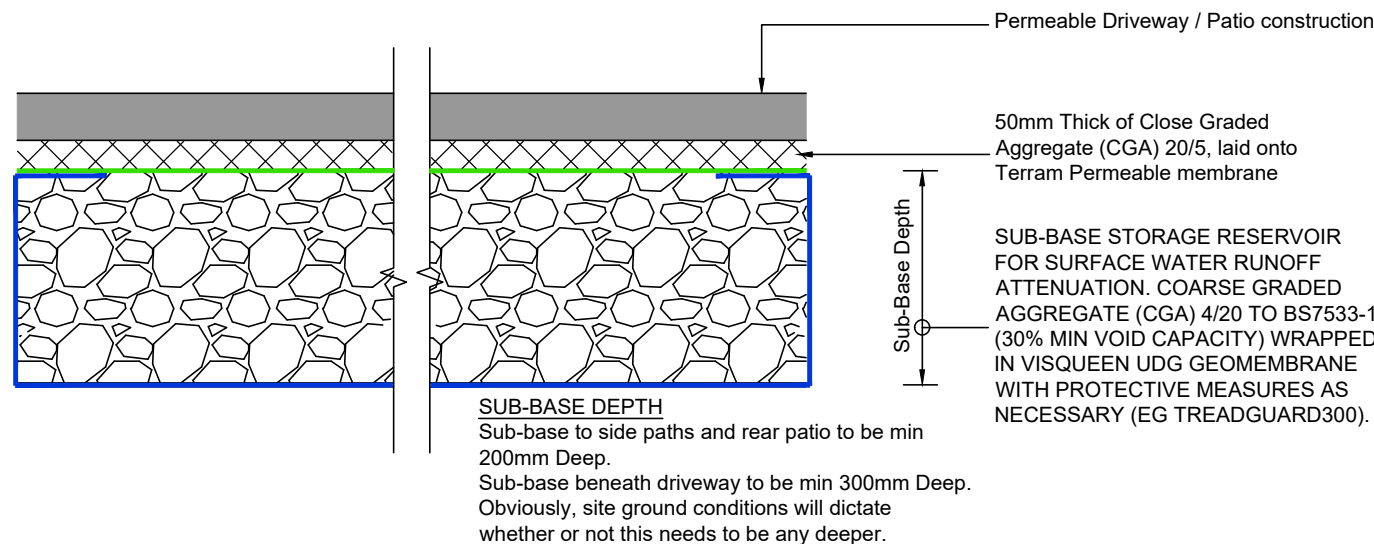
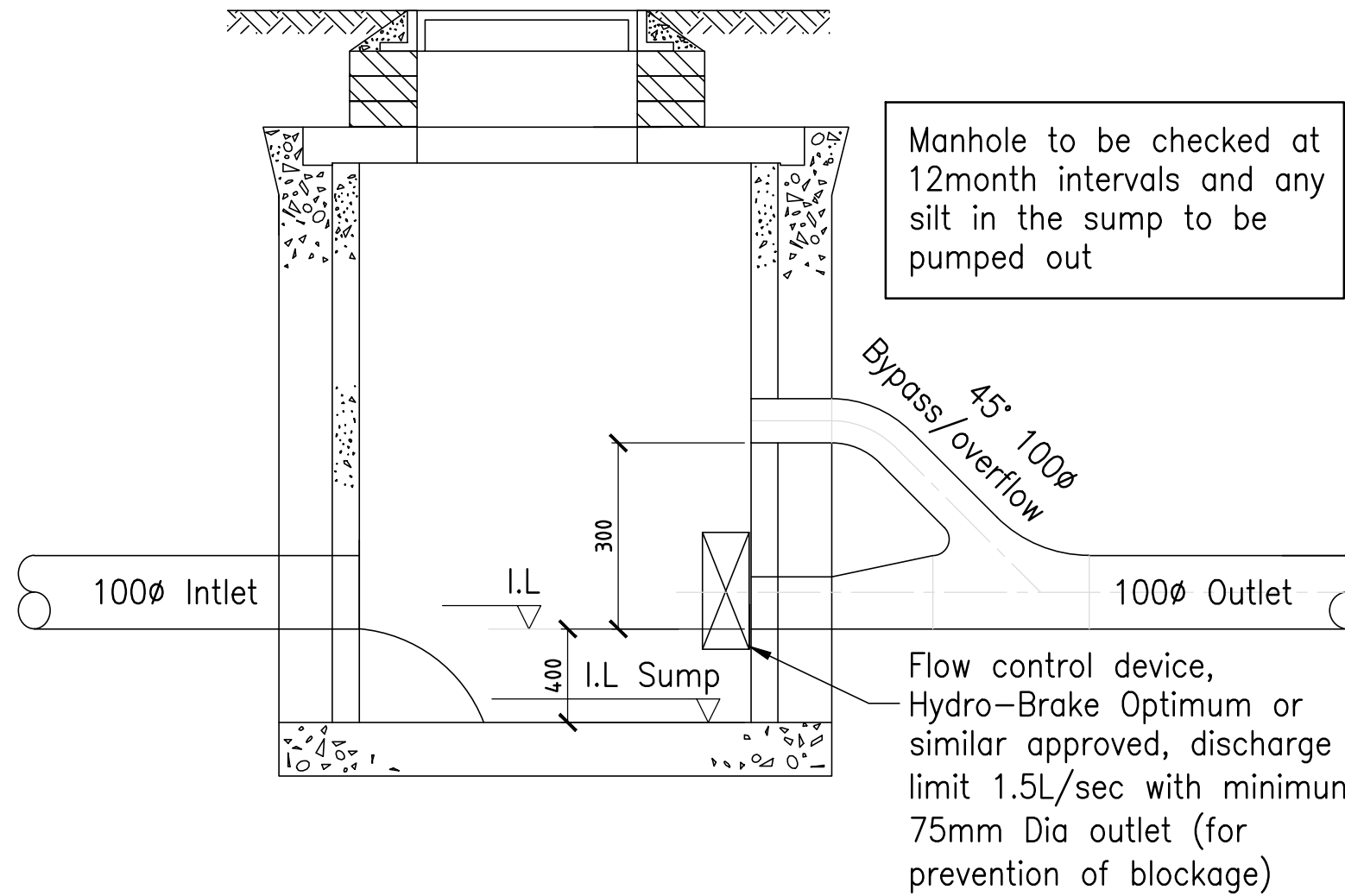




TYPICAL SECTION THROUGH EXTERNAL HARDSTANDINGS



SECTION THROUGH FLOW CONTROL MANHOLE

NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTS, ENGINEERS, M&E CONSULTANTS AND SPECIALIST MANUFACTURERS INSTRUCTIONS ETC.

ALL DRAINAGE WORK TO BE CARRIED OUT IN ACCORDANCE WITH BS8301, BS8005 AND THE BUILDING REGULATIONS.

ALL PIPE SURROUNDS TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF SEWERS FOR ADOPTION 7TH EDITION.

EXACT LOCATIONS OF FOUL OUTLETS REFER TO ARCHITECTS DRAWINGS IN CONJUNCTION WITH M&E CONSULTANTS DRAWINGS.

EXACT LOCATIONS OF RWP'S WILL BE DEPENDANT UPON ROOF GUTTER DESIGN AND THE PROPOSED SIZE AND SPACINGS OF THE RWP'S.

SURFACE WATER DRAINS SHALL COMPRISE EITHER HDPE (TO BS EN 1401-1), OR PCC (TO BS 5911) OR VC (TO BS 65 & BS EN 295)

FOUL WATER DRAINS TO BE VC (TO BS 65 / BS EN 295)

GULLY OUTLET INVERT LEVELS TO BE MIN 450mm BELOW COVER LEVEL.

ALL MANHOLE AND INSPECTION CHAMBER COVERS, FRAMES, TO BE APPROPRIATE FOR THEIR USE, BE IT DRIVEWAY OR LANDSCAPING.

ALL FOUL DRAINAGE BRANCHES TO BE MIN 100MM I/D.

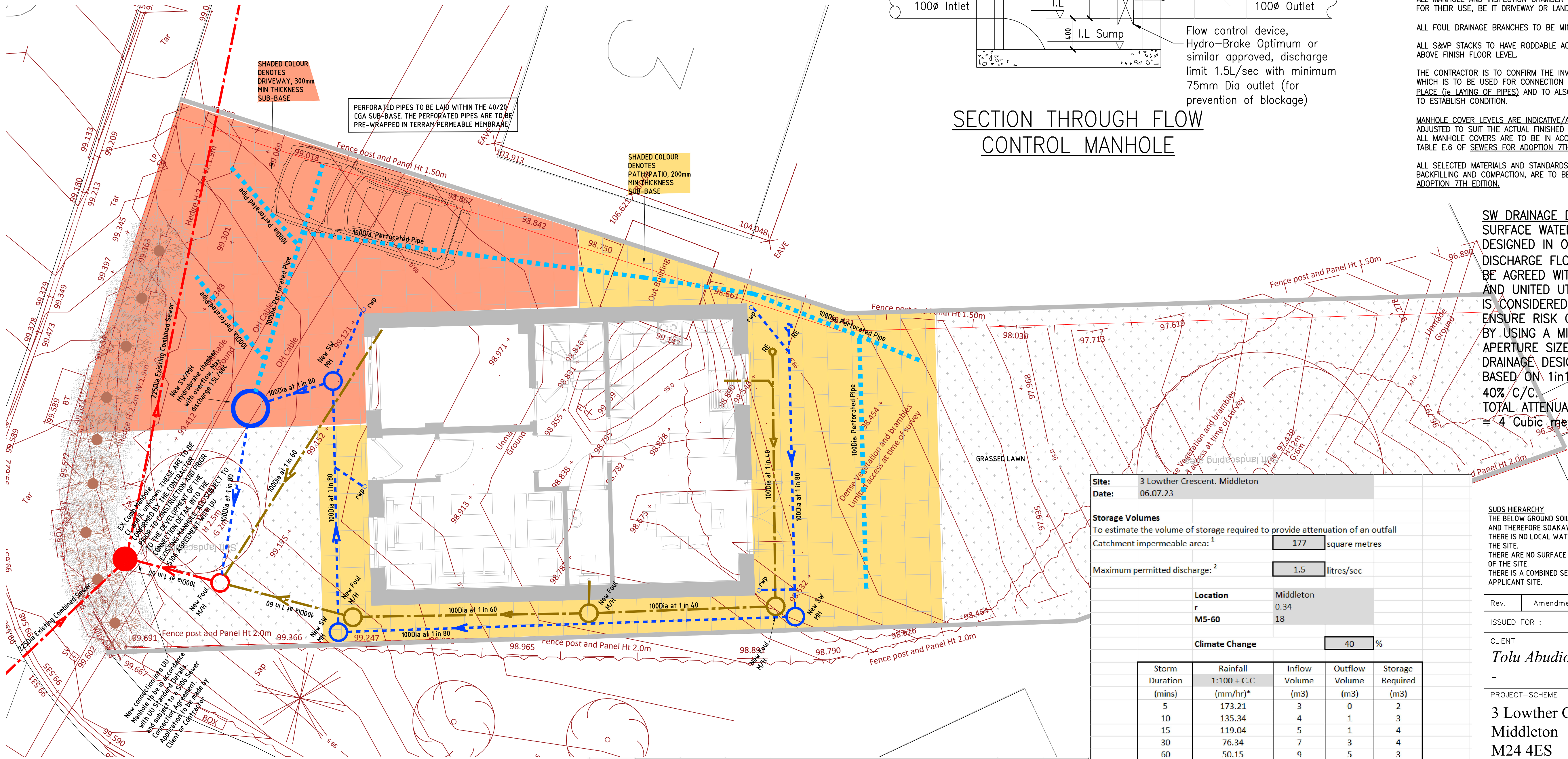
ALL S&VP STACKS TO HAVE RODDABLE ACCESS COVERS LOCATED APPROX 150mm ABOVE FINISH FLOOR LEVEL.

THE CONTRACTOR IS TO CONFIRM THE INVERT LEVELS OF EXISTING DRAINAGE WHICH IS TO BE USED FOR CONNECTION PRIOR TO ANY CONSTRUCTION TAKING PLACE (ie LAYING OF PIPES) AND TO ALSO HAVE CAMERA SURVEYS UNDERTAKEN TO ESTABLISH CONDITION.

MANHOLE COVER LEVELS ARE INDICATIVE/APPROX. AND MAY NEED TO BE ADJUSTED TO SUIT THE ACTUAL FINISHED LEVELS OF THE EXTERNAL AREAS. ALL MANHOLE COVERS ARE TO BE IN ACCORDANCE WITH SECTION E2.32 AND TABLE E.6 OF SEWERS FOR ADOPTION 7TH EDITION.

ALL SELECTED MATERIALS AND STANDARDS OF ALL WORKMANSHIP INCLUDING BACKFILLING AND COMPACTION, ARE TO BE IN ACCORDANCE WITH SEWERS FOR ADOPTION 7TH EDITION.

SW DRAINAGE DESIGN PHILOSOPHY
SURFACE WATER DRAINAGE HAS BEEN DESIGNED IN ORDER TO LIMIT OFF-SITE DISCHARGE FLOW RATE TO 1.5L/Sec, TO BE AGREED WITH THE LOCAL AUTHORITY AND UNITED UTILITIES. THIS FLOW RATE IS CONSIDERED TO BE THE MINIMUM TO ENSURE RISK OF BLOCKAGE IS AVOIDED BY USING A MINIMUM 75mm DIAMETER APERTURE SIZE.
DRAINAGE DESIGN AND ATTENUATION BASED ON 1in100Yr STORM EVENT + 40% C/C.
TOTAL ATTENUATION VOLUME REQUIRED = 4 Cubic metres.



SUB-SURFACE GROUND CONDITIONS

Below ground soils comprise clay to depth. Therefore, natural percolation into the ground is not possible given the impermeability of the below ground soils. Therefore traditional forms of SUDS drainage design are not practical.
The design presented therefore adopts An attenuated design comprising of PERMEABLE PAVING AND A OPEN GRADED SUB-BASE AGGREGATE TO ACT AS A STORAGE RESERVOIR for the surface water run-off, thereby limiting the off-site discharge to predevelopment levels.

DRAINAGE DESIGN PHILOSOPHY

Surface water discharge to be limited to 1.5Litres per second, or subject to United Utilities predetermined flow rate (To Be Advised).
Basis of design: 1in 100 Year + 40% Climate Change
Required Storage Volume = 4 Cubic Metres.
Provide storm water attenuation as described in paragraph above.
The external hardstandings area, depth of sub-base and voids ratio of the sub-base granular material specification provides 8.3 Cubic Metres of storage

ALL MANHOLE COVER LEVELS ARE INDICATIVE/APPROXIMATE ONLY AND MAY NEED TO BE ADJUSTED TO SUIT THE ACTUAL FINISHED LEVELS OF THE EXTERNAL AREAS

Rainfall Profile Table

Duration (mins)	Return Period											
	1:1						1:100 + C.C					
	Intensity (mm/hr) ³	Flow l/s/Ha ⁴	Intensity (mm/hr) ³	Flow l/s/Ha ⁴	Intensity (mm/hr) ³	Flow l/s/Ha ⁴	Intensity (mm/hr) ³	Flow l/s/Ha ⁴	Intensity (mm/hr) ³	Flow l/s/Ha ⁴	Intensity (mm/hr) ⁵	Flow l/s/Ha ⁴
5	42.85	119.03	54.6	151.67	100.09	278.03	123.72	343.67	173.21	481.13		
10	33.48	93.00	42.66	118.50	78.2	217.22	96.67	268.53	135.34	375.94		
15	27.16	75.44	35.17	97.69	67.85	188.47	85.03	236.19	119.04	330.67		
30	17.42	48.39	22.55	62.64	43.51	120.86	54.53	151.47	76.34	212.06		
60	11.16	31.00	14.4	40.00	28.33	78.69	35.82	99.50	50.15	139.30		
120	7.05	19.58	8.92	24.78	17.61	48.92	22.35	62.08	31.29	86.92		
240	4.33	12.03	5.38	14.94	10.49	29.14	13.19	36.64	18.47	51.29		
360	3.23	8.97	4.01	11.14	7.83	21.75	9.84	27.33	13.78	38.27		
600	2.31	6.42	2.82	7.83	5.34	14.83	6.69	18.58	9.37	26.02		
1440	1.26	3.50	1.51	4.19	2.77	7.69	3.41	9.47	4.77	13.26		
2440	0.76	2.11	0.9	2.50	1.54	4.28	1.91	5.31	2.67	7.43		

Site: 3 Lowther Crescent, Middleton
Date: 06.07.23

Storage Volumes

To estimate the volume of storage required to provide attenuation of an outfall

Catchment impermeable area: ¹ 177 square metres

Maximum permitted discharge: ² 1.5 litres/sec

Location: Middleton
r: 0.34
M5-60: 18

Climate Change: 40 %

Storm Duration (mins)	Rainfall 1:100 + C.C (mm/hr)*	Inflow Volume (m3)	Outflow Volume (m3)	Storage Required (m3)
5	173.21	3	0	2
10	135.34	4	1	3
15	119.04	5	1	4
30	76.34	7	3	4
60	50.15	9	5	3
120	31.29	11	11	0
240	18.47	13	22	-9
360	13.78	15	32	-18
600	9.37	17	54	-37
1440	4.77	20	130	-109
2440	2.67	19	220	-200

Required storage volume is: 4 m³

Approx flow rate into tank is: 2 l/s (1:30)

Approx flow rate into tank is: 3 l/s (1:100)

Approx flow rate into tank is: 4 l/s (1:100 + C.C.)

SUDS HIERARCHY

THE BELOW GROUND SOILS HAVE BEEN PROVEN TO BE IMPERMEABLE AND THEREFORE SOAKAWAYS ARE NOT SUITABLE.
THERE IS NO LOCAL WATERCOURSES WITHIN REASONABLE REACH OF THE SITE.
THERE ARE NO SURFACE WATER SEWERS WITHIN REASONABLE REACH OF THE SITE.
THERE IS A COMBINED SEWER CROSSING THROUGH THE FRONT OF THE APPLICANT SITE.

Rev. Amendments Date

ISSUED FOR: Building Regulations

CLIENT

Tolu Abudiore

PROJECT—SCHEME

3 Lowther Crescent
Middleton
M24 4ES

TITLE

DRAINAGE G.A. PLAN
AND DETAILS

PROJECT No. DRG. No. SCALE

D001 1:50

DATE REVISION

Aug. '22 A

structural
engineers

99 Manor Road, Shaw, Oldham, OL2 7JG (m: 07971 037112)

THIS IS AN ISO A1 SIZED DRAWING