by	
Innovyze		Network 2017.1.2
<div>Simulation Criteria for Storm</div> <div>Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000 Hot Start (mins) 0 Inlet Coefficient 0.800 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1 Number of Input Hydrographs 0 Number of Storage Structures 1 Number of Online Controls 1 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0</div> <div>Synthetic Rainfall Details</div> <div>Rainfall Model FSR Profile Type Summer Return Period (years) 5 Cv (Summer) 0.750 Region England and Wales Cv (Winter) 0.840 M5-60 (mm) 18.000 Storm Duration (mins) 30 Ratio R 0.379</div>		
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Innovyze		Network 2017.1.2

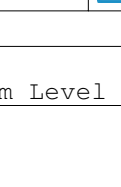
Online Controls for Storm

Pump Manhole: TANK, DS/PN: 1.001, Volume (m³): 0.1

Invert Level (m) 26.600

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000
0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000
0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000
0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000
1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000
1.400	0.0000	3.000	0.0000	4.600	0.0000		
1.600	0.0000	3.200	0.0000	4.800	0.0000		

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Innovyze	Network 2017.1.2																																																																																					
<div>Storage Structures for Storm</div> <div>Cellular Storage Manhole: TANK, DS/PN: 1.001</div> <div>Invert Level (m) 26.600 Safety Factor 5.0 Infiltration Coefficient Base (m/hr) 0.26700 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.26700</div> <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>3.5</td><td>3.5</td><td>5.200</td><td>0.0</td><td>9.5</td></tr><tr><td>0.400</td><td>3.5</td><td>6.5</td><td>5.600</td><td>0.0</td><td>9.5</td></tr><tr><td>0.800</td><td>3.5</td><td>9.5</td><td>6.000</td><td>0.0</td><td>9.5</td></tr><tr><td>0.801</td><td>0.0</td><td>9.5</td><td>6.400</td><td>0.0</td><td>9.5</td></tr><tr><td>1.600</td><td>0.0</td><td>9.5</td><td>6.800</td><td>0.0</td><td>9.5</td></tr><tr><td>2.000</td><td>0.0</td><td>9.5</td><td>7.200</td><td>0.0</td><td>9.5</td></tr><tr><td>2.400</td><td>0.0</td><td>9.5</td><td>7.600</td><td>0.0</td><td>9.5</td></tr><tr><td>2.800</td><td>0.0</td><td>9.5</td><td>8.000</td><td>0.0</td><td>9.5</td></tr><tr><td>3.200</td><td>0.0</td><td>9.5</td><td>8.400</td><td>0.0</td><td>9.5</td></tr><tr><td>3.600</td><td>0.0</td><td>9.5</td><td>8.800</td><td>0.0</td><td>9.5</td></tr><tr><td>4.000</td><td>0.0</td><td>9.5</td><td>9.200</td><td>0.0</td><td>9.5</td></tr><tr><td>4.400</td><td>0.0</td><td>9.5</td><td>9.600</td><td>0.0</td><td>9.5</td></tr><tr><td>4.800</td><td>0.0</td><td>9.5</td><td>10.000</td><td>0.0</td><td>9.5</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	3.5	3.5	5.200	0.0	9.5	0.400	3.5	6.5	5.600	0.0	9.5	0.800	3.5	9.5	6.000	0.0	9.5	0.801	0.0	9.5	6.400	0.0	9.5	1.600	0.0	9.5	6.800	0.0	9.5	2.000	0.0	9.5	7.200	0.0	9.5	2.400	0.0	9.5	7.600	0.0	9.5	2.800	0.0	9.5	8.000	0.0	9.5	3.200	0.0	9.5	8.400	0.0	9.5	3.600	0.0	9.5	8.800	0.0	9.5	4.000	0.0	9.5	9.200	0.0	9.5	4.400	0.0	9.5	9.600	0.0	9.5	4.800	0.0	9.5	10.000	0.0	9.5
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0.800	3.5	9.5	6.000	0.0	9.5																																																																																	
0.801	0.0	9.5	6.400	0.0	9.5																																																																																	
1.600	0.0	9.5	6.800	0.0	9.5																																																																																	
2.000	0.0	9.5	7.200	0.0	9.5																																																																																	
2.400	0.0	9.5	7.600	0.0	9.5																																																																																	
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3.200	0.0	9.5	8.400	0.0	9.5																																																																																	
3.600	0.0	9.5	8.800	0.0	9.5																																																																																	
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File high Lane - Plot A Rear...	Checked by	
Innovyze		Network 2017.1.2

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.379
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	1	+0%					27.521
1.001	TANK	120 Winter	1	+0%	1/30 Winter				26.729

Surcharged Flooded					Pipe		
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	SW01	-0.079	0.000	0.10		0.7	OK
1.001	TANK	0.029	0.000	0.00		0.0	SURCHARGED

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY				High Lane, Chorlton Plot A Rear SW Network				
Date 11/06/2024				Designed by paulg				
File high Lane - Plot A Rear...				Checked by				
Innovyze				Network 2017.1.2				
<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>								
Simulation Criteria								
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000		
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000		
Hot Start Level (mm)		0		Inlet Coefficient		0.800		
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000		
Foul Sewage per hectare (l/s)		0.000						
Number of Input Hydrographs		0		Number of Storage Structures		1		
Number of Online Controls		1		Number of Time/Area Diagrams		0		
Number of Offline Controls		0		Number of Real Time Controls		0		
Synthetic Rainfall Details								
Rainfall Model		FSR		Ratio R		0.379		
Region England and Wales		Cv (Summer)		0.750				
M5-60 (mm)		18.000		Cv (Winter)		0.840		
Margin for Flood Risk Warning (mm)		300.0						
Analysis Timestep		2.5 Second Increment (Extended)						
DTS Status		OFF						
DVD Status		ON						
Inertia Status		ON						
Profile(s)		Summer and Winter						
Duration(s) (mins)		15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440						
Return Period(s) (years)		1, 30, 100						
Climate Change (%)		0, 0, 45						
Water								
US/MH	Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	
PN Name Storm Period Change Surcharge Flood Overflow Act. (m)								
1.000 SW01 15 Winter 100 +45%								27.547
1.001 TANK 180 Winter 100 +45% 1/30 Winter								27.381
Surcharged Flooded								
US/MH	Depth	Volume	Flow /	Overflow	Pipe		Level	
PN Name (m) (m³) Cap. (l/s) (l/s) Status Exceeded								
1.000 SW01 -0.053 0.000 0.45 3.4 OK								
1.001 TANK 0.681 0.000 0.00 0.0 SURCHARGED								
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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot B & D SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot B & D ...	Checked by	
Innovyze	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.379	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.013	4-8	0.003

Total Area Contributing (ha) = 0.016

Total Pipe Volume (m³) = 0.298

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	15.000	0.190	78.9	0.005	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	7.000	0.090	77.8	0.006	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	6.000	0.075	80.0	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	10.000	0.171	58.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.29	26.990	0.005	0.0	0.0	0.0	0.87	6.8	0.7
1.001	50.00	5.42	26.800	0.011	0.0	0.0	0.0	0.87	6.9	1.5
1.002	50.00	5.54	26.710	0.016	0.0	0.0	0.0	0.86	6.8	2.2
1.003	50.00	5.70	26.000	0.016	0.0	0.0	0.0	1.01	7.9	2.2

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot B & D SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot B & D ...	Checked by	
Innovyze	Network 2017.1.2	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	SW13	27.750	26.990	0.660	Open Manhole	450
1.001	o	100	SW14	27.750	26.800	0.850	Open Manhole	1200
1.002	o	100	SW15	27.400	26.710	0.590	Open Manhole	1200
1.003	o	100	TANK	27.400	26.000	1.300	Open Manhole	300

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	15.000	78.9	SW14	27.750	26.800	0.850	Open Manhole	1200
1.001	7.000	77.8	SW15	27.400	26.710	0.590	Open Manhole	1200
1.002	6.000	80.0	TANK	27.400	26.635	0.665	Open Manhole	300
1.003	10.000	58.5	dummy	28.000	25.829	2.071	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	dummy	28.000	25.829	26.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	5	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.379		

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot B & D SW Network	
Date 19/08/2024	Designed by paulg	
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Innovyze	Network 2017.1.2	

Online Controls for Storm

Pump Manhole: TANK, DS/PN: 1.003, Volume (m³): 0.1

Invert Level (m) 26.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000
0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000
0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000
0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000
1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000
1.400	0.0000	3.000	0.0000	4.600	0.0000		
1.600	0.0000	3.200	0.0000	4.800	0.0000		

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot B & D SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot B & D ...	Checked by	
Innovyze		Network 2017.1.2

Storage Structures for Storm

Cellular Storage Manhole: TANK, DS/PN: 1.003

Invert Level (m) 26.000 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.26700 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.26700

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	12.0	12.0	5.200	0.0	23.1
0.400	12.0	17.5	5.600	0.0	23.1
0.800	12.0	23.1	6.000	0.0	23.1
0.801	0.0	23.1	6.400	0.0	23.1
1.600	0.0	23.1	6.800	0.0	23.1
2.000	0.0	23.1	7.200	0.0	23.1
2.400	0.0	23.1	7.600	0.0	23.1
2.800	0.0	23.1	8.000	0.0	23.1
3.200	0.0	23.1	8.400	0.0	23.1
3.600	0.0	23.1	8.800	0.0	23.1
4.000	0.0	23.1	9.200	0.0	23.1
4.400	0.0	23.1	9.600	0.0	23.1
4.800	0.0	23.1	10.000	0.0	23.1

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot B & D SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot B & D ...	Checked by	
Innovyze	Network 2017.1.2	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.379
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 45

									Water
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
1.000	SW13	15 Winter	1	+0%					27.011
1.001	SW14	15 Winter	1	+0%	100/15 Summer				26.830
1.002	SW15	15 Winter	1	+0%	100/15 Summer				26.747
1.003	TANK	120 Winter	1	+0%	30/15 Summer				26.097

		Surcharged Flooded			Pipe			Level	
PN	US/MH Name	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Exceeded	
1.000	SW13	-0.079	0.000	0.09		0.6	OK		
1.001	SW14	-0.070	0.000	0.20		1.2	OK		
1.002	SW15	-0.063	0.000	0.29		1.7	OK		
1.003	TANK	-0.003	0.000	0.00		0.0	OK		

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY					High Lane, Chorlton Plot B & D SW Network				
Date 19/08/2024					Designed by paulg				
File high Lane - Plot B & D ...					Checked by				
Innovyze					Network 2017.1.2				
30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm									
Simulation Criteria									
Areal Reduction Factor 1.000					Additional Flow - % of Total Flow 0.000				
Hot Start (mins) 0					MADD Factor * 10m³/ha Storage 2.000				
Hot Start Level (mm) 0					Inlet Coefficient 0.800				
Manhole Headloss Coeff (Global) 0.500					Flow per Person per Day (l/per/day) 0.000				
Foul Sewage per hectare (l/s) 0.000									
Number of Input Hydrographs 0					Number of Storage Structures 1				
Number of Online Controls 1					Number of Time/Area Diagrams 0				
Number of Offline Controls 0					Number of Real Time Controls 0				
Synthetic Rainfall Details									
Rainfall Model FSR					Ratio R 0.379				
Region England and Wales Cv (Summer) 0.750									
M5-60 (mm) 18.000					Cv (Winter) 0.840				
Margin for Flood Risk Warning (mm)					300.0				
Analysis Timestep 2.5 Second Increment (Extended)									
DTS Status					OFF				
DVD Status					ON				
Inertia Status					ON				
Profile(s) Summer and Winter									
Duration(s) (mins)					15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440				
Return Period(s) (years)					1, 30, 100				
Climate Change (%)					0, 0, 45				
Water									
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)
1.000	SW13	15 Winter	30	+0%					27.023
1.001	SW14	15 Winter	30	+0%	100/15 Summer				26.853
1.002	SW15	15 Winter	30	+0%	100/15 Summer				26.780
1.003	TANK	120 Winter	30	+0%	30/15 Summer				26.290
Surcharged Flooded									
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded	
1.000	SW13	-0.067	0.000	0.23		1.5	OK		
1.001	SW14	-0.047	0.000	0.54		3.4	OK		
1.002	SW15	-0.030	0.000	0.81		4.9	OK		
1.003	TANK	0.190	0.000	0.00		0.0	SURCHARGED		
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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024 File high Lane - Plot C Rear...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.379	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.022	4-8	0.005

Total Area Contributing (ha) = 0.027

Total Pipe Volume (m³) = 0.495

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.210	47.6	0.006	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	20.000	0.255	78.4	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	20.000	0.250	80.0	0.007	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	3.000	0.038	80.0	0.007	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	10.000	0.171	58.5	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.15	26.800	0.006	0.0	0.0	0.0	1.12	8.8	0.8
1.001	50.00	5.53	26.590	0.013	0.0	0.0	0.0	0.87	6.8	1.8
1.002	50.00	5.92	26.335	0.020	0.0	0.0	0.0	0.86	6.8	2.7
2.000	50.00	4.06	26.390	0.007	0.0	0.0	0.0	0.86	6.8	0.9
1.003	50.00	6.08	25.600	0.027	0.0	0.0	0.0	1.01	7.9	3.7

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network																																																																																																																																																																									
Date 19/08/2024 File high Lane - Plot C Rear...	Designed by paulg Checked by																																																																																																																																																																									
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<div>PIPELINE SCHEDULES for Storm</div> <div>Upstream Manhole</div> <table><tr><th>PN</th><th>Hyd Sect</th><th>Diam (mm)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>1.000</td><td>o</td><td>100</td><td>SW20</td><td>27.400</td><td>26.800</td><td>0.500</td><td>Open Manhole</td><td>450</td></tr><tr><td>1.001</td><td>o</td><td>100</td><td>SW21</td><td>27.400</td><td>26.590</td><td>0.710</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.002</td><td>o</td><td>100</td><td>SW21</td><td>27.400</td><td>26.335</td><td>0.965</td><td>Open Manhole</td><td>1200</td></tr><tr><td>2.000</td><td>o</td><td>100</td><td>SW24</td><td>27.400</td><td>26.390</td><td>0.910</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.003</td><td>o</td><td>100</td><td>TANK</td><td>27.400</td><td>25.600</td><td>1.700</td><td>Open Manhole</td><td>300</td></tr></table> <div>Downstream Manhole</div> <table><tr><th>PN</th><th>Length (m)</th><th>Slope (1:X)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>1.000</td><td>10.000</td><td>47.6</td><td>SW21</td><td>27.400</td><td>26.590</td><td>0.710</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.001</td><td>20.000</td><td>78.4</td><td>SW21</td><td>27.400</td><td>26.335</td><td>0.965</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.002</td><td>20.000</td><td>80.0</td><td>TANK</td><td>27.400</td><td>26.085</td><td>1.215</td><td>Open Manhole</td><td>300</td></tr><tr><td>2.000</td><td>3.000</td><td>80.0</td><td>TANK</td><td>27.400</td><td>26.353</td><td>0.947</td><td>Open Manhole</td><td>300</td></tr><tr><td>1.003</td><td>10.000</td><td>58.5</td><td>dummy</td><td>28.000</td><td>25.429</td><td>2.471</td><td>Open Manhole</td><td>0</td></tr></table> <div>Free Flowing Outfall Details for Storm</div> <table><tr><th>Outfall Pipe Number</th><th>Outfall Name</th><th>C. Level (m)</th><th>I. Level (m)</th><th>Min I. Level (m)</th><th>D,L (mm)</th><th>W (mm)</th></tr><tr><td>1.003</td><td>dummy</td><td>28.000</td><td>25.429</td><td>26.000</td><td>0</td><td>0</td></tr></table> <div>Simulation Criteria for Storm</div> <table><tr><td>Volumetric Runoff Coeff</td><td>0.750</td><td>Additional Flow - % of Total Flow</td><td>0.000</td></tr><tr><td>Areal Reduction Factor</td><td>1.000</td><td>MADD Factor * 10m³/ha Storage</td><td>2.000</td></tr><tr><td>Hot Start (mins)</td><td>0</td><td>Inlet Coefficient</td><td>0.800</td></tr><tr><td>Hot Start Level (mm)</td><td>0</td><td>Flow per Person per Day (l/per/day)</td><td>0.000</td></tr><tr><td>Manhole Headloss Coeff (Global)</td><td>0.500</td><td>Run Time (mins)</td><td>60</td></tr><tr><td>Foul Sewage per hectare (l/s)</td><td>0.000</td><td>Output Interval (mins)</td><td>1</td></tr><tr><td>Number of Input Hydrographs</td><td>0</td><td>Number of Storage Structures</td><td>1</td></tr><tr><td>Number of Online Controls</td><td>1</td><td>Number of Time/Area Diagrams</td><td>0</td></tr><tr><td>Number of Offline Controls</td><td>0</td><td>Number of Real Time Controls</td><td>0</td></tr></table> <div>Synthetic Rainfall Details</div> <table><tr><td>Rainfall Model</td><td>FSR</td><td>Region</td><td>England and Wales</td></tr><tr><td>Return Period (years)</td><td>5</td><td>M5-60 (mm)</td><td>18.000</td></tr></table>			PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	1.000	o	100	SW20	27.400	26.800	0.500	Open Manhole	450	1.001	o	100	SW21	27.400	26.590	0.710	Open Manhole	1200	1.002	o	100	SW21	27.400	26.335	0.965	Open Manhole	1200	2.000	o	100	SW24	27.400	26.390	0.910	Open Manhole	1200	1.003	o	100	TANK	27.400	25.600	1.700	Open Manhole	300	PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	1.000	10.000	47.6	SW21	27.400	26.590	0.710	Open Manhole	1200	1.001	20.000	78.4	SW21	27.400	26.335	0.965	Open Manhole	1200	1.002	20.000	80.0	TANK	27.400	26.085	1.215	Open Manhole	300	2.000	3.000	80.0	TANK	27.400	26.353	0.947	Open Manhole	300	1.003	10.000	58.5	dummy	28.000	25.429	2.471	Open Manhole	0	Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)	1.003	dummy	28.000	25.429	26.000	0	0	Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000	Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000	Hot Start (mins)	0	Inlet Coefficient	0.800	Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000	Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60	Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1	Number of Input Hydrographs	0	Number of Storage Structures	1	Number of Online Controls	1	Number of Time/Area Diagrams	0	Number of Offline Controls	0	Number of Real Time Controls	0	Rainfall Model	FSR	Region	England and Wales	Return Period (years)	5	M5-60 (mm)	18.000	©1982-2017 XP Solutions	
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Brennan Consult		Page 3
Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot C Rear...	Checked by	
Innovyze		Network 2017.1.2
<p style="text-align: center;"><u>Synthetic Rainfall Details</u></p> <p style="text-align: center;"> Ratio R 0.379 Cv (Winter) 0.840 Profile Type Summer Storm Duration (mins) 30 Cv (Summer) 0.750 </p>		
<p style="text-align: center;">©1982-2017 XP Solutions</p>		

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot C Rear...	Checked by	
Innovyze		Network 2017.1.2

Online Controls for Storm

Pump Manhole: TANK, DS/PN: 1.003, Volume (m³): 0.3

Invert Level (m) 25.600

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000
0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000
0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000
0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000
1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000
1.400	0.0000	3.000	0.0000	4.600	0.0000		
1.600	0.0000	3.200	0.0000	4.800	0.0000		

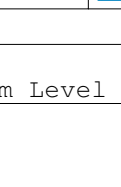
Brennan Consult		Page 5
Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot C Rear...	Checked by	
Innovyze		Network 2017.1.2

Storage Structures for Storm

Cellular Storage Manhole: TANK, DS/PN: 1.003

Invert Level (m) 25.600 Safety Factor 5.0
Infiltration Coefficient Base (m/hr) 0.26700 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.26700

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	15.0	15.0	5.200	0.0	27.4
0.400	15.0	21.2	5.600	0.0	27.4
0.800	15.0	27.4	6.000	0.0	27.4
0.801	0.0	27.4	6.400	0.0	27.4
1.600	0.0	27.4	6.800	0.0	27.4
2.000	0.0	27.4	7.200	0.0	27.4
2.400	0.0	27.4	7.600	0.0	27.4
2.800	0.0	27.4	8.000	0.0	27.4
3.200	0.0	27.4	8.400	0.0	27.4
3.600	0.0	27.4	8.800	0.0	27.4
4.000	0.0	27.4	9.200	0.0	27.4
4.400	0.0	27.4	9.600	0.0	27.4
4.800	0.0	27.4	10.000	0.0	27.4

Brennan Consult		Page 6
Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024 File high Lane - Plot C Rear...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.379
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

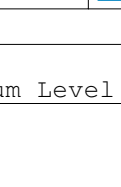
Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW20	15 Winter	1	+0%					26.820
1.001	SW21	15 Winter	1	+0%	100/15 Summer				26.622
1.002	SW21	15 Winter	1	+0%	100/15 Summer				26.375
2.000	SW24	15 Summer	1	+0%	100/120 Winter				26.418
1.003	TANK	120 Winter	1	+0%	1/30 Summer				25.743

Surcharged Flooded

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW20	-0.080	0.000	0.09		0.7	OK	
1.001	SW21	-0.068	0.000	0.22		1.5	OK	
1.002	SW21	-0.060	0.000	0.33		2.2	OK	
2.000	SW24	-0.072	0.000	0.17		0.9	OK	
1.003	TANK	0.043	0.000	0.00		0.0	SURCHARGED	

Brennan Consult		Page 7
Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024	Designed by paulg	
File high Lane - Plot C Rear...	Checked by	
Innovyze	Network 2017.1.2	

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.379
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

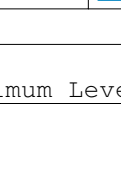
Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW20	15 Winter	30	+0%					26.832
1.001	SW21	15 Winter	30	+0%	100/15 Summer				26.647
1.002	SW21	15 Winter	30	+0%	100/15 Summer				26.413
2.000	SW24	15 Summer	30	+0%	100/120 Winter				26.435
1.003	TANK	180 Winter	30	+0%	1/30 Summer				26.023

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW20	-0.068	0.000	0.22		1.8	OK	
1.001	SW21	-0.043	0.000	0.60		4.0	OK	
1.002	SW21	-0.022	0.000	0.94		6.1	OK	
2.000	SW24	-0.055	0.000	0.42		2.3	OK	
1.003	TANK	0.323	0.000	0.00		0.0	SURCHARGED	

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Oak House, 2 Gatley Road Cheadle Stockport, SK8 1PY	High Lane, Chorlton Plot C SW Network	
Date 19/08/2024 File high Lane - Plot C Rear...	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

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

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.379
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW20	15 Winter	100	+45%					26.867
1.001	SW21	15 Winter	100	+45%	100/15 Summer				26.838
1.002	SW21	240 Winter	100	+45%	100/15 Summer				26.829
2.000	SW24	240 Winter	100	+45%	100/120 Winter				26.831
1.003	TANK	240 Winter	100	+45%	1/30 Summer				27.324

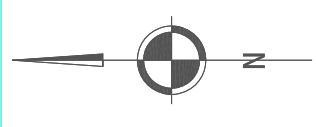
PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW20	-0.033	0.000	0.41		3.4	OK	
1.001	SW21	0.148	0.000	0.89		5.9	SURCHARGED	
1.002	SW21	0.394	0.000	0.35		2.3	SURCHARGED	
2.000	SW24	0.341	0.000	0.15		0.8	SURCHARGED	
1.003	TANK	1.624	0.000	0.00		0.0	FLOOD RISK	

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Project Title High Lane, Chorlton, Manchester, M21 9FA
Project Title Drainage Condition Report
Project No 2835-BCL-00-XX-RP-C-0002
Date 16th April 2025



Appendix C – Extract of CCTV Survey



Legend/Notes:

- Combined Sewer
- Foul Sewer
- SW Sewer
- Assumed Sewer (Not Proven)
- Rising Main
- Highway Drainage
- Culvert Sewer
- Open Water Course
- Overflow Line
- Treated Line
- Rain Water Down Pipe
- Foul Water Down Pipe
- Combined Down Pipe
- Gray Water Down Pipe
- Highway Gully
- Septic Tanks
- Direction of overland flows
- Spot levels



Warrington Business Park, Long Lane, Warrington, Cheshire, W42 8TX
Tel: 01925 244376 Fax: 01925 241517
Email: kevin@invek.com - www.invek.com

Client

Brennan Consult

Drawing Title

High Lane, Chorlton
Drainage Layout

Scale(s)	N.T.S	Drawn	PW
Date	07.06.23	Checked	RD
Job Number	2108	Approved	KN

Sheet Size, Drawing Number & Revision

A1_2108/01_Rev_00



Project Title High Lane, Chorlton, Manchester, M21 9FA
Project Title Drainage Condition Report
Project No 2835-BCL-00-XX-RP-C-0002
Date 16th April 2025



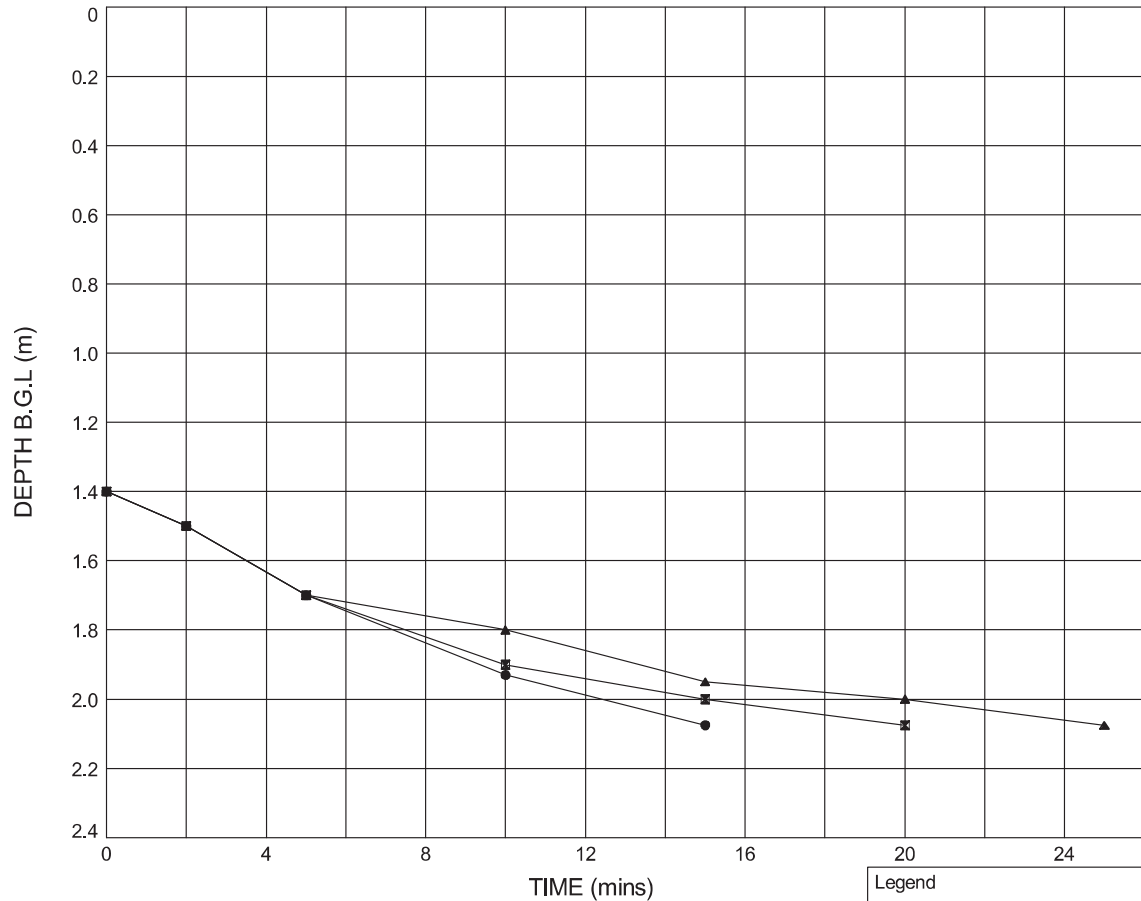
Appendix D – Soakaway Test Results

FULL SCALE SOAKAWAY TEST

In accordance with BRE Digest 365

Soakaway Test - Position ID : **SA01**

Plot of Depth of Water Below Ground Level Against Time

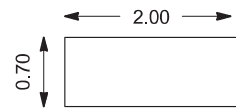


	Test 1	Test 2	Test 3	
Pit start depth:	= 2.30	2.30	2.30	m
Pit final depth:	= 2.30	2.30	2.30	m
Effective depth, D_e	= 0.90	0.90	0.90	m
Effective storage volume, V_{p75-25}	= 0.6300	0.6300	0.6300	m ³
Surface area, a_{s50}	= 3.8300	3.8300	3.8300	m ²
Time, t_{p75-25}	= 668.0	968.0	1268.0	secs
Infiltration rate, f	= 2.46×10^{-4}	1.70×10^{-4}	1.30×10^{-4}	m/s

Legend

●	Test 1	(27.11.23)
■	Test 2	(27.11.23)
▲	Test 3	(27.11.23)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

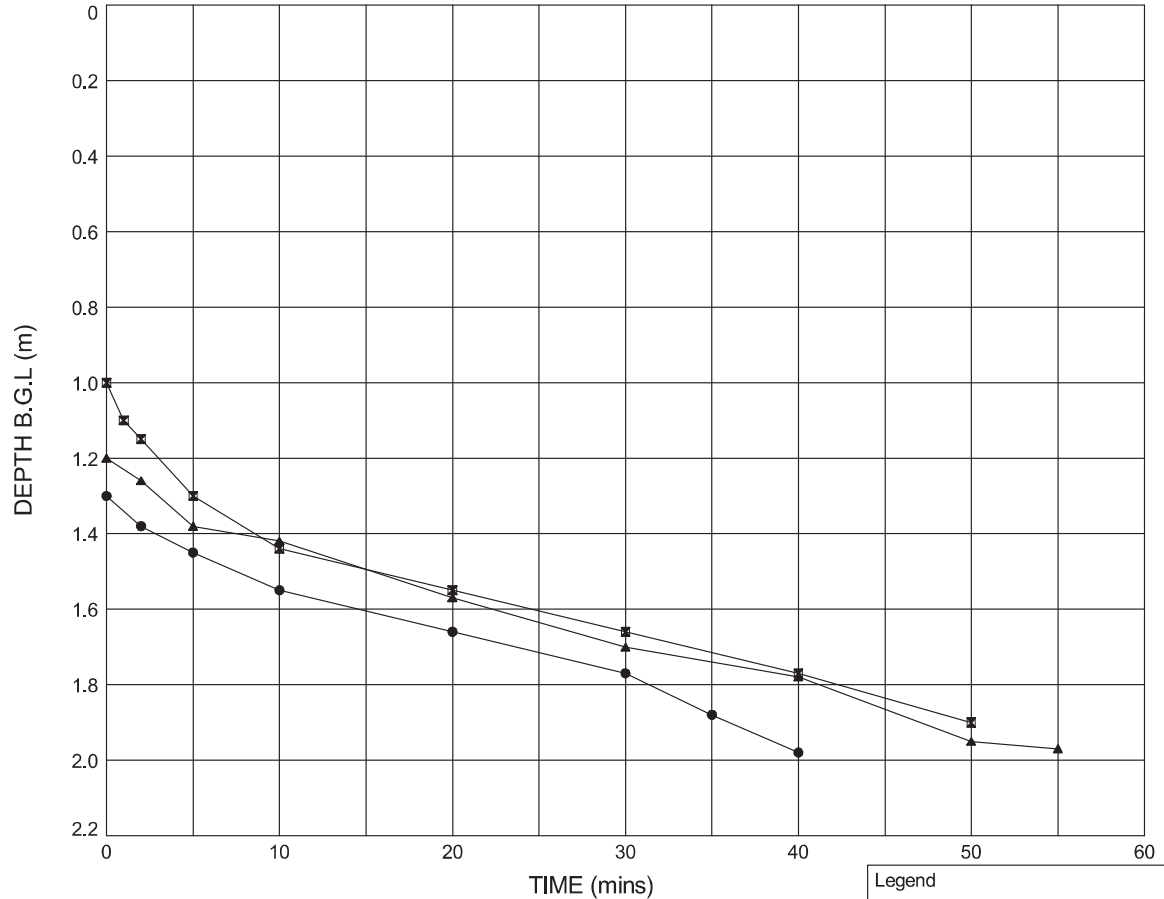
Compiled By	Date	Checked By	Date
<i>K. Flunacher</i>	27/11/23	<i>M. Dine</i>	27/11/23
Contract	Contract Ref:		
Chorlton High School	785518		

FULL SCALE SOAKAWAY TEST

In accordance with BRE Digest 365

Soakaway Test - Position ID : **SA02**

Plot of Depth of Water Below Ground Level Against Time

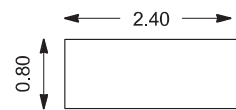


	Test 1	Test 2	Test 3	
Pit start depth:	= 2.20	2.20	2.20	m
Pit final depth:	= 2.20	2.20	2.20	m
Effective depth, D_e	= 0.90	1.20	1.00	m
Effective storage volume, V_{p75-25}	= 0.8640	1.1520	0.9600	m ³
Surface area, a_{s50}	= 4.8000	5.7600	5.1200	m ²
Time, t_{p75-25}	= 1860.0	2700.0	2280.0	secs
Infiltration rate, f	= 9.68×10^{-5}	7.41×10^{-5}	8.22×10^{-5}	m/s

Legend

- Test 1 (27.11.23)
- Test 2 (27.11.23)
- ▲ Test 3 (27.11.23)

Plan (Not to scale)



No Bearing Taken



STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By	Date	Checked By	Date
<i>K. Krumacher</i>	27/11/23	<i>M. Dine</i>	27/11/23
Contract		Contract Ref:	
Chorlton High School		785518	