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Surface Water and SuDS Assessment Rev0

Queens Road,
Manchester,
M8 0RX

21 February 2023

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Prepared by	Checked by	Date
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This document has been prepared solely as a Surface Water and SuDS Assessment for Seed Architects. Base Energy accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared.

1. Introduction

This Surface Water and SuDS Assessment has been prepared to support the planning application for the proposed development on land off Queens Road, Manchester.

Existing Site Description

The existing site is currently occupied by areas of concrete hardstanding, and grass and brambles. The existing layout is shown on the topographic survey in **Appendix A**.

Development Proposals

Proposals are for a 'trade counter' style warehouse with associated car parking. A copy of the proposed site layout plans is provided in **Appendix B**.

2. Planning Policy

Manchester Council

Core Strategy

Policy EN 14 Flood Risk states:

All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

12.84 The main ways in which Local Authorities can influence water quality are by: encouraging the use of sustainable drainage systems (SUDS) as a way to reduce water run-off; not all types of SUDS are appropriate for all urban areas; in some parts of Manchester there are brownfield sites which have issues of contamination where the use of some types of SUDS would be problematic, causing transfer of contaminants to receptor sites (the Strategic Flood Risk Assessment provides further guidance on this); where appropriate, above-ground SUDS such as retention ponds, ponds and swales are preferred to underground options because they have greater landscape and biodiversity value; in densely built-up urban areas such as Manchester where there is limited open space, there is also a role for innovative SUDS solutions including green roofs and green walls.

Non-Statutory Technical Standards for SuDS

The Non-Statutory Technical Standards for SuDS, (and accompanying Local Authority SuDS Officer Organisation (LASOO) Practice Guidance) sets out the details which should be addressed within a SuDS Report, including:

- Flood Risk Outside of the Development
- Peak Flow Control and Volume Control
- Flood Risk Within the Development
- Runoff Destinations

-
- Structural Integrity
 - Designing for Maintenance Considerations
 - Construction

3. Surface Water and SuDS

The whole site comprises approximately 400m² (0.04ha).

The **ICP SuDS** method within Micro Drainage has been used to calculate flow rates from the total site (as detailed in **Appendix D** and shown in **Table 1**).

Table 1 – ICP SuDS – Proposed Greenfield Runoff Rates (l/s)

Return Period	Flow Rate for 400m ² (0.04ha) (l/s)
QBAR	0.2
1 in 30 year	0.4
1 in 100 year	0.5

Following redevelopment of the site, the areas will be made up as follows:

- Roof areas ~200m²
- Hardstanding ~200m²

SuDS Approach

When choosing and designing SuDS for a development, it is important to recognise the constraints associated with the type of SuDS to be installed, including the size of the site and the underlying ground conditions. Most Councils set out a strategic approach for the disposal of surface water runoff, which mirrors the hierarchy set out in Building Regulations Approved Document Part H¹. In general, these are as follows:

¹ Building Regulations Approved Document H Section 3 page 45

Infiltration

The Soilsapes Maps provided by the National Soil Resources Institute at Cranfield University indicate that the soils at the site and surrounding areas are comprised of '*Freely draining slightly acid loamy soils*'.

The British Geological Survey geology maps indicate that the site is underlain by Devensian Till. The underlying bedrock is shown to be comprised of Pennine Middle Coal Measures Formation - Mudstone, siltstone and sandstone.

In order to investigate the underlying ground conditions further, reference has been made to the BGS borehole records; there nearest record is from Bury Electric Railways on Queens Road (**Appendix D**). The record confirms that the underlying ground is sandy and stoney loam, underlain by clay, quicksand and loam.

Given the presence of clay, we would not recommend a strategy based on infiltration.

Discharge to a watercourse

There are no watercourses in the immediate vicinity of the site.

Discharge to a surface water sewer

It is understood that surface water runoff currently connects into the public sewer system. Therefore, it is recommended that surface water continues to drain as existing, with SuDS to manage flows from the site.

SuDS Strategy

SuDS aim to mimic natural drainage and can achieve multiple objectives such as removing pollutants from urban runoff at source, controlling surface water runoff from developments, ensuring that flood risk is not increased further downstream and combining water management with green space which can increase amenity and biodiversity value. When selecting SuDS, consideration needs to be given to a range of factors including the ground conditions, type of proposals, and the constraints of the site.

Based on the desktop study of underlying ground condition, and recognising the scale and nature of the proposals, in this instance it is suggested that surface water continues to drain into the public sewer system, via attenuation storage with a controlled outlet set at 5ls.

As shown in **Appendix E**, a total storage volume of 9m³ would be required. The storage has been designed at a depth of 1.5m, filling to 1.0m and with a 0.5m freeboard provided, should any excess flows be received.

United Utilities will be consulted to confirm capacity and agree the flow rates will be undertaken once planning permission has been granted. Detailed drainage drawings will be submitted at detailed drainage design stage.

The SuDS strategy has been put together based on our understanding of the ground conditions and site layout. Building Control will need to be consulted on the siting of the SuDS, and the recommendations and advice of the SuDS manufacturer / installer should always be followed.

SuDS Maintenance

Schedules are provided below (taken from Ciria C753 The SuDS Manual); these, or similar should be followed.

Attenuation Storage

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
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required

Remedial Actions	Repair/ rehabilitate inlets, outlet, overflow, 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 five years, or as required

Pipe System

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
	Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
	Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks to avoid damage to system	Monthly or as required
Remedial Actions	Repair physical damage if necessary	As required
Monitoring	Inspect all inlets, outlets and vents to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required

Hydrobrake

Hydro International Warranty, Maintenance Statement

The following has been provided by Hydro International:

Normally, little maintenance is required as there are no moving parts within the Flow Control. Experience has shown that if blockages occur they do so at the intake, and the cause on such occasions has been due to a lack of attention to engineering detail such as approach velocities being too low, inadequate benching, or the use of units below the minimum recommended size.

The Flow Control (where applicable) is fitted with a pivoting bypass door, which allows the manhole chamber to be drained down should blockage occur. The smaller conical units, below the minimum recommended size, are also supplied with rodding facilities or vortex suppressor pipes as standard.

Following installation of the Flow Control it is vitally important that any extraneous material i.e. building materials are removed from the unit and the chamber.

After the system is made live, and assuming that the chamber design is satisfactory, it is recommended that each unit be inspected monthly for three months and thereafter at six monthly intervals with hose down if required.

4. Conclusions

This Surface Water and SuDS Assessment has been prepared to support the planning application for the proposed development on land off Queens Road, Manchester.

The existing site is currently occupied by areas of concrete hardstanding, and grass and brambles.

Proposals are for a 'trade counter' style warehouse with associated car parking.

Based on the desktop study of underlying ground condition, and recognising the scale and nature of the proposals, in this instance it is suggested that surface water continues to drain into the public sewer system, via attenuation storage with a controlled outlet set at 5ls.

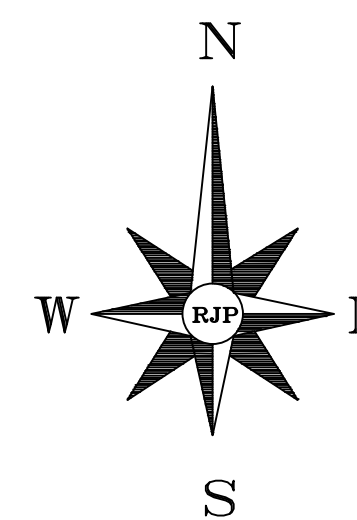
On this basis a total storage volume of 9m³ would be required. The storage has been designed at a depth of 1.5m, filling to 1.0m and with a 0.5m freeboard provided, should any excess flows be received.

United Utilities will be consulted to confirm capacity and agree the flow rates will be undertaken once planning permission has been granted. Detailed drainage drawings will be submitted at detailed drainage design stage.

The SuDS strategy has been put together based on our understanding of the ground conditions and site layout. Building Control will need to be consulted on the siting of the SuDS, and the recommendations and advice of the SuDS manufacturer / installer should always be followed.

Appendices

Appendix A - Topographic Survey



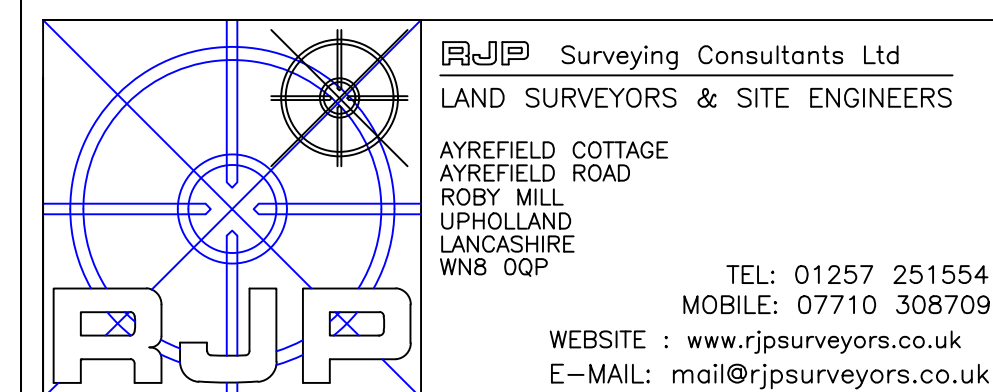
STATION	EASTING	NORTHING	LEVEL (m)
1	385075.931	400627.057	54.742
2	385131.369	400639.205	53.922

ABBREVIATIONS			
AV	VALVE/VENT	IC	INSPECT CHAMBER
BOL	BOLLARD	IL	INVERT LEVEL
BB	BELLSHA BEAK	JKW	JANESHA KNOTT WEED
BM	BENCH MARK	LH	LAMP HOLE
BL	BLD LEVEL	LP	LUMP
BS	BUS STOP	MP	NAME PLATE
BT	BRITISH TELECOM	MH	MANHOLE
CL	COVER LEVEL	POST	POST/SIGN POST
DIL	DILAPIDATED	PB	POST BOX
DIS	DISUSED	PX	UNKNOWN SURVICE
EL	ELEVES LEVEL	RA	ROOOFING EYE
ELE	ELEC JUNCT. BOX	RL	ROGE LEVEL
EP	ELECTRICITY POLE	RS	ROAD SIGN
FH	FIRE HYDRANT	ST	STOP TAP
FL	FLOOR LEVEL	TH	TRIAL HOLE
FOS	FULL OF SEDIMENT	TL	TRAFFIC LIGHT
FP	FLAG POLE	TP	TELEGRAPH POLE
G	GULLY	TV	CABLE TV BOX
GV	GAS VALVE	UN	UNABLE TO LIFT
CV	CAS VALVE	WM	WATER METER

<u>SYMBOLS</u>			
	SURVEY STATION		TREE
	O\H ELEC CABLE		BENCH MARK
	O\H PHONE LINE		TRIAL PIT
	CANOPY\HEDGE		BOREHOLE

NOTES

Rev	Description	Date
	PROPOSED DEVELOPMENT AT QUEENS RD, CHEETHAM HILL	
	SEED ARCHITECTS	
	TOPOGRAPHICAL SURVEY	
SD008/TOO	Surveyed	A. BAYBUTT
	Drawn	I. GREEN
	Date	JANUARY 2023
	Scale	1:200 @ A1



Appendix B - Proposed Site Layout Plan

Appendix C - Greenfield Runoff

Base Energy Services Limited		Page 1
44 Canal Street Bootle Liverpool L20 8QU	Queens Road Manchester Total Site Greenfield	
Date 21/02/2023 File F - Attenuation.SRCX	Designed by CC Checked by PK	
Micro Drainage Source Control 2020.1.3		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 0.040 Urban 0.000 SAAR (mm) 860 Region Number Region 10 Results 1/s QBAR Rural 0.2 QBAR Urban 0.2 Q100 years 0.5 Q1 year 0.2 Q30 years 0.4 Q100 years 0.5		
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Appendix D - British Geological Survey Borehole Records

SD 80 SE 84-11.85

(R10008) Wt.5086-S111-2,000 6/25 Gp.160. O.A.

SECTION OF L. & Y. Boreholes at Cheetham Hill & Grumpsall
made for the building of the new electric railway Manchester - Bury.

Maps: One-inch 85. Six-inch 104 N. E. W County Lancashire.

Height above O.D. Below Latitude — Longitude —

Communicated by L. & Y. R. Date of Sinking —

Made by District Engineer's Office Dip of Strata —
Hunt & Bury, Manchester
All on present line of electric railway. Other holes in this series on 96 S.W.

No. 11. 85
No. 1. Queen's Road. 180 ft. O.D.

Sandy loam
Strong loam

Thickness. Depth from Surface.

Thickness.		Depth from Surface.	
		metres	
10	—	3.05	10 —
13	6	7.16	23 6

No. 10. 84
No. 4. 11 ft. N. of Queen's Road. 198 ft. O.D.

Clay
Quicksand
Loam
marl

1	6	0.46	1 6
16	—	5.33	17 6
5	6	7.01	23 —
11	—	10.36	34 —

Appendix E - Micro Drainage Storage Calculations

Base Energy Services Limited					Page 1	
44 Canal Street		Queens Road				
Bootle		Attenuation				
Liverpool L20 8QU		100yr 40Cc 5ls				
Date 21/02/2023		Designed by CC				
File 100yr 40CC.SRCX		Checked by PK				
Micro Drainage		Source Control 2020.1.3				
<u>Summary of Results for 100 year Return Period (+40%)</u>						
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status	
15 min Summer	0.669	0.669	5.0	6.7	O K	
30 min Summer	0.774	0.774	5.0	7.7	O K	
60 min Summer	0.714	0.714	5.0	7.1	O K	
120 min Summer	0.498	0.498	5.0	5.0	O K	
180 min Summer	0.323	0.323	5.0	3.2	O K	
240 min Summer	0.213	0.213	4.9	2.1	O K	
360 min Summer	0.122	0.122	4.3	1.2	O K	
480 min Summer	0.099	0.099	3.5	1.0	O K	
600 min Summer	0.086	0.086	3.0	0.9	O K	
720 min Summer	0.078	0.078	2.6	0.8	O K	
960 min Summer	0.067	0.067	2.1	0.7	O K	
1440 min Summer	0.055	0.055	1.5	0.6	O K	
2160 min Summer	0.046	0.046	1.1	0.5	O K	
2880 min Summer	0.040	0.040	0.8	0.4	O K	
4320 min Summer	0.033	0.033	0.6	0.3	O K	
5760 min Summer	0.029	0.029	0.5	0.3	O K	
7200 min Summer	0.027	0.027	0.4	0.3	O K	
8640 min Summer	0.025	0.025	0.3	0.2	O K	
10080 min Summer	0.023	0.023	0.3	0.2	O K	
15 min Winter	0.783	0.783	5.0	7.8	O K	
30 min Winter	0.898	0.898	5.0	9.0	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)		
15 min Summer	147.106	0.0	11.0	21		
30 min Summer	94.613	0.0	14.2	30		
60 min Summer	57.877	0.0	17.4	48		
120 min Summer	34.225	0.0	20.5	78		
180 min Summer	24.863	0.0	22.4	108		
240 min Summer	19.719	0.0	23.7	134		
360 min Summer	14.165	0.0	25.5	190		
480 min Summer	11.206	0.0	26.9	250		
600 min Summer	9.338	0.0	28.0	308		
720 min Summer	8.042	0.0	28.9	368		
960 min Summer	6.349	0.0	30.5	488		
1440 min Summer	4.545	0.0	32.7	734		
2160 min Summer	3.249	0.0	35.1	1088		
2880 min Summer	2.558	0.0	36.8	1456		
4320 min Summer	1.825	0.0	39.4	2136		
5760 min Summer	1.435	0.0	41.3	2936		
7200 min Summer	1.190	0.0	42.8	3664		
8640 min Summer	1.021	0.0	44.1	4392		
10080 min Summer	0.897	0.0	45.2	5072		
15 min Winter	147.106	0.0	12.4	21		
30 min Winter	94.613	0.0	15.9	31		
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Base Energy Services Limited					Page 2
44 Canal Street Bootle Liverpool L20 8QU		Queens Road Attenuation 100yr 40Cc 5ls			
Date 21/02/2023 File 100yr 40CC.SRCX		Designed by CC Checked by PK			
Micro Drainage		Source Control 2020.1.3			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.804	0.804	5.0	8.0	O K
120 min Winter	0.462	0.462	5.0	4.6	O K
180 min Winter	0.227	0.227	4.9	2.3	O K
240 min Winter	0.130	0.130	4.5	1.3	O K
360 min Winter	0.093	0.093	3.3	0.9	O K
480 min Winter	0.079	0.079	2.6	0.8	O K
600 min Winter	0.070	0.070	2.2	0.7	O K
720 min Winter	0.064	0.064	1.9	0.6	O K
960 min Winter	0.055	0.055	1.5	0.6	O K
1440 min Winter	0.046	0.046	1.1	0.5	O K
2160 min Winter	0.038	0.038	0.8	0.4	O K
2880 min Winter	0.034	0.034	0.6	0.3	O K
4320 min Winter	0.028	0.028	0.4	0.3	O K
5760 min Winter	0.025	0.025	0.3	0.2	O K
7200 min Winter	0.023	0.023	0.3	0.2	O K
8640 min Winter	0.021	0.021	0.2	0.2	O K
10080 min Winter	0.020	0.020	0.2	0.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	57.877	0.0	19.4	50	
120 min Winter	34.225	0.0	23.0	82	
180 min Winter	24.863	0.0	25.1	108	
240 min Winter	19.719	0.0	26.5	132	
360 min Winter	14.165	0.0	28.6	190	
480 min Winter	11.206	0.0	30.1	248	
600 min Winter	9.338	0.0	31.4	308	
720 min Winter	8.042	0.0	32.4	366	
960 min Winter	6.349	0.0	34.1	492	
1440 min Winter	4.545	0.0	36.6	736	
2160 min Winter	3.249	0.0	39.3	1100	
2880 min Winter	2.558	0.0	41.3	1436	
4320 min Winter	1.825	0.0	44.1	2212	
5760 min Winter	1.435	0.0	46.3	2936	
7200 min Winter	1.190	0.0	48.0	3608	
8640 min Winter	1.021	0.0	49.4	4272	
10080 min Winter	0.897	0.0	50.6	5056	
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Base Energy Services Limited		Page 3
44 Canal Street Bootle Liverpool L20 8QU	Queens Road Attenuation 100yr 40Cc 5ls	
Date 21/02/2023 File 100yr 40CC.SRCX	Designed by CC Checked by PK	
Micro Drainage Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.400	Shortest Storm (mins)	15
Ratio R	0.450	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.040

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.013	4 8	0.013	8 12	0.013

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Base Energy Services Limited		Page 4
44 Canal Street Bootle Liverpool L20 8QU	Queens Road Attenuation 100yr 40Cc 5ls	
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Micro Drainage Source Control 2020.1.3		

Model Details

Storage is Online Cover Level (m) 1.500

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	10.0	0.700	10.0	1.400	10.0	2.100	10.0
0.100	10.0	0.800	10.0	1.500	10.0	2.200	10.0
0.200	10.0	0.900	10.0	1.600	10.0	2.300	10.0
0.300	10.0	1.000	10.0	1.700	10.0	2.400	10.0
0.400	10.0	1.100	10.0	1.800	10.0	2.500	10.0
0.500	10.0	1.200	10.0	1.900	10.0		
0.600	10.0	1.300	10.0	2.000	10.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0105-5000-1000-5000

Design Head (m) 1.000

Design Flow (l/s) 5.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 105

Invert Level (m) 0.000

Minimum Outlet Pipe Diameter (mm) 150

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flo™	0.296	5.0
Kick-Flo®	0.637	4.1
Mean Flow over Head Range	-	4.3

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		

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