



Drainage Design Report

Flow+

v6.0

Copyright © 1988-2018 Causeway Software Solutions Limited

Network	Storm Network
Filename	S:\LIVE Project Files\1495 - New Romney Caravan Park\2018 Update\SS Data\Causeway - Existing\Existing Runoff.pfd
Username	Flood Team (flood@herringtonconsulting.co.uk)
Last analysed	02/05/2018 10:14:28
Report produced on	03/05/2018 15:27:14

Causeway Sales

Tel:	+44(0) 1628 552000
Fax:	+44(0) 1628 552001
Email:	marketing@causeway.com
Web:	www.causeway.com

Technical support web portal:

<http://support.causeway.com>

Link ID	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)	US Node ID	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node ID	Dia (mm)	Width (mm)	Node Type	MH Type
E.Drain2	10.000	9.5	1000	Circular	10.000	8.350	0.650	9.500	7.300	1.200	E.Impermeable	1350		Manhole	Adoptable	E.Outlet			Junction	
D IE.Outfall	10.000	20.0	1000	Ditch	9.500	7.300	1.200	9.000	6.800	1.200	E.Outlet			Junction		E.Discharge			Junction	
P.Drain2	10.000	9.5	1000	Circular	10.000	8.350	0.650	9.500	7.300	1.200	P.Impermeable	1350		Manhole	Adoptable	P.Outlet			Junction	
D IP.Outfall	10.000	20.0	1000	Ditch	9.500	7.300	1.200	9.000	6.800	1.200	P.Outlet			Junction		P.Discharge			Junction	

Node ID	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections		Link ID	IL (m)	Dia (mm)	Link Type
E.Impermeable	110.000	100.000	10.000	1.650	1350		Manhole	Adoptable						
										0	E.Drain2	8.350	1000	Circular
E.Outlet	120.000	100.000	9.500	2.200			Junction			1	E.Drain2	7.300	1000	Circular
														
										0	DitE.Outfall	7.300	1000	Ditch
E.Discharge	130.000	100.000	9.000	2.200			Junction			1	DitE.Outfall	6.800	1000	Ditch
														
P.Impermeable	110.000	80.000	10.000	1.650	1350		Manhole	Adoptable						
										0	P.Drain2	8.350	1000	Circular
P.Outlet	120.000	80.000	9.500	2.200			Junction			1	P.Drain2	7.300	1000	Circular
														
										0	DitP.Outfall	7.300	1000	Ditch
P.Discharge	130.000	80.000	9.000	2.200			Junction			1	DitP.Outfall	6.800	1000	Ditch
														

Rainfall Methodology	FSR		Return Period (years)	Climate Change (%)
FSR Region	England and Wales		1	0
M5-60 (mm)	20.000		30	0
Ratio-R	0.400		100	0
Summer CV	1.000		100	20
Winter CV	1.000			
Analysis Speed	Normal			
Drain Down Time (mins)	240			
Additional Storage (m³/ha)	20.0			
Storm Durations (mins)	15			
	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
	2160			
	2880			
	4320			
	5760			
	7200			
	8640			
	10080			
Check Discharge Rate(s)	x			
1 year (l/s)				
30 year (l/s)				
100 year (l/s)				
Check Discharge Volume	x			

100 year 360 minute (m³)				
--------------------------	--	--	--	--

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.91%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	10	8.387	0.037	26.0	0.1123	0.0000	OK	E.Drain2	E.Outlet	26.0	4.027	0.002	0.0658	
15 minute summer	E.Outlet	10	7.323	0.023	26.0	0.0000	0.0000	OK	DitE.Outfall	E.Discharge	26.0	2.267	0.002	0.1152	10.1
15 minute summer	E.Discharge	10	6.823	0.023	26.0	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	10	8.393	0.043	36.2	0.1570	0.0000	OK	P.Drain2	P.Outlet	36.2	4.316	0.003	0.0852	
15 minute summer	P.Outlet	10	7.328	0.028	36.2	0.0000	0.0000	OK	DitP.Outfall	P.Discharge	36.2	2.556	0.003	0.1416	14.1
15 minute summer	P.Discharge	10	6.828	0.028	36.2	0.0000	0.0000	OK							

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.91%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	9	8.406	0.056	63.8	0.1684	0.0000	OK	E.Drain2	E.Outlet	63.9	4.828	0.006	0.1341	
15 minute summer	E.Outlet	9	7.339	0.039	63.9	0.0000	0.0000	OK	DitE.Outfall	E.Discharge	63.9	3.150	0.005	0.2028	24.8
15 minute summer	E.Discharge	10	6.839	0.039	63.9	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	9	8.415	0.065	88.7	0.2377	0.0000	OK	P.Drain2	P.Outlet	88.8	5.106	0.008	0.1743	
15 minute summer	P.Outlet	9	7.348	0.048	88.8	0.0000	0.0000	OK	DitP.Outfall	P.Discharge	88.8	3.537	0.008	0.2510	34.5
15 minute summer	P.Discharge	10	6.848	0.048	88.8	0.0000	0.0000	OK							

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.91%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	9	8.413	0.063	82.8	0.1907	0.0000	OK	E.Drain2	E.Outlet	82.8	5.041	0.008	0.1649	
15 minute summer	E.Outlet	9	7.346	0.046	82.8	0.0000	0.0000	OK	DitE.Outfall	E.Discharge	82.9	3.452	0.007	0.2402	32.2
15 minute summer	E.Discharge	10	6.846	0.046	82.9	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	9	8.424	0.074	115.1	0.2690	0.0000	OK	P.Drain2	P.Outlet	115.1	5.430	0.011	0.2161	
15 minute summer	P.Outlet	9	7.356	0.056	115.1	0.0000	0.0000	OK	DitP.Outfall	P.Discharge	115.2	3.882	0.010	0.2968	44.8
15 minute summer	P.Discharge	10	6.856	0.056	115.2	0.0000	0.0000	OK							

Results for 100 year +20% Critical Storm Duration. Lowest mass balance: 99.91%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E Impermeable	9	8.419	0.069	99.4	0.2081	0.0000	OK	E_Drain2	E_Outlet	99.4	5.240	0.009	0.1918	
15 minute summer	E_Outlet	9	7.352	0.052	99.4	0.0000	0.0000	OK	DitE_Outfall	E_Discharge	99.5	3.683	0.008	0.2702	38.7
15 minute summer	E_Discharge	10	6.851	0.051	99.5	0.0000	0.0000	OK							
15 minute summer	P Impermeable	9	8.431	0.081	138.1	0.2935	0.0000	OK	P_Drain2	P_Outlet	138.2	5.596	0.013	0.2494	
15 minute summer	P_Outlet	9	7.363	0.063	138.2	0.0000	0.0000	OK	DitP_Outfall	P_Discharge	138.4	4.140	0.012	0.3343	53.7
15 minute summer	P_Discharge	10	6.863	0.063	138.4	0.0000	0.0000	OK							



Drainage Design Report

Flow+

v6.0

Copyright © 1988-2018 Causeway Software Solutions Limited

Network	Storm Network
Filename	S:\LIVE Project Files\1495 - New Romney Caravan Park\2018 Update\SS Data\Causeway - Proposed\Proposed Layout.pfd
Username	Flood Team (flood@herringtonconsulting.co.uk)
Last analysed	02/05/2018 11:21:49
Report produced on	03/05/2018 15:35:45

Causeway Sales

Tel:	+44(0) 1628 552000
Fax:	+44(0) 1628 552001
Email:	marketing@causeway.com
Web:	www.causeway.com

Technical support web portal:

<http://support.causeway.com>

Link ID	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)	US Node ID	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node ID	Dia (mm)	Width (mm)	Node Type	MH Type
1.001	15.000	241.9	300	Circular	5.000	4.400	0.300	5.000	4.338	0.362	Filter A2	1200		Manhole	Adoptable	Filter A	1200		Manhole	Adoptable
1.002	5.000	238.1	300	Circular	5.000	4.338	0.362	5.000	4.317	0.383	Filter A	1200		Manhole	Adoptable	Swale A			Junction	
1.003	35.000	350.0	300	Swale	5.000	4.317	0.383	4.900	4.217	0.383	Swale A			Junction		Swale A2			Junction	
1.004	10.000	59.9	300	Swale	4.900	4.217	0.383	4.850	4.050	0.500	Swale A2			Junction		Basin A			Junction	
Dit1.005	5.000	100.0	500	Ditch	4.850	4.050	0.300	4.800	4.000	0.300	Basin A			Junction		Outfall A			Junction	
2.001	15.000	241.9	300	Circular	5.000	4.400	0.300	5.000	4.338	0.362	Filter B2	1200		Manhole	Adoptable	Filter B	1200		Manhole	Adoptable
2.002	5.000	238.1	300	Circular	5.000	4.338	0.362	5.000	4.317	0.383	Filter B	1200		Manhole	Adoptable	Swale B			Junction	
2.003	35.000	350.0	300	Swale	5.000	4.317	0.383	4.900	4.217	0.383	Swale B			Junction		Swale B2			Junction	
2.004	5.000	29.9	300	Swale	4.900	4.217	0.383	4.850	4.050	0.500	Swale B2			Junction		Basin B			Junction	
Dit2.005	5.000	100.0	500	Ditch	4.850	4.050	0.300	4.800	4.000	0.300	Basin B			Junction		Outfall B			Junction	

Node ID	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections		Link ID	IL (m)	Dia (mm)	Link Type
Swale A	100.000	100.000	5.000	0.683			Junction			1	1.002	4.317	300	Circular
Swale B	105.000	100.000	5.000	0.683			Junction			1	2.002	4.317	300	Circular
Filter A	100.000	95.000	5.000	0.662	1200		Manhole	Adoptable		1	1.001	4.338	300	Circular
Filter B	105.000	95.000	5.000	0.662	1200		Manhole	Adoptable		1	2.001	4.338	300	Circular
Basin A	55.000	100.000	4.850	0.800			Junction			1	1.004	4.050	300	Swale
Basin B	145.000	100.000	4.850	0.800			Junction			1	2.004	4.050	300	Swale
Outfall A	50.000	100.000	4.800	0.800			Junction			1	Dit1.005	4.000	500	Ditch
Outfall B	150.000	100.000	4.800	0.800			Junction			1	Dit2.005	4.000	500	Ditch
Swale A2	65.000	100.000	4.900	0.683			Junction			1	1.003	4.217	300	Swale
										0	1.004	4.217	300	Swale
Swale B2	140.000	100.000	4.900	0.683			Junction			1	2.003	4.217	300	Swale

														
										0	2.004	4.217	300	Swale
Filter A2	100.000	80.000	5.000	0.600	1200		Manhole	Adoptable						
										0	1.001	4.400	300	Circular
Filter B2	105.000	80.000	5.000	0.600	1200		Manhole	Adoptable						
										0	2.001	4.400	300	Circular

Rainfall Methodology	FSR		Return Period (years)	Climate Change (%)
FSR Region	England and Wales		100	20
M5-60 (mm)	26.250		100	40
Ratio-R	0.400			
Summer CV	1.000			
Winter CV	0.840			
Analysis Speed	Normal			
Drain Down Time (mins)	240			
Additional Storage (m³/ha)	20.0			
Storm Durations (mins)	15			
	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
Check Discharge Rate(s)	x			
1 year (l/s)				
30 year (l/s)				
100 year (l/s)				
Check Discharge Volume	x			
100 year 360 minute (m³)				

Results for 100 year +20% Critical Storm Duration. Lowest mass balance: 98.40%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	Swale A	44	4.726	0.409	63.4	0.5981	0.0000	FLOOD RISK	1.003	Swale A2	67.8	0.887	0.283	6.3007	
60 minute summer	Swale B	46	4.747	0.430	62.9	0.6301	0.0000	FLOOD RISK	2.003	Swale B2	59.4	0.995	0.248	6.3007	
60 minute summer	Filter A	46	4.727	0.369	29.1	0.4395	0.0000	FLOOD RISK	1.002	Swale A	32.3	0.776	0.451	0.3521	
60 minute summer	Filter B	46	4.747	0.409	29.0	0.4631	0.0000	FLOOD RISK	2.002	Swale B	31.8	0.794	0.444	0.3521	
60 minute summer	Basin A	45	4.727	0.677	77.5	23.6797	0.0000	FLOOD RISK	Dit1.005	Outfall A	12.5	0.261	0.019	1.2501	
									Infiltration		0.2				
60 minute summer	Basin B	45	4.747	0.697	105.1	24.3935	0.0000	FLOOD RISK	Dit2.005	Outfall B	15.0	0.258	0.023	1.2501	
									Infiltration		0.2				
60 minute summer	Outfall A	46	4.726	0.726	12.5	0.0000	0.0000	OK	Weir		9.1				56.2
60 minute summer	Outfall B	45	4.747	0.747	15.0	0.0000	0.0000	OK	Weir		9.5				56.5
60 minute summer	Swale A2	48	4.727	0.510	136.1	0.0000	0.0000	FLOOD RISK	1.004	Basin A	77.5	1.058	0.133	1.8002	
									Infiltration		0.4				
60 minute summer	Swale B2	44	4.749	0.532	119.5	0.0000	0.0000	FLOOD RISK	2.004	Basin B	105.1	1.241	0.127	0.9001	
									Infiltration		0.4				
60 minute summer	Filter A2	46	4.731	0.331	31.1	0.9247	0.0000	FLOOD RISK	1.001	Filter A	29.1	0.797	0.409	1.0563	
60 minute summer	Filter B2	46	4.747	0.347	31.1	0.9714	0.0000	FLOOD RISK	2.001	Filter B	29.0	0.807	0.408	1.0563	

Results for 100 year +40% Critical Storm Duration. Lowest mass balance: 98.40%															
Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Swale A	76	4.802	0.485	42.7	0.7098	0.0000	FLOOD RISK	1.003	Swale A2	44.1	0.645	0.184	6.3007	
60 minute summer	Swale B	39	4.806	0.489	67.8	0.7160	0.0000	FLOOD RISK	2.003	Swale B2	57.9	0.925	0.242	6.3007	
60 minute summer	Filter A	44	4.802	0.464	33.5	0.5247	0.0000	FLOOD RISK	1.002	Swale A	32.6	0.733	0.454	0.3521	
60 minute summer	Filter B	39	4.808	0.470	31.9	0.5317	0.0000	FLOOD RISK	2.002	Swale B	31.5	0.819	0.440	0.3521	
60 minute summer	Basin A	43	4.800	0.750	65.4	26.2580	0.0000	FLOOD RISK	Dit1.005	Outfall A	13.4	0.269	0.021	1.2501	
									Infiltration		0.2				
120 minute summer	Basin B	72	4.803	0.753	89.0	26.3513	0.0000	FLOOD RISK	Dit2.005	Outfall B	21.9	0.228	0.034	1.2501	
									Infiltration		0.2				
120 minute summer	Outfall A	76	4.800	0.800	14.7	0.0000	0.5757	FLOOD	Weir		10.6				77.5
60 minute summer	Outfall B	39	4.800	0.800	35.1	0.0000	3.2714	FLOOD	Weir		10.6				63.2
60 minute summer	Swale A2	41	4.807	0.590	112.1	0.0000	0.0000	FLOOD RISK	1.004	Basin A	65.4	1.115	0.112	1.8002	
									Infiltration		0.4				
60 minute summer	Swale B2	39	4.804	0.587	135.1	0.0000	0.0000	FLOOD RISK	2.004	Basin B	154.3	1.289	0.187	0.9001	
									Infiltration		0.4				
60 minute summer	Filter A2	44	4.803	0.403	36.3	1.1280	0.0000	FLOOD RISK	1.001	Filter A	33.5	0.811	0.471	1.0563	
60 minute summer	Filter B2	39	4.814	0.414	36.3	1.1571	0.0000	FLOOD RISK	2.001	Filter B	31.9	0.801	0.448	1.0563	