Project: SEA STREET, WHITSTABLE	Job No: A4453
Description: SOUTHERN WATER S106 APPLICATION RESPONSE REF SWS-ICENT-S106-011113	By: JT
	Date: 23/4/18
	Sheet No: 1

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- EXISTING SITE IMPERMEABLE AREA = 1650m²
- HALF OF EXISTING SURFACE WATER RUNOFF ENTERING EXISTING SEWER VIA RAINWATER PIPE SHOES PUSHING RUNOFF INTO EXISTING GULLIES.
- EXISTING SURFACE WATER RUN-OFF RATE (BASED UPON BUILDING REGULATION PART H3 CALCULATIONS)

  825m² X 0.01 L/s/m² (50mm PER HOUR MAIN INTENSITY) = 11.55 l/s

- PROPOSED SURFACE WATER RUNOFF RATE FOR WHOLE OF SITE TO ENTER EXISTING SEWER AT CONTROLLED RATE OF 5 l/s.
- THEREFORE AN IMPROVED RUNOFF RATE THAN EXISTING SITUATION.

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	1.683	0.683	5.0	35.5	O K
30 min Summer	1.866	0.866	5.0	45.0	O K
60 min Summer	1.985	0.985	5.0	51.2	O K
120 min Summer	1.977	0.977	5.0	50.8	O K
180 min Summer	1.933	0.933	5.0	48.5	O K
240 min Summer	1.886	0.886	5.0	46.0	O K
360 min Summer	1.790	0.790	5.0	41.1	O K
480 min Summer	1.696	0.696	5.0	36.2	O K
600 min Summer	1.594	0.594	5.0	30.9	O K
720 min Summer	1.483	0.483	5.0	25.1	O K
960 min Summer	1.315	0.315	5.0	16.4	O K
1440 min Summer	1.109	0.109	5.0	5.7	O K
2160 min Summer	1.000	0.000	4.6	0.0	O K
2880 min Summer	1.000	0.000	3.7	0.0	O K
4320 min Summer	1.000	0.000	2.6	0.0	O K
5760 min Summer	1.000	0.000	2.1	0.0	O K
7200 min Summer	1.000	0.000	1.7	0.0	O K
8640 min Summer	1.000	0.000	1.5	0.0	O K
10080 min Summer	1.000	0.000	1.3	0.0	O K
15 min Winter	1.779	0.779	5.0	40.5	O K
30 min Winter	1.991	0.991	5.0	51.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	135.884	0.0	42.0	24
30 min Summer	89.242	0.0	55.1	37
60 min Summer	55.837	0.0	69.1	64
120 min Summer	33.756	0.0	83.3	108
180 min Summer	24.813	0.0	91.8	140
240 min Summer	19.827	0.0	98.4	174
360 min Summer	14.397	0.0	106.9	244
480 min Summer	11.474	0.0	113.7	312
600 min Summer	9.615	0.0	119.0	382
720 min Summer	8.318	0.0	123.6	438
960 min Summer	6.614	0.0	131.0	554
1440 min Summer	4.780	0.0	141.9	776
2160 min Summer	3.449	0.0	153.6	0
2880 min Summer	2.733	0.0	162.3	0
4320 min Summer	1.966	0.0	175.2	0
5760 min Summer	1.555	0.0	184.8	0
7200 min Summer	1.296	0.0	192.4	0
8640 min Summer	1.116	0.0	198.8	0
10080 min Summer	0.983	0.0	204.4	0
15 min Winter	135.884	0.0	46.9	24
30 min Winter	89.242	0.0	61.7	37

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	2.142	1.142	5.1	59.4	O K
120 min Winter	2.160	1.160	5.1	60.3	O K
180 min Winter	2.094	1.094	5.0	56.9	O K
240 min Winter	2.029	1.029	5.0	53.5	O K
360 min Winter	1.888	0.888	5.0	46.2	O K
480 min Winter	1.746	0.746	5.0	38.8	O K
600 min Winter	1.585	0.585	5.0	30.4	O K
720 min Winter	1.416	0.416	5.0	21.6	O K
960 min Winter	1.189	0.189	5.0	9.8	O K
1440 min Winter	1.000	0.000	4.7	0.0	O K
2160 min Winter	1.000	0.000	3.4	0.0	O K
2880 min Winter	1.000	0.000	2.7	0.0	O K
4320 min Winter	1.000	0.000	1.9	0.0	O K
5760 min Winter	1.000	0.000	1.5	0.0	O K
7200 min Winter	1.000	0.000	1.3	0.0	O K
8640 min Winter	1.000	0.000	1.1	0.0	O K
10080 min Winter	1.000	0.000	1.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	55.837	0.0	77.6	64
120 min Winter	33.756	0.0	93.5	116
180 min Winter	24.813	0.0	103.2	148
240 min Winter	19.827	0.0	110.1	186
360 min Winter	14.397	0.0	119.4	262
480 min Winter	11.474	0.0	127.0	338
600 min Winter	9.615	0.0	133.0	412
720 min Winter	8.318	0.0	138.2	464
960 min Winter	6.614	0.0	146.6	568
1440 min Winter	4.780	0.0	159.0	734
2160 min Winter	3.449	0.0	172.1	0
2880 min Winter	2.733	0.0	181.8	0
4320 min Winter	1.966	0.0	196.2	0
5760 min Winter	1.555	0.0	206.9	0
7200 min Winter	1.296	0.0	215.5	0
8640 min Winter	1.116	0.0	222.7	0
10080 min Winter	0.983	0.0	228.9	0

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.165

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.055	4	8	0.055	8	12	0.055

Model Details

Storage is Online Cover Level (m) 3.020

Tank or Pond Structure

Invert Level (m) 1.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	52.0	2.800	0.0	5.600	0.0	8.400	0.0
0.400	52.0	3.200	0.0	6.000	0.0	8.800	0.0
0.800	52.0	3.600	0.0	6.400	0.0	9.200	0.0
1.200	52.0	4.000	0.0	6.800	0.0	9.600	0.0
1.201	0.0	4.400	0.0	7.200	0.0	10.000	0.0
2.000	0.0	4.800	0.0	7.600	0.0		
2.400	0.0	5.200	0.0	8.000	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0101-5000-1300-5000
Design Head (m)	1.300
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	101
Invert Level (m)	0.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	5.0
Flush-Flo™	0.384	5.0
Kick-Flo®	0.798	4.0
Mean Flow over Head Range	-	4.4

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	3.4	1.200	4.8	3.000	7.4	7.000	11.0
0.200	4.7	1.400	5.2	3.500	7.9	7.500	11.4
0.300	4.9	1.600	5.5	4.000	8.5	8.000	11.8
0.400	5.0	1.800	5.8	4.500	9.0	8.500	12.1
0.500	4.9	2.000	6.1	5.000	9.4	9.000	12.5
0.600	4.8	2.200	6.4	5.500	9.8	9.500	12.8
0.800	4.0	2.400	6.7	6.000	10.3		
1.000	4.4	2.600	6.9	6.500	10.7		