

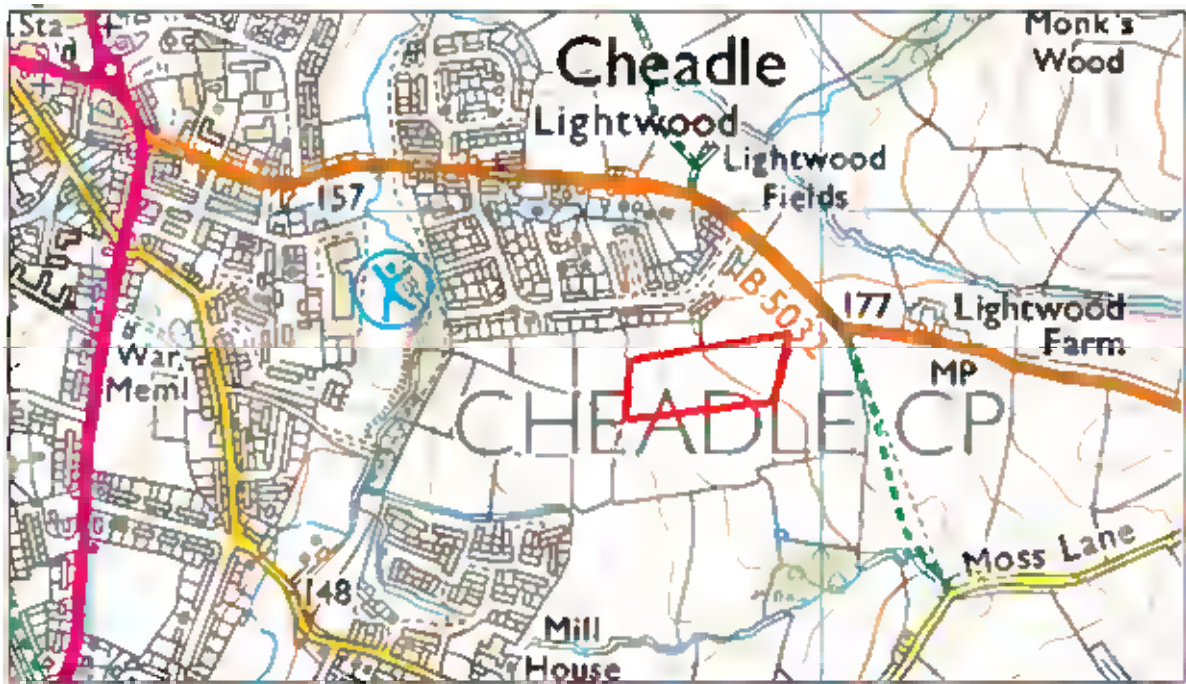
Technical Note 01

Project:	Thorley Drive, Cheadle Phase 2, Staffordshire	Office:	Manchester
Project No:	784-B076708	Prepared	Agi Seamans
Client:	Keepmoat Homes	Approved	Lukasz Baran
Date:	29/01/2026	Status:	Final
Subject:	Drainage Summary		

1 EXECUTIVE SUMMARY

- 1.1 The Drainage Technical Note 01 aims to outline the drainage proposal and assess potential risk from surface water flooding associated with the scheme. It serves as a supporting document for the planning process, providing key information to guide design and decision-making regarding drainage and flood risk management.
- 1.2 The proposed residential development, known as phase 2, comprises 37 dwellings is located to the south of Thorley Drive in Cheadle, Staffordshire. The nearest postcode is ST10 1SA. The approximate grid reference of the proposed development site is SK018427. The site boundary is shown in Figure 1.0 below.

Figure 1.0 Development Site Boundary



2 BACKGROUND & FINDINGS

- 2.1 The area of the phase 2 is approximately 1.7ha and is recognised as a greenfield site. It is bound by phase 1 to the north and east southeast, and grassland to the south and west.
- 2.2 The ground levels fall from northeast to southwest from approximately 175.3m to 165.0m AOD.
- 2.3 The most recent Flood Risk Assessment (FRA) report, prepared by Banners Gate in January 2023, evaluated potential flood risks and documented the following geological and hydrological information.
 - According to British Geological Survey maps, the site is underlain by the Pennine Lower Coal Measures bedrock geology, with no superficial deposits recorded.
 - Cecilly Brook, a designated Main River, is situated approximately 300 meters west of the site. An unnamed tributary is located near the site, and the topographic survey also shows a shallow ditch along the western boundary of the site.
 - The Environment Agency Flood Map for Planning shows that the entire site lies within Flood Zone 1, as illustrated in Figure 2.0 below. The site has been assessed to have a very low risk of flooding from all sources.
 - The site lacks a positive drainage system, with greenfield runoff seemingly draining into the unnamed tributaries of Cecilly Brook.

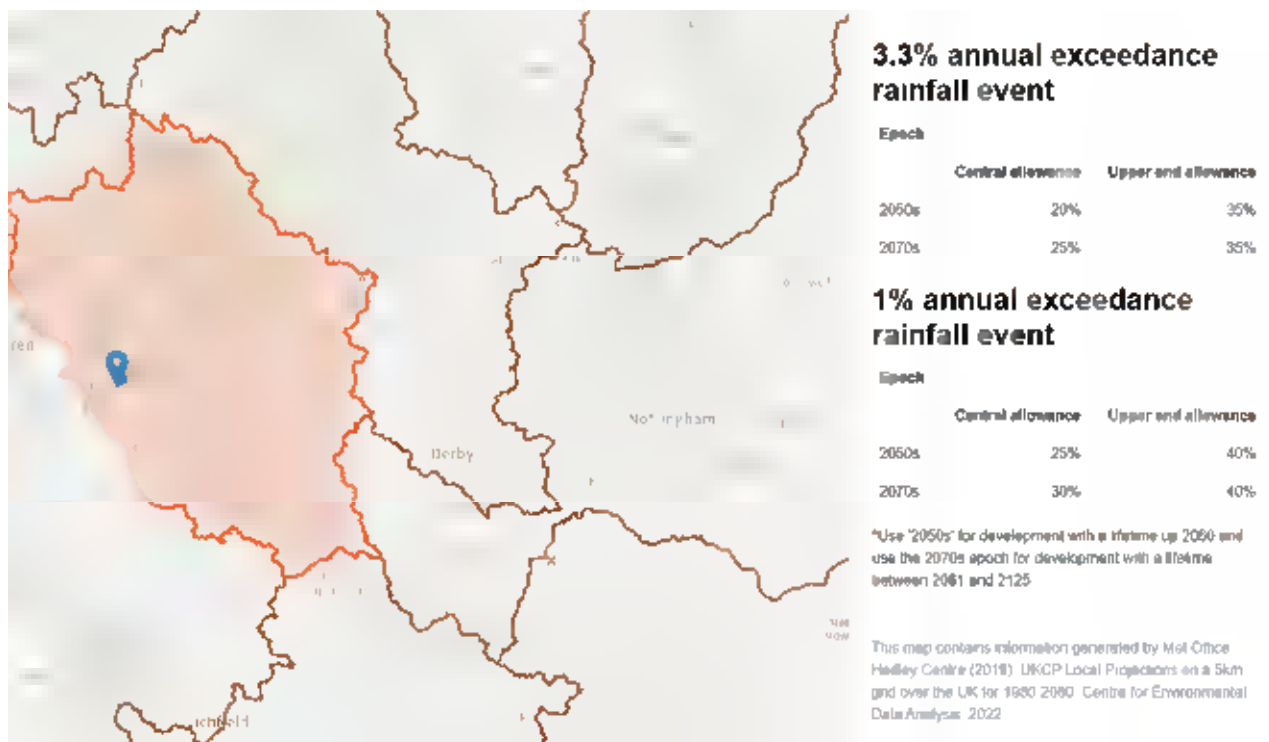
Figure 2.0 Flood Map for Planning



3 SURFACE & FOUL WATER DESIGN PROPOSAL

- 3.1 In line with the water disposal hierarchy and considering the site's geological and level constraints, the proposal is to discharge stormwater runoff from the development into the nearby ordinary watercourses located to the west and east of the site. The proposed drainage design is included in Appendix A.
- 3.2 Although the calculated pre-development greenfield runoff rate (QBar) is 4.7 l/s/ha, as detailed in the FRA, the Decision Notice SMD/2020/0502, dated 13th November 2024, specifies a flow rate of 6.3 l/s with the reference to Banners Gate's Proposed Drainage Strategy plan 20111/SK01-B. The design is therefore based on this allowable flow of 6.3 l/s.
- 3.3 Following the latest SuDS guidance, Tetra Tech has incorporated a maximum allowance for urban creep of 10% over the proposed impermeable area within the property curtilage. Additionally, the current Environment Agency guidance (see Figure 3.0) recommends a climate change allowance of 40% for a 100-year return period storm event, rather than the 30% specified in the FRA and mentioned in the decision notice.
- 3.4 Simulation results can be found in Appendix B.

Figure 3.0 Climate change allowances for peak river flow in England (data.gov.uk)



- 3.5 The estimated storage volume generated by the proposed development, based on a contributing area of 0.702 hectares and restricted flow of 6.3l/s for a 100-year event plus 40% climate change, is approximately 474 to 476 cubic meters, as shown in Table 1.

Table 1.0: Estimated volumes comparison

Network Reference	Contributing Area [ha]	Allowable rate [l/s]	Estimated volume for [m ³]
Storm Water Network	0.702	6.3	474-476

- 3.6 The proposal includes incorporating SuDS into the design. An online balancing pond or basin is planned upstream of a flow control structure, positioned before the final outfall to the existing watercourse. Additionally, where feasible, permeable surfaces may be integrated within private shared access areas to manage runoff and pollutants at their source.
- 3.7 If a larger buffer zone is needed between the proposed foul pumping station and the open SuDS, there is the possibility of introducing a drainage trench to the east of the attenuation structure and along the highway with an outfall to the balancing pond/basin. Refer to Drainage Strategy drawing in Appendix A.
- 3.8 The current SuDS have been designed to manage and attenuate flows from 100-year storms, including a 40% allowance for climate change. Table 2 below presents the volumes that can be accommodated within the existing design.

Table 2.0: Proposed SuDS Specification

SuDS Network Reference	Depth (m)	Void Ratio	Volume Provided (m ³)
Balancing pond/detention basin	1.5	100%	405
Permeable surfaces (potential)	0.5	30%	30 (subject to the extent)

- 3.9 The SuDS design should seek to provide an appropriate management train of SuDS components to effectively mitigate the pollution risks associated with the site users. In accordance with Table 26.2 of The SuDS Manual CIRIA C753, the pollution hazard level of the entire site is 'low' for the proposed land use as shown in Table 3.0

Table 3.0: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbon
Residential Roofs	Very Low	0.2	0.2	0.05
Individual Property Driveways, residential car parks, low traffic roads	Low	0.5	0.4	0.4

- 3.10 The proposal includes the use of SuDS to provide treatment for surface water. The mitigation indices associated with these features are detailed below in Table 4.0

Table 4.0: SuDS Mitigation Indices

SuDS Component	Total Suspended Solids	Metals	Hydrocarbon
Detention basins	0.5	0.5	0.6
Balancing pond	0.7	0.7	0.5
Permeable pavement	0.7	0.6	0.7

- 3.11 A pumping station is proposed to manage the foul water sewer serving all 37 dwellings, with the final connection to the foul sewer at Phase 1 (MH Ref 8805). The foul pumping station is planned to be located near the proposed SuDS, with both positioned in the lowest part of the site.
- 3.12 The foul gravity option has been considered but established not feasible as the sewer run would require to cross multiple third-party land, with the final outfall located approximately 600 meters south of the site.

4 SUMMARY

- 4.1 The proposed development comprises of the construction of 37 residential dwellings with associated accesses, parking, landscaping and infrastructure lies within Flood Zone 1.
- 4.2 The drainage strategy comprises of a surface water gravity network proposed throughout the site. Which is proposed to convey the flows generated by the impermeable residential areas and adoptable highway via gravity pipes, sections of permeable surfaces though balancing pond/detention basin with the final restricted outfall to the ordinary watercourse located to the south west corner of the site.
- 4.3 The runoff rates from the site are restricted to Greenfield rates which are based on the natural catchments within the development site of approximately 1.7ha with an estimated 0.7ha of contributing catchment. The storage required for events up to and including 1 in 100-year storms plus 40/% climate change is proposed to be attenuated within the open SuDS. The open SuDS is an online structure designed to store flows generated by events higher than 30 years. The final flow of 6.3l/s is proposed to be achieved by a vortex flow control installed within the last chamber prior to the final outfall to the unnamed ditch. The Lead Local Flood Authority consence would be required for the discharge to the unnamed ditch.
- 4.4 Maintenance of any SuDS will follow the guidelines set out in CIRIA 753, as summarized in Tables 5.0 – 5.1 below. Detention basins are identified as the most suitable SuDS for this development. When integrated into a surface water drainage network, these detention basins can fulfil both attenuation and pollution mitigation functions.

Table 5.0: Detention basins maintenance

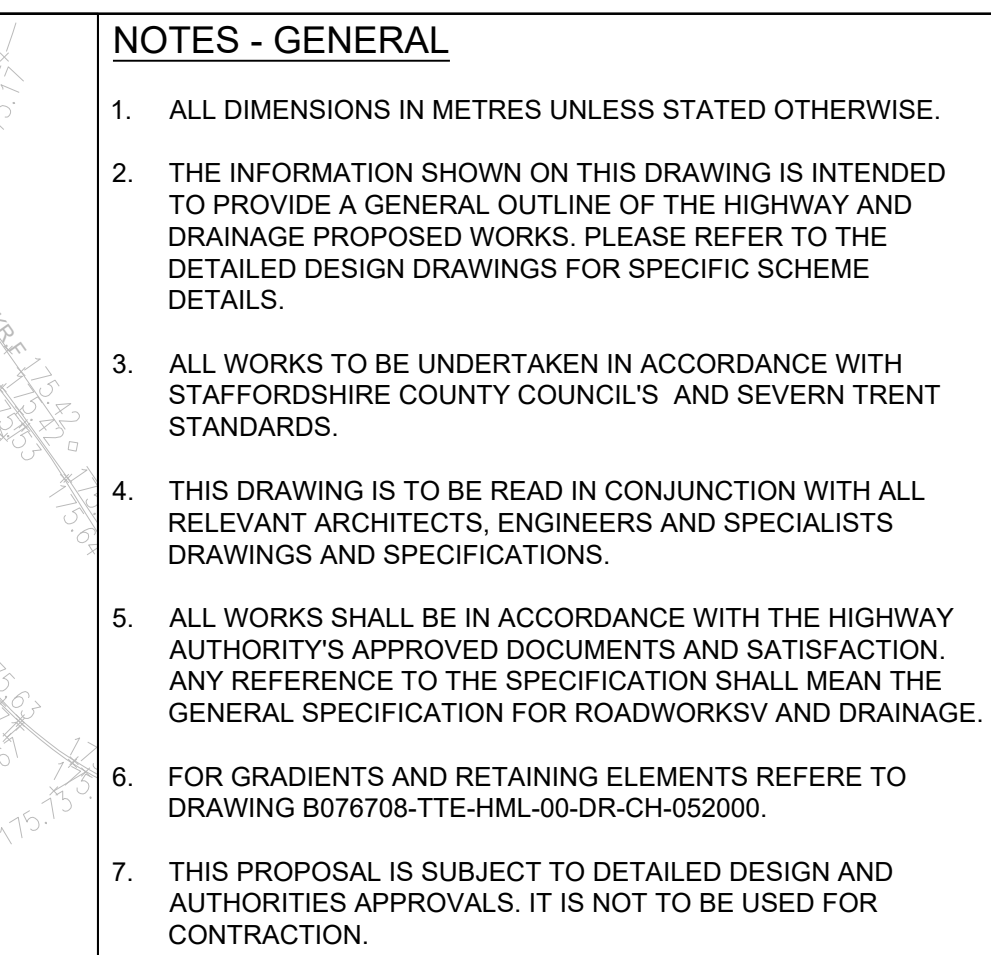
Operation and maintenance requirements for detention basins		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
		Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
	Remove sediment from inlets, outlets, forebay and main basin when required	
Remedial actions	Repair erosion or other damage by reseedling or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

Table 5.1: Permeable pavements maintenance

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
	Stabilise and mow contributing and adjacent areas	As required
Occasional maintenance	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
Remedial Actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually



APPENDIX A – PROPOSED DRAINAGE DESIGN



KEY:

-  RED LINE BOUNDARY
-  PROPOSED SURFACE WATER SEWER
-  PROPOSED FOUL WATER SEWER
-  PROPOSED GULLIES
-  PROPOSED ONLINE ATTENUATION
-  INDICATIVE PERMEABLE SURFACES
-  PROPOSED 1 IN 3 EMBANKMENT
-  PROPOSED EASEMENT
- FFL XX.XXXX** PROPOSED FINISHED FLOOR LEVELS
-  FOUL WATER RISING MAIN
-  POSSIBLE DITCH/DEPRESSION

P02	UPDATED TO MATCH NEW LAYOUT	27.01.2025	OS	AS	LB
P01	FIRST ISSUE	10.10.2025	OS	AS	LB
Rev	Description	Date	Dim / Chk / App		
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Client	KEEPMOAT HOMES LTD
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DESIGN	

Project Name	THORLEY DRIVE, CHEADLE PHASE 2
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RISK WG	Sheet Title
	PRELIMINARY DRAINAGE STRATEGY

TO THAT OR ON	
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TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale (if A)	Suitability
784-B076708	RN	Oct '25	AS	Oct '25	LB	Oct '25	1:250	S3
Client District Number	Originator	Exemption	Special	Form	Date	Number	Baseline	

Quota's Project Number	Originator	Advertiser	Agency	Product	Brand	Estimatee	Estimate Number
B076708 - TTE	- HDG	- 00	- DR	- CH	- 050000	P02	
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APPENDIX B – SIMULATION RESULTS

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.102	1.500	Type B	175.324	173.200	1.824	401931.527	342794.479
S2	0.065	1.500	Type B	175.012	172.780	1.932	401936.697	342774.805
S3	0.045	1.500	Type B	173.942	171.770	1.872	401885.986	342761.037
S4	0.063	1.500	Type C	174.298	172.690	1.308	401868.425	342788.256
S5	0.023	1.500	Type B	174.011	172.140	1.571	401870.523	342771.470
S6	0.091	1.500	Type B	173.583	171.500	1.783	401874.963	342756.333
S7	0.123	2.100	Type C	170.243	168.770	1.173	401805.429	342782.742
S8	0.058	2.100	Type B	170.677	168.210	2.167	401816.356	342740.251
S9	0.020	1.500	Type B	169.426	166.780	2.346	401792.219	342733.663
S10	0.048	1.800	Type B	168.639	165.500	2.689	401776.203	342737.725
S11	0.000	0.000	Unknown	167.000	164.670	1.880	401765.551	342730.357
S12	0.055	1.500	Type B	167.454	165.047	2.106	401750.646	342762.113
S13	0.000	1.800	Type B	167.783	165.000	2.482	401750.371	342754.409
S14	0.029	1.500	Type B	167.635	164.940	2.395	401740.265	342754.082
S15	0.000	0.000	Unknown	166.402	164.660	1.292	401738.441	342726.968
S16	0.000	0.000	Unknown	166.402	164.605	1.497	401745.164	342718.739
S17	0.000	2.400	Type B	166.402	164.555	1.547	401739.723	342713.533
S18	0.000	0.000	Unknown	165.000	164.500	0.200	401729.959	342705.529

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S1	173.200	S2	172.780	Circ	0.3mØ	20.342	48.4	0.600	1.824	1.932
1.001	S2	172.780	S3	171.770	Circ	0.3mØ	52.546	52.0	0.600	1.932	1.872
1.002	S3	171.770	S6	171.500	Circ	0.3mØ	11.985	44.4	0.600	1.872	1.783
2.000	S4	172.690	S5	172.140	Circ	0.3mØ	16.917	30.8	0.600	1.308	1.571
2.001	S5	172.140	S6	171.500	Circ	0.3mØ	15.775	24.6	0.600	1.571	1.783
1.003	S6	171.500	S8	168.210	Circ	0.3mØ	60.774	18.5	0.600	1.783	2.167
3.000	S7	168.770	S8	168.210	Circ	0.3mØ	43.873	78.3	0.600	1.173	2.167
1.004	S8	168.210	S9	166.780	Circ	0.3mØ	25.019	17.5	0.600	2.167	2.346
1.005	S9	166.780	S10	165.500	Circ	0.3mØ	16.523	14.6	0.600	2.346	2.689
1.006	S10	165.500	S11	164.670	Circ	0.45mØ	12.952	15.6	0.600	2.689	1.880
1.007	S11	164.670	S16	164.605	Circ	0.45mØ	23.465	361.0	0.600	1.880	1.347
4.000	S12	165.047	S13	165.000	Circ	0.3mØ	7.708	164.0	0.600	2.106	2.482
4.001	S13	165.000	S14	164.940	Circ	0.3mØ	10.111	167.6	0.600	2.482	2.395
4.002	S14	164.940	S15	164.810	Circ	0.3mØ	27.176	209.0	0.600	2.395	1.292
4.003	S15	164.660	S16	164.605	Circ	0.45mØ	10.626	193.2	0.600	1.292	1.347
1.008	S16	164.605	S17	164.555	Circ	0.3mØ	7.530	150.6	0.600	1.497	1.547
1.009	S17	164.555	S18	164.500	Circ	0.3mØ	12.626	229.6	0.600	1.547	0.200

Outfall Details

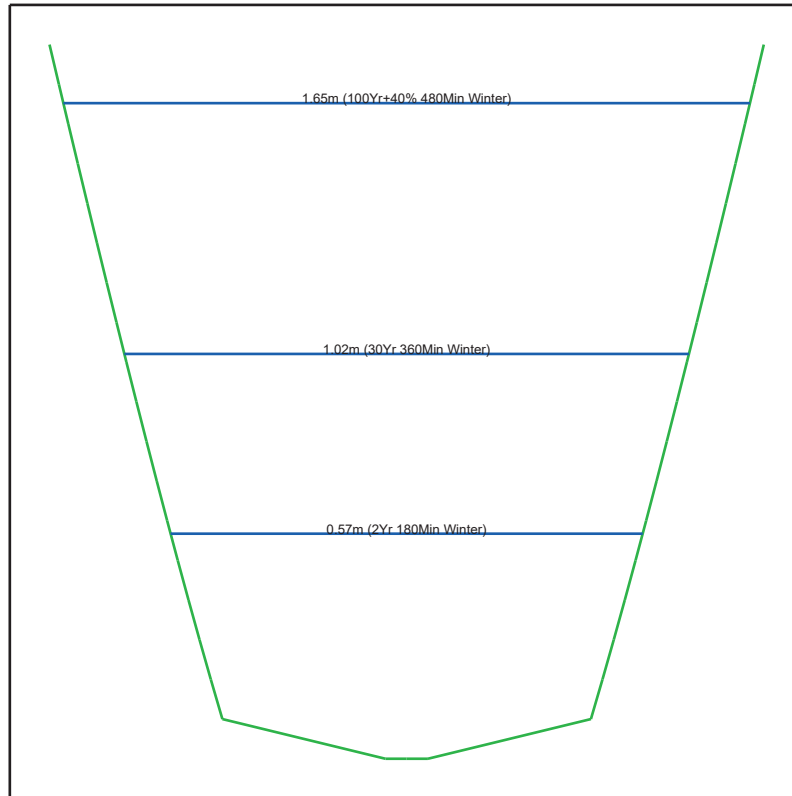
Outfall Manhole S18 : Free Discharge

Flow Control Details

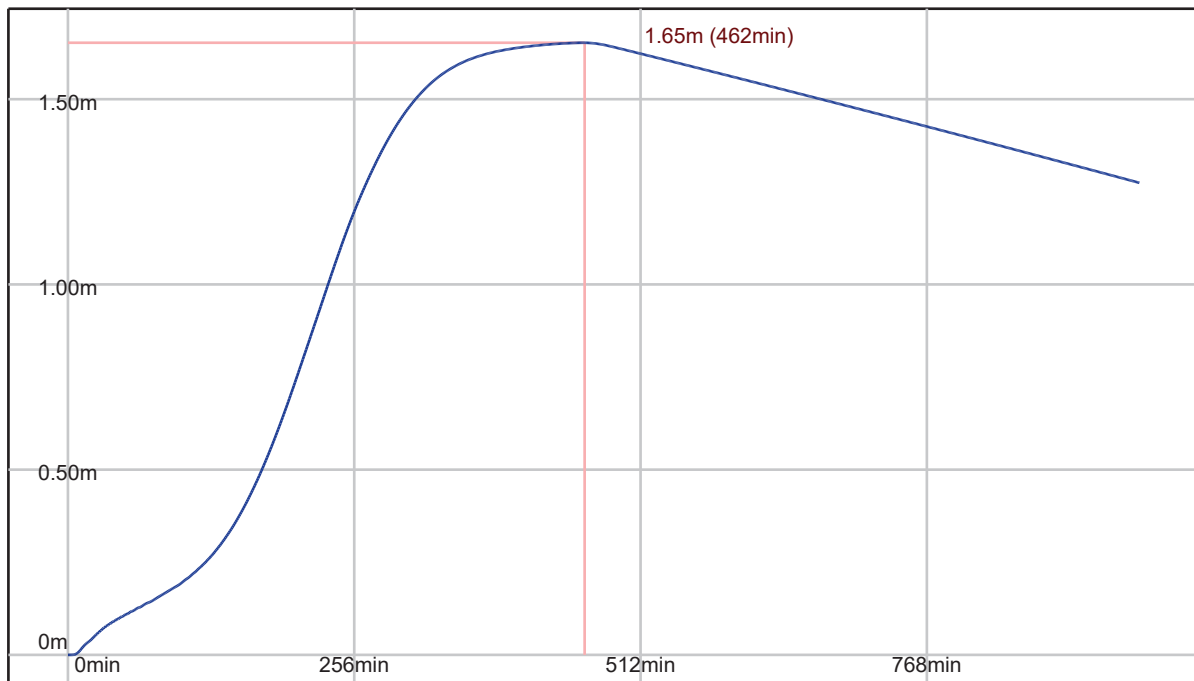
Pond Structure at Manhole S16

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
164.602	1.800	405.378	166.102	0.300	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S16



Pond at S16 (100Yr+40% 480Min Winter)

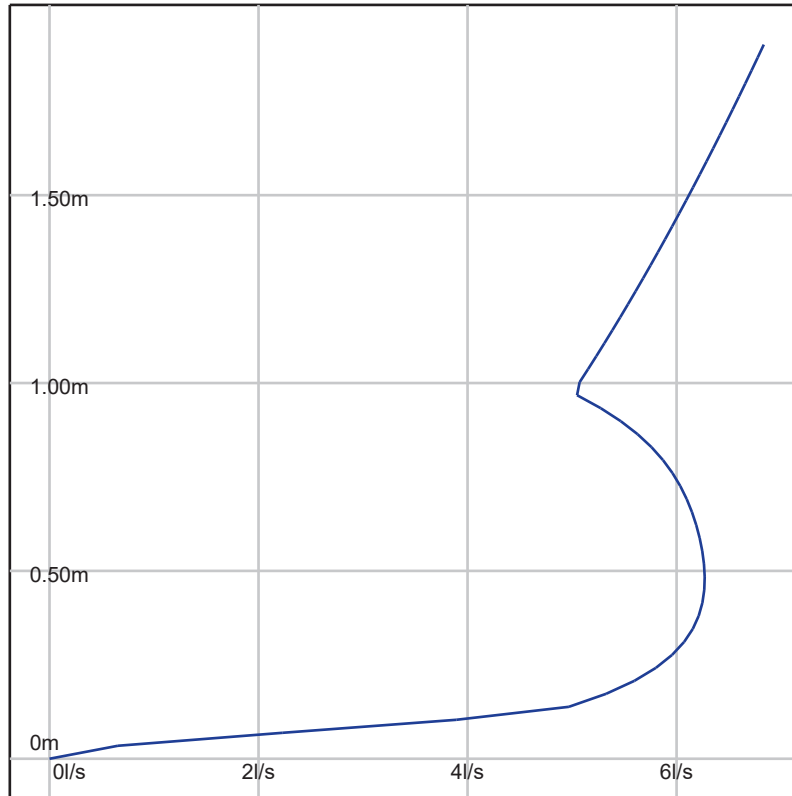


Controls within Manhole S17

Hydro-Brake® Optimum Control at Manhole S17

Model Ref	Design Depth (m)	Design Flow (l/s)	Depth Above Invert (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0109-6300-1600-6300	1.600	6.300	0.000	0.479	6.269	0.973	5.002

Hydro-Brake® Optimum Control at S17



Simulation Settings

FSR: M5-60=18.90, R=0.35, Locale=England and Wales

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080

Return Periods (yrs) + Climate Change: (2, +0%), (30, +0%), (100, +40%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
2Yr 15Min Winter	38.404	0.00	-0.12	30Yr 720Min Winter	4.809	0.00	0.02
2Yr 15Min Summer	38.404	0.00	-0.12	30Yr 960Min Summer	3.874	0.00	0.03
2Yr 30Min Winter	25.012	0.00	-0.07	30Yr 960Min Winter	3.874	0.00	0.02
2Yr 30Min Summer	25.012	0.00	-0.06	30Yr 1440Min Summer	2.853	0.00	0.03
2Yr 60Min Winter	15.742	0.00	0.00	30Yr 1440Min Winter	2.853	0.00	0.02
2Yr 60Min Summer	15.742	0.00	0.04	30Yr 2160Min Summer	2.098	0.00	0.03
2Yr 120Min Winter	9.736	0.00	-0.03	30Yr 2160Min Winter	2.098	0.00	0.03
2Yr 120Min Summer	9.736	0.00	-0.02	30Yr 2880Min Summer	1.685	0.00	0.03
2Yr 180Min Summer	7.327	0.00	-0.06	30Yr 2880Min Winter	1.685	0.00	0.04
2Yr 180Min Winter	7.327	0.00	-0.06	30Yr 4320Min Summer	1.236	0.00	0.03
2Yr 240Min Summer	5.987	0.00	-0.02	30Yr 4320Min Winter	1.236	0.00	0.08
2Yr 240Min Winter	5.987	0.00	-0.03	30Yr 5760Min Summer	0.992	0.00	0.05
2Yr 360Min Summer	4.499	0.00	0.03	30Yr 5760Min Winter	0.992	0.00	0.12
2Yr 360Min Winter	4.499	0.00	0.02	30Yr 7200Min Summer	0.835	0.00	0.07
2Yr 480Min Summer	3.670	0.00	0.03	30Yr 7200Min Winter	0.835	0.00	0.12
2Yr 480Min Winter	3.670	0.00	0.03	30Yr 8640Min Summer	0.726	0.00	0.09
2Yr 600Min Summer	3.133	0.00	0.03	30Yr 8640Min Winter	0.726	0.00	0.11
2Yr 600Min Winter	3.133	0.00	0.03	30Yr 10080Min Summer	0.645	0.00	0.09
2Yr 720Min Summer	2.753	0.00	0.03	30Yr 10080Min Winter	0.645	0.00	0.10
2Yr 720Min Winter	2.753	0.00	0.03	100Yr+40% 15Min Summer	123.913	0.00	2.04
2Yr 960Min Summer	2.245	0.00	0.03	100Yr+40% 15Min Winter	123.913	0.00	2.25
2Yr 960Min Winter	2.245	0.00	0.03	100Yr+40% 30Min Summer	83.311	0.00	2.35
2Yr 1440Min Winter	1.683	0.00	0.04	100Yr+40% 30Min Winter	83.311	0.00	2.68
2Yr 1440Min Summer	1.683	0.00	0.04	100Yr+40% 60Min Summer	53.483	0.00	2.74
2Yr 2160Min Winter	1.263	0.00	0.09	100Yr+40% 60Min Winter	53.483	0.00	2.75
2Yr 2160Min Summer	1.263	0.00	0.04	100Yr+40% 120Min Summer	33.167	0.00	2.57
2Yr 2880Min Summer	1.030	0.00	0.06	100Yr+40% 120Min Winter	33.167	0.00	2.58
2Yr 2880Min Winter	1.030	0.00	0.12	100Yr+40% 180Min Summer	24.715	0.00	2.39
2Yr 4320Min Summer	0.773	0.00	0.09	100Yr+40% 180Min Winter	24.715	0.00	2.40
2Yr 4320Min Winter	0.773	0.00	0.12	100Yr+40% 240Min Summer	19.918	0.00	2.21
2Yr 5760Min Summer	0.630	0.00	0.10	100Yr+40% 240Min Winter	19.918	0.00	2.22
2Yr 5760Min Winter	0.630	0.00	0.09	100Yr+40% 360Min Summer	14.640	0.00	1.85
2Yr 7200Min Summer	0.538	0.00	0.09	100Yr+40% 360Min Winter	14.640	0.00	1.87
2Yr 7200Min Winter	0.538	0.00	0.06	100Yr+40% 480Min Summer	11.765	0.00	1.55
2Yr 8640Min Summer	0.473	0.00	0.07	100Yr+40% 480Min Winter	11.765	0.00	1.57
2Yr 8640Min Winter	0.473	0.00	0.04	100Yr+40% 600Min Summer	9.922	0.00	1.27
2Yr 10080Min Winter	0.424	0.00	0.02	100Yr+40% 600Min Winter	9.922	0.00	1.29
2Yr 10080Min Summer	0.424	0.00	0.06	100Yr+40% 720Min Summer	8.627	0.00	1.01
30Yr 15Min Summer	68.452	0.00	0.66	100Yr+40% 720Min Winter	8.627	0.00	1.02
30Yr 15Min Winter	68.452	0.00	0.52	100Yr+40% 960Min Summer	6.913	0.00	0.39
30Yr 30Min Summer	45.575	0.00	1.28	100Yr+40% 960Min Winter	6.913	0.00	0.41
30Yr 30Min Winter	45.575	0.00	1.14	100Yr+40% 1440Min Summer	5.050	0.00	0.01
30Yr 60Min Summer	29.080	0.00	1.86	100Yr+40% 1440Min Winter	5.050	0.00	0.01
30Yr 60Min Winter	29.080	0.00	1.86	100Yr+40% 2160Min Summer	3.681	0.00	0.02
30Yr 120Min Summer	18.019	0.00	1.76	100Yr+40% 2160Min Winter	3.681	0.00	0.01
30Yr 120Min Winter	18.019	0.00	1.76	100Yr+40% 2880Min Summer	2.937	0.00	0.02
30Yr 180Min Summer	13.467	0.00	1.49	100Yr+40% 2880Min Winter	2.937	0.00	0.01
30Yr 180Min Winter	13.467	0.00	1.50	100Yr+40% 4320Min Summer	2.133	0.00	0.02
30Yr 240Min Summer	10.900	0.00	1.17	100Yr+40% 4320Min Winter	2.133	0.00	0.02
30Yr 240Min Winter	10.900	0.00	1.17	100Yr+40% 5760Min Summer	1.698	0.00	0.02
30Yr 360Min Summer	8.067	0.00	0.47	100Yr+40% 5760Min Winter	1.698	0.00	0.03
30Yr 360Min Winter	8.067	0.00	0.46	100Yr+40% 7200Min Summer	1.421	0.00	0.03
30Yr 480Min Summer	6.513	0.00	0.02	100Yr+40% 7200Min Winter	1.421	0.00	0.05
30Yr 480Min Winter	6.513	0.00	0.01	100Yr+40% 8640Min Summer	1.230	0.00	0.03
30Yr 600Min Summer	5.513	0.00	0.00	100Yr+40% 8640Min Winter	1.230	0.00	0.08

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
30Yr 600Min Winter	5.513	0.00	0.00	100Yr+40% 10080Min Winter	1.089	0.00	0.11
30Yr 720Min Summer	4.809	0.00	0.02	100Yr+40% 10080Min Summer	1.089	0.00	0.04

Simulation Results

Return Period Yrs: 2.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Summer	8	173.276	0.076	23.063		OK
S2	15 min Summer	8	172.879	0.099	37.587		OK
S3	15 min Summer	9	171.877	0.107	46.463		OK
S4	15 min Summer	8	172.743	0.053	14.269		OK
S5	15 min Summer	8	172.199	0.059	19.474		OK
S6	15 min Summer	9	171.617	0.117	85.513		OK
S7	15 min Summer	8	168.864	0.094	27.906		OK
S8	15 min Summer	9	168.355	0.145	125.912		OK
S9	15 min Summer	9	166.919	0.139	131.221		OK
S10	15 min Summer	9	165.624	0.124	141.951		OK
S11	180 min Winter	153	165.170	0.500	5.494		Surcharged
S12	180 min Winter	151	165.170	0.123	0.476		OK
S13	180 min Winter	152	165.170	0.170	0.404		OK
S14	180 min Winter	158	165.170	0.230	0.758		OK
S15	180 min Winter	154	165.170	0.510	0.506		Surcharged
S16	180 min Winter	153	165.170	0.567	6.276		Surcharged
S17	180 min Winter	153	165.169	0.614	6.242		Surcharged
S18	600 min Winter	445	164.559	0.059	6.269		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S1	S2	0.087	1.340	22.943	0.143	OK
1.001	15 min Summer	8	S2	S3	0.103	1.727	37.083	0.240	OK
1.002	15 min Summer	9	S3	S6	0.112	1.938	46.836	0.280	OK
2.000	15 min Summer	8	S4	S5	0.056	1.551	14.200	0.071	OK
2.001	15 min Summer	8	S5	S6	0.088	1.118	19.351	0.086	OK
1.003	15 min Summer	9	S6	S8	0.131	2.905	86.047	0.331	OK
3.000	15 min Summer	9	S7	S8	0.119	1.056	27.532	0.219	OK
1.004	15 min Summer	9	S8	S9	0.142	3.852	126.874	0.475	OK
1.005	15 min Summer	9	S9	S10	0.139	4.090	131.570	0.451	OK
1.006	120 min Winter	82	S10	S11	0.249	1.210	42.566	0.052	OK
1.007	60 min Summer	60	S11	S16	0.450	0.945	91.581	0.542	OK
4.000	180 min Winter	152	S12	S13	0.146	0.569	4.966	0.057	OK
4.001	180 min Winter	155	S13	S14	0.200	0.466	5.610	0.066	OK
4.002	180 min Winter	158	S14	S15	0.265	0.563	4.255	0.056	OK
4.003	60 min Summer	52	S15	S16	0.450	0.332	11.035	0.048	OK
1.008	15 min Summer	11	S16	S17	0.300	0.822	30.497	0.338	Surcharged
1.009	600 min Winter	445	S17	S18	0.059	0.645	6.269	0.086	OK

Return Period Yrs: 30.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Summer	8	173.302	0.102	41.120		OK
S2	15 min Summer	8	172.916	0.136	67.051		OK
S3	15 min Summer	8	171.918	0.148	84.348		OK
S4	15 min Summer	8	172.761	0.071	25.440		OK
S5	15 min Summer	8	172.219	0.079	34.745		OK
S6	15 min Summer	8	171.664	0.164	154.764		OK
S7	15 min Summer	8	168.899	0.129	49.753		OK
S8	15 min Summer	9	168.420	0.210	224.095		OK
S9	15 min Summer	9	166.980	0.200	233.903		OK
S10	15 min Summer	9	165.668	0.168	253.118		OK
S11	360 min Winter	325	165.635	0.965	3.420		Surcharged
S12	360 min Winter	339	165.623	0.575	0.383		Surcharged
S13	360 min Winter	339	165.623	0.622	0.358		Surcharged
S14	360 min Winter	339	165.622	0.682	0.522		Surcharged
S15	360 min Winter	337	165.623	0.963	0.587		Surcharged
S16	360 min Winter	337	165.623	1.020	4.905		Surcharged
S17	360 min Winter	337	165.623	1.068	5.108		Surcharged
S18	1440 min Winter	1402	164.559	0.059	6.269		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S1	S2	0.119	1.569	40.944	0.256	OK
1.001	15 min Summer	8	S2	S3	0.142	2.015	66.305	0.430	OK
1.002	15 min Summer	8	S3	S6	0.156	2.252	83.574	0.500	OK
2.000	15 min Summer	8	S4	S5	0.075	1.837	25.342	0.126	OK
2.001	15 min Summer	8	S5	S6	0.121	1.292	34.567	0.154	OK
1.003	15 min Summer	9	S6	S8	0.187	3.330	153.505	0.591	OK
3.000	15 min Summer	8	S7	S8	0.169	1.210	49.212	0.392	OK
1.004	15 min Summer	9	S8	S9	0.205	4.395	226.157	0.847	OK
1.005	15 min Summer	9	S9	S10	0.200	4.678	234.619	0.803	OK
1.006	15 min Summer	10	S10	S11	0.305	2.265	253.307	0.308	OK
1.007	15 min Winter	11	S11	S16	0.450	1.634	230.723	1.365	OK
4.000	60 min Winter	41	S12	S13	0.300	0.847	17.846	0.206	Surcharged
4.001	60 min Summer	37	S13	S14	0.300	0.739	16.558	0.194	Surcharged
4.002	30 min Winter	22	S14	S15	0.300	0.926	24.247	0.317	Surcharged
4.003	15 min Winter	12	S15	S16	0.450	0.597	26.229	0.113	OK
1.008	15 min Winter	9	S16	S17	0.300	0.897	35.120	0.389	Surcharged
1.009	30 min Winter	17	S17	S18	0.059	0.645	6.269	0.086	OK

Return Period Yrs: 100.0

Climate Change %: 40

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Summer	8	173.342	0.142	74.494		OK
S2	15 min Summer	8	172.976	0.196	121.499		OK
S3	15 min Summer	10	172.160	0.390	128.861		Surcharged
S4	15 min Summer	8	172.786	0.096	46.088		OK
S5	15 min Summer	8	172.247	0.107	62.967		OK
S6	15 min Summer	10	172.001	0.501	237.049		Surcharged
S7	15 min Summer	10	169.476	0.706	72.059		Surcharged
S8	15 min Summer	11	169.348	1.138	308.506		Surcharged
S9	15 min Summer	11	167.347	0.567	329.585		Surcharged
S10	480 min Winter	460	166.255	0.755	5.777		Surcharged
S11	480 min Winter	460	166.255	1.585	5.779		Surcharged
S12	480 min Winter	460	166.255	1.207	0.464		Surcharged
S13	480 min Winter	460	166.255	1.254	0.464		Surcharged
S14	480 min Winter	460	166.255	1.315	0.704		Surcharged
S15	480 min Winter	460	166.255	1.595	0.704		Flood Risk
S16	480 min Winter	460	166.255	1.652	6.482		Flood Risk
S17	480 min Winter	460	166.255	1.700	6.380		Flood Risk
S18	480 min Winter	461	164.559	0.059	6.379		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S1	S2	0.169	1.812	74.203	0.464	OK
1.001	15 min Summer	9	S2	S3	0.247	2.249	120.244	0.779	OK
1.002	15 min Summer	9	S3	S6	0.300	2.453	149.051	0.892	Surcharged
2.000	15 min Summer	8	S4	S5	0.102	2.175	45.932	0.228	OK
2.001	15 min Summer	9	S5	S6	0.203	1.459	62.696	0.279	OK
1.003	15 min Summer	9	S6	S8	0.300	3.778	264.273	1.018	Surcharged
3.000	15 min Winter	9	S7	S8	0.300	1.295	75.552	0.602	Surcharged
1.004	15 min Winter	10	S8	S9	0.300	4.460	315.270	1.181	Surcharged
1.005	30 min Summer	18	S9	S10	0.300	4.780	322.901	1.106	Surcharged
1.006	180 min Summer	108	S10	S11	0.450	1.431	165.467	0.201	OK
1.007	30 min Summer	16	S11	S16	0.450	2.145	341.147	2.019	OK
4.000	15 min Winter	11	S12	S13	0.300	1.096	37.324	0.432	Surcharged
4.001	15 min Winter	11	S13	S14	0.300	0.899	36.743	0.430	Surcharged
4.002	15 min Winter	10	S14	S15	0.300	1.152	54.955	0.719	Surcharged
4.003	15 min Winter	9	S15	S16	0.450	0.648	46.763	0.202	OK
1.008	15 min Winter	7	S16	S17	0.300	0.912	36.413	0.403	Surcharged
1.009	480 min Winter	461	S17	S18	0.059	0.649	6.379	0.087	OK