

DRAINAGE STRATEGY REPORT

**PROPOSED RESIDENTIAL DEVELOPMENT
CALLIARDS MILL
SMITHY BRIDGE ROAD
LITTLEBOROUGH
ROCHDALE
OL15 8HP**

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Client: Hallmark Developments Ltd
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Revision	Date	Reason
0	sept 2025	Original to address planning condition.

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1 Introduction.

1.1 Purpose of Assessment.

The primary purpose of this report is to identify drainage strategy from the proposed development. The proposal is for 8No residential dwellings.

A planning application is to be submitted in due course, presently there are no planning conditions to discharge.

The Site will be assessed in accordance with the national drainage hierarchy for surface water disposal & exceedance characteristics, also considering the proposed end adopters and their requirements.

Regarding Site assessment, this report will appraise the existing and local drainage infrastructure, assess the suitability of the proposed development, giving recommendations for drainage design & management, specifically for approval of the LLFA/EA/sewerage undertakers, as applicable.

Drainage from new developments is to be designed to follow the national drainage hierarchy for surface water discharge to the following networks in order of preference:

- infiltration.
- Watercourse.
- surface water sewer.
- combined sewer.

Flow rates (existing & proposed) are to be estimated for approval using the following methodology:

- Development should aim to deliver greenfield runoff on greenfield sites up to a 100yr rainfall event, considering climate change.
- Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites on a 1yr rainfall event.
- Development should be designed so that there is no flooding to the development in a 30yr event, and so that there is no property flooding in a 100yr event considering climate change.

1.2 LLFA Consultation.

No consultations at the time of writing.

1.3 LPA Planning.

No planning comments at the time of writing.

2 Site Proposals.

See Location Plan in Appendix showing the area features.

The site is within the Smithy Bridge area of Littleborough, close to the River Roch, off Smithy Bridge Road. It is part of external areas to what remains of Calliards Mill (off site to the south east).

The River Roch is approximately 10m south. It flows NE-SW, flowing over a weir in the vicinity and approximately located halfway along the south boundary.

2.1 Site Plan.

The site is accessed off Stubley Mill Road from Smithy Bridge Road.

The historic extent of Calliards Mill was much larger than the present off-site building which remains to the present day. It comprised a larger mill building which encompassed the western half of the Application Site.

Historic mill ponds were formerly situated on the central and eastern parts of the site. They have since been infilled, and the site remained as external areas to the now off-site Calliards Mill which has been used as a residential dwelling.

The proposal is for the construction of 8No residential dwellings, associated gardens, driveways and site access. It is located is to the rear of the former mill building, in an area of general vegetation. The red line boundary of the site retains a 10m buffer to the River Roch.

Refer to Proposed Plan in appendix.

2.2 Derivation of Data, Surveys and Models.

2.2.1 Existing and proposed topography.

A topographic survey has been undertaken recently c2025, noting features of the Site, levels, and contours.

The survey recorded the following levels in maOD:

Northwest corner adjacent Stubley Mill Road: 141.29.

Northeast corner adjacent Stubley Mill Road: 137.08.

West corner adjacent the extant offsite Calliards Mill: 137.25.

Southeast corner of red line boundary: 134.60

South corner of red line boundary: 135.90.

The River Roch bank is between approximately 135m aOD.

The weir central to the south boundary has a cill level of 134.39m aOD, and a toe of 133.00m aOD.

Upstream bed level is nominally 133.50m aOD.

Downstream bed level is nominally 132.30m aOD.

2.2.2 Geology.

BGS maps shows the area to be underlain by alluvium & boulder clay.

2.2.3 Drainage Surveys.

N/A – not yet undertaken.

2.2.4 Sewer Undertaker Records.

There is a 675dia combined sewer flowing northeast southwest through the site with a 4m easement either side.

There is a 150dia surface water sewer flowing nominally nor to south through the centre of the site with a 3m easement either side.

2.2.5 Site Investigations.

Site investigations have been undertaken which have recorded between 2-3m of clay MADE GROUND over the site.

Virgin CLAY was noted below this in all trial holes.

Due to the clay nature of the subsoil found, infiltration is not considered a suitable way of controlling surface water flows from the proposed development.

The site is also marshy, with a lower pond area adjacent to the watercourse.

3 Drainage Strategy.

3.1 Existing Site rainfall & drainage systems.

The site is considered greenfield for the purposes of the assessment.

Local rainfall characteristics are as follows:

M5-60 rainfall depth (mm) 	20 
'r' ratio M5-60 / M5-2day 	0.3 
FEH/FSR conversion factor 	1.12
Hydrological region 	10

DESIGN RAINFALL 1YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other	
Storm duration	D = 30 min	
Return period	Period = 1 yr	
Ratio 60 min to 2 day rainfall of 5 yr return period		r = 0.300
5-year return period rainfall of 60 minutes duration		M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming		p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.77	
Rainfall for 30min storm with 5 year return period	M5_30min _i = Z1 ' M5_60min = 15.4 mm	
Factor Z2 (Wallingford procedure)	Z2 = 0.62	
Rainfall for 30min storm with 1 year return period	M1_30min = Z2 ' M5_30min _i = 9.6 mm	
Design rainfall intensity	I _{max} = M1_30min / D = 19.1 mm/hr	

DESIGN RAINFALL 30YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedd's calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other	
Storm duration	D = 30 min	
Return period	Period = 30 yr	
Ratio 60 min to 2 day rainfall of 5 yr return period		r = 0.300
5-year return period rainfall of 60 minutes duration		M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming		p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.77	
Rainfall for 30min storm with 5 year return period	M5_30min _i = Z1 ' M5_60min = 15.4 mm	
Factor Z2 (Wallingford procedure)	Z2 = 1.53	
Rainfall for 30min storm with 30 year return period	M30_30min = Z2 ' M5_30min _i = 23.5 mm	
Design rainfall intensity	I _{max} = M30_30min / D = 47.1 mm/hr	

DESIGN RAINFALL 100YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

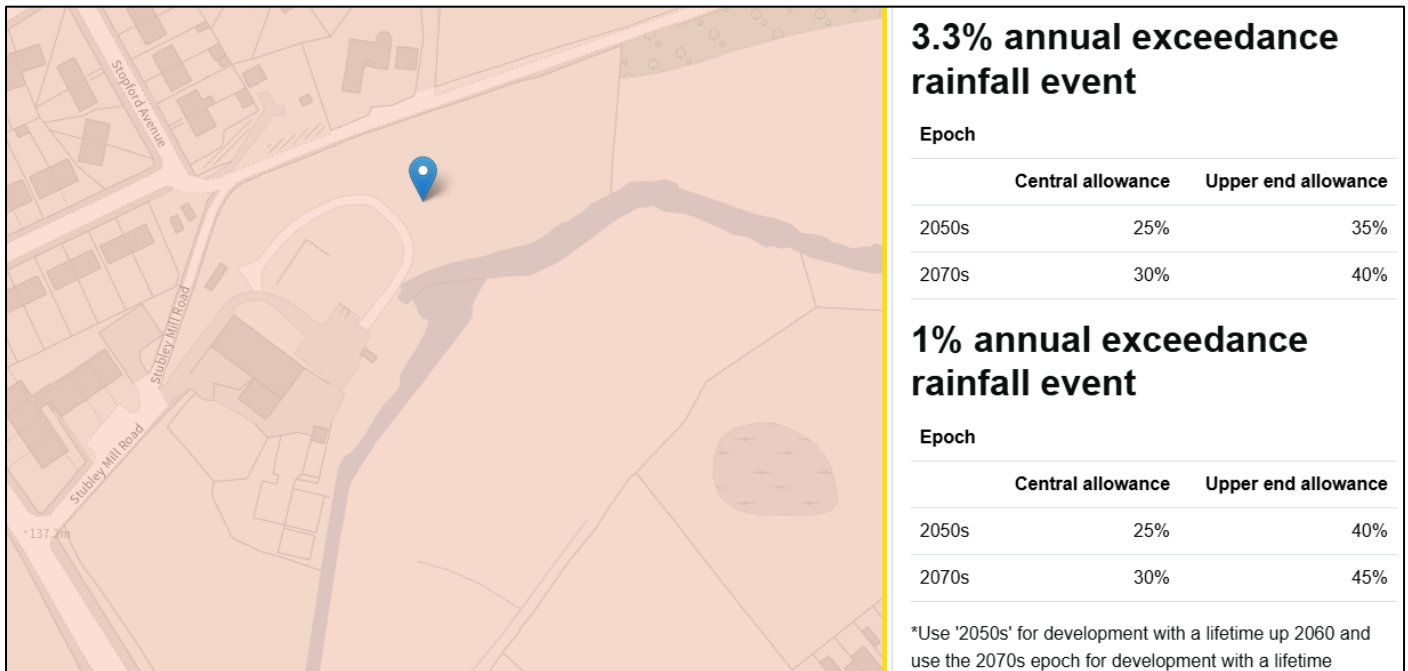
Tedd's calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other	
Storm duration	D = 30 min	
Return period	Period = 100 yr	
Ratio 60 min to 2 day rainfall of 5 yr return period		r = 0.300
5-year return period rainfall of 60 minutes duration		M5_60min = 20.0 mm
Increase of rainfall intensity due to global warming		p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.77	
Rainfall for 30min storm with 5 year return period	M5_30min _i = Z1 ' M5_60min = 15.4 mm	
Factor Z2 (Wallingford procedure)	Z2 = 1.99	
Rainfall for 30min storm with 100 year return period	M100_30min = Z2 ' M5_30min _i = 30.7 mm	
Design rainfall intensity	I _{max} = M100_30min / D = 61.4 mm/hr	

3.2 Rainfall Climate Change Impacts.

Climate change allowances to peak rainfall intensity are given nationally across the whole of England, based upon river management catchment areas. Refer to graphic inset:



Given the proposed residential end use, the 2070s epoch is considered suitable for climate change estimation cross referenced with the upper end allowance potential; which suggests the following climate change estimations to be used:

30yr rainfalls +40% climate change allowance.

100yr rainfalls +45% climate change allowance.

3.3 Proposed Surface Water Drainage.

3.3.1 Infiltration.

BGS maps suggest the site is underlain by alluvium and boulder clay. In the local areas alluvium is generally sandy CLAY.

Site investigations recorded mixed clay lithology in all trial holes from historic infilling of both mill ponds which covered much of the site, as well as the general site area. Beneath this material, virgin CLAY has been encountered. Outside of the former pond areas, virgin CLAY was encountered at shallower depth.

Part of the site to the east and south is marshy suggesting generally impermeable ground.

Infiltration is not considered a suitable method of discharging surface water.

3.3.2 Watercourse.

However, the marshy area is considered to be suitable to use as an open attenuation pond, doubling up as a marsh with habitat value when not in use.

Due to the wide area of the pond, calculations show that the development site can easily be catered for within the attenuation pond. Simulations show that with a retaining banking of c300mm around the southern extent of the pond, a c280mm high level over rainwater can be attenuated which results from a 100yr+45% rainfall event, discharging at <5l/s to the River Roch.

Refer to Microdrainage calculation in the Appendix.

Refer also to the Indicative Drainage Plan in the Appendix.

3.3.3 SW Sewer.

Not required.

3.3.4 Combined Sewer.

Foul water connections only.

3.4 Proposed Foul Water Drainage.

It is proposed to connect the site foul to the United Utilities combined sewer flowing through the site.

3.5 Adoption.

The drainage systems drainage will remain private.

3.6 Maintenance.

Maintenance of suds will be private.

4 Conclusion & Residual risks.

This report should be suitable for initial planning validation.

Detailed design will be undertaken in due course.



Signed.....



D.S. Slattery BSc (Hons).

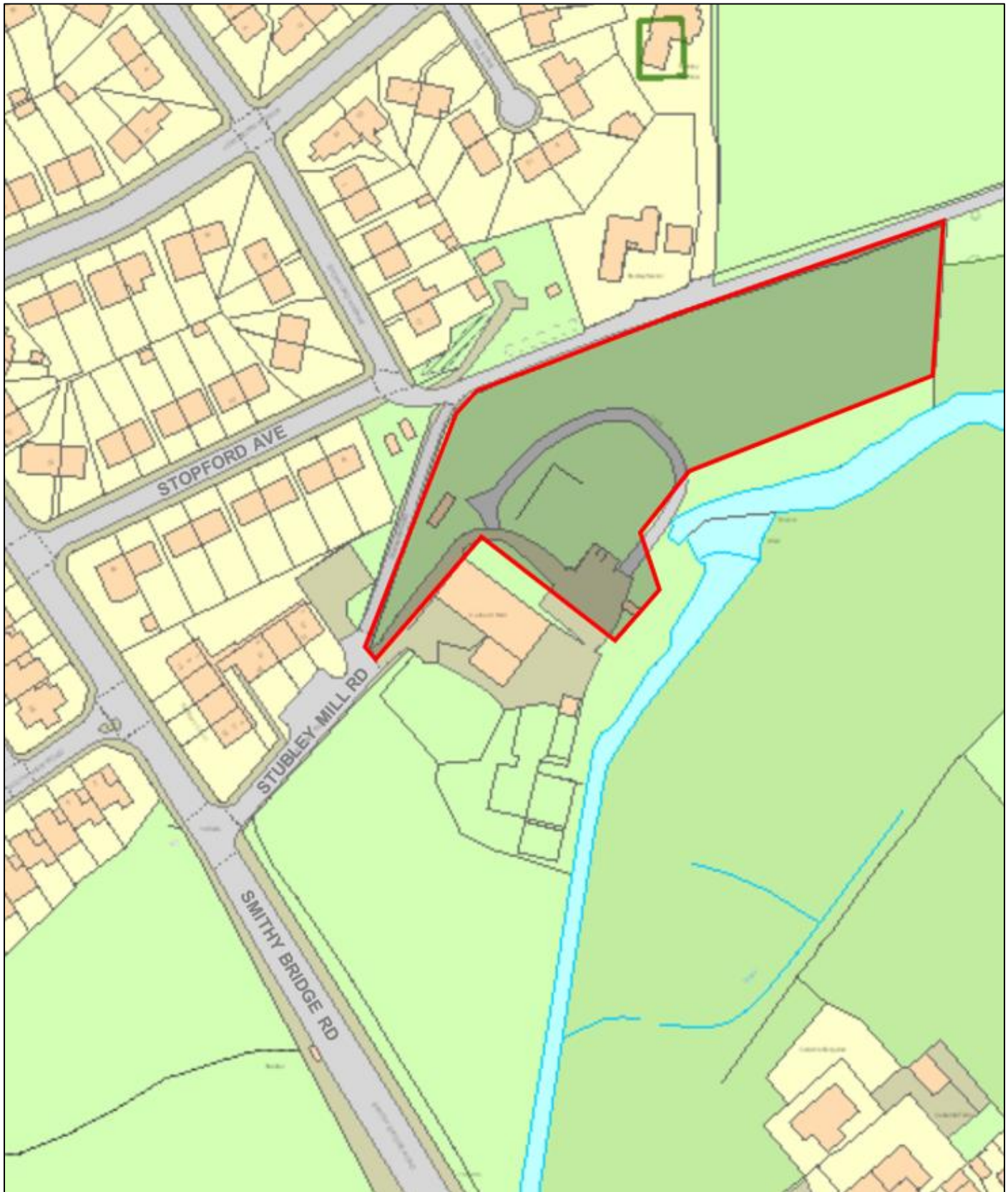
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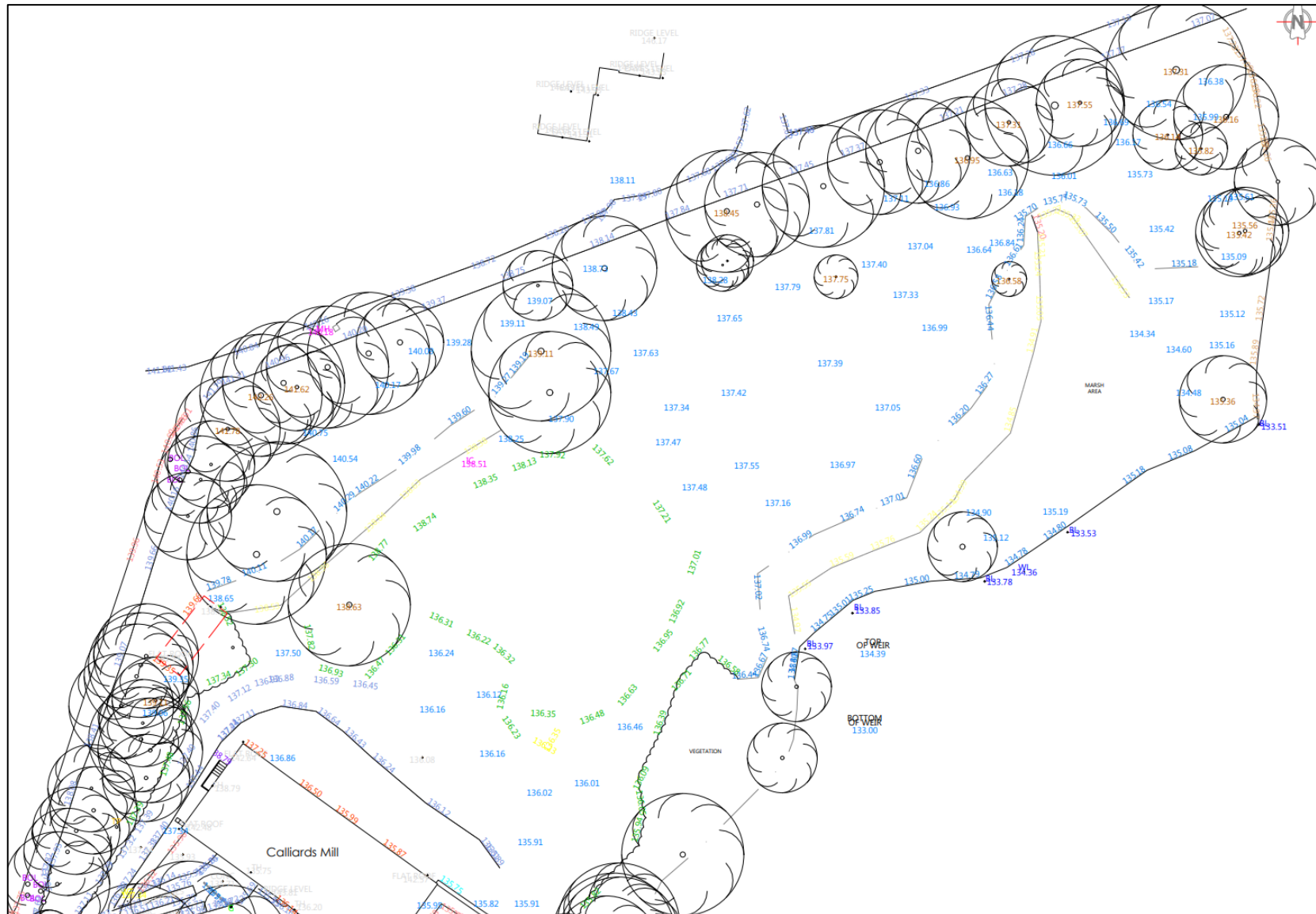


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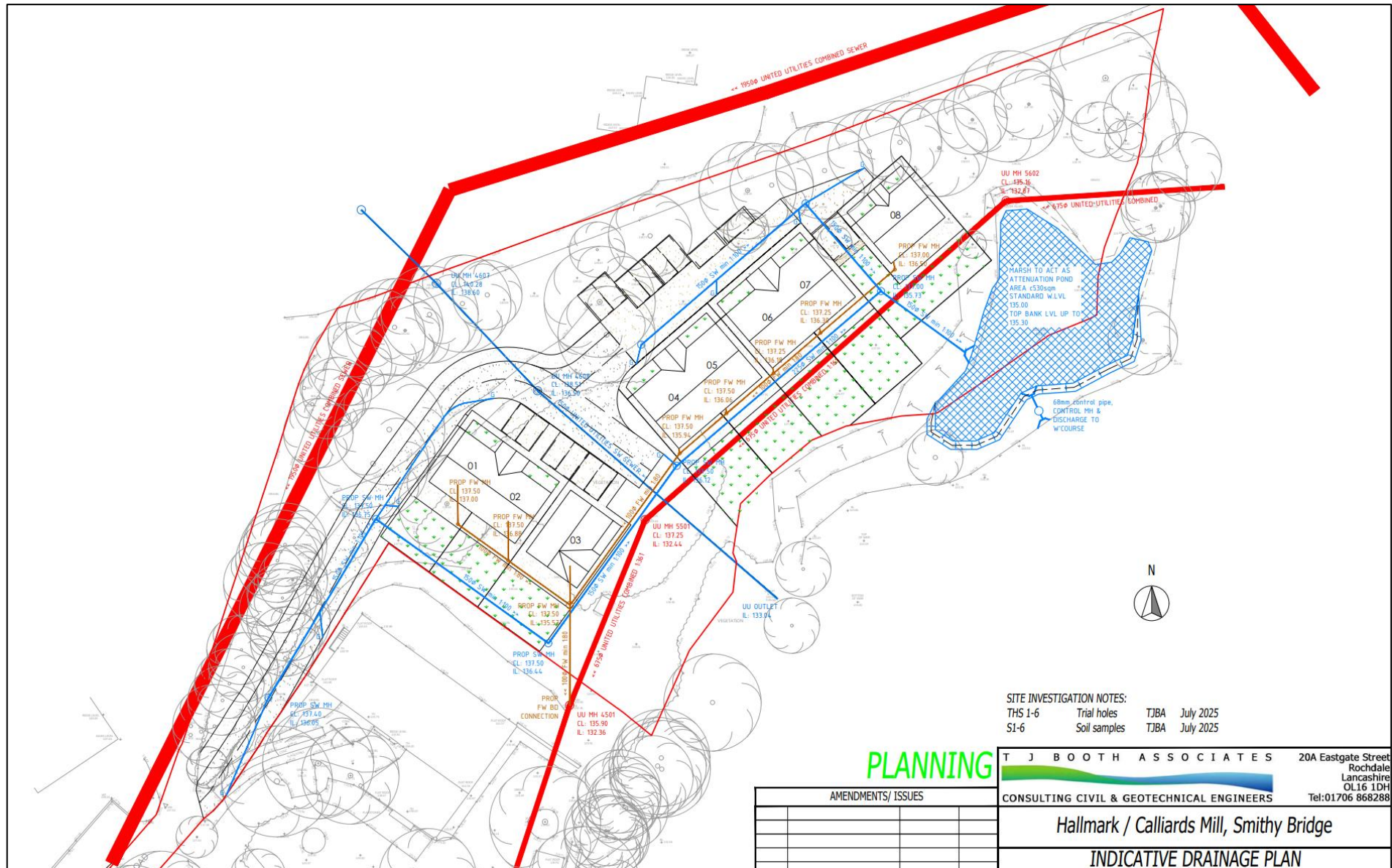
5 Appendix.**5.1 Location Plan.**

5.2 Existing Plan.



5.3 Proposed Plan.





5.5 Microdrainage Calculations.

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104 Yorkshire St Rochdale Lancashire OL16 1JY		attenuation pond hallmark calliards mill				
Date sept 2025 File CALC-T~1.SRC		Designed By ds Checked By				
Micro Drainage		Source Control W.10.4				
Summary of Results for 100 year Return Period (+45%)						
Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
15 Summer	2.6	2.6	135.1073	0.1073	56.8	FLOOD RISK
30 Summer	3.2	3.2	135.1458	0.1457	77.1	FLOOD RISK
60 Summer	3.8	3.8	135.1857	0.1857	98.4	FLOOD RISK
120 Summer	4.2	4.2	135.2213	0.2212	117.3	FLOOD RISK
180 Summer	4.3	4.3	135.2352	0.2352	124.6	FLOOD RISK
240 Summer	4.4	4.4	135.2417	0.2417	128.0	FLOOD RISK
360 Summer	4.5	4.5	135.2498	0.2497	132.4	FLOOD RISK
480 Summer	4.5	4.5	135.2538	0.2537	134.5	FLOOD RISK
600 Summer	4.5	4.5	135.2547	0.2547	135.0	FLOOD RISK
720 Summer	4.5	4.5	135.2538	0.2537	134.6	FLOOD RISK
960 Summer	4.5	4.5	135.2493	0.2492	132.2	FLOOD RISK
1440 Summer	4.3	4.3	135.2348	0.2347	124.5	FLOOD RISK
2160 Summer	4.1	4.1	135.2108	0.2107	111.8	FLOOD RISK
2880 Summer	3.8	3.8	135.1897	0.1897	100.5	FLOOD RISK
4320 Summer	3.4	3.4	135.1573	0.1573	83.3	FLOOD RISK
5760 Summer	3.1	3.1	135.1342	0.1343	71.3	FLOOD RISK
7200 Summer	2.8	2.8	135.1183	0.1183	62.6	FLOOD RISK
8640 Summer	2.6	2.6	135.1062	0.1063	56.2	FLOOD RISK
10080 Summer	2.4	2.4	135.0972	0.0973	51.7	O K
15 Winter	2.8	2.8	135.1203	0.1203	63.7	FLOOD RISK
30 Winter	3.5	3.5	135.1633	0.1632	86.5	FLOOD RISK
60 Winter	4.0	4.0	135.2088	0.2087	110.6	FLOOD RISK
120 Winter	4.5	4.5	135.2498	0.2497	132.3	FLOOD RISK
180 Winter	4.7	4.7	135.2663	0.2662	141.1	FLOOD RISK
240 Winter	4.7	4.7	135.2737	0.2737	145.1	FLOOD RISK
Storm Duration (mins)	Rain (mm/hr)		Time-Peak (mins)			
15 Summer	89.23		19			
30 Summer	61.54		33			
60 Summer	40.51		62			
120 Summer	25.63		122			
180 Summer	19.23		180			
240 Summer	15.63		210			
360 Summer	11.65		272			
480 Summer	9.44		338			
600 Summer	8.01		406			
720 Summer	7.00		476			
960 Summer	5.65		614			
1440 Summer	4.17		880			
2160 Summer	3.07		1276			
2880 Summer	2.46		1644			
4320 Summer	1.81		2380			
5760 Summer	1.45		3112			
7200 Summer	1.23		3816			
8640 Summer	1.07		4504			
10080 Summer	0.95		5240			
15 Winter	89.23		18			
30 Winter	61.54		33			
60 Winter	40.51		62			
120 Winter	25.63		118			
180 Winter	19.23		174			
240 Winter	15.63		228			
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104 Yorkshire St Rochdale Lancashire OL16 1JY		attenuation pond hallmark calliards mill				
Date sept 2025 File CALC-T~1.SRC		Designed By ds Checked By				
Micro Drainage		Source Control W.10.4				
Summary of Results for 100 year Return Period (+45%)						
Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m³)	Status
360 Winter	4.8	4.8	135.2802	0.2802	148.6	FLOOD RISK
480 Winter	4.8	4.8	135.2827	0.2827	149.9	FLOOD RISK
600 Winter	4.8	4.8	135.2818	0.2817	149.2	FLOOD RISK
720 Winter	4.8	4.8	135.2782	0.2782	147.5	FLOOD RISK
960 Winter	4.7	4.7	135.2682	0.2682	142.1	FLOOD RISK
1440 Winter	4.4	4.4	135.2433	0.2432	129.0	FLOOD RISK
2160 Winter	4.0	4.0	135.2083	0.2082	110.3	FLOOD RISK
2880 Winter	3.7	3.7	135.1792	0.1793	94.9	FLOOD RISK
4320 Winter	3.1	3.1	135.1378	0.1378	73.1	FLOOD RISK
5760 Winter	2.7	2.7	135.1122	0.1123	59.5	FLOOD RISK
7200 Winter	2.4	2.4	135.0968	0.0968	51.2	O K
8640 Winter	2.1	2.1	135.0883	0.0883	46.8	O K
10080 Winter	1.9	1.9	135.0818	0.0818	43.4	O K
Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)				
360 Winter	11.65	286				
480 Winter	9.44	362				
600 Winter	8.01	440				
720 Winter	7.00	514				
960 Winter	5.65	662				
1440 Winter	4.17	940				
2160 Winter	3.07	1344				
2880 Winter	2.46	1728				
4320 Winter	1.81	2464				
5760 Winter	1.45	3168				
7200 Winter	1.23	3816				
8640 Winter	1.07	4576				
10080 Winter	0.95	5248				
(c)1982-2006 Micro Drainage						



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Drainage®**

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Date sept 2025 File CALC-T~1.SRC		Designed By ds Checked By	
Micro Drainage		Source Control W.10.4	



Tank/Pond Details

Invert Level (m) 135.000 Ground Level (m) 135.300

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	530.0	0.60	530.0	1.20	530.0	1.80	530.0	2.40	530.0
0.10	530.0	0.70	530.0	1.30	530.0	1.90	530.0	2.50	530.0
0.20	530.0	0.80	530.0	1.40	530.0	2.00	530.0		
0.30	530.0	0.90	530.0	1.50	530.0	2.10	530.0		
0.40	530.0	1.00	530.0	1.60	530.0	2.20	530.0		
0.50	530.0	1.10	530.0	1.70	530.0	2.30	530.0		

Orifice Outflow Control

Diameter (m) 0.068 Invert Level (m) 135.000
 Discharge Coefficient 0.600

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