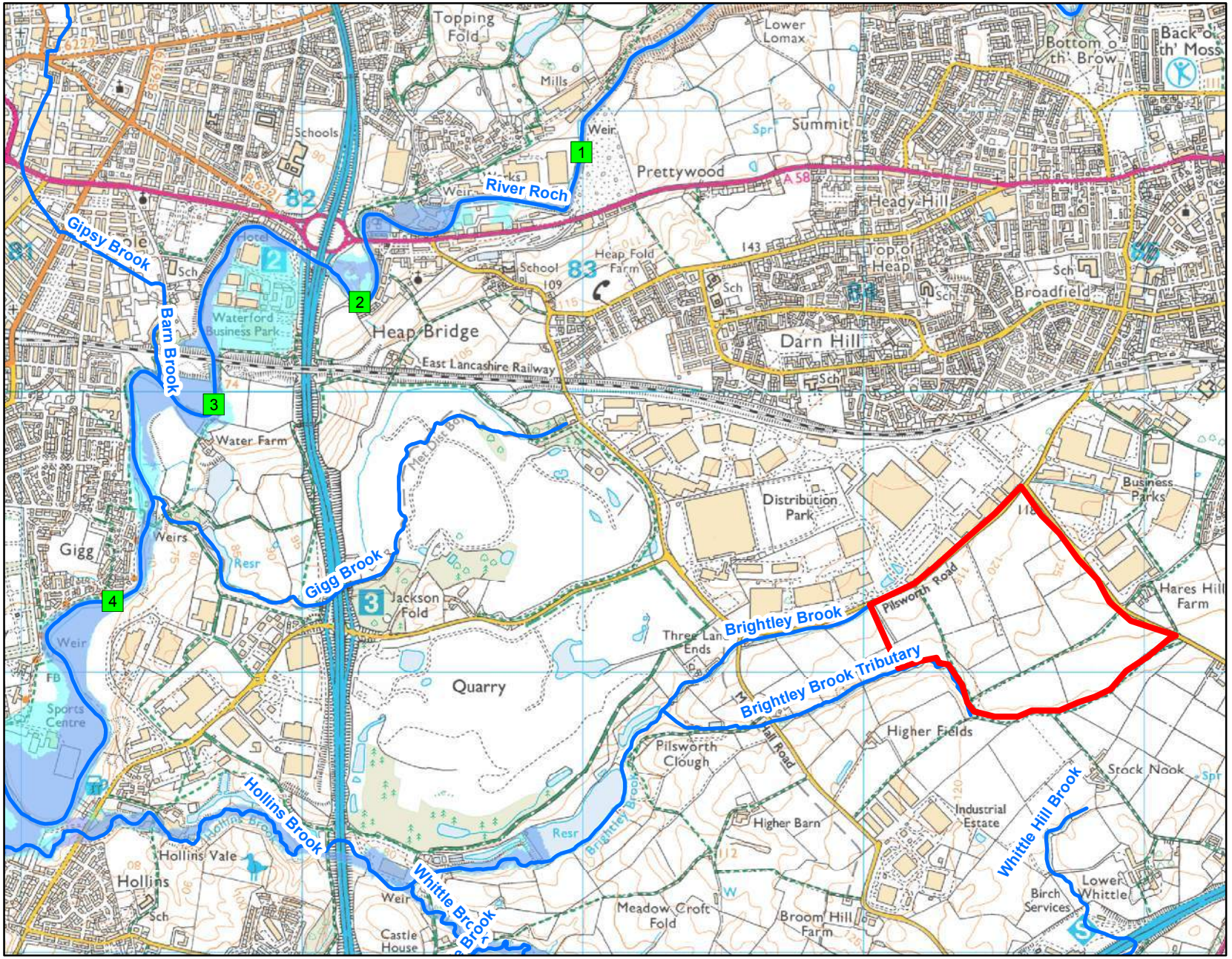
Appendix D – Environment Agency Correspondence

Detailed Flood Map centred on South Heywood, Rochdale, OL10 2TT. Created on 25/08/2020 [GMMC179065CC]



Environment Agency

1:20,000

N

Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

					Unmitigated													Climate+35											
Sky Reference	Model Node Reference	Easting	Northing	Data	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	20 % AEP (1 in 10 year)	10 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% Increase in Flow	1 % AEP (1 in 100 year) + 35% Increase in Flow	1 % AEP (1 in 300 year) + 70% Increase in Flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	0.5 % AEP (1 in 1000 year) + 50% Increase in Flow	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% Increase in Flow	1 % AEP (1 in 100 year) + 35% Increase in Flow	1 % AEP (1 in 100 year) + 70% Increase in Flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	0.5 % AEP (1 in 1000 year) + 50% Increase in Flow
1	442342E 333005	5929562	4199973	Modelled Water Level (m asdB)	74.91	80.10	80.30	80.49	80.54	80.76	80.95	81.07	81.46	81.56	81.82	80.48	81.62	82.37	74.91	80.10	80.30	80.49	80.55	80.75	80.95	81.07	81.46	81.54	82.07	81.82	82.37
		517.85	13.67	20.37	78.63	161.48	1,43.01	127.17	133.64	174.64	201.82	226.22	312.26	230.85	272.69	51.84	75.67	20.37	78.63	161.48	1,43.01	127.17	133.64	174.64	201.82	226.22	312.26	230.85	272.69
2	442341E 333004	5929560	4199912	Modelled Water Level (m asdB)	74.89	79.99	80.19	80.38	80.43	80.65	80.84	80.96	81.35	81.45	81.71	80.42	81.51	82.26	74.89	79.99	80.19	80.38	80.43	80.65	80.84	80.96	81.35	81.45	81.71	80.42	81.51	81.51	82.26
				Modelled Flow (cumecs)									0.00	0.00	0.00	0.00	0.00	0.00	52.66	75.89	85.98	98.66	103.64	121.73	133.84	138.58	165.69	168.57	188.97	144.89	188.84	188.84
3	442341E 332210	5919560	4199960	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
4	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
5	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
6	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
7	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
8	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
9	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69
10	442342E 332141	5919560	4199921	Modelled Water Level (m asdB)	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	82.15	74.74	79.88	80.08	80.26	80.32	80.54	80.73	80.85	81.24	81.34	81.60	80.31	81.40	81.40	82.15
		517.84	13.60	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	51.84	75.67	20.30	78.56	161.40	1,43.04	127.20	133.64	174.64	201.82	226.23	312.26	230.85	272.69	272.69

Model data taken from Lower Roch 2017 Study

AEP - Annual Exceedence Probability

m asdB - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: *Climate Change Scenario - 20%, 30% and 70% increases in flow calculated for the 2000's (2010 - 2119). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to over-ride in any flood risk assessment.

Flood risk assessments: Climate change allowances

Application of the allowances and local considerations

Greater Manchester, Merseyside & Cheshire

1) The climate change allowances

The National Planning Practice Guidance refers planners, developers and advisors to the Environment Agency guidance on considering climate change in Flood Risk Assessments (FRAs). This guidance was updated in February 2016 and is available on Gov.uk and should be read in conjunction with this document. The guidance can be used for planning applications, local plans, neighbourhood plans and other projects. It provides climate change allowances for peak river flow, peak rainfall, sea level rise, wind speed and wave height. The guidance provides a range of allowances to assess fluvial flooding, rather than a single national allowance. It advises on what allowances to use for assessment based on vulnerability classification, flood zone and development lifetime.

2) Assessment of climate change impacts on fluvial flooding

Table A below indicates the level of technical assessment of climate change impacts on fluvial flooding appropriate for new developments depending on their scale and location. This should be used as **a guide only**. Ultimately, the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. **For these reasons we recommend that applicants and / or their consultants should contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis**. **Table A** defines three possible approaches to account for flood risk impacts due to climate change, in new development proposals:

- **Basic:** Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts. The allowance should be derived and agreed locally by Environment Agency teams.
- **Intermediate:** Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- **Detailed:** Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

Table A – Indicative guide to assessment approach

VULNERABILITY CLASSIFICATION	FLOOD ZONE	DEVELOPMENT TYPE		
		MINOR	SMALL-MAJOR	LARGE-MAJOR
ESSENTIAL INFRASTRUCTURE	Zone 2	Detailed		
	Zone 3a	Detailed		
	Zone 3b	Detailed		
HIGHLY VULNERABLE	Zone 2	Intermediate/ Basic	Intermediate/ Basic	Detailed
	Zone 3a	Not appropriate development		
	Zone 3b	Not appropriate development		
MORE VULNERABLE	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Detailed	Detailed
	Zone 3b	Not appropriate development		
LESS VULNERABLE	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Basic	Detailed
	Zone 3b	Not appropriate development		
WATER COMPATIBLE	Zone 2	None		
	Zone 3a	Intermediate/ Basic		
	Zone 3b	Detailed		

NOTES:

- Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches
- Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches
- Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non residential building or development over 1000 sq m.

The assessment approach should be agreed with the Environment Agency as part of pre-planning application discussions to avoid abortive work.

3) Specific local considerations

Where the Environment Agency and the applicant and / or their consultant has agreed that a '**basic**´ level of assessment is appropriate the figures in Table B below can be used as a precautionary allowance for potential climate change impacts on peak 'design' (i.e. 1% annual probability) fluvial flood level rather than undertaking detailed modelling.

Table B – Local precautionary allowances for potential climate change impacts

Watercourse	Central	Higher Central	Upper
All	0.15m	0.24m	0.48m

Use of these allowances will only be accepted after discussion with the Environment Agency.

4) Fluvial food risk mitigation

Read the guidance on Gov.uk to find out which allowances to use to **assess** the impact of climate change on flood risk.

For planning consultations where we are a statutory consultee and our Flood risk standing advice **does not** apply we use the following benchmarks to inform flood risk **mitigation** for different vulnerability classifications. **These are a guide only**. **We strongly recommend you contact us at the pre-planning application stage to confirm this on a case by case basis. Please note you may be charged for this advice.** For planning consultations where we are not a statutory consultee or our Flood risk Standing advice applies we recommend local planning authorities and developers use these benchmarks but we do not expect to be consulted.

- For development classed as '**Essential Infrastructure**' our benchmark for flood risk mitigation is for it to be designed to the '**upper end**' climate change allowance for the epoch that most closely represents the lifetime of the development, including decommissioning.

- For **highly vulnerable** in flood zone 2, the '**higher central'** climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **upper end** allowance.

- For **more vulnerable developments** in flood zone 2, the '**central**' climate change allowance is our minimum benchmark for flood risk mitigation, and in flood zone 3 the '**higher central**' climate change allowance is our minimum benchmark for flood risk

mitigation. In sensitive locations it may be necessary to use the **higher central** (in flood zone 2) and the **upper end** allowance (in flood zone 3).

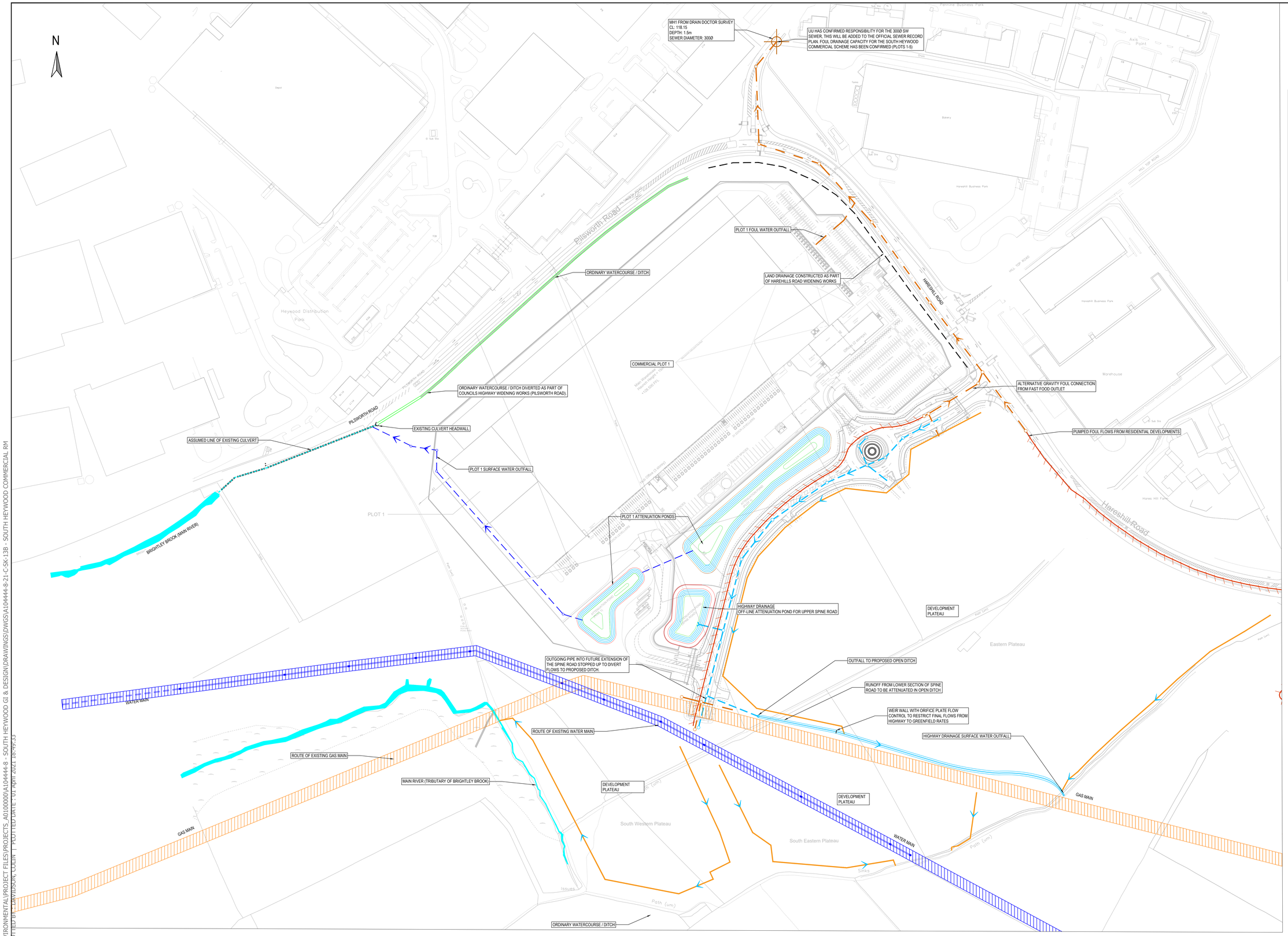
- For **water compatible** or **less vulnerable** development (e.g. commercial), the '**central**' climate change allowance for the epoch that most closely represents the lifetime of the development is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (particularly in flood zone 3) to inform built in resilience.

There may be circumstances where local evidence supports the use of other data or allowances. Where you think this is the case we may want to check this data and how you propose to use it.

END.

Appendix E – Proposed Drainage Strategy Plans

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



KEY

- POTENTIAL CONNECTION POINT TO UU SEWER NETWORK
- PROPOSED PUMPING STATION
- PROPOSED RISING MAIN
- PROPOSED GRAVITY SEWER
- PROPOSED HIGHWAY DRAINAGE
- OVERSIZE TANK SEWER
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- ORDINARY WATERCOURSE
- MAIN RIVER
- PROPOSED SURFACE WATER OUTFALL
- EARTHWORKS DRAINAGE DITCHES / SWALES

0 12.5 25 37.5 50 62.5 m
SCALE 1:1250

REV	DESCRIPTION	BY	CHK	APP	DATE
A	PROPOSED SPINE ROAD SHORTENED	CD	DB	DB	01.04.21

ARNDALE COURT
HEADINGLEY
LEEDS
LS6 2UJ

TEL: +44 (0)113 278 7111
FAX: +44 (0)113 278 3487
e-mail: leeds@wyg.com

Project:
SOUTH HEYWOOD COMMERCIAL

Drawing Title:
SOUTH HEYWOOD COMMERCIAL RESERVED MATTERS APRIL 2021 DRAINAGE STRATEGY

Scale @ A0	Drawn	Date	Checked	Date	Approved	Date
1:1250	CD	JUNE 2020	DB	15.07.20		

Project No.	Office	Type	Drawing No.	Revision
A104444-8	21	C	SK013A	A

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FILENAME : \\MANCHESTER32\ENVIRONMENTAL\PROJECT FILES\PROJECTS_A0100000\A104444-8 - SOUTH HEYWOOD GI & DESIGN\DRAWINGS\DWGS\A104444-8-21-C-SK-13B - SOUTH HEYWOOD COMMERCIAL RM
DRAINAGE STRATEGY.DWG | PLOTTED BY : DAVIDSON, COLIN | PLOTTED DATE : 01 April 2021 18:49:33

KEY

SWD	- - ->	SURFACE WATER DRAIN (PRIVATE)
SW MH	○	SURFACE WATER MANHOLE (PRIVATE)
SW SMH	○	SURFACE WATER SIPHONIC CHAMBER (PRIVATE)
SRWP	- - -	SIPHONIC RAINWATER PIPE (PRIVATE)
G	- - -	GULLY
ACO QMAX	——	DRAINAGE CHANNEL
SWD	-·->	TEMPORARY RAINWATER PIPE (PRIVATE)
FWD	- - ->	FOUL WATER DRAIN (PRIVATE)
FW MH	○	FOUL WATER MANHOLE (PRIVATE)

DESIGN PHILOSOPHY PLOT 1

CATCHMENT AREA	15ha
TOTAL DRAINED AREA	12.16ha
GREENFIELD RUN-OFF ALLOWANCE	Q1 = 7 l/s/Ha Q30 = 13 l/s/Ha Q100 = 16 l/s/Ha
PLOT FLOW ALLOWANCE	Q1 = 85.1 l/s Q30 = 158 l/s Q100 = 194.5 l/s Q100+30% CC = 194.5 l/s
M5-60	18.50
RATIO R	0.32

DESIGN PHILOSOPHY

SURFACE WATER DRAINAGE DESIGN IS BASED ON THE PRINCIPLES SET IN THE APPROVED FRA PRODUCED BY CAMPBELL REITH FOR PLANNING APPLICATION 16/01399/HYBR

SURFACE WATER DISCHARGE IS TO THE REALIGNED BRIGHTLEY WHICH FLOWS FROM EAST TO WEST ALONG THE NORTHERN BOUNDARY OF THE DEVELOPMENT. THE DISCHARGES ARE LIMITED TO THE PREDEVELOPMENT GREENFIELD RUN-OFF RATES FOR THE Q1, Q30 AND Q100 STORMS. ATTENUATION IS PROVIDED BY BASINS LOCATED TO THE SOUTH OF THE MAIN SERVICE YARD SERVICE YARD. FLOWS ARE CONTROLLED BY 3No HYDROBRAKE CHAMBER, 2 CONTROLLING THE PASS-FORWARD FLOWS FROM THE PONDS AND 1 CONTROLLING THE FINAL DISCHARGE FROM THE PLOT 1 CATCHMENT. THE FINAL HYDROBRAKE IS SUPPLEMENTED BY A HIGHER LEVEL ORIFICE WHICH ALLOWS A VARIABLE RATE TO BE ACHIEVED FOR THE DIFFERENT STORM RETURN PERIODS. SURFACE WATER IS TREATED BY OIL AND SILT SEPARATORS LOCATED IN LOCATIONS WHERE POLLUTANT RUN OFF IS LIKELY TO BE HIGH SUCH AS SERVICE YARDS AND CAR PARKS.

NOTES

1. SITE PLAN FROM 20019-ASA-VS-ZZ-DR-A-9001 MASTERPLAN, RECEIVED 13 OCT 2020
2. CONDITIONS OF OUTFALL TO BRIGHTLY BROOK TO BE AGREED WITH ROCHDALE BOROUGH COUNCIL AS LEAD LOCAL FLOOD AUTHORITY
3. ALL DRAINAGE DESIGN IS IN ACCORDANCE WITH BS EN 752 - DRAINS AND SEWER SYSTEMS OUTSIDE BUILDINGS
4. ALL SUDS DESIGN IS IN ACCORDANCE WITH CIRIA 753 - THE SUDS MANUAL
5. SURFACE WATER CONNECTION TO THE BRIGHTLY BROOK WATERCOURSE SUBJECT TO S23 LAND DRAINAGE CONSENT FROM ROCHDALE METROPOLITAN BOROUGH COUNCIL
6. FOUL WATER CONNECTION TO NEW S104 SEWER IN HARESHILL ROAD SUBJECT TO APPROVAL FROM UNITED UTILITIES

0 5 10 15 20 25 m
SCALE 1:500

PLANNING ISSUE

Client: RUSSELLS SOUTH HEYWOOD LTD

Project Name: SOUTH HEYWOOD COMMERCIAL

Sheet Title: PLOT 1 DRAINAGE GENERAL ARRANGEMENT

Issuing Office: WYG Leeds
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Rev	Description	Date	Drn	Chk	App
P03	LAND DRAIN ADDED.	13/11/2020	RM	DB	JP
P02	WETLAND AREAS ADDED TO PONDS. VOLUMES UPDATED	26/10/2020	OC	DB	JP
P01	PLANNING ISSUE	20/10/2020	OC	DB	JP

Document Control

WYG Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A0	Suitability
A104444-8	RM	OCT 20	JP	OCT 20	JP	OCT 20	1:500	S0

Client Project Number	Originator	Volume/System	Level/Location	Type	Role	Number	Revision
SOHW	WYG	00	XX	C	52	0100	P03

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REFER TO Ph1.0502

PLOT 1

HARESHILL ROAD

HARESHILL ROAD

SR-H1-9 (1500Ø)
CL.129.268
IL.126.848 (3750)
IL.127.073 (1500)
IL.126.848(3750)

SR-H1.005 50.084m 3750 1:300

SR-H1-8 (1500Ø)
CL.129.873
IL.127.142 (3000)
IL.127.067 (3750)

SR-H1.004 65.772m 3750 1:300

SR-H1-6 (1200Ø)
CL. 129.100
IL. 127.468 (2250)
IL. 127.543 (1500)
IL. 127.543 (1500)
IL. 127.468 (2250)

SR-H1-5 (1200Ø)
CL.128.950
IL.127.600 (1500)
IL.127.600 (1500)
IL.127.525 (2250)

SR-H1.003 43.641m 3000 1:297

SR-H1-002
19.624m 3000 1:156

SR-H1.001
26.158m 3000
1:155

SR-H1.000 41.183m 3000 1:313

SR-H1-7 (1500Ø)
CL.129.600
IL.127.289 (3000)
IL. 127.364 (2250)
IL. 127.364 (2250)
IL.127.289(3000)

SR-H1-4 (1200Ø)
CL. 129.600
IL. 128.100 (2250)
IL. 128.175 (1500)

SR-H1-3 (1500Ø)
CL.129.500
IL.127.415 (3000)
IL.127.415 (3000)

SR-H1-2 (1350Ø)
CL. 129.270
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IL. 127.584 (3000)

SR-H1-1 (1350Ø)
CL.129.598
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SR-F2-1 (1200Ø)
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IL.127.645 (3000)

SR-F2-0 (1200Ø)
CL. 129.426
IL.127.690 (3000)

SR-F8.001 27.8m 3000 1:141

SR-F8.002 24.8m 1500 1:50

IL. 127.960 (1500)
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N:409294.897

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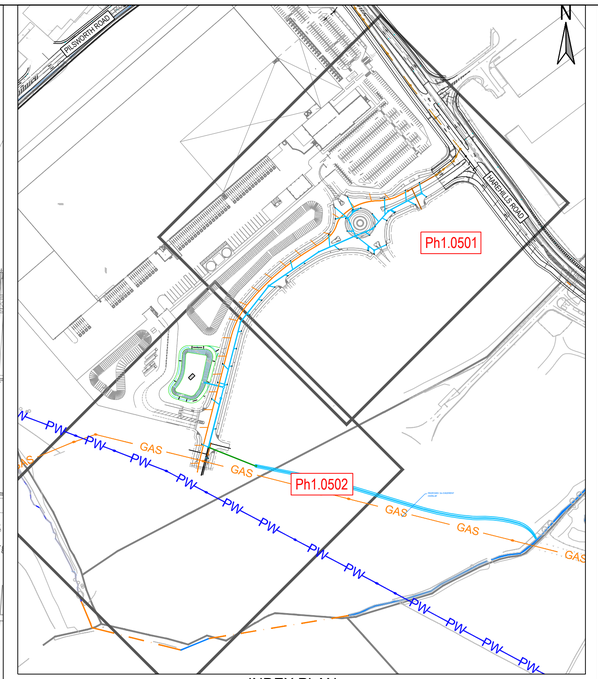
SCALE 1:500



INDEX PLAN

GENERAL NOTES.

a. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT WYG DRAWINGS, SPECIFICATIONS, STANDARD DETAILS AND C.D.M. RISK MANAGEMENT FORMS FOR THE WORKS.
b. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED.
c. THE TOPOGRAPHICAL SURVEY IS BASED ON INFORMATION RECEIVED FROM SURVEY OPERATIONS DRAWING A0 20G240/001. RECEIVED SEPTEMBER 2020.
d. THE INFORMATION USED IN PREPARATION OF THIS AND ALL OTHER WYG DESIGNS AND DRAWINGS IS NOT WARRANTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL SURVEY INFORMATION PROVIDED AND REPORT ANY ANOMALIES TO WYG.
e. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ASHTON SMITH MASTER PLAN AND DESIGN CODE.
f. DESIGNED IN ACCORDING WITH DESIGN CONSTRUCTION GUIDANCE, SEWERAGE CODES FOR ADOPTION.
g. HIGHWAYS DESIGN TO STORM RETURN PERIODS, Q1, Q30, AND Q100 + 30% CLIMATE CHANGE ALLOWANCE.
h. HIGHWAY TO BE POSITIVELY DRAINED BY TRAPPED ROAD GULLIES AT REGULAR SPACINGS DISCHARGING TO CARRIER DRAIN.
i. DISCHARGE RATES RESTRICTED TO:

Q1	-	7.9 l/s
Q30	-	14.2 l/s
Q100 + 30%	-	18.1 l/s

NOTES

1. SITE PLAN FROM 20019-ASA-VS-ZZ-DR-A-9001 MASTERPLAN, RECEIVED 13 OCT 2020
2. CONDITIONS OF OUTFALL TO BRIGHTLY BROOK TRIBUTORY TO BE AGREED WITH ROCHDALE BOROUGH COUNCIL AS LEAD LOCAL FLOOD AUTHORITY AND / OR THE ENVIRONMENT AGENCY
3. ALL DRAINAGE DESIGN IS IN ACCORDANCE WITH DMRB AND THE SPECIFICATION FOR HIGHWAY WORKS.
4. ALL SUDS DESIGN IS IN ACCORDANCE WITH CIRIA 753 - THE SUDS MANUAL
5. SURFACE WATER CONNECTION TO THE BRIGHTLY BROOK WATERCOURSE SUBJECT TO S23 LAND DRAINAGE CONSENT FROM ROCHDALE METROPOLITAN BOROUGH COUNCIL
6. FOUL WATER IN SOUTH HEYWOOD SPINE ROAD SUBJECT TO S104 APPROVAL UNITED UTILITIES

KEY

- S38 HIGHWAY DRAIN
- S38 HIGHWAY MANHOLE
- S38 HIGHWAY GULLY

PLANNING ISSUE

Rev	Description	Date	Drn	Chk	App
P02	ISSUED FOR PLANNING	06.04.21	AB	CR	DB
P01	ISSUED FOR PLANNING	31.03.21	AB	CR	DB

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Client

RUSSELLS SOUTH HEYWOOD Ltd.

Project Name

SOUTH HEYWOOD COMMERCIAL

Sheet Title

PHASE 1 HIGHWAYS
DRAINAGE GENERAL ARRANGEMENT
SHEET 1 OF 2

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A1	Suitability
A104444-8	AB	MAR 21	CR	MAR 21	DB	MAR 21	As Shown	S0

Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision
A104444-8	TTE	00	XX	H	C	-Ph1.0501	P02

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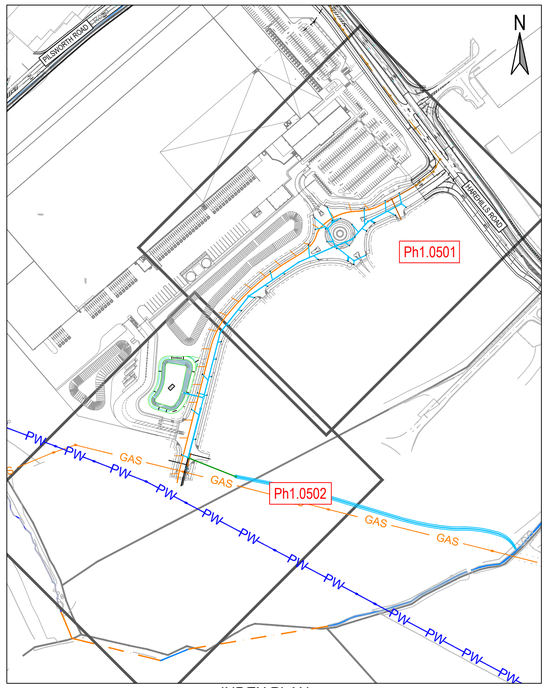
TTE_MT_v1



INDEX PLAN

REFER TO Ph1.0501

FOR NOTES REFER TO DRAWING A104444-8-21-C-H.S38.05.01

KEY

- S38 HIGHWAY DRAIN
- S38 HIGHWAY MANHOLE
- S38 HIGHWAY GULLY

PLANNING ISSUE

Rev	Description	Date	Drn / Chk / App
P01	ISSUED FOR PLANNING	31.03.21	AB CR DB

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SOUTH HEYWOOD COMMERCIAL

Sheet Title

PHASE 1 HIGHWAYS
DRAINAGE GENERAL ARRANGEMENT
SHEET 2 OF 2

TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A1	Suitability
A104444-8	AB	MAR 21	CR	MAR 21	DB	MAR 21	As Shown	S0

Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision
A104444-8 -	TTE	- 00	- XX	- H	- C	-Ph1.0502	P01

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TTE_MT_v1

EXISTING MH 1
CL 118.180 (Ex. EST), 118.150 (PROP)
IL 116.740 (EST)
D = 1.440 (EST), 1.410 (PROP)

300Ø CO 1 in 150

Ex. 300Ø CO

Ex. 300Ø CI

MH F112
1350Ø
CL 118.025
IL 116.905
D = 1.120m

300Ø CO 1 in 150

MH F111
1350Ø
CL 118.560
IL 117.030
D = 1.530m

300Ø CO 1 in 51

EXISTING MH 1A
CL TBC
IL TBC
D = TBC

MH F110
1350Ø
CL 119.450
IL 117.650
D = 1.800m

300Ø CO 1 in 45

300Ø CO 1 in 29.5

HIGHWAY DRAINAGE
BY OTHERS

ALTERNATIVE ROUTE SUBJECT TO RECEIPT OF EXISTING/PROPOSED SERVICES INFORMATION AND ADOPTABLE HIGHWAY / LAND OWNERSHIP RECORDS

MH F109
1350Ø
CL 120.100
IL 118.300
D = 1.800m

300Ø CO 1 in 20.8

300Ø CO 1 in 36

MH F108a
1350Ø
CL 121.300
IL 119.500
D = 1.800m

MH F108
1350Ø
CL 122.170
IL 120.370
D = 1.800m

HARESHILL ROAD

Tanks

El Sub Sta

Tk

NOTE:

THE PROPOSED LINE AND LEVEL OF THE GRAVITY FOUL DRAINAGE HAS TAKEN ACCOUNT AT CROSSOVER LOCATIONS OF LEVEL OF EXISTING CULVERTS AND PROPOSED HIGHWAY DRAINAGE, WITH AT LEAST 0.3m CLEARANCE PROVIDED AT EACH LOCATION. UPON RECEIPT OF EXISTING/PROPOSED SERVICES PLANS, FURTHER CHECKS WILL BE REQUIRED TO CONFIRM THAT NO CLASHES OCCUR WITH THESE

DEVELOPMENT DRAINAGE
BY OTHERS

INCOMING FW GRAVITY CONNECTION
(SIZE TBC) TO F107 BY OTHERS

MH F107
1500Ø
CL 124.560
IL 121.850
D = 2.710m

300Ø CO 1 in 30

300Ø CO 1 in 45

300Ø CO 1 in 15

MH F106
1350Ø
CL 124.910
IL 122.540
D = 2.370m

MH F105
1350Ø
CL 125.340
IL 123.540
D = 1.800m

300Ø CO 1 in 37.6

MH F104
1350Ø
CL 127.680
IL 125.880
D = 1.800m

HIGHWAY DRAINAGE
BY OTHERS

300Ø CO 1 in 67

DEVELOPMENT DRAINAGE
BY OTHERS

INCOMING FW RISING MAIN AND GRAVITY
CONNECTION (SIZE TBC) TO F101 BY OTHERS

MH F101
1350Ø
CL 129.670 (TBC)
IL 127.500
D = 2.170m

300Ø CO 1 in 150

300Ø CO 1 in 150

MH F102
1350Ø
CL 129.970
IL 127.285
D = 2.685m

MH F103
1500Ø
CL 130.400
IL 127.185 (300Ø)
IL 127.335 (150Ø)
D = 3.215m

500m

INCOMING FW RISING MAIN AND 150Ø
GRAVITY CONNECTION TO F103 BY OTHERS

HILL TOP ROAD

126.45

126.18

Hareshill Business Park

PLAN
SCALE 1:500

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES (TO ORDNANCE DATUM) UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING.

SECTION 104 NOTES:

1. ALL ADOPTABLE DRAINAGE WORKS TO BE CONSTRUCTED AS DETAILED IN SEWERS FOR ADOPTION, 7th EDITION OR AS STIPULATED BY UNITED UTILITIES.
2. ALL ADOPTABLE MANHOLE COVERS SHALL COMPLY WITH BS EN 124 IN ACCORDANCE WITH SEWERS FOR ADOPTION 7th EDITION, CLAUSE 5.2.32. COVERS AND FRAMES TO BE KITEMARKED.
3. ALL PIPEWORK WITH LESS THAN 1.2m COVER IN HIGHWAY OR LESS THAN 0.9m IN SOFT SHALL HAVE A CONCRETE SURROUND OR SLAB TO UU REQUIREMENTS. WHERE A PIPE REQUIRES A CONCRETE SURROUND, C20 CONCRETE MIX SHOULD BE USED WITH VERTICAL JOINTS FORMED AT THE FACE OF EACH FLEXIBLE JOINT USING 18mm THICK COMPRESSIBLE BOARD.
4. SCREENS/GRILLS TO BE INSTALLED IN OUTLET MANHOLES TO PREVENT DEBRIS/RUBBLE FROM ENTERING THE EXISTING NETWORK DURING CONSTRUCTION.
5. ALL UNCOVERED AND SHALLOW PIPEWORK TO BE PROTECTED AGAINST CONSTRUCTION TRAFFIC AS PART OF THE CONTRACTOR'S TEMPORARY WORKS.
6. A SECTION 106 APPLICATION AND APPROVAL FROM UU IS REQUIRED FOR ALL CONNECTIONS (INCLUDING INDIRECTLY) TO THE EXISTING PUBLIC SEWER NETWORK PRIOR TO ANY CONNECTION BEING MADE.
7. ALL PIPE LENGTHS AND GRADIENTS ARE BASED ON CENTRE OF MANHOLE TO CENTRE OF MANHOLE.
8. THE EXACT POSITION, LEVEL, SIZE AND USE OF EXISTING SEWERS TO BE CONFIRMED ON SITE AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORKS.
9. ALL PIPES TO BE LAID WITH LEVEL SOFFITS OR AS INDICTED.
10. WHERE FOUL WATER PIPES CROSS ABOVE SURFACE WATER PIPES, PLASTIC MEMBRANES TO BE USED TO ELIMINATE ANY CHANCE OF CROSS CONTAMINATION.
11. PRECAST CONCRETE MANHOLE RINGS WILL NOT BE CUT UNDER ANY CIRCUMSTANCES. OTHER OPTIONS WILL INSTEAD BE UTILISED SUCH AS BUILDING UP WITH CONCRETE OR BRICKWORK TO THE TOP OF THE PIPE.

KEY:

PROPOSED ADOPTABLE FOUL WATER MANHOLE/SEWER

ALTERNATIVE FW ROUTE

ISSUED FOR BUDGET COSTING PURPOSES ONLY

REV	DRN	CHK	APP	DATE	DESCRIPTION
P1	EMT	KM	RLG	30.09.20	PRELIMINARY ISSUE FOR COMMENT

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Client
RUSSELL WHBO

Project
HAREHILL
GRAVITY FOUL DRAINAGE

Title
PROPOSED FW SEWER
S104 AGREEMENT LAYOUT
GENERAL ARRANGEMENT

Scale	Drawn	Date	Chkd	Approved
AS SHOWN	EMT	SEPT '20	KM	RLG

Drawing No.
784/015/001

Revision
P1

Status
PRELIMINARY

Sheet Size
A1

Appendix F – Supporting Drainage Calculations

Existing Network Details for PLOT 1 - SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S1.000	26.323	0.088	300.0	0.080	5.00	0.600		o	300	Pipe/Conduit
S1.001	37.112	0.124	300.0	0.111	0.00	0.600		o	300	Pipe/Conduit
S2.000	48.957	0.163	300.0	0.209	5.00	0.600		o	300	Pipe/Conduit
S2.001	11.642	0.039	300.0	0.032	0.00	0.600		o	300	Pipe/Conduit
S1.002	25.325	0.084	300.0	0.061	0.00	0.600		o	300	Pipe/Conduit
S3.000	72.520	0.145	500.0	1.058	5.00	0.600		o	825	Pipe/Conduit
S3.001	72.520	0.145	500.0	1.412	0.00	0.600		o	825	Pipe/Conduit
S3.002	29.395	0.059	500.0	0.582	0.00	0.600		o	825	Pipe/Conduit
S3.003	17.330	0.035	500.0	0.028	0.00	0.600		o	825	Pipe/Conduit
S3.004	99.299	0.199	500.0	0.047	0.00	0.600		o	900	Pipe/Conduit
S3.005	42.259	0.085	500.0	0.000	0.00	0.600		o	900	Pipe/Conduit
S4.000	68.400	0.137	500.0	0.160	5.00	0.600		o	450	Pipe/Conduit
S4.001	16.520	0.033	500.0	0.338	0.00	0.600		o	450	Pipe/Conduit
S4.002	59.843	0.120	500.0	0.156	0.00	0.600		o	525	Pipe/Conduit
S4.003	20.994	0.042	500.0	0.000	0.00	0.600		o	525	Pipe/Conduit
S4.004	86.116	0.172	500.0	0.579	0.00	0.600		o	525	Pipe/Conduit
S4.005	23.046	0.046	500.0	0.000	0.00	0.600		o	575	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
S1.000	35	127.000	124.800	1.900	127.000	124.712	1.988		1200
S1.001	36	127.000	124.712	1.988	127.000	124.588	2.112		1200
S2.000	27	127.050	124.790	1.960	127.000	124.627	2.073		1200
S2.001	28	127.000	124.627	2.073	127.000	124.588	2.112		1200
S1.002	37	127.000	124.588	2.112	127.000	124.504	2.196		1200
S3.000	18	127.250	125.525	0.900	127.500	125.380	1.295		1800
S3.001	17	127.500	125.380	1.295	128.300	125.235	2.240		1800
S3.002	16	128.300	125.235	2.240	128.350	125.176	2.349		1800
S3.003	15	128.350	125.176	2.349	128.000	125.141	2.034		1800
S3.004	14	128.000	125.066	2.034	128.000	124.867	2.233		1800
S3.005	13	128.000	124.867	2.233	127.500	124.782	1.818		1800
S4.000	25	127.300	125.950	0.900	127.850	125.813	1.587		1350
S4.001	24	127.850	125.813	1.587	127.650	125.780	1.420		1350
S4.002	23	127.650	125.705	1.420	127.950	125.585	1.840		1500
S4.003	22	127.950	125.585	1.840	127.950	125.543	1.882		1500
S4.004	21	127.950	125.543	1.882	128.300	125.371	2.404		1500
S4.005	20	128.300	125.371	2.354	128.600	125.325	2.700		1500

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Existing Network Details for PLOT 1 - SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S4.006	36.245	0.068	533.0	0.039	0.00	0.600		o	575	Pipe/Conduit
S3.006	55.814	0.000	0.0	0.000	0.00		0.045	\/	-1	Pipe/Conduit
S5.000	82.331	0.498	165.3	0.494	5.00	0.600		o	375	Pipe/Conduit
S6.000	39.886	0.498	80.1	0.270	5.00	0.600		o	225	Pipe/Conduit
S5.001	46.030	0.153	300.0	0.182	0.00	0.600		o	450	Pipe/Conduit
S3.007	80.802	0.000	0.0	0.760	0.00		0.045	\/	-1	Pipe/Conduit
S7.000	37.491	0.187	200.0	0.517	5.00	0.600		o	375	Pipe/Conduit
S8.000	21.446	0.107	200.0	0.124	5.00	0.600		o	225	Pipe/Conduit
S7.001	55.560	0.184	302.0	0.000	0.00	0.600		o	375	Pipe/Conduit
S9.000	21.370	0.216	98.9	0.152	5.00	0.600		o	225	Pipe/Conduit
S7.002	21.840	0.073	299.2	0.000	0.00	0.600		o	375	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
S4.006	19	128.600	125.225	2.800	127.500	125.157	1.768		1500
S3.006	12-POND1	127.500	124.700	0.000	127.500	124.700	0.000		0
S5.000	15	127.500	125.925	1.200	127.500	125.427	1.698		1350
S6.000	16	127.500	126.075	1.200	127.500	125.577	1.698		1200
S5.001	16	127.500	125.252	1.798	127.500	125.099	1.951		1350
S3.007	11-POND2	127.500	124.700	0.000	127.500	124.700	0.000		0
S7.000	18	127.500	125.780	1.345	127.500	125.593	1.532		1350
S8.000	20	127.200	125.850	1.125	127.500	125.743	1.532		1200
S7.001	20	127.500	125.593	1.532	127.500	125.409	1.716		1350
S9.000	22	127.200	125.775	1.200	127.500	125.559	1.716		1200
S7.002	22	127.500	125.409	1.716	127.500	125.336	1.789		1350

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Date 20/10/2020 19:00 | Designed by JAMES.PETERS
File S Heywood - Plot 1.MDX | Checked by
XP Solutions | Network 2017.1.2

Existing Network Details for PLOT 1 - SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S7.003	46.064	0.154	299.1	0.000	0.00	0.600		o	450	Pipe/Conduit
S3.008	39.577	0.000	0.0	0.000	0.00	0.045		\/	-1	Pipe/Conduit
S3.009	8.693	0.017	498.9	0.000	0.00	0.600		o	900	Pipe/Conduit
S3.010	30.610	0.061	501.8	0.000	0.00	0.600		o	450	Pipe/Conduit
S3.011	58.609	0.117	500.0	0.000	0.00	0.600		o	450	Pipe/Conduit
S10.000	36.422	0.073	500.0	0.153	5.00	0.600		o	600	Pipe/Conduit
S10.001	35.929	0.072	500.0	0.833	0.00	0.600		o	600	Pipe/Conduit
S10.002	36.395	0.073	500.0	0.824	0.00	0.600		o	750	Pipe/Conduit
S10.003	36.395	0.073	500.0	0.265	0.00	0.600		o	750	Pipe/Conduit
S10.004	60.115	0.120	500.0	0.999	0.00	0.600		o	750	Pipe/Conduit
S10.005	32.494	0.065	500.0	0.000	0.00	0.600		o	750	Pipe/Conduit
S1.003	26.859	0.104	258.3	0.000	0.00	0.600		o	1050	Pipe/Conduit
S1.004	11.647	0.038	306.9	0.000	0.00	0.600		o	1050	Pipe/Conduit
S1.005	15.756	0.032	500.0	0.000	0.00	0.600		o	600	Pipe/Conduit
S1.006	43.026	0.086	500.0	0.000	0.00	0.600		o	600	Pipe/Conduit
S1.007	48.124	0.096	500.0	0.000	0.00	0.600		o	600	Pipe/Conduit
S1.008	100.000	0.200	500.0	0.000	0.00	0.600		o	600	Pipe/Conduit
S1.009	22.535	0.045	500.0	0.074	0.00	0.600		o	600	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
S7.003	19	127.500	125.161	1.889	127.500	125.007	2.043		1350
S3.008	10-POND3	127.500	124.700	0.000	127.500	124.700	0.000		0
S3.009	9-POND4	127.500	124.700	1.900	127.200	124.683	1.617		0
S3.010	HBRAKE	127.200	124.683	2.067	127.350	124.622	2.278	Hydro-Brake®	1800
S3.011	7	127.350	124.622	2.278	127.000	124.505	2.045		1350
S10.000	34	127.250	125.350	1.300	127.800	125.277	1.923		1500
S10.001	35	127.800	125.277	1.923	128.300	125.205	2.495		1500
S10.002	36	128.300	125.055	2.495	128.300	124.982	2.568		1800
S10.003	37	128.300	124.982	2.568	128.300	124.909	2.641		1800
S10.004	38	128.300	124.909	2.641	127.400	124.789	1.861		1800
S10.005	39	127.400	124.789	1.861	127.000	124.724	1.526		1800
S1.003	28	127.000	124.404	1.546	127.000	124.300	1.650		1950
S1.004	29 - ACCESS BASIN	127.000	124.300	1.650	128.000	124.262	2.688		1950
S1.005	ACCESS ROAD HBRAKE	128.000	124.262	3.138	127.400	124.230	2.570	Hydro-Brake®	1950
S1.006	6	127.400	124.230	2.570	128.150	124.144	3.406		1500
S1.007	5	128.150	124.144	3.406	128.200	124.048	3.552		1500
S1.008	4	128.200	124.048	3.552	127.950	123.848	3.502		1500
S1.009	3	127.950	123.848	3.502	127.250	123.803	2.847		1500

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Date 20/10/2020 19:00 | Designed by JAMES.PETERS
File S Heywood - Plot 1.MDX | Checked by
XP Solutions | Network 2017.1.2

Existing Network Details for PLOT 1 - SW

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S11.000	5.910	0.020	300.0	0.425	5.00	0.600		o	300	Pipe/Conduit
S11.001	96.666	0.193	500.0	0.170	0.00	0.600		o	900	Pipe/Conduit
S11.002	101.262	0.203	500.0	0.000	0.00	0.600		o	900	Pipe/Conduit
S11.003	101.262	0.203	500.0	0.162	0.00	0.600		o	900	Pipe/Conduit
S11.004	67.673	0.135	500.0	0.050	0.00	0.600		o	900	Pipe/Conduit
S11.005	18.947	0.038	500.0	0.000	0.00	0.600		o	900	Pipe/Conduit
S12.000	8.190	0.082	100.0	0.815	5.00	0.600		o	450	Pipe/Conduit
S1.010	11.000	0.550	20.0	0.000	0.00	0.600		o	375	Pipe/Conduit
S1.011	11.000	0.137	80.0	0.000	0.00	0.600		o	375	Pipe/Conduit
S1.012	11.000	0.138	80.0	0.000	0.00	0.600		o	375	Pipe/Conduit
S1.013	11.060	0.138	80.0	0.000	0.00	0.600		o	375	Pipe/Conduit
S1.014	11.379	0.142	80.0	0.000	0.00	0.600		o	375	Pipe/Conduit
S1.015	12.697	0.068	186.7	0.000	0.00	0.600		o	375	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
S11.000	41	127.300	125.620	1.380	127.200	125.600	1.300		1200
S11.001	42	127.200	125.000	1.300	127.200	124.807	1.493		1800
S11.002	43	127.200	124.807	1.493	127.200	124.604	1.696		1800
S11.003	44	127.200	124.604	1.696	127.200	124.401	1.899		1800
S11.004	45	127.200	124.401	1.899	127.225	124.266	2.059		1800
S11.005	45	127.225	124.266	2.059	127.250	124.228	2.122		1800
S12.000	46	127.350	125.214	1.686	127.250	125.132	1.668		1350
S1.010	2 - HYDROBRAKE	127.250	123.803	3.072	124.413	123.253	0.784	Complex	3000
S1.011	50	124.413	119.747	4.290	121.000	119.610	1.015		1500
S1.012	47	121.000	117.413	3.212	118.650	117.276	1.000		1500
S1.013	51	118.650	115.200	3.075	116.300	115.062	0.863		1500
S1.014	47	116.300	114.142	1.783	114.900	114.000	0.525		1500
S1.015	49	114.900	113.893	0.632	115.000	113.825	0.800		1500

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Simulation Criteria for PLOT 1 - SW

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.500	Storm Duration (mins)	30
Ratio R	0.324		

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Online Controls for PLOT 1 - SW

Hydro-Brake® Optimum Manhole: SHBRAKE, DS/PN: S3.010, Volume (m³): 11.4

Unit Reference	MD-SHE-0250-4000-2300-4000
Design Head (m)	2.300
Design Flow (l/s)	40.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	250
Invert Level (m)	124.683
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	40.0
Flush-Flo™	0.669	40.0
Kick-Flo®	1.445	32.0
Mean Flow over Head Range	-	34.7

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	8.1	1.200	37.1	3.000	45.5	7.000	68.5
0.200	25.5	1.400	33.3	3.500	49.0	7.500	70.8
0.300	36.0	1.600	33.6	4.000	52.2	8.000	73.1
0.400	38.2	1.800	35.6	4.500	55.3	8.500	75.3
0.500	39.4	2.000	37.4	5.000	58.2	9.000	77.4
0.600	39.9	2.200	39.2	5.500	60.9	9.500	79.5
0.800	39.8	2.400	40.8	6.000	63.6		
1.000	38.9	2.600	42.4	6.500	66.1		

Hydro-Brake® Optimum Manhole: SACCESS ROAD HBRAKE, DS/PN: S1.005, Volume (m³): 19.6

Unit Reference	MD-SCL-0283-6000-2000-6000
Design Head (m)	2.000
Design Flow (l/s)	60.0
Flush-Flo™	Calculated
Objective	Minimise blockage risk
Application	Surface
Sump Available	Yes
Diameter (mm)	283
Invert Level (m)	124.262
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

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Hydro-Brake® Optimum Manhole: SACCESS ROAD HBRAKE, DS/PN: S1.005, Volume (m³): 19.6

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	60.0
Flush-Flo™	0.460	60.0
Kick-Flo®	1.160	46.2
Mean Flow over Head Range	-	50.0

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	9.8	1.200	46.9	3.000	73.0	7.000	110.1
0.200	32.2	1.400	50.5	3.500	78.6	7.500	113.8
0.300	52.9	1.600	53.9	4.000	83.9	8.000	117.5
0.400	59.8	1.800	57.0	4.500	88.8	8.500	121.0
0.500	59.9	2.000	60.0	5.000	93.5	9.000	124.4
0.600	59.1	2.200	62.8	5.500	97.9	9.500	127.7
0.800	56.5	2.400	65.5	6.000	102.1		
1.000	52.7	2.600	68.1	6.500	106.2		

Complex Manhole: S2 - HYDROBRAKE, DS/PN: S1.010, Volume (m³): 41.6

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0370-8500-0900-8500
Design Head (m)	0.900
Design Flow (l/s)	85.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	370
Invert Level (m)	123.803
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	85.0
Flush-Flo™	0.510	85.0
Kick-Flo®	0.772	78.9
Mean Flow over Head Range	-	64.0

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

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Hydro-Brake® Optimum

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	10.5	1.200	97.7	3.000	152.7	7.000	231.2
0.200	37.0	1.400	105.3	3.500	164.6	7.500	239.2
0.300	69.7	1.600	112.4	4.000	175.7	8.000	246.9
0.400	83.7	1.800	119.0	4.500	186.2	8.500	254.3
0.500	85.0	2.000	125.3	5.000	196.0	9.000	261.6
0.600	84.3	2.200	131.2	5.500	205.4	9.500	266.2
0.800	80.3	2.400	136.9	6.000	214.4		
1.000	89.4	2.600	142.4	6.500	222.9		

Orifice

Diameter (m) 0.350 Discharge Coefficient 0.600 Invert Level (m) 125.603

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Storage Structures for PLOT 1 - SW

Tank or Pond Manhole: S29 - ACCESS BASIN, DS/PN: S1.004

Invert Level (m) 124.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	450.0	2.700	2000.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.324
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S35	480 Winter	1	+0%	30/15 Summer			
S1.001	S36	480 Winter	1	+0%	30/15 Summer			
S2.000	S27	480 Winter	1	+0%	30/15 Summer			
S2.001	S28	480 Winter	1	+0%	1/240 Winter			
S1.002	S37	480 Winter	1	+0%	1/120 Winter			
S3.000	S18	15 Winter	1	+0%	100/15 Summer			
S3.001	S17	15 Winter	1	+0%	30/30 Summer			
S3.002	S16	15 Winter	1	+0%	30/15 Summer			
S3.003	S15	15 Winter	1	+0%	100/15 Summer			
S3.004	S14	15 Winter	1	+0%	100/15 Summer			
S3.005	S13	480 Winter	1	+0%	30/240 Winter			
S4.000	S25	15 Winter	1	+0%	100/15 Summer			
S4.001	S24	15 Winter	1	+0%	30/15 Summer			
S4.002	S23	15 Winter	1	+0%	30/15 Winter			
S4.003	S22	15 Winter	1	+0%	30/15 Summer			
S4.004	S21	15 Winter	1	+0%	30/15 Summer			
S4.005	S20	15 Winter	1	+0%	100/15 Summer			
S4.006	S19	15 Winter	1	+0%	30/360 Winter			
S3.006	S12-POND1	480 Winter	1	+0%				
S5.000	S15	15 Winter	1	+0%	100/15 Summer			
S6.000	S16	15 Winter	1	+0%	30/15 Summer	100/15 Summer		

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S35	124.969	-0.131	0.000	0.02		1.4	OK	
S1.001	S36	124.968	-0.044	0.000	0.05		3.2	OK	
S2.000	S27	124.970	-0.120	0.000	0.06		3.7	OK	
S2.001	S28	124.968	0.041	0.000	0.07		3.6	SURCHARGED	
S1.002	S37	124.966	0.078	0.000	0.12		6.9	SURCHARGED	
S3.000	S18	125.833	-0.517	0.000	0.19		115.5	OK	
S3.001	S17	125.786	-0.419	0.000	0.35		214.3	OK	
S3.002	S16	125.705	-0.355	0.000	0.46		242.8	OK	
S3.003	S15	125.651	-0.350	0.000	0.63		242.9	OK	
S3.004	S14	125.409	-0.557	0.000	0.30		234.8	OK	
S3.005	S13	125.343	-0.424	0.000	0.07		52.0	OK	
S4.000	S25	126.088	-0.312	0.000	0.13		17.1	OK	
S4.001	S24	126.042	-0.221	0.000	0.51		46.3	OK	
S4.002	S23	125.924	-0.306	0.000	0.29		57.4	OK	
S4.003	S22	125.846	-0.264	0.000	0.37		57.1	OK	
S4.004	S21	125.809	-0.259	0.000	0.48		97.3	OK	
S4.005	S20	125.644	-0.302	0.000	0.46		94.0	OK	
S4.006	S19	125.485	-0.315	0.000	0.42		94.8	OK	
S3.006	S12-POND1	125.329	-2.171	0.000	0.00		73.1	OK	
S5.000	S15	126.090	-0.210	0.000	0.38		56.7	OK	
S6.000	S16	126.200	-0.100	0.000	0.58		32.1	OK	4

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood
S5.001	S16	15 Winter	1	+0%	30/15 Summer	
S3.007	S11-POND2	480 Winter	1	+0%		
S7.000	S18	15 Winter	1	+0%	30/15 Summer	100/15 Summer
S8.000	S20	15 Winter	1	+0%	30/15 Summer	100/15 Summer
S7.001	S20	15 Winter	1	+0%	30/15 Summer	
S9.000	S22	15 Winter	1	+0%	30/15 Summer	
S7.002	S22	15 Winter	1	+0%	30/15 Summer	
S7.003	S19	15 Winter	1	+0%	30/15 Winter	
S3.008	S10-POND3	480 Winter	1	+0%		
S3.009	S9-POND4	480 Winter	1	+0%	30/120 Winter	
S3.010	SHBRAKE	1440 Winter	1	+0%	1/30 Winter	
S3.011	S7	480 Winter	1	+0%	30/30 Summer	
S10.000	S34	15 Winter	1	+0%	30/15 Winter	
S10.001	S35	15 Winter	1	+0%	30/15 Summer	
S10.002	S36	15 Winter	1	+0%	30/15 Winter	
S10.003	S37	15 Winter	1	+0%	30/15 Summer	
S10.004	S38	15 Winter	1	+0%	30/15 Summer	
S10.005	S39	15 Winter	1	+0%	30/15 Summer	
S1.003	S28	480 Winter	1	+0%	30/240 Winter	
S1.004	S29 - ACCESS BASIN	480 Winter	1	+0%	30/120 Winter	
S1.005	SACCESS ROAD HBRAKE	360 Winter	1	+0%	1/120 Summer	100/360 Winter
S1.006	S6	120 Winter	1	+0%	30/30 Summer	100/120 Summer
S1.007	S5	120 Winter	1	+0%	30/15 Winter	
S1.008	S4	120 Winter	1	+0%	30/15 Summer	
S1.009	S3	120 Winter	1	+0%	30/15 Summer	
S11.000	S41	15 Summer	1	+0%	30/15 Summer	
S11.001	S42	15 Winter	1	+0%	100/120 Summer	
S11.002	S43	15 Winter	1	+0%	100/60 Winter	
S11.003	S44	15 Winter	1	+0%	100/30 Winter	
S11.004	S45	15 Winter	1	+0%	100/30 Summer	
S11.005	S45	15 Winter	1	+0%	100/15 Winter	
S12.000	S46	15 Winter	1	+0%	30/15 Summer	
S1.010	S2 - HYDROBRAKE	120 Winter	1	+0%	1/30 Summer	
S1.011	S50	240 Winter	1	+0%	100/60 Winter	
S1.012	S47	240 Winter	1	+0%	100/60 Winter	
S1.013	S51	240 Winter	1	+0%	100/60 Winter	
S1.014	S47	120 Summer	1	+0%	100/60 Winter	
S1.015	S49	240 Summer	1	+0%	100/30 Winter	

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)
S5.001	S16			125.513	-0.189	0.000	0.63	
S3.007	S11-POND2			125.327	-2.173	0.000	0.00	
S7.000	S18			125.965	-0.190	0.000	0.48	
S8.000	S20			125.956	-0.119	0.000	0.44	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
S7.001	S20			125.824	-0.144	0.000	0.67	
S9.000	S22			125.872	-0.128	0.000	0.38	
S7.002	S22			125.681	-0.103	0.000	0.87	
S7.003	S19			125.387	-0.224	0.000	0.50	
S3.008	S10-POND3			125.322	-2.178	0.000	0.00	
S3.009	S9-POND4			125.321	-0.279	0.000	0.05	
S3.010	SHBRAKE			125.338	0.205	0.000	0.27	
S3.011	S7			125.045	-0.027	0.000	0.28	
S10.000	S34			125.544	-0.406	0.000	0.07	
S10.001	S35			125.536	-0.341	0.000	0.35	
S10.002	S36			125.443	-0.362	0.000	0.37	
S10.003	S37			125.387	-0.345	0.000	0.40	
S10.004	S38			125.328	-0.331	0.000	0.53	
S10.005	S39			125.198	-0.341	0.000	0.58	
S1.003	S28			124.963	-0.491	0.000	0.07	
S1.004	S29 - ACCESS BASIN			124.939	-0.411	0.000	0.07	
S1.005	SACCESS ROAD HBRAKE			124.975	0.113	0.000	0.34	
S1.006	S6			124.529	-0.301	0.000	0.23	
S1.007	S5			124.493	-0.251	0.000	0.23	
S1.008	S4			124.451	-0.197	0.000	0.22	
S1.009	S3			124.386	-0.062	0.000	0.31	
S11.000	S41			125.920	0.000	0.000	1.01	
S11.001	S42			125.174	-0.726	0.000	0.08	
S11.002	S43			124.970	-0.737	0.000	0.07	
S11.003	S44			124.778	-0.726	0.000	0.08	
S11.004	S45			124.594	-0.707	0.000	0.08	
S11.005	S45			124.472	-0.694	0.000	0.12	
S12.000	S46			125.462	-0.202	0.000	0.57	
S1.010	S2 - HYDROBRAKE			124.337	0.159	0.000	0.29	
S1.011	S50			119.953	-0.169	0.000	0.59	
S1.012	S47			117.619	-0.169	0.000	0.59	
S1.013	S51			115.406	-0.169	0.000	0.58	
S1.014	S47			114.346	-0.171	0.000	0.58	
S1.015	S49			114.146	-0.122	0.000	0.79	

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S5.001	S16	106.4	OK	
S3.007	S11-POND2	73.8	OK	
S7.000	S18	60.8	OK	3
S8.000	S20	14.6	OK	4
S7.001	S20	71.8	OK	
S9.000	S22	17.9	OK	
S7.002	S22	84.9	OK	
S7.003	S19	84.7	OK	

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S3.008	S10-POND3	45.4	OK	
S3.009	S9-POND4	39.3	OK*	
S3.010	SHBRAKE	33.0	SURCHARGED	
S3.011	S7	36.4	OK	
S10.000	S34	17.2	OK	
S10.001	S35	90.5	OK	
S10.002	S36	161.8	OK	
S10.003	S37	176.6	OK	
S10.004	S38	250.9	OK	
S10.005	S39	249.0	OK	
S1.003	S28	84.3	OK	
S1.004	S29 - ACCESS BASIN	57.5	OK	
S1.005	SACCESS ROAD HBRAKE	58.9	SURCHARGED	1
S1.006	S6	59.7	OK	2
S1.007	S5	60.3	OK	
S1.008	S4	62.8	OK	
S1.009	S3	70.7	OK	
S11.000	S41	44.9	OK	
S11.001	S42	62.1	OK	
S11.002	S43	57.0	OK	
S11.003	S44	63.0	OK	
S11.004	S45	61.7	OK	
S11.005	S45	60.4	OK	
S12.000	S46	96.5	OK	
S1.010	S2 - HYDROBRAKE	85.0	SURCHARGED	
S1.011	S50	85.0	OK	
S1.012	S47	85.0	OK	
S1.013	S51	85.0	OK	
S1.014	S47	85.0	OK	
S1.015	S49	85.0	OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.324
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S35	480 Winter	30	+0%	30/15 Summer			
S1.001	S36	480 Winter	30	+0%	30/15 Summer			
S2.000	S27	480 Winter	30	+0%	30/15 Summer			
S2.001	S28	480 Winter	30	+0%	1/240 Winter			
S1.002	S37	480 Winter	30	+0%	1/120 Winter			
S3.000	S18	15 Winter	30	+0%	100/15 Summer			
S3.001	S17	30 Summer	30	+0%	30/30 Summer			
S3.002	S16	15 Winter	30	+0%	30/15 Summer			
S3.003	S15	15 Summer	30	+0%	100/15 Summer			
S3.004	S14	480 Winter	30	+0%	100/15 Summer			
S3.005	S13	480 Winter	30	+0%	30/240 Winter			
S4.000	S25	15 Winter	30	+0%	100/15 Summer			
S4.001	S24	15 Winter	30	+0%	30/15 Summer			
S4.002	S23	15 Winter	30	+0%	30/15 Winter			
S4.003	S22	15 Winter	30	+0%	30/15 Summer			
S4.004	S21	15 Winter	30	+0%	30/15 Summer			
S4.005	S20	15 Winter	30	+0%	100/15 Summer			
S4.006	S19	480 Winter	30	+0%	30/360 Winter			
S3.006	S12-POND1	480 Winter	30	+0%				
S5.000	S15	15 Winter	30	+0%	100/15 Summer			
S6.000	S16	15 Winter	30	+0%	30/15 Summer	100/15 Summer		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S35	125.564	0.464	0.000	0.05		2.9	SURCHARGED	
S1.001	S36	125.562	0.550	0.000	0.12		6.9	SURCHARGED	
S2.000	S27	125.565	0.475	0.000	0.13		7.7	SURCHARGED	
S2.001	S28	125.562	0.635	0.000	0.17		8.8	SURCHARGED	
S1.002	S37	125.560	0.672	0.000	0.31		17.9	SURCHARGED	
S3.000	S18	126.350	0.000	0.000	0.43		266.7	OK	
S3.001	S17	126.205	0.000	0.000	0.73		451.5	SURCHARGED	
S3.002	S16	126.086	0.026	0.000	1.16		616.1	SURCHARGED	
S3.003	S15	126.001	0.000	0.000	1.33		514.8	OK	
S3.004	S14	125.959	-0.007	0.000	0.14		110.9	OK	
S3.005	S13	125.870	0.103	0.000	0.15		102.3	SURCHARGED	
S4.000	S25	126.345	-0.055	0.000	0.30		40.7	OK	
S4.001	S24	126.278	0.015	0.000	1.47		133.8	SURCHARGED	
S4.002	S23	126.245	0.015	0.000	0.76		149.4	SURCHARGED	
S4.003	S22	126.196	0.086	0.000	0.90		139.8	SURCHARGED	
S4.004	S21	126.158	0.090	0.000	1.18		237.2	SURCHARGED	
S4.005	S20	125.931	-0.015	0.000	1.00		206.1	OK	
S4.006	S19	125.870	0.070	0.000	0.21		47.7	SURCHARGED	
S3.006	S12-POND1	125.869	-1.631	0.000	0.00		145.4	OK	
S5.000	S15	126.272	-0.028	0.000	0.90		133.3	OK	
S6.000	S16	126.663	0.363	0.000	1.26		69.5	SURCHARGED	4

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood
S5.001	S16	480 Winter	30	+0%	30/15 Summer	
S3.007	S11-POND2	480 Winter	30	+0%		
S7.000	S18	15 Winter	30	+0%	30/15 Summer	100/15 Summer
S8.000	S20	15 Winter	30	+0%	30/15 Summer	100/15 Summer
S7.001	S20	15 Winter	30	+0%	30/15 Summer	
S9.000	S22	15 Winter	30	+0%	30/15 Summer	
S7.002	S22	15 Winter	30	+0%	30/15 Summer	
S7.003	S19	480 Winter	30	+0%	30/15 Winter	
S3.008	S10-POND3	480 Winter	30	+0%		
S3.009	S9-POND4	480 Winter	30	+0%	30/120 Winter	
S3.010	SHBRAKE	960 Winter	30	+0%	1/30 Winter	
S3.011	S7	480 Winter	30	+0%	30/30 Summer	
S10.000	S34	15 Winter	30	+0%	30/15 Winter	
S10.001	S35	15 Winter	30	+0%	30/15 Summer	
S10.002	S36	15 Winter	30	+0%	30/15 Winter	
S10.003	S37	15 Winter	30	+0%	30/15 Summer	
S10.004	S38	15 Winter	30	+0%	30/15 Summer	
S10.005	S39	15 Winter	30	+0%	30/15 Summer	
S1.003	S28	480 Winter	30	+0%	30/240 Winter	
S1.004	S29 - ACCESS BASIN	480 Winter	30	+0%	30/120 Winter	
S1.005	SACCESS ROAD HBRAKE	120 Winter	30	+0%	1/120 Summer	100/360 Winter
S1.006	S6	120 Winter	30	+0%	30/30 Summer	100/120 Summer
S1.007	S5	120 Winter	30	+0%	30/15 Winter	
S1.008	S4	120 Winter	30	+0%	30/15 Summer	
S1.009	S3	120 Winter	30	+0%	30/15 Summer	
S11.000	S41	15 Winter	30	+0%	30/15 Summer	
S11.001	S42	15 Winter	30	+0%	100/120 Summer	
S11.002	S43	60 Winter	30	+0%	100/60 Winter	
S11.003	S44	60 Winter	30	+0%	100/30 Winter	
S11.004	S45	120 Winter	30	+0%	100/30 Summer	
S11.005	S45	120 Winter	30	+0%	100/15 Winter	
S12.000	S46	15 Winter	30	+0%	30/15 Summer	
S1.010	S2 - HYDROBRAKE	120 Winter	30	+0%	1/30 Summer	
S1.011	S50	120 Winter	30	+0%	100/60 Winter	
S1.012	S47	120 Winter	30	+0%	100/60 Winter	
S1.013	S51	120 Winter	30	+0%	100/60 Winter	
S1.014	S47	120 Winter	30	+0%	100/60 Winter	
S1.015	S49	120 Winter	30	+0%	100/30 Winter	

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)
S5.001	S16			125.864	0.162	0.000	0.22	
S3.007	S11-POND2			125.863	-1.637	0.000	0.00	
S7.000	S18			126.533	0.378	0.000	0.99	
S8.000	S20			126.422	0.347	0.000	0.86	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)
S7.001	S20			126.340	0.372	0.000	1.41	
S9.000	S22			126.088	0.088	0.000	0.83	
S7.002	S22			125.958	0.174	0.000	1.89	
S7.003	S19			125.854	0.243	0.000	0.18	
S3.008	S10-POND3			125.854	-1.646	0.000	0.00	
S3.009	S9-POND4			125.853	0.253	0.000	0.05	
S3.010	SHBRAKE			125.849	0.716	0.000	0.32	
S3.011	S7			125.616	0.544	0.000	0.30	
S10.000	S34			125.991	0.041	0.000	0.15	
S10.001	S35			125.972	0.095	0.000	0.83	
S10.002	S36			125.906	0.101	0.000	0.87	
S10.003	S37			125.852	0.120	0.000	0.96	
S10.004	S38			125.781	0.122	0.000	1.28	
S10.005	S39			125.577	0.038	0.000	1.39	
S1.003	S28			125.554	0.100	0.000	0.11	
S1.004	S29 - ACCESS BASIN			125.552	0.202	0.000	0.07	
S1.005	SACCESS ROAD HBRAKE			125.841	0.979	0.000	0.35	
S1.006	S6			125.114	0.284	0.000	0.23	
S1.007	S5			125.035	0.291	0.000	0.24	
S1.008	S4			125.024	0.376	0.000	0.25	
S1.009	S3			125.012	0.564	0.000	0.37	
S11.000	S41			126.139	0.219	0.000	2.76	
S11.001	S42			125.288	-0.612	0.000	0.20	
S11.002	S43			125.137	-0.570	0.000	0.11	
S11.003	S44			125.115	-0.389	0.000	0.12	
S11.004	S45			125.076	-0.225	0.000	0.07	
S11.005	S45			125.022	-0.144	0.000	0.09	
S12.000	S46			125.746	0.082	0.000	1.41	
S1.010	S2 - HYDROBRAKE			125.002	0.824	0.000	0.34	
S1.011	S50			119.972	-0.150	0.000	0.67	
S1.012	S47			117.638	-0.150	0.000	0.67	
S1.013	S51			115.425	-0.150	0.000	0.67	
S1.014	S47			114.365	-0.152	0.000	0.66	
S1.015	S49			114.172	-0.096	0.000	0.91	

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S5.001	S16	36.2	SURCHARGED	
S3.007	S11-POND2	137.2	OK	
S7.000	S18	126.9	SURCHARGED	3
S8.000	S20	28.7	SURCHARGED	4
S7.001	S20	150.2	SURCHARGED	
S9.000	S22	39.6	SURCHARGED	
S7.002	S22	184.7	SURCHARGED	
S7.003	S19	29.7	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded	
S3.008	S10-POND3	61.6	OK		
S3.009	S9-POND4	40.2	SURCHARGED*		
S3.010	SHBRAKE	39.9	SURCHARGED		
S3.011	S7	39.8	SURCHARGED		
S10.000	S34	37.7	SURCHARGED		
S10.001	S35	213.8	SURCHARGED		
S10.002	S36	385.2	SURCHARGED		
S10.003	S37	422.6	SURCHARGED		
S10.004	S38	612.0	SURCHARGED		
S10.005	S39	601.9	SURCHARGED		
S1.003	S28	134.8	SURCHARGED		
S1.004	S29 - ACCESS BASIN	65.0	SURCHARGED		
S1.005	SACCESS ROAD HBRAKE	59.8	SURCHARGED		1
S1.006	S6	60.2	SURCHARGED		2
S1.007	S5	63.2	SURCHARGED		
S1.008	S4	71.9	SURCHARGED		
S1.009	S3	82.3	SURCHARGED		
S11.000	S41	123.0	SURCHARGED		
S11.001	S42	161.5	OK		
S11.002	S43	88.8	OK		
S11.003	S44	93.0	OK		
S11.004	S45	50.5	OK		
S11.005	S45	43.1	OK		
S12.000	S46	237.9	SURCHARGED		
S1.010	S2 - HYDROBRAKE	97.3	SURCHARGED		
S1.011	S50	97.2	OK		
S1.012	S47	97.2	OK		
S1.013	S51	97.2	OK		
S1.014	S47	97.3	OK		
S1.015	S49	97.4	OK		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.324
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
S1.000	S35	480 Winter	100	+30%	30/15 Summer		
S1.001	S36	480 Winter	100	+30%	30/15 Summer		
S2.000	S27	15 Winter	100	+30%	30/15 Summer		
S2.001	S28	480 Winter	100	+30%	1/240 Winter		
S1.002	S37	480 Winter	100	+30%	1/120 Winter		
S3.000	S18	15 Winter	100	+30%	100/15 Summer		
S3.001	S17	15 Winter	100	+30%	30/30 Summer		
S3.002	S16	15 Winter	100	+30%	30/15 Summer		
S3.003	S15	1440 Winter	100	+30%	100/15 Summer		
S3.004	S14	1440 Winter	100	+30%	100/15 Summer		
S3.005	S13	1440 Winter	100	+30%	30/240 Winter		
S4.000	S25	15 Winter	100	+30%	100/15 Summer		
S4.001	S24	15 Winter	100	+30%	30/15 Summer		
S4.002	S23	15 Winter	100	+30%	30/15 Winter		
S4.003	S22	15 Winter	100	+30%	30/15 Summer		
S4.004	S21	15 Winter	100	+30%	30/15 Summer		
S4.005	S20	1440 Winter	100	+30%	100/15 Summer		
S4.006	S19	1440 Winter	100	+30%	30/360 Winter		
S3.006	S12-POND1	1440 Winter	100	+30%			
S5.000	S15	15 Winter	100	+30%	100/15 Summer		
S6.000	S16	15 Winter	100	+30%	30/15 Summer	100/15 Summer	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
S1.000	S35		126.420	1.320	0.000	0.08		4.8	SURCHARGED
S1.001	S36		126.418	1.406	0.000	0.19		11.5	SURCHARGED
S2.000	S27		126.498	1.408	0.000	1.38		83.1	SURCHARGED
S2.001	S28		126.416	1.489	0.000	0.28		14.6	SURCHARGED
S1.002	S37		126.413	1.525	0.000	0.52		29.5	SURCHARGED
S3.000	S18		127.130	0.780	0.000	0.67		414.5	FLOOD RISK
S3.001	S17		127.070	0.865	0.000	1.43		882.5	SURCHARGED
S3.002	S16		126.760	0.700	0.000	2.03		1079.3	SURCHARGED
S3.003	S15		126.607	0.606	0.000	0.23		87.6	SURCHARGED
S3.004	S14		126.605	0.639	0.000	0.11		89.0	SURCHARGED
S3.005	S13		126.606	0.839	0.000	0.13		88.5	SURCHARGED
S4.000	S25		127.237	0.837	0.000	0.44		58.8	FLOOD RISK
S4.001	S24		127.203	0.940	0.000	2.13		193.7	SURCHARGED
S4.002	S23		127.128	0.898	0.000	1.22		238.0	SURCHARGED
S4.003	S22		126.983	0.873	0.000	1.51		234.4	SURCHARGED
S4.004	S21		126.906	0.838	0.000	2.03		407.1	SURCHARGED
S4.005	S20		126.607	0.661	0.000	0.16		32.2	SURCHARGED
S4.006	S19		126.606	0.806	0.000	0.15		33.1	SURCHARGED
S3.006	S12-POND1		126.604	-0.896	0.000	0.00		118.8	OK
S5.000	S15		127.266	0.966	0.000	1.38		204.1	FLOOD RISK
S6.000	S16		127.504	1.204	4.398	1.69		93.1	FLOOD

PN	US/MH Name	Level Exceeded
S1.000	S35	
S1.001	S36	
S2.000	S27	
S2.001	S28	
S1.002	S37	
S3.000	S18	
S3.001	S17	
S3.002	S16	
S3.003	S15	
S3.004	S14	
S3.005	S13	
S4.000	S25	
S4.001	S24	
S4.002	S23	
S4.003	S22	
S4.004	S21	
S4.005	S20	
S4.006	S19	
S3.006	S12-POND1	
S5.000	S15	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Level Exceeded
S6.000	S16	4

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood
S5.001	S16	1440 Winter	100	+30%	30/15 Summer	
S3.007	S11-POND2	1440 Winter	100	+30%		
S7.000	S18	15 Winter	100	+30%	30/15 Summer	100/15 Summer
S8.000	S20	15 Winter	100	+30%	30/15 Summer	100/15 Summer
S7.001	S20	15 Winter	100	+30%	30/15 Summer	
S9.000	S22	15 Winter	100	+30%	30/15 Summer	
S7.002	S22	1440 Winter	100	+30%	30/15 Summer	
S7.003	S19	1440 Winter	100	+30%	30/15 Winter	
S3.008	S10-POND3	1440 Winter	100	+30%		
S3.009	S9-POND4	1440 Winter	100	+30%	30/120 Winter	
S3.010	SHBRAKE	1440 Winter	100	+30%	1/30 Winter	
S3.011	S7	480 Winter	100	+30%	30/30 Summer	
S10.000	S34	15 Winter	100	+30%	30/15 Winter	
S10.001	S35	15 Winter	100	+30%	30/15 Summer	
S10.002	S36	15 Winter	100	+30%	30/15 Winter	
S10.003	S37	15 Winter	100	+30%	30/15 Summer	
S10.004	S38	15 Winter	100	+30%	30/15 Summer	
S10.005	S39	480 Winter	100	+30%	30/15 Summer	
S1.003	S28	480 Winter	100	+30%	30/240 Winter	
S1.004	S29 - ACCESS BASIN	480 Winter	100	+30%	30/120 Winter	
S1.005	SACCESS ROAD HBRAKE	480 Winter	100	+30%	1/120 Summer	100/360 Winter
S1.006	S6	240 Winter	100	+30%	30/30 Summer	100/120 Summer
S1.007	S5	240 Winter	100	+30%	30/15 Winter	
S1.008	S4	240 Winter	100	+30%	30/15 Summer	
S1.009	S3	240 Winter	100	+30%	30/15 Summer	
S11.000	S41	15 Winter	100	+30%	30/15 Summer	
S11.001	S42	120 Winter	100	+30%	100/120 Summer	
S11.002	S43	120 Winter	100	+30%	100/60 Winter	
S11.003	S44	120 Winter	100	+30%	100/30 Winter	
S11.004	S45	120 Winter	100	+30%	100/30 Summer	
S11.005	S45	240 Winter	100	+30%	100/15 Winter	
S12.000	S46	15 Winter	100	+30%	30/15 Summer	
S1.010	S2 - HYDROBRAKE	240 Winter	100	+30%	1/30 Summer	
S1.011	S50	240 Winter	100	+30%	100/60 Winter	
S1.012	S47	240 Winter	100	+30%	100/60 Winter	
S1.013	S51	240 Winter	100	+30%	100/60 Winter	
S1.014	S47	240 Winter	100	+30%	100/60 Winter	
S1.015	S49	240 Winter	100	+30%	100/30 Winter	

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)
S5.001	S16			126.601	0.899	0.000	0.15	
S3.007	S11-POND2			126.599	-0.901	0.000	0.00	
S7.000	S18			127.504	1.349	4.477	1.48	
S8.000	S20			127.203	1.128	3.108	1.67	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
S7.001	S20			127.119	1.151	0.000	2.00	
S9.000	S22			126.753	0.753	0.000	1.29	
S7.002	S22			126.589	0.805	0.000	0.21	
S7.003	S19			126.587	0.976	0.000	0.12	
S3.008	S10-POND3			126.585	-0.915	0.000	0.00	
S3.009	S9-POND4			126.583	0.983	0.000	0.05	
S3.010	SHBRAKE			126.594	1.461	0.000	0.32	
S3.011	S7			126.403	1.331	0.000	0.28	
S10.000	S34			127.068	1.118	0.000	0.22	
S10.001	S35			127.055	1.178	0.000	1.39	
S10.002	S36			126.917	1.112	0.000	1.47	
S10.003	S37			126.743	1.011	0.000	1.63	
S10.004	S38			126.523	0.864	0.000	2.23	
S10.005	S39			126.411	0.872	0.000	0.44	
S1.003	S28			126.403	0.949	0.000	0.17	
S1.004	S29 - ACCESS BASIN			126.402	1.052	0.000	0.07	
S1.005	SACCESS ROAD HBRAKE			128.000	3.138	0.029	0.33	
S1.006	S6			127.402	2.572	5.270	0.37	
S1.007	S5			126.083	1.339	0.000	0.35	
S1.008	S4			126.083	1.435	0.000	0.27	
S1.009	S3			125.901	1.453	0.000	0.38	
S11.000	S41			126.572	0.652	0.000	4.59	
S11.001	S42			125.921	0.021	0.000	0.13	
S11.002	S43			125.912	0.205	0.000	0.09	
S11.003	S44			125.904	0.400	0.000	0.11	
S11.004	S45			125.893	0.592	0.000	0.13	
S11.005	S45			125.883	0.717	0.000	0.13	
S12.000	S46			126.080	0.416	0.000	2.34	
S1.010	S2 - HYDROBRAKE			125.881	1.703	0.000	0.64	
S1.011	S50			120.192	0.070	0.000	1.28	
S1.012	S47			117.855	0.067	0.000	1.29	
S1.013	S51			115.645	0.070	0.000	1.28	
S1.014	S47			114.629	0.112	0.000	1.26	
S1.015	S49			114.407	0.139	0.000	1.71	

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S5.001	S16	25.6	SURCHARGED	
S3.007	S11-POND2	108.4	OK	
S7.000	S18	189.0	FLOOD	3
S8.000	S20	55.6	FLOOD	4
S7.001	S20	214.0	SURCHARGED	
S9.000	S22	61.6	SURCHARGED	
S7.002	S22	20.5	SURCHARGED	
S7.003	S19	20.4	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for PLOT 1 - SW

PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
S3.008	S10-POND3	51.2	OK	
S3.009	S9-POND4	41.7	SURCHARGED*	
S3.010	SHBRAKE	40.0	SURCHARGED	
S3.011	S7	37.1	SURCHARGED	
S10.000	S34	57.7	FLOOD RISK	
S10.001	S35	356.6	SURCHARGED	
S10.002	S36	647.7	SURCHARGED	
S10.003	S37	722.1	SURCHARGED	
S10.004	S38	1060.4	SURCHARGED	
S10.005	S39	192.5	SURCHARGED	
S1.003	S28	219.3	SURCHARGED	
S1.004	S29 - ACCESS BASIN	63.2	SURCHARGED	
S1.005	SACCESS ROAD HBRAKE	57.1	FLOOD	1
S1.006	S6	97.9	FLOOD	2
S1.007	S5	93.4	SURCHARGED	
S1.008	S4	76.4	SURCHARGED	
S1.009	S3	84.5	SURCHARGED	
S11.000	S41	204.7	SURCHARGED	
S11.001	S42	102.2	SURCHARGED	
S11.002	S43	74.0	SURCHARGED	
S11.003	S44	90.6	SURCHARGED	
S11.004	S45	97.7	SURCHARGED	
S11.005	S45	65.7	SURCHARGED	
S12.000	S46	395.9	SURCHARGED	
S1.010	S2 - HYDROBRAKE	185.8	SURCHARGED	
S1.011	S50	186.3	SURCHARGED	
S1.012	S47	186.6	SURCHARGED	
S1.013	S51	186.5	SURCHARGED	
S1.014	S47	185.4	SURCHARGED	
S1.015	S49	182.9	SURCHARGED	

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Time Area Diagram for H'WAY

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.126	8-12	0.666	12-16	0.340

Total Area Contributing (ha) = 1.132

Total Pipe Volume (m^3) = 652.107

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Existing Network Details for H'WAY

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
SR-H1.000	41.183	0.366	112.5	0.164	5.00	0.0	0.600		o	300	Pipe/Conduit
SR-H1.001	26.158	0.169	154.8	0.065	0.00	0.0	0.600		o	300	Pipe/Conduit
SR-H1.002	19.626	0.126	155.8	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit
SR-H2.000	25.861	0.736	35.1	0.063	5.00	0.0	0.600		o	225	Pipe/Conduit
SR-H3.000	11.363	0.057	199.4	0.070	5.00	0.0	0.600		o	225	Pipe/Conduit
SR-H3.001	20.693	0.104	199.0	0.044	0.00	0.0	0.600		o	225	Pipe/Conduit
SR-H1.003	43.641	0.147	296.9	0.101	0.00	0.0	0.600		o	300	Pipe/Conduit
SR-H1.004	65.772	0.219	300.3	0.117	0.00	0.0	0.600		o	375	Pipe/Conduit
SR-H1.005	50.081	0.333	150.4	0.078	0.00	0.0	0.600		o	375	Pipe/Conduit
SR-H1.006	73.175	0.415	176.3	0.131	0.00	0.0	0.600		o	375	Pipe/Conduit
SR-H4.000	21.542	0.050	430.8	0.152	5.00	0.0	0.600		o	375	Pipe/Conduit
SR-H1.007	12.484	0.083	150.4	0.006	0.00	0.0	0.600		o	225	Pipe/Conduit
SR-H1.008	54.895	0.183	300.0	0.137	0.00	0.0	0.600		o	600	Pipe/Conduit
SR-H1.009	54.303	0.272	199.6	0.004	0.00	0.0	0.600		o	225	Pipe/Conduit
SR-H1.010	80.432	0.201	400.2	0.000	0.00	0.0		0.045	1 _/	500	1:1 Ditch
SR-H1.011	108.819	0.628	173.3	0.000	0.00	0.0		0.045	1 _/	500	1:1 Ditch
SR-H1.012	55.085	1.100	50.1	0.000	0.00	0.0		0.045	1 _/	500	1:1 Ditch
SR-H1.013	50.174	1.000	50.2	0.000	0.00	0.0		0.045	1 _/	500	1:1 Ditch

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
SR-H1.000	127.950	0.164	0.0	1.48	104.7
SR-H1.001	127.584	0.228	0.0	1.26	89.2
SR-H1.002	127.415	0.228	0.0	1.26	88.9
SR-H2.000	128.100	0.063	0.0	2.21	88.0
SR-H3.000	127.525	0.070	0.0	0.92	36.7
SR-H3.001	127.468	0.114	0.0	0.92	36.7
SR-H1.003	127.289	0.506	0.0	0.91	64.1
SR-H1.004	127.067	0.623	0.0	1.04	114.9
SR-H1.005	126.848	0.701	0.0	1.48	162.9
SR-H1.006	126.515	0.833	0.0	1.36	150.4
SR-H4.000	126.150	0.152	0.0	0.87	95.7
SR-H1.007	126.100	0.990	0.0	1.06	42.3
SR-H1.008	124.383	1.127	0.0	1.40	396.1
SR-H1.009	124.200	1.132	0.0	0.92	36.6
SR-H1.010	123.928	1.132	0.0	0.73	1534.6
SR-H1.011	123.728	1.132	0.0	1.13	2554.5
SR-H1.012	123.100	1.132	0.0	1.74	2196.9
SR-H1.013	122.000	1.132	0.0	1.84	2766.1

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Existing Network Details for H'WAY

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
SR-H1.014	26.628	1.100	24.2	0.000	0.00	0.0		0.045	1 _/	500	1:1 Ditch

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
SR-H1.014	121.000	1.132	0.0	2.65	3982.4

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Online Controls for H'WAY

Hydro-Brake® Optimum Manhole: SR-H1-11-HB, DS/PN: SR-H1.007, Volume (m³): 14.9

Unit Reference	MD-SHE-0113-5000-0500-5000
Design Head (m)	0.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	113
Invert Level (m)	126.100
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	5.0	Kick-Flo®	0.372	4.4
Flush-Flo™	0.179	5.0	Mean Flow over Head Range	-	4.1

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	3.9	1.200	7.5	3.000	11.6	7.000	17.4
0.200	5.0	1.400	8.1	3.500	12.5	7.500	18.1
0.300	4.8	1.600	8.6	4.000	13.3	8.000	18.7
0.400	4.5	1.800	9.1	4.500	14.1	8.500	19.2
0.500	5.0	2.000	9.6	5.000	14.8	9.000	19.8
0.600	5.4	2.200	10.0	5.500	15.4	9.500	20.3
0.800	6.2	2.400	10.4	6.000	16.1		
1.000	6.9	2.600	10.8	6.500	16.8		

Complex Manhole: SR-H1-15, DS/PN: SR-H1.011, Volume (m³): 169.3

Orifice

Diameter (m) 0.087 Discharge Coefficient 0.600 Invert Level (m) 123.728

Weir

Discharge Coef 0.544 Width (m) 1.900 Invert Level (m) 124.428

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Storage Structures for H'WAY

Tank or Pond Manhole: SR-H1-HEADWALL01, DS/PN: SR-H4.000

Invert Level (m) 126.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1084.0	1.400	1706.0	1.401	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for H'WAY

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.324
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
SR-H1.000	SR-H1-1	15 Winter	1	+0%	30/15 Winter		
SR-H1.001	SR-H1-2	15 Winter	1	+0%	30/15 Summer	100/15 Winter	
SR-H1.002	SR-H1-3	15 Winter	1	+0%	30/15 Summer		
SR-H2.000	SR-H1-4	15 Winter	1	+0%	100/15 Summer		
SR-H3.000	SR-H1-5	15 Winter	1	+0%	30/15 Summer	100/15 Summer	
SR-H3.001	SR-H1-6	15 Winter	1	+0%	30/15 Summer		
SR-H1.003	SR-H1-7	15 Winter	1	+0%	30/15 Summer		
SR-H1.004	SR-H1-8	15 Winter	1	+0%	30/15 Summer		
SR-H1.005	SR-H1-9	15 Winter	1	+0%	30/15 Winter		
SR-H1.006	SR-H1-10	15 Winter	1	+0%	30/15 Summer		
SR-H4.000	SR-H1-HEADWALL01	360 Winter	1	+0%	100/120 Winter		
SR-H1.007	SR-H1-11-HB	15 Winter	1	+0%	1/15 Summer		
SR-H1.008	SR-H1-12-CP	15 Winter	1	+0%			
SR-H1.009	SR-H1-13-CP	15 Winter	1	+0%	30/15 Summer		
SR-H1.010	SR-H1-14	30 Winter	1	+0%			
SR-H1.011	SR-H1-15	120 Winter	1	+0%			
SR-H1.012	SR-H1-16	120 Winter	1	+0%			
SR-H1.013	SR-H1-17	120 Winter	1	+0%			
SR-H1.014	SR-H1-18	120 Winter	1	+0%			

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for H'WAY

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
SR-H1.000	SR-H1-1		128.041	-0.209	0.000	0.20		19.2	OK
SR-H1.001	SR-H1-2		127.701	-0.183	0.000	0.32		25.7	OK
SR-H1.002	SR-H1-3		127.549	-0.166	0.000	0.33		25.3	OK
SR-H2.000	SR-H1-4		128.146	-0.179	0.000	0.09		7.5	OK
SR-H3.000	SR-H1-5		127.605	-0.145	0.000	0.27		8.4	OK
SR-H3.001	SR-H1-6		127.565	-0.128	0.000	0.38		12.8	OK
SR-H1.003	SR-H1-7		127.511	-0.078	0.000	0.87		52.0	OK
SR-H1.004	SR-H1-8		127.272	-0.170	0.000	0.55		60.0	OK
SR-H1.005	SR-H1-9		127.021	-0.202	0.000	0.43		65.1	OK
SR-H1.006	SR-H1-10		126.707	-0.183	0.000	0.51		72.5	OK
SR-H4.000	SR-H1-HEADWALL01		126.239	-0.286	0.000	0.05		4.3	OK
SR-H1.007	SR-H1-11-HB		126.584	0.259	0.000	0.14		5.0	SURCHARGED
SR-H1.008	SR-H1-12-CP		124.472	-0.511	0.000	0.05		18.6	OK
SR-H1.009	SR-H1-13-CP		124.316	-0.109	0.000	0.51		18.1	OK
SR-H1.010	SR-H1-14		124.063	-1.087	0.000	0.01		16.0	OK
SR-H1.011	SR-H1-15		124.016	-0.984	0.000	0.00		7.8	OK
SR-H1.012	SR-H1-16		123.142	-0.858	0.000	0.00		7.8	OK
SR-H1.013	SR-H1-17		122.041	-0.959	0.000	0.00		7.8	OK
SR-H1.014	SR-H1-18		121.033	-0.967	0.000	0.00		7.8	OK

PN	US/MH Name	Level Exceeded
SR-H1.000	SR-H1-1	
SR-H1.001	SR-H1-2	2
SR-H1.002	SR-H1-3	
SR-H2.000	SR-H1-4	
SR-H3.000	SR-H1-5	4
SR-H3.001	SR-H1-6	
SR-H1.003	SR-H1-7	
SR-H1.004	SR-H1-8	
SR-H1.005	SR-H1-9	
SR-H1.006	SR-H1-10	
SR-H4.000	SR-H1-HEADWALL01	
SR-H1.007	SR-H1-11-HB	
SR-H1.008	SR-H1-12-CP	
SR-H1.009	SR-H1-13-CP	
SR-H1.010	SR-H1-14	
SR-H1.011	SR-H1-15	
SR-H1.012	SR-H1-16	
SR-H1.013	SR-H1-17	
SR-H1.014	SR-H1-18	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for H'WAY

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.324
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
SR-H1.000	SR-H1-1	15 Winter	30	+0%	30/15 Winter		
SR-H1.001	SR-H1-2	15 Winter	30	+0%	30/15 Summer	100/15 Winter	
SR-H1.002	SR-H1-3	15 Winter	30	+0%	30/15 Summer		
SR-H2.000	SR-H1-4	15 Winter	30	+0%	100/15 Summer		
SR-H3.000	SR-H1-5	15 Winter	30	+0%	30/15 Summer	100/15 Summer	
SR-H3.001	SR-H1-6	15 Winter	30	+0%	30/15 Summer		
SR-H1.003	SR-H1-7	15 Winter	30	+0%	30/15 Summer		
SR-H1.004	SR-H1-8	15 Winter	30	+0%	30/15 Summer		
SR-H1.005	SR-H1-9	15 Winter	30	+0%	30/15 Winter		
SR-H1.006	SR-H1-10	30 Winter	30	+0%	30/15 Summer		
SR-H4.000	SR-H1-HEADWALL01	480 Winter	30	+0%	100/120 Winter		
SR-H1.007	SR-H1-11-HB	30 Winter	30	+0%	1/15 Summer		
SR-H1.008	SR-H1-12-CP	15 Winter	30	+0%			
SR-H1.009	SR-H1-13-CP	15 Winter	30	+0%	30/15 Summer		
SR-H1.010	SR-H1-14	120 Winter	30	+0%			
SR-H1.011	SR-H1-15	120 Winter	30	+0%			
SR-H1.012	SR-H1-16	120 Winter	30	+0%			
SR-H1.013	SR-H1-17	120 Winter	30	+0%			
SR-H1.014	SR-H1-18	120 Winter	30	+0%			

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for H'WAY

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
SR-H1.000	SR-H1-1		128.327	0.077	0.000	0.47		46.1	SURCHARGED
SR-H1.001	SR-H1-2		128.192	0.308	0.000	0.60		47.7	SURCHARGED
SR-H1.002	SR-H1-3		128.085	0.370	0.000	0.63		48.4	SURCHARGED
SR-H2.000	SR-H1-4		128.173	-0.152	0.000	0.23		18.4	OK
SR-H3.000	SR-H1-5		128.077	0.327	0.000	0.52		16.3	SURCHARGED
SR-H3.001	SR-H1-6		128.053	0.360	0.000	0.78		26.1	SURCHARGED
SR-H1.003	SR-H1-7		127.987	0.398	0.000	1.76		105.3	SURCHARGED
SR-H1.004	SR-H1-8		127.513	0.071	0.000	1.13		122.1	SURCHARGED
SR-H1.005	SR-H1-9		127.234	0.011	0.000	0.82		123.7	SURCHARGED
SR-H1.006	SR-H1-10		127.012	0.122	0.000	0.93		132.8	SURCHARGED
SR-H4.000	SR-H1-HEADWALL01		126.420	-0.105	0.000	0.06		4.9	OK
SR-H1.007	SR-H1-11-HB		126.647	0.322	0.000	0.14		5.2	SURCHARGED
SR-H1.008	SR-H1-12-CP		124.536	-0.447	0.000	0.13		46.5	OK
SR-H1.009	SR-H1-13-CP		124.446	0.021	0.000	1.04		36.8	SURCHARGED
SR-H1.010	SR-H1-14		124.191	-0.959	0.000	0.01		18.9	OK
SR-H1.011	SR-H1-15		124.187	-0.813	0.000	0.00		10.2	OK
SR-H1.012	SR-H1-16		123.149	-0.851	0.000	0.00		10.2	OK
SR-H1.013	SR-H1-17		122.049	-0.951	0.000	0.00		10.2	OK
SR-H1.014	SR-H1-18		121.039	-0.961	0.000	0.00		10.2	OK

PN	US/MH Name	Level Exceeded
SR-H1.000	SR-H1-1	
SR-H1.001	SR-H1-2	2
SR-H1.002	SR-H1-3	
SR-H2.000	SR-H1-4	
SR-H3.000	SR-H1-5	4
SR-H3.001	SR-H1-6	
SR-H1.003	SR-H1-7	
SR-H1.004	SR-H1-8	
SR-H1.005	SR-H1-9	
SR-H1.006	SR-H1-10	
SR-H4.000	SR-H1-HEADWALL01	
SR-H1.007	SR-H1-11-HB	
SR-H1.008	SR-H1-12-CP	
SR-H1.009	SR-H1-13-CP	
SR-H1.010	SR-H1-14	
SR-H1.011	SR-H1-15	
SR-H1.012	SR-H1-16	
SR-H1.013	SR-H1-17	
SR-H1.014	SR-H1-18	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for H'WAY

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.324
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow
SR-H1.000	SR-H1-1	15 Winter	100	+30%	30/15 Winter		
SR-H1.001	SR-H1-2	15 Winter	100	+30%	30/15 Summer	100/15 Winter	
SR-H1.002	SR-H1-3	15 Winter	100	+30%	30/15 Summer		
SR-H2.000	SR-H1-4	15 Winter	100	+30%	100/15 Summer		
SR-H3.000	SR-H1-5	30 Winter	100	+30%	30/15 Summer	100/15 Summer	
SR-H3.001	SR-H1-6	15 Winter	100	+30%	30/15 Summer		
SR-H1.003	SR-H1-7	15 Winter	100	+30%	30/15 Summer		
SR-H1.004	SR-H1-8	15 Winter	100	+30%	30/15 Summer		
SR-H1.005	SR-H1-9	15 Winter	100	+30%	30/15 Winter		
SR-H1.006	SR-H1-10	15 Winter	100	+30%	30/15 Summer		
SR-H4.000	SR-H1-HEADWALL01	960 Winter	100	+30%	100/120 Winter		
SR-H1.007	SR-H1-11-HB	30 Winter	100	+30%	1/15 Summer		
SR-H1.008	SR-H1-12-CP	15 Winter	100	+30%			
SR-H1.009	SR-H1-13-CP	15 Winter	100	+30%	30/15 Summer		
SR-H1.010	SR-H1-14	120 Winter	100	+30%			
SR-H1.011	SR-H1-15	120 Winter	100	+30%			
SR-H1.012	SR-H1-16	120 Winter	100	+30%			
SR-H1.013	SR-H1-17	120 Winter	100	+30%			
SR-H1.014	SR-H1-18	120 Winter	100	+30%			

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for H'WAY

PN	US/MH Name	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
SR-H1.000	SR-H1-1		129.452	1.202	0.000	0.63		61.7	FLOOD RISK
SR-H1.001	SR-H1-2		129.272	1.388	2.421	0.95		76.0	FLOOD
SR-H1.002	SR-H1-3		129.214	1.499	0.000	1.01		78.2	FLOOD RISK
SR-H2.000	SR-H1-4		129.191	0.866	0.000	0.31		25.0	SURCHARGED
SR-H3.000	SR-H1-5		128.958	1.208	8.482	1.53		47.6	FLOOD
SR-H3.001	SR-H1-6		129.084	1.391	0.000	1.70		56.8	FLOOD RISK
SR-H1.003	SR-H1-7		129.123	1.534	0.000	2.08		124.4	SURCHARGED
SR-H1.004	SR-H1-8		128.590	1.148	0.000	1.43		155.2	SURCHARGED
SR-H1.005	SR-H1-9		128.164	0.941	0.000	1.16		175.0	SURCHARGED
SR-H1.006	SR-H1-10		127.710	0.820	0.000	1.43		203.1	SURCHARGED
SR-H4.000	SR-H1-HEADWALL01		126.654	0.129	0.000	0.06		5.1	SURCHARGED
SR-H1.007	SR-H1-11-HB		126.797	0.472	0.000	0.16		5.8	SURCHARGED
SR-H1.008	SR-H1-12-CP		124.678	-0.305	0.000	0.21		74.1	OK
SR-H1.009	SR-H1-13-CP		124.631	0.206	0.000	1.31		46.1	SURCHARGED
SR-H1.010	SR-H1-14		124.361	-0.789	0.000	0.02		26.8	OK
SR-H1.011	SR-H1-15		124.356	-0.644	0.000	0.00		12.1	OK
SR-H1.012	SR-H1-16		123.154	-0.846	0.000	0.01		12.1	OK
SR-H1.013	SR-H1-17		122.054	-0.946	0.000	0.00		12.1	OK
SR-H1.014	SR-H1-18		121.043	-0.957	0.000	0.00		12.1	OK

PN	US/MH Name	Level Exceeded
SR-H1.000	SR-H1-1	
SR-H1.001	SR-H1-2	2
SR-H1.002	SR-H1-3	
SR-H2.000	SR-H1-4	
SR-H3.000	SR-H1-5	4
SR-H3.001	SR-H1-6	
SR-H1.003	SR-H1-7	
SR-H1.004	SR-H1-8	
SR-H1.005	SR-H1-9	
SR-H1.006	SR-H1-10	
SR-H4.000	SR-H1-HEADWALL01	
SR-H1.007	SR-H1-11-HB	
SR-H1.008	SR-H1-12-CP	
SR-H1.009	SR-H1-13-CP	
SR-H1.010	SR-H1-14	
SR-H1.011	SR-H1-15	
SR-H1.012	SR-H1-16	
SR-H1.013	SR-H1-17	
SR-H1.014	SR-H1-18	

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