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Firth Buildings 99-101 Leeds Road Dewsbury WF12 7BU	SB HOMES LINGARDS ROAD SURFACE WATER 1 RevE	
Date 23/11/2022 11:34 File Lingards6.MDX	Designed by HH Checked by	
Micro Drainage	Network 2020.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for LINGARDS SURFACE6.SWS

Pipe Sizes LINGARDS SURFACE3 Manhole Sizes LINGARDS SURFACE3

FSR Rainfall Model - England and Wales			
Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for LINGARDS SURFACE6.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	12.737	0.159	80.1	0.010	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	23.990	0.300	80.0	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	12.062	0.151	80.0	0.254	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	57.102	0.714	80.0	0.121	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.004	40.214	0.402	100.0	0.166	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.005	49.182	0.492	100.0	0.033	0.00	0.0	0.600	o	375	Pipe/Conduit	
S1.006	10.154	0.911	11.1	0.122	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.007	5.000	0.420	11.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.008	5.547	0.042	133.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

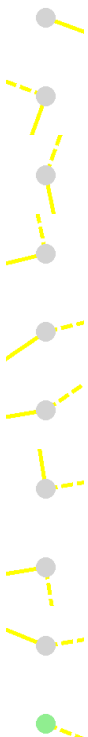
Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	66.99	4.15	179.950	0.010	0.0	0.0	0.0	1.46	58.1	1.8
S1.001	65.40	4.42	179.791	0.052	0.0	0.0	0.0	1.46	58.2	9.2
S1.002	64.64	4.56	179.491	0.306	0.0	0.0	0.0	1.46	58.2	53.6
S1.003	62.18	5.03	179.190	0.427	0.0	0.0	0.0	2.03	223.9	71.9
S1.004	60.40	5.40	175.300	0.593	0.0	0.0	0.0	1.81	200.1	97.0
S1.005	58.37	5.85	174.898	0.626	0.0	0.0	0.0	1.81	200.2	99.0
S1.006	58.25	5.88	174.331	0.748	0.0	0.0	0.0	6.12	972.7	118.0
S1.007	58.19	5.89	173.420	0.748	0.0	0.0	0.0	5.92	941.1	118.0
S1.008	67.37	4.08	172.950	0.000	6.6	0.0	0.0	1.13	45.0	6.6

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Manhole Schedules for LINGARDS SURFACE6.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	181.377	1.427	Open Manhole	1200	S1.000	179.950	225				
S2	182.368	2.577	Open Manhole	1200	S1.001	179.791	225	S1.000	179.791	225	
S3	181.997	2.506	Open Manhole	1200	S1.002	179.491	225	S1.001	179.491	225	
S4	184.203	5.013	Open Manhole	1500	S1.003	179.190	375	S1.002	179.340	225	
S5	180.961	5.661	Open Manhole	1500	S1.004	175.300	375	S1.003	178.476	375	3176
S6	181.501	6.603	Open Manhole	1500	S1.005	174.898	375	S1.004	174.898	375	
S7	182.020	7.689	Open Manhole	1500	S1.006	174.331	450	S1.005	174.406	375	
S8	181.342	7.922	Open Manhole	1500	S1.007	173.420	450	S1.006	173.420	450	
S9	180.800	7.850	Open Manhole	2100	S1.008	172.950	225	S1.007	173.000	450	275
S10	177.756	4.848	Open Manhole	1200		OUTFALL		S1.008	172.908	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	407350.141	413417.639	407350.141	413417.639	Required	
S2	407362.099	413413.255	407362.099	413413.255	Required	
S3	407353.841	413390.731	407353.841	413390.731	Required	
S4	407356.290	413378.920	407356.290	413378.920	Required	
S5	407300.799	413365.454	407300.799	413365.454	Required	
S6	407267.559	413342.821	407267.559	413342.821	Required	
S7	407219.036	413334.793	407219.036	413334.793	Required	
S8	407217.459	413344.824	407217.459	413344.824	Required	
S9	407212.522	413344.034	407212.522	413344.034	Required	
S10	407207.377	413346.107			No Entry	

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Online Controls for LINGARDS SURFACE6.SWS

Hydro-Brake® Optimum Manhole: S9, DS/PN: S1.008, Volume (m³): 27.7

Unit Reference	MD-SHE-0100-6600-2500-6600
Design Head (m)	2.500
Design Flow (l/s)	6.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	172.950
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)	2.500	6.6	Kick-Flo®	0.896	4.1
Flush-Flo™	0.438	5.1	Mean Flow over Head Range	-	5.1

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	3.3	1.200	4.7	3.000	7.2	7.000	10.7
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.1
0.300	5.0	1.600	5.4	4.000	8.2	8.000	11.4
0.400	5.1	1.800	5.7	4.500	8.7	8.500	11.8
0.500	5.1	2.000	5.9	5.000	9.1	9.000	12.1
0.600	5.0	2.200	6.2	5.500	9.6	9.500	12.4
0.800	4.6	2.400	6.5	6.000	10.0		
1.000	4.3	2.600	6.7	6.500	10.4		

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<u>Storage Structures for LINGARDS SURFACE6.SWS</u> <u>Tank or Pond Manhole: S9, DS/PN: S1.008</u> Invert Level (m) 173.300 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>180.0</td><td>2.200</td><td>180.0</td><td>2.250</td><td>0.0</td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	180.0	2.200	180.0	2.250	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)									
0.000	180.0	2.200	180.0	2.250	0.0									
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Summary of Critical Results by Maximum Level (Rank 1) for LINGARDS
SURFACE6.SWS

Simulation Criteria

Synthetic Rainfall Details

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

PN	US/MH Name	Storm	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
								Level (m)	Depth (m)
S1.000	S1	15 Winter	+0%					179.977	-0.198
S1.001	S2	15 Winter	+0%					179.847	-0.169
S1.002	S3	15 Winter	+0%					179.654	-0.062
S1.003	S4	15 Winter	+0%					179.327	-0.238
S1.004	S5	15 Winter	+0%					175.477	-0.198
S1.005	S6	15 Winter	+0%					175.078	-0.195
S1.006	S7	15 Winter	+0%					174.463	-0.318
S1.007	S8	180 Winter	+0%					173.765	-0.105
S1.008	S9	180 Winter	+0%	+0%/15 Winter				173.764	0.589

