

RCD		Page 1																																																																																																																			
9 Birchtree Way Maidstone Kent ME15 7RP	THE BUILDERS YARD LOWER RANGE ROAD GRAVESEND																																																																																																																				
Date 08/08/2022 13:34 File 1190-2202-PRE-DEV.MDX	Designed by RAC Checked by																																																																																																																				
Micro Drainage	Network 2020.1.3																																																																																																																				
<u>STORM SEWER DESIGN by the Modified Rational Method</u> <u>Design Criteria for Storm</u> Pipe Sizes STANDARD Manhole Sizes STANDARD FSR Rainfall Model - England and Wales <table><tr><td>Return Period (years)</td><td>1</td><td>PIMP (%)</td><td>100</td></tr><tr><td>M5-60 (mm)</td><td>26.250</td><td>Add Flow / Climate Change (%)</td><td>0</td></tr><tr><td>Ratio R</td><td>0.350</td><td>Minimum Backdrop Height (m)</td><td>0.000</td></tr><tr><td>Maximum Rainfall (mm/hr)</td><td>0</td><td>Maximum Backdrop Height (m)</td><td>10.000</td></tr><tr><td>Maximum Time of Concentration (mins)</td><td>30</td><td>Min Design Depth for Optimisation (m)</td><td>1.200</td></tr><tr><td>Foul Sewage (l/s/ha)</td><td>0.000</td><td>Min Vel for Auto Design only (m/s)</td><td>1.00</td></tr><tr><td>Volumetric Runoff Coeff.</td><td>0.750</td><td>Min Slope for Optimisation (1:X)</td><td>500</td></tr></table> Designed with Level Soffits <u>Time Area Diagram for Storm</u> <table><tr><td>Time (mins)</td><td>Area (ha)</td><td>Time (mins)</td><td>Area (ha)</td></tr><tr><td>0-4</td><td>0.013</td><td>4-8</td><td>0.006</td></tr></table> Total Area Contributing (ha) = 0.019 Total Pipe Volume (m³) = 1.414			Return Period (years)	1	PIMP (%)	100	M5-60 (mm)	26.250	Add Flow / Climate Change (%)	0	Ratio R	0.350	Minimum Backdrop Height (m)	0.000	Maximum Rainfall (mm/hr)	0	Maximum Backdrop Height (m)	10.000	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)	1.00	Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500	Time (mins)	Area (ha)	Time (mins)	Area (ha)	0-4	0.013	4-8	0.006																																																																															
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RCD		Page 2
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Micro Drainage Network 2020.1.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN Invert Level (m)	Diameter (mm)	Pipes In PN Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	4.000	0.600	Open Manhole	450	1.000	3.400	150		
2	4.000	0.800	Open Manhole	450	1.001	3.200	150	1.000	3.200
3	4.000	1.000	Open Manhole	450	1.002	3.000	150	1.001	3.000
4	4.000	1.200	Open Manhole	450	1.003	2.800	150	1.002	2.800
ex	4.000	1.400	Open Manhole	1200		OUTFALL		1.003	2.600

No coordinates have been specified, layout information cannot be produced.

RCD		Page 3
9 Birchtree Way Maidstone Kent ME15 7RP		THE BUILDERS YARD LOWER RANGE ROAD GRAVESEND
Date 08/08/2022 13:34 File 1190-2202-PRE-DEV.MDX		Designed by RAC Checked by
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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	1	4.000	3.400	0.450	Open Manhole	450
1.001	o	150	2	4.000	3.200	0.650	Open Manhole	450
1.002	o	150	3	4.000	3.000	0.850	Open Manhole	450
1.003	o	150	4	4.000	2.800	1.050	Open Manhole	450

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	20.000	100.0	2	4.000	3.200	0.650	Open Manhole	450
1.001	20.000	100.0	3	4.000	3.000	0.850	Open Manhole	450
1.002	20.000	100.0	4	4.000	2.800	1.050	Open Manhole	450
1.003	20.000	100.0	ex	4.000	2.600	1.250	Open Manhole	1200

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003	ex	4.000	2.600	0.000	1200	0

Simulation Criteria for Storm

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 Coefficient	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	0
Number of Online Controls	0	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)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	26.250	Storm Duration (mins)	30
Ratio R	0.350		

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RCD		Page 4
9 Birchtree Way Maidstone Kent ME15 7RP	THE BUILDERS YARD LOWER RANGE ROAD GRAVESEND	
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Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	1	0.095	0.353	0.000	0.449
1.001	2	0.127	0.353	0.000	0.481
1.002	3	0.159	0.353	0.000	0.512
1.003	4	0.191	0.353	0.000	0.544
Total		0.573	1.414	0.000	1.986

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	1	0.095	0.345	0.000	0.441
1.001	2	0.127	0.345	0.000	0.473
1.002	3	0.159	0.345	0.000	0.505
1.003	4	0.191	0.339	0.000	0.530
Total		0.573	1.375	0.000	1.948

RCD		Page 5	
9 Birchtree Way Maidstone Kent ME15 7RP		THE BUILDERS YARD LOWER RANGE ROAD GRAVESEND	
Date 08/08/2022 13:34 File 1190-2202-PRE-DEV.MDX		Designed by RAC Checked by	
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	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	0
Number of Online Controls	0	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	26.250	Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second	Increment (Extended)	
DTS Status			ON
DVD Status			ON
Inertia Status			ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+0%					3.457
1.001	2	15 Winter	100	+0%					3.274
1.002	3	15 Winter	100	+0%					3.090
1.003	4	15 Winter	100	+0%					2.889

PN	US/MH Name	Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.093	0.000	0.30			5.1	OK	
1.001	2	-0.076	0.000	0.47			7.9	OK	
1.002	3	-0.060	0.000	0.65			10.8	OK	
1.003	4	-0.061	0.000	0.65			10.9	OK	