Reid Jones partnership

Consulting Civil & Structural Engineers

DRAINAGE STATEMENT

CLYDE COURT
LAPWING LANE
WEST DIDSBURY

WILMSLOW ROAD DEVELOPMENTS LTD

Project No.: 11266				
Issue Date	**Revision**	**Status**	**Issued By**	**Checked By**
14.07.2023	B		KLH	SJR
12.06.2024	C		SHR	SJR
13.06.2024	D		SHR	SJR

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DEVELOPMENT DRAINAGE STRATEGY

1.0 Introduction

1.1 This drainage statement has been produced on behalf of Wilmslow Road Developments ltd to discharge condition 14 of the planning approval for the project which consists of the conversion and extension of a former nursing home to form a terrace of five 3-storey dwellinghouses and erection of a detached three storey dwellinghouse fronting Clyde Road, with associated landscaping and car parking.

1.2 The site location is at 22-24 Lapwing Ln, West Didsbury, Manchester M20 2NS.The site covers an area of approximately 52 x 42m and houses a former nursing home, with associated parking and external grassed and paved areas.

1.3 The National Planning Policy Framework (NPPF) and the National Planning Practice Guidance (NPPG) to which condition 14 refers states the following:

> *Prior to the commencement of development, details of a sustainable surface water drainage scheme and a foul water drainage scheme shall be submitted to and approved in writing by the Local Planning Authority. The drainage schemes must include:*
>
> *(i) An investigation of the hierarchy of drainage options in the National Planning Practice Guidance (or any subsequent amendment thereof). This investigation shall include evidence of an assessment of ground conditions and the potential for infiltration of surface water in accordance with BRE365;*
> *(ii) A restricted rate of discharge of surface water agreed with the local planning authority (if it is agreed that infiltration is discounted by the investigations);*
> *(iii) Levels of the proposed drainage systems including proposed ground and finished floor levels in AOD;*
> *(iv) Incorporate mitigation measures to manage the risk of sewer surcharge where applicable; and*
> *(v) Foul and surface water shall drain on separate systems.*
>
> The approved schemes shall also be in accordance with the Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacement national standards.
>
> Prior to occupation of the proposed development, the drainage schemes shall be completed in accordance with the approved details and maintained thereafter for the lifetime of the development.

1.4 This drainage statement is produced to demonstrate the scheme has been designed in accordance with the surface water drainage hierarchy outlined above. It describes the existing site conditions and proposed development. It assesses the potential impact of proposals on existing drainage and includes a proposed scheme for the provision of new drainage to serve the proposed development.

2.0 Site Description and Location

2.1 The development location is shown on Figure 1 below.

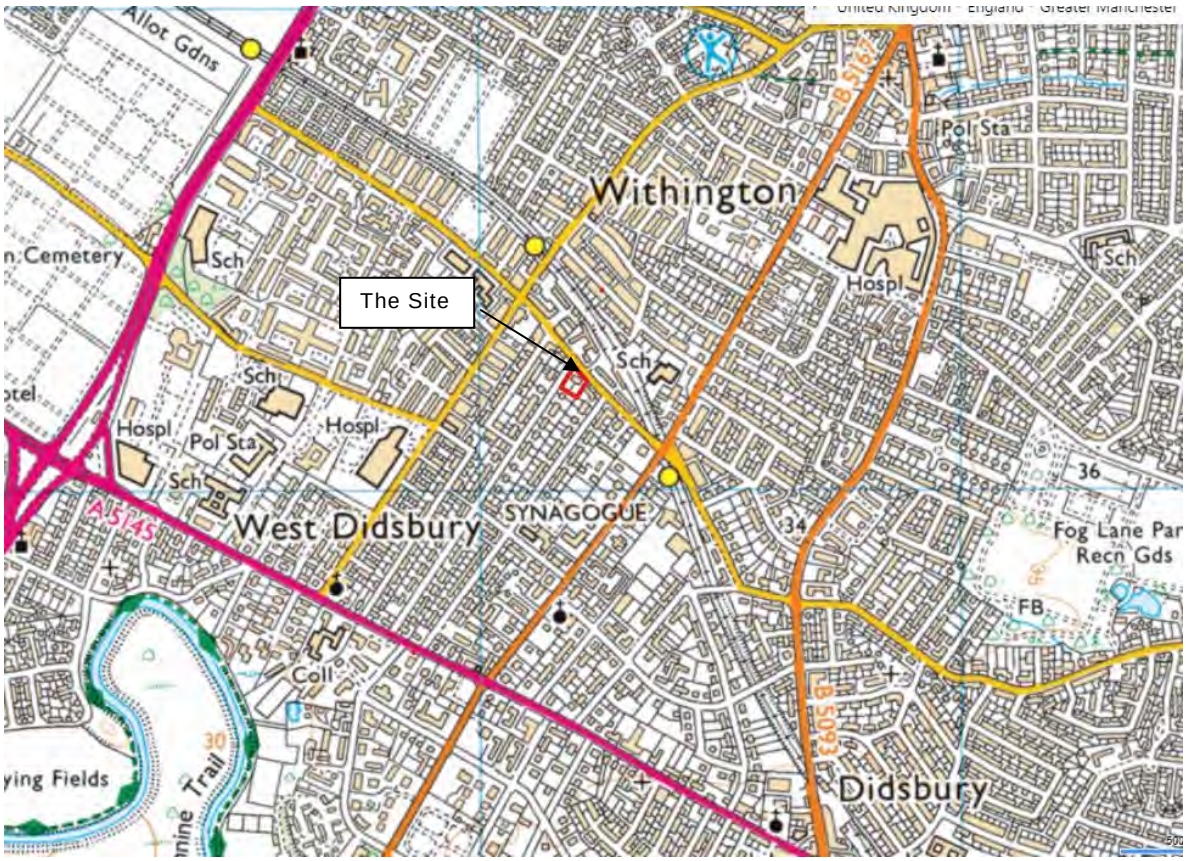


Figure 1 – Site Location Plan

2.2 The site covers an area of approximately 52 x 42m and houses the Former Clyde Court Nursing Home, with associated parking and external grassed and paved areas.

2.3 The site is bounded by Clyde Road and Lapwing Lane and residential houses to the East and South, and is centred at Ordnance Survey reference 384215 E, 392216 N.

3.0 Investigations and Enquiries

3.1 A drainage survey has been carried out to confirm the existing on site drainage and the off site connection to the local sewers.

3.2 The survey identified combined drains joining in a manhole close to the boundary fence with Clyde Road.

3.3 The existing sewer records were requested from United Utilites.

3.4 Ground investigations have been conducted and appended to this report.

4.0 Findings and Recommendations

4.1 The sewer records received from United Utilities and the on site drainage survey confirms that the existing surface water and foul drainage discharge into the combined sewer located in Clyde Road.

4.2 The planning conditions stipulate that surface water discharge should adhere to the highest possible point in the drainage hierarchy.

4.3 Following the drainage heirachy outlined in Building Regulations part H3 and National Planning Practice Guidance (NPPG), surface water should be drained via infiltration systems/soakaways wherever possible.

4.4 Infiltration tests have been carried out to a depth of 1.5m, and the ground is suitable for the use of permeable paving to hard landscaped areas. The demolition of existing building extensions and hard landscaping throughout the site, and the utilisation of permeable paving to new hard landscaped areas will reduce the impermeable surface water area of the site from 1370m^2 to 730m^2. Drawing no. 102-P4 showing the permeable and impermeable areas is apended to this document.

4.4.1 The permeable paving will require a maintenance regime to maintain its functionality. The maintenance regime is appended to this document.

4.5 The requirement to maintain a 5-metre distance from new and existing buildings, the public highway, site boundaries, and the new sunken garden makes it impractical to utilise soakaways for disposing of surface water from roofs on this site.

4.6 To prevent water infiltration around the basement of the detached house, all surrounding areas will be drained positively. This will be achieved through a combination of a pump situated at the lower ground level and gravity drainage for the surrounding areas at higher level.

4.7 The invert level of the combined existing manhole on site forming the connection to the public sewer is higher than the basement level of the new detached house. Consequently, the foul and surface water drainage from the basement of this property will be pumped. A maintenance regime for the pumps will also be implemented.
For the sunken garden area at the rear of the detached house, any surface water will be managed by a dual 190-litre Stormwater Pumping Station. This system can handle up to 300 litre per minute. The surface water will flow into the pumping chamber through an ACO channel linear drain. Additionally, the land drain surrounding the basement will connect to the ACO channel drain, directing its water into the pumping station.

Since the land drain will be situated above the water table and most high level surface water will be intercepted and naturally drained via gravity, it is expected that minimal water will be discharged from the land drain.
The grey and black water from the house will be pumped vertically using two Saniflo domestic sanitary systems. These systems will then discharge the water into the foul drain.
The detached house drainage system layout is depicted in RJP drawing no. 103-P2.

4.8 With no watercourses in close proximity to the site, utilising this option to drain surface water is not feasible.

5.0 Conclusions

5.1 The storm periods considered in the causeway flow surface water analysis were 1-in-1-year, 1-in-30-years with a 45% climate change factor, and 1-in-100-years with a 45% climate change factor. The appended analyses cover surface water scenarios for the general drainage scheme, drainage for the lower basement level of the detached house, and infiltration of surface water via permeable paving. All these analyses confirm no instances of flooding.

5.2 Following the drainage hierarchy, it's apparent that the only feasible choice is to discharge surface water into the combined sewer system.

Based on the restrictions of the site configuration a hydro-brake will be installed in the surface water system to limit the rate at which water discharges off site, at a rate not exceeding 5l/s, into the combined sewer in Clyde Road.

5.3 The proposed general drainage scheme is as indicated on RJP drawing No.11266-101-P6.

5.5 The proposed drainage for the lower level basement of the detached house is indicated on RJP drawing No.11266-103-P2.

5.6 Ground investigations confirm that the infiltration rates are sufficient to support the use of permeable paving. By implementing permeable paving, the area effectively draining into the combined sewer from the site will be reduced by 53%.

4.0 Appendix A

UU Sewer Records



Scale:	1:1250	**SEWER RECORDS**	United Utilities Water for the North West
Date:	17/01/2023		
Address or Site Reference:	CLYDE COURT NURSING HOME 22-24 LAPWING LANE, MANCHESTER, M20 2NS		
Printed by:	Property Searches		

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Appendix B

Permeable Paving Maintenance Regime

Maintenance Regime

Clyde Court - Drainage Maintenance Plan				
Task	Managed By	Frequency	Agreed Action	Person Responsible
General Visual Inspection	Facilities Manager	Weekly	Visual checks of the gullies, surface channels and manhole covers are to be carried out by a suitably trained and experienced person.	Facilities Manager
Cleaning of Drainage Channels and Gullies	Facilities Manager	Quarterly/6 Monthly	Drainage channels and gullies are to be checked monthly to assess the buildup of debris deposited. Depending on the local environment, channels and gully pots are to be cleaned at regular intervals of between 3 to 6 months.	Facilities Manager
Permeable Paving	Facilities Manager	As required	Refer to Permeable Paving Manufacturer guidelines	Facilities Manager
Foul and Surface Pumps	Facilities Manager	As required	As advised by Pump supplier, (maintenance contract recommended)	Facilities Manager

Appendix C

Proposed Drainage General Arrangement
Drawing no. 11266 -101-P6



PROPOSED DRAINAGE GENERAL ARRANGEMENT

1:100

GENERAL NOTES

1. UN-ADOPTED FW & SW DRAINAGE IS TO BE CONSTRUCTED IN ACCORDANCE WITH CURRENT BUILDING REGULATIONS. INCLUDING APPROVED DOCUMENT H (UPDATED 2015): BS EN 752:2008 AND OTHER RELEVANT STANDARDS AND CERTIFICATES.

2. THE LOCATION AND LEVELS OF EXISTING DRAINAGE PIPES AND CULVERTS MUST BE CHECKED ON-SITE PRIOR TO CONSTRUCTION.

3. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO THE COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORKS.

4. DRAINS ARE TO BE CONSTRUCTED USING FLEXIBLY JOINTED VITRIFIED CLAY PIPES TO BS 65 (1991) AND BS EN 295 (2012 / 2013): OR UPVC BUILDING DRAINAGE SYSTEM PIPEWORK TO BS 4660 (2000), BS EN 13589-1 (2010) * BS EN 1401-1 (2009); BEDDED & BACKFILLED IN ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS.

5. BACKFILLING OF DRAIN TRENCHES ADJACENT TO DWELLINGS OR OTHER STRUCTURES TO BE IN ACCORDANCE WITH BS EN 1610 (1998) AND APPROVED DOCUMENT H.

6. ACCESS FITTINGS & INSPECTION CHAMBERS <1.2m DEEP ARE TO BE CLAYWARE OR PRE-FORMED POLYPROPYLENE AS APPROPRIATE TO THE NUMBER OF CONNECTIONS. POLYPROPYLENE CHAMBERS CAN BE USED UP TO 3m DEEP BUT REQUIRE A MAX 350mm DIAMETER RESTRICTOR RING TO PREVENT MAN ENTRY. INSPECTION CHAMBER SIZES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH BS EN 752 (2008).

7. MANHOLE CHAMBERS ARE TO BE OF PRECAST CONCRETE CONSTRUCTION WITH 150mm INSITU CONCRETE SURROUND WITH A MINIMUM CLEAR OPENING OF 600mm.

8. POLYPROPYLENE INSPECTION CHAMBERS ARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

9. COVER LEVELS INDICATED ON THE DRAWINGS ARE NOMINAL AND MAY BE ADJUSTED TO SUIT FINISHED LEVELS AS NECESSARY. INSPECTION CHAMBER COVERS SHOULD BE GRADE A15 FOR PEDESTRIAN AREAS ONLY, C250 FOR LIGHTLY TRAFFICKED ROADS AND SMALL PRIVATE CAR PARKS, AND D400 WITHIN THE ACCESS ROAD.

10. WHERE DRAINS PASS THROUGH FOUNDATIONS OR OTHER RIGID STRUCTURES, A LINTEL, OR SLEEVE IS TO BE USED & PROVISION FOR FLEXIBILITY IS TO MADE WITH ROCKER PIPES.

11. ANY EXISTING LAND DRAINS SEVERED BY SITE OPERATIONS SHOULD BE DIVERTED AROUND ANY PROPERTIES/BUILDINGS AND RECONNECTED TO THE EXISTING LAND DRAINAGE SYSTEM VIA A SILT TRAP.

12. CONCRETE PROTECTION REQUIRED TO PIPES WHERE DEPTH OF PIPE FROM GROUND LEVEL TO BARREL IS <0.6m WITHIN NON-TRAFFICKED AREAS; <0.9m WITHIN DOMESTIC DRIVEWAYS AND LIGHT ROADS; AND <1.2 m WITHIN THE PUBLIC HIGHWAY, OTHERWISE PIPES TO BE LAID IN CLASS S BEDDING (150mm GRANULAR BED & SURROUND).

13. WHERE PIPES RUN UNDER BUILDINGS AND WHERE COVER TO UNDERSIDE OF SLAB IS LESS THAN 300mm, PROVIDE A CONCRETE BED AND SURROUND.

14. UNLESS NOTED OTHERWISE, ALL FOUL DRAINS ARE 100mm DIA. AND SURFACE WATER DRAINS ARE 150mm DIA. SURFACE WATER CONNECTIONS FROM RWPs TO BE 100mm DIA.

15. MINIMUM GRADIENTS (UNLESS NOTED OTHERWISE):

FOUL
100 DIA FROM OUTLETS WITHIN BUILDING TO INSPECTION CHAMBER 1:40, THEREAFER 1:80

SURFACE WATER
150 DIA

16. ALL REDUNDANT DRAINS AND CHAMBERS TO BE REMOVED AS FAR AS PRACTICABLE OR ELSE GROUTED AND SEALED.

17. BEDDING AND BACKFILL TO CONFORM TO THE REQUIREMENT OF THE WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).

18. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTORS AND BENDS.

19. THE POSITIONS OF SVP'S, STUB-STACKS, WC OUTLETS AND RAINWATER DOWNPIPES ARE TO BE ACCURATELY LOCATED FROM THE ARCHITECT'S DRAWINGS.

20. CATCHPIT CHAMBERS ARE REQUIRED TO HAVE A MINIMUM 300mm SUMP.

PRELIMINARY DRAWING.
NOT FOR CONSTRUCTION.

LEGEND

- EXISTING COMBINED DRAIN
- EXISTING WATER MAIN
- EXISTING SURFACE WATER DRAIN
- EXISTING FOUL DRAIN
- EXISTING SURFACE WATER DRAIN STOPPED OFF AND SEALED
- EXISTING FOUL DRAIN STOPPED OFF AND SEALED
- MH EXISTING COMBINED MANHOLE
- PRPOPOSED COMBINED DRAIN
- PROPOSED FOUL DRAIN
- PROPOSED SURFACE WATER DRAIN
- PROPOSED LAND DRAIN
- PP IC PROPOSED POLYPROPYLENE INSPECTION CHAMBER
- PCC PROPOSED PRE-CAST CONCRETE MANHOLE
- RWP PROPOSED RAINWATER PIPE
- SVP PROPOSED SOIL VENT PIPE
- SP PROPOSED SOIL PIPE
- G PROPOSED GULLY
- RE PROPOSED RODDING EYE
- PERMEABLE BLOCK PAVING (PRIVATE DRIVEAWAY/ GARDEN)

RJP DRAWING REFERENCE

1. SEE STANDARD DETAIL SERIES 11266-SD DRAWINGS FOR DETAIL OF CONSTRUCTION

Rev	Details	Drawn By	Ckd/App By	Date
P6	DETACHED HOUSE DRAINAGE AMENDED	SHR	SJR	13.06.24
P5	DETACHED HOUSE DRAINAGE AMENDED	SHR	SJR	10.05.24
P4	NEW LAYOUT ADDED	SHR	KLH	15.04.24
P3	ISSUED FOR APPROVAL	SHR	LR	26.07.23
P2	UPDATED TO ARCHITECT'S COMMENTS	KLH	SJR	06.03.23
P1	ISSUED FOR INFORMATION	KLH	SJR	01.03.23

Client:
WILMSLOW ROAD INVESTMENTS LTD

Project:
CLYDE COURT
WEST DIDSBURY

Title:
PROPOSED DRAINAGE GENERAL ARRANGEMENT

Issued For:
APPROVAL

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Scale: AS INDICATED @ (A1)

Project No:	Drawing No:	Issue:
11266	101	P6

DO NOT SCALE - USE FIGURED DIMENSIONS ONLY.
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ISO 9001:2015 REGISTERED

Appendix D

Surface Water Drainage Hydrocalculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	2.000
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	x
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.008	5.00	33.100		-337.000	291.277	0.950
S2	0.008	5.00	32.850	450	-325.110	281.924	0.920
S3	0.016	5.00	32.800	1200	-338.361	261.607	1.150
S4	0.004	5.00	32.800	1200	-351.207	270.500	1.370
S5	0.006	5.00	33.100	450	-340.193	292.813	1.050
S6	0.006	5.00	32.800	450	-348.898	298.370	0.950
S7	0.002	5.00	32.747	450	-359.110	283.975	1.147
S8			32.727	1200	-358.902	275.805	1.217
S9	0.006	5.00	32.800	1200	-355.275	273.291	1.370
S12	0.002	5.00	32.600	2400	-355.967	268.460	1.764
S10	0.004	5.00	32.620	450	-355.833	262.198	0.750
S13	0.007	5.00	32.625	1200	-365.834	275.552	1.356
S14			32.625	1500	-363.953	278.300	1.390
DISCHARGE			32.750	1200	-358.391	287.084	1.619

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	15.128	0.600	32.150	31.930	0.220	68.8	150	5.21	58.7
1.001	S2	S3	24.256	0.600	31.930	31.650	0.280	86.6	150	5.58	56.9
1.002	S3	S4	15.624	0.600	31.650	31.430	0.220	71.0	150	5.80	56.0
1.003	S4	S12	5.179	0.600	31.430	31.385	0.045	115.1	150	5.89	55.6
2.000	S5	S6	10.328	0.600	32.050	31.850	0.200	51.6	150	5.12	59.1
2.001	S6	S7	17.649	0.600	31.850	31.600	0.250	70.6	150	5.37	57.9
2.002	S7	S8	8.173	0.600	31.600	31.510	0.090	90.8	150	5.50	57.3
2.003	S8	S9	4.413	0.600	31.510	31.430	0.080	55.2	150	5.55	57.1
2.004	S9	S12	4.880	0.600	31.430	31.385	0.045	108.5	150	5.64	56.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.214	21.5	1.3	0.800	0.770	0.008	0.0
1.001	1.080	19.1	2.5	0.770	1.000	0.016	0.0
1.002	1.194	21.1	4.9	1.000	1.220	0.032	0.0
1.003	0.936	16.5	5.4	1.220	1.065	0.036	0.0
2.000	1.403	24.8	1.0	0.900	0.800	0.006	0.0
2.001	1.198	21.2	1.9	0.800	0.997	0.012	0.0
2.002	1.055	18.6	2.2	0.997	1.067	0.014	0.0
2.003	1.357	24.0	2.2	1.067	1.220	0.014	0.0
2.004	0.964	17.0	3.1	1.220	1.065	0.020	0.0

Flow v10.8 Copyright © 1988-2024 Causeway Technologies Ltd

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.004	S12	S13	12.151	0.600	31.385	31.269	0.116	104.8	150	6.10	54.7
3.000	S10	S12	6.263	0.600	31.870	30.836	1.034	6.1	150	5.03	59.6
1.005	S13	S14	3.330	0.600	31.269	31.235	0.034	97.9	150	6.15	54.5
1.006	S14	DISCHARGE	10.397	0.600	31.235	31.131	0.104	100.0	150	6.33	53.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.004	0.981	17.3	9.2	1.065	1.206	0.062	0.0
3.000	4.121	72.8	0.6	0.600	1.614	0.004	0.0
1.005	1.015	17.9	10.2	1.206	1.240	0.069	0.0
1.006	1.005	17.8	10.1	1.240	1.469	0.069	0.0

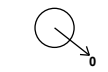
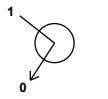
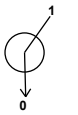
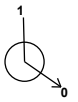
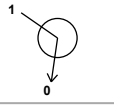
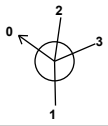
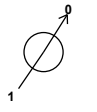
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	15.128	68.8	150	Circular	33.100	32.150	0.800	32.850	31.930	0.770
1.001	24.256	86.6	150	Circular	32.850	31.930	0.770	32.800	31.650	1.000
1.002	15.624	71.0	150	Circular	32.800	31.650	1.000	32.800	31.430	1.220
1.003	5.179	115.1	150	Circular	32.800	31.430	1.220	32.600	31.385	1.065
2.000	10.328	51.6	150	Circular	33.100	32.050	0.900	32.800	31.850	0.800
2.001	17.649	70.6	150	Circular	32.800	31.850	0.800	32.747	31.600	0.997
2.002	8.173	90.8	150	Circular	32.747	31.600	0.997	32.727	31.510	1.067
2.003	4.413	55.2	150	Circular	32.727	31.510	1.067	32.800	31.430	1.220
2.004	4.880	108.5	150	Circular	32.800	31.430	1.220	32.600	31.385	1.065
1.004	12.151	104.8	150	Circular	32.600	31.385	1.065	32.625	31.269	1.206
3.000	6.263	6.1	150	Circular	32.620	31.870	0.600	32.600	30.836	1.614
1.005	3.330	97.9	150	Circular	32.625	31.269	1.206	32.625	31.235	1.240
1.006	10.397	100.0	150	Circular	32.625	31.235	1.240	32.750	31.131	1.469

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1		Manhole	Adoptable	S2	450	Manhole	Adoptable
1.001	S2	450	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S12	2400	Manhole	Adoptable
2.000	S5	450	Manhole	Adoptable	S6	450	Manhole	Adoptable
2.001	S6	450	Manhole	Adoptable	S7	450	Manhole	Adoptable
2.002	S7	450	Manhole	Adoptable	S8	1200	Manhole	Adoptable
2.003	S8	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable
2.004	S9	1200	Manhole	Adoptable	S12	2400	Manhole	Adoptable
1.004	S12	2400	Manhole	Adoptable	S13	1200	Manhole	Adoptable
3.000	S10	450	Manhole	Adoptable	S12	2400	Manhole	Adoptable
1.005	S13	1200	Manhole	Adoptable	S14	1500	Manhole	Adoptable
1.006	S14	1500	Manhole	Adoptable	DISCHARGE	1200	Manhole	Adoptable

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	-337.000	291.277	33.100	0.950					
						0	1.000	32.150	150
S2	-325.110	281.924	32.850	0.920	450		1	1.000	31.930	150
						0	1.001	31.930	150
S3	-338.361	261.607	32.800	1.150	1200		1	1.001	31.650	150
						0	1.002	31.650	150
S4	-351.207	270.500	32.800	1.370	1200		1	1.002	31.430	150
						0	1.003	31.430	150
S5	-340.193	292.813	33.100	1.050	450				
						0	2.000	32.050	150
S6	-348.898	298.370	32.800	0.950	450		1	2.000	31.850	150
						0	2.001	31.850	150
S7	-359.110	283.975	32.747	1.147	450		1	2.001	31.600	150
						0	2.002	31.600	150
S8	-358.902	275.805	32.727	1.217	1200		1	2.002	31.510	150
						0	2.003	31.510	150
S9	-355.275	273.291	32.800	1.370	1200		1	2.003	31.430	150
						0	2.004	31.430	150
S12	-355.967	268.460	32.600	1.764	2400		1	3.000	30.836	150
							2	2.004	31.385	150
							3	1.003	31.385	150
							0	1.004	31.385	150
S10	-355.833	262.198	32.620	0.750	450				
						0	3.000	31.870	150
S13	-365.834	275.552	32.625	1.356	1200		1	1.004	31.269	150
						0	1.005	31.269	150
S14	-363.953	278.300	32.625	1.390	1500		1	1.005	31.235	150
						0	1.006	31.235	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
DISCHARGE	-358.391	287.084	32.750	1.619	1200	1	1.006	31.131	150



Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	17.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	1.8
Summer CV	0.750	30 year (l/s)	4.1
Winter CV	0.840	100 year (l/s)	5.2
Analysis Speed	Normal	Check Discharge Volume	✓
Skip Steady State	x	100 year +40% 360 minute (m³)	251

Storm Durations

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

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

Pre-development Discharge Rate

Site Makeup	Brownfield	Growth Factor 1 year	0.85
Brownfield Method	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)	0.930	Betterment (%)	0
SAAR (mm)	845	QBar	2.1
Soil Index	2	Q 1 year (l/s)	1.8
SPR	0.30	Q 30 year (l/s)	4.1
Region	10	Q 100 year (l/s)	5.2

Pre-development Discharge Volume

Site Makeup	Brownfield	Return Period (years)	100
Brownfield Method	Greenfield	Climate Change (%)	40
Greenfield Method	FSR/FEH	Storm Duration (mins)	360
Positively Drained Area (ha)	0.930	Betterment (%)	0
Soil Index	2	PR	0.355
SPR	0.30	Runoff Volume (m³)	251
CWI	124.613		

Node S14 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	31.235	Product Number	CTL-SHE-0107-5000-0900-5000
Design Depth (m)	0.900	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

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Node S11 Online Pump Control

Flap Valve	x	Design Depth (m)	1.000	Switch off depth (m)	0.001
Replaces Downstream Link	✓	Design Flow (l/s)	1.7		
Invert Level (m)	0.000	Switch on depth (m)	0.200		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	1.700	1.000	1.700

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Results for 1 year Critical Storm Duration. Lowest mass balance: 97.18%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	32.172	0.022	1.0	0.0000	0.0000	OK
15 minute winter	S2	11	31.962	0.032	2.0	0.0051	0.0000	OK
15 minute winter	S3	11	31.693	0.043	3.7	0.0482	0.0000	OK
15 minute winter	S4	11	31.485	0.055	4.1	0.0623	0.0000	OK
15 minute winter	S5	11	32.067	0.017	0.7	0.0028	0.0000	OK
15 minute winter	S6	11	31.876	0.026	1.4	0.0042	0.0000	OK
15 minute winter	S7	11	31.631	0.031	1.6	0.0049	0.0000	OK
15 minute winter	S8	11	31.537	0.027	1.6	0.0300	0.0000	OK
15 minute winter	S9	11	31.469	0.039	2.3	0.0444	0.0000	OK
30 minute winter	S12	23	31.433	0.597	5.5	2.7003	0.0000	OK
15 minute summer	S10	10	31.879	0.009	0.5	0.0014	0.0000	OK
30 minute winter	S13	24	31.332	0.063	4.0	0.0710	0.0000	OK
30 minute winter	S14	24	31.331	0.096	3.7	0.1700	0.0000	OK
15 minute summer	DISCHARGE	1	31.131	0.000	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	1.0	0.459	0.045	0.0322	
15 minute winter	S2	1.001	S3	1.9	0.555	0.099	0.0828	
15 minute winter	S3	1.002	S4	3.7	0.750	0.177	0.0779	
15 minute winter	S4	1.003	S12	4.1	0.745	0.251	0.0289	
15 minute winter	S5	2.000	S6	0.7	0.447	0.028	0.0164	
15 minute winter	S6	2.001	S7	1.4	0.602	0.066	0.0412	
15 minute winter	S7	2.002	S8	1.6	0.678	0.086	0.0193	
15 minute winter	S8	2.003	S9	1.6	0.562	0.066	0.0127	
15 minute winter	S9	2.004	S12	2.3	0.647	0.134	0.0172	
30 minute winter	S12	1.004	S13	3.7	0.707	0.213	0.0688	
15 minute summer	S10	3.000	S12	0.5	0.649	0.007	0.0564	
30 minute winter	S13	1.005	S14	3.7	0.555	0.208	0.0315	
30 minute winter	S14	Hydro-Brake®	DISCHARGE	3.5				2.2

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Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 97.18%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	32.190	0.040	3.4	0.0000	0.0000	OK
15 minute winter	S2	10	31.991	0.061	6.8	0.0097	0.0000	OK
60 minute winter	S3	46	31.988	0.338	6.9	0.3822	0.0000	SURCHARGED
60 minute winter	S4	46	31.986	0.556	7.7	0.6283	0.0000	SURCHARGED
15 minute winter	S5	10	32.082	0.032	2.5	0.0051	0.0000	OK
60 minute winter	S6	47	31.985	0.135	2.6	0.0215	0.0000	OK
60 minute winter	S7	46	31.985	0.385	3.0	0.0612	0.0000	SURCHARGED
60 minute winter	S8	46	31.985	0.475	2.8	0.5369	0.0000	SURCHARGED
60 minute winter	S9	46	31.985	0.555	3.4	0.6272	0.0000	SURCHARGED
60 minute winter	S12	46	31.984	1.148	9.4	5.1941	0.0000	SURCHARGED
60 minute winter	S10	46	31.984	0.114	0.9	0.0181	0.0000	OK
60 minute winter	S13	46	31.976	0.707	8.6	0.7995	0.0000	SURCHARGED
60 minute winter	S14	46	31.972	0.737	6.5	1.3019	0.0000	SURCHARGED
15 minute summer	DISCHARGE	1	31.131	0.000	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S1	1.000	S2	3.4	0.646	0.157	0.0792	
15 minute winter	S2	1.001	S3	6.6	0.763	0.346	0.2791	
60 minute winter	S3	1.002	S4	6.8	0.775	0.321	0.2751	
60 minute winter	S4	1.003	S12	6.7	0.690	0.403	0.0912	
15 minute winter	S5	2.000	S6	2.5	0.645	0.100	0.0401	
60 minute winter	S6	2.001	S7	2.6	0.730	0.123	0.3029	
60 minute winter	S7	2.002	S8	2.8	0.769	0.150	0.1439	
60 minute winter	S8	2.003	S9	2.3	0.610	0.097	0.0777	
60 minute winter	S9	2.004	S12	3.2	0.601	0.188	0.0859	
60 minute winter	S12	1.004	S13	7.6	0.738	0.438	0.2139	
60 minute winter	S10	3.000	S12	0.9	0.819	0.012	0.1001	
60 minute winter	S13	1.005	S14	6.5	0.597	0.361	0.0586	
60 minute winter	S14	Hydro-Brake®	DISCHARGE	5.0				19.3

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.18%

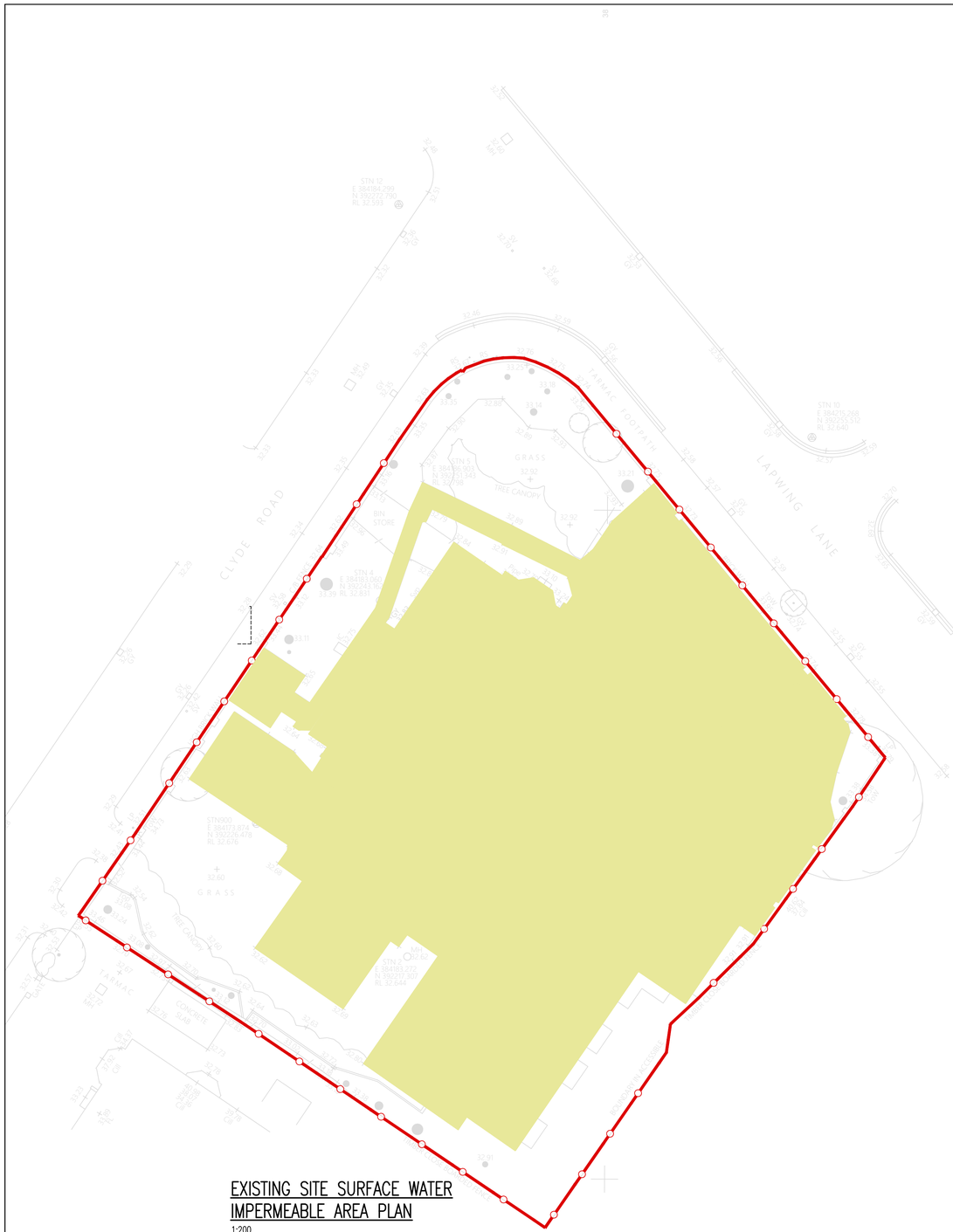
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	S1	48	32.252	0.102	2.3	0.0000	0.0000	OK
60 minute winter	S2	48	32.252	0.322	4.6	0.0512	0.0000	SURCHARGED
60 minute winter	S3	47	32.251	0.601	9.1	0.6795	0.0000	SURCHARGED
60 minute winter	S4	48	32.247	0.817	8.3	0.9244	0.0000	SURCHARGED
60 minute winter	S5	47	32.248	0.198	1.7	0.0315	0.0000	SURCHARGED
60 minute winter	S6	47	32.248	0.398	3.4	0.0633	0.0000	SURCHARGED
60 minute winter	S7	47	32.247	0.647	4.0	0.1029	0.0000	SURCHARGED
60 minute winter	S8	47	32.246	0.736	3.1	0.8329	0.0000	SURCHARGED
60 minute winter	S9	47	32.246	0.816	3.6	0.9230	0.0000	SURCHARGED
60 minute winter	S12	48	32.246	1.410	10.3	6.3767	0.0000	SURCHARGED
60 minute winter	S10	48	32.246	0.376	1.8	0.0597	0.0000	SURCHARGED
60 minute winter	S13	48	32.235	0.966	8.7	1.0922	0.0000	SURCHARGED
60 minute winter	S14	48	32.229	0.994	7.0	1.7571	0.0000	SURCHARGED
15 minute summer	DISCHARGE	1	31.131	0.000	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	S1	1.000	S2	2.3	0.579	0.107	0.2299	
60 minute winter	S2	1.001	S3	4.6	0.668	0.241	0.4270	
60 minute winter	S3	1.002	S4	7.3	0.784	0.347	0.2751	
60 minute winter	S4	1.003	S12	7.8	0.692	0.470	0.0912	
60 minute winter	S5	2.000	S6	1.7	0.578	0.069	0.1818	
60 minute winter	S6	2.001	S7	3.4	0.751	0.161	0.3107	
60 minute winter	S7	2.002	S8	3.1	0.787	0.168	0.1439	
60 minute winter	S8	2.003	S9	2.4	0.607	0.101	0.0777	
60 minute winter	S9	2.004	S12	2.9	0.582	0.173	0.0859	
60 minute winter	S12	1.004	S13	7.7	0.735	0.444	0.2139	
60 minute winter	S10	3.000	S12	1.1	1.064	0.015	0.1103	
60 minute winter	S13	1.005	S14	7.0	0.549	0.389	0.0586	
60 minute winter	S14	Hydro-Brake®	DISCHARGE	5.2				26.1

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Appendix E

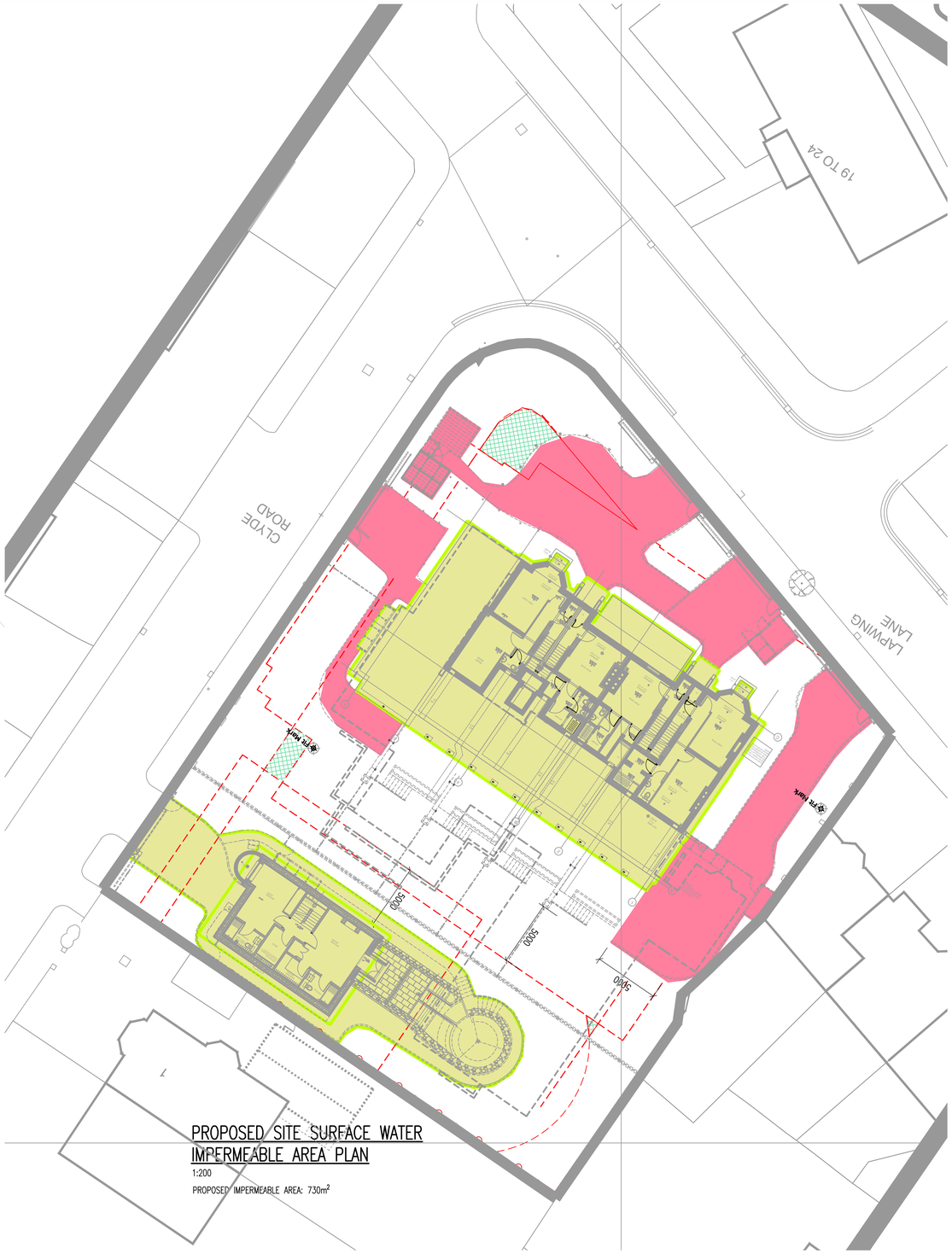
Impermeable/Permeable Areas
Drawing no. 11266-102-P4



EXISTING SITE SURFACE WATER IMPERMEABLE AREA PLAN

1:200

EXISTING IMPERMEABLE AREA: 1370m²



PROPOSED SITE SURFACE WATER IMPERMEABLE AREA PLAN

1:200

PROPOSED IMPERMEABLE AREA: 730m²

KEY:

- PROPOSED IMPERMEABLE ROOF AREA/OR EXTERNAL PAVING
- PROPOSED PERMEABLE PAVED ZONES
- ALLOWABLE SOAKAWAY LOCATION
- SOAKAWAY EXCLUSION ZONE BOUNDARY
- SITE BOUNDARY

Rev	Details	Drawn By	Chd/App By	Date
P4	UPDATED TO LATEST LAYOUT	SHR	SJR	13.06.24
P3	IMPERMEABLE AREA AMENDED	SHR	KLH	15.04.24
P2	BUILDING REGS ISSUE	KLH	SJR	29.09.23
P2	UPDATED TO ARCHITECT'S COMMENTS	KLH	SJR	06.03.23
P1	ISSUED FOR INFORMATION	KLH	SJR	01.03.23

Client:

WILMSLOW ROAD INVESTMENTS LTD

Project:

CLYDE COURT
WEST DIDSBURY

Title:

PROPOSED AND EXISTING SURFACE WATER IMPERMEABLE AREA

Issued For:

INFORMATION

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Scale: AS INDICATED @ (A1)

Project No:	Drawing No:	Issue:
11266	102	P4

PRELIMINARY DRAWING.
NOT FOR CONSTRUCTION.

DO NOT SCALE - USE FIGURED DIMENSIONS ONLY.
This drawing is confidential and is the property of Reid Jones Partnership. It must not be disclosed to any third party, copied or lent without prior written consent. The contractor is to check all dimensions on site prior to commencement of works.

QMS ISO 9001 : 2015 REGISTERED QUALITY MANAGEMENT

Appendix F

Permeable Paving Analysis

Permeable Paving statement

The existing site was formerly occupied by the Clyde Court Nursing Home, consisting of a three storey, partially two-storey (plus a basement) brick-built building located in the northern section of the site fronting onto Lapwing Lane. The site is mainly hard paved and positively drained.
The pre-development impermeable area is approximately 1370 m². The proposed drainage scheme plans to decrease this to 730 m² via the use of permeable paving. This reduction of area drained into the local sewer yields a betterment of 53%. The impermeable and permeable areas are shown in RJP drawing no. 102-P3.
A Ground investigation has been undertaken to determine the suitability of the natural strata underlying the site for infiltration drainage.
To obtain the infiltration rates, three falling head permability tests were performed from a standpipe in Borehole 1.
The soil infiltration rate (K) was calculated for each trial pit and is shown in the table below :

Trial Pit Number	Infiltration Rate (m/s)	Infiltration Rate (m/h)
Borehole 1	2.45×10^{-5}	0.0882
Borehole 1	3.17×10^{-5}	0.11412
Borehole 1	2.81×10^{-5}	0.10116

The lowest recorded value was 2.45 x 10 -5 m/s, which is equivalent to a rainfall of 88.2 mm/hr being able to infiltrate to ground directly, with no ponding or flooding off site.

The analysis for the permeability of the ground was undertaken on Flow for a 1 in 100 year + 45%CC storm event and the results show no flooding or ponding.

Thus it is proposed that external paved areas will be constructed with permeable paving to allow for infiltration.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.300
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Cover Level (m)	Depth (m)
PP	0.000	0.350

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

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

Node PP Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.08820	Invert Level (m)	-0.350	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	22	Depth (m)	0.350
Safety Factor	2.0	Width (m)	1.000	Inf Depth (m)	
Porosity	0.32	Length (m)	1.000		

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Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PP	1	-0.350	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
15 minute summer	PP	Infiltration	0.0

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

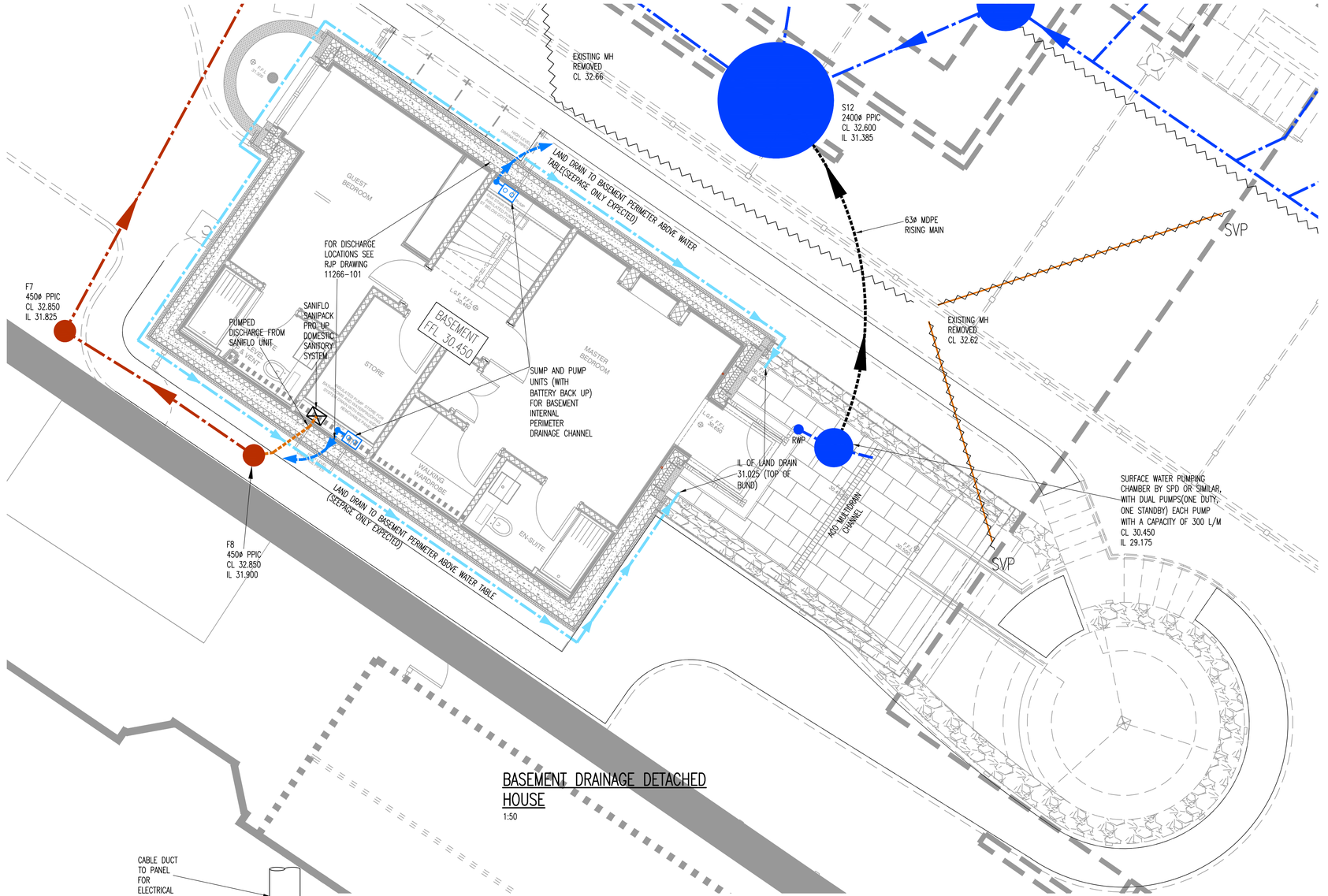
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PP	1	-0.350	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
15 minute summer	PP	Infiltration	0.0

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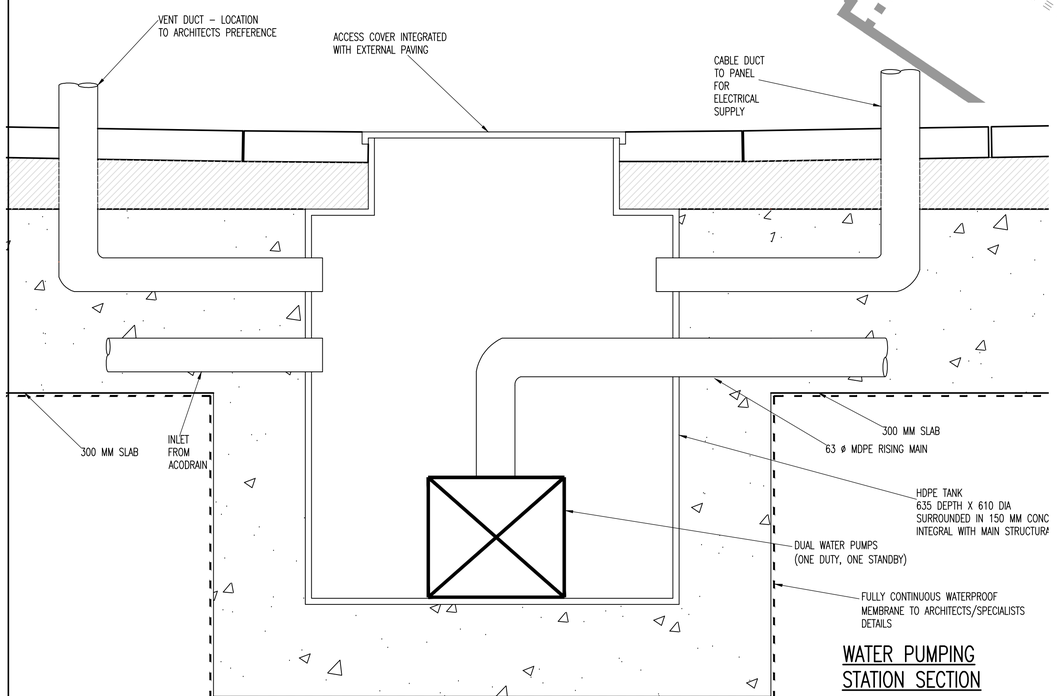
Appendix G

Proposed Drainage Arrangement for lower level basement of detached house Drawing no. 11266 – 103 – P2



BASEMENT DRAINAGE DETACHED HOUSE

1:50



WATER PUMPING STATION SECTION

1:5

LEGEND

- EXISTING COMBINED DRAIN
- EXISTING WATER MAIN
- EXISTING SURFACE WATER DRAIN
- EXISTING FOUL DRAIN
- EXISTING SURFACE WATER DRAIN STOPPED OFF AND SEALED
- EXISTING FOUL DRAIN STOPPED OFF AND SEALED
- MH EXISTING COMBINED MANHOLE
- PROPOSED COMBINED DRAIN
- PROPOSED FOUL DRAIN
- PROPOSED SURFACE WATER DRAIN
- PROPOSED LAND DRAIN
- PP IC PROPOSED POLYPROPYLENE INSPECTION CHAMBER
- PCC PROPOSED PRE-CAST CONCRETE MANHOLE
- RWP PROPOSED RAINWATER PIPE
- SVP PROPOSED SOIL VENT PIPE
- SP PROPOSED SOIL PIPE
- G PROPOSED GULLY
- RE PROPOSED RODDING EYE

Rev	Details	Drawn By	Ck'd/App By	Date
P2	AMENDED PUMP LOCATIONS	SHR	SJR	13.06.24
P1	ISSUED FOR INFORMATION	SHR	SJR	20.05.24

Client:
WILMSLOW ROAD INVESTMENTS LTD

Project:
CLYDE COURT
WEST DIDSBURY

Title:
BASEMENT DRAINAGE DETACHED HOUSE

Issued For:
INFORMATION

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Scale: AS INDICATED @ (A1)

Project No:	Drawing No:	Issue:
11266	103	P2

PRELIMINARY DRAWING.
NOT FOR CONSTRUCTION.

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