DESIGNERS RESPONSE TO LLFA COMMENTS

FOR

OAKWOOD LODGE

WYTHENSHAWE

(PLANNING APPLICATION REF: 133576/FO/2022 – CONDITION 13)

Ref:33266/LLFA Response_Rev A

Sutcliffe

In response to the LLFA comments received in relation to the planning approval 133576/FO/2022, condition 13 we comment as follows.

Comment

Further consideration of alternative SuDS solution (that is either utilising infiltration or attenuation) if practicable.

Response

Refer to Phase 2 ground report, attached separately to this response, referenced 33266-SUT-ZZ-OO-RP-G-7201.

Infiltration tests have been carried out and proved that infiltration to ground is not viable. The infiltration tests were carried out in accordance with Building Regulations as it would have been the intention to provide plot soakaways rather than shared soakaways.

Copy of infiltration test results included in appendix A.

Comment

Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester Trafford and Salford Strategic Flood Risk Assessment, i.e. at least a 50% reduction in runoff rate compared to the existing rates, as the site is located within Conurbation Core Critical Drainage Area; the proposed impermeable area should not be used to calculate the existing brownfield run-off rates.

Response

We have calculated the existing runoff / discharge rate from the site immediately prior to demolition (which was carried out as part of the construction contract) and the 2 year storm event discharge rate was calculated as being 47.0 l/s (Existing drainage drawing, existing catchment area plan and Existing Drainage Calculations for the 2 year rainfall event included within Appendix B)

It has been agreed with United Utilities that the maximum SW discharge rate into their sewer is no more than 23.5 l/s (50% reduction from existing 2 year storm event). This value has been used in the design of the proposed drainage network for the site, which is currently being reviewed for a Section 104 Agreement.

Comment

Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 45% climate change in any part of a building.

Response

The proposed drainage has been designed so that no flooding occurs for all rainfall events up to and including the 100 year rainfall event including a 45% climate change allowance.

Calculations for the proposed drainage are included within appendix C.

Comment

Assessment of overland flow routes for extreme events that is diverted away from buildings

(including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.

Response

An overland flow routing plan (33266-SUT-ZZ-XX-DR-C-6010-P01) is included within Appendix D.

No properties are affected by overland flows.

Comment

Results of ground investigation carried out under Building Research Establishment Digest 365. Site investigations should be undertaken in locations and at proposed depths of the proposed infiltration devices. Proposal of the attenuation that is achieving half emptying time within 24 hours. If no ground investigations are possible or infiltration is not feasible on site, evidence of alternative surface water disposal routes (as follows) is required.

Response

Infiltration tests have been carried out and proved that infiltration to ground is not viable. Copy of test results included in appendix A.

The infiltration tests were carried out in accordance with Building Regulations as it would have been the intention to provide plot soakaways rather than shared soakaways.

Comment

Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.

Response

Attached is e-mail response from UU confirming acceptance of connection to existing combined sewer.

Please note that we have reduced the existing discharge from our site by 50% so reducing any future flood risk.

Refer to appendix E for emails to and from United Utilities.

Comment

Where surface water is connected to the highway drain, agreement in principle from the highway authority is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.

Response

No connection to the Highway Drain is being made.

Comment

Hydraulic calculation of the proposed drainage system; Construction details of flow control and SuDS elements.

Response

Hydraulic calculations are included in Appendix C.

Refer to appendix F for details of proposed flow control and offline attenuation in accordance with the drainage design.

Appendix A

SUTCLIFFE INVESTIGATIONS

TEL: 0151 227 3155
FAX: 0151 227 3156

Building Regulations Percolation Test

Job No.:	33266LG	**Job Name:**	Oakwood Lodge, Wythenshawe		
Position Ref.:	PT101	**Date:**	13/11/2023	**Site Team:**	MW

Trial Pit Dimensions		**Test Pit Dimensions**	
Depth (mm):	850.00	**Depth (mm):**	300.00
Width (mm):	600.00	**Width (mm):**	300.00
Length (mm):	2.20	**Length (mm):**	300.00

75% Capacity (mm)	75	**25% Capacity (mm)**	225	**Effective Depth (mm)**	150

Fill 1		**Fill 2**		**Fill 3**	
Time (s)	**Depth (mm)**	**Time (s)**	**Depth (mm)**	**Time (s)**	**Depth (mm)**
0	1.04				
210	1.05				
412	1.05				
1170	1.06				
2700	1.08				
4320	1.085				
6300	1.09				

Test Ref.	**Time (s) to fall from 75% to 25%**	**V_p**	**Infiltration Rate (mm/s)**	**Infiltration Rate (m/s)**
Fill 1		0.00	-	-
Fill 2		0.00	-	-
Fill 3		0.00	-	-

Comments

Test Failed - The test results did not provide an infiltration rate due to the inefficiencies of the ground to infiltrate. Infiltration testing has been undertaken and failed, therefore alternative drainage solutions will be required.

SUTCLIFFE INVESTIGATIONS

TEL: 0151 227 3155
FAX: 0151 227 3156

Building Regulations Percolation Test

Job No.:	33266LG	**Job Name:**	Oakwood Lodge, Wythenshawe		
Position Ref.:	PT102	**Date:**	14/11/2023	**Site Team:**	MW

Trial Pit Dimensions		**Test Pit Dimensions**	
Depth (mm):	1100.00	**Depth (mm):**	300.00
Width (mm):	600.00	**Width (mm):**	300.00
Length (mm):	2.20	**Length (mm):**	300.00

75% Capacity (mm)	75	**25% Capacity (mm)**	225	**Effective Depth (mm)**	150

Fill 1		**Fill 2**		**Fill 3**	
Time (s)	**Depth (mm)**	**Time (s)**	**Depth (mm)**	**Time (s)**	**Depth (mm)**
0	1.26	0	1.2	0	1.23
90	1.31	360	1.4	480	1.4
165	1.34				
255	1.4				

Test Ref.	**Time (s) to fall from 75% to 25%**	**V_p**	**Infiltration Rate (mm/s)**	**Infiltration Rate (m/s)**
Fill 1		0.00	-	-
Fill 2		0.00	-	-
Fill 3		0.00	-	-

Comments

Test Failed - The test results did not provide an infiltration rate due to the inefficiencies of the ground to infiltrate. Infiltration testing has been undertaken and failed, therefore alternative drainage solutions will be required.

SUTCLIFFE INVESTIGATIONS

TEL: 0151 227 3155
FAX: 0151 227 3156

Building Regulations Percolation Test

Job No.:	33266LG	**Job Name:**	Oakwood Lodge, Wythenshawe		
Position Ref.:	PT103	**Date:**	14/11/2023	**Site Team:**	MW

Trial Pit Dimensions		**Test Pit Dimensions**	
Depth (mm):	1000.00	**Depth (mm):**	300.00
Width (mm):	600.00	**Width (mm):**	300.00
Length (mm):	2.20	**Length (mm):**	300.00

75% Capacity (mm)	75	**25% Capacity (mm)**	225	**Effective Depth (mm)**	150

Fill 1		**Fill 2**		**Fill 3**	
Time (s)	**Depth (mm)**	**Time (s)**	**Depth (mm)**	**Time (s)**	**Depth (mm)**
0	1.05	0	1.02		
180	1.16	50	1.04		
540	1.25	300	1.07		
960	1.32	660	1.1		
		900	1.12		
		1080	1.15		
		1200	1.18		
		1380	1.21		
		1560	1.24		
		1680	1.25		
		1800	1.27		

Test Ref.	**Time (s) to fall from 75% to 25%**	**V_p**	**Infiltration Rate (mm/s)**	**Infiltration Rate (m/s)**
Fill 1		0.00	-	-
Fill 2		0.00	-	-
Fill 3		0.00	-	-

Comments

Test Failed - The test results did not provide an infiltration rate due to the inefficiencies of the ground to infiltrate. Infiltration testing has been undertaken and failed, therefore alternative drainage solutions will be required.

Appendix B

General Notes

THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR / FABRICATOR PRIOR TO COMMENCEMENT OF WORKS.

ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.

ALL WORKS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE ENGINEER'S SPECIFICATIONS, RELEVANT BRITISH STANDARDS, STATUTORY HEALTH AND SAFETY/C.D.M. REGULATIONS, RELEVANT CODES OF PRACTICE AND THE CURRENT EDITION OF THE BUILDING REGULATIONS.

FOR FINAL SETTING OUT INFORMATION RELATING TO GRID LINES AND WALL POSITIONS REFER TO THE ARCHITECT'S DRAWINGS.

EXISTING SITE CONDITIONS:

THE DEVELOPER SHALL NOT COMMENCE ANY WORK WHICH AFFECTS THE PUBLIC HIGHWAY UNTIL ALL THE APPROVED TRAFFIC SAFETY AND MANAGEMENT MEASURES NECESSITATED BY THE WORKS ARE IN PLACE.

THE DEVELOPER SHALL MAINTAIN ACCESS TO AND ALONG ALL EXISTING FOOTWAYS, PRIVATE ACCESSES, PUBLIC RIGHTS OF WAY AND PROPOSED CROSSINGS OF THE WORKS THROUGHOUT THE CONSTRUCTION PHASE.

THE CONTRACTOR IS TO CONFIRM EXISTING ROAD LEVELS AT ALL PROPOSED JUNCTIONS BETWEEN NEW AND EXISTING ROAD CONSTRUCTION PRIOR TO COMMENCEMENT OF WORKS.

CATCHMENT KEY:

- 1.000 - 103.66m²
- 1.002 - 222.01m²
- 1.003 - 188.58m²
- 1.005 - 264.08m²
- 1.007 - 221.46m²
- 1.009 - 643m²
- 2.000 - 43.54m²
- 3.000 - 99.05m²
- 4.000 - 372.53m²
- 5.000 - 131.12m²
- 5.001 - 104.27m²
- 5.002 - 61.06m²
- 5.003 - 176.46m²
- 5.004 - 88.17m²
- 5.005 - 217.34m²
- 6.000 - 282.13m²
- 7.000 - 498.82m²
- 8.000 - 32.46m²

TOTAL: 3868.10m² (0.387 Ha)

SCALE BAR 1:200

0 1 2 3 4 5 10 15 20

Rev	Description	Date	By	Chkd
P01	ISSUED FOR COMMENT	03.06.24	KW	DS

Drawing Status
PRELIMINARY DRAWING

Sutcliffe
Structural & Civil Engineering
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Liverpool Head Office: 0151 227 5135
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Client
GARDEN CITY DESIGN AND BUILD

Project
OAKWOOD LODGE
WYTHENSHAWE

Drawing Title
EXISTING DRAINAGE AND CATCHMENT PLAN LAYOUT

Date	Drawn By	Checked By
JUN 24	KW	DS

Scale at A1	Project Number
1:200	33266

Sheet Number	Revision
33266-SUT-ZZ-XX-DR-C-6011	P04

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.383	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)	400

Designed with Level Soffits

Time Area Diagram for Surface Network 1

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.204	4-8	0.183

Total Area Contributing (ha) = 0.387

Total Pipe Volume (m³) = 10.497

Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

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	13.449	0.191	70.3	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	14.166	0.256	55.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	14.770	0.249	59.2	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	15.521	0.295	52.7	0.019	0.00	0.0	0.600	o	150	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	5.19	34.896	0.010	0.0	0.0	0.0	1.20	21.2	1.4
1.001	50.00	5.36	34.705	0.010	0.0	0.0	0.0	1.36	24.0	1.4
1.002	50.00	5.55	34.448	0.033	0.0	0.0	0.0	1.31	23.1	4.4
1.003	50.00	5.74	34.199	0.051	0.0	0.0	0.0	1.39	24.5	7.0

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Network Design Table for Surface Network 1

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
2.000	16.241	0.302	53.8	0.016	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	11.255	0.246	45.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	10.280	0.254	40.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	13.962	0.175	80.0	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	20.865	0.261	80.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	10.827	1.158	9.4	0.010	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	6.462	1.166	5.5	0.037	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	12.623	0.145	87.2	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.000	10.606	0.177	60.0	0.013	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	12.745	0.225	56.6	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.002	22.326	0.353	63.2	0.006	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.000	8.344	0.066	125.9	0.028	5.00	0.0	0.600	o	100	Pipe/Conduit	
5.003	16.039	0.367	43.7	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	16.838	0.337	50.0	0.050	5.00	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)
2.000	50.00	5.20	34.452	0.016	0.0	0.0	0.0	1.37	24.3	2.2
2.001	50.00	5.32	34.150	0.016	0.0	0.0	0.0	1.49	26.3	2.2
1.004	50.00	5.82	33.904	0.068	0.0	0.0	0.0	2.06	82.1	9.2
1.005	50.00	5.98	33.650	0.094	0.0	0.0	0.0	1.46	58.2	12.8
1.006	50.00	6.21	33.476	0.094	0.0	0.0	0.0	1.46	58.2	12.8
3.000	50.00	5.05	34.448	0.010	0.0	0.0	0.0	3.31	58.6	1.3
4.000	50.00	5.02	34.455	0.037	0.0	0.0	0.0	4.31	76.1	5.0
1.007	50.00	6.36	33.215	0.164	0.0	0.0	0.0	1.40	55.7	22.1
5.000	50.00	5.14	34.771	0.013	0.0	0.0	0.0	1.30	23.0	1.8
5.001	50.00	5.29	34.594	0.024	0.0	0.0	0.0	1.34	23.7	3.2
5.002	50.00	5.59	34.369	0.030	0.0	0.0	0.0	1.27	22.4	4.0
6.000	50.00	5.20	34.132	0.028	0.0	0.0	0.0	0.68	5.4	3.8
5.003	50.00	5.76	34.016	0.076	0.0	0.0	0.0	1.53	27.0	10.2
7.000	50.00	5.26	34.035	0.050	0.0	0.0	0.0	1.09	8.6	6.8

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Network Design Table for Surface Network 1

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
5.004	9.696	0.054	180.9	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.005	16.888	0.450	37.5	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	3.823	0.076	50.0	0.003	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	4.995	0.100	50.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.002	17.178	0.344	50.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.008	31.586	0.455	69.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	30.146	0.235	128.3	0.064	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.010	29.353	0.372	78.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.011	13.787	0.175	79.0	0.000	0.00	0.0	0.600	o	225	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)
5.004	50.00	5.98	33.649	0.134	0.0	0.0	0.0	0.74	13.1«	18.2
5.005	50.00	6.15	33.595	0.156	0.0	0.0	0.0	1.65	29.1	21.1
8.000	50.00	5.04	34.450	0.003	0.0	0.0	0.0	1.43	25.2	0.4
8.001	50.00	5.10	34.374	0.003	0.0	0.0	0.0	1.43	25.2	0.4
8.002	50.00	5.30	34.274	0.003	0.0	0.0	0.0	1.43	25.2	0.4
1.008	50.00	6.70	33.070	0.323	0.0	0.0	0.0	1.57	62.5	43.7
1.009	50.00	7.14	32.615	0.387	0.0	0.0	0.0	1.15	45.8«	52.4
1.010	50.00	7.47	32.380	0.387	0.0	0.0	0.0	1.47	58.6	52.4
1.011	50.00	7.62	32.008	0.387	0.0	0.0	0.0	1.47	58.5	52.4

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PIPELINE SCHEDULES for Surface Network 1

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	150	MH30	35.676	34.896	0.630	Open Manhole	600
1.001	o	150	MH29	35.505	34.705	0.650	Open Manhole	600
1.002	o	150	MH32	35.558	34.448	0.960	Open Manhole	600
1.003	o	150	MH33	35.479	34.199	1.130	Open Manhole	600
2.000	o	150	MH35	35.532	34.452	0.930	Open Manhole	600
2.001	o	150	MH34	35.515	34.150	1.215	Open Manhole	180
1.004	o	225	MH09	35.494	33.904	1.365	Open Manhole	900
1.005	o	225	MH08	35.627	33.650	1.752	Open Manhole	1200
1.006	o	225	MH07	35.652	33.476	1.951	Open Manhole	1200
3.000	o	150	MH11	35.448	34.448	0.850	Open Manhole	600
4.000	o	150	MH10	35.505	34.455	0.900	Open Manhole	600
1.007	o	225	MH01	35.265	33.215	1.825	Open Manhole	1200
5.000	o	150	MH28A	35.549	34.771	0.628	Open Manhole	600
5.001	o	150	MH28	35.644	34.594	0.900	Open Manhole	600
5.002	o	150	MH20	35.549	34.369	1.030	Open Manhole	600

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	13.449	70.3	MH29	35.505	34.705	0.650	Open Manhole	600
1.001	14.166	55.3	MH32	35.558	34.448	0.960	Open Manhole	600
1.002	14.770	59.2	MH33	35.479	34.199	1.130	Open Manhole	600
1.003	15.521	52.7	MH09	35.494	33.904	1.440	Open Manhole	900
2.000	16.241	53.8	MH34	35.515	34.150	1.215	Open Manhole	180
2.001	11.255	45.8	MH09	35.494	33.904	1.440	Open Manhole	900
1.004	10.280	40.4	MH08	35.627	33.650	1.752	Open Manhole	1200
1.005	13.962	80.0	MH07	35.652	33.476	1.951	Open Manhole	1200
1.006	20.865	80.0	MH01	35.265	33.215	1.825	Open Manhole	1200
3.000	10.827	9.4	MH01	35.265	33.290	1.825	Open Manhole	1200
4.000	6.462	5.5	MH01	35.265	33.290	1.825	Open Manhole	1200
1.007	12.623	87.2	MH02	35.200	33.070	1.905	Open Manhole	1200
5.000	10.606	60.0	MH28	35.644	34.594	0.900	Open Manhole	600
5.001	12.745	56.6	MH20	35.549	34.369	1.030	Open Manhole	600
5.002	22.326	63.2	PS4	35.406	34.016	1.240	Open Manhole	600

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PIPELINE SCHEDULES for Surface Network 1

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)
6.000	o	100	MH19	35.602	34.132	1.370	Open Manhole	600
5.003	o	150	PS4	35.406	34.016	1.240	Open Manhole	600
7.000	o	100	MH18	35.614	34.035	1.479	Open Manhole	600
5.004	o	150	MH16	35.268	33.649	1.470	Open Manhole	600
5.005	o	150	MH15	35.215	33.595	1.470	Open Manhole	600
8.000	o	150	PS12	35.552	34.450	0.952	Open Manhole	600
8.001	o	150	PS13	35.513	34.374	0.989	Open Manhole	600
8.002	o	150	MH12	35.585	34.274	1.162	Open Manhole	600
1.008	o	225	MH02	35.200	33.070	1.905	Open Manhole	1200
1.009	o	225	MH03	35.195	32.615	2.355	Open Manhole	1200
1.010	o	225	PS9	35.620	32.380	3.015	Open Manhole	1200
1.011	o	225	MH05	35.758	32.008	3.525	Open Manhole	1200

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)
6.000	8.344	125.9	PS4	35.406	34.066	1.240	Open Manhole	600
5.003	16.039	43.7	MH16	35.268	33.649	1.470	Open Manhole	600
7.000	16.838	50.0	MH16	35.268	33.699	1.470	Open Manhole	600
5.004	9.696	180.9	MH15	35.215	33.595	1.470	Open Manhole	600
5.005	16.888	37.5	MH02	35.200	33.145	1.905	Open Manhole	1200
8.000	3.823	50.0	PS13	35.513	34.374	0.989	Open Manhole	600
8.001	4.995	50.0	MH12	35.585	34.274	1.162	Open Manhole	600
8.002	17.178	50.0	MH02	35.200	33.930	1.120	Open Manhole	1200
1.008	31.586	69.4	MH03	35.195	32.615	2.355	Open Manhole	1200
1.009	30.146	128.3	PS9	35.620	32.380	3.015	Open Manhole	1200
1.010	29.353	78.9	MH05	35.758	32.008	3.525	Open Manhole	1200
1.011	13.787	79.0	UU 3303	35.540	31.834	3.481	Open Manhole	1200

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.001	0.001	0.001
	User	-	100	0.006	0.006	0.007
	User	-	100	0.004	0.004	0.010
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.022	0.022	0.022
1.003	User	-	100	0.013	0.013	0.013
	User	-	100	0.006	0.006	0.019
2.000	User	-	100	0.006	0.006	0.006
	User	-	100	0.010	0.010	0.016
2.001	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	User	-	100	0.011	0.011	0.011
	User	-	100	0.015	0.015	0.026
1.006	-	-	100	0.000	0.000	0.000
3.000	User	-	100	0.010	0.010	0.010
4.000	User	-	100	0.037	0.037	0.037
1.007	User	-	100	0.022	0.022	0.022
5.000	User	-	100	0.003	0.003	0.003
	User	-	100	0.005	0.005	0.008
	User	-	100	0.006	0.006	0.013
5.001	User	-	100	0.006	0.006	0.006
	User	-	100	0.004	0.004	0.010
5.002	User	-	100	0.006	0.006	0.006
6.000	User	-	100	0.028	0.028	0.028
5.003	User	-	100	0.018	0.018	0.018
7.000	User	-	100	0.050	0.050	0.050
5.004	User	-	100	0.009	0.009	0.009
5.005	User	-	100	0.022	0.022	0.022
8.000	User	-	100	0.003	0.003	0.003
8.001	-	-	100	0.000	0.000	0.000
8.002	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	User	-	100	0.034	0.034	0.034
	User	-	100	0.030	0.030	0.064
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.387	0.387	0.387

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.011	UU 3303	35.540	31.834	0.000	1200	0

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Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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	0
Number of Online Controls	0	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)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.383		

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Summary of Results for 30 minute 2 year Summer (Surface Network 1)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	MH30	34.922	-0.123	0.000	0.07			1.4	OK
1.001	MH29	34.729	-0.125	0.000	0.06			1.4	OK
1.002	MH32	34.492	-0.106	0.000	0.19			4.1	OK
1.003	MH33	34.253	-0.096	0.000	0.28			6.3	OK
2.000	MH35	34.484	-0.118	0.000	0.10			2.2	OK
2.001	MH34	34.181	-0.119	0.000	0.09			2.2	OK
1.004	MH09	33.957	-0.172	0.000	0.12			8.6	OK
1.005	MH08	33.723	-0.152	0.000	0.23			11.7	OK
1.006	MH07	33.547	-0.153	0.000	0.22			11.6	OK
3.000	MH11	34.464	-0.134	0.000	0.03			1.4	OK
4.000	MH10	34.483	-0.122	0.000	0.08			5.1	OK
1.007	MH01	33.318	-0.121	0.000	0.43			20.5	OK
5.000	MH28A	34.801	-0.120	0.000	0.09			1.8	OK
5.001	MH28	34.632	-0.113	0.000	0.14			3.0	OK
5.002	MH20	34.412	-0.108	0.000	0.18			3.8	OK
6.000	MH19	34.199	-0.033	0.000	0.78			3.9	OK
5.003	PS4	34.081	-0.085	0.000	0.39			9.7	OK
7.000	MH18	34.105	-0.030	0.000	0.83			6.8	OK
5.004	MH16	33.860	0.062	0.000	1.50			17.5	SURCHARGED
5.005	MH15	33.692	-0.053	0.000	0.74			20.0	OK
8.000	PS12	34.466	-0.134	0.000	0.03			0.4	OK
8.001	PS13	34.389	-0.135	0.000	0.02			0.4	OK
8.002	MH12	34.287	-0.137	0.000	0.02			0.4	OK
1.008	MH02	33.210	-0.085	0.000	0.70			41.2	OK
1.009	MH03	32.886	0.046	0.000	1.11			47.3	SURCHARGED
1.010	PS9	32.542	-0.063	0.000	0.85			46.7	OK
1.011	MH05	32.179	-0.055	0.000	0.92			47.0	OK

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Appendix C

Sutcliffe

NOTE:
OUTFALL LEVEL TO BE CONFIRMED PRIOR TO CONSTRUCTION OF ANY DRAINAGE

NOTE: INTERNAL SVP/SP POSITIONS TO BE CONFIRMED BY ARCHITECT PRIOR TO CONSTRUCTION OF GROUND FLOOR SLAB.

>> 1000ø HIGHWAY DRAIN

MH 3901
CL: 35.17 TBC (BURIED)
IL: 30.78 TBC
LOCATED BY METAL DETECTOR UNDER TREE ROOT
(OFFSET CHAMBER UU RECORDS)

FFL 35.550
FFL 35.475
FFL 35.800
FFL 35.450
FFL 35.720
FFL 35.775
FFL 35.700
FFL 35.550
FFL 35.500

S6 - FLOW CONTROL MH
Q=23.5l/s @ 2.30m DESIGN HEAD.
ORIFICE = 194mm
REF: MD-SHE-0194-2350-2300-2350

8m x 7.5m x 1.4m DEEP SURFACE WATER ATTENUATION @ IL: 33.436
POLYSTORM CELLS (OR SIMILAR). SYSTEM TO BE VENTED & INSTALLED TO MANUFACTURERS DETAILS.
CELLULAR ATTENUATION TO BE BBA CERTIFIED.
CONTRACTOR TO ALLOW FOR CONSTRUCTION LOADING DURING CONSTRUCTION PERIOD OR PROVIDE ADEQUATE PROTECTION TO PREVENT EXCESS LOADING OF CELLULAR ATTENUATION.

NOTE: ALL RWP/SP/BIG POSITIONS TO BE CONFIRMED BY ARCHITECT PRIOR TO START OF WORKS ON SITE

SCALE BAR 1:200
0 1 2 3 4 5 10 15 20

General Notes

DO NOT SCALE OFF THIS DRAWING

THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR / FABRICATOR PRIOR TO COMMENCEMENT OF WORKS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.

ALL WORKS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE ENGINEER'S SPECIFICATIONS, RELEVANT BRITISH STANDARDS, STATUTORY HEALTH AND SAFETY/C.D.M. REGULATIONS, RELEVANT CODES OF PRACTICE AND THE CURRENT EDITION OF THE BUILDING REGULATIONS.

FOR FINAL SETTING OUT INFORMATION RELATING TO GRID LINES AND WALL POSITIONS REFER TO THE ARCHITECT'S DRAWINGS.

ALL FLOOR LEVELS TO BE CONFIRMED BY ARCHITECT PRIOR TO CONSTRUCTION

ALL COVER LEVELS TO BE CONFIRMED BY ARCHITECT PRIOR TO CONSTRUCTION

ALL DRAINAGE PENETRATING THOUGH FLOOR SLABS AND RAINWATER PIPE LOCATIONS TAKEN FROM ARCHITECTS DRAWINGS. ARCHITECT TO CONFIRM LOCATIONS PRIOR TO CONSTRUCTION.

EXISTING SERVICES

ROAD SIGNS AND LAMP COLUMNS ON THE SITE PERIPHERY TO BE RE-SITED IF REQUIRED BY, AND TO THE APPROVAL OF, THE LOCAL AUTHORITY.

CONTRACTOR TO SATISFY THEMSELVES THAT EXISTING AND PROPOSED SERVICES DO NOT CLASH WITH PROPOSED DRAINAGE

KNOWN EXISTING SERVICES ARE INDICATED ON THE PLAN WHERE THEY CROSS THE PROPOSED DRAINAGE. THE EXACT TYPE AND LOCATION SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO START OF WORKS TO ENSURE THAT PROPOSED DRAINAGE LEVELS DO NOT INTERFERE WITH SERVICES. ALL DISCREPANCIES SHALL BE REPORTED TO ENGINEER IMMEDIATELY.

THE CONTRACTOR SHALL CHECK ALL EXISTING COVER / INVERT LEVELS AND PIPE / SEWER SIZES ON SITE PRIOR TO START OF WORKS TO ENSURE PROPOSED DRAINAGE CAN BE CONSTRUCTED AS INDICATED ON THE DRAWING. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

ALL REDUNDANT DRAINAGE WITHIN SITE TO BE GRUBBED UP, CHASED AND SEALED TO APPROVAL OF LOCAL AUTHORITY

PROPOSED DRAINAGE

OUTSIDE EDGE OF ADOPTED SEWER SHALL NOT ENCROACH WITHIN 1M OF KERB FACE. OUTSIDE EDGE OF ADOPTED MANHOLES SHALL NOT ENCROACH WITHIN 0.5M OF KERB FACE.

ALL DRAINAGE IN HIGHWAYS/CAR PARKING AREAS/DRIVEWAYS LESS THAN 1.2M DEEP TO BE CONCRETE ENCASED.

ALL PPIC'S GREATER THAN 1.2M DEEP TO HAVE REDUCED ACCESS COVERS TO PREVENT MAN ENTRY.

SURFACE WATER DRAINAGE:
ALL PRIVATE SURFACE WATER DRAINAGE TO BE 100MM ø AT 1:80 GRADIENT UNLESS NOTED OTHERWISE.
ALLOWANCE TO BE MADE FOR DRIVEWAY GULLIES AND ASSOCIATED DRAIN RUNS WHERE APPLICABLE

FOUL WATER / COMBINED DRAINAGE:
ALL UNDERSLAB FOUL WATER DRAINAGE TO BE 100MM ø AT 1:40 GRADIENT UNLESS NOTED OTHERWISE ALL OTHER PRIVATE FOUL WATER DRAINAGE TO BE 100MM ø AT 1:80 GRADIENT UNLESS NOTED OTHERWISE
INTERNAL VENTING OF DRAINAGE SYSTEM TO ARCHITECTS DETAILS
ALL INTERNAL SP/SVP POSITIONS TO BE CONFIRMED BY ARCHITECT PRIOR TO CONSTRUCTION OF GROUND FLOOR SLAB

DRAINAGE KEY

- NEW COMBINED PRIVATE DRAIN
- ADOPTED COMBINED SEWER
- EX COM > EXISTING COMBINED DRAIN / SEWER
- NEW SURFACE WATER PRIVATE DRAIN
- ADOPTED SURFACE WATER SEWER
- EX SW > EXISTING SURFACE WATER DRAIN / SEWER
- NEW FOUL WATER PRIVATE DRAIN
- ADOPTED FOUL WATER SEWER
- EX FW > EXISTING FOUL WATER DRAIN / SEWER
- EXTG DRAINAGE TO BE ABANDONED TO L.A. APPROVAL
- NEW MANHOLE - REFER TO PLAN FOR SIZE
- NEW POLYPROPYLENE INSPECTION CHAMBER (PPIC)
- NEW MINI ACCESS CHAMBER
- NEW MANHOLE WITH INCOMING BACKDROP
- EXTG MH / CL: XXX / IL: XXX EXISTING MANHOLE / ACCESS CHAMBER
- RWP RAINWATER PIPE LOCATION
- SP SOIL PIPE LOCATION
- EX G EXISTING ROAD GULLEY
- RG NEW ROAD GULLEY
- DG NEW DRIVEWAY GULLEY
- PERMEABLE DRIVEWAY
- DIFFUSER BOX OUTLET
- SURFACE WATER ATTENUATION CELLS

Rev	Description	Date	By	Chkd
P07	EASEMENT REMOVED	23.04.24	AJB	DS
P06	FW CYLINDER POP UPS ADDED	15.03.24	AJB	DS
P05	SVP/RWP LOCATIONS UPDATED	11.12.23	KW	DS
P04	S10 LEVELS ADDED	04.12.23	KW	DS
P03	SITE LOCATION UPDATED	28.11.23	JW	DS
P02	SITE LAYOUT UPDATED	02.11.23	AJB	DS
P01	ISSUED FOR COMMENT	29.08.23	AJB	DS

Drawing Status
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Client
GARDEN CITY DESIGN AND BUILD

Project
OAKWOOD LODGE
WYTHENSHAWE

Drawing Title
PRIVATE DRAINAGE LAYOUT

Date	Drawn By	Checked By
AUG. 2023	AJB	DS

Scale at A1	Project Number
1:200	33266

Sheet Number
33266-SUT-ZZ-XX-DR-C-6200

Revision
P07

Lovett Walk

LONGLEY LANE

Nursery

TCB

131 131a 133 133a 135 135a 137 137a 139 141 141a 143 143a 145 145a 147 147a 149 149a 151 181 771

39 37 15 13 3 1

>> 1000m HIGHWAY DRAIN

MH 3401
CL: 33.17 TBC (BURIED)
IL: 30.78 TBC
LOCATED BY METAL DETECTO
UNDER TREE ROOT
(OFFSET CHAMBER UU RECORDS)

S6 - FLOW CONTROL MH
Q=23.5l/s @ 2.30m DESIGN HEAD.
ORIFICE = 194mm
REF: MD-SHE-0194-2350-2300-2350

EXISTING SEWER BEYOND
THE SITE BOUNDARY IS AN
EXISTING SEWER TRANSFER
(TRANSFER SEWER 2011 ACT)

8m x 7.5m x 1.4m DEEP SURFACE WATER ATTENUATION @ IL: 33.436
POLYSTORM CELLS (OR SIMILAR). SYSTEM TO BE VENTED & INSTALLED
TO MANUFACTURERS DETAILS.
CELLULAR ATTENUATION TO BE BBA CERTIFIED.
CONTRACTOR TO ALLOW FOR CONSTRUCTION LOADING DURING
CONSTRUCTION PERIOD OR PROVIDE ADEQUATE PROTECTION TO PREVENT
EXCESS LOADING OF CELLULAR ATTENUATION.

SCALE BAR 1:250
0 5 10 15 20 25

GENERAL NOTES

THIS DRAWING SHOULD NOT BE SCALED FROM. ALL DIMENSIONS SHOULD BE TAKEN FROM RELEVANT DRAWINGS. IF NO DIMENSIONS ARE AVAILABLE THEN THE ENGINEER SHOULD BE CONTACTED FOR ADVICE.

ALL DIMENSIONS SHOULD BE CHECKED ON SITE AND ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORKS.

ALL WORKS RELATING TO PROPOSED SEWERS SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH THE DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS OFFERED FOR ADOPTION UNDER THE CODE FOR ADOPTION AGREEMENTS FOR WATER AND SEWERAGE COMPANIES OPERATING WHOLLY OR MAINLY IN ENGLAND ("THE CODE") AND SHALL BE REFERRED TO AS 'THE DCG.'

THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS TO ENSURE THAT THE ADOPTED SEWERS (AS INDICATED ON THIS DRAWING) ARE CONSTRUCTED IN ACCORDANCE WITH THE DCG AND ALL STATUTORY UNDERTAKER AMENDMENTS.

THE DESIGN OF THE SEWERS AND OTHER ELEMENTS TO BE ADOPTED (AS INDICATED ON THIS DRAWING) HAVE BEEN DESIGNED IN ACCORDANCE WITH PARTS B, C AND D OF THE DCG. PUMPING STATION DESIGNS WILL BE CARRIED OUT BY A SPECIALIST THIRD PARTY.

THE CONSTRUCTION OF THE SEWERS TO BE ADOPTED (AS INDICATED ON THIS DRAWING) WILL BE ACCORDANCE WITH PARTS B TO F OF THE DCG.

THE DEVELOPER WILL REMAIN RESPONSIBLE FOR THE SEWERS TO BE ADOPTED (AS INDICATED ON THIS DRAWING) UP TO THE TIME THE SEWERS ARE ADOPTED.

IF ANY EXISTING SEWERS ARE LOCATED ON SITE DURING THE WORKS THE ENGINEER SHALL BE NOTIFIED. ANY UNKNOWN SEWERS LOCATED ON SITE SHALL NOT BE REMOVED UNTIL ADVISED OTHERWISE.

THE DEVELOPER SHALL PROVIDE AN AS-BUILT SURVEY OF THE DRAINAGE TO THE ENGINEER UPON COMPLETION OF WORKS SO THAT AN AS-BUILT RECORD DRAWING CAN BE PREPARED.

THE DEVELOPER SHALL PROVIDE A CDM HEALTH AND SAFETY FILE IN ACCORDANCE WITH THE GUIDANCE PROVIDED IN APPENDIX I OF THE DCG.

PRIOR TO CONSTRUCTION THE CONTRACTOR IS TO ENSURE THAT THE PROPOSED DRAINAGE DOES NOT CLASH WITH THE EXISTING SERVICES. THE CONTRACTOR IS TO ALLOW FOR THIS PROVISION WITHIN THE TENDER SUM.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ATTAINING ALL NECESSARY APPROVALS FOR ANY SERVICE DIVERSIONS REQUIRED TO FACILITATE THE PROPOSED WORKS

S104 DRAINAGE KEY

- SITE BOUNDARY
- NEW S104 COMBINED SEWER
- NEW S104 SURFACE WATER SEWER
- NEW S104 FOUL WATER SEWER
- NEW MANHOLE - REFER TO PLAN FOR SIZE
- EX COM — EX COMBINED DRAIN/SEWER
- EX SW — EX SURFACE WATER DRAIN/SEWER
- EX FW — EX FOUL WATER DRAIN/SEWER
- SURFACE WATER PRIVATE DRAIN
- FOUL WATER PRIVATE DRAIN
- EXISTING SEWER EASEMENT

NOTE: ALL DRAINAGE CONNECTIONS SHALL BE SOFFIT TO SOFFIT UNLESS DETAILED/NOTED OTHERWISE

NOTE: NO ADOPTABLE WORKS SHALL BE CARRIED OUT UNTIL FULLY APPROVED BY ADOPTING AUTHORITY. ANY WORKS CARRIED OUT PRIOR TO APPROVAL WILL BE UNDERTAKEN AT CONTRACTORS RISK.

NOTE: CONCRETE PROTECTION SHALL BE GRADE GEN 3 (C16/C20) COMPLYING WITH BRE SPECIAL DIGEST 1.

Rev	Description	Date	By	Chkd
P10	NOTE ADDED ADJACENT MH05	24.05.24	MG	DS
P09	AMENDED TO COMMENTS	25.04.24	AJB	DS
P08	F8-MH03 BACKDROP ADDED	07.02.24	AJB	DS
P07	AMENDED TO UU COMMENTS (11.12.23)	03.01.24	AJB	DS
P06	PS8 LATERAL DRAIN AMENDED	04.12.23	KW	DS
P05	SITE LOCATION UPDATED	27.11.23	KW	DS
P04	SITE LAYOUT UPDATED	02.11.23	AJB	DS
P03	UPDATED LEGAL BOUNDARY	20.10.23	JW	DS
P02	LOOP INFORMATION UPDATED	12.09.23	JW	DS
P01	ISSUED FOR COMMENT	29.08.23	AJB	DS

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GARDEN CITY DESIGN AND BUILD

Project
OAKWOOD LODGE
WYTHENSHAWE

Drawing Title
S104 DRAINAGE LAYOUT

Date	Drawn By	Checked By
AUG. 2023	AJB	DS

Scale at A1	Project Number
1:250	33266

Sheet Number	Revision
33266-SUT-ZZ-XX-DR-C-6550	P10

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.385	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)	400

Designed with Level Soffits

Network Design Table for Surface Network 1

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	11.735	0.147	80.0	0.052	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	39.963	0.100	400.0	0.050	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.000	6.763	0.103	65.6	0.083	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	6.210	0.016	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	2.855	0.029	100.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	12.762	0.128	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	14.717	0.037	400.0	0.030	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	5.133	0.064	80.0	0.026	5.00	0.0	0.600	o	150	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	5.17	34.093	0.052	0.0	0.0	0.0	1.12	19.9	7.0
1.001	50.00	5.72	32.945	0.102	0.0	0.0	0.0	1.21	342.5	13.8
2.000	50.00	5.09	34.047	0.083	0.0	0.0	0.0	1.24	22.0	11.2
1.002	50.00	5.81	32.845	0.185	0.0	0.0	0.0	1.21	342.5	25.0
3.000	50.00	5.05	33.436	0.000	0.0	0.0	0.0	1.00	17.8	0.0
3.001	50.00	5.26	33.407	0.000	0.0	0.0	0.0	1.00	17.8	0.0
1.003	50.00	6.01	32.830	0.215	0.0	0.0	0.0	1.21	342.5	29.1
4.000	50.00	5.08	34.086	0.026	0.0	0.0	0.0	1.12	19.9	3.5

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Network Design Table for Surface Network 1

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
1.004	27.842	0.070	400.0	0.034	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	13.591	0.170	80.0	0.039	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	14.679	0.037	400.0	0.028	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	5.414	0.068	80.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	7.156	0.072	100.0	0.000	0.00	0.0	0.600	o	225	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)
1.004	50.00	6.39	32.793	0.276	0.0	0.0	0.0	1.21	342.5	37.3
5.000	50.00	5.20	33.925	0.039	0.0	0.0	0.0	1.12	19.9	5.3
1.005	50.00	6.60	32.723	0.342	0.0	0.0	0.0	1.21	342.5	46.4
6.000	50.00	5.08	33.888	0.025	0.0	0.0	0.0	1.12	19.9	3.4
1.006	50.00	6.69	32.687	0.368	0.0	0.0	0.0	1.31	52.0	49.8

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.047	0.047	0.047
	User	-	100	0.005	0.005	0.052
1.001	User	-	100	0.050	0.050	0.050
2.000	User	-	100	0.034	0.034	0.034
	User	-	100	0.003	0.003	0.038
	User	-	100	0.041	0.041	0.078
	User	-	100	0.004	0.004	0.083
1.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.030	0.030	0.030
4.000	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.018
	User	-	100	0.007	0.007	0.025
	User	-	100	0.001	0.001	0.026
1.004	User	-	100	0.034	0.034	0.034
5.000	User	-	100	0.035	0.035	0.035
	User	-	100	0.004	0.004	0.039
1.005	User	-	100	0.028	0.028	0.028
6.000	User	-	100	0.023	0.023	0.023
	User	-	100	0.002	0.002	0.025
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.368	0.368	0.368

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006	S12	35.156	32.615	0.000	1200	0

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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	2	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

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Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.385		

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Online Controls for Surface Network 1

Non Return Valve Manhole: S11, DS/PN: 3.001, Volume (m³): 1.5

Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.006, Volume (m³): 17.3

Unit Reference	MD-SHE-0194-2350-2300-2350
Design Head (m)	2.300
Design Flow (l/s)	23.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	194
Invert Level (m)	32.687
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	23.5
Flush-Flo™	0.662	23.5
Kick-Flo®	1.396	18.5
Mean Flow over Head Range	-	20.5

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	6.7	1.200	21.3	3.000	26.7	7.000	40.1
0.200	18.0	1.400	18.6	3.500	28.7	7.500	41.5
0.300	21.2	1.600	19.8	4.000	30.6	8.000	42.8
0.400	22.5	1.800	20.9	4.500	32.4	8.500	44.1
0.500	23.1	2.000	22.0	5.000	34.1	9.000	45.3
0.600	23.4	2.200	23.0	5.500	35.7	9.500	46.5
0.800	23.3	2.400	24.0	6.000	37.2		
1.000	22.7	2.600	24.9	6.500	38.7		

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Offline Controls for Surface Network 1

Pipe Manhole: S3, DS/PN: 1.003, Loop to PN: 3.000

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	10.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	34.200

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Storage Structures for Surface Network 1

Tank or Pond Manhole: S10, DS/PN: 3.000

Invert Level (m) 33.436

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	60.0	0.400	60.0	0.800	60.0	1.200	60.0
0.100	60.0	0.500	60.0	0.900	60.0	1.300	60.0
0.200	60.0	0.600	60.0	1.000	60.0	1.400	60.0
0.300	60.0	0.700	60.0	1.100	60.0	1.401	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
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	2	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.385
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	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2
Climate Change (%)	0

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	PS8	15 Winter	2	+0%					34.165
1.001	S1	15 Winter	2	+0%					33.059
2.000	PS17	15 Winter	2	+0%					34.141
1.002	S2	15 Winter	2	+0%					33.048
3.000	S10	15 Summer	2	+0%					33.436
3.001	S11	15 Summer	2	+0%					33.407
1.003	S3	15 Winter	2	+0%				0	33.047
4.000	PS33	15 Winter	2	+0%					34.138
1.004	S4	15 Winter	2	+0%					33.045
5.000	S16	15 Winter	2	+0%					33.986
1.005	S5	15 Winter	2	+0%					33.041
6.000	PS39	15 Winter	2	+0%					33.938
1.006	S6	15 Winter	2	+0%	2/15 Summer				33.037

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	PS8	-0.078	0.000	0.46			8.3	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	S1	-0.486	0.000	0.05			14.4	OK	
2.000	PS17	-0.056	0.000	0.71			13.2	OK	
1.002	S2	-0.397	0.000	0.11			22.5	OK	
3.000	S10	-0.150	0.000	0.00			0.0	OK	
3.001	S11	-0.150	0.000	0.00			0.0	OK	
1.003	S3	-0.383	0.000	0.12	0.0		24.5	OK	
4.000	PS33	-0.098	0.000	0.26			4.2	OK	
1.004	S4	-0.348	0.000	0.10			28.0	OK	
5.000	S16	-0.089	0.000	0.34			6.2	OK	
1.005	S5	-0.282	0.000	0.12			25.5	OK	
6.000	PS39	-0.099	0.000	0.25			4.1	OK	
1.006	S6	0.126	0.000	0.58			21.9	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.385	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)	400

Designed with Level Soffits

Network Design Table for Surface Network 1

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	11.735	0.147	80.0	0.052	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	39.963	0.100	400.0	0.050	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.000	6.763	0.103	65.6	0.083	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	6.210	0.016	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	2.855	0.029	100.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	12.762	0.128	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	14.717	0.037	400.0	0.030	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	5.133	0.064	80.0	0.026	5.00	0.0	0.600	o	150	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	5.17	34.093	0.052	0.0	0.0	0.0	1.12	19.9	7.0
1.001	50.00	5.72	32.945	0.102	0.0	0.0	0.0	1.21	342.5	13.8
2.000	50.00	5.09	34.047	0.083	0.0	0.0	0.0	1.24	22.0	11.2
1.002	50.00	5.81	32.845	0.185	0.0	0.0	0.0	1.21	342.5	25.0
3.000	50.00	5.05	33.436	0.000	0.0	0.0	0.0	1.00	17.8	0.0
3.001	50.00	5.26	33.407	0.000	0.0	0.0	0.0	1.00	17.8	0.0
1.003	50.00	6.01	32.830	0.215	0.0	0.0	0.0	1.21	342.5	29.1
4.000	50.00	5.08	34.086	0.026	0.0	0.0	0.0	1.12	19.9	3.5

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Network Design Table for Surface Network 1

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
1.004	27.842	0.070	400.0	0.034	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	13.591	0.170	80.0	0.039	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	14.679	0.037	400.0	0.028	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	5.414	0.068	80.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	7.156	0.072	100.0	0.000	0.00	0.0	0.600	o	225	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)
1.004	50.00	6.39	32.793	0.276	0.0	0.0	0.0	1.21	342.5	37.3
5.000	50.00	5.20	33.925	0.039	0.0	0.0	0.0	1.12	19.9	5.3
1.005	50.00	6.60	32.723	0.342	0.0	0.0	0.0	1.21	342.5	46.4
6.000	50.00	5.08	33.888	0.025	0.0	0.0	0.0	1.12	19.9	3.4
1.006	50.00	6.69	32.687	0.368	0.0	0.0	0.0	1.31	52.0	49.8

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.047	0.047	0.047
	User	-	100	0.005	0.005	0.052
1.001	User	-	100	0.050	0.050	0.050
2.000	User	-	100	0.034	0.034	0.034
	User	-	100	0.003	0.003	0.038
	User	-	100	0.041	0.041	0.078
	User	-	100	0.004	0.004	0.083
1.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.030	0.030	0.030
4.000	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.018
	User	-	100	0.007	0.007	0.025
	User	-	100	0.001	0.001	0.026
1.004	User	-	100	0.034	0.034	0.034
5.000	User	-	100	0.035	0.035	0.035
	User	-	100	0.004	0.004	0.039
1.005	User	-	100	0.028	0.028	0.028
6.000	User	-	100	0.023	0.023	0.023
	User	-	100	0.002	0.002	0.025
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.368	0.368	0.368

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006	S12	35.156	32.615	0.000	1200	0

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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	2	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

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Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.385		

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Online Controls for Surface Network 1

Non Return Valve Manhole: S11, DS/PN: 3.001, Volume (m³): 1.5

Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.006, Volume (m³): 17.3

Unit Reference	MD-SHE-0194-2350-2300-2350
Design Head (m)	2.300
Design Flow (l/s)	23.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	194
Invert Level (m)	32.687
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	23.5
Flush-Flo™	0.662	23.5
Kick-Flo®	1.396	18.5
Mean Flow over Head Range	-	20.5

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	6.7	1.200	21.3	3.000	26.7	7.000	40.1
0.200	18.0	1.400	18.6	3.500	28.7	7.500	41.5
0.300	21.2	1.600	19.8	4.000	30.6	8.000	42.8
0.400	22.5	1.800	20.9	4.500	32.4	8.500	44.1
0.500	23.1	2.000	22.0	5.000	34.1	9.000	45.3
0.600	23.4	2.200	23.0	5.500	35.7	9.500	46.5
0.800	23.3	2.400	24.0	6.000	37.2		
1.000	22.7	2.600	24.9	6.500	38.7		

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Offline Controls for Surface Network 1

Pipe Manhole: S3, DS/PN: 1.003, Loop to PN: 3.000

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	10.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	34.200

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Storage Structures for Surface Network 1

Tank or Pond Manhole: S10, DS/PN: 3.000

Invert Level (m) 33.436

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	60.0	0.400	60.0	0.800	60.0	1.200	60.0
0.100	60.0	0.500	60.0	0.900	60.0	1.300	60.0
0.200	60.0	0.600	60.0	1.000	60.0	1.400	60.0
0.300	60.0	0.700	60.0	1.100	60.0	1.401	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
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	2	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.385
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	ON
DVD Status	OFF
Inertia Status	OFF

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

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	PS8	15 Winter	30	+0%					34.202
1.001	S1	30 Winter	30	+0%					33.362
2.000	PS17	15 Winter	30	+0%	30/15 Summer				34.275
1.002	S2	30 Winter	30	+0%					33.360
3.000	S10	15 Summer	30	+0%					33.436
3.001	S11	15 Summer	30	+0%					33.407
1.003	S3	30 Winter	30	+0%				0	33.359
4.000	PS33	15 Winter	30	+0%					34.161
1.004	S4	30 Winter	30	+0%					33.357
5.000	S16	15 Winter	30	+0%					34.013
1.005	S5	30 Winter	30	+0%	30/30 Winter				33.351
6.000	PS39	15 Winter	30	+0%					33.960
1.006	S6	30 Winter	30	+0%	30/15 Summer				33.347

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	PS8	-0.041	0.000	0.87			15.6	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.001	S1	-0.183	0.000	0.07			21.3	OK	
2.000	PS17	0.078	0.000	1.33			24.8	SURCHARGED	
1.002	S2	-0.085	0.000	0.11			23.4	OK	
3.000	S10	-0.150	0.000	0.00			0.0	OK	
3.001	S11	-0.150	0.000	0.00			0.0	OK	
1.003	S3	-0.070	0.000	0.12	0.0		25.9	OK	
4.000	PS33	-0.075	0.000	0.50			7.9	OK	
1.004	S4	-0.036	0.000	0.11			30.7	OK	
5.000	S16	-0.062	0.000	0.65			11.8	OK	
1.005	S5	0.027	0.000	0.13			28.1	SURCHARGED	
6.000	PS39	-0.077	0.000	0.47			7.7	OK	
1.006	S6	0.435	0.000	0.62			23.4	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.385	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)	400

Designed with Level Soffits

Network Design Table for Surface Network 1

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	11.735	0.147	80.0	0.052	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	39.963	0.100	400.0	0.050	0.00	0.0	0.600	o	600	Pipe/Conduit	
2.000	6.763	0.103	65.6	0.083	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	6.210	0.016	400.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
3.000	2.855	0.029	100.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	12.762	0.128	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	14.717	0.037	400.0	0.030	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	5.133	0.064	80.0	0.026	5.00	0.0	0.600	o	150	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	5.17	34.093	0.052	0.0	0.0	0.0	1.12	19.9	7.0
1.001	50.00	5.72	32.945	0.102	0.0	0.0	0.0	1.21	342.5	13.8
2.000	50.00	5.09	34.047	0.083	0.0	0.0	0.0	1.24	22.0	11.2
1.002	50.00	5.81	32.845	0.185	0.0	0.0	0.0	1.21	342.5	25.0
3.000	50.00	5.05	33.436	0.000	0.0	0.0	0.0	1.00	17.8	0.0
3.001	50.00	5.26	33.407	0.000	0.0	0.0	0.0	1.00	17.8	0.0
1.003	50.00	6.01	32.830	0.215	0.0	0.0	0.0	1.21	342.5	29.1
4.000	50.00	5.08	34.086	0.026	0.0	0.0	0.0	1.12	19.9	3.5

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Network Design Table for Surface Network 1

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
1.004	27.842	0.070	400.0	0.034	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	13.591	0.170	80.0	0.039	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	14.679	0.037	400.0	0.028	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	5.414	0.068	80.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	7.156	0.072	100.0	0.000	0.00	0.0	0.600	o	225	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)
1.004	50.00	6.39	32.793	0.276	0.0	0.0	0.0	1.21	342.5	37.3
5.000	50.00	5.20	33.925	0.039	0.0	0.0	0.0	1.12	19.9	5.3
1.005	50.00	6.60	32.723	0.342	0.0	0.0	0.0	1.21	342.5	46.4
6.000	50.00	5.08	33.888	0.025	0.0	0.0	0.0	1.12	19.9	3.4
1.006	50.00	6.69	32.687	0.368	0.0	0.0	0.0	1.31	52.0	49.8

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Area Summary for Surface Network 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.047	0.047	0.047
	User	-	100	0.005	0.005	0.052
1.001	User	-	100	0.050	0.050	0.050
2.000	User	-	100	0.034	0.034	0.034
	User	-	100	0.003	0.003	0.038
	User	-	100	0.041	0.041	0.078
	User	-	100	0.004	0.004	0.083
1.002	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.030	0.030	0.030
4.000	User	-	100	0.017	0.017	0.017
	User	-	100	0.002	0.002	0.018
	User	-	100	0.007	0.007	0.025
	User	-	100	0.001	0.001	0.026
1.004	User	-	100	0.034	0.034	0.034
5.000	User	-	100	0.035	0.035	0.035
	User	-	100	0.004	0.004	0.039
1.005	User	-	100	0.028	0.028	0.028
6.000	User	-	100	0.023	0.023	0.023
	User	-	100	0.002	0.002	0.025
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.368	0.368	0.368

Free Flowing Outfall Details for Surface Network 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006	S12	35.156	32.615	0.000	1200	0

Simulation Criteria for Surface Network 1

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	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	2	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

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Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.385		

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Online Controls for Surface Network 1

Non Return Valve Manhole: S11, DS/PN: 3.001, Volume (m³): 1.5

Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.006, Volume (m³): 17.3

Unit Reference	MD-SHE-0194-2350-2300-2350
Design Head (m)	2.300
Design Flow (l/s)	23.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	194
Invert Level (m)	32.687
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	23.5
Flush-Flo™	0.662	23.5
Kick-Flo®	1.396	18.5
Mean Flow over Head Range	-	20.5

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	6.7	1.200	21.3	3.000	26.7	7.000	40.1
0.200	18.0	1.400	18.6	3.500	28.7	7.500	41.5
0.300	21.2	1.600	19.8	4.000	30.6	8.000	42.8
0.400	22.5	1.800	20.9	4.500	32.4	8.500	44.1
0.500	23.1	2.000	22.0	5.000	34.1	9.000	45.3
0.600	23.4	2.200	23.0	5.500	35.7	9.500	46.5
0.800	23.3	2.400	24.0	6.000	37.2		
1.000	22.7	2.600	24.9	6.500	38.7		

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Offline Controls for Surface Network 1

Pipe Manhole: S3, DS/PN: 1.003, Loop to PN: 3.000

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	10.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	34.200

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Storage Structures for Surface Network 1

Tank or Pond Manhole: S10, DS/PN: 3.000

Invert Level (m) 33.436

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	60.0	0.400	60.0	0.800	60.0	1.200	60.0
0.100	60.0	0.500	60.0	0.900	60.0	1.300	60.0
0.200	60.0	0.600	60.0	1.000	60.0	1.400	60.0
0.300	60.0	0.700	60.0	1.100	60.0	1.401	0.0

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
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	2	Number of Time/Area Diagrams	0
Number of Offline Controls	1	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.385
Region	England and Wales	Cv (Summer)	1.000
M5-60 (mm)	18.000	Cv (Winter)	1.000

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	PS8	30 Summer	100	+45%	100/15 Summer			
1.001	S1	30 Summer	100	+45%	100/15 Summer			
2.000	PS17	30 Summer	100	+45%	100/15 Summer			
1.002	S2	30 Summer	100	+45%	100/15 Summer			
3.000	S10	60 Winter	100	+45%	100/15 Summer			
3.001	S11	60 Winter	100	+45%	100/15 Summer			
1.003	S3	30 Summer	100	+45%	100/15 Summer		100/15 Summer	11
4.000	PS33	30 Summer	100	+45%	100/15 Summer			
1.004	S4	30 Summer	100	+45%	100/15 Summer			
5.000	S16	30 Summer	100	+45%	100/15 Summer			
1.005	S5	30 Summer	100	+45%	100/15 Summer			
6.000	PS39	30 Summer	100	+45%	100/15 Summer			
1.006	S6	30 Summer	100	+45%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	PS8	35.119	0.876	0.000	1.85			33.3	SURCHARGED

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.001	S1	34.970	1.425	0.000	0.15			44.1	SURCHARGED
2.000	PS17	35.337	1.140	0.000	2.87			53.5	SURCHARGED
1.002	S2	34.964	1.519	0.000	0.30			62.5	SURCHARGED
3.000	S10	34.339	0.753	0.000	1.40			15.2	SURCHARGED
3.001	S11	34.357	0.800	0.000	0.95			15.4	SURCHARGED
1.003	S3	34.960	1.530	0.000	0.19	68.1		39.8	SURCHARGED
4.000	PS33	34.979	0.744	0.000	1.07			17.0	SURCHARGED
1.004	S4	34.965	1.572	0.000	0.18			48.4	SURCHARGED
5.000	S16	35.039	0.964	0.000	1.37			24.9	FLOOD RISK
1.005	S5	34.965	1.642	0.000	0.25			52.1	FLOOD RISK
6.000	PS39	34.977	0.939	0.000	1.00			16.3	FLOOD RISK
1.006	S6	34.963	2.051	0.000	0.62			23.4	FLOOD RISK

PN	US/MH Name	Level Exceeded
1.000	PS8	
1.001	S1	
2.000	PS17	
1.002	S2	
3.000	S10	
3.001	S11	
1.003	S3	
4.000	PS33	
1.004	S4	
5.000	S16	
1.005	S5	
6.000	PS39	
1.006	S6	

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Appendix D

KEY

INDICATES FLOOD FLOW ROUTE

SCALE BAR 1:500

0 10 20 30 40 50

N

LONGLEY LANE

Nursery

151

181

35 135a 137 137a 139 141 141a 143 143a 145 145a 147 147a 149 149a

39 37 15 13 3 1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

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Drawing Status

PRELIMINARY DRAWING

Client

GARDEN CITY DESIGN AND BUILD

Project

OAKWOOD LODGE
WYTHINSHAWE

Drawing Title

FLOOD FLOW ROUTE

Rev	Description	Date	By	Chkd
P01	ISSUED FOR COMMENT	30.05.24	AJB	DS

Date	Drawn By	Checked By
MAY "24	AJB	DS

Scale at A3	Project Number
1:500	33266

Sheet Number

33266-SUT-ZZ-XX-DR-C-6010

Revision

P01

Appendix E

From:	seweradoptions@uuplc.co.uk
To:	dave.samuels@sutcliffe.co.uk
Cc:	steven@johnsouthworth.co.uk
Subject:	RE: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872
Date:	01 August 2023 14:34:53
Attachments:	image002.png image003.png

Good Afternoon Dave,

I am just picking this up on behalf of Ashleigh whilst she is on leave.

Thank you for the below I am happy with the evidence provided to discount a highway drain as a possibility.

As Ashleigh has stated below we would not object to 50% betterment being provided.

Kind regards,

Eireann Thompson
Assistant Developer Engineer
Developer Services & Metering
Customer Services
Mobex: 07553074138
unitedutilities.com

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry https://www.unitedutilities.com/builders-developers/ or you can email us at developerserviceswater@uuplc.co.uk

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---------- Original Message ----------
From: Dave Samuels [dave.samuels@sutcliffe.co.uk]
Sent: 27/07/2023 08:35
To: seweradoptions@uuplc.co.uk
Cc: steven@johnsouthworth.co.uk
Subject: RE: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

Dear Sirs

Further to your below email please find attached email from Manchester City Council LLFA stating that they do **not** accept private developments to discharge into a highway drain.

Eireann Thompson
Assistant Developer Engineer
Developer Services & Metering
Customer Services
Mobex: 07553074138
unitedutilities.com

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry https://www.unitedutilities.com/builders-developers/ or you can email us at developerserviceswater@uuplc.co.uk

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---------- Original Message ----------
From: Dave Samuels [dave.samuels@sutcliffe.co.uk]
Sent: 27/07/2023 08:35
To: seweradoptions@uuplc.co.uk
Cc: steven@johnsouthworth.co.uk
Subject: RE: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

Dear Sirs

Further to your below email please find attached email from Manchester City Council LLFA stating that they do **not** accept private developments to discharge into a highway drain.

Therefore, we confirm that, as per your last email we will design our proposed drainage scheme to provide 50% betterment on the 2 year rainfall event with a SW discharge rate of 23.5 l/s

We look forward to your confirmation.

If you have any queries, please do not hesitate to contact this office.

Regards

Dave Samuels
BEng(Hons) CEng MIStructE MaPS
Technical Drainage Director

SUTCLIFFE

18-20 Harrington Street, Liverpool, L2 9QA

t: 0151 227 3155

m: 07968 514 672

dd: 0151 305 5439
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Cert: 1122

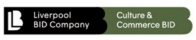












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If you have received this email in error, please notify us immediately by email or telephone.

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: Tuesday, July 4, 2023 3:51 PM
To: dave.samuels@sutcliffe.co.uk
Subject: RE: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

Good afternoon Dave,

Thank you for providing further information.

Prior to approving the connection to the public combined sewer United Utilities do require evidence that the highway drain is a discounted option. However, once I have this evidence United Utilities would not object to the surface water flows discharging to the public combined network. All developments should be aiming to discharge at greenfield rates, however if this is

not possible we would not object to 50% betterment being provided. Please note the final decision on flow rates are made by the LLFA.

If I can be of any further assistance please do get in touch.

Kind regards

Ashleigh Bellerby
Assistant Developer Engineer
Developer Services & Metering
Customer Services
T: 07826891650
unitedutilities.com

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---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 22/06/2023 16:06
To: dave.samuels@sutcliffe.co.uk
Subject: RE: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

Good Afternoon

Thank you for your enquiry for site Oakwood Lodge this has been logged with our engineer Ashleigh for technical assessment her contact number is 07826 891 650 he is due to respond to you on or before 04.07.2023.

Kind Regards

Lucie Gaskell
Customer Advisor Advanced
Developer Services & Metering
Customer Services
Direct Tel: 01925 429037
Tel: 0345 072 6067
unitedutilities.com

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---------- Original Message ----------
From: Dave Samuels [dave.samuels@sutcliffe.co.uk]
Sent: 20/06/2023 09:15
To: seweradoptions@uuplc.co.uk
Subject: RE: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

Dear Sirs

Further to your response below we have carried out a drainage survey of the site and undertaken surface water hydraulic calculations for the site.

The drainage for the site is as shown on the attached drawing. The current drainage network is a combined drainage network.

We intend to retain as much of the existing network as possible for the foul drainage and will provide a new surface water drainage network.

As the proposed road will be offered for adoption, we will need to offer the existing & proposed sewers for adoption.

We have written to the Flood Authority for Manchester to request discharging the surface water into the adjacent highway drain but have not received any response from them. We are chasing this with the flood authority as the large diameter highway drain should be considered suitable but, as you know, the Highway Authority generally refuse permission to discharge surface water into their drains.

Therefore, at this stage of the design we are providing 2 proposals, which are.

1. Discharge to the Highway Drain

2. Discharge to the existing combined drain

As stated, we have not managed to receive any advice regarding discharge to the highway drain so currently a discharge to the combined sewer is the option with more certainty.

With regards to the advice given in your response to our predevelopment submission we would question the allowable surface water discharge rate.

Having carried out a hydraulic assessment on the existing drainage network we get a discharge rate for the 2-year storm event of 47 l/s. If we offer a 50% reduction, in line with the SFRA for Manchester then the allowable discharge rate of 23.5 l/s is calculated.

We feel that the requested discharge rate of 5 l/s is too low and penalises the developer in cost to accommodate the low discharge rate feel that the requested discharge rate of **23.5 l/s** is reasonable as a 50% reduction is offered / provided.

Can you please confirm the above is acceptable to UU?

Regards

Dave Samuels
BEng(Hons) CEng MIStructE MaPS
Executive Associate

SUTCLIFFE

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If you have received this email in error, please notify us immediately by email or telephone.

From: seweradoptions@uuplc.co.uk <seweradoptions@uuplc.co.uk>
Sent: Monday, May 15, 2023 11:22 AM
To: Dave Samuels <dave.samuels@sutcliffe.co.uk>
Subject: Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

Good morning Dave,

Pre Development Enquiry for: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB UU Reference Number : 03961872

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.
If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:
https://www.unitedutilities.com/builders-developers/working-near-our-assets/

Foul Water
Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.
Our preferred point of discharge would be to the 900mm diameter public combined sewer within Longley Lane located to the South of your proposed development at an unrestricted rate. If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.
In accordance with our infrastructure plans we may ask you to change your point of connection.

Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

https://www.gov.uk/government/publications/groundwater-protection-position-statements

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Firstly, please note the surface water sewer you have referred to in your email is on our records as a 1000mm Highway Drain. I have sent a screenshot of our records below. For any consent to discharge here you would need to contact the Highways Authority directly, United Utilities cannot grant consent for a surface water connection to a highway drain.

Error! Filename not specified.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 900mm diameter public combined sewer within Longley Lane located South of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the pubic sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:
https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/
We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.
If we can be of any further assistance please don't hesitate to contact us further.

Sewer Adoptions
You have indicated on your application form that you intend to put the sewers forward for adoption (including any SuDS components that can come within the meaning of a sewer). United Utilities assess adoption applications based on the current Design & Construction Guidance and local practices which have now replaced 'Sewers For Adoption 6th Edition'. We recommend that you submit a pre design assessment to the sewer adoption mailbox (SewerAdoptions@uuplc.co.uk) stating pre design assessment in the title
Please refer to links below to obtain further guidance:
https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-adoptions/
Site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.
If you intend to put forward your wastewater assets for adoption by United Utilities, the proposed detail design will be subject to a technical appraisal by an Adoption Engineer as we need to be sure that the proposals meets the requirements set out in the Design & Construction Guidance. The proposed design should give consideration to long term operability and give United Utilities a safe and cost effective proposal for the lifetime of the assets. In these cases, we strongly recommend that no construction commences until the detailed drainage design, submitted as part of the Section 104 application, has been assessed and accepted in writing by United Utilities. Any work carried out prior to the technical assessment being approved is done entirely at the developer's own risk and could be subject to change.

SuDS
If your development proposal incorporates any SuDS component(s) which interact with a sewer network you plan on offering for adoption to United Utilities; contact should be made with our technical team at your earliest convenience, please complete the 'Section 104 pre-application form : ' and include as much relevant detail as you can. These discussions can help prevent delays later in the development process.
Section 104 Pre application form (1b)
As per the sewerage sector guidance, all SuDS should be designed in accordance with the standards within the Design & construction guidance & the CIRIA SuDS manual (C753)

Codes For Adoption
The new Codes for Adoption are outlined on the Water UK Website. The link below takes you to their webpage:
https://www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/
A free copy of the new Design & Construction Guidance can be downloaded via the link below**:**
https://www.water.org.uk/sewerage-sector-guidance-approved-documents/

Many thanks and kind regards,

Ashleigh Bellerby
Assistant Developer Engineer
Developer Services & Metering
Customer Services

T: 07826891650
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---------- Original Message ----------
From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]
Sent: 28/04/2023 10:27
To: dave.samuels@sutcliffe.co.uk
Subject: 03961872 - Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB

Dear Dave

PRE DEVELOPMENT APPLICATION AT: Oakwood Lodge, Longley Lane, Wythenshawe, M22 4LB – UU Ref 03961872

Please accept this email as receipt of your application received on 27 April 2023 for the above development. This has now been logged on our system and the job reference is 03961872 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Ashleigh Bellerby for technical assessment. You will receive their response within 8 working days.

Kind regards

Jayne Guest
Customer Advisor Advanced
Developer Services & Metering
Customer Services
Tel: 0345 072 6067
unitedutilities.com

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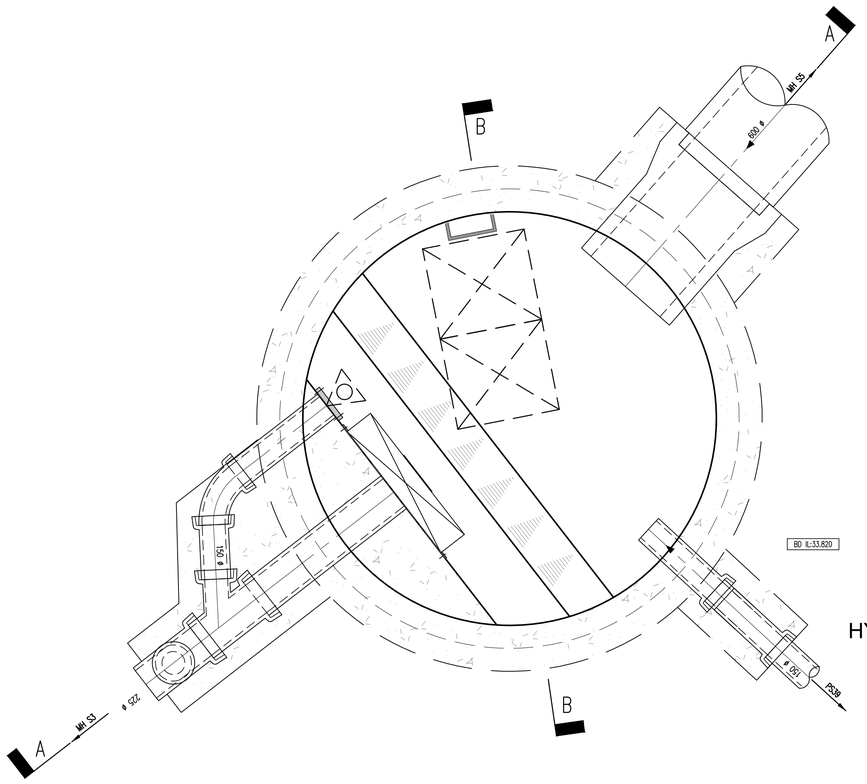
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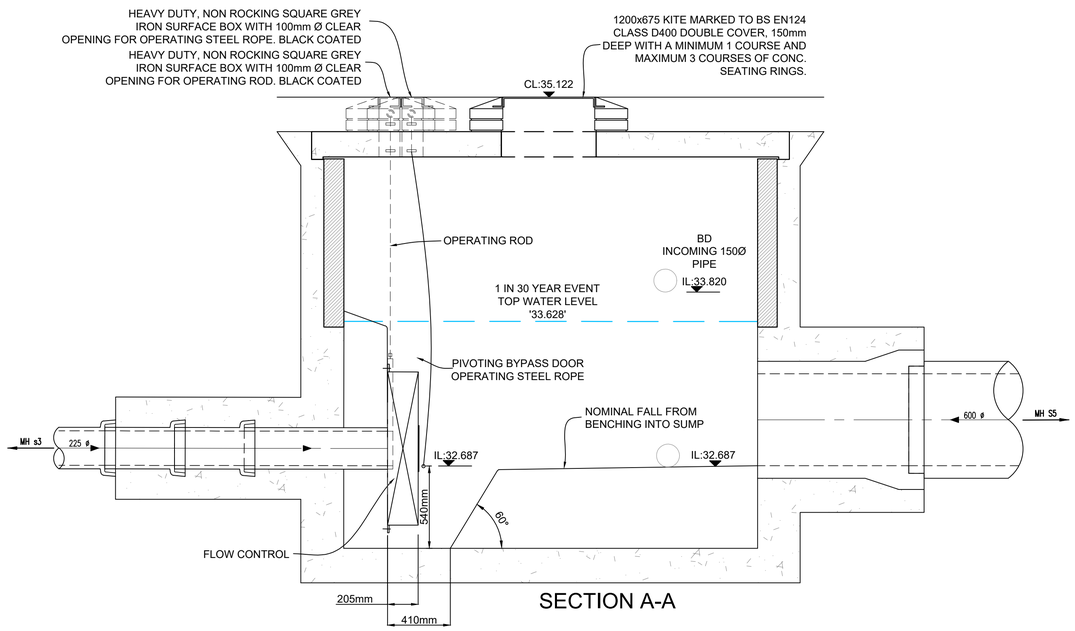
Appendix F

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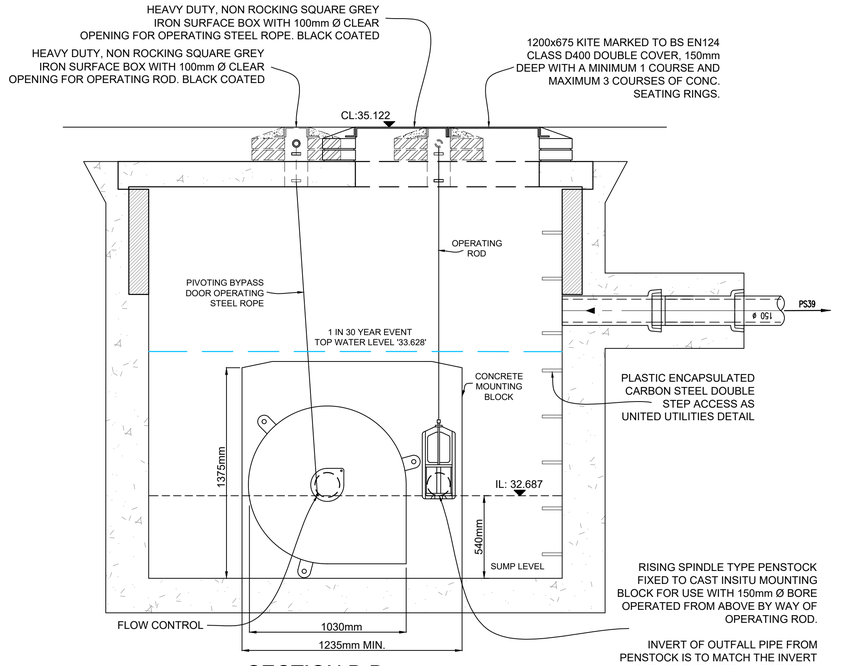


HYDROBRAKE PLAN MH REF S6

HYDROBRAKE DETAILS	
MANHOLE REFERENCE	S6
MANHOLE SIZE	2700mm DIA.
HYDROBRAKE TYPE	OPTIMUM
HYDROBRAKE REFERENCE	SHE-0194-2350-2300-2350
DISCHARGE RATE	23.5 l/sec
DESIGN HEAD	2.3m
ORIFICE SIZE (mm)	194
SUMP DEPTH (mm)	540
INVERT LEVEL (m)	32.687m
WEIR LEVEL (m)	N/A



SECTION A-A



SECTION B-B

SCALE BAR 1:20

0 0.5 1 1.5 2

DO NOT SCALE OFF THIS DRAWING

GENERAL NOTES

THIS DRAWING TO READ IN CONJUNCTION WITH ALL RELEVANT STRUCTURAL AND ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR / FABRICATOR PRIOR TO COMMENCEMENT OF WORKS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.

ALL DRAINAGE AND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE DCG.

DRAINAGE NOTES:

MANHOLE COVERS AND FRAMES SHALL BE IN ACCORDANCE WITH DCG CLAUSE 2.32.

LADDER / DOUBLE STEP ACCESS:

ALL IN ACCORDANCE WITH DCG FIGURES B4 TO B12.

FOR 1200 & 1500mm ø MANHOLE CHAMBERS, OR WHERE THE DEPTH TO SOFFIT IS LESS THAN 3m, A FULL HEIGHT (NO ACCESS SHAFT) CONSTRUCTION IS PREFERRED.

WHERE THE DEPTH TO SOFFIT FROM COVER LEVEL IS LESS THAN 3.0m, DOUBLE ACCESS STEPS SHALL BE USED IN PLACE OF A LADDER.

WHERE THE DEPTH TO SOFFIT FROM COVER LEVEL IS GREATER THAN 3.0m, AN ACCESS LADDER SHALL BE USED. ACCESS LADDER TO UNITED UTILITIES STANDARD DETAIL No. 8. MINIMUM 1200mm INTERNAL SHAFT DIAMETER REQUIRED FOR ACCESS LADDERS.

ROCKER PIPE LENGTHS (DCG E6.6):

150mm ø PIPE – 600mm ø PIPE : MINIMUM 600mm LONG ROCKER PIPE
601mm ø PIPE – 750mm ø PIPE: MINIMUM 1000mm LONG ROCKER PIPE
OVER 750: MINIMUM 1250mm LONG ROCKER PIPE

MANHOLE TYPES:

REFER TO DCG FIGURES B4 TO B25 FOR DETAILS.

VARIABLE FEATURES:

LADDERS: IN ACCORDANCE WITH DCG CLAUSE E2.37

HANDRAILS: IN ACCORDANCE WITH DCG CLAUSE E2.36

SAFETY CHAINS: IN ACCORDANCE WITH DCG CLAUSE E2.35

NOTE: ALL DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH THE DCG

NOTE: ALL CONNECTIONS WITHIN THE MANHOLE TO BE SOFFIT TO SOFFIT CONNECTIONS.

NOTE: TO BE READ IN CONJUNCTION WITH S104 LAYOUT AND PRIVATE DRAINAGE LAYOUT

Rev	Description	Date	By	Chkd
P03	COVER SIZE AMENDED	07.02.24	AJB	DS
P02	COVER LEVELS UPDATED	30.11.23	KW	DS
P01	ISSUE FOR COMMENT	09.08.23	KW	DS

Drawing Status
PRELIMINARY DRAWING

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Client
GARDEN CITY DESIGN AND BUILD

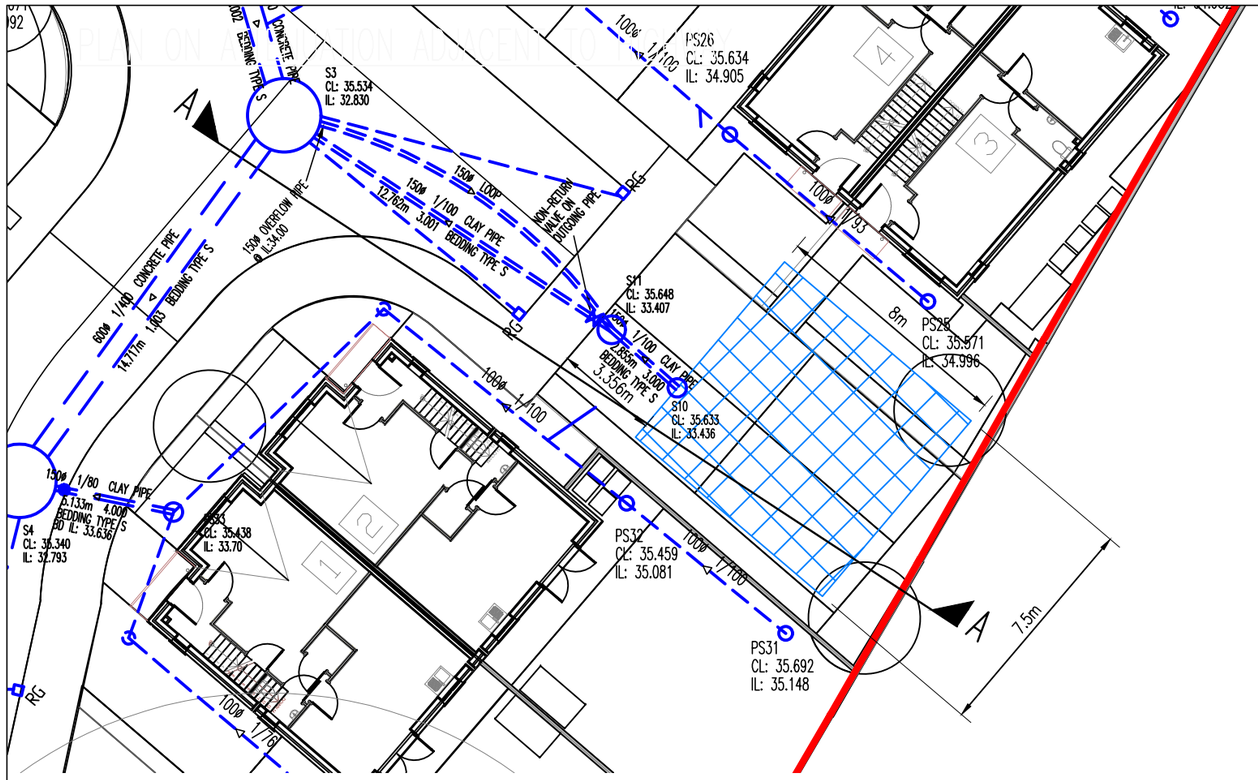
Project
OAKWOOD LODGE
WYTHENSHAW

Drawing Title
HYDROBRAKE DETAIL MH S6

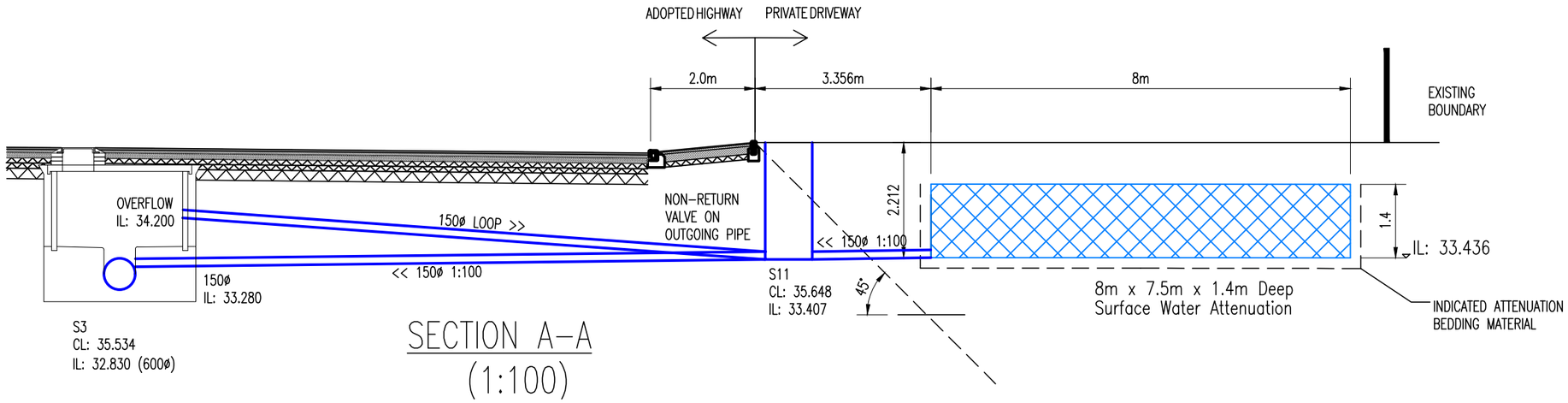
Date	Drawn By	Checked By
AUG 23	KW	DS

Scale at A1	Project Number
1:20	33266

Sheet Number	Revision
33266-SUT-ZZ-XX-DR-C-6310	P03



PLAN ON ATTENUATION ADJACENT TO HIGHWAY
(1:200)



SECTION A–A
(1:100)

General Notes

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ALL WORKS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE ENGINEER'S SPECIFICATIONS, RELEVANT BRITISH STANDARDS, STATUTORY HEALTH AND SAFETY/C.D.M. REGULATIONS, RELEVANT CODES OF PRACTICE AND THE CURRENT EDITION OF THE BUILDING REGULATIONS.

FOR FINAL SETTING OUT INFORMATION RELATING TO GRID LINES AND WALL POSITIONS REFER TO THE ARCHITECT'S DRAWINGS.

SCALE BAR 1:100

0 1 2 3 4 5 10

Rev	Description	Date	By	Chkd
P03	COVER LEVELS UPDATED	07.11.23	AJB	DS
P02	LOOP INFORMATION UPDATED	12.09.23	JW	DS
P01	PRELIMINARY DRAWING	24.08.23	MJB	DS

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Drawing Status
PRELIMINARY DRAWING

Client
GARDEN CITY DESIGN AND BUILD

Project
OAKWOOD LODGE
WHYTHENSHAW

Drawing Title
SECTION THROUGH CELLULAR ATTENUATION AND HIGHWAY

Date	Drawn By	Checked By
AUG 2023	MJB	DS

Scale at A3	Project Number
1:100	33266

Sheet Number: 33266-SUT-ZZ-XX-DR-C-6270

Revision: P03