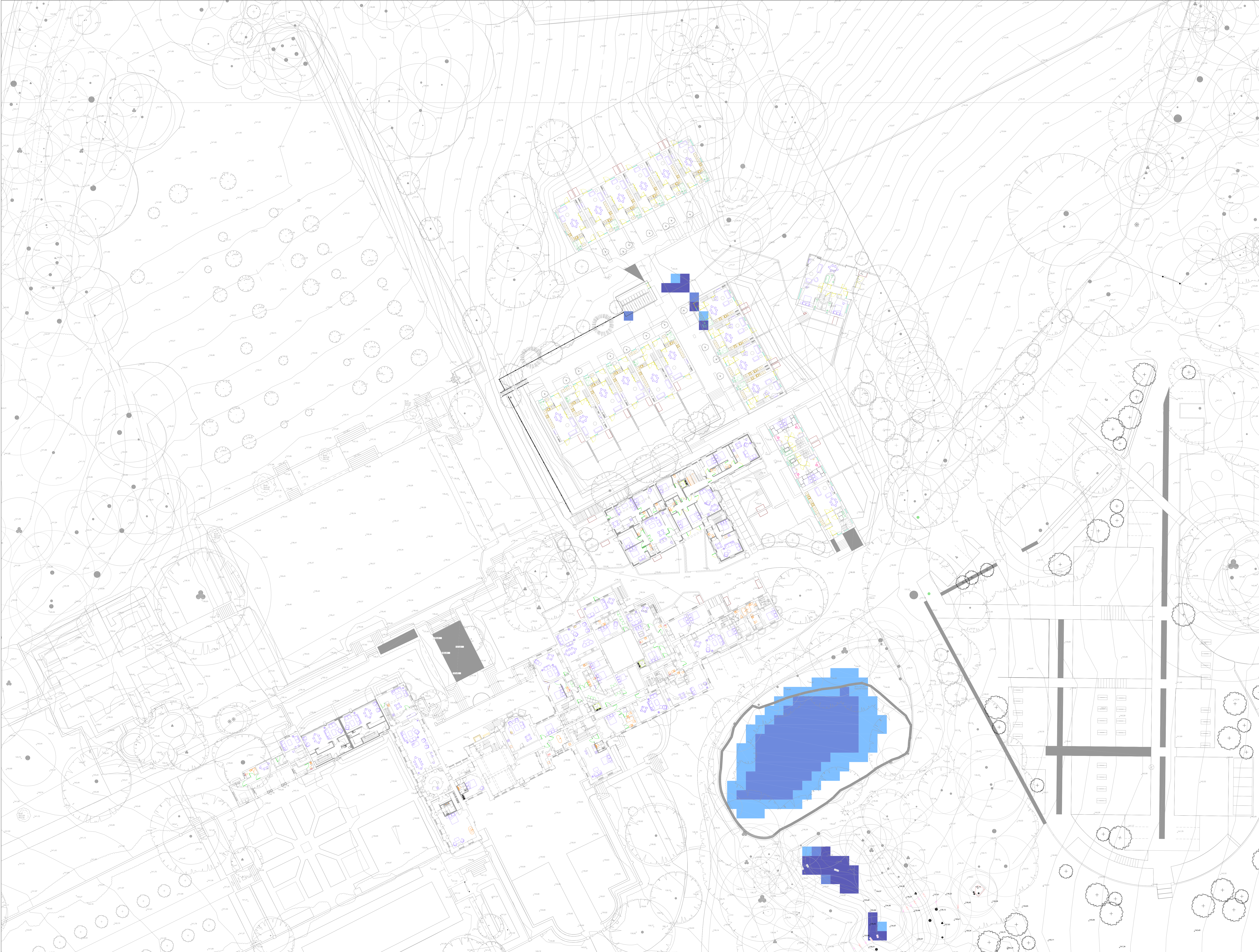




KEY:

HIGH RISK

MEDIUM RISK

LOW RISK

REV	DATE	BY	DESCRIPTION	OWN	APP
DRAWING STATUS:					
Derivative Drawing (D) Own Copyright 2018. All Rights Reserved. License Number: 100000000					
F.A.S. 1st Floor Millers House, Rippon Road, Dunfermline, Fife, Scotland, DD1 6RH Tel: 01392 871777 www.fas.co.uk					
CLIENT: SCABAL					
PROJECT: TEMPLE DINSELY, PRESTON HITCHIN					
TITLE: SURFACE WATER FLOOD RISK FOR FLOOD DEPTH OF 600mm OR DEEPER					
SCALE: @ A3 1:250		DESIGN-DRAWN: MC		DATE: 17/09/2025	
PROJECT No: 5201		DRAWING No:		SK07	

Appendix H – Surface Water Flood Risk Mitigation Measures



HIGH RISK OF SURFACE WATER FLOOD
DEPTHS LESS THAN 200mm

MEDIUM RISK OF SURFACE WATER
FLOOD DEPTHS LESS THAN 200mm

LOW RISK OF SURFACE WATER FLOOD
DEPTHS LESS THAN 200mm

EXISTING RIDGE PREVENTING SURFACE WATER RUNOFF FROM FLOWING FREELY TO DITCH TO BE REMOVED, WITH CONSTANT FALL TO DITCH PROVIDED

MAXIMUM FLOOD DEPTH OF 600mm AS SHOWN ON DRAWING SK06/07, FINISHED FLOOR LEVEL OF PROPOSED BUILDING TO BE RAISED BY 600mm FROM EXISTING LEVELS.
- EXISTING LEVEL: 130.0m AOD
- PROPOSED FINISHED FLOOR LEVEL: 130.6m AOD
PROPOSED FINISHED FLOOR LEVEL OF 130.6m AOD ACHIEVES FREEBOARD IN EXCESS OF 300mm TO MEDIUM RISK OR DESIGN FLOOD LEVEL

MAXIMUM FLOOD DEPTH OF 600mm AS SHOWN ON DRAWING SK06/07, FINISHED FLOOR LEVEL OF PROPOSED BUILDING TO BE RAISED BY 600mm FROM EXISTING LEVELS.
- EXISTING LEVEL: 130.0m AOD
- PROPOSED FINISHED FLOOR LEVEL: 130.6m AOD
PROPOSED FINISHED FLOOR LEVEL OF 130.6m AOD ACHIEVES FREEBOARD IN EXCESS OF 300mm TO MEDIUM RISK OR DESIGN FLOOD LEVEL

MAXIMUM FLOOD DEPTH BELOW 300mm AS SHOWN ON SK06/07 (ONLY ISOLATED PIXELS AWAY FROM BUILDING ENTRANCE SHOW GREATER DEPTH). BASED ON MAXIMUM FLOOD DEPTH OF 300mm, POTENTIAL FLOOD DEPTH OF 140mm WITHIN BUILDING AS EXISTING FINISHED FLOOR LEVEL IS RAISED 160mm FROM SURROUNDING GROUND LEVELS

AS BUILDING AND GARDEN AREA ARE GRADE II LISTED FINISHED FLOOR LEVELS CANNOT BE RAISED. AS SUCH, FLOOD DOORS TO REPLACE EXISTING DOORS TO PREVENT FLOOD WATER ENTERING BUILDING

REV	DATE	BY	DESCRIPTION	CHK	APP
DRAWING STATUS:					
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F.A.S. 1st Floor Millers House, Rippon Road, Sharncliffe Estate, Nottingham, NG12 8PL Tel: 01522 871777 www.fas.co.uk					
CLIENT: SCABAL					
WORKFOLDER:					
PROJECT: TEMPLE DINSELEY, PRESTON HITCHIN					
TITLE: SURFACE WATER FLOOD RISK MITIGATION MEASURES					
SCALE: @ A3 1:250		DESIGN-DRAWN: MC		DATE: 17/02/2025	
PROJECT NO: 5201		DRAWING NO:		SK06	

Appendix: I – Infiltration Testing Report

27th June 2024
21307c01

Mr R. Prince
c/o Michael Caraglia (EAS)
The Door PHC Ltd
Carters
High Wych
CM21 0LB

Dear Russell,

SOAKAGE ASSESSMENT REPORT – JUNE 2024

FORMER PRINCESS HELENA COLLEGE, HITCHIN, SG4 7RT

Introduction

WDE Consulting (WDE) is pleased to present The Door PHC Ltd (the client) with the results of the BRE365 soakage testing completed in June 2024 at Former Princess Helena College, SG4 7RT (Figure 1). It is understood that this site is being considered for further redevelopment (Figure 2) and that further information is required on the suitability of shallow soakaways for the drainage design.

The works described in this report are subject to WDE's Terms of Business. This report was finalised in June 2024 and should be read in light of any subsequent changes in legislation, statutory requirements, statutory guidance, non-statutory guidance, relevant research, and industry practices.

Background Information

The subject site comprises an open soft-standing field within the grounds of the former college and is situated within a semi-rural setting.

Published geological information indicates that the site is underlain by superficial deposits of clay-with-flints and bedrock geology comprising of the Lewes and Seaford Chalk Formation. The nearest surface water body is a pond within the exiting grounds located ~60 SW of the investigation area. The site lies on a principal aquifer within a source protection zone 3.

Scope Of Work

The programme of work that was undertaken comprises the following items presented in Table 1

Table 1 - Programme of Works.

Item	Description	Start Date	Completion Date
1	Intrusive investigation – 2no BRE365 Soakage Testing	20/06/2024	20/06/2024
2	Reporting of results	27/06/2024	27/06/2024

Field Methods

The locations of the BRE365 Soakage Testing investigation are presented on Figure 3 and comprise the following:

- 2no trial pits (TP1 – TP2) were excavated using a JCB3CX and filled using a high-capacity water bowser

All of the fieldwork was completed under the supervision of a WDE site engineer. Photographs taken during the investigation are presented in appendix A.

Constraints

The locations were provided to WDE by EAS and were located in soft-standing.

Field Results

The geology that was encountered during the investigation is presented below in Table 2, with the full logs presented in Appendix B.

Table 2 - Summary of Encountered Geology (m/bgl).

Units	Description	TP1	TP2
Topsoil		0.00 – 0.20	0.00 – 0.30
Clay-With-Flints	Brown gravelly clay	0.20 – 1.60	0.30 – 2.60
Putty Chalk	White putty chalk (grade Dm) comprised of soft clay	1.60 – 3.00	2.60 – 3.10

Groundwater was not encountered during the investigation.

Soakage Testing Information

The result from the BRE365 soakage test is summarised in Table 3 with the full results in Appendix C.

Table 3 - Summary of Soakage Testing Field Results.

Location	Depth (m bgl)	Material	Drainage (m/sec)	Qualitative Soakage Potential
			Test 1	
TP1	3.00	White putty chalk (grade Dm)	<E-06	Poor
TP2	3.10	White putty chalk (grade Dm)	<E-06	Poor

Soakage in the highly weathered putty chalk materials achieved poor soakage rates with all the tests failing to drain 75% depth.

Therefore, soakages to ground are unlikely to be feasible due and alternative drainage methods such as deep borehole soakage's into the more competent chalk should be considered in line with the SuDS guidelines.

Please contact us should you require any additional information.

Yours sincerely
WDE Consulting Ltd



Ryan Saint
Graduate Consultant



Jason Fitzgerald
Principal Consultant

Attached:

Figures
Appendix A – Photographs
Appendix B – Field Logs
Appendix C – BRE365 test sheets

FIGURES

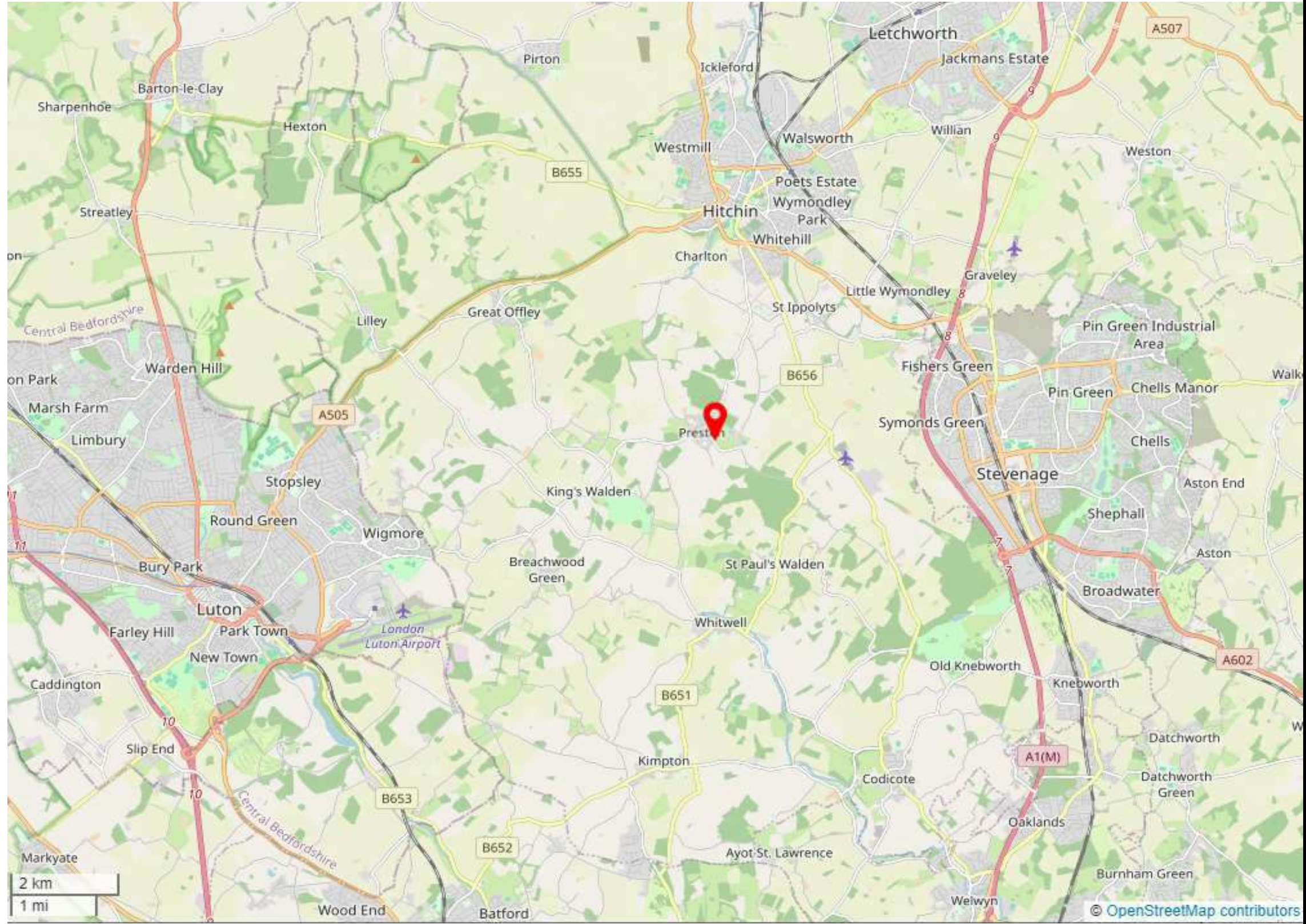
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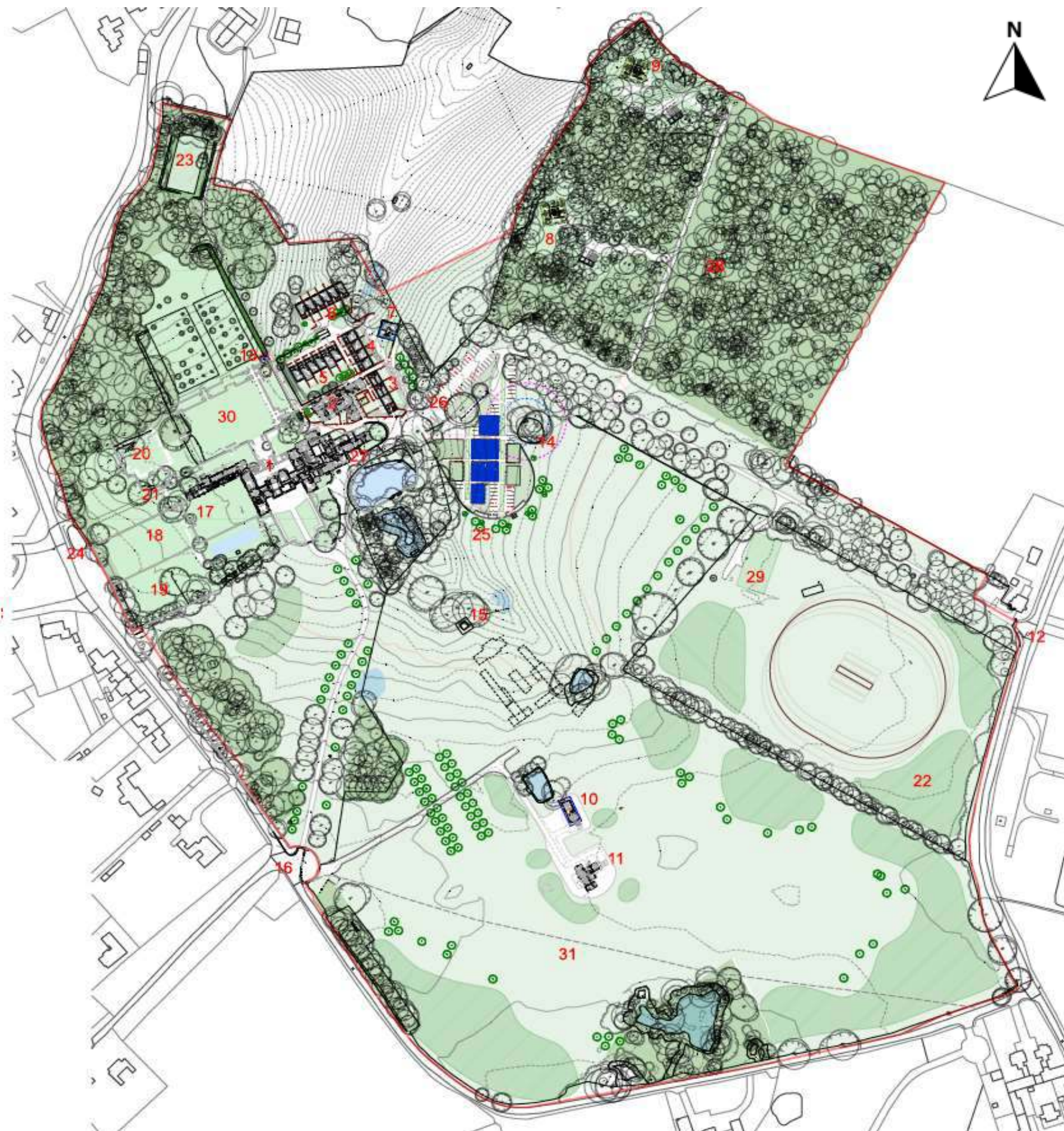
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Site Area : 277945 sq.m
(27.8 ha)

Buildings and Structures on site:

1. Main Building
2. Teaching Block
3. Edwln
4. Violet
5. Sadleir
6. lthel
7. Templar
8. Summer House
9. Harwood House
10. Tank House
11. Pump House
12. Lodge Gate
13. Belvedere
14. Ice House
15. Plgery
16. Park Wall
17. Paved Rose garden
18. Herbaceous Garden
19. Small Herbaceous Garden
20. Rose Garden
21. Magnolia Steps
22. Cricket Pitch
23. North Tennis Court
24. Village Gate
25. Walled Parking Garden
26. Existing Parking
27. Visitor Parking
28. Summer House Plantation
29. East Tennis Court
30. Pergola Garden



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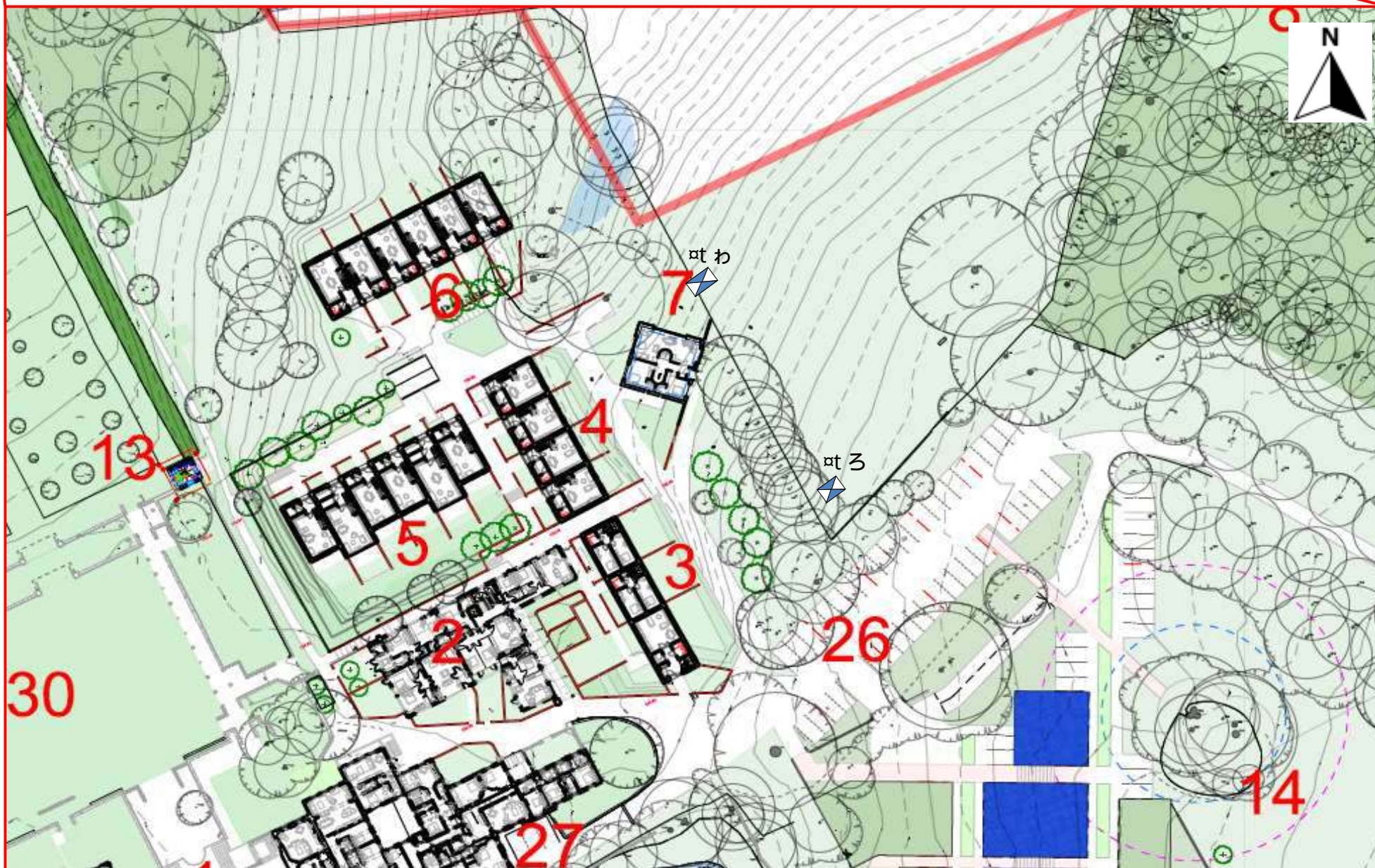
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WDE consulting

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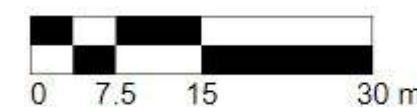
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APPENDIX A – PHOTOGRAPHS

Photo 1: TP1 being excavated with JCB



Photo 2: TP1 filled with water



Photo 3: TP2 filled with water



APPENDIX B – FIELD LOGS

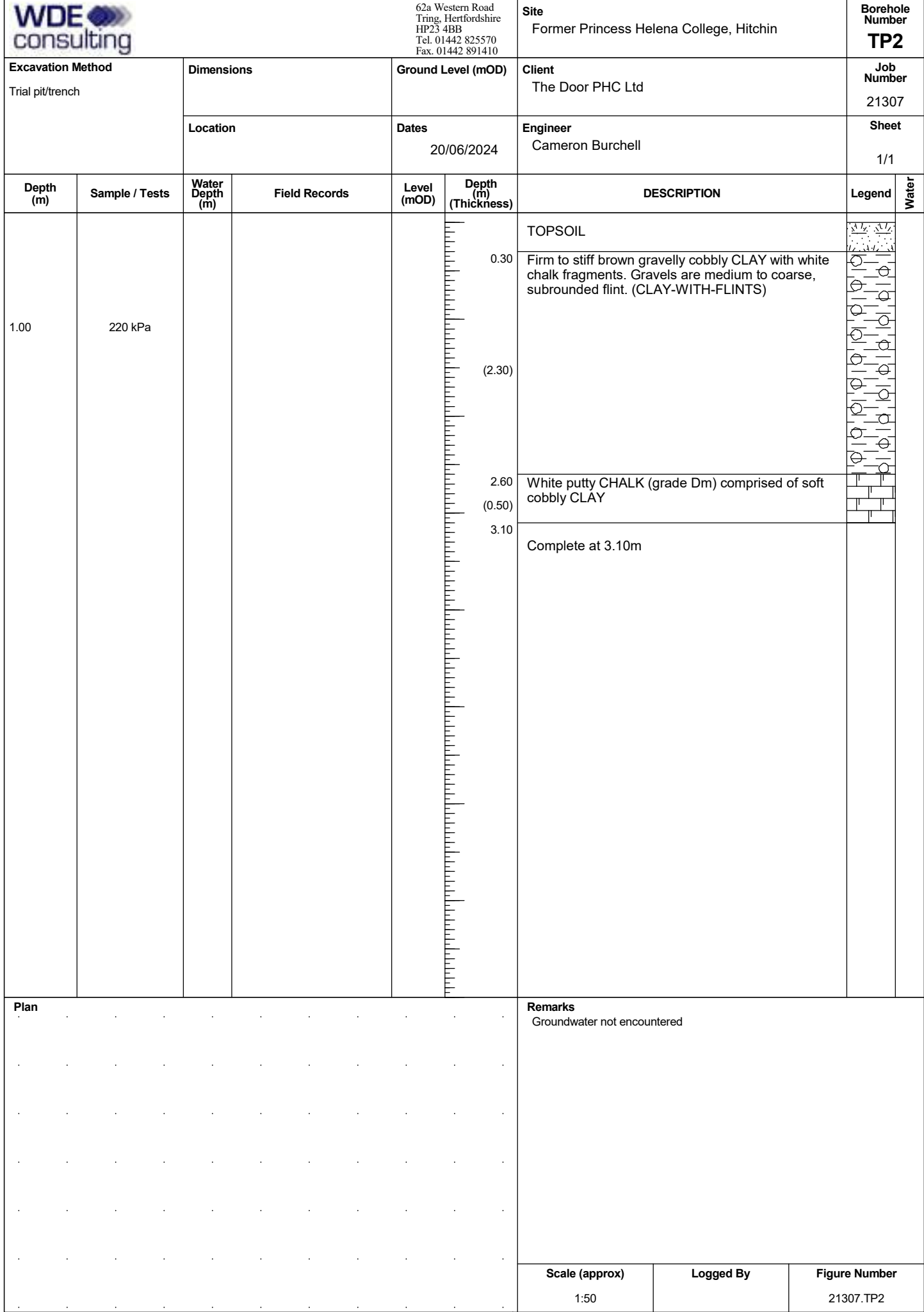


62a Western Road
Tring, Hertfordshire
HP23 4BB
Tel. 01442 825570
Fax. 01442 891410

Site
Former Princess Helena College, Hitchin

Borehole
Number
TP1

Excavation Method Trial pit/trench		Dimensions		Ground Level (mOD)		Client The Door PHC Ltd		Job Number 21307	
		Location		Dates 20/06/2024		Engineer Cameron Burchell		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	DESCRIPTION		Legend	Water
1.00	225 kPa					TOPSOIL			
						Soft to stiff brown gravelly slightly cobbly CLAY. Gravels are medium to coarse, subrounded to rounded flint. (CLAY-WITH-FLINTS)			
						White putty CHALK (grade Dm) comprised of soft cobbly CLAY			
						Complete at 3.00m			
Plan						Remarks Groundwater not encountered			
						Scale (approx) 1:50			
						Logged By		Figure Number 21307.TP1	



APPENDIX C – BRE365 SOAKAGE SHEETS

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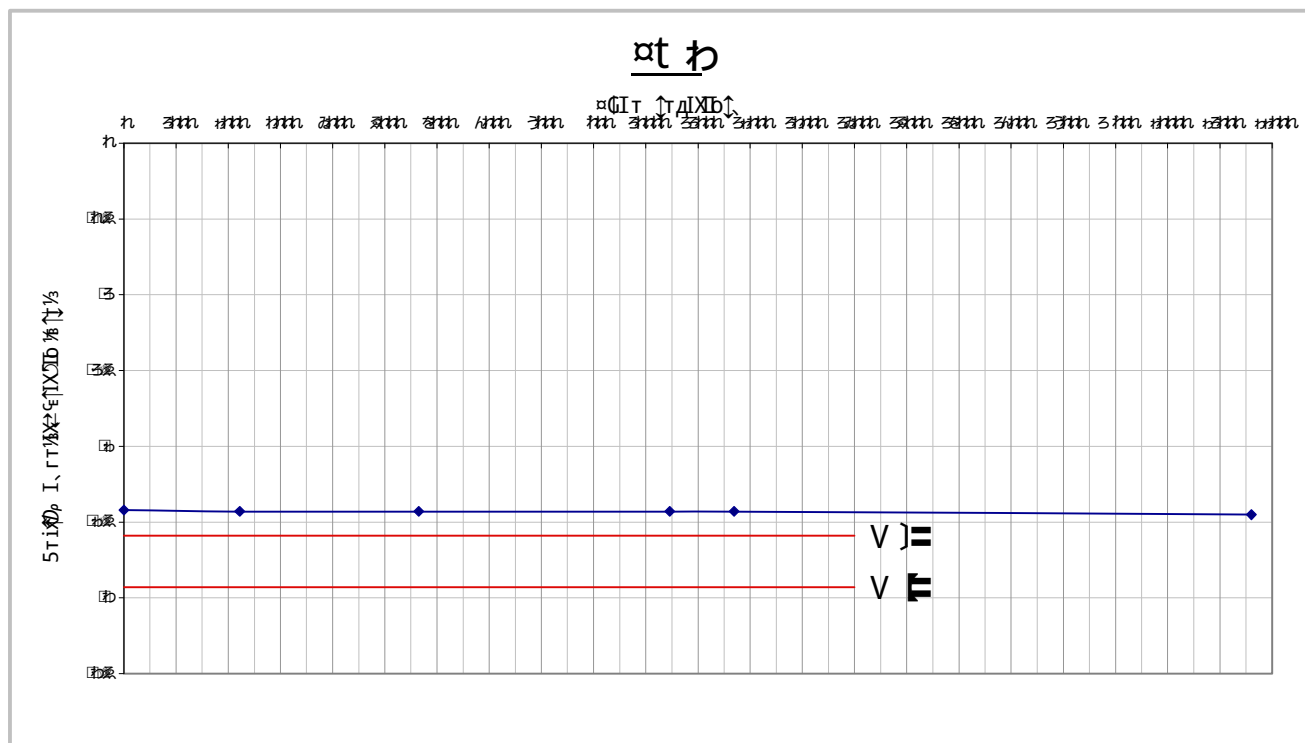


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Appendix: J – Existing Runoff Rate Calculations



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	40	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
✓ 1	0.023	5.00	138.000	Manhole	Adoptable	1200	4.562	-116.936	1.350
✓ 2	0.023	5.00	138.000	Manhole	Adoptable	1200	11.584	-74.221	1.350
✓ 3	0.023	5.00	138.000	Manhole	Adoptable	1200	128.025	-118.691	3.445
✓ 4	0.023	5.00	135.000	Manhole	Adoptable	1200	210.528	-72.466	2.034
✓ 5	0.023	5.00	135.000	Manhole	Adoptable	1200	204.677	-33.262	2.700
✓ 6	0.023	5.00	134.000	Manhole	Adoptable	1200	-25.674	-23.211	1.000
✓ 7	0.023	5.00	134.000	Manhole	Adoptable	1200	56.515	-12.161	1.350
✓ 8	0.023	5.00	134.000	Manhole	Adoptable	1200	8.856	54.858	1.450
✓ 9	0.023	5.00	134.000	Manhole	Adoptable	1200	98.035	48.552	1.617
✓ 10	0.023	5.00	134.000	Manhole	Adoptable	1200	162.892	44.949	1.750
✓ 11	0.023	5.00	135.000	Manhole	Adoptable	1200	212.736	37.885	3.000
✓ 12	0.023	5.00	134.000	Manhole	Adoptable	1200	180.307	101.699	3.219
✓ 13	0.023	5.00	132.000	Manhole	Adoptable	1200	159.589	148.240	2.075
✓ 14	0.023	5.00	132.000	Manhole	Adoptable	1200	134.066	202.588	3.084
✓ 14_OUT			128.000	Manhole	Adoptable	1200	125.959	240.477	1.070

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	1	3	15.000	0.600	Colebrook-White	136.650	134.555	2.095	7.2	150	Circular	5.07	50.0
2.000	2	3	15.000	0.600	Colebrook-White	136.650	134.555	2.095	7.2	150	Circular	5.07	50.0
1.001	3	4	40.000	0.600	Colebrook-White	134.555	132.966	1.589	25.2	150	Circular	5.40	50.0
1.002	4	5	25.000	0.600	Colebrook-White	132.966	132.300	0.666	37.5	150	Circular	5.65	50.0
1.003	5	11	25.000	0.600	Colebrook-White	132.300	132.133	0.167	150.0	150	Circular	6.16	50.0
3.000	6	8	15.000	0.600	Colebrook-White	133.000	132.900	0.100	150.0	150	Circular	5.31	50.0
4.000	7	8	15.000	0.600	Colebrook-White	132.650	132.550	0.100	150.0	150	Circular	5.31	50.0
3.001	8	9	25.000	0.600	Colebrook-White	132.550	132.383	0.167	150.0	150	Circular	5.81	50.0
3.002	9	10	20.000	0.600	Colebrook-White	132.383	132.250	0.133	150.0	150	Circular	6.22	50.0
3.003	10	11	15.000	0.600	Colebrook-White	132.250	132.150	0.100	150.0	150	Circular	6.53	50.0
1.004	11	12	20.000	0.600	Colebrook-White	132.000	130.781	1.219	16.4	150	Circular	6.66	50.0
1.005	12	13	20.000	0.600	Colebrook-White	130.781	129.925	0.856	23.4	150	Circular	6.82	50.0
1.006	13	14	20.000	0.600	Colebrook-White	129.925	128.916	1.009	19.8	150	Circular	6.97	50.0
1.007	14	14_OUT	5.000	0.600	Colebrook-White	128.916	126.930	1.986	2.5	150	Circular	6.98	50.0

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	240	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 %)				
2			0		0		0				
10			0		0		0				
30			0		0		0				
30			40		0		0				
100			0		0		0				
100			40		0		0				

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	136.675	0.025	3.9	0.0361	0.0000	OK
15 minute summer	2	10	136.675	0.025	3.9	0.0361	0.0000	OK
15 minute summer	3	10	134.614	0.059	11.7	0.0740	0.0000	OK
15 minute summer	4	11	133.043	0.077	15.4	0.1042	0.0000	OK
15 minute summer	5	12	132.517	0.217	18.9	0.2820	0.0000	SURCHARGED
15 minute summer	6	10	133.054	0.054	3.9	0.0860	0.0000	OK
15 minute summer	7	10	132.703	0.053	3.9	0.0773	0.0000	OK
15 minute summer	8	11	132.650	0.100	11.5	0.1444	0.0000	OK
15 minute summer	9	12	132.573	0.190	15.1	0.2690	0.0000	SURCHARGED
15 minute summer	10	12	132.430	0.180	17.5	0.2504	0.0000	SURCHARGED
15 minute summer	11	13	132.237	0.237	37.7	0.3040	0.0000	SURCHARGED
15 minute summer	12	13	131.325	0.544	40.6	0.6933	0.0000	SURCHARGED
15 minute summer	13	13	130.320	0.395	39.6	0.5347	0.0000	SURCHARGED
15 minute summer	14	12	128.988	0.072	40.2	0.0915	0.0000	OK
15 minute summer	14_OUT	12	126.991	0.061	40.2	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	3.9	0.979	0.058	0.0617	
15 minute summer	2	2.000	3	3.9	0.979	0.058	0.0617	
15 minute summer	3	1.001	4	11.5	1.493	0.322	0.3074	
15 minute summer	4	1.002	5	15.2	1.086	0.521	0.3335	
15 minute summer	5	1.003	11	17.7	1.020	1.226	0.4128	
15 minute summer	6	3.000	8	3.8	0.681	0.262	0.0836	
15 minute summer	7	4.000	8	3.8	0.429	0.265	0.1339	
15 minute summer	8	3.001	9	11.2	0.784	0.776	0.3755	
15 minute summer	9	3.002	10	13.7	0.803	0.949	0.3521	
15 minute summer	10	3.003	11	16.9	0.980	1.172	0.2456	
15 minute summer	11	1.004	12	36.9	2.297	0.836	0.3521	
15 minute summer	12	1.005	13	36.6	2.093	0.990	0.3521	
15 minute summer	13	1.006	14	37.7	2.957	0.939	0.2589	
15 minute summer	14	1.007	14_OUT	40.2	5.384	0.355	0.0373	24.0

Results for 10 year Critical Storm Duration. Lowest mass balance: 97.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	136.685	0.035	8.0	0.0515	0.0000	OK
15 minute summer	2	10	136.685	0.035	8.0	0.0515	0.0000	OK
15 minute summer	3	11	134.648	0.093	23.9	0.1177	0.0000	OK
15 minute summer	4	13	134.009	1.043	31.6	1.4152	0.0000	SURCHARGED
15 minute summer	5	13	133.685	1.385	28.5	1.8024	0.0000	SURCHARGED
15 minute summer	6	14	133.514	0.514	8.0	0.8178	0.0000	SURCHARGED
15 minute summer	7	14	133.515	0.865	8.0	1.2726	0.0000	SURCHARGED
15 minute summer	8	14	133.510	0.960	20.4	1.3897	0.0000	SURCHARGED
15 minute summer	9	14	133.449	1.066	20.0	1.5088	0.0000	SURCHARGED
15 minute summer	10	14	133.360	1.109	22.3	1.5466	0.0000	SURCHARGED
15 minute summer	11	14	133.246	1.246	43.8	1.5996	0.0000	SURCHARGED
15 minute summer	12	13	132.137	1.356	44.6	1.7272	0.0000	SURCHARGED
15 minute summer	13	13	130.815	0.890	47.8	1.2045	0.0000	SURCHARGED
15 minute summer	14	12	129.000	0.084	51.1	0.1075	0.0000	OK
15 minute summer	14_OUT	12	126.999	0.069	51.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	8.0	1.164	0.119	0.1087	
15 minute summer	2	2.000	3	8.0	1.164	0.119	0.1087	
15 minute summer	3	1.001	4	23.6	1.675	0.663	0.5816	
15 minute winter	4	1.002	5	21.3	1.217	0.731	0.4401	
15 minute summer	5	1.003	11	21.7	1.235	1.504	0.4401	
15 minute summer	6	3.000	8	8.3	0.788	0.574	0.2641	
15 minute summer	7	4.000	8	5.6	0.481	0.384	0.2641	
15 minute summer	8	3.001	9	13.8	0.797	0.956	0.4401	
15 minute summer	9	3.002	10	14.9	0.844	1.028	0.3521	
15 minute summer	10	3.003	11	19.3	1.096	1.334	0.2641	
15 minute winter	11	1.004	12	38.8	2.309	0.878	0.3521	
15 minute summer	12	1.005	13	41.6	2.363	1.125	0.3521	
15 minute summer	13	1.006	14	45.2	2.920	1.126	0.2775	
15 minute summer	14	1.007	14_OUT	51.1	5.652	0.452	0.0452	48.9

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	136.690	0.040	10.4	0.0588	0.0000	OK
15 minute summer	2	10	136.690	0.040	10.4	0.0588	0.0000	OK
15 minute summer	3	13	135.214	0.659	31.1	0.8338	0.0000	SURCHARGED
15 minute summer	4	13	134.803	1.837	37.6	2.4931	0.0000	FLOOD RISK
15 minute summer	5	14	134.409	2.109	31.8	2.7434	0.0000	SURCHARGED
30 minute summer	6	21	134.000	1.000	10.4	1.5910	0.4063	FLOOD
30 minute summer	7	21	134.000	1.350	9.2	1.9872	0.3854	FLOOD
15 minute summer	8	13	134.000	1.450	21.7	2.0996	0.2912	FLOOD
15 minute summer	9	13	133.995	1.612	21.7	2.2815	0.0000	FLOOD RISK
15 minute summer	10	13	133.938	1.688	23.3	2.3536	0.0000	FLOOD RISK
15 minute summer	11	14	133.851	1.851	48.3	2.3764	0.0000	SURCHARGED
15 minute summer	12	13	132.611	1.830	48.3	2.3319	0.0000	SURCHARGED
15 minute summer	13	13	131.098	1.173	52.5	1.5872	0.0000	SURCHARGED
15 minute summer	14	12	129.007	0.091	57.0	0.1162	0.0000	OK
15 minute summer	14_OUT	12	127.004	0.074	57.0	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	10.4	1.216	0.155	0.1595	
15 minute summer	2	2.000	3	10.4	1.216	0.155	0.1595	
15 minute summer	3	1.001	4	27.6	1.695	0.775	0.7042	
15 minute summer	4	1.002	5	23.3	1.351	0.800	0.4401	
15 minute summer	5	1.003	11	24.4	1.388	1.690	0.4401	
15 minute summer	6	3.000	8	10.0	0.776	0.691	0.2641	
30 minute winter	7	4.000	8	5.8	0.445	0.404	0.2641	
15 minute winter	8	3.001	9	13.4	0.799	0.924	0.4401	
15 minute winter	9	3.002	10	16.1	0.915	1.114	0.3521	
30 minute winter	10	3.003	11	20.2	1.148	1.398	0.2641	
15 minute summer	11	1.004	12	40.5	2.324	0.916	0.3521	
15 minute summer	12	1.005	13	44.6	2.532	1.206	0.3521	
15 minute summer	13	1.006	14	49.2	3.111	1.224	0.2875	
15 minute summer	14	1.007	14_OUT	57.0	5.765	0.504	0.0494	63.4

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 97.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	136.698	0.048	14.6	0.0703	0.0000	OK
15 minute summer	2	11	136.698	0.048	14.6	0.0703	0.0000	OK
15 minute summer	3	12	136.214	1.659	43.7	2.0980	0.0000	SURCHARGED
15 minute summer	4	11	135.000	2.034	40.9	2.7601	4.5254	FLOOD
15 minute summer	5	12	134.756	2.456	37.3	3.1958	0.0000	FLOOD RISK
30 minute winter	6	18	134.000	1.000	10.4	1.5910	3.0912	FLOOD
30 minute winter	7	18	134.000	1.350	10.4	1.9872	3.0090	FLOOD
30 minute winter	8	18	134.000	1.450	15.4	2.0996	3.1458	FLOOD
30 minute summer	9	18	134.000	1.617	20.4	2.2881	2.6045	FLOOD
15 minute summer	10	11	134.000	1.750	25.2	2.4395	2.6416	FLOOD
15 minute summer	11	11	134.052	2.052	50.3	2.6343	0.0000	SURCHARGED
15 minute summer	12	12	133.066	2.285	53.3	2.9112	0.0000	SURCHARGED
15 minute summer	13	13	131.473	1.548	59.8	2.0946	0.0000	SURCHARGED
15 minute summer	14	11	129.018	0.102	66.7	0.1309	0.0000	OK
15 minute summer	14_OUT	11	127.011	0.081	66.5	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	14.6	1.276	0.217	0.1682	
15 minute summer	2	2.000	3	14.6	1.276	0.217	0.1682	
15 minute summer	3	1.001	4	29.5	1.757	0.828	0.7042	
15 minute winter	4	1.002	5	23.0	1.316	0.788	0.4401	
15 minute summer	5	1.003	11	28.2	1.605	1.954	0.4401	
15 minute winter	6	3.000	8	10.1	0.781	0.701	0.2641	
15 minute summer	7	4.000	8	6.1	0.448	0.425	0.2641	
30 minute summer	8	3.001	9	12.8	0.771	0.888	0.4401	
30 minute winter	9	3.002	10	16.1	0.915	1.114	0.3521	
30 minute winter	10	3.003	11	20.4	1.157	1.409	0.2641	
15 minute summer	11	1.004	12	40.5	2.326	0.918	0.3521	
30 minute summer	12	1.005	13	45.9	2.605	1.241	0.3521	
15 minute summer	13	1.006	14	54.5	3.330	1.358	0.3040	
15 minute summer	14	1.007	14_OUT	66.5	5.910	0.588	0.0562	74.1

Results for 100 year Critical Storm Duration. Lowest mass balance: 97.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	136.695	0.045	13.1	0.0661	0.0000	OK
15 minute summer	2	10	136.695	0.045	13.1	0.0661	0.0000	OK
15 minute summer	3	13	135.895	1.340	39.2	1.6948	0.0000	SURCHARGED
30 minute summer	4	19	135.000	2.034	38.3	2.7601	2.3364	FLOOD
15 minute summer	5	12	134.714	2.414	35.6	3.1412	0.0000	FLOOD RISK
30 minute winter	6	19	134.000	1.000	9.5	1.5910	2.1507	FLOOD
30 minute winter	7	19	134.000	1.350	9.5	1.9872	2.1320	FLOOD
30 minute winter	8	19	134.000	1.450	19.7	2.0996	2.2681	FLOOD
30 minute summer	9	19	134.000	1.617	20.2	2.2881	1.6818	FLOOD
30 minute summer	10	19	134.000	1.750	22.8	2.4395	1.1867	FLOOD
30 minute summer	11	19	134.012	2.011	47.3	2.5827	0.0000	SURCHARGED
15 minute summer	12	12	132.932	2.151	52.1	2.7402	0.0000	SURCHARGED
15 minute summer	13	13	131.362	1.437	57.2	1.9444	0.0000	SURCHARGED
15 minute summer	14	11	129.014	0.098	63.2	0.1256	0.0000	OK
15 minute summer	14_OUT	11	127.008	0.078	63.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	13.1	1.266	0.195	0.1652	
15 minute summer	2	2.000	3	13.1	1.266	0.195	0.1652	
30 minute summer	3	1.001	4	27.6	1.639	0.775	0.7042	
15 minute summer	4	1.002	5	22.5	1.279	0.773	0.4401	
15 minute summer	5	1.003	11	27.7	1.573	1.915	0.4401	
15 minute summer	6	3.000	8	8.6	0.820	0.596	0.2641	
15 minute winter	7	4.000	8	6.0	0.460	0.413	0.2641	
15 minute summer	8	3.001	9	13.0	0.771	0.896	0.4401	
30 minute winter	9	3.002	10	15.9	0.905	1.102	0.3521	
30 minute winter	10	3.003	11	20.2	1.150	1.398	0.2641	
30 minute summer	11	1.004	12	40.5	2.304	0.917	0.3521	
15 minute summer	12	1.005	13	45.8	2.602	1.239	0.3521	
15 minute summer	13	1.006	14	52.7	3.267	1.313	0.2981	
15 minute summer	14	1.007	14_OUT	63.1	5.864	0.558	0.0538	70.6

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.25%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	136.904	0.254	18.3	0.3736	0.0000	SURCHARGED
15 minute summer	2	12	136.904	0.254	18.3	0.3736	0.0000	SURCHARGED
15 minute summer	3	12	136.824	2.269	52.8	2.8697	0.0000	SURCHARGED
30 minute summer	4	17	135.000	2.034	48.9	2.7601	11.2268	FLOOD
15 minute summer	5	11	134.878	2.578	40.4	3.3542	0.0000	FLOOD RISK
30 minute winter	6	17	134.000	1.000	13.3	1.5910	5.1428	FLOOD
30 minute winter	7	17	134.000	1.350	13.3	1.9872	5.0853	FLOOD
30 minute winter	8	17	134.000	1.450	16.5	2.0996	5.2333	FLOOD
30 minute winter	9	17	134.000	1.617	19.2	2.2881	4.7071	FLOOD
30 minute summer	10	17	134.000	1.750	28.2	2.4395	6.7488	FLOOD
15 minute summer	11	11	134.102	2.102	52.8	2.6993	0.0000	SURCHARGED
15 minute summer	12	12	133.366	2.585	56.6	3.2928	0.0000	SURCHARGED
15 minute summer	13	12	131.783	1.858	64.3	2.5134	0.0000	FLOOD RISK
15 minute summer	14	11	129.029	0.113	74.9	0.1448	0.0000	OK
15 minute summer	14_OUT	11	127.017	0.087	74.8	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	17.3	1.268	0.258	0.2641	
15 minute summer	2	2.000	3	17.3	1.268	0.258	0.2641	
15 minute summer	3	1.001	4	35.5	2.015	0.996	0.7042	
15 minute summer	4	1.002	5	23.0	1.305	0.789	0.4401	
15 minute summer	5	1.003	11	28.8	1.639	1.995	0.4401	
15 minute winter	6	3.000	8	8.6	0.824	0.598	0.2641	
15 minute winter	7	4.000	8	6.1	0.455	0.424	0.2641	
15 minute summer	8	3.001	9	13.1	0.775	0.903	0.4401	
30 minute summer	9	3.002	10	16.1	0.914	1.113	0.3521	
30 minute summer	10	3.003	11	20.4	1.157	1.409	0.2641	
15 minute summer	11	1.004	12	40.6	2.309	0.921	0.3521	
15 minute summer	12	1.005	13	46.3	2.629	1.252	0.3521	
15 minute summer	13	1.006	14	58.7	3.470	1.461	0.3186	
15 minute summer	14	1.007	14_OUT	74.8	5.993	0.661	0.0621	80.4



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	40	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
✓ 1	0.023	5.00	138.000	Manhole	Adoptable	1200	4.562	-116.936	1.350
✓ 2	0.023	5.00	138.000	Manhole	Adoptable	1200	11.584	-74.221	1.350
✓ 3	0.023	5.00	138.000	Manhole	Adoptable	1200	128.025	-118.691	3.445
✓ 4	0.023	5.00	135.000	Manhole	Adoptable	1200	210.528	-72.466	2.034
✓ 5	0.023	5.00	135.000	Manhole	Adoptable	1200	204.677	-33.262	2.700
✓ 6	0.023	5.00	134.000	Manhole	Adoptable	1200	-25.674	-23.211	1.000
✓ 7	0.023	5.00	134.000	Manhole	Adoptable	1200	56.515	-12.161	1.350
✓ 8	0.023	5.00	134.000	Manhole	Adoptable	1200	8.856	54.858	1.450
✓ 9	0.023	5.00	134.000	Manhole	Adoptable	1200	98.035	48.552	1.617
✓ 10	0.023	5.00	134.000	Manhole	Adoptable	1200	162.892	44.949	1.750
✓ 11	0.023	5.00	135.000	Manhole	Adoptable	1200	212.736	37.885	3.000
✓ 12	0.023	5.00	134.000	Manhole	Adoptable	1200	180.307	101.699	3.219
✓ 13	0.023	5.00	132.000	Manhole	Adoptable	1200	159.589	148.240	2.075
✓ 14	0.023	5.00	132.000	Manhole	Adoptable	1200	134.066	202.588	3.084
✓ 14_OUT			128.000	Manhole	Adoptable	1200	125.959	240.477	1.070

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	1	3	15.000	0.600	Colebrook-White	136.650	134.555	2.095	7.2	150	Circular	5.07	50.0
2.000	2	3	15.000	0.600	Colebrook-White	136.650	134.555	2.095	7.2	150	Circular	5.07	50.0
1.001	3	4	40.000	0.600	Colebrook-White	134.555	132.966	1.589	25.2	150	Circular	5.40	50.0
1.002	4	5	25.000	0.600	Colebrook-White	132.966	132.300	0.666	37.5	150	Circular	5.65	50.0
1.003	5	11	25.000	0.600	Colebrook-White	132.300	132.133	0.167	150.0	150	Circular	6.16	50.0
3.000	6	8	15.000	0.600	Colebrook-White	133.000	132.900	0.100	150.0	150	Circular	5.31	50.0
4.000	7	8	15.000	0.600	Colebrook-White	132.650	132.550	0.100	150.0	150	Circular	5.31	50.0
3.001	8	9	25.000	0.600	Colebrook-White	132.550	132.383	0.167	150.0	150	Circular	5.81	50.0
3.002	9	10	20.000	0.600	Colebrook-White	132.383	132.250	0.133	150.0	150	Circular	6.22	50.0
3.003	10	11	15.000	0.600	Colebrook-White	132.250	132.150	0.100	150.0	150	Circular	6.53	50.0
1.004	11	12	20.000	0.600	Colebrook-White	132.000	130.781	1.219	16.4	150	Circular	6.66	50.0
1.005	12	13	20.000	0.600	Colebrook-White	130.781	129.925	0.856	23.4	150	Circular	6.82	50.0
1.006	13	14	20.000	0.600	Colebrook-White	129.925	128.916	1.009	19.8	150	Circular	6.97	50.0
1.007	14	14_OUT	5.000	0.600	Colebrook-White	128.916	126.930	1.986	2.5	150	Circular	6.98	50.0

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Analysis Speed	Normal	Additional Storage (m³/ha)	20.0		



Storm Durations
360

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

Results for 100 year 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
360 minute summer	1	184	136.670	0.020	2.6	0.0298	0.0000	OK
360 minute summer	2	184	136.670	0.020	2.6	0.0298	0.0000	OK
360 minute summer	3	184	134.603	0.048	7.8	0.0602	0.0000	OK
360 minute summer	4	184	133.028	0.062	10.4	0.0836	0.0000	OK
360 minute summer	5	184	132.415	0.115	12.9	0.1495	0.0000	OK
360 minute summer	6	184	133.044	0.044	2.6	0.0699	0.0000	OK
360 minute summer	7	184	132.693	0.043	2.6	0.0630	0.0000	OK
360 minute summer	8	184	132.628	0.078	7.8	0.1126	0.0000	OK
360 minute summer	9	184	132.478	0.095	10.3	0.1347	0.0000	OK
360 minute summer	10	184	132.367	0.117	12.8	0.1633	0.0000	OK
360 minute summer	11	184	132.088	0.088	28.1	0.1125	0.0000	OK
360 minute summer	12	184	130.889	0.108	30.6	0.1378	0.0000	OK
360 minute summer	13	184	130.049	0.124	33.1	0.1679	0.0000	OK
360 minute summer	14	184	128.982	0.066	35.6	0.0848	0.0000	OK
360 minute summer	14_OUT	184	126.987	0.057	35.6	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	1	1.000	3	2.6	0.871	0.039	0.0466	
360 minute summer	2	2.000	3	2.6	0.871	0.039	0.0466	
360 minute summer	3	1.001	4	7.8	1.339	0.218	0.2322	
360 minute summer	4	1.002	5	10.3	0.956	0.354	0.2662	
360 minute summer	5	1.003	11	12.7	0.922	0.881	0.3453	
360 minute summer	6	3.000	8	2.6	0.613	0.178	0.0632	
360 minute summer	7	4.000	8	2.6	0.391	0.179	0.1002	
360 minute summer	8	3.001	9	7.7	0.734	0.534	0.2626	
360 minute summer	9	3.002	10	10.2	0.768	0.709	0.2655	
360 minute summer	10	3.003	11	12.7	0.911	0.880	0.2092	
360 minute summer	11	1.004	12	28.0	2.302	0.635	0.2429	
360 minute summer	12	1.005	13	30.5	2.087	0.826	0.2919	
360 minute summer	13	1.006	14	33.0	2.804	0.822	0.2308	
360 minute summer	14	1.007	14_OUT	35.6	5.245	0.315	0.0339	202.3