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16871

Flood Risk Assessment Compliance

For
Camp Road, Upper Heyford
Phase 5 (Parcel D6a)

May 2016

Contents

Appendices

1.0 Introduction

1.1 This Flood Risk Assessment Compliance report has been prepared on behalf of the Dorchester Group in support of their Reserved Matters application for Parcel D6a (now referred to as Phase 5) of the redevelopment off Camp Road, Upper Heyford.

1.2 The purpose of this report is to demonstrate that the proposed drainage design for phase 5 complies with the approved Flood Risk Assessment (FRA) carried out by Waterman dated October 2010 (Ref C11234 ES 001).

1.3 Phase 5 is part of the Dorchester Group development located to the South of the whole site (refer to the Site Residential Parcel Plan given in **Appendix A**).

1.4 This report is intended to assist in the discharge of any planning conditions that requires the developer to demonstrate compliance with the approved FRA.

2.0 Overview of Approved FRA

2.1 The entire site is located within Flood Zone 1.

2.2 The FRA sets out a detailed approach to attenuation across the Upper Heyford site which comprises of areas identified for retention, areas for refurbishment and areas for redevelopment to provide new residential dwellings.

2.3 The Environment Agency (EA) has confirmed that areas identified solely for retention and refurbishment do not require attenuation of existing surface water discharge.

2.4 The fundamental principle of the FRA is that runoff from proposed areas of redevelopment should be attenuated to existing 1 in 100 year flows with a 30% allowance for climate change.

2.5 Attenuation is to be provided through the use of balancing ponds, permeable paving and attenuation tanks where necessary. Swales will be incorporated through the site where appropriate.

2.6 The FRA splits the development into four main catchment areas and provides a series of calculations for each.

2.7 The FRA also requires a 10% betterment of existing flows entering the eastern tributary of the Gallos Brook.

3.0 Proposed Development

3.1 Phase 5 (parcel D6a) comprises 60 dwellings within 2.573 hectares of land. Refer to **Appendix B** for proposed layout.

3.2 Phases 5 is located within Catchment Area 2 as identified in the approved FRA figure 5.

3.3 The Indicative Surface Water Drainage Layout within the approved FRA suggests attenuation of surface water for Catchment 2 is provided by the use of attenuation tanks, permeable paving and oversized pipes. It is proposed that these phases will utilize attenuation tanks, oversized pipes and flow control devices upstream of and connecting to, the approved phase 4 network which in turn connects to the existing network leading to the existing outfall.

Discharge Strategy

3.4 Paragraph 3.20 of the FRA states: "In accordance with PPS25, local policy and EA guidance the rate of surface water runoff from new development would be controlled so that it does not increase over the existing situation for the 1 in 100 year event, while taking climate change into account".

3.5 It is proposed to connect the phase 4 network via run 26.009 on the proposed calculations in accordance with the approved phase 4 FRA Compliance document.

3.6 The Phase 3, 4, 5, 5b and 6 system has been simulated as one complete network and have been reviewed as a whole.

3.7 The FRA prescribes the following existing 1 in 100 year runoff rates for use in calculations:

Existing 1 in 100yr	Greenfield runoff- 10.7 l/s/ha	Greenfield brownfield- 112.8 l/s/ha

3.8 The purpose of this report is not to revisit the calculation of these rates. Further information on how these rates were derived can be found in the approved FRA.

3.9 Following detailed assessment of the topographical survey and site visits the following calculations can be derived. These replicate the information shown in the phase 4 FRAC.

The outfall into the existing system contains the flow from phases 3, 4, 5b, 5 and 6 therefore the other phase results are shown below for completeness.

Phase 4 (approved)		
	Area (m^2)	**1 in 100yr Discharge (l/s)**
Existing Impermeable surfacing	16726	188.7 l/s

Phase 5b (approved)		
	Area (m^2)	**1 in 100yr Discharge (l/s)**
Existing Impermeable surfacing	1116	12.6 l/s

Phase 5		
	Area (m^2)	**1 in 100yr Discharge (l/s)**
Existing Impermeable surfacing	17946	202.4 l/s

Phase 3 south (as approved)		
	Area (m^2)	**1 in 100yr Discharge (l/s)**
Existing Impermeable surfacing	9934	112.1 l/s

Phase 6 (subject to future FRA-C)		
	Area (m^2)	**1 in 100yr Discharge (l/s)**
Existing Impermeable surfacing	6168	69.6 l/s

Total flow from phases 3, 4, 5b, 5 and 6	
	1 in 100yr Discharge (l/s)
Total allowable rate for proposed phases	585.4 l/s
Actual rate from phases into existing network (runs 20.018, 37.000 and 38.005 in the calculations)	108.4 + 30.3 + 109.4 = 248.1 l/s

Attenuation Strategy and SUDS elements

3.10 The parcels contain attenuation in the form of underground tanks and oversized pipes both within the application boundary, and within the client's ownership between the phase boundary and the proposed outfall location.

3.11 The oversized pipes are proposed for adoption by the Water Company.

3.12 The underground storage tanks will cater for the majority of the attenuation required and either be maintained by the Water Company or a management company as will the swale.

3.13 The final discharge into the existing system from the phases will be controlled using hydro-brake vortex controllers. There will also be intermediate hydro-brakes on phase 5 to maximise the efficiency of the storage network.

3.14 Living roofs have been discounted as they are not in keeping with the strict urban planning requirements within a conservation area. Rain water harvesting has also been discounted due to ongoing maintenance issues and integration into domestic plumbing.

3.15 The use of porous paving or other infiltration devices have been discounted due to the lack of infiltration within this area. This was confirmed via BRE complaint soakaway tests within the Phase 4/5 area on 13th May 2016 which were abandoned when the water did not drain away and was noted as standing at a fixed level for 2-6 hours.

3.16 It is noted that the approved treatments plan for the overall planning layout which dictates the road class and amount of porous paving per phase does not have any requirements for porous paving in the phase 3-5 area.

4.0 Hydraulic Performance

4.1 A detailed Microdrainage model has been constructed to simulate the 1 in 100 year (plus climate change) storm for the proposed systems.

4.2 The Microdrainage model (refer to **Appendix C**) demonstrates that the total proposed 1 in 100 year (plus climate change) discharge rate does not exceed 585.4 l/s at runs 20.018, 37.000 and 38.005.

4.4 The achieved discharge rates are significantly lower than the allowable discharge rates.

Exceedance

4.5 During storms in excess of the designated storm, there is the potential for the storage structures and drainage system to be overwhelmed, leading to flooding. Indicative finished levels have been designed so that during these periods, flood water will be directed away from the proposed building entrances and into the roads and soft landscaping areas.

4.6 The primary phase 5 road falls to the south connecting to the phase 4 roads. For phase 4 exceedance information please refer to the approved FRA-C for that area.

Pollution prevention

4.6 As the parking areas are smaller than 800m sq, PPG3 states that trapped gullies will provide suitable protection against contamination.

4.7 It is noted that the off parcel sewer passes through a petrol interceptor before discharge into the existing watercourse which meets the requirements of PPG3.

Maintenance

4.8 Refer to "SUDS Maintenance Regime" report dated May 2016 which covers Phases 4, 5b and 5.

5.0 Summary and Conclusions

5.1 This report has been prepared to allow discharge of any planning conditions which require evidence of compliance with the approved Waterman Flood Risk Assessment.

5.2 The FRA confirms no attenuation is required for areas being refurbished or retained.

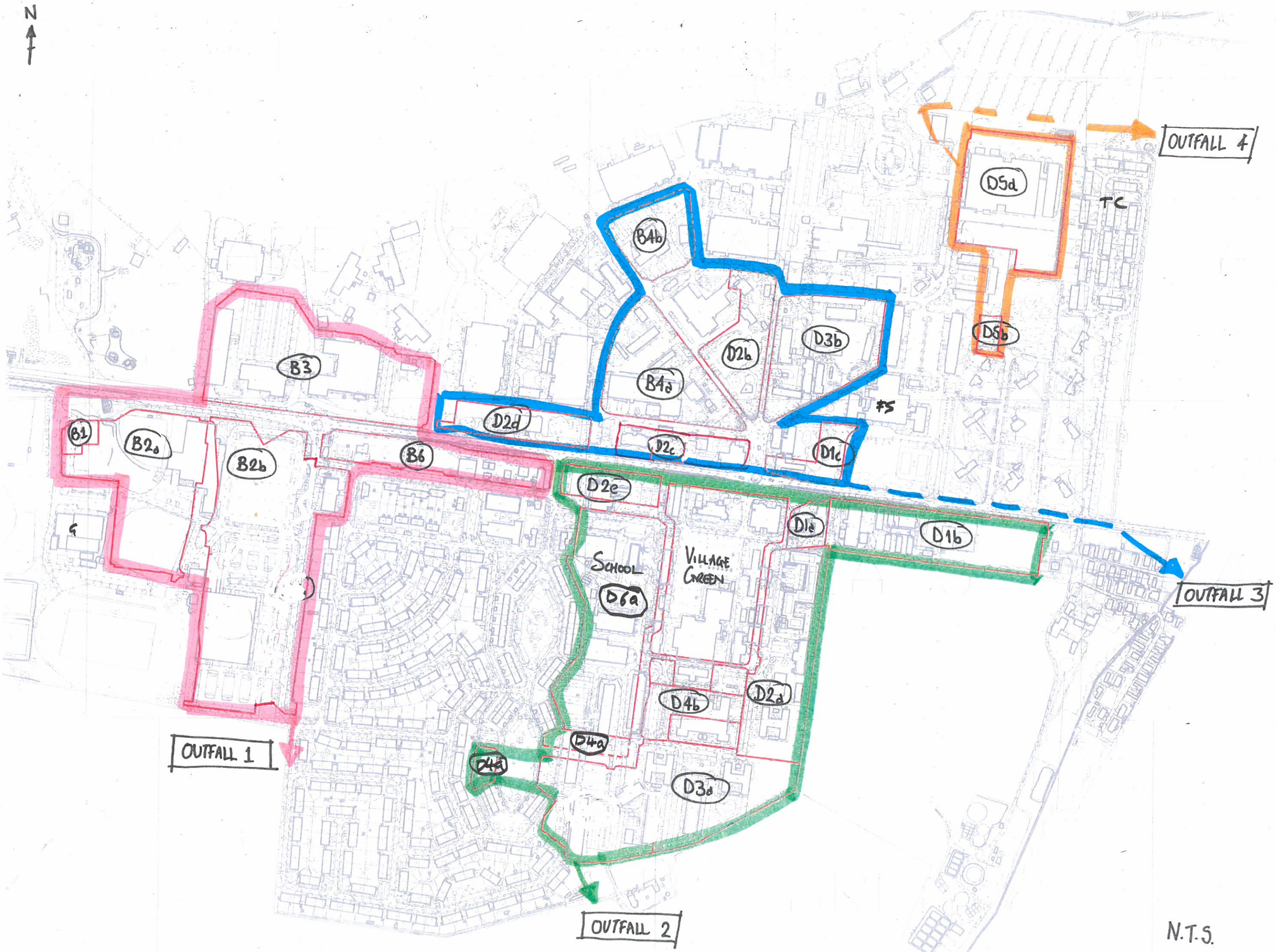
5.3 The FRA requires surface water runoff from new development to be restricted to existing 1 in 100 year runoff rates, and flows attenuated including a 30% allowance for climate change.

5.4 A Microdrainage model has been created and the results demonstrate a significant betterment in discharge rates.

5.5 The Microdrainage model also demonstrates no flooding during events up to and including a 1 in 100 year return period including a 30% allowance for climate change.

APPENDIX A

Residential Parcel Plan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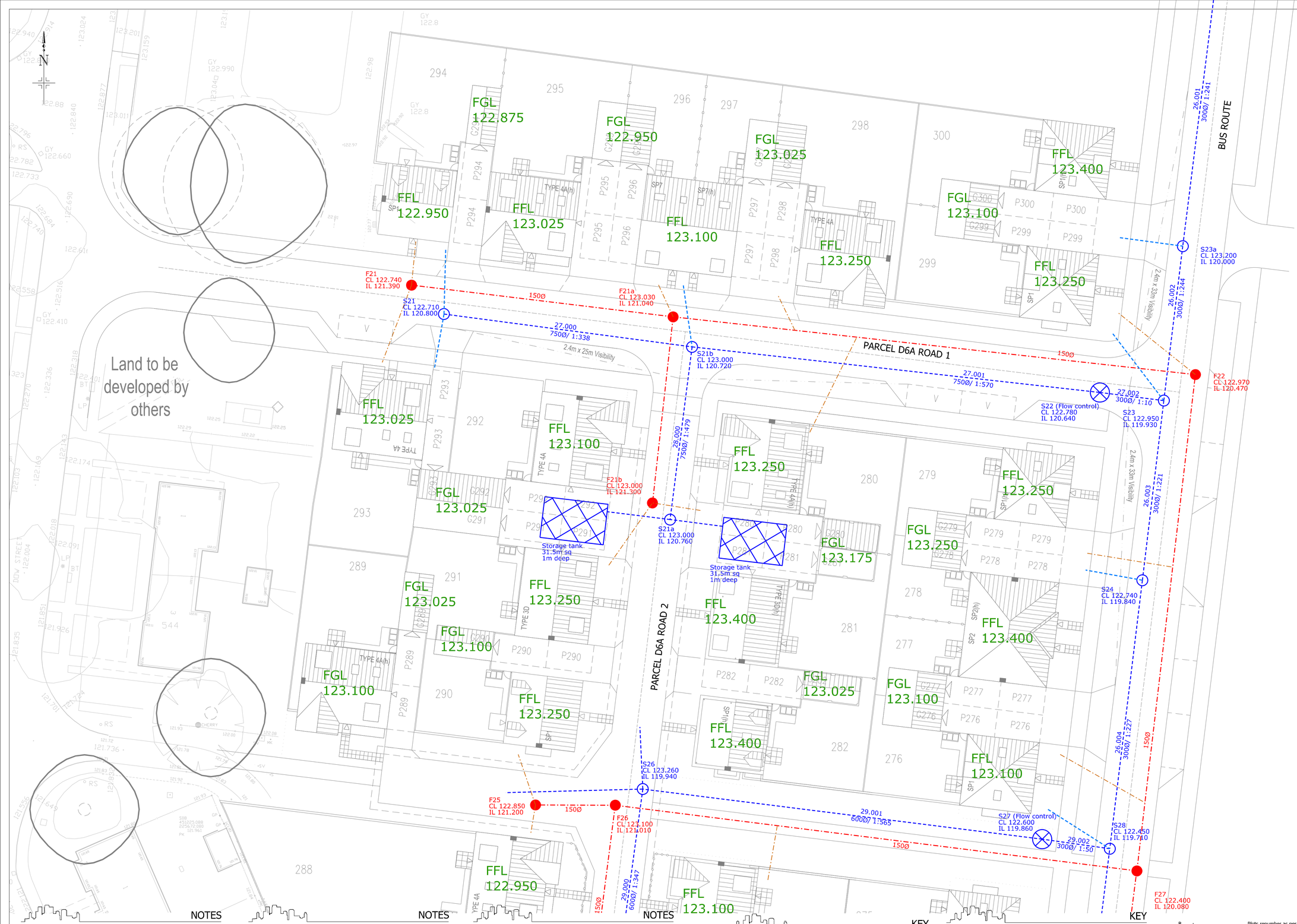
OUTFALL 4
D5a
TC
B4b
D5b
B3
D2b
D3b
B4a
#5
B1
B2a
D2d
D2c
D1c
B2b
B6
D2e
D1a
D1b
SCHOOL
VILLAGE GREEN
OUTFALL 3
D6a
D4b
D2a
D4a
D4c
D3a
OUTFALL 1
OUTFALL 2
N.T.S.

APPENDIX B

Proposed levels and drainage layouts



RWP, SVP AND GULLEY POSITIONS TBC AS PART OF THE DETAILED DESIGN. FFLS ARE +/- 450MM

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Building Drainage

1. All connections to adoptable manholes from private building drainage to be 150mm diameter pipes unless otherwise specified.

NOTES

2. All house drainage to be 100mm dia unless otherwise stated, and laid in accordance with current Building Regulations and BS8301 : 1985.
3. All private drainage products are to be Polypipe or similar approved.
4. Pipe bedding material is to be Class S with 150mm minimum thickness surround.
5. Backfill is to be be with selected fill free of stones larger than 40mm, lumps of clay over 100mm, timber, frozen material and vegetable matter.
6. Pipe protection of house drainage runs is required in accordance with the Typical House Drainage Details drawing. The contractor shall satisfy themselves and agree with the Site Management the actual extent of pipe protection required.

NOTES

7. Pipes entering and leaving manholes/inspection chambers shall include a rocker pipe, 600mm in length.
8. Brickwork to chambers shall be Class B Engineering to BS3921.
9. Rainwater pipes are to be sited on side elevations whenever possible.
10. All retaining walls with a height of 600mm or greater are to include 1.2m high post and rail fencing unless located in rear gardens. Similar retaining walls in rear gardens are to include 900mm height picket fence.
11. All flights of steps to primary level access, with more than 2 steps are to be provided with handrailing, except where the steps are 900mm are more appart.
12. Drainage and road design subject to Water and Highway Authority approval.
13. Edge restraint to private/blockwork - 2 stretcher course (unless noted otherwise).

KEY

Adoptable Sewers

- F1 — Proposed Adoptable Foul Sewer
- S1 — Proposed Adoptable Surface Water Sewer
- G — Highway Gully (Existing)

KEY

Private Drains

- Medium Foul I.C. (450mm dia. Depth to invert 600-1000mm) Non Entry I.C. (330mm dia. Depth to invert 1000-3000mm)
- Large Foul I.C. (1200x750mm or PC rings. Depth to invert 1000-1800mm)
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- Rodding Eye

REVISION	DESCRIPTION	DRAWN	CHECKED	DATE
B	Plots renumber as per latest architect's layout	AT	JF	06.08.15
A	Revised to suit latest site layout	AT	JF	27.07.15

PRELIMINARY ■ INFORMATION ☐ TENDER ☐ CONSTRUCTION ☐ AS BUILT ☐

WOODS HARDWICK
ARCHITECTS, ENGINEERS AND DEVELOPMENT CONSULTANTS

TITLE UPPER HEYFORD
PARCEL D6a (PHASE 5)

DETAILS PROPOSED ENGINEERING LAYOUT
SHEET 1

SCALE: A1- 1:200 DATE: JUNE 2015 DRAWN: AT CHK: JF

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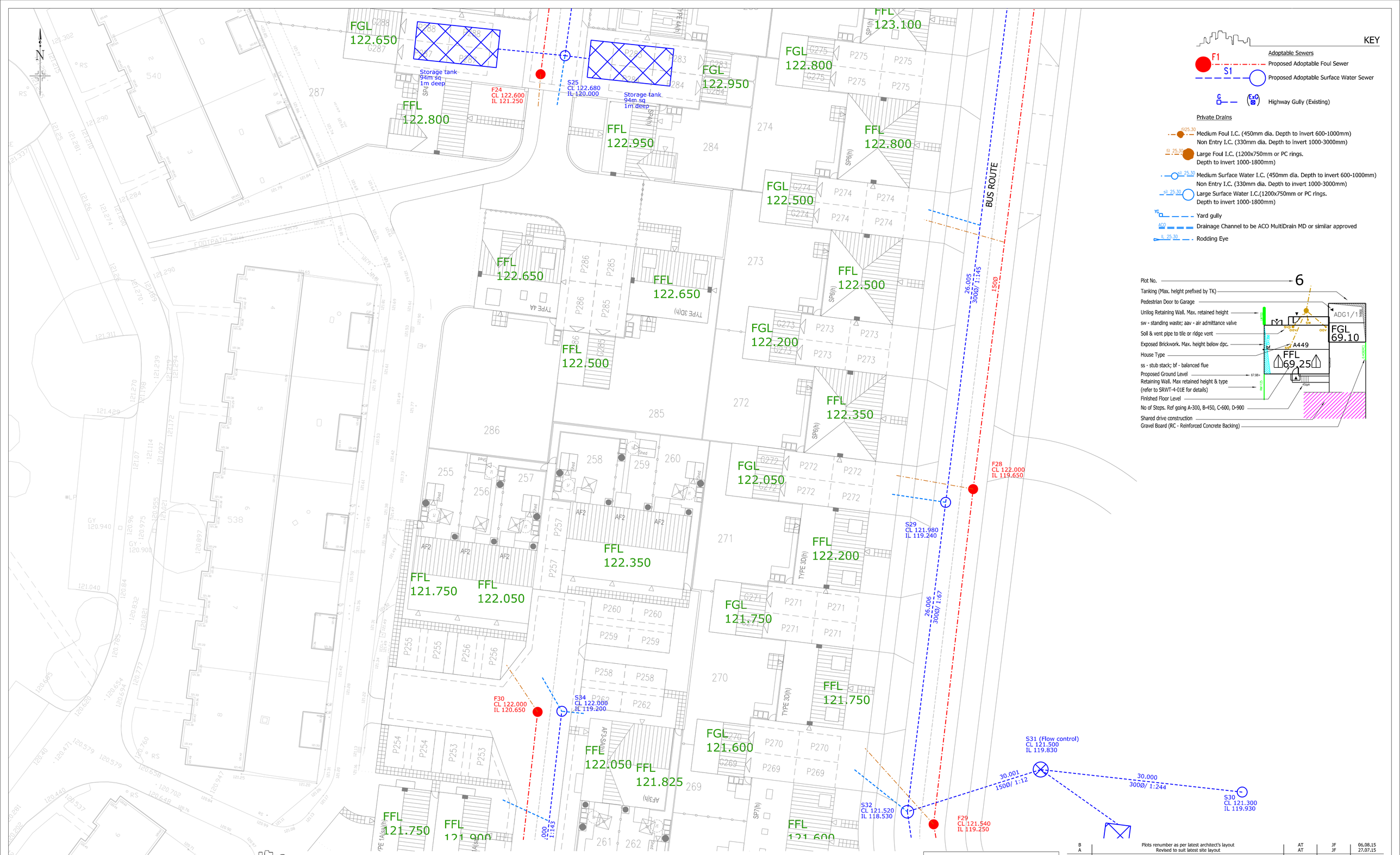

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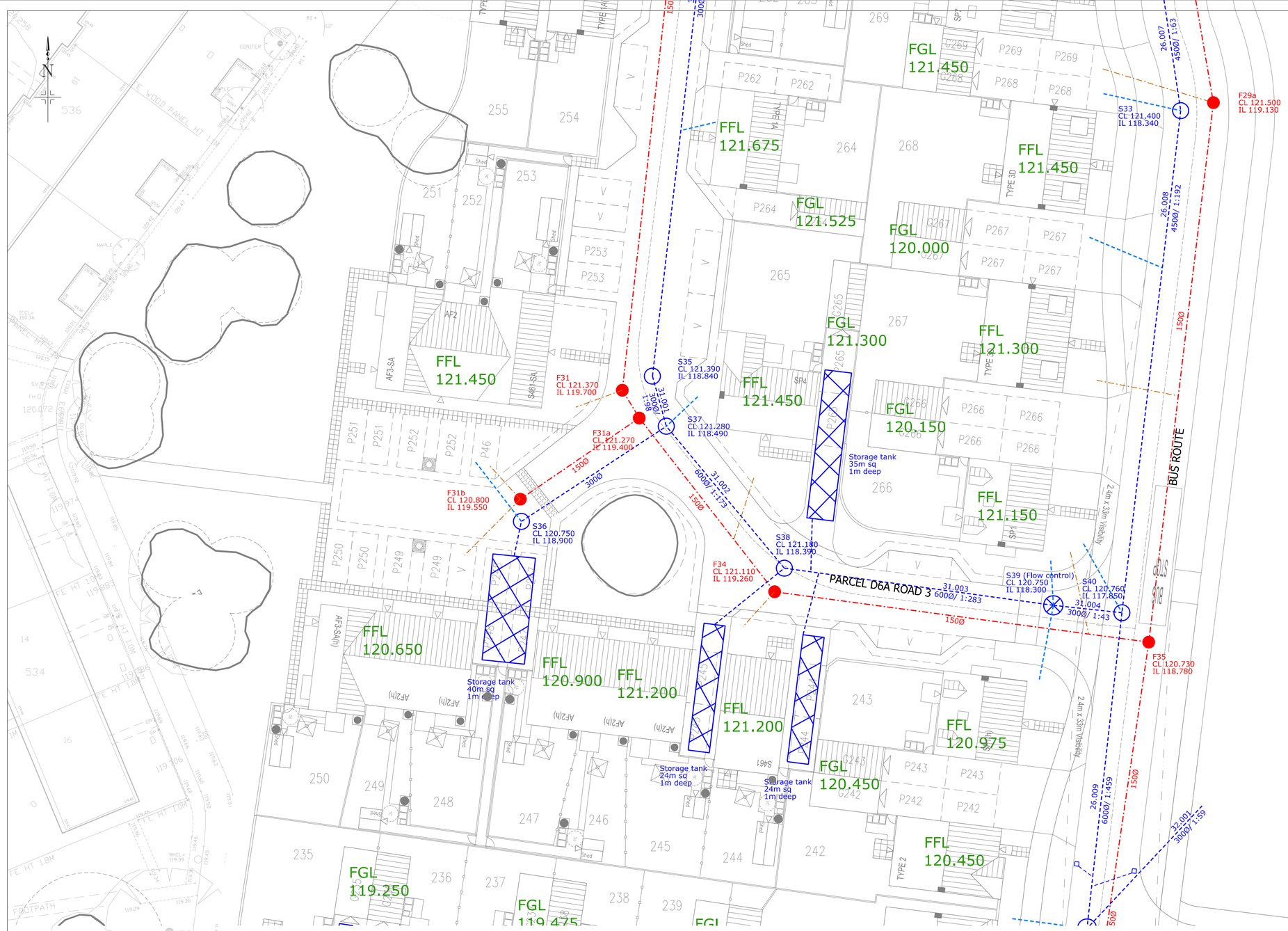

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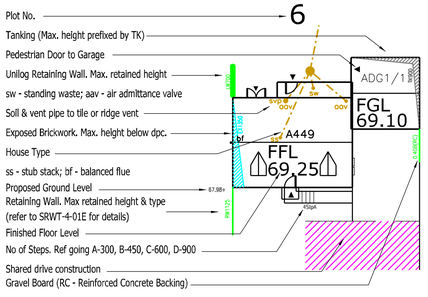
ACO — Drainage Channel to be ACO MultiDrain MD or similar approved

IL 25.30 — Rodding Eye



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DETAILS PROPOSED ENGINEERING LAYOUT
SHEET 3

SCALE: A1- 1:200 DATE: JUNE 2015 DRAWN: AT CHK: JF

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APPENDIX C

Proposed Microdrainage Calculations- Central network

Note: The calculations include the entire network including existing areas upstream and areas downstream of this phase. The runs numbers which relate to these phases (in the order shown in the calculations) are:

Pipe ref	Phase	Parcel
19.000	5b	D4a
19.001	5b	D4a
25.000	4	D3a
20.008	4	D3a
20.009	4	D3a
26.000	5	D6a
26.001	5	D6a
26.002	5	D6a
27.000	5	D6a
27.001	5	D6a
28.000	5	D6a
27.002	5	D6a
26.003	5	D6a
26.004	5	D6a
29.000	5	D6a
29.001	5	D6a
29.002	5	D6a
26.005	5	D6a
26.006	5	D6a
26.007	5	D6a
26.008	5	D6a
31.000	5	D6a
31.001	5	D6a
31.002	5	D6a
31.003	5	D6a
31.004	5	D6a
26.009	5	D6a
20.010	4	D3a
20.011	4	D3a
33.000	5b	D4a

Pipe ref	Phase	Parcel
33.001	5b	D4a
33.002	5b	D4a
33.003	5b	D4a
20.012	4	D3a
34.000	4	D3a
20.013	4	D3a
35.000	4	D3a
20.014	4	D3a
20.015	4	D3a
20.016	4	D3a
36.000	4	D3a
20.017	4	D3a
20.018	4	D3a
37.000	4	D3a
38.000	4	D3a
38.001	4	D3a
38.002	4	D3a
38.003	4	D3a
39.000	4	D3a
40.000	4	D3a
40.001	4	D3a
40.002	4	D3a
39.001	4	D3a
39.002	4	D3a
39.003	4	D3a
39.004	4	D3a
39.005	4	D3a
38.004	4	D3a
38.005	4	D3a

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
Site Location	GB 450500 225250 SP 50500 25250
C (1km)	-0.023
D1 (1km)	0.328
D2 (1km)	0.309
D3 (1km)	0.264
E (1km)	0.292
F (1km)	2.461
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.000
Maximum Backdrop Height (m)	0.000
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for SWS

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	46.310	0.699	66.3	0.462	5.00	0.0	0.600	o	225	
1.001	27.589	0.287	96.1	0.090	0.00	0.0	0.600	o	225	
1.002	19.709	0.161	122.4	0.084	0.00	0.0	0.600	o	225	
1.003	54.656	0.602	90.8	0.024	0.00	0.0	0.600	o	225	
1.004	48.308	0.537	90.0	0.000	0.00	0.0	0.600	o	300	

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	0.00	5.48	125.633	0.462	0.0	0.0	0.0	1.61	64.0	0.0
1.001	0.00	5.82	124.934	0.552	0.0	0.0	0.0	1.33	53.0	0.0
1.002	0.00	6.10	124.647	0.636	0.0	0.0	0.0	1.18	46.9	0.0
1.003	0.00	6.77	124.486	0.660	0.0	0.0	0.0	1.37	54.6	0.0
1.004	0.00	7.25	123.809	0.660	0.0	0.0	0.0	1.66	117.2	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.005	11.396	0.122	93.4	0.000	0.00	0.0	0.600	o	300	
2.000	9.477	0.311	30.5	0.100	5.00	0.0	0.600	o	150	
2.001	22.265	0.731	30.5	0.049	0.00	0.0	0.600	o	150	
2.002	38.145#	0.302	126.3	0.109	0.00	0.0	0.600	o	150	
2.003	7.222#	0.675	10.7	0.000	0.00	0.0	0.600	o	225	
1.006	59.849	0.160	374.1	0.145	0.00	0.0	0.600	o	450	
3.000	26.967	0.234	115.2	0.105	5.00	0.0	0.600	o	150	
3.001	46.625	0.520	89.7	0.090	0.00	0.0	0.600	o	150	
3.002	4.363	0.018	242.4	0.130	0.00	0.0	0.600	o	150	
3.003	22.819	0.169	135.0	0.076	0.00	0.0	0.600	o	150	
3.004	21.320#	0.119	179.2	0.060	0.00	0.0	0.600	o	150	
4.000	71.622	0.359	199.5	0.175	5.00	0.0	0.600	o	150	
3.005	27.060#	0.185	146.3	0.000	0.00	0.0	0.600	o	450	
5.000	8.420#	0.093	90.5	0.057	5.00	0.0	0.600	o	150	
3.006	40.137	0.227	176.8	0.057	0.00	0.0	0.600	o	450	

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)
1.005	0.00	7.37	123.272	0.660	0.0	0.0	0.0	1.63	115.0	0.0
2.000	0.00	5.09	125.319	0.100	0.0	0.0	0.0	1.83	32.3	0.0
2.001	0.00	5.29	125.008	0.149	0.0	0.0	0.0	1.83	32.4	0.0
2.002	0.00	6.00	124.277	0.258	0.0	0.0	0.0	0.89	15.8	0.0
2.003	0.00	6.03	123.900	0.258	0.0	0.0	0.0	4.02	160.0	0.0
1.006	0.00	8.32	123.000	1.063	0.0	0.0	0.0	1.05	166.2	0.0
3.000	0.00	5.48	126.002	0.105	0.0	0.0	0.0	0.94	16.5	0.0
3.001	0.00	6.21	125.768	0.195	0.0	0.0	0.0	1.06	18.8	0.0
3.002	0.00	6.33	125.248	0.325	0.0	0.0	0.0	0.64	11.3	0.0
3.003	0.00	6.77	125.230	0.401	0.0	0.0	0.0	0.86	15.3	0.0
3.004	0.00	7.24	125.061	0.461	0.0	0.0	0.0	0.75	13.2	0.0
4.000	0.00	6.69	125.351	0.175	0.0	0.0	0.0	0.71	12.5	0.0
3.005	0.00	7.51	124.892	0.636	0.0	0.0	0.0	1.68	267.0	0.0
5.000	0.00	5.13	125.100	0.057	0.0	0.0	0.0	1.06	18.7	0.0
3.006	0.00	7.95	124.707	0.750	0.0	0.0	0.0	1.53	242.7	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
3.007	20.544	0.085	241.7	0.074	0.00	0.0	0.600	o	450	
3.008	7.935	1.330	6.0	0.000	0.00	0.0	0.600	o	225	
6.000	8.698	0.037	235.1	0.000	5.00	0.0	0.600	o	300	
6.001	24.347	0.063	386.5	0.000	0.00	0.0	0.600	o	450	
1.007	37.392	0.253	147.8	0.069	0.00	0.0	0.600	o	150	
7.000	12.065#	0.453	26.6	0.036	5.00	0.0	0.600	o	100	
7.001	33.946#	0.418	81.2	0.060	0.00	0.0	0.600	o	100	
7.002	24.933	0.375	66.5	0.042	0.00	0.0	0.600	o	150	
7.003	12.230	0.045	271.8	0.045	0.00	0.0	0.600	o	150	
8.000	11.634	0.383	30.4	0.061	5.00	0.0	0.600	o	100	
7.004	48.302	0.600	80.5	0.055	0.00	0.0	0.600	o	150	
7.005	39.390	0.653	60.3	0.000	0.00	0.0	0.600	o	150	
1.008	13.653	0.092	148.4	0.000	0.00	0.0	0.600	o	150	
1.009	29.758	0.157	189.5	0.000	0.00	0.0	0.600	o	225	
9.000	49.037	0.490	100.1	0.102	5.00	0.0	0.600	o	300	

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)
3.007	0.00	8.21	124.480	0.824	0.0	0.0	0.0	1.30	207.3	0.0
3.008	0.00	8.24	124.395	0.824	0.0	0.0	0.0	5.39	214.4	0.0
6.000	0.00	5.14	122.940	0.000	0.0	0.0	0.0	1.02	72.2	0.0
6.001	0.00	5.54	122.903	0.000	0.0	0.0	0.0	1.03	163.5	0.0
1.007	0.00	9.08	122.840	1.956	0.0	0.0	0.0	0.82	14.6	0.0
7.000	0.00	5.13	125.181	0.036	0.0	0.0	0.0	1.50	11.8	0.0
7.001	0.00	5.80	124.728	0.096	0.0	0.0	0.0	0.85	6.7	0.0
7.002	0.00	6.13	124.260	0.138	0.0	0.0	0.0	1.24	21.8	0.0
7.003	0.00	6.47	123.885	0.183	0.0	0.0	0.0	0.60	10.7	0.0
8.000	0.00	5.14	124.273	0.061	0.0	0.0	0.0	1.41	11.0	0.0
7.004	0.00	7.19	123.840	0.299	0.0	0.0	0.0	1.12	19.8	0.0
7.005	0.00	7.69	123.240	0.299	0.0	0.0	0.0	1.30	22.9	0.0
1.008	0.00	9.36	122.587	2.255	0.0	0.0	0.0	0.82	14.5	0.0
1.009	0.00	9.88	122.420	2.255	0.0	0.0	0.0	0.95	37.6	0.0
9.000	0.00	5.52	122.870	0.102	0.0	0.0	0.0	1.57	111.1	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
9.001	3.625	0.042	86.3	0.000	0.00	0.0	0.600	o	150	
1.010	23.462	0.160	146.6	0.030	0.00	0.0	0.600	o	225	
10.000	15.760	0.100	157.6	0.030	5.00	0.0	0.600	o	225	
10.001	13.900	0.090	154.4	0.030	0.00	0.0	0.600	o	225	
10.002	26.250	0.160	164.1	0.030	0.00	0.0	0.600	o	225	
10.003	23.160	0.140	165.4	0.037	0.00	0.0	0.600	o	225	
10.004	21.300	0.130	163.8	0.030	0.00	0.0	0.600	o	225	
10.005	12.120	0.075	161.6	0.000	0.00	0.0	0.600	o	225	
10.006	16.610	0.090	184.6	0.030	0.00	0.0	0.600	o	300	
11.000	9.110	0.050	182.2	0.035	5.00	0.0	0.600	o	300	
10.007	6.510	0.030	217.0	0.000	0.00	0.0	0.600	o	300	
10.008	12.600	0.060	210.0	0.030	0.00	0.0	0.600	o	300	
10.009	28.830	0.130	221.8	0.010	0.00	0.0	0.600	o	300	
10.010	23.380	0.110	212.5	0.038	0.00	0.0	0.600	o	300	
10.011	9.000	0.102	88.2	0.000	0.00	0.0	0.600	o	150	
1.011	14.060	0.079	178.0	0.000	0.00	0.0	0.600	o	225	
1.012	74.443	1.113	66.9	0.046	0.00	0.0	0.600	o	225	

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)
9.001	0.00	5.58	122.380	0.102	0.0	0.0	0.0	1.08	19.1	0.0
1.010	0.00	10.24	122.263	2.387	0.0	0.0	0.0	1.08	42.8	0.0
10.000	0.00	5.25	123.470	0.030	0.0	0.0	0.0	1.04	41.3	0.0
10.001	0.00	5.47	123.370	0.060	0.0	0.0	0.0	1.05	41.7	0.0
10.002	0.00	5.90	123.280	0.090	0.0	0.0	0.0	1.02	40.5	0.0
10.003	0.00	6.28	123.120	0.127	0.0	0.0	0.0	1.01	40.3	0.0
10.004	0.00	6.63	122.980	0.157	0.0	0.0	0.0	1.02	40.5	0.0
10.005	0.00	6.83	122.850	0.157	0.0	0.0	0.0	1.03	40.8	0.0
10.006	0.00	7.07	122.700	0.187	0.0	0.0	0.0	1.15	81.6	0.0
11.000	0.00	5.13	122.660	0.035	0.0	0.0	0.0	1.16	82.1	0.0
10.007	0.00	7.17	122.610	0.222	0.0	0.0	0.0	1.06	75.2	0.0
10.008	0.00	7.37	122.580	0.252	0.0	0.0	0.0	1.08	76.4	0.0
10.009	0.00	7.82	122.520	0.262	0.0	0.0	0.0	1.05	74.3	0.0
10.010	0.00	8.19	122.390	0.300	0.0	0.0	0.0	1.07	76.0	0.0
10.011	0.00	8.33	122.280	0.300	0.0	0.0	0.0	1.07	18.9	0.0
1.011	0.00	10.48	122.103	2.687	0.0	0.0	0.0	0.98	38.8	0.0
1.012	0.00	11.26	122.024	2.733	0.0	0.0	0.0	1.60	63.7	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
12.000	1.770	0.180	9.8	0.037	5.00	0.0	0.600	o	150	
12.001	8.180	0.760	10.8	0.000	0.00	0.0	0.600	o	150	
13.000	1.000	0.010	100.0	0.016	5.00	0.0	0.600	o	150	
13.001	6.940	0.454	15.3	0.000	0.00	0.0	0.600	o	150	
1.013	38.178	0.321	118.9	0.021	0.00	0.0	0.600	o	225	
1.014	39.956	0.269	148.5	0.012	0.00	0.0	0.600	oo	-1	
1.015	14.126	0.079	178.8	0.015	0.00	0.0	0.600	oo	-1	
14.000	16.816	0.095	177.0	0.000	5.00	0.0	0.600	o	300	
14.001	23.092	0.066	349.9	0.070	0.00	0.0	0.600	o	300	
15.000	7.219	0.024	300.8	0.080	5.00	0.0	0.600	o	300	
14.002	37.034	0.553	67.0	0.020	0.00	0.0	0.600	o	450	
14.003	22.412	0.230	97.4	0.080	0.00	0.0	0.600	o	450	
14.004	12.749	0.110	115.9	0.000	0.00	0.0	0.600	o	300	
14.005	21.721	0.325	66.8	0.027	0.00	0.0	0.600	o	300	
16.000	30.605	0.313	97.8	0.020	5.00	0.0	0.600	o	150	

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)
12.000	0.00	5.01	122.510	0.037	0.0	0.0	0.0	3.23	57.1	0.0
12.001	0.00	5.05	122.330	0.037	0.0	0.0	0.0	3.09	54.6	0.0
13.000	0.00	5.02	121.450	0.016	0.0	0.0	0.0	1.00	17.8	0.0
13.001	0.00	5.06	121.440	0.016	0.0	0.0	0.0	2.59	45.8	0.0
1.013	0.00	11.79	120.911	2.807	0.0	0.0	0.0	1.20	47.6	0.0
1.014	0.00	12.41	120.590	2.819	0.0	0.0	0.0	1.07	85.6	0.0
1.015	0.00	12.65	120.321	2.834	0.0	0.0	0.0	0.97	78.0	0.0
14.000	0.00	5.24	122.676	0.000	0.0	0.0	0.0	1.18	83.3	0.0
14.001	0.00	5.70	122.581	0.070	0.0	0.0	0.0	0.83	59.0	0.0
15.000	0.00	5.13	122.539	0.080	0.0	0.0	0.0	0.90	63.7	0.0
14.002	0.00	5.95	122.515	0.170	0.0	0.0	0.0	2.49	395.6	0.0
14.003	0.00	6.13	121.962	0.250	0.0	0.0	0.0	2.06	327.6	0.0
14.004	0.00	6.27	121.732	0.250	0.0	0.0	0.0	1.46	103.2	0.0
14.005	0.00	6.46	121.622	0.277	0.0	0.0	0.0	1.93	136.1	0.0
16.000	0.00	5.50	121.610	0.020	0.0	0.0	0.0	1.02	18.0	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
17.000	52.101	0.591	88.2	0.040	5.00	0.0	0.600	o	100	
17.001	27.999	0.358	78.2	0.056	0.00	0.0	0.600	o	150	
14.006	17.974	1.055	17.0	0.010	0.00	0.0	0.600	o	225	
1.016	27.337	0.141	193.9	0.047	0.00	0.0	0.600	oo	-1	
1.017	8.947	0.284	31.5	0.000	0.00	0.0	0.600	oo	-1	
1.018	66.119	0.710	93.1	0.066	0.00	0.0	0.600	o	225	
1.019	47.865	0.330	145.0	0.066	0.00	0.0	0.600	o	225	
1.020	8.672	0.025	346.9	0.000	0.00	0.0	0.600	o	225	
1.021	14.635	0.213	68.7	0.000	0.00	0.0	0.600	o	300	
18.000	27.683	0.135	205.1	0.042	5.00	0.0	0.600	o	100	
1.022	78.854	0.348	226.6	0.000	0.00	0.0	0.600	o	300	
1.023	20.664	0.861	24.0	0.000	0.00	0.0	0.600	o	300	
19.000	15.210	0.070	217.3	0.039	5.00	0.0	0.600	o	375	
19.001	47.310	0.470	100.7	0.000	0.00	0.0	0.600	o	150	
1.024	22.191	0.107	207.4	0.000	0.00	0.0	0.600	o	300	

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)
17.000	0.00	6.06	122.246	0.040	0.0	0.0	0.0	0.82	6.4	0.0
17.001	0.00	6.47	121.655	0.096	0.0	0.0	0.0	1.14	20.1	0.0
14.006	0.00	6.56	121.297	0.403	0.0	0.0	0.0	3.19	126.7	0.0
1.016	0.00	13.14	120.242	3.284	0.0	0.0	0.0	0.94	74.8	0.0
1.017	0.00	13.20	120.101	3.284	0.0	0.0	0.0	2.34	187.1	0.0
1.018	0.00	14.02	119.817	3.350	0.0	0.0	0.0	1.36	53.9	0.0
1.019	0.00	14.75	119.107	3.416	0.0	0.0	0.0	1.08	43.1	0.0
1.020	0.00	14.96	118.777	3.416	0.0	0.0	0.0	0.70	27.7	0.0
1.021	0.00	15.09	118.752	3.416	0.0	0.0	0.0	1.90	134.3	0.0
18.000	0.00	5.87	118.874	0.042	0.0	0.0	0.0	0.53	4.2	0.0
1.022	0.00	16.35	118.539	3.458	0.0	0.0	0.0	1.04	73.5	0.0
1.023	0.00	16.46	118.191	3.458	0.0	0.0	0.0	3.22	227.8	0.0
19.000	0.00	5.21	118.020	0.039	0.0	0.0	0.0	1.23	135.3	0.0
19.001	0.00	5.99	117.950	0.039	0.0	0.0	0.0	1.00	17.7	0.0
1.024	0.00	16.80	117.330	3.497	0.0	0.0	0.0	1.09	76.9	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.025	21.756#	0.103	211.2	0.000	0.00	0.0	0.600	o	300	
1.026	10.222#	0.060	170.4	0.000	0.00	0.0	0.600	o	300	
1.027	20.569#	0.102	201.7	0.000	0.00	0.0	0.600	o	300	
20.000	45.191#	0.190	237.8	0.090	5.00	0.0	0.600	o	300	
21.000	8.916#	0.050	178.3	0.100	5.00	0.0	0.600	o	300	
21.001	14.955#	0.070	213.6	0.100	0.00	0.0	0.600	o	300	
21.002	31.564#	0.140	225.5	0.119	0.00	0.0	0.600	oo	43	
21.003	12.952#	0.050	259.0	0.000	0.00	0.0	0.600	o	300	
20.001	75.871#	0.270	281.0	0.074	0.00	0.0	0.600	o	450	
22.000	14.667#	0.090	163.0	0.100	5.00	0.0	0.600	o	225	
22.001	7.980#	0.050	159.6	0.100	0.00	0.0	0.600	o	300	
22.002	35.000#	0.180	194.4	0.121	0.00	0.0	0.600	oo	42	
22.003	14.500#	0.080	181.3	0.000	0.00	0.0	0.600	o	300	
20.002	25.245#	0.090	280.5	0.000	0.00	0.0	0.600	o	450	
20.003	16.985#	0.060	283.1	0.046	0.00	0.0	0.600	o	450	
20.004	30.268#	0.110	275.2	0.000	0.00	0.0	0.600	o	450	

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)
1.025	0.00	17.13	117.223	3.497	0.0	0.0	0.0	1.08	76.2	0.0
1.026	0.00	17.28	117.120	3.497	0.0	0.0	0.0	1.20	84.9	0.0
1.027	0.00	17.59	117.060	3.497	0.0	0.0	0.0	1.10	78.0	0.0
20.000	0.00	5.74	119.100	0.090	0.0	0.0	0.0	1.02	71.8	0.0
21.000	0.00	5.13	119.370	0.100	0.0	0.0	0.0	1.17	83.0	0.0
21.001	0.00	5.36	119.320	0.200	0.0	0.0	0.0	1.07	75.8	0.0
21.002	0.00	5.75	119.100	0.319	0.0	0.0	0.0	1.35	429.2	0.0
21.003	0.00	5.97	118.960	0.319	0.0	0.0	0.0	0.97	68.7	0.0
20.001	0.00	7.02	118.760	0.483	0.0	0.0	0.0	1.21	192.1	0.0
22.000	0.00	5.24	119.190	0.100	0.0	0.0	0.0	1.02	40.6	0.0
22.001	0.00	5.35	119.025	0.200	0.0	0.0	0.0	1.24	87.8	0.0
22.002	0.00	5.80	118.900	0.321	0.0	0.0	0.0	1.30	286.5	0.0
22.003	0.00	6.00	118.720	0.321	0.0	0.0	0.0	1.16	82.3	0.0
20.002	0.00	7.37	118.490	0.804	0.0	0.0	0.0	1.21	192.3	0.0
20.003	0.00	7.60	118.400	0.850	0.0	0.0	0.0	1.20	191.4	0.0
20.004	0.00	8.01	118.340	0.850	0.0	0.0	0.0	1.22	194.1	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
23.000	29.525#	0.100	295.3	0.354	5.00	0.0	0.600	o	600	
23.001	16.210#	0.170	95.4	0.000	0.00	0.0	0.600	o	450	
20.005	16.985#	0.075	226.5	0.000	0.00	0.0	0.600	o	450	
20.006	15.017#	0.035	429.1	0.052	0.00	0.0	0.600	o	600	
24.000	16.432#	0.100	164.3	0.082	5.00	0.0	0.600	o	225	
24.001	29.945#	0.060	499.1	0.100	0.00	0.0	0.600	o	600	
25.000	24.172#	0.060	402.9	0.066	5.00	0.0	0.600	o	600	
24.002	14.980#	0.030	499.3	0.000	0.00	0.0	0.600	o	750	
20.007	55.756#	0.087	640.9	0.067	0.00	0.0	0.600	o	750	
20.008	45.623#	0.068	670.9	0.109	0.00	0.0	0.600	o	750	
20.009	18.617#	0.030	620.6	0.132	0.00	0.0	0.600	o	750	
26.000	105.340#	0.490	215.0	0.133	5.00	0.0	0.600	o	300	
26.001	38.530#	0.160	240.8	0.020	0.00	0.0	0.600	o	300	
26.002	17.110#	0.070	244.4	0.088	0.00	0.0	0.600	o	300	
27.000	27.055#	0.080	338.2	0.130	5.00	0.0	0.600	o	750	

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)
23.000	0.00	5.35	118.500	0.354	0.0	0.0	0.0	1.41	399.2	0.0
23.001	0.00	5.48	118.400	0.354	0.0	0.0	0.0	2.08	331.2	0.0
20.005	0.00	8.22	118.230	1.204	0.0	0.0	0.0	1.35	214.2	0.0
20.006	0.00	8.44	118.005	1.256	0.0	0.0	0.0	1.17	330.6	0.0
24.000	0.00	5.27	118.535	0.082	0.0	0.0	0.0	1.02	40.4	0.0
24.001	0.00	5.73	118.060	0.182	0.0	0.0	0.0	1.08	306.3	0.0
25.000	0.00	5.33	118.060	0.066	0.0	0.0	0.0	1.21	341.3	0.0
24.002	0.00	5.93	117.850	0.248	0.0	0.0	0.0	1.25	550.2	0.0
20.007	0.00	9.29	117.820	1.571	0.0	0.0	0.0	1.10	485.1	0.0
20.008	0.00	9.99	117.733	1.680	0.0	0.0	0.0	1.07	473.9	0.0
20.009	0.00	10.27	117.665	1.812	0.0	0.0	0.0	1.12	493.0	0.0
26.000	0.00	6.64	120.650	0.133	0.0	0.0	0.0	1.07	75.5	0.0
26.001	0.00	7.28	120.160	0.153	0.0	0.0	0.0	1.01	71.3	0.0
26.002	0.00	7.56	120.000	0.241	0.0	0.0	0.0	1.00	70.8	0.0
27.000	0.00	5.30	120.800	0.130	0.0	0.0	0.0	1.52	669.8	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
28.000	19.140#	0.040	478.5	0.076	5.00	0.0	0.600	o	750	
27.001	45.605#	0.080	570.1	0.063	0.00	0.0	0.600	o	750	
27.002	7.091#	0.710	10.0	0.000	0.00	0.0	0.600	o	300	
26.003	19.900#	0.090	221.1	0.030	0.00	0.0	0.600	o	300	
26.004	29.530#	0.130	227.2	0.030	0.00	0.0	0.600	o	300	
29.000	20.790#	0.060	346.5	0.178	5.00	0.0	0.600	o	600	
29.001	45.220#	0.080	565.3	0.069	0.00	0.0	0.600	o	600	
29.002	7.510#	0.150	50.1	0.000	0.00	0.0	0.600	o	300	
26.005	68.040#	0.470	144.8	0.093	0.00	0.0	0.600	o	300	
26.006	37.480#	0.560	66.9	0.132	0.00	0.0	0.600	o	300	
30.000	24.371#	0.100	243.7	0.050	5.00	0.0	0.600	o	300	
30.001	11.936#	1.000	11.9	0.000	0.00	0.0	0.600	o	150	
26.007	11.948#	0.190	62.9	0.128	0.00	0.0	0.600	o	450	
26.008	65.185#	0.340	191.7	0.050	0.00	0.0	0.600	o	450	

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)
28.000	0.00	5.25	120.760	0.076	0.0	0.0	0.0	1.27	562.2	0.0
27.001	0.00	5.95	120.720	0.269	0.0	0.0	0.0	1.16	514.6	0.0
27.002	0.00	5.97	120.640	0.269	0.0	0.0	0.0	5.00	353.6	0.0
26.003	0.00	7.88	119.930	0.540	0.0	0.0	0.0	1.05	74.5	0.0
26.004	0.00	8.35	119.840	0.570	0.0	0.0	0.0	1.04	73.4	0.0
29.000	0.00	5.27	120.000	0.178	0.0	0.0	0.0	1.30	368.3	0.0
29.001	0.00	6.01	119.940	0.247	0.0	0.0	0.0	1.02	287.6	0.0
29.002	0.00	6.06	119.860	0.247	0.0	0.0	0.0	2.23	157.4	0.0
26.005	0.00	9.22	119.710	0.910	0.0	0.0	0.0	1.30	92.2	0.0
26.006	0.00	9.55	119.240	1.042	0.0	0.0	0.0	1.92	136.0	0.0
30.000	0.00	5.41	119.930	0.050	0.0	0.0	0.0	1.00	70.9	0.0
30.001	0.00	5.47	119.830	0.050	0.0	0.0	0.0	2.93	51.8	0.0
26.007	0.00	9.62	118.530	1.220	0.0	0.0	0.0	2.57	408.3	0.0
26.008	0.00	10.37	118.340	1.270	0.0	0.0	0.0	1.46	233.0	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
31.000	51.632#	0.360	143.4	0.132	5.00	0.0	0.600	o	300	
31.001	4.880#	0.050	97.6	0.050	0.00	0.0	0.600	o	300	
31.002	17.330#	0.100	173.3	0.113	0.00	0.0	0.600	o	600	
31.003	25.500#	0.090	283.3	0.056	0.00	0.0	0.600	o	600	
31.004	6.480#	0.150	43.2	0.000	0.00	0.0	0.600	o	300	
26.009	29.819#	0.065	458.8	0.047	0.00	0.0	0.600	o	600	
32.000	40.691#	0.120	339.1	0.090	5.00	0.0	0.600	o	525	
32.001	17.440#	0.295	59.1	0.000	0.00	0.0	0.600	o	300	
20.010	23.889#	0.055	434.3	0.076	0.00	0.0	0.600	o	750	
20.011	7.756#	0.070	110.8	0.000	0.00	0.0	0.600	o	750	
33.000	17.551#	0.100	175.5	0.035	5.00	0.0	0.600	o	300	
33.001	17.392#	0.100	173.9	0.038	0.00	0.0	0.600	o	300	
33.002	16.123#	0.090	179.1	0.038	0.00	0.0	0.600	o	300	
33.003	13.713#	0.050	274.3	0.000	0.00	0.0	0.600	o	375	
20.012	33.095#	0.065	509.2	0.100	0.00	0.0	0.600	o	750	
34.000	26.703#	0.065	410.8	0.069	5.00	0.0	0.600	o	900	

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)
31.000	0.00	5.66	119.200	0.132	0.0	0.0	0.0	1.31	92.7	0.0
31.001	0.00	5.71	118.840	0.182	0.0	0.0	0.0	1.59	112.5	0.0
31.002	0.00	5.86	118.490	0.295	0.0	0.0	0.0	1.85	522.2	0.0
31.003	0.00	6.16	118.390	0.351	0.0	0.0	0.0	1.44	407.6	0.0
31.004	0.00	6.20	118.300	0.351	0.0	0.0	0.0	2.40	169.6	0.0
26.009	0.00	10.81	117.850	1.668	0.0	0.0	0.0	1.13	319.6	0.0
32.000	0.00	5.56	118.500	0.090	0.0	0.0	0.0	1.21	262.1	0.0
32.001	0.00	5.70	118.380	0.090	0.0	0.0	0.0	2.05	144.8	0.0
20.010	0.00	11.10	117.635	3.646	0.0	0.0	0.0	1.34	590.4	0.0
20.011	0.00	11.15	117.580	3.646	0.0	0.0	0.0	2.66	1174.3	0.0
33.000	0.00	5.25	118.300	0.035	0.0	0.0	0.0	1.18	83.7	0.0
33.001	0.00	5.49	118.200	0.073	0.0	0.0	0.0	1.19	84.1	0.0
33.002	0.00	5.72	118.100	0.111	0.0	0.0	0.0	1.17	82.8	0.0
33.003	0.00	5.93	117.935	0.111	0.0	0.0	0.0	1.09	120.3	0.0
20.012	0.00	11.60	117.510	3.857	0.0	0.0	0.0	1.23	544.9	0.0
34.000	0.00	5.29	117.360	0.069	0.0	0.0	0.0	1.54	979.4	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
20.013	18.722#	0.045	416.0	0.015	0.00	0.0	0.600	o	900	
35.000	15.090#	0.030	503.0	0.090	5.00	0.0	0.600	o	900	
20.014	23.110#	0.030	770.3	0.020	0.00	0.0	0.600	o	900	
20.015	27.835#	0.060	463.9	0.080	0.00	0.0	0.600	o	900	
20.016	6.492#	0.030	216.4	0.046	0.00	0.0	0.600	o	900	
36.000	14.400#	0.050	288.0	0.040	5.00	0.0	0.600	o	450	
20.017	18.010#	0.095	189.6	0.000	0.00	0.0	0.600	o	375	
20.018	11.134#	0.137	81.3	0.044	0.00	0.0	0.600	o	375	
37.000	8.070#	0.177	45.6	0.040	5.00	0.0	0.600	o	150	
1.028	6.515#	0.081	80.4	0.030	0.00	0.0	0.600	o	375	
1.029	21.272	0.239	89.0	0.000	0.00	0.0	0.600	o	375	
1.030	9.700#	0.158	61.4	0.032	0.00	0.0	0.600	o	375	
1.031	12.290	0.085	144.6	0.000	0.00	0.0	0.600	o	375	
38.000	33.338	0.250	133.4	0.119	5.00	0.0	0.600	o	300	

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)
20.013	0.00	11.80	117.295	3.941	0.0	0.0	0.0	1.53	973.2	0.0
35.000	0.00	5.18	117.280	0.090	0.0	0.0	0.0	1.39	884.4	0.0
20.014	0.00	12.15	117.250	4.051	0.0	0.0	0.0	1.12	713.1	0.0
20.015	0.00	12.47	117.220	4.131	0.0	0.0	0.0	1.45	921.2	0.0
20.016	0.00	12.52	117.160	4.177	0.0	0.0	0.0	2.13	1352.5	0.0
36.000	0.00	5.20	117.180	0.040	0.0	0.0	0.0	1.19	189.7	0.0
20.017	0.00	12.75	117.130	4.217	0.0	0.0	0.0	1.31	145.0	0.0
20.018	0.00	12.84	117.035	4.261	0.0	0.0	0.0	2.01	222.1	0.0
37.000	0.00	5.09	117.300	0.040	0.0	0.0	0.0	1.49	26.4	0.0
1.028	0.00	17.64	116.898	7.828	0.0	0.0	0.0	2.02	223.3	0.0
1.029	0.00	17.83	116.817	7.828	0.0	0.0	0.0	1.92	212.2	0.0
1.030	0.00	17.89	116.578	7.860	0.0	0.0	0.0	2.32	255.8	0.0
1.031	0.00	18.03	116.420	7.860	0.0	0.0	0.0	1.50	166.2	0.0
38.000	0.00	5.41	117.140	0.119	0.0	0.0	0.0	1.36	96.1	0.0

Network Design Table for SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
38.001	37.692	0.160	235.6	0.100	0.00	0.0	0.600	o	300	
38.002	26.668	0.110	242.4	0.039	0.00	0.0	0.600	o	300	
38.003	9.480	0.070	135.4	0.071	0.00	0.0	0.600	o	300	
39.000	1.000	0.010	100.0	0.000	5.00	0.0	0.600	\/	-3	
40.000	26.430	0.080	330.4	0.098	5.00	0.0	0.600	o	375	
40.001	8.580	0.030	286.0	0.051	0.00	0.0	0.600	o	375	
40.002	14.670	0.040	366.8	0.100	0.00	0.0	0.600	o	375	
39.001	30.540	0.080	381.8	0.000	0.00	0.0	0.600	\/	-3	
39.002	21.500	0.180	119.4	0.000	0.00	0.0	0.600	o	150	
39.003	10.000	0.090	111.1	0.000	0.00	0.0	0.600	o	150	
39.004	91.800#	0.600	153.0	0.000	0.00	0.0	0.600	\/	-3	
39.005	7.200	1.050	6.9	0.000	0.00	0.0	0.600	o	150	
38.004	34.248	0.220	155.7	0.000	0.00	0.0	0.600	o	450	
38.005	5.260	0.070	75.1	0.000	0.00	0.0	0.600	o	450	
1.032	28.710	0.160	179.4	0.000	0.00	0.0	0.600	o	450	
1.033	5.466#	0.210	26.0	0.000	0.00	0.0	0.600	o	450	

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)
38.001	0.00	6.02	116.890	0.219	0.0	0.0	0.0	1.02	72.1	0.0
38.002	0.00	6.47	116.730	0.258	0.0	0.0	0.0	1.01	71.1	0.0
38.003	0.00	6.58	116.620	0.329	0.0	0.0	0.0	1.35	95.4	0.0
39.000	0.00	5.00	118.900	0.000	0.0	0.0	0.0	3.38	4689.2	0.0
40.000	0.00	5.44	119.000	0.098	0.0	0.0	0.0	0.99	109.5	0.0
40.001	0.00	5.58	118.920	0.149	0.0	0.0	0.0	1.07	117.8	0.0
40.002	0.00	5.84	118.890	0.249	0.0	0.0	0.0	0.94	103.8	0.0
39.001	0.00	6.13	118.850	0.249	0.0	0.0	0.0	1.73	2391.3	0.0
39.002	0.00	6.52	118.770	0.249	0.0	0.0	0.0	0.92	16.2	0.0
39.003	0.00	6.70	118.590	0.249	0.0	0.0	0.0	0.95	16.8	0.0
39.004	0.00	7.26	118.500	0.249	0.0	0.0	0.0	2.73	3787.6	0.0
39.005	0.00	7.29	117.900	0.249	0.0	0.0	0.0	3.87	68.4	0.0
38.004	0.00	7.64	116.550	0.578	0.0	0.0	0.0	1.63	258.8	0.0
38.005	0.00	7.68	116.330	0.578	0.0	0.0	0.0	2.35	373.3	0.0
1.032	0.00	18.35	116.260	8.438	0.0	0.0	0.0	1.51	240.9	0.0
1.033	0.00	18.37	116.010	8.438	0.0	0.0	0.0	4.00	635.8	0.0

Free Flowing Outfall Details for SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.033	Outfall	116.600	115.800	121.405	0	0

Simulation Criteria for SWS

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	1.000
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)	120
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

Number of Input Hydrographs	0	Number of Storage Structures	34
Number of Online Controls	18	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
Site Location GB 450500 225250 SP 50500 25250	
C (1km)	-0.023
D1 (1km)	0.328
D2 (1km)	0.309
D3 (1km)	0.264
E (1km)	0.292
F (1km)	2.461
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	60

Online Controls for SWS

Hydro-Brake® Manhole: SC6, DS/PN: 1.007, Volume (m³): 26.3

Design Head (m) 1.200 Hydro-Brake® Type Md6 SW Only Invert Level (m) 122.840
Design Flow (l/s) 10.0 Diameter (mm) 126

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.1	1.200	9.9	3.000	15.7	7.000	24.0
0.200	8.0	1.400	10.7	3.500	16.9	7.500	24.8
0.300	8.5	1.600	11.5	4.000	18.1	8.000	25.6
0.400	8.1	1.800	12.2	4.500	19.2	8.500	26.4
0.500	7.8	2.000	12.8	5.000	20.3	9.000	27.2
0.600	7.8	2.200	13.4	5.500	21.2	9.500	27.9
0.800	8.3	2.400	14.0	6.000	22.2		
1.000	9.1	2.600	14.6	6.500	23.1		

Orifice Manhole: 12 (B6), DS/PN: 10.011, Volume (m³): 5.3

Diameter (m) 0.046 Discharge Coefficient 0.600 Invert Level (m) 122.280

Orifice Manhole: 13 (B6), DS/PN: 12.001, Volume (m³): 2.2

Diameter (m) 0.027 Discharge Coefficient 0.600 Invert Level (m) 122.330

Orifice Manhole: 14 (B6), DS/PN: 13.001, Volume (m³): 3.1

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 121.440

Hydro-Brake Optimum® Manhole: 65 (D4b), DS/PN: 19.001, Volume (m³): 3.2

Unit Reference	MD-SHE-0134-8000-0800-8000
Design Head (m)	0.800
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	134
Invert Level (m)	117.950
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	8.0
Flush-Flo™	0.251	8.0
Kick-Flo®	0.558	6.7
Mean Flow over Head Range	-	6.8

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

Hydro-Brake Optimum® Manhole: 65 (D4b), DS/PN: 19.001, Volume (m³): 3.2

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.8	1.200	9.6	3.000	14.9	7.000	22.3
0.200	7.9	1.400	10.4	3.500	16.0	7.500	23.1
0.300	7.9	1.600	11.0	4.000	17.1	8.000	23.8
0.400	7.7	1.800	11.7	4.500	18.1	8.500	24.4
0.500	7.3	2.000	12.3	5.000	19.0	9.000	25.2
0.600	7.0	2.200	12.8	5.500	19.9	9.500	25.9
0.800	8.0	2.400	13.4	6.000	20.7		
1.000	8.8	2.600	13.9	6.500	21.5		

Hydro-Brake® Manhole: 3 (D2a), DS/PN: 21.003, Volume (m³): 16.0

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 118.960
Design Flow (l/s) 63.0 Diameter (mm) 287

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.4	1.200	61.2	3.000	81.5	7.000	124.3
0.200	26.7	1.400	61.5	3.500	87.9	7.500	128.7
0.300	44.6	1.600	62.9	4.000	94.0	8.000	132.9
0.400	58.4	1.800	65.1	4.500	99.7	8.500	137.0
0.500	64.8	2.000	67.7	5.000	105.1	9.000	141.0
0.600	66.4	2.200	70.4	5.500	110.2	9.500	144.8
0.800	65.3	2.400	73.2	6.000	115.1		
1.000	62.6	2.600	76.0	6.500	119.8		

Pre-initialised control selected, excessive flows may result.

Hydro-Brake® Manhole: 6 (D2a), DS/PN: 22.003, Volume (m³): 12.2

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 118.720
Design Flow (l/s) 63.0 Diameter (mm) 287

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.4	1.200	61.2	3.000	81.5	7.000	124.3
0.200	26.7	1.400	61.5	3.500	87.9	7.500	128.7
0.300	44.6	1.600	62.9	4.000	94.0	8.000	132.9
0.400	58.4	1.800	65.1	4.500	99.7	8.500	137.0
0.500	64.8	2.000	67.7	5.000	105.1	9.000	141.0
0.600	66.4	2.200	70.4	5.500	110.2	9.500	144.8
0.800	65.3	2.400	73.2	6.000	115.1		
1.000	62.6	2.600	76.0	6.500	119.8		

Pre-initialised control selected, excessive flows may result.

Hydro-Brake® Manhole: 11 (D4b), DS/PN: 23.001, Volume (m³): 13.4

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 118.400
Design Flow (l/s) 70.0 Diameter (mm) 299

Hydro-Brake® Manhole: 11 (D4b), DS/PN: 23.001, Volume (m³): 13.4

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.7	1.200	68.0	3.000	88.5	7.000	135.0
0.200	27.9	1.400	67.9	3.500	95.5	7.500	139.7
0.300	47.2	1.600	69.1	4.000	102.0	8.000	144.3
0.400	62.7	1.800	71.2	4.500	108.2	8.500	148.7
0.500	71.1	2.000	73.8	5.000	114.1	9.000	153.0
0.600	73.4	2.200	76.6	5.500	119.6	9.500	157.2
0.800	72.8	2.400	79.6	6.000	124.9		
1.000	69.9	2.600	82.6	6.500	130.0		

Pre-initialised control selected, excessive flows may result.

Hydro-Brake® Manhole: 18 (D3a), DS/PN: 20.009, Volume (m³): 28.1

Design Head (m) 2.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 117.665
Design Flow (l/s) 180.0 Diameter (mm) 442

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	13.6	1.200	193.1	3.000	197.1	7.000	294.9
0.200	41.6	1.400	187.8	3.500	210.2	7.500	305.3
0.300	75.8	1.600	183.1	4.000	223.6	8.000	315.3
0.400	110.9	1.800	180.4	4.500	236.7	8.500	325.0
0.500	143.0	2.000	180.0	5.000	249.4	9.000	334.4
0.600	168.6	2.200	181.4	5.500	261.4	9.500	343.5
0.800	192.4	2.400	184.1	6.000	273.0		
1.000	195.8	2.600	187.8	6.500	284.2		

Pre-initialised control selected, excessive flows may result.

Hydro-Brake Optimum® Manhole: 22 (D6a), DS/PN: 27.002, Volume (m³): 24.8

Unit Reference	MD-SHE-0235-3140-1500-3140
Design Head (m)	1.500
Design Flow (l/s)	31.4
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	235
Invert Level (m)	120.640
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	31.3
Flush-Flo™	0.465	31.3
Kick-Flo®	1.020	26.1
Mean Flow over Head Range	-	26.8

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

Hydro-Brake Optimum® Manhole: 22 (D6a), DS/PN: 27.002, Volume (m³): 24.8

invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.8	1.200	28.2	3.000	43.7	7.000	65.9
0.200	23.7	1.400	30.3	3.500	47.1	7.500	68.2
0.300	30.3	1.600	32.3	4.000	50.3	8.000	70.3
0.400	31.2	1.800	34.2	4.500	53.2	8.500	72.5
0.500	31.3	2.000	36.0	5.000	56.0	9.000	74.5
0.600	31.0	2.200	37.7	5.500	58.6	9.500	76.5
0.800	29.9	2.400	39.3	6.000	61.2		
1.000	26.7	2.600	40.8	6.500	63.6		

Hydro-Brake Optimum® Manhole: 27 (D6a), DS/PN: 29.002, Volume (m³): 17.2

Unit Reference	MD-SHE-0294-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	50.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	294
Invert Level (m)	119.860
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	49.9
Flush-Flo™	0.444	49.9
Kick-Flo®	0.783	44.4
Mean Flow over Head Range	-	40.1

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	9.1	1.200	54.5	3.000	85.0	7.000	128.5
0.200	30.3	1.400	58.7	3.500	91.6	7.500	132.9
0.300	48.4	1.600	62.6	4.000	97.7	8.000	137.1
0.400	49.8	1.800	66.3	4.500	103.5	8.500	141.3
0.500	49.8	2.000	69.8	5.000	109.0	9.000	145.3
0.600	48.9	2.200	73.1	5.500	114.2	9.500	149.2
0.800	44.9	2.400	76.2	6.000	119.1		
1.000	49.9	2.600	79.3	6.500	123.9		

Hydro-Brake Optimum® Manhole: 31 (D4b), DS/PN: 30.001, Volume (m³): 5.9

Unit Reference	MD-SHE-0138-9000-1000-9000
Design Head (m)	1.000

Hydro-Brake Optimum® Manhole: 31 (D4b), DS/PN: 30.001, Volume (m³): 5.9

Design Flow (l/s)	9.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	138
Invert Level (m)	119.830
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.9
Flush-Flo™	0.301	8.9
Kick-Flo®	0.667	7.4
Mean Flow over Head Range	-	7.7

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	5.0	1.200	9.7	3.000	15.0	7.000	22.6
0.200	8.7	1.400	10.5	3.500	16.2	7.500	23.3
0.300	8.9	1.600	11.2	4.000	17.2	8.000	24.1
0.400	8.8	1.800	11.8	4.500	18.2	8.500	24.8
0.500	8.6	2.000	12.4	5.000	19.2	9.000	25.5
0.600	8.1	2.200	13.0	5.500	20.1	9.500	26.1
0.800	8.1	2.400	13.5	6.000	20.9		
1.000	8.9	2.600	14.0	6.500	21.8		

Hydro-Brake® Manhole: 39 (D6a), DS/PN: 31.004, Volume (m³): 13.0

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 118.300
Design Flow (l/s) 50.0 Diameter (mm) 263

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	8.7	1.200	49.2	3.000	68.4	7.000	104.4
0.200	24.2	1.400	50.1	3.500	73.8	7.500	108.1
0.300	39.4	1.600	51.8	4.000	78.9	8.000	111.6
0.400	49.6	1.800	54.0	4.500	83.7	8.500	115.1
0.500	52.9	2.000	56.4	5.000	88.2	9.000	118.4
0.600	53.5	2.200	58.9	5.500	92.5	9.500	121.6
0.800	51.7	2.400	61.3	6.000	96.7		
1.000	49.6	2.600	63.7	6.500	100.6		

Pre-initialised control selected, excessive flows may result.

Hydro-Brake Optimum® Manhole: 42 (D4b), DS/PN: 32.001, Volume (m³): 12.4

Unit Reference	MD-SHE-0149-1080-1000-1080
Design Head (m)	1.000
Design Flow (l/s)	10.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	149
Invert Level (m)	118.380
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	10.5
Flush-Flo™	0.305	10.5
Kick-Flo®	0.677	8.8
Mean Flow over Head Range	-	9.0

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	5.4	1.200	11.5	3.000	17.7	7.000	26.6
0.200	10.2	1.400	12.3	3.500	19.1	7.500	27.5
0.300	10.5	1.600	13.1	4.000	20.3	8.000	28.4
0.400	10.4	1.800	13.9	4.500	21.5	8.500	29.2
0.500	10.1	2.000	14.6	5.000	22.6	9.000	30.1
0.600	9.6	2.200	15.3	5.500	23.7	9.500	30.9
0.800	9.5	2.400	15.9	6.000	24.7		
1.000	10.5	2.600	16.6	6.500	25.7		

Orifice Manhole: 46 (D4a), DS/PN: 33.003, Volume (m³): 6.3

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 117.935

Hydro-Brake Optimum® Manhole: 47 (D3a), DS/PN: 20.012, Volume (m³): 10.3

Unit Reference	MD-SHE-0398-1100-2000-1100
Design Head (m)	2.000
Design Flow (l/s)	110.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Diameter (mm)	398
Invert Level (m)	117.510
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	109.7

Hydro-Brake Optimum® Manhole: 47 (D3a), DS/PN: 20.012, Volume (m³): 10.3

Control Points	Head (m)	Flow (l/s)
Flush-Flo™	0.687	109.7
Kick-Flo®	1.431	93.3
Mean Flow over Head Range	-	92.5

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	11.0	1.200	103.6	3.000	133.7	7.000	202.2
0.200	39.2	1.400	95.5	3.500	144.1	7.500	209.2
0.300	75.7	1.600	98.5	4.000	153.8	8.000	215.9
0.400	104.4	1.800	104.3	4.500	162.9	8.500	222.4
0.500	107.7	2.000	109.7	5.000	171.5	9.000	228.7
0.600	109.3	2.200	114.9	5.500	179.7	9.500	234.9
0.800	109.2	2.400	119.9	6.000	187.5		
1.000	107.2	2.600	124.7	6.500	195.0		

Hydro-Brake® Manhole: 56 (D3a), DS/PN: 20.017, Volume (m³): 7.9

Design Head (m) 1.300 Hydro-Brake® Type Md6 SW Only Invert Level (m) 117.130
Design Flow (l/s) 112.0 Diameter (mm) 362

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.5	1.200	113.0	3.000	130.3	7.000	197.8
0.200	34.2	1.400	110.1	3.500	140.1	7.500	204.8
0.300	60.2	1.600	109.2	4.000	149.6	8.000	211.5
0.400	84.7	1.800	110.1	4.500	158.6	8.500	218.0
0.500	103.7	2.000	112.2	5.000	167.2	9.000	224.3
0.600	114.3	2.200	115.1	5.500	175.3	9.500	230.4
0.800	118.9	2.400	118.6	6.000	183.1		
1.000	116.9	2.600	122.4	6.500	190.6		

Pre-initialised control selected, excessive flows may result.

Hydro-Brake® Manhole: 67 (D3a), DS/PN: 38.004, Volume (m³): 5.4

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 116.550
Design Flow (l/s) 110.5 Diameter (mm) 354

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.3	0.600	108.8	1.600	103.3	2.600	116.8
0.200	33.4	0.800	112.4	1.800	104.4	3.000	124.5
0.300	58.6	1.000	110.2	2.000	106.7	3.500	134.0
0.400	82.0	1.200	106.4	2.200	109.7	4.000	143.1
0.500	99.6	1.400	103.9	2.400	113.1	4.500	151.7

Hydro-Brake® Manhole: 67 (D3a), DS/PN: 38.004, Volume (m³): 5.4

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
5.000	159.9	6.500	182.3	8.000	202.2	9.500	220.4
5.500	167.7	7.000	189.2	8.500	208.4		
6.000	175.1	7.500	195.8	9.000	214.5		

Pre-initialised control selected, excessive flows may result.

Storage Structures for SWS

Tank or Pond Manhole: TANK, DS/PN: 6.000

Invert Level (m) 122.940

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	470.0	1.200	470.0	1.201	0.0

Porous Car Park Manhole: 1 (B6), DS/PN: 10.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.3
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	26.5	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.600	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: 2 (B6), DS/PN: 10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	40.0
Max Percolation (l/s)	33.3	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.600	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: 3 (B6), DS/PN: 10.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	39.0
Max Percolation (l/s)	32.5	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.750	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: 4 (B6), DS/PN: 10.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.0
Membrane Percolation (mm/hr)	1000	Length (m)	60.0
Max Percolation (l/s)	50.0	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	123.750	Cap Volume Depth (m)	0.000

Porous Car Park Manhole: 5 (B6), DS/PN: 10.004

Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0
Membrane Percolation (mm/hr)	1000	Porosity	0.30
Max Percolation (l/s)	45.0	Invert Level (m)	123.750

Porous Car Park Manhole: 5 (B6), DS/PN: 10.004

Width (m)	3.0	Depression Storage (mm)	5
Length (m)	54.0	Evaporation (mm/day)	3
Slope (1:X)	500.0	Cap Volume Depth (m)	0.000

Tank or Pond Manhole: Tank (B6), DS/PN: 11.000

Invert Level (m) 122.660

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	143.0	0.800	143.0	0.801	0.0

Porous Car Park Manhole: PP (B6), DS/PN: 12.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	117.0
Max Percolation (l/s)	162.5	Slope (1:X)	300.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	122.580	Cap Volume Depth (m)	0.000

Tank or Pond Manhole: 14 (B6), DS/PN: 13.001

Invert Level (m) 121.440

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	20.0	0.400	20.0	0.401	0.0

Tank or Pond Manhole: 0011, DS/PN: 1.018

Invert Level (m) 119.830

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	133.0	0.800	133.0	0.801	0.0

Tank or Pond Manhole: 2b (D2a), DS/PN: 21.002

Invert Level (m) 119.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	98.0	0.800	98.0	0.801	0.0

Tank or Pond Manhole: 6 (D2a), DS/PN: 22.003

Invert Level (m) 118.720

Tank or Pond Manhole: 6 (D2a), DS/PN: 22.003

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	63.0	0.800	63.0	0.801	0.0

Tank or Pond Manhole: 10 (D4b), DS/PN: 23.000

Invert Level (m) 118.550

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	120.0	1.200	120.0	1.201	0.0

Tank or Pond Manhole: 14 (D2a), DS/PN: 24.001

Invert Level (m) 118.210

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	192.0	0.800	192.0	0.801	0.0

Tank or Pond Manhole: 17a (D3a), DS/PN: 20.008

Invert Level (m) 117.733

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	288.5	1.200	288.5	1.201	0.0

Tank or Pond Manhole: 18 (D3a), DS/PN: 20.009

Invert Level (m) 117.685

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	96.5	1.500	96.5	1.501	0.0

Tank or Pond Manhole: 21a (D6a), DS/PN: 28.000

Invert Level (m) 120.760

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	63.0	1.000	63.0	1.001	0.0

Tank or Pond Manhole: 25 (D6a), DS/PN: 29.000

Invert Level (m) 120.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	90.0	1.000	90.0	1.001	0.0

Tank or Pond Manhole: 31 (D4b), DS/PN: 30.001

Invert Level (m) 119.830

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	21.0	0.500	21.0	0.501	0.0

Tank or Pond Manhole: 37 (D6a), DS/PN: 31.002

Invert Level (m) 118.490

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	40.0	1.000	40.0	1.001	0.0

Tank or Pond Manhole: 38 (D6a), DS/PN: 31.003

Invert Level (m) 118.390

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	83.0	1.000	83.0	1.001	0.0

Tank or Pond Manhole: 41 (D4b), DS/PN: 32.000

Invert Level (m) 118.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	60.0	1.000	60.0	1.001	0.0

Tank or Pond Manhole: 45 (D4a), DS/PN: 33.000

Invert Level (m) 118.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	50.0	1.000	50.0	1.001	0.0

Tank or Pond Manhole: 45a (D4a), DS/PN: 33.001

Invert Level (m) 118.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	50.0	1.000	50.0	1.001	0.0

Tank or Pond Manhole: 45b (D4a), DS/PN: 33.002

Invert Level (m) 118.100

Tank or Pond Manhole: 45b (D4a), DS/PN: 33.002

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	50.0	1.000	50.0	1.001	0.0

Tank or Pond Manhole: 49 (D3a), DS/PN: 34.000

Invert Level (m) 117.380

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	85.0	1.000	85.0	1.001	0.0

Tank or Pond Manhole: 52 (D3a), DS/PN: 20.014

Invert Level (m) 117.250

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	56.0	1.000	56.0	1.001	0.0

Tank or Pond Manhole: 53 (D3a), DS/PN: 20.015

Invert Level (m) 117.220

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	74.0	1.000	74.0	1.001	0.0

Tank or Pond Manhole: 54 (D3a), DS/PN: 20.016

Invert Level (m) 117.160

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	65.0	1.000	65.0	1.001	0.0

Tank or Pond Manhole: 55 (D3a), DS/PN: 36.000

Invert Level (m) 117.180

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	250.0	1.000	250.0	1.001	0.0

Tank or Pond Manhole: SC18c, DS/PN: 1.028

Invert Level (m) 116.998

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	81.0	0.500	81.0	0.501	0.0

Tank or Pond Manhole: Swale (D3a), DS/PN: 39.000

Invert Level (m) 118.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	28.4	0.500	81.7	0.501	0.0

Tank or Pond Manhole: Pipe (D3a), DS/PN: 39.005

Invert Level (m) 117.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	22.8	0.500	61.8	0.501	0.0

Tank or Pond Manhole: 67 (D3a), DS/PN: 38.004

Invert Level (m) 116.650

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	99.0	0.500	99.0	0.501	0.0

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	1.000
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	34
Number of Online Controls	18	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Site Location GB 450500 225250 SP 50500 25250	
C (1km)	-0.023
D1 (1km)	0.328
D2 (1km)	0.309
D3 (1km)	0.264
E (1km)	0.292
F (1km)	2.461
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
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 (%)	30

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			9
1.001	120 Winter	100	+30%	100/15 Summer	100/15 Summer			12
1.002	15 Winter	100	+30%	100/15 Summer				
1.003	240 Winter	100	+30%	100/15 Summer	100/15 Summer			14
1.004	240 Winter	100	+30%	100/15 Summer				
1.005	360 Winter	100	+30%	100/15 Summer	100/60 Summer			14
2.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
2.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			2
2.002	960 Winter	100	+30%	100/15 Summer	100/15 Summer			18
2.003	480 Winter	100	+30%	100/15 Summer	100/60 Summer			14
1.006	360 Winter	100	+30%	100/15 Summer				
3.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
3.001	60 Winter	100	+30%	100/15 Summer	100/15 Summer			14
3.002	30 Winter	100	+30%	100/15 Summer	100/15 Summer			14
3.003	15 Winter	100	+30%	100/15 Summer				

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
3.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
4.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			8
3.005	240 Winter	100	+30%	100/15 Summer				
5.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
3.006	360 Winter	100	+30%	100/15 Summer				
3.007	480 Winter	100	+30%	100/15 Summer				
3.008	360 Winter	100	+30%	100/15 Summer	100/15 Summer			15
6.000	360 Winter	100	+30%	100/15 Summer				
6.001	360 Winter	100	+30%	100/15 Summer				
1.007	360 Winter	100	+30%	100/15 Summer	100/60 Summer			14
7.000	60 Winter	100	+30%	100/15 Summer	100/15 Summer			8
7.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			8
7.002	60 Winter	100	+30%	100/15 Summer	100/15 Summer			11
7.003	15 Summer	100	+30%	100/15 Summer				
8.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			8
7.004	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
7.005	15 Winter	100	+30%	100/15 Summer				
1.008	15 Winter	100	+30%	100/15 Summer				
1.009	15 Winter	100	+30%	100/15 Summer				
9.000	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
9.001	15 Winter	100	+30%	100/15 Summer				
1.010	15 Winter	100	+30%	100/15 Summer				
10.000	15 Winter	100	+30%	100/15 Summer				
10.001	15 Winter	100	+30%	100/15 Summer				
10.002	15 Winter	100	+30%	100/15 Summer				
10.003	15 Summer	100	+30%	100/15 Summer				
10.004	15 Summer	100	+30%	100/15 Summer				
10.005	120 Winter	100	+30%	100/15 Summer				
10.006	120 Winter	100	+30%	100/15 Summer				
11.000	120 Winter	100	+30%	100/15 Summer				
10.007	120 Winter	100	+30%	100/15 Summer				
10.008	120 Winter	100	+30%	100/15 Summer				
10.009	120 Winter	100	+30%	100/15 Summer				
10.010	120 Winter	100	+30%	100/15 Summer				
10.011	120 Winter	100	+30%	100/15 Summer				
1.011	15 Winter	100	+30%	100/15 Summer				
1.012	15 Winter	100	+30%	100/15 Summer				
12.000	120 Winter	100	+30%	100/15 Summer				
12.001	120 Winter	100	+30%	100/15 Summer				
13.000	60 Winter	100	+30%	100/15 Summer				
13.001	60 Winter	100	+30%	100/15 Summer				
1.013	30 Winter	100	+30%	100/15 Summer	100/15 Summer			5
1.014	30 Winter	100	+30%	100/15 Summer	100/15 Summer			8
1.015	15 Winter	100	+30%	100/15 Summer				
14.000	15 Winter	100	+30%					
14.001	15 Winter	100	+30%	100/15 Summer				
15.000	15 Winter	100	+30%	100/15 Summer				
14.002	15 Winter	100	+30%					
14.003	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
14.004	15 Summer	100	+30%	100/15 Summer	100/15 Summer			2
14.005	15 Summer	100	+30%	100/15 Summer				

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
16.000	15 Winter	100	+30%	100/15 Summer				
17.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
17.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			7
14.006	15 Winter	100	+30%	100/15 Summer	100/15 Summer			4
1.016	15 Winter	100	+30%	100/15 Summer				
1.017	120 Winter	100	+30%	100/15 Summer	100/15 Summer			14
1.018	120 Winter	100	+30%	100/15 Summer	100/15 Summer			13
1.019	240 Winter	100	+30%	100/15 Summer	100/15 Summer			14
1.020	240 Winter	100	+30%	100/15 Summer				
1.021	240 Winter	100	+30%					
18.000	15 Winter	100	+30%	100/15 Summer	100/15 Summer			6
1.022	60 Winter	100	+30%					
1.023	60 Winter	100	+30%					
19.000	15 Winter	100	+30%	100/15 Summer				
19.001	15 Winter	100	+30%	100/15 Summer	100/15 Summer			5
1.024	360 Winter	100	+30%	100/15 Summer				
1.025	360 Winter	100	+30%	100/15 Summer				
1.026	360 Winter	100	+30%	100/15 Summer				
1.027	360 Winter	100	+30%	100/15 Summer				
20.000	120 Winter	100	+30%	100/15 Winter				
21.000	15 Winter	100	+30%	100/15 Summer				
21.001	15 Winter	100	+30%	100/15 Summer				
21.002	15 Winter	100	+30%	100/15 Summer				
21.003	120 Winter	100	+30%	100/15 Summer				
20.001	120 Winter	100	+30%	100/15 Summer				
22.000	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
22.001	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
22.002	15 Winter	100	+30%	100/15 Summer				
22.003	15 Winter	100	+30%	100/15 Summer				
20.002	120 Winter	100	+30%	100/15 Summer				
20.003	120 Winter	100	+30%	100/15 Summer				
20.004	120 Winter	100	+30%	100/15 Summer				
23.000	120 Winter	100	+30%	100/15 Summer				
23.001	120 Winter	100	+30%	100/15 Summer				
20.005	120 Winter	100	+30%	100/15 Summer				
20.006	120 Winter	100	+30%	100/15 Summer				
24.000	120 Winter	100	+30%	100/15 Summer				
24.001	120 Winter	100	+30%	100/15 Summer				
25.000	120 Winter	100	+30%	100/15 Summer				
24.002	120 Winter	100	+30%	100/15 Summer				
20.007	120 Winter	100	+30%	100/15 Summer				
20.008	120 Winter	100	+30%	100/15 Summer				
20.009	120 Winter	100	+30%	100/15 Summer				
26.000	15 Winter	100	+30%	100/15 Summer	100/15 Winter			1
26.001	15 Winter	100	+30%	100/15 Summer				
26.002	15 Winter	100	+30%	100/15 Summer				
27.000	15 Winter	100	+30%	100/15 Winter				
28.000	15 Winter	100	+30%	100/15 Winter				
27.001	15 Winter	100	+30%	100/15 Winter				
27.002	15 Winter	100	+30%	100/15 Summer				
26.003	15 Winter	100	+30%	100/15 Summer				

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
26.004	15 Winter	100	+30%	100/15 Summer				
29.000	15 Winter	100	+30%	100/15 Summer				
29.001	15 Winter	100	+30%	100/15 Summer				
29.002	15 Winter	100	+30%	100/15 Summer				
26.005	15 Winter	100	+30%	100/15 Summer				
26.006	15 Winter	100	+30%	100/15 Summer				
30.000	15 Winter	100	+30%	100/15 Summer				
30.001	15 Winter	100	+30%	100/15 Summer				
26.007	15 Winter	100	+30%	100/15 Summer				
26.008	15 Winter	100	+30%	100/15 Summer				
31.000	15 Winter	100	+30%	100/15 Summer				
31.001	120 Winter	100	+30%	100/15 Summer				
31.002	120 Winter	100	+30%	100/15 Summer				
31.003	120 Winter	100	+30%	100/15 Summer				
31.004	120 Winter	100	+30%	100/15 Summer				
26.009	15 Winter	100	+30%	100/15 Summer				
32.000	120 Winter	100	+30%	100/60 Winter				
32.001	120 Winter	100	+30%	100/15 Summer				
20.010	15 Winter	100	+30%	100/15 Summer				
20.011	15 Winter	100	+30%	100/15 Summer				
33.000	120 Winter	100	+30%	100/30 Summer				
33.001	120 Winter	100	+30%	100/15 Summer				
33.002	120 Winter	100	+30%	100/15 Summer				
33.003	120 Winter	100	+30%	100/15 Summer				
20.012	15 Winter	100	+30%	100/15 Summer				
34.000	480 Winter	100	+30%					
20.013	480 Winter	100	+30%	100/240 Winter				
35.000	480 Winter	100	+30%	100/240 Winter				
20.014	480 Winter	100	+30%	100/240 Winter				
20.015	480 Winter	100	+30%	100/240 Winter				
20.016	360 Winter	100	+30%	100/240 Winter				
36.000	360 Winter	100	+30%	100/15 Summer				
20.017	360 Winter	100	+30%	100/15 Summer				
20.018	360 Winter	100	+30%	100/30 Summer				
37.000	15 Winter	100	+30%	100/15 Summer				
1.028	360 Winter	100	+30%	100/15 Summer				
1.029	360 Winter	100	+30%	100/240 Summer				
1.030	360 Winter	100	+30%	100/15 Winter				
1.031	30 Winter	100	+30%	100/15 Summer				
38.000	15 Winter	100	+30%	100/15 Summer				
38.001	15 Winter	100	+30%	100/15 Summer				
38.002	15 Winter	100	+30%	100/15 Summer				
38.003	15 Winter	100	+30%	100/15 Summer				
39.000	15 Winter	100	+30%					
40.000	15 Winter	100	+30%	100/15 Summer				
40.001	15 Winter	100	+30%	100/15 Summer				
40.002	15 Winter	100	+30%	100/15 Summer				
39.001	15 Winter	100	+30%	100/15 Winter				
39.002	30 Winter	100	+30%	100/15 Summer				
39.003	30 Winter	100	+30%	100/15 Summer				
39.004	30 Winter	100	+30%					

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

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
39.005	30 Winter	100	+30%					
38.004	15 Winter	100	+30%	100/15 Summer				
38.005	30 Winter	100	+30%	100/15 Winter				
1.032	30 Winter	100	+30%	100/15 Winter				
1.033	30 Winter	100	+30%					

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	0542	126.686	0.828	107.399	0.95	0.0	58.2	FLOOD
1.001	0648	126.133	0.974	56.912	1.13	0.0	55.6	FLOOD
1.002	Ex MH	126.096	1.224	0.000	1.73	0.0	73.5	FLOOD RISK
1.003	0579	125.676	0.965	35.815	1.13	0.0	59.4	FLOOD
1.004	SC1	125.386	1.277	0.000	0.53	0.0	58.7	FLOOD RISK
1.005	SC2	125.290	1.718	83.615	0.56	0.0	49.0	FLOOD
2.000	0580	125.973	0.504	24.401	0.94	0.0	26.9	FLOOD
2.001	EX MH	125.958	0.800	1.371	1.08	0.0	33.2	FLOOD
2.002	1015	125.259	0.832	177.655	0.78	0.0	12.0	FLOOD
2.003	SC3	125.271	1.146	171.035	0.15	0.0	17.9	FLOOD
1.006	SC4	125.284	1.834	0.000	0.52	0.0	79.2	FLOOD RISK
3.000	0613	126.898	0.746	19.754	1.24	0.0	19.6	FLOOD
3.001	0615	126.569	0.651	59.557	0.90	0.0	16.5	FLOOD
3.002	0610	126.456	1.058	64.742	2.88	0.0	27.3	FLOOD
3.003	0611	126.836	1.456	0.000	1.89	0.0	27.3	FLOOD RISK
3.004	0532	126.435	1.224	7.482	3.35	0.0	41.8	FLOOD
4.000	1032	126.879	1.378	37.165	2.19	0.0	27.0	FLOOD
3.005	0608	125.622	0.280	0.000	0.23	0.0	51.5	SURCHARGED
5.000	GY	125.653	0.403	2.927	2.01	0.0	32.7	FLOOD
3.006	0530	125.508	0.351	0.000	0.25	0.0	54.8	FLOOD RISK
3.007	0544	125.400	0.470	0.000	0.32	0.0	53.1	FLOOD RISK
3.008	0529	125.306	0.686	72.962	0.37	0.0	59.3	FLOOD
6.000	TANK	125.285	2.045	0.000	0.00	0.0	0.0	FLOOD RISK
6.001	SC5	125.285	1.932	0.000	0.00	0.0	0.0	FLOOD RISK
1.007	SC6	125.285	2.295	121.349	0.95	0.0	13.4	FLOOD
7.000	0842	126.179	0.898	12.629	0.75	0.0	8.3	FLOOD
7.001	0772	126.190	1.362	10.220	1.53	0.0	10.0	FLOOD
7.002	EX MH	125.248	0.838	47.695	1.04	0.0	21.5	FLOOD
7.003	0535	125.732	1.697	0.000	2.26	0.0	22.0	FLOOD RISK
8.000	0533	125.774	1.401	12.477	1.31	0.0	13.6	FLOOD
7.004	0524	125.648	1.658	7.409	1.69	0.0	32.6	FLOOD
7.005	SC19	125.164	1.774	0.000	1.08	0.0	23.9	FLOOD RISK
1.008	SC7	124.734	1.997	0.000	2.50	0.0	33.2	SURCHARGED
1.009	SC8	124.561	1.916	0.000	0.97	0.0	34.2	SURCHARGED
9.000	SC9	125.066	1.896	0.394	0.53	0.0	55.2	FLOOD
9.001	SC10	124.931	2.401	0.000	3.47	0.0	44.6	FLOOD RISK
1.010	SC11	124.515	2.027	0.000	1.66	0.0	65.1	SURCHARGED
10.000	1 (B6)	123.870	0.175	0.000	0.37	0.0	13.4	SURCHARGED
10.001	2 (B6)	123.854	0.259	0.000	0.79	0.0	28.7	SURCHARGED
10.002	3 (B6)	123.835	0.330	0.000	0.81	0.0	30.4	SURCHARGED
10.003	4 (B6)	123.816	0.471	0.000	1.04	0.0	38.3	SURCHARGED

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

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m^3)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
10.004	5 (B6)	123.752	0.547	0.000	1.37	0.0	50.5	SURCHARGED
10.005	6 (B6)	123.738	0.663	0.000	0.75	0.0	26.4	SURCHARGED
10.006	7 (B6)	123.737	0.737	0.000	0.46	0.0	31.8	SURCHARGED
11.000	Tank (B6)	123.736	0.776	0.000	0.27	0.0	16.8	FLOOD RISK
10.007	8 (B6)	123.735	0.825	0.000	0.33	0.0	17.5	FLOOD RISK
10.008	9 (B6)	123.734	0.854	0.000	0.27	0.0	16.6	SURCHARGED
10.009	10 (B6)	123.731	0.911	0.000	0.19	0.0	12.7	SURCHARGED
10.010	11 (B6)	123.727	1.037	0.000	0.14	0.0	9.4	FLOOD RISK
10.011	12 (B6)	123.722	1.292	0.000	0.30	0.0	5.0	FLOOD RISK
1.011	SC12	124.082	1.754	0.000	1.80	0.0	61.1	FLOOD RISK
1.012	SC13	123.833	1.584	0.000	1.14	0.0	70.6	SURCHARGED
12.000	PP (B6)	122.812	0.152	0.000	0.12	0.0	3.1	SURCHARGED
12.001	13 (B6)	122.811	0.331	0.000	0.02	0.0	1.0	SURCHARGED
13.000	PP (B6)	122.016	0.416	0.000	0.49	0.0	5.3	SURCHARGED
13.001	14 (B6)	122.016	0.426	0.000	0.02	0.0	1.0	SURCHARGED
1.013	SC14	122.365	1.229	3.090	1.46	0.0	65.7	FLOOD
1.014	SC15	121.695	0.880	19.953	0.96	0.0	78.4	FLOOD
1.015	SC16	121.639	1.093	0.000	1.14	0.0	77.8	SURCHARGED
14.000	0015	122.918	-0.058	0.000	0.02	0.0	1.3	OK
14.001	0014	122.919	0.038	0.000	0.95	0.0	49.6	SURCHARGED
15.000	0005	122.908	0.069	0.000	1.30	0.0	60.2	SURCHARGED
14.002	0004	122.851	-0.114	0.000	0.35	0.0	121.4	OK
14.003	0454	122.755	0.343	13.125	0.46	0.0	124.6	FLOOD
14.004	0326	122.712	0.680	0.090	1.13	0.0	94.2	FLOOD
14.005	0323	122.599	0.677	0.000	0.93	0.0	111.3	FLOOD RISK
16.000	0455	122.489	0.729	0.000	0.76	0.0	13.1	FLOOD RISK
17.000	0460	122.823	0.477	7.284	1.03	0.0	6.5	FLOOD
17.001	0459	122.214	0.409	19.419	1.46	0.0	28.1	FLOOD
14.006	0373	122.292	0.770	4.754	0.94	0.0	107.0	FLOOD
1.016	0009	121.563	1.096	0.000	2.58	0.0	179.0	SURCHARGED
1.017	0010	121.052	0.726	126.013	0.83	0.0	125.5	FLOOD
1.018	0011	120.920	0.878	26.781	1.23	0.0	64.1	FLOOD
1.019	0480	119.863	0.531	35.690	1.47	0.0	60.6	FLOOD
1.020	0526	119.151	0.149	0.000	2.89	0.0	60.6	FLOOD RISK
1.021	0643	118.909	-0.143	0.000	0.54	0.0	60.6	OK
18.000	0497	119.700	0.726	5.824	2.53	0.0	10.3	FLOOD
1.022	0029	118.777	-0.062	0.000	0.99	0.0	70.0	OK
1.023	0288	118.314	-0.177	0.000	0.35	0.0	70.0	FLOOD RISK
19.000	64 (D4b)	118.697	0.302	0.000	0.26	0.0	27.4	SURCHARGED
19.001	65 (D4b)	118.604	0.504	3.898	0.45	0.0	7.8	FLOOD
1.024	SC17	117.835	0.205	0.000	0.97	0.0	66.1	SURCHARGED
1.025	SC18	117.743	0.220	0.000	0.98	0.0	66.0	SURCHARGED
1.026	SC18a	117.651	0.231	0.000	1.07	0.0	65.9	SURCHARGED
1.027	SC18b	117.568	0.208	0.000	0.97	0.0	65.8	SURCHARGED
20.000	1 (D2a)	119.708	0.308	0.000	0.27	0.0	17.9	SURCHARGED
21.000	2 (D2a)	120.074	0.404	0.000	1.24	0.0	76.4	SURCHARGED
21.001	2a (D2a)	119.978	0.358	0.000	2.45	0.0	155.7	SURCHARGED
21.002	2b (D2a)	119.779	0.229	0.000	0.21	0.0	78.9	SURCHARGED
21.003	3 (D2a)	119.759	0.499	0.000	0.78	0.0	44.1	SURCHARGED
20.001	4 (D2a)	119.705	0.495	0.000	0.42	0.0	75.2	SURCHARGED

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

PN	US/MH Name	Water Level (m)	Surch'ed Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
22.000	5 (D2a)	120.525	1.110	5.005	1.98	0.0	70.6	FLOOD
22.001	5a (D2a)	120.585	1.260	0.290	2.36	0.0	144.9	FLOOD
22.002	5b (D2a)	120.569	1.294	0.000	0.89	0.0	230.0	FLOOD RISK
22.003	6 (D2a)	120.478	1.458	0.000	0.97	0.0	66.3	FLOOD RISK
20.002	7 (D2a)	119.700	0.760	0.000	0.68	0.0	110.3	SURCHARGED
20.003	8 (D2a)	119.693	0.843	0.000	0.77	0.0	116.4	SURCHARGED
20.004	9 (D2a)	119.686	0.896	0.000	0.68	0.0	113.1	SURCHARGED
23.000	10 (D4b)	119.651	0.551	0.000	0.12	0.0	38.6	SURCHARGED
23.001	11 (D4b)	119.662	0.812	0.000	0.15	0.0	33.8	SURCHARGED
20.005	12 (D2a)	119.679	0.999	0.000	0.84	0.0	141.4	SURCHARGED
20.006	13 (D2a)	119.673	1.068	0.000	0.74	0.0	144.7	FLOOD RISK
24.000	14a (D2a)	119.678	0.918	0.000	0.45	0.0	16.3	FLOOD RISK
24.001	14 (D2a)	119.673	1.013	0.000	0.09	0.0	21.7	FLOOD RISK
25.000	15 (D3a)	119.672	1.012	0.000	0.05	0.0	13.1	FLOOD RISK
24.002	16 (D2a)	119.672	1.072	0.000	0.08	0.0	23.0	FLOOD RISK
20.007	17 (D2a)	119.671	1.101	0.000	0.30	0.0	124.7	FLOOD RISK
20.008	17a (D3a)	119.667	1.184	0.000	0.16	0.0	63.6	SURCHARGED
20.009	18 (D3a)	119.664	1.249	0.000	0.25	0.0	67.3	SURCHARGED
26.000	19 (D6a)	123.402	2.452	1.909	1.00	0.0	73.1	FLOOD
26.001	20 (D6a)	123.066	2.606	0.000	1.27	0.0	84.2	FLOOD RISK
26.002	23a (D6a)	122.856	2.556	0.000	1.97	0.0	119.0	SURCHARGED
27.000	21 (D6a)	121.591	0.041	0.000	0.18	0.0	92.4	SURCHARGED
28.000	21a (D6a)	121.571	0.061	0.000	0.08	0.0	29.6	SURCHARGED
27.001	21b (D6a)	121.588	0.118	0.000	0.16	0.0	70.6	SURCHARGED
27.002	22 (D6a)	121.595	0.655	0.000	0.15	0.0	31.2	SURCHARGED
26.003	23 (D6a)	122.581	2.351	0.000	1.70	0.0	110.0	SURCHARGED
26.004	24 (D6a)	122.349	2.209	0.000	1.84	0.0	122.5	SURCHARGED
29.000	25 (D6a)	120.956	0.356	0.000	0.38	0.0	107.7	SURCHARGED
29.001	26 (D6a)	121.289	0.749	0.000	0.19	0.0	46.5	SURCHARGED
29.002	27 (D6a)	121.520	1.360	0.000	0.49	0.0	48.0	SURCHARGED
26.005	28 (D6a)	122.012	2.002	0.000	1.35	0.0	119.1	SURCHARGED
26.006	29 (D6a)	121.428	1.888	0.000	1.49	0.0	187.2	SURCHARGED
30.000	30 (D4b)	120.348	0.118	0.000	0.59	0.0	37.3	SURCHARGED
30.001	31 (D4b)	120.324	0.344	0.000	0.19	0.0	8.9	SURCHARGED
26.007	32 (D6a)	120.292	1.312	0.000	1.07	0.0	261.9	SURCHARGED
26.008	33 (D6a)	120.091	1.301	0.000	1.29	0.0	279.6	SURCHARGED
31.000	34 (D6a)	119.848	0.348	0.000	1.12	0.0	98.1	SURCHARGED
31.001	35 (D6a)	119.653	0.513	0.000	0.59	0.0	36.2	SURCHARGED
31.002	37 (D6a)	119.650	0.560	0.000	0.11	0.0	39.5	SURCHARGED
31.003	38 (D6a)	119.649	0.659	0.000	0.10	0.0	31.5	SURCHARGED
31.004	39 (D6a)	119.646	1.046	0.000	0.31	0.0	30.2	SURCHARGED
26.009	40 (D6a)	119.588	1.138	0.000	0.99	0.0	257.9	SURCHARGED
32.000	41 (D4b)	119.431	0.406	0.000	0.05	0.0	10.4	SURCHARGED
32.001	42 (D4b)	119.454	0.774	0.000	0.08	0.0	10.3	SURCHARGED
20.010	43 (D3a)	119.532	1.147	0.000	0.35	0.0	151.2	SURCHARGED
20.011	44 (D3a)	119.523	1.193	0.000	0.23	0.0	138.0	SURCHARGED
33.000	45 (D4a)	118.998	0.398	0.000	0.07	0.0	4.9	SURCHARGED
33.001	45a (D4a)	118.998	0.498	0.000	0.09	0.0	6.8	SURCHARGED
33.002	45b (D4a)	119.001	0.601	0.000	0.14	0.0	9.8	SURCHARGED
33.003	46 (D4a)	119.008	0.698	0.000	0.10	0.0	9.9	SURCHARGED

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

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20.012	47 (D3a)	119.517	1.257	0.000	0.25	0.0	109.6	SURCHARGED
34.000	49 (D3a)	118.223	-0.037	0.000	0.05	0.0	32.4	OK
20.013	50 (D3a)	118.233	0.038	0.000	0.20	0.0	122.8	SURCHARGED
35.000	51 (D3a)	118.227	0.047	0.000	0.01	0.0	5.9	SURCHARGED
20.014	52 (D3a)	118.227	0.077	0.000	0.33	0.0	126.0	SURCHARGED
20.015	53 (D3a)	118.220	0.100	0.000	0.19	0.0	127.5	SURCHARGED
20.016	54 (D3a)	118.215	0.155	0.000	0.22	0.0	131.4	SURCHARGED
36.000	55 (D3a)	118.192	0.562	0.000	0.17	0.0	24.9	SURCHARGED
20.017	56 (D3a)	118.213	0.708	0.000	0.90	0.0	107.9	SURCHARGED
20.018	57 (D3a)	117.601	0.191	0.000	0.75	0.0	108.3	SURCHARGED
37.000	58 (D3a)	117.586	0.136	0.000	1.32	0.0	30.3	SURCHARGED
1.028	SC18c	117.475	0.202	0.000	1.53	0.0	170.2	SURCHARGED
1.029	0271	117.286	0.094	0.000	0.95	0.0	170.2	SURCHARGED
1.030	0270	117.071	0.118	0.000	1.10	0.0	170.6	FLOOD RISK
1.031	Ex MH	116.895	0.100	0.000	1.25	0.0	142.3	SURCHARGED
38.000	59 (D3a)	119.071	1.631	0.000	0.87	0.0	76.5	SURCHARGED
38.001	60 (D3a)	118.886	1.696	0.000	1.98	0.0	131.8	FLOOD RISK
38.002	61 (D3a)	118.237	1.207	0.000	2.38	0.0	152.0	SURCHARGED
38.003	62 (D3a)	117.917	0.997	0.000	2.86	0.0	189.7	SURCHARGED
39.000	Swale (D3a)	119.384	-0.016	0.000	0.01	0.0	16.5	FLOOD RISK
40.000	63 (D3a)	119.625	0.250	0.000	0.78	0.0	74.0	SURCHARGED
40.001	64 (D3a)	119.544	0.249	0.000	1.34	0.0	111.8	SURCHARGED
40.002	65 (D3a)	119.457	0.192	0.000	2.51	0.0	188.0	SURCHARGED
39.001	Swale (D3a)	119.384	0.034	0.000	0.08	0.0	118.2	FLOOD RISK
39.002	Pipe (D3a)	119.312	0.392	0.000	1.56	0.0	24.0	FLOOD RISK
39.003	66 (D3a)	118.873	0.133	0.000	1.60	0.0	24.0	SURCHARGED
39.004	Swale (D3a)	118.555	-0.445	0.000	0.01	0.0	23.9	OK
39.005	Pipe (D3a)	117.967	-0.083	0.000	0.41	0.0	23.9	OK
38.004	67 (D3a)	117.774	0.774	0.000	0.50	0.0	112.2	SURCHARGED
38.005	68 (D3a)	116.865	0.085	0.000	0.64	0.0	108.6	SURCHARGED
1.032	Ex MH	116.763	0.053	0.000	1.21	0.0	249.2	SURCHARGED
1.033	PI	116.362	-0.098	0.000	0.97	0.0	249.6	OK