

 T J Booth Associates. Consulting Engineers 20A Eastgate St, Rochdale OL16 1DH	Project Creative Developments - 120 Laund Rd, Salendine Nook,				Job Ref. calc-tjba-cdevs-120 laund rd-detailed drainage design-081217.docx	
	Section Detailed Drainage Design				Sheet no./rev. 1	
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History.

Revision	Date	Reason
p0	Dec 2017	Original for YW approval.
1	Aug 2018	Updated following stipulation of 5l/s peak flow rate from YW.
2	Dec 2018	Updated re attenuation crate design.

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Background.

The Development Site is formerly part of a single curtilage comprising a single detached residential dwelling and associated driveway and external hardstandings.

The Site currently has planning permission (ref No: 2014/93584) for the erection of 10No. residential dwellings. However the Site plan has since been revised to comprise 8 dwellings of detached & semi-detached layout.

This purpose of the report is to address the detailed drainage design and accompany the Proposed Drainage Plan & Details drawing ref: dwg-tjba-CDEVs-120 laund rd, hudds-drainage plan & details-revp2.

Drainage Hierarchy.

National Planning Policy stipulates the following hierarchal order of preference for the discharge of surface water from new developments to off site sources:

- infiltration;
- watercourse;
- sewer (first to SW sewer, and then to combined if SW not available).

Site investigations local to the site have revealed clay over shale bedrock, and the HR wallingford soil class estimator has indicated the site comprises soil class 4 (heavy clay); and thus is not suitable for infiltration techniques. The LPA drainage officer has been contacted and has agreed that infiltration is not an option for the site which rules out infiltration as a means of surface water discharge.

Due to the lack of watercourses in the area local to the Site, discharge via this option is not feasible.

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Finally, the only feasible way of discharging surface water from the Site is to the local Yorkshire Water public combined sewer in Laund Road. There is no surface water sewer available.

Predevelopment Land Usage.

The existing and proposed site areas are as follows:

Total brownfield areas:	0.023 Ha.	(0230 sqm)
Existing building area & positively drained surrounds:	0.023 Ha.	(0230 sqm)
Total greenfield areas:		
Overall greenfield area inc none positively drained H/S areas:	0.217 Ha.	(2170 sqm)
Access road, and concrete areas not positively drained:	0.048 Ha.	(0485 sqm) (22% of overall greenfield)
 Total Existing	 0.240 Ha.	 (2400 sqm)

Proposed Development Land Usage.

Total proposed urban/paved area	0.130 Ha	(1300 sqm)
Roofs	0.055 Ha	(0550 sqm)
Roofs, driveways, access rd & pavements	0.075 Ha	(0750 sqm)
Total proposed rural/permeable area	0.110 Ha	(1100 sqm)
(gardens, path where falls to s.landscaping)	0.110 Ha	(1100 sqm)
 Total Proposed Site	 0.240 Ha.	 (2400 sqm)

Post-development Runoff Rate.

Surface water discharge from the Site will be discharged in to the Yorkshire Water combined sewer in Laund Road. Previous discussions with Kirklees Drainage Department/LLFA have indicated that if water is to be discharged to a YW combined sewer, then Yorkshire Water will be free to set the flow rate from the Site.

Yorkshire Water have been consulted and have stipulated that surface water may discharge from the Site in to the YW combined sewer in Laund Road, at a peak flow rate of not greater than 5l/s up to and including the 1:100yr +30% flood event, refer to email correspondence in appendix.

Proposed SW Flood Attenuation System

The access road is to be private and the attenuation system on site will comprise flood attenuation/storage crates, controlled by a Hydrobrake Optimum vortex flow control device.

Flood Storage Attenuation & Discharges.

100 Year Return Period.

The following indicates the flow control and storage on site before discharge to the YW sewer.

Storage provided	Attenuation crates/control manhole = 44m ³ .
Critical storm	120 winter
Max water level	49.65m aOD (1.073m)

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Time to peak 98 mins

Control Hydro-brake Optimum vortex flow control, 5l/s max at 1.1m head.

Control discharge 5 l/s

Allowable discharge = ngt 5 l/s OK.

Refer to calculations in appendix. All calculations are run with a 30% allowance for climate change.

Proposed FW System

A check was undertaken as to the flow of foul water in the residential systems.

Each residential dwelling will be on a private 100dia system. Once the individual dwellings systems combine, the FW sewer will comprise 150dia piped system.

The FW check was undertaken in line with BS EN 752-4, inputting discharge units for each house type/sanitary services as in the tables below.

Concluding and using the worst case house type multiplied by the number of proposed dwellings gives a peak foul flow of 4.6l/s which is within the capacity of a 150dia sewer system.

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Appendix.

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Rochdale	Land at 120 Laund Road		
Lancashire OL16 1JY	Salendine Nook Hudds		
Date Nov 2018	Designed By DS		
File CALC-T~4.SRC	Checked By		
Micro Drainage	Source Control W.10.4		

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 79 minutes

Storm Duration (mins)	Maximum Control (l/s)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	5.0	0.0	5.0	49.1118	0.5317	22.0	O K
30 Summer	5.0	0.0	5.0	49.3083	0.7283	30.1	O K
60 Summer	5.0	0.0	5.0	49.4568	0.8768	36.2	O K
120 Summer	5.0	0.0	5.0	49.5048	0.9248	38.2	O K
180 Summer	5.0	0.0	5.0	49.4873	0.9073	37.5	O K
240 Summer	5.0	0.0	5.0	49.4558	0.8758	36.2	O K
360 Summer	5.0	0.0	5.0	49.3728	0.7928	32.7	O K
480 Summer	5.0	0.0	5.0	49.2808	0.7008	28.9	O K
600 Summer	5.0	0.0	5.0	49.1848	0.6048	25.0	O K
720 Summer	5.0	0.0	5.0	49.0918	0.5117	21.1	O K
960 Summer	5.0	0.0	5.0	48.9448	0.3647	15.1	O K
1440 Summer	4.8	0.0	4.8	48.7978	0.2177	9.0	O K
2160 Summer	3.9	0.0	3.9	48.7138	0.1338	5.5	O K
2880 Summer	3.4	0.0	3.4	48.6763	0.0963	4.0	O K
4320 Summer	2.5	0.0	2.5	48.6513	0.0713	2.9	O K
5760 Summer	2.0	0.0	2.0	48.6373	0.0572	2.4	O K
7200 Summer	1.7	0.0	1.7	48.6288	0.0487	2.0	O K
8640 Summer	1.5	0.0	1.5	48.6223	0.0422	1.7	O K
10080 Summer	1.3	0.0	1.3	48.6178	0.0377	1.6	O K
15 Winter	5.0	0.0	5.0	49.1718	0.5917	24.4	O K
30 Winter	5.0	0.0	5.0	49.4153	0.8353	34.5	O K
60 Winter	5.0	0.0	5.0	49.5853	1.0053	41.5	O K
120 Winter	5.0	0.0	5.0	49.6533	1.0733	44.3	O K
180 Winter	5.0	0.0	5.0	49.6218	1.0418	43.0	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
15 Summer	89.23	17
30 Summer	61.54	32
60 Summer	40.51	60
120 Summer	25.63	94
180 Summer	19.23	128
240 Summer	15.63	162
360 Summer	11.65	232
480 Summer	9.44	298
600 Summer	8.01	362
720 Summer	7.00	420
960 Summer	5.65	538
1440 Summer	4.17	764
2160 Summer	3.07	1116
2880 Summer	2.46	1472
4320 Summer	1.81	2204
5760 Summer	1.45	2912
7200 Summer	1.23	3664
8640 Summer	1.07	4336
10080 Summer	0.95	5136
15 Winter	89.23	17
30 Winter	61.54	31
60 Winter	40.51	60
120 Winter	25.63	98
180 Winter	19.23	136

(c)1982-2006 Micro Drainage

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Micro Drainage	Source Control W.10.4	

Summary of Results for 100 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Filtration (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
240 Winter	5.0	0.0	5.0	49.5698	0.9898	40.9	O K
360 Winter	5.0	0.0	5.0	49.4398	0.8598	35.5	O K
480 Winter	5.0	0.0	5.0	49.2888	0.7088	29.2	O K
600 Winter	5.0	0.0	5.0	49.1273	0.5472	22.6	O K
720 Winter	5.0	0.0	5.0	48.9903	0.4102	16.9	O K
960 Winter	4.9	0.0	4.9	48.8328	0.2527	10.4	O K
1440 Winter	4.0	0.0	4.0	48.7188	0.1388	5.7	O K
2160 Winter	3.1	0.0	3.1	48.6673	0.0873	3.6	O K
2880 Winter	2.5	0.0	2.5	48.6503	0.0703	2.9	O K
4320 Winter	1.8	0.0	1.8	48.6318	0.0517	2.1	O K
5760 Winter	1.5	0.0	1.5	48.6218	0.0417	1.7	O K
7200 Winter	1.2	0.0	1.2	48.6153	0.0352	1.4	O K
8640 Winter	1.1	0.0	1.1	48.6108	0.0307	1.3	O K
10080 Winter	1.0	0.0	1.0	48.6073	0.0272	1.1	O K

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
240 Winter	15.63	176
360 Winter	11.65	250
480 Winter	9.44	322
600 Winter	8.01	384
720 Winter	7.00	438
960 Winter	5.65	546
1440 Winter	4.17	768
2160 Winter	3.07	1100
2880 Winter	2.46	1464
4320 Winter	1.81	2200
5760 Winter	1.45	2872
7200 Winter	1.23	3640
8640 Winter	1.07	4320
10080 Winter	0.95	5080

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Micro Drainage	Source Control W.10.4	

Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	100	Longest Storm (mins)	10080
M5-60 (mm)	20.000	Summer Storms	Yes
Ratio-R	0.300	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+30
Cv (Winter)	0.840		

Pipe Network

Volume in Pipe Network (m³)	3	Dia of Outfall Pipe (m)	0.100
Slope of Outfall Pipe (1:x)	100.0	Roughness of Outfall Pipe	0.600

Time / Area Diagram

Total Area (ha) = 0.130

Time from:	(mins) to:	Area (ha)
0	4	0.130

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Cellular Storage Details

Infil Coef - Base (m/hr) 0.000000 Porosity 0.96
 Infil Coef - Sides (m/hr) 0.000000 Invert Level (m) 48.580
 Safety Factor 1.0 Ground Level (m) 50.100

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.00	43.0	0.50	43.0	1.00	43.0	1.50	43.0	2.00	43.0	2.50	43.0
0.10	43.0	0.60	43.0	1.10	43.0	1.60	43.0	2.10	43.0		
0.20	43.0	0.70	43.0	1.20	43.0	1.70	43.0	2.20	43.0		
0.30	43.0	0.80	43.0	1.30	43.0	1.80	43.0	2.30	43.0		
0.40	43.0	0.90	43.0	1.40	43.0	1.90	43.0	2.40	43.0		

Depth / Flow Outflow Control

Invert Level of Control 48.580

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	3.5	0.80	4.4	2.00	5.3	4.00	5.3	7.00	5.3
0.20	4.8	1.00	4.8	2.20	5.3	4.50	5.3	7.50	5.3
0.30	5.0	1.20	5.3	2.40	5.3	5.00	5.3	8.00	5.3
0.40	4.9	1.40	5.3	2.60	5.3	5.50	5.3	8.50	5.3
0.50	4.8	1.60	5.3	3.00	5.3	6.00	5.3	9.00	5.3
0.60	4.5	1.80	5.3	3.50	5.3	6.50	5.3	9.50	5.3

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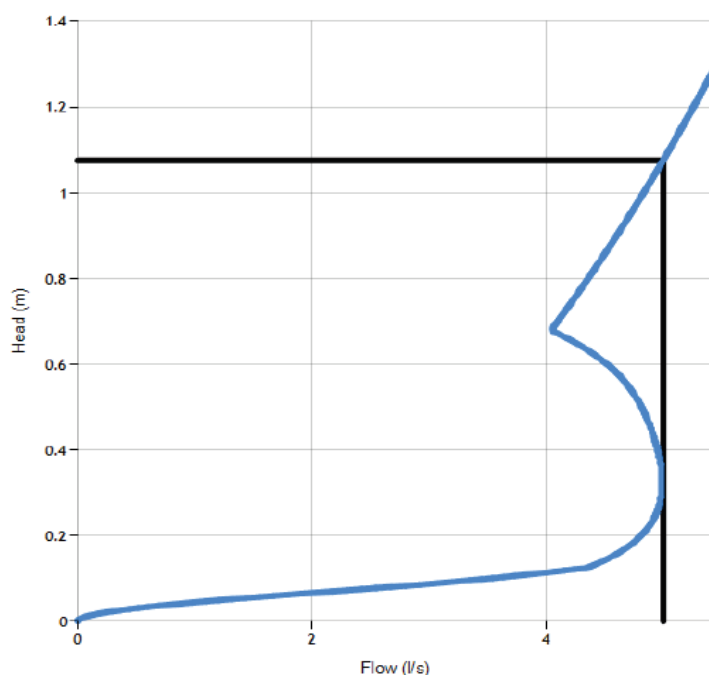
Hydro-Brake Optimum Flow Control Hydraulics

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.075	4.999
Flush-Flo™	0.318	4.990
Kick-Flo®	0.678	4.040
Mean Flow		4.352



PT/329/0412



Head (m)	Flow (l/s)
0.000	0.000
0.037	0.725
0.074	2.391
0.111	3.915
0.148	4.542
0.185	4.753
0.222	4.883
0.259	4.955
0.297	4.986
0.334	4.988
0.371	4.970
0.408	4.938
0.445	4.896
0.482	4.841
0.519	4.771
0.556	4.676
0.593	4.546
0.630	4.368
0.667	4.129
0.704	4.112
0.741	4.210
0.778	4.306
0.816	4.399
0.853	4.491
0.890	4.580
0.927	4.667
0.964	4.752
1.001	4.836
1.038	4.918
1.075	4.999

DESIGN ADVICE



The head/flow characteristics of this SHE-0104-5000-1075-5000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.



DATE	03/12/2018 14:53:32
SITE	120 Laund Rd, Hudds
DESIGNER	Daniel Slattery
REF	Site SW Control MH

SHE-0104-5000-1075-5000
Hydro-Brake Optimum®

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FW Peak Flow Estimation BS EN 752-4.

FOUL DRAINAGE MANHOLE SCHEDULE							
Client				Cdevs			
Site Name & Location				120 Laund Road, Huddersfield			
Route Description				Proposed Foul Water Only			
House Types 1, 5, 6, 7, 8				House Types 2,3,4			
BS EN 752-4				BS EN 752-4			
Appliance Type	No of Appliances	DU	DU Tot	Appliance Type	No of Appliances	DU	DU Tot
Basin	1	0.6	0.6	Basin	2	0.6	1.2
Kitchen sink	2	1.3	2.6	Kitchen sink	3	1.3	3.9
Shower	2	0.6	1.2	Shower	3	0.6	1.8
Toilet	1	2.5	2.5	Toilet	1	2.5	2.5
Bath	2	1.3	2.6	Bath	2	1.3	2.6
		Tot DU tot	9.5			Tot DU tot	12
		ave DU tot/house	10.4375				
BS EN 752-4							
No of Dwellings		8					
Discharge Units / dwelling		10.44					
Total DU's		83.52					
Freq Factor		0.5					
Peak Foul flow l/s		4.6					
Average Foul flow l/s		0.6					
Pipe full velocity =		0.355CD ^{0.63} (hf/L) ^{0.54}					
Hazen Williams C =		150					

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Yorkshire Water Correspondence – SW Discharge Agreement.

Dan Slattery TJBA

From: John Wellham <john.wellham@yorkshirewater.co.uk>
Sent: 14 August 2018 10:20
To: Dan Slattery TJBA
Cc: tim@tjba.co.uk
Subject: RE: FAO John Wellham, YW ref: U004363, 120 Laund Road Development

Good morning Dan, thank you for your emails. I have been away for just over a week; I am catching up slowly!

I agree that soakaways will not be viable for this site.

In terms of the report you have sent, I note that the existing building area and positively drained surrounds total an area of 0.023ha which equates to just over 3 l/s in a 1 in 1 year event. I note that you have based the 30% reduction on a return period of 1:100. The 30% reduction should always be applied to the existing discharge rate during a 1:1 year event. The total greenfield areas cannot be included in your calculations.

I am prepared to compromise however and I would be willing to agree a restricted surface water discharge rate of 5 (five) l/s. This rate should be maintained across all storm events up to and including a 1:100 year event.

Kind Regards

John Wellham
 Sewerage Technician
 Yorkshire Water

*** Please note, all replies must be sent to technical.sewerage@yorkshirewater.co.uk and will be responded to within 10 working days ***

From: Dan Slattery TJBA [mailto:pc3@tjba.co.uk]
Sent: 09 August 2018 14:47
To: John Wellham <john.wellham@yorkshirewater.co.uk>
Cc: tim@tjba.co.uk; Technical Sewerage <technical.sewerage@yorkshirewater.co.uk>
Subject: FW: FAO John Wellham, YW ref: U004363, 120 Laund Road Development

EXTERNAL SOURCE - THINK BEFORE YOU CLICK

Hi John,