

**SURFACE WATER AND FOUL WATER
DRAINAGE STRATEGY**

for

OAKMERE HOMES

PROPOSED RESIDENTIAL DEVELOPMENT

on

**LAND AT CHATBURN ROAD
CLITHEROE**

JULY 2017



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- B Surface water drainage design

1. INTRODUCTION

- 1.1 Outline Planning Permission, reference 3/2013/0981, has been granted by Ribble Valley Borough Council for a residential development to be sited on land off Chatburn Road, Clitheroe.
- 1.2 This drainage strategy is produced to address the conditions within the planning permission that relate to the drainage of the development.
- 1.3 The conditions require the following:
 - A surface water drainage design that restricts surface water runoff from the developed site to 17 l/s into the watercourse that runs along the site's northern boundary.
 - A foul water design that addresses the disposal of foul water from the entire site.

2. BASE INFORMATION

Site geology

- 2.1 The online Soilsmap Viewer has identified the site lies in a region characterised by *slowly permeable seasonally wet slightly acid loamy and clayey soils with impeded drainage*.
- 2.2 Infiltration tests have not been carried out for this site as the ground would not be conducive to infiltration.

Understanding of existing drainage local to the site

- 2.3 Along the northern boundary of the site runs a watercourse that flows to the west.
- 2.4 The watercourse ultimately discharges into the River Ribble. The watercourse takes surface water runoff from the local area including the application site.
- 2.5 A public foul sewer is within Chatburn Road that lies along the site's southern boundary.

3. PROPOSED DRAINAGE STRATEGY

3.1 The proposed surface and foul water drainage layout is included within Appendix A.

Surface Water Drainage

3.2 The following design criteria have been applied to the surface water drainage design:

- No flooding from sewers for 1 in 30 year.
- No risk of flooding to the site or downstream from the site between 1 in 1 year and up to 1 in 100 year plus 30% for climate change.
- Restrictive discharge of 17 l/s to the watercourse that runs within the rear of the site.

3.3 Two surface water discharges will be made into the watercourse that runs along the northern boundary of the site. The total discharge from the developed site into the watercourse will not exceed 17 l/s as defined within Condition 11 of the planning approval.

3.4 The surface water drainage design has catered for surface water runoff generated by all rainfall events up to the 100 year critical rain storm plus 30% on stored volumes. The additional 30% is to allow for climate change and has been included in the surface water volume.

3.5 Attenuation will be provide within the development site using oversized pipes.

3.6 A surface water drainage design has been carried out and is included within Appendix B.

Foul Water Drainage

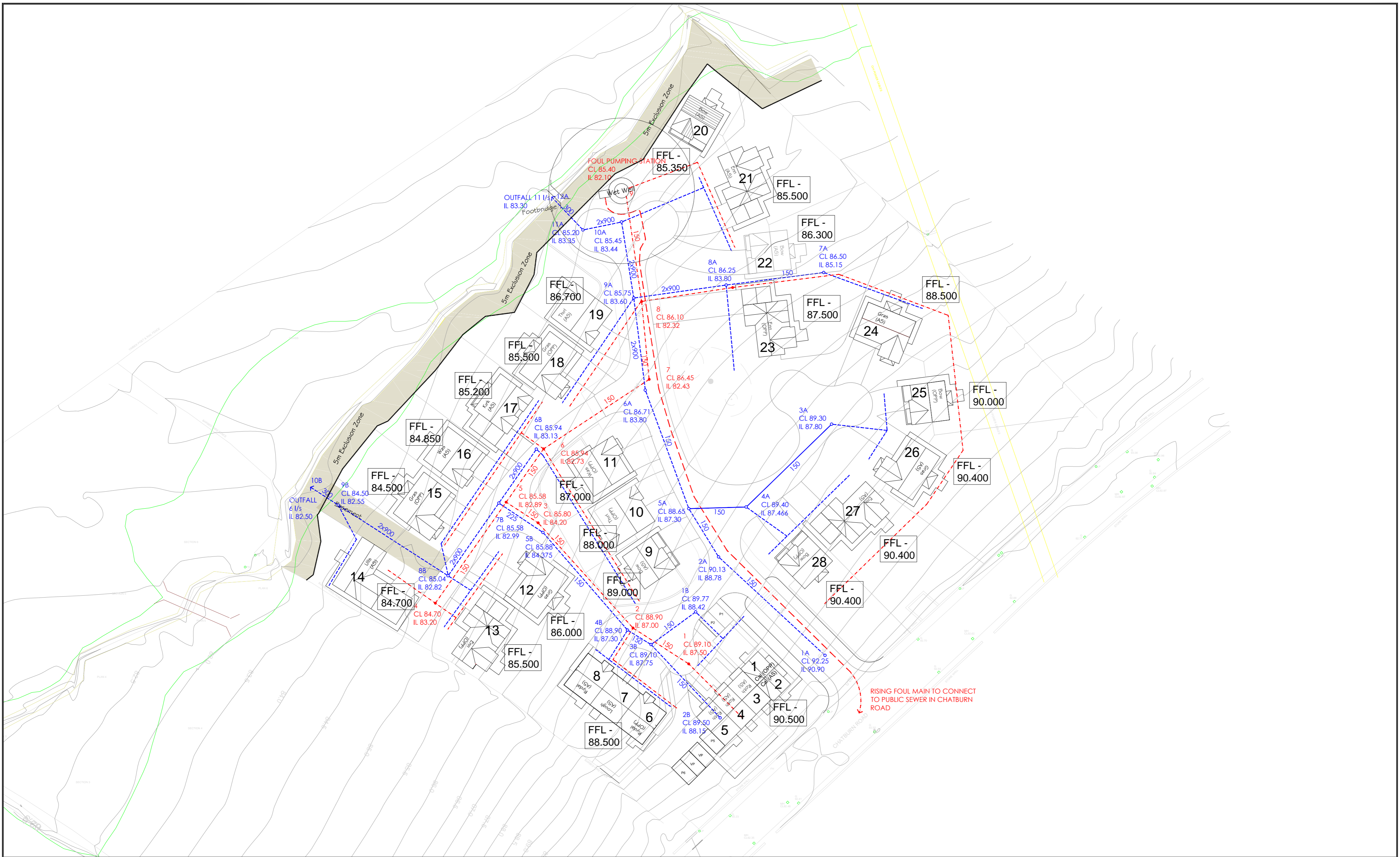
3.7 Foul water discharges from the site will be to an onsite foul pumping station located at the end of the access spine road and the foul water pumped to the public sewer that runs within Chatburn Road.

4. SUMMARY AND CONCLUSIONS

- 4.1 This drainage strategy has been produced to address the conditions that relate to the drainage of the development within the planning permission, reference 3/2013/0981, that has been granted by Ribble Valley Borough Council for a residential development on land off Chatburn Road, Clitheroe.
- 4.2 The nature of the local geology means that infiltration of surface water runoff back into the ground is not feasible on this site.
- 4.3 Two surface water discharges will be made into the watercourse that runs along the northern boundary of the site. The total discharge from the developed site into the watercourse will not exceed 17 l/s as defined within Condition 11 of the planning approval.
- 4.4 The surface water drainage design has catered for surface water runoff generated by all rainfall events up to the 100 year critical rain storm plus 30% on stored volumes. The additional 30% is to allow for climate change and has been included in the surface water volume.
- 4.5 Foul water discharges from the site will be to an onsite foul pumping station located at the end of the access spine road and the foul water pumped to the public sewer that runs within Chatburn Road.

Client:		Oakmere Homes	
Project Name:		Proposed Residential Development, Land at Chatburn Road, Clitheroe	
Project Number:		2016-C-116	
Report Title:		Surface water and foul water drainage strategy	
Created by:	Bob Ford	Date:	July 2017
Proofed By:	Sarah Buckley	Date:	July 2017
Approved by:	Bob Ford bob@tonks-consulting.co.uk	Date:	July 2017

APPENDIX A



RISING FOUL MAIN TO CONNECT TO PUBLIC SEWER IN CHATBURN ROAD

Rev	Date	Description	Drn	Chk	App
A	JUL 17		SB	BF	BF
-		ORIGINAL ISSUE	SB	BF	BF

OAKMERE HOMES
CHATBURN ROAD

DRAINAGE LAYOUT
SCALE: 1:500 @A2
REV -
C116-500 REV A

CTC
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APPENDIX B

Drainage Design Report

Flow

v4.0

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Network	Storm Network
Filename	C:\Users\Bob\Documents\ctc\chatburn road\drainage design\network a residential\chatburn road network a residential.pfd
Username	Bob-TOSH\Bob
Last analysed	04-Jul-17 11:57:04 AM
Report produced on	04-Jul-17 12:20:25 PM

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Rainfall Methodology	FSR
Return Period (years)	2
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.200
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.600
Preferred Cover Depth (m)	1.200
Enforce best practice design rules	

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Diameter (mm)	Depth (m)
1a	0.018	5.00		92.250	Manhole	1200	1.350
2a	0.010	5.00		90.130	Manhole	1200	1.350
3a	0.061	5.00		89.300	Manhole	1200	1.500
4a	0.015	5.00		89.400	Manhole	1200	1.934
5a	0.013	5.00		88.650	Manhole	1200	1.350
6a	0.025	5.00		86.710	Manhole	2100	2.910
7a	0.033	5.00		86.500	Manhole	1200	1.350
8a				86.250	Manhole	1800	2.450
9a	0.035	5.00		85.750	Manhole	2100	2.150
10a	0.048	5.00		85.450	Manhole	2100	2.010
11a	0.020	5.00		85.200	Manhole	2100	1.850
12a				83.980	Manhole	1200	0.680

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Min DS IL (m)
1.000	1a	2a	25.000	90.900	88.780	2.120	11.8	150	Circular	5.14	48.7	
1.001	2a	5a	15.000	88.780	87.300	1.480	10.1	150	Circular	5.22	48.5	
2.000	3a	4a	25.000	87.800	87.466	0.334	74.9	150	Circular	5.36	48.1	
2.001	4a	5a	10.000	87.466	87.300	0.166	60.2	150	Circular	5.49	47.7	
1.002	5a	6a	25.000	87.300	84.550	2.750	9.1	150	Circular	5.61	47.3	
1.003	6a	9a	20.000	83.800	83.600	0.200	100.0	900	Double	5.72	47.0	
3.000	7a	8a	20.000	85.150	84.550	0.600	33.3	150	Circular	5.19	48.6	
3.001	8a	9a	20.000	83.800	83.600	0.200	100.0	900	Double	5.30	48.2	
1.004	9a	10a	16.000	83.600	83.440	0.160	100.0	900	Double	5.80	46.8	
1.005	10a	11a	9.000	83.440	83.350	0.090	100.0	900	Double	5.85	46.7	
1.006	11a	12a	8.000	83.350	83.300	0.050	160.0	300	Circular	5.96	46.4	83.300

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (ha)
1.000	1a	2a	2.950	52.1	2.4	1.200	1.200	0.018	0.0
1.001	2a	5a	3.183	56.2	3.7	1.200	1.200	0.028	0.0
2.000	3a	4a	1.163	20.6	7.9	1.350	1.784	0.061	0.0
2.001	4a	5a	1.298	22.9	9.8	1.784	1.200	0.076	0.0
1.002	5a	6a	3.361	59.4	15.0	1.200	2.010	0.117	0.0
1.003	6a	9a	3.133	3986.3	18.1	2.010	1.250	0.142	0.0
3.000	7a	8a	1.749	30.9	4.3	1.200	1.550	0.033	0.0
3.001	8a	9a	3.133	3986.3	4.3	1.550	1.250	0.033	0.0
1.004	9a	10a	3.133	3986.3	26.6	1.250	1.110	0.210	0.0
1.005	10a	11a	3.133	3986.3	32.6	1.110	0.950	0.258	0.0
1.006	11a	12a	1.240	87.7	34.9	1.550	0.380	0.278	0.0

Rainfall Methodology	FSR		Return Period (years)	Climate Change (%)
FSR Region	England and Wales		1	0
M5-60 (mm)	20.000		30	0
Ratio-R	0.200		100	0
Summer CV	0.750		100	30
Winter CV	0.840			
Analysis Speed	Detailed			
Drain Down Time (mins)	480			
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)				

Head/Flow									
Node	Flap Valve	Online / Offline	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Head (m)	Flow (l/s)
11a	x	Online	x		83.350			0.038	0.905
								0.076	3.196
								0.113	6.017
								0.151	8.252
								0.189	9.204
								0.227	9.688
								0.264	10.061
								0.302	10.347
								0.340	10.564
								0.378	10.724
								0.415	10.837
								0.453	10.913
								0.491	10.958
								0.529	10.977
								0.566	10.977
								0.604	10.959
								0.642	10.927
								0.680	10.882
								0.717	10.825
								0.755	10.756
								0.793	10.672
								0.831	10.573
								0.868	10.454
								0.906	10.312
								0.944	10.142
								0.982	9.938
								1.019	9.695
								1.057	9.407
								1.095	9.068
								1.133	8.736

								1.170	8.866
								1.208	8.999
								1.246	9.130
								1.284	9.258
								1.321	9.385
								1.359	9.510
								1.397	9.634
								1.435	9.755
								1.472	9.875
								1.510	9.993
								1.548	10.110
								1.586	10.226
								1.623	10.340
								1.661	10.452
								1.699	10.564
								1.737	10.674
								1.774	10.782
								1.812	10.890
								1.850	10.997
								2.035	11.503
								2.220	11.986

Default Values		Overrides						
		Link	Entry Loss	Exit Loss		Node	Flood Risk (m)	
Entry Loss (manhole)	0.250							
Exit Loss (manhole)	0.250							
Entry Loss (junction)	0.000							
Exit Loss (junction)	0.000							
Flood Risk (m)	0.300							

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.98%

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 winter	1a	10	90.920	0.020	2.0	0.0280	0.0000	OK	1.000	2a	2.0	1.244	0.038	0.0398	
15 minute winter	2a	10	88.804	0.024	3.1	0.0304	0.0000	OK	1.001	5a	3.1	0.953	0.054	0.0502	
15 minute winter	3a	10	87.859	0.059	6.8	0.1148	0.0000	OK	2.000	4a	6.7	0.943	0.325	0.1772	
15 minute winter	4a	10	87.534	0.068	8.4	0.0873	0.0000	OK	2.001	5a	8.3	1.311	0.360	0.0632	
15 minute winter	5a	11	87.348	0.048	12.8	0.0641	0.0000	OK	1.002	6a	12.8	2.648	0.215	0.1208	
15 minute winter	6a	11	83.840	0.040	15.4	0.1469	0.0000	OK	1.003	9a	15.5	0.688	0.004	0.6237	
15 minute winter	7a	10	85.185	0.035	3.7	0.0573	0.0000	OK	3.000	8a	3.6	1.161	0.117	0.0625	
15 minute winter	8a	11	83.821	0.021	3.6	0.0538	0.0000	OK	3.001	9a	3.6	0.237	0.001	0.5702	
60 minute winter	9a	43	83.710	0.110	16.8	0.4177	0.0000	OK	1.004	10a	23.3	0.433	0.006	3.1761	
60 minute winter	10a	45	83.713	0.273	26.7	1.0761	0.0000	OK	1.005	11a	37.5	0.223	0.009	3.5333	
60 minute summer	11a	42	83.713	0.363	32.5	1.3353	0.0000	SURCHARGED	1.006	12a	10.2	0.803	0.116	0.1017	26.6
60 minute winter	12a	44	83.369	0.069	10.3	0.0000	0.0000	OK							

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.98%

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 winter	1a	10	90.931	0.031	4.9	0.0433	0.0000	OK	1.000	2a	4.9	1.622	0.093	0.0750	
15 minute winter	2a	10	88.817	0.037	7.6	0.0474	0.0000	OK	1.001	5a	7.5	1.182	0.133	0.0968	
15 minute winter	3a	10	87.905	0.105	16.7	0.2039	0.0000	OK	2.000	4a	16.4	1.138	0.798	0.3588	
15 minute winter	4a	11	87.590	0.124	20.5	0.1595	0.0000	OK	2.001	5a	20.2	1.585	0.883	0.1258	
15 minute winter	5a	11	87.380	0.080	31.2	0.1062	0.0000	OK	1.002	6a	31.1	3.327	0.524	0.2338	
120 minute winter	6a	90	84.025	0.225	17.2	0.8161	0.0000	OK	1.003	9a	20.5	0.584	0.005	8.2338	
15 minute winter	7a	10	85.207	0.057	9.0	0.0920	0.0000	OK	3.000	8a	8.9	1.484	0.287	0.1195	
120 minute winter	8a	92	84.026	0.226	13.6	0.5751	0.0000	OK	3.001	9a	13.6	0.199	0.003	8.2277	
120 minute winter	9a	86	84.021	0.421	43.4	1.5952	0.0000	OK	1.004	10a	33.7	0.476	0.008	11.5460	
120 minute winter	10a	92	84.022	0.582	61.4	2.2951	0.0000	OK	1.005	11a	49.9	0.202	0.013	8.5361	
120 minute winter	11a	90	84.031	0.681	52.3	2.5069	0.0000	SURCHARGED	1.006	12a	11.0	0.818	0.125	0.1074	97.3
60 minute summer	12a	44	83.371	0.071	11.0	0.0000	0.0000	OK							

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.98%

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 winter	1a	10	90.935	0.035	6.3	0.0492	0.0000	OK	1.000	2a	6.3	1.744	0.120	0.0899	
15 minute winter	2a	10	88.822	0.042	9.8	0.0539	0.0000	OK	1.001	5a	9.7	1.287	0.172	0.1139	
15 minute winter	3a	11	88.022	0.222	21.5	0.4318	0.0000	SURCHARGED	2.000	4a	19.4	1.167	0.944	0.4401	
15 minute winter	4a	11	87.670	0.204	24.4	0.2620	0.0000	SURCHARGED	2.001	5a	24.1	1.552	1.049	0.1440	
15 minute winter	5a	11	87.391	0.091	37.8	0.1207	0.0000	OK	1.002	6a	37.8	3.471	0.636	0.2721	
120 minute winter	6a	94	84.207	0.407	22.7	1.4806	0.0000	OK	1.003	9a	33.2	0.574	0.008	14.7891	
15 minute winter	7a	10	85.216	0.066	11.6	0.1062	0.0000	OK	3.000	8a	11.4	1.583	0.370	0.1443	
120 minute winter	8a	92	84.207	0.407	26.8	1.0366	0.0000	OK	3.001	9a	27.3	0.196	0.007	14.7591	
120 minute winter	9a	94	84.214	0.614	63.5	2.3261	0.0000	OK	1.004	10a	37.5	0.478	0.009	16.5757	
120 minute winter	10a	94	84.206	0.766	46.6	3.0197	0.0000	OK	1.005	11a	53.1	0.229	0.013	10.7747	
120 minute winter	11a	96	84.207	0.857	55.5	3.1528	0.0000	SURCHARGED	1.006	12a	11.0	0.818	0.125	0.1074	127.3
15 minute winter	12a	20	83.371	0.071	11.0	0.0000	0.0000	OK							

Results for 100 year +30% Critical Storm Duration. Lowest mass balance: 99.98%

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 winter	1a	10	90.940	0.040	8.2	0.0562	0.0000	OK	1.000	2a	8.1	1.877	0.156	0.1087	
15 minute winter	2a	10	88.828	0.048	12.7	0.0619	0.0000	OK	1.001	5a	12.7	1.408	0.225	0.1378	
15 minute winter	3a	11	88.355	0.555	27.9	1.0783	0.0000	SURCHARGED	2.000	4a	24.1	1.369	1.173	0.4401	
15 minute winter	4a	12	87.814	0.348	30.6	0.4469	0.0000	SURCHARGED	2.001	5a	30.0	1.798	1.307	0.1559	
15 minute winter	5a	11	87.408	0.108	47.6	0.1430	0.0000	OK	1.002	6a	47.6	3.620	0.801	0.3284	
180 minute winter	6a	144	84.780	0.980	22.8	3.5620	0.0000	SURCHARGED	1.003	9a	22.0	0.552	0.006	25.3510	
15 minute winter	7a	10	85.227	0.077	15.1	0.1243	0.0000	OK	3.000	8a	14.9	1.689	0.481	0.1762	
180 minute winter	8a	148	84.778	0.978	16.6	2.4886	0.0000	SURCHARGED	3.001	9a	-14.1	0.189	-0.004	25.3510	
180 minute winter	9a	144	84.777	1.177	39.0	4.4585	0.0000	SURCHARGED	1.004	10a	24.0	0.459	0.006	20.2808	
180 minute winter	10a	144	84.779	1.339	52.0	5.2757	0.0000	SURCHARGED	1.005	11a	44.0	0.206	0.011	11.4079	
180 minute winter	11a	144	84.779	1.429	47.2	5.2600	0.0000	SURCHARGED	1.006	12a	11.0	0.818	0.125	0.1074	192.9
15 minute summer	12a	24	83.371	0.071	11.0	0.0000	0.0000	OK							

Drainage Design Report

Flow

v4.0

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Network	Storm Network
Filename	C:\Users\Bob\Documents\ctc\chatburn road\drainage design\network b\chatburn road network b.pfd
Username	Bob-TOSH\Bob
Last analysed	04-Jul-17 12:54:14 PM
Report produced on	04-Jul-17 1:01:47 PM

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Rainfall Methodology	FSR
Return Period (years)	2
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.200
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Enforce best practice design rules	

Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Diameter (mm)	Depth (m)
1b	0.022	5.00		89.770	Manhole	1200	1.350
2b	0.025	5.00		89.500	Manhole	1200	1.350
3b	0.015	5.00		89.100	Manhole	1200	1.350
4b	0.020	5.00		88.900	Manhole	1200	1.600
5b				85.880	Manhole	1200	1.505
6b	0.054	5.00		85.940	Manhole	2700	2.810
7b	0.018	5.00		85.580	Manhole	2700	2.590
8b	0.064	5.00		85.040	Manhole	2700	2.220
9b	0.013	5.00		84.500	Manhole	2700	1.950
10b				83.000	Manhole	1350	0.500

Name	US Node	DS Node	Length (m)	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Min DS IL (m)
2.000	1b	3b	10.000	88.420	87.750	0.670	14.9	150	Circular	5.06	49.0	
1.000	2b	3b	20.000	88.150	87.750	0.400	50.0	150	Circular	5.23	48.4	
1.001	3b	4b	6.000	87.750	87.300	0.450	13.3	150	Circular	5.27	48.3	
1.002	4b	5b	25.000	87.300	84.375	2.925	8.5	150	Circular	5.39	48.0	
1.003	5b	7b	10.000	84.375	84.100	0.275	36.4	225	Circular	5.47	47.7	
3.000	6b	7b	14.000	83.130	82.990	0.140	100.0	900	Double	5.07	48.9	
1.004	7b	8b	17.000	82.990	82.820	0.170	100.0	900	Double	5.56	47.5	
1.005	8b	9b	27.000	82.820	82.550	0.270	100.0	900	Double	5.70	47.1	
1.006	9b	10b	8.000	82.550	82.500	0.050	160.0	300	Circular	5.81	46.8	82.500

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (ha)
2.000	1b	3b	2.621	46.3	2.9	1.200	1.200	0.022	0.0
1.000	2b	3b	1.426	25.2	3.3	1.200	1.200	0.025	0.0
1.001	3b	4b	2.773	49.0	8.1	1.200	1.450	0.062	0.0
1.002	4b	5b	3.467	61.3	10.7	1.450	1.355	0.082	0.0
1.003	5b	7b	2.176	86.5	10.6	1.280	1.255	0.082	0.0
3.000	6b	7b	3.133	3986.3	7.2	1.910	1.690	0.054	0.0
1.004	7b	8b	3.133	3986.3	19.8	1.690	1.320	0.154	0.0
1.005	8b	9b	3.133	3986.3	27.8	1.320	1.050	0.218	0.0
1.006	9b	10b	1.240	87.7	29.3	1.650	0.200	0.231	0.0

Rainfall Methodology	FSR		Return Period (years)	Climate Change (%)
FSR Region	England and Wales		1	0
M5-60 (mm)	20.000		30	0
Ratio-R	0.200		100	0
Summer CV	0.750		100	30
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)				

Head/Flow									
Node	Flap Valve	Online / Offline	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Head (m)	Flow (l/s)
9b	x	Online	x		82.550			0.040	0.801
								0.079	2.552
								0.119	3.963
								0.158	4.454
								0.198	4.732
								0.238	4.930
								0.277	5.069
								0.317	5.163
								0.356	5.223
								0.396	5.256
								0.436	5.269
								0.475	5.266
								0.515	5.251
								0.554	5.225
								0.594	5.189
								0.633	5.142
								0.673	5.083
								0.713	5.007
								0.752	4.910
								0.792	4.787
								0.831	4.632
								0.871	4.439
								0.911	4.227
								0.950	4.302
								0.990	4.384
								1.029	4.464
								1.069	4.543
								1.109	4.620
								1.148	4.695
								1.188	4.770

								1.227	4.843
								1.267	4.914
								1.307	4.985
								1.346	5.055
								1.386	5.123
								1.425	5.191
								1.465	5.257
								1.504	5.323
								1.544	5.388
								1.584	5.452
								1.623	5.515
								1.663	5.577
								1.702	5.639
								1.742	5.699
								1.782	5.759
								1.821	5.819
								1.861	5.878
								1.900	5.936
								1.940	5.993
								2.134	6.266
								2.328	6.527

Default Values		Overrides						
		Link	Entry Loss	Exit Loss		Node	Flood Risk (m)	
Entry Loss (manhole)	0.250							
Exit Loss (manhole)	0.250							
Entry Loss (junction)	0.000							
Exit Loss (junction)	0.000							
Flood Risk (m)	0.300							

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.39%

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 winter	1b	10	88.444	0.024	2.5	0.0344	0.0000	OK	2.000	3b	2.5	0.905	0.053	0.0278	
15 minute winter	2b	10	88.183	0.033	2.8	0.0502	0.0000	OK	1.000	3b	2.7	0.820	0.109	0.0671	
15 minute winter	3b	10	87.790	0.040	6.9	0.0543	0.0000	OK	1.001	4b	6.8	1.844	0.139	0.0222	
15 minute winter	4b	10	87.339	0.039	9.0	0.0535	0.0000	OK	1.002	5b	8.9	2.026	0.146	0.1110	
15 minute winter	5b	11	84.426	0.051	8.9	0.0579	0.0000	OK	1.003	7b	9.0	1.369	0.103	0.0654	
15 minute winter	6b	10	83.156	0.026	6.1	0.1605	0.0000	OK	3.000	7b	6.0	0.398	0.001	0.2158	
15 minute winter	7b	11	83.032	0.042	16.7	0.2465	0.0000	OK	1.004	8b	16.9	0.712	0.004	0.4463	
120 minute winter	8b	84	82.974	0.154	11.7	0.9695	0.0000	OK	1.005	9b	14.5	0.259	0.004	9.7904	
120 minute winter	9b	88	82.975	0.425	15.1	2.4916	0.0000	SURCHARGED	1.006	10b	5.2	0.668	0.060	0.0628	35.2
120 minute winter	10b	86	82.549	0.049	5.2	0.0000	0.0000	OK							

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.39%

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 winter	1b	10	88.456	0.036	6.0	0.0531	0.0000	OK	2.000	3b	6.0	1.111	0.129	0.0545	
15 minute winter	2b	10	88.203	0.053	6.8	0.0794	0.0000	OK	1.000	3b	6.7	1.025	0.267	0.1314	
15 minute winter	3b	10	87.817	0.067	16.8	0.0905	0.0000	OK	1.001	4b	16.6	2.296	0.339	0.0435	
15 minute winter	4b	10	87.362	0.062	22.1	0.0859	0.0000	OK	1.002	5b	22.0	2.593	0.359	0.2124	
15 minute winter	5b	10	84.459	0.084	22.0	0.0946	0.0000	OK	1.003	7b	21.8	1.725	0.252	0.1266	
180 minute winter	6b	148	83.337	0.207	7.2	1.2655	0.0000	OK	3.000	7b	11.1	0.363	0.003	4.6964	
180 minute winter	7b	140	83.337	0.347	22.3	2.0364	0.0000	OK	1.004	8b	20.3	0.543	0.005	10.2419	
180 minute winter	8b	144	83.337	0.517	26.4	3.2605	0.0000	OK	1.005	9b	31.8	0.271	0.008	26.0504	
180 minute winter	9b	140	83.338	0.788	33.0	4.6158	0.0000	SURCHARGED	1.006	10b	5.3	0.669	0.060	0.0630	94.8
60 minute summer	10b	123	82.549	0.049	5.3	0.0000	0.0000	OK							

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.39%

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 winter	1b	10	88.461	0.041	7.7	0.0602	0.0000	OK	2.000	3b	7.7	1.165	0.165	0.0665	
15 minute winter	2b	10	88.211	0.061	8.8	0.0912	0.0000	OK	1.000	3b	8.7	1.086	0.345	0.1605	
15 minute winter	3b	10	87.829	0.079	21.7	0.1065	0.0000	OK	1.001	4b	21.5	2.431	0.438	0.0530	
15 minute winter	4b	10	87.372	0.072	28.5	0.0990	0.0000	OK	1.002	5b	28.3	2.777	0.462	0.2545	
15 minute winter	5b	10	84.472	0.097	28.3	0.1098	0.0000	OK	1.003	7b	28.0	1.833	0.324	0.1533	
240 minute winter	6b	196	83.589	0.459	19.6	2.8050	0.0000	OK	3.000	7b	18.8	0.350	0.005	10.8213	
240 minute winter	7b	196	83.589	0.599	39.9	3.5110	0.0000	OK	1.004	8b	27.0	0.535	0.007	17.4231	
240 minute winter	8b	200	83.589	0.769	41.8	4.8471	0.0000	OK	1.005	9b	29.4	0.267	0.007	32.6928	
240 minute winter	9b	200	83.589	1.039	30.7	6.0899	0.0000	SURCHARGED	1.006	10b	5.3	0.669	0.060	0.0630	129.7
120 minute summer	10b	270	82.549	0.049	5.3	0.0000	0.0000	OK							

Results for 100 year +30% Critical Storm Duration. Lowest mass balance: 99.39%

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 winter	1b	10	88.468	0.048	10.1	0.0693	0.0000	OK	2.000	3b	10.0	1.225	0.217	0.0824	
15 minute winter	2b	10	88.220	0.070	11.4	0.1056	0.0000	OK	1.000	3b	11.3	1.140	0.448	0.1979	
15 minute winter	3b	10	87.844	0.094	28.2	0.1278	0.0000	OK	1.001	4b	28.0	2.560	0.571	0.0655	
15 minute winter	4b	10	87.384	0.084	37.2	0.1161	0.0000	OK	1.002	5b	37.0	2.990	0.604	0.3073	
15 minute winter	5b	10	84.489	0.114	37.0	0.1295	0.0000	OK	1.003	7b	36.6	1.949	0.423	0.1883	
360 minute winter	6b	280	84.472	1.342	19.0	8.1968	0.0000	SURCHARGED	3.000	7b	15.4	0.327	0.004	17.7457	
360 minute winter	7b	272	84.471	1.481	31.4	8.6889	0.0000	SURCHARGED	1.004	8b	21.3	0.489	0.005	21.5483	
360 minute winter	8b	272	84.469	1.649	41.6	10.3917	0.0000	SURCHARGED	1.005	9b	24.2	0.246	0.006	34.2238	
360 minute winter	9b	272	84.470	1.920	25.3	11.2499	0.0000	FLOOD RISK	1.006	10b	5.9	0.690	0.067	0.0683	168.8
360 minute winter	10b	272	82.552	0.052	5.9	0.0000	0.0000	OK							