REFORD

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11th November 2025

Ribble Valley Borough Council
Development Control
Council Offices Church Walk
Clitheroe
Lancashire
BB7 2RA

Dear Development Control

Planning reference: 3/2025/0141
Location: Bolton Fold Farm, Alston Lane, Longridge, PR3 3BN
Proposal: Regularisation of erection of three commercial buildings (10 commercial units Use Class E) and associated works

We refer to the letter from the Lead Local Flood Authority (LLFA) dated 12th August 2025 in which the LLFA had no objection in principle to the above application, subject to the evidence outlined below being provided. Our responses are alongside.

a) Sustainable drainage calculations for peak flow control and volume control for the:

i. 100% (1 in 1-year) annual exceedance probability event;
ii. 3.3% (1 in 30-year) annual exceedance probability event + 45% climate change allowance, with an allowance for urban creep;
iii. 1% (1 in 100-year) annual exceedance probability event + 50% climate change allowance, with an allowance for urban creep.

Response: The calculations have been produced and are attached to this letter.

b) Final sustainable drainage plans appropriately labelled to include, as a minimum:

i. Site plan showing all permeable and impermeable areas that contribute to the drainage network either directly or indirectly, including surface water flows from outside the curtilage as necessary;
ii. Final detailed sustainable drainage system layout showing all pipe and structure references, dimensions and design levels;
iii. Details of all sustainable drainage components, including landscape drawings showing topography and slope gradient as appropriate;
iv. Drainage plan showing flood water exceedance routes in accordance with Defra Technical Standards for Sustainable Drainage Systems;
v. Details of proposals to collect and mitigate surface water runoff from the development boundary;
vi. Measures taken to manage the quality of the surface water runoff to prevent pollution, protect groundwater and surface waters, and delivers suitably clean water to sustainable drainage components;

Response: The drainage plan has been updated with the above information and is attached to this letter.

c) Evidence of the condition and capacity of the existing ordinary watercourse, to confirm this system can accept the runoff generated by the proposed development.

Response: The existing ordinary watercourse is in good condition and has the capacity to accept the restricted runoff from the development as prior to the development the surface water runoff from the site discharged into the watercourse. The restriction into the watercourse is the Greenfield runoff rate (2.8 l/s).

d) A site-specific Operation and Maintenance Manual for the lifetime of the development, pertaining to the surface water sustainable drainage system and prepared by a suitably competent person.

Response: A Sustainable Drainage Management and Maintenance Plan is attached to this letter.

e) A site-specific verification report, pertaining to the surface water sustainable drainage system, and prepared by a suitably competent person, has been submitted to and approved in writing by the Local Planning Authority.

Response: A verification report on the surface water drainage system will be produced once the drainage serving the site has been completely installed in accordance with the design.

With trust the above will be acceptable to the LLFA.

Yours sincerely,

Bob Ford

Bob Ford
DIRECTOR
REFORD Consulting Engineers Limited

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	75.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.800	Minimum Backdrop Height (m)	3.000
Ratio-R	0.300	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
ch1	0.055	5.00	100.000	300	0.300
ch2	0.069	5.00	100.000	300	0.314
ch3	0.055	5.00	100.000	300	0.352
ch4			100.000	300	1.066
1			100.000	1200	1.166
2	0.064	5.00	100.000	1200	0.825
3	0.063	5.00	100.000	1200	1.355
4	0.038	5.00	100.000	1200	1.532
5			100.000	1200	1.666
pond			100.000	1200	1.691
6			100.000	1200	1.740

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	ch1	ch2	14.000	0.600	99.700	99.686	0.014	1000.0	300	5.35	55.5
1.001	ch2	ch3	38.000	0.600	99.686	99.648	0.038	1000.0	300	6.31	51.9
1.002	ch3	ch4	38.000	0.600	99.648	99.610	0.038	1000.0	300	7.27	48.8
1.003	ch4	1	10.000	0.600	98.934	98.834	0.100	100.0	300	7.37	48.5
1.004	1	5	50.000	0.600	98.834	98.334	0.500	100.0	300	7.91	47.0
2.000	2	3	90.000	0.600	99.175	98.645	0.530	169.8	225	6.50	51.2
2.001	3	4	30.000	0.600	98.645	98.468	0.177	169.5	225	7.00	49.6
2.002	4	5	10.000	0.600	98.468	98.409	0.059	169.5	225	7.17	49.1
1.005	5	pond	5.000	0.600	98.334	98.309	0.025	200.0	300	7.98	46.8
1.006	pond	6	5.000	0.600	98.309	98.260	0.049	102.0	150	8.06	46.6

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	0.661	79.3	8.3	0.000	0.014	0.055	0.0
1.001	0.661	79.3	17.4	0.014	0.052	0.124	0.0
1.002	0.661	79.3	23.7	0.052	0.090	0.179	0.0
1.003	1.572	111.1	23.5	0.766	0.866	0.179	0.0
1.004	1.572	111.1	22.8	0.866	1.366	0.179	0.0
2.000	1.000	39.8	8.9	0.600	1.130	0.064	0.0
2.001	1.001	39.8	17.1	1.130	1.307	0.127	0.0
2.002	1.001	39.8	22.0	1.307	1.366	0.165	0.0
1.005	1.108	78.3	43.6	1.366	1.391	0.344	0.0
1.006	0.994	17.6	43.4	1.541	1.590	0.344	0.0

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m³/ha)	20.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)	
FSR Region	England and Wales	Analysis Speed	Normal	Check Discharge Rate(s)	x
M5-60 (mm)	18.800	Skip Steady State	x	Check Discharge Volume	x
Ratio-R	0.300	Drain Down Time (mins)	240		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0	100	0	0	0
30	45	0	0	100	50	0	0

Node pond Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	98.309	Product Number	CTL-SHE-0071-2800-1650-2800
Design Depth (m)	1.650	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.8	Min Node Diameter (mm)	1200

Node pond Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.309
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)
0.000	130.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.18%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ch1	11	99.770	0.070	6.6	0.2556	0.0000	OK
15 minute winter	ch2	11	99.767	0.081	14.2	0.3579	0.0000	OK
15 minute winter	ch3	12	99.747	0.099	19.3	0.3148	0.0000	OK
15 minute winter	ch4	12	99.020	0.086	17.5	0.0061	0.0000	OK
15 minute winter	1	13	98.914	0.080	17.4	0.0900	0.0000	OK
15 minute winter	2	11	99.240	0.065	7.7	0.1732	0.0000	OK
15 minute winter	3	11	98.736	0.091	14.5	0.1878	0.0000	OK
15 minute winter	4	11	98.622	0.154	18.2	0.2502	0.0000	OK
15 minute summer	5	11	98.599	0.265	35.1	0.2996	0.0000	OK
360 minute winter	pond	272	98.590	0.281	7.5	36.8809	0.0000	SURCHARGED
15 minute summer	6	1	98.260	0.000	1.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ch1	1.000	ch2	5.9	0.206	0.075	0.4233	
15 minute winter	ch2	1.001	ch3	13.1	0.388	0.166	1.3661	
15 minute winter	ch3	1.002	ch4	17.5	0.559	0.220	1.1892	
15 minute winter	ch4	1.003	1	17.4	1.112	0.157	0.1573	
15 minute winter	1	1.004	5	17.4	0.762	0.157	1.8873	
15 minute winter	2	2.000	3	7.3	0.599	0.183	1.1004	
15 minute winter	3	2.001	4	13.9	0.757	0.350	0.6596	
15 minute winter	4	2.002	5	22.4	0.969	0.563	0.3095	
15 minute summer	5	1.005	pond	48.5	1.941	0.620	0.1668	
360 minute winter	pond	Hydro-Brake®	6	2.2				60.5

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 98.18%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ch1	11	99.904	0.204	23.4	0.7482	0.0000	OK
15 minute winter	ch2	11	99.902	0.216	50.5	0.9500	0.0000	OK
15 minute winter	ch3	11	99.873	0.225	69.9	0.7198	0.0000	OK
600 minute winter	ch4	585	99.535	0.601	9.1	0.0427	0.0000	SURCHARGED
600 minute winter	1	570	99.535	0.701	9.1	0.7932	0.0000	SURCHARGED
600 minute winter	2	570	99.535	0.360	3.2	0.9665	0.0000	SURCHARGED
600 minute winter	3	570	99.535	0.890	6.4	1.8349	0.0000	SURCHARGED
600 minute winter	4	570	99.535	1.067	7.6	1.7365	0.0000	SURCHARGED
600 minute winter	5	570	99.535	1.201	15.7	1.3578	0.0000	SURCHARGED
600 minute winter	pond	570	99.535	1.226	15.2	160.7757	0.0000	SURCHARGED
15 minute summer	6	1	98.260	0.000	2.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ch1	1.000	ch2	21.6	0.270	0.272	1.1767	
15 minute winter	ch2	1.001	ch3	47.8	0.545	0.602	3.3548	
15 minute winter	ch3	1.002	ch4	67.3	0.917	0.849	2.7908	
600 minute winter	ch4	1.003	1	9.1	0.904	0.082	0.7042	
600 minute winter	1	1.004	5	8.3	0.365	0.075	3.5210	
600 minute winter	2	2.000	3	3.2	0.433	0.080	3.5794	
600 minute winter	3	2.001	4	5.7	0.546	0.143	1.1931	
600 minute winter	4	2.002	5	7.4	0.565	0.187	0.3977	
600 minute winter	5	1.005	pond	15.2	0.820	0.194	0.3521	
600 minute winter	pond	Hydro-Brake®	6	2.4				101.5

Results for 100 year Critical Storm Duration. Lowest mass balance: 98.18%

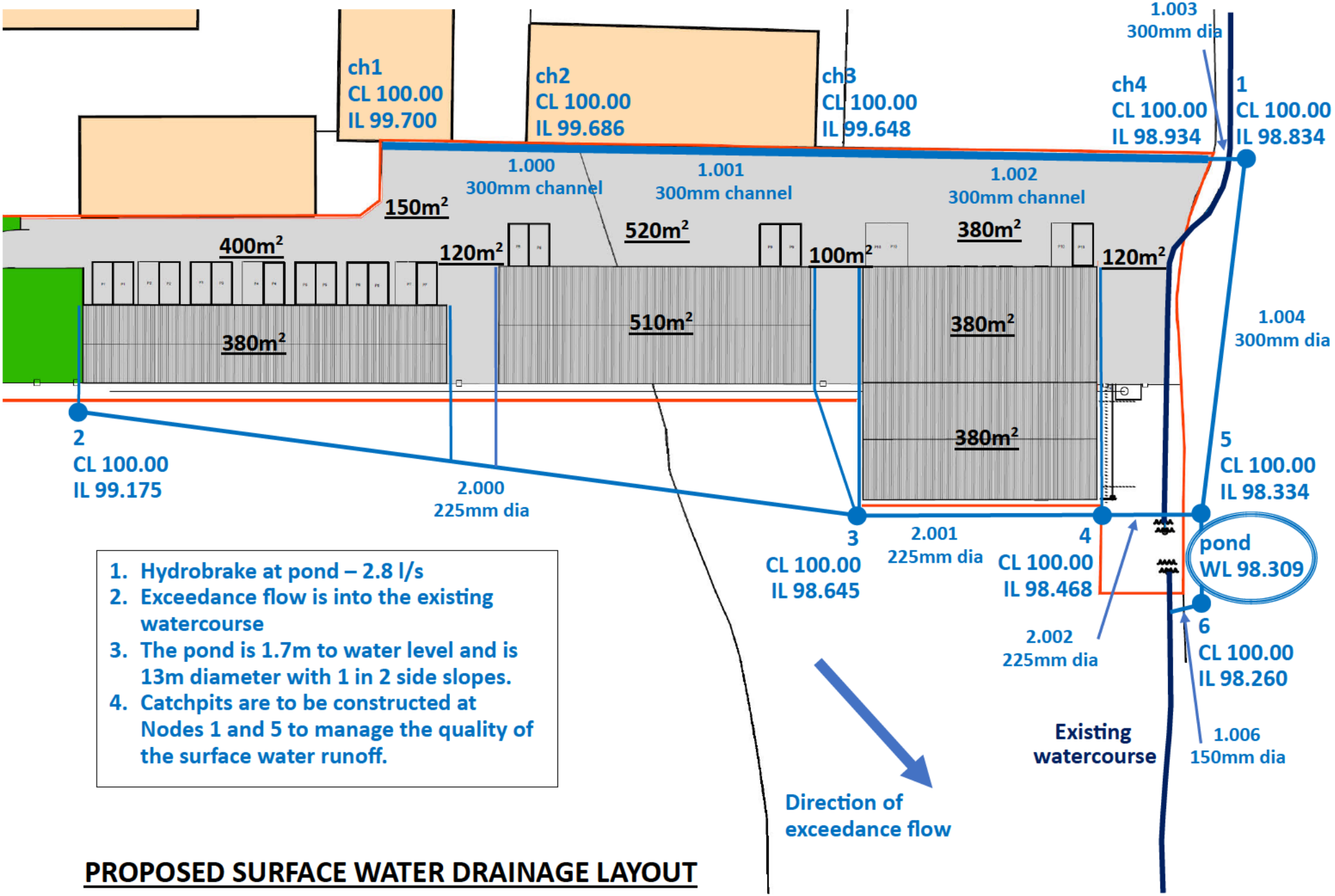
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ch1	11	99.886	0.186	20.9	0.6808	0.0000	OK
15 minute winter	ch2	11	99.884	0.198	44.9	0.8693	0.0000	OK
15 minute winter	ch3	12	99.856	0.208	61.9	0.6650	0.0000	OK
480 minute winter	ch4	464	99.351	0.417	9.4	0.0296	0.0000	SURCHARGED
480 minute winter	1	464	99.351	0.517	9.4	0.5847	0.0000	SURCHARGED
480 minute winter	2	464	99.351	0.176	3.4	0.4722	0.0000	OK
480 minute winter	3	464	99.351	0.706	6.7	1.4552	0.0000	SURCHARGED
480 minute winter	4	464	99.351	0.883	7.9	1.4366	0.0000	SURCHARGED
480 minute winter	5	480	99.351	1.017	17.1	1.1504	0.0000	SURCHARGED
480 minute winter	pond	464	99.351	1.042	16.6	136.6234	0.0000	SURCHARGED
15 minute summer	6	1	98.260	0.000	2.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ch1	1.000	ch2	19.1	0.263	0.240	1.0738	
15 minute winter	ch2	1.001	ch3	42.3	0.525	0.533	3.0832	
15 minute winter	ch3	1.002	ch4	59.6	0.878	0.751	2.5794	
480 minute winter	ch4	1.003	1	9.4	0.934	0.085	0.7042	
480 minute winter	1	1.004	5	9.4	0.375	0.085	3.5210	
480 minute winter	2	2.000	3	3.4	0.460	0.085	3.2900	
480 minute winter	3	2.001	4	5.9	0.579	0.149	1.1931	
480 minute winter	4	2.002	5	7.7	0.595	0.195	0.3977	
480 minute winter	5	1.005	pond	16.6	0.843	0.212	0.3521	
480 minute winter	pond	Hydro-Brake®	6	2.3				82.7

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 98.18%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	ch1	690	99.966	0.266	3.2	0.9740	0.0000	OK
720 minute winter	ch2	690	99.966	0.280	7.2	1.2289	0.0000	OK
720 minute winter	ch3	690	99.966	0.318	10.4	1.0151	0.0000	FLOOD RISK
720 minute winter	ch4	690	99.966	1.032	10.4	0.0732	0.0000	FLOOD RISK
720 minute winter	1	690	99.966	1.132	10.3	1.2798	0.0000	FLOOD RISK
720 minute winter	2	690	99.966	0.791	3.7	2.1206	0.0000	FLOOD RISK
720 minute winter	3	690	99.966	1.321	7.4	2.7218	0.0000	FLOOD RISK
720 minute winter	4	690	99.966	1.498	8.7	2.4365	0.0000	FLOOD RISK
720 minute winter	5	690	99.966	1.632	18.4	1.8454	0.0000	FLOOD RISK
720 minute winter	pond	690	99.965	1.656	18.3	217.2034	0.0000	FLOOD RISK
15 minute summer	6	1	98.260	0.000	2.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute winter	ch1	1.000	ch2	3.2	0.165	0.040	1.5269	
720 minute winter	ch2	1.001	ch3	7.2	0.285	0.091	4.5395	
720 minute winter	ch3	1.002	ch4	10.4	0.459	0.131	5.1171	
720 minute winter	ch4	1.003	1	10.3	0.911	0.093	0.7042	
720 minute winter	1	1.004	5	10.1	0.379	0.091	3.5210	
720 minute winter	2	2.000	3	3.7	0.417	0.093	3.5794	
720 minute winter	3	2.001	4	6.5	0.506	0.164	1.1931	
720 minute winter	4	2.002	5	8.5	0.522	0.214	0.3977	
720 minute winter	5	1.005	pond	18.3	0.838	0.234	0.3521	
720 minute winter	pond	Hydro-Brake®	6	2.8				131.3



1. Hydrobrake at pond – 2.8 l/s
2. Exceedance flow is into the existing watercourse
3. The pond is 1.7m to water level and is 13m diameter with 1 in 2 side slopes.
4. Catchpits are to be constructed at Nodes 1 and 5 to manage the quality of the surface water runoff.

PROPOSED SURFACE WATER DRAINAGE LAYOUT

Sustainable Drainage Management and Maintenance Plan

The owner of the buildings will be responsible for the maintenance of the various drainage features of the scheme.

The table below lists the various drainage features utilised within the proposed drainage design, along with the maintenance regime that should be followed.

BUILDING DRAINAGE	
Regular maintenance	**Frequency**
Visually inspect gutters to ensure they are kept clear of leaves, debris etc. Lift covers of drainage to inspect chambers for debris and build-up of silts. Manhole covers are securely in place.	Annually. No triggers other than maintenance to be taken on regular schedule.
Occasional tasks	**Frequency**
Remove leaves and debris from gutters. Remove debris from inspection chambers to ensure outlets are kept clear of debris to ensure adequate drainage.	As required. Indicator of problem / trigger for maintenance when surcharging or flooding of drains occurs or gutters and chambers full of debris and leaves etc.
Remedial work	**Frequency**
Should drains be heavily blocked or damaged contact drainage maintenance company for unblocking / repair works.	As required. Indicator of problem / trigger for maintenance when drainage not functioning and unblocking pipes and chambers etc. not effective.

WATERCOURSE	
Regular maintenance	**Frequency**
Visually inspect watercourse to ensure it is kept reasonably clear of leaves and debris etc. at surface. Inspection of inlet and outlet structures.	Annually. No triggers other than maintenance to be taken on regular schedule.
Cutting of vegetation along length of open watercourse sections so that the watercourse doesn't become overgrown.	Frequency varies, vegetation will require cutting more often in summer / spring months than autumn / winter months. To be cut as required. No triggers other than maintenance to be taken on regular schedule.

Remedial work	**Frequency**
Maintenance of watercourse profile should scour or erosion or build-up of silt occur. Repair of inlets and outlets.	As required. Indicator of problem / trigger for maintenance when significant watercourse scour and erosion or build-up of silt has occurred.

ATTENUATION POND	
Regular maintenance	**Frequency**
Cut grass, remove leaves and debris. Visually inspect pond to be clear of debris or contaminants and remove if present.	4 to 6 times annually.
Occasional tasks	**Frequency**
Clear rubbish and deposits from pond after heavy storms and check for damage. Control weed and algae.	As required.
Remedial work	**Frequency**
Should the pond have large deposits of silt and dead organic matter, remove only half at any one time. Remove encroaching vegetation.	Autumn.

OUTFALLS TO THE WATERCOURSE	
Regular maintenance	**Frequency**
Visually inspect reed bed channel to ensure it is kept reasonably clear of leaves and debris etc. at surface. Inspection of inlet and outlet structures.	Annually. No triggers other than maintenance to be taken on regular schedule.
Cutting of vegetation along length of reed bed channel sections so that it doesn't become overgrown.	Frequency varies, vegetation will require cutting more often in summer / spring months than autumn / winter months. To be cut as required. No triggers other than maintenance to be taken on regular schedule.
Remedial work	**Frequency**
Maintenance of reed bad channel profile should scour or erosion or build-up of silt occur. Repair of inlets and outlets.	As required. Indicator of problem / trigger for maintenance when significant watercourse scour and erosion or build-up of silt has occurred.