CAMBRIA

Constructive Thinking

Report Title

DRAINAGE STRATEGY REPORT

Project

GLAN MYDDYFI, PENTREFELIN

Report Reference

CC2013-CAM-ZZ-XX-RP-C-00-0001

Client

JCR PLANNING

Date

OCTOBER 2019

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REPORT CONTROL SHEET

Client:	JCR Planning
Project:	Glan Myddyfi, Pentrefelin
Job Number:	CC2013
Report Title:	Drainage Strategy Report
Report Reference:	CC2013-CAM-ZZ-XX-RP-C-00-0001
Prepared By:	J McCarthy MEng (Hons) GMICE
Reviewed and Authorised By:	B Whyman MEng (Hons) GMICE MCIHT

Revision	Date	Description	Prepared By	Authorised By
P01	24/09/19	Draft Issue	J McCarthy	B Whyman
P02	02/10/19	References to the new SUDS legislation removed.	B Whyman	B Whyman

Contents

1 INTRODUCTION

1.1 Cambria Consulting Ltd have been commissioned by JCR Planning Consultants on behalf of their client to produce a Drainage Strategy Report for a poultry farm in Carmarthenshire. The proposed poultry farm, located at Glan Myddyfi, is to house 16,000 chickens for free range egg production in Pentre-felin, Carmarthenshire.

1.2 This report has been produced to support the planning application, reference no. E/37351 and to address NRW consultation comments. The report should be read in conjunction with the Pollution Risk Assessment and Construction Pollution Prevention Plan.

1.3 The objectives of this report are to;

- Identify suitable outfall locations for the Surface Water and Foul Drainage from the development.
- Undertaken hydraulic calculations to identify peak design flows or restrictions to the development and any subsequent attenuation requirements
- Provide a schematic layout of the proposed foul and surface water drainage proposals.

1.4 SITE LOCATION

1.5 The development site is made up of two separate sites as shown in the Figure 2.1 below.

1.6 The northern site is 1.28ha and is a greenfield site bounded by other greenfield sites and a watercourse on the Western boundary. The existing use of the northern site is as a cattle ground.

1.7 The southern site is 0.24 ha greenfield site and is significantly smaller.

1.8 The northern site is centred around OS coordinates E: 259849, N: 224055 and the southern site is centred around OS coordinates E: 259895, N: 223906.

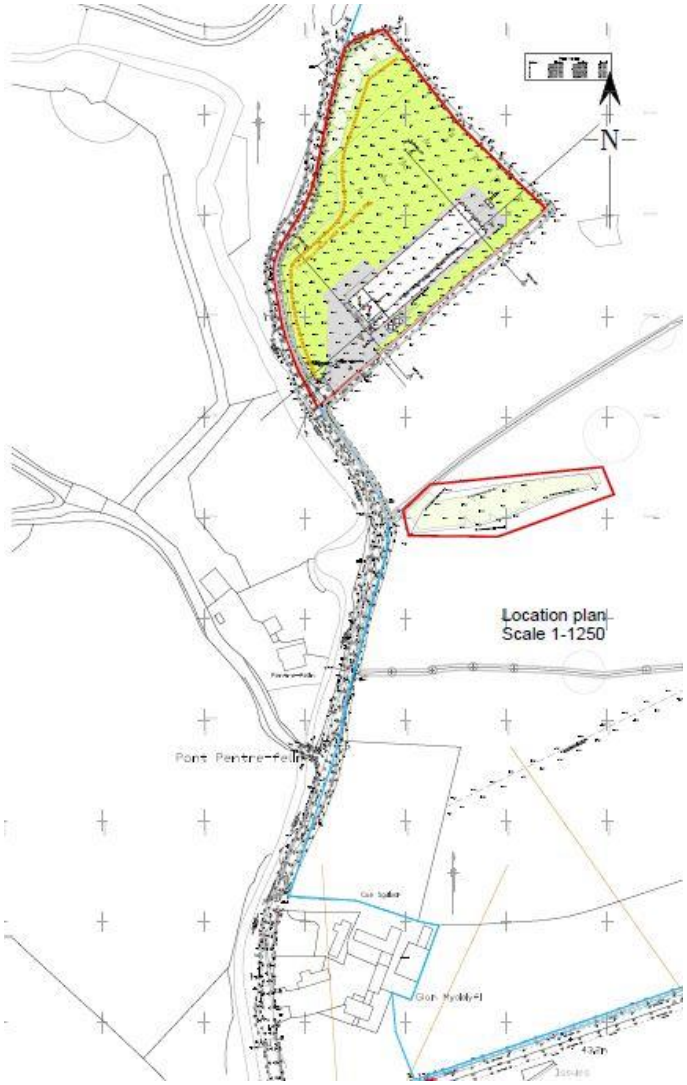


Figure 2.1 - Location Plan

1.9 A more detailed site location plan is included in **Appendix A**.

2 EXISTING TOPOGRAPHY

2.1 A topographical survey of the sites was undertaken in April 2014 by Mike Williams Surveys.

2.2 The survey shows the existing ground to be sloping in westerly across the whole site at varying gradients. The highest point is located in the far eastern corner of the site and at 57.91mAOD with the low point located in the south-west corner near the entrance 45.91mAOD.

2.3 The cattle compound is located in the south-west corner of the site with access onto an existing asphalt concrete road running north-south of the site. This road provides access to the Glan Myddyfi and other sites from the A40.

3 DEVELOPMENT PROPOSALS

3.1 The proposed site layout plan produced by JCR Planning Consultants is included in **Appendix B** and an extract of the layout is shown in Figure 4.1 below;

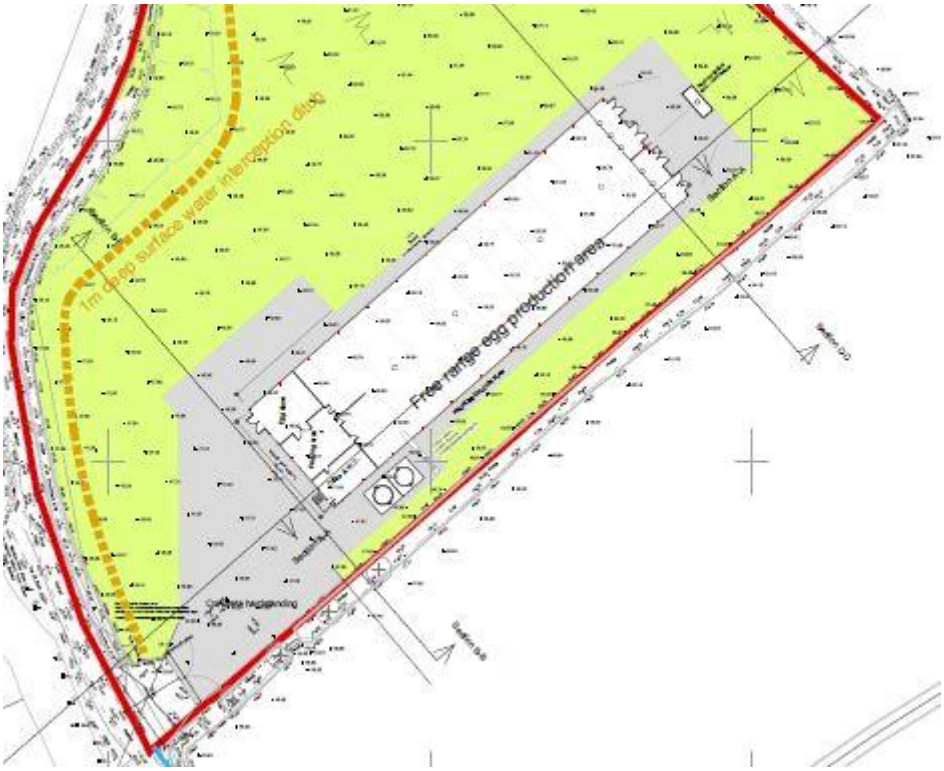


Figure 4.1 – Proposed Development Plan

3.2 Development proposals includes the following;

- Free range poultry farm for 16,000 chickens
- Access track to the poultry farm
- 1,000 gallon wash-down tank

4 FLOOD RISK

4.1 The Development Advice Maps (DAM) show the site is in Flood Zone C2. Therefore, a flood consequence assessment (FCA) is required. This was undertaken by Francis Sant in January 2018.

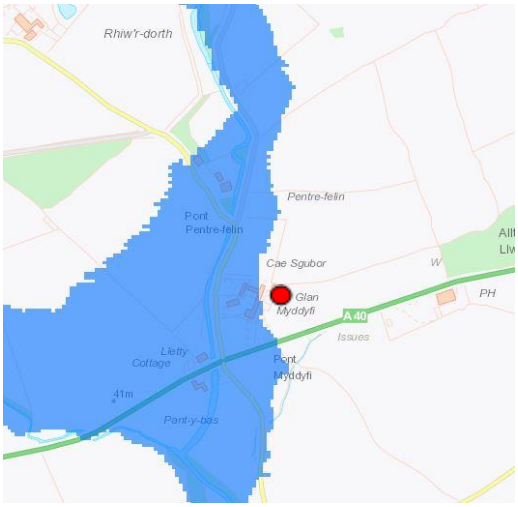


Figure 5.1 – Extract from DAM maps

4.2 The study used Flood Estimation Handbook (FEH) data to model the 1 in 100 year, 1 in 100 year plus climate change and the 1 in 1000 year event. Analysis of these events showed that the proposed farm would remain flood free during these events.

4.3 There is a possibility that the site entrance will flood by approximately 1m.

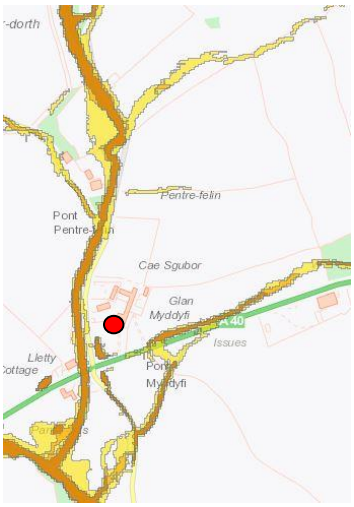


Figure 5.2 – Extract from NRW Flood Mapping

4.4 The FCA indicated that the site should be drained using SuDS to prevent an increase in rainfall runoff.

5 FOUL DRAINAGE

5.1 Foul waste from this site will be generated from the poultry farm and a small amount from the 1no. WC in the building.

5.2 Trade effluent can be discharged into a Dwr Cymru Welsh Water sewer under a legal agreement however there are no DCWW sewers near the site.

5.3 It is proposed that a septic tank be installed near the entrance but not in the area of potential flooding. The septic tank will need to be a minimum of 7m from the building to comply with Buildings Regs Part H.

5.4 The foul water will discharge to the tank by gravity and will be drained periodically and taken offsite.

6 SURFACE WATER DRAINAGE

6.1 In determining a suitable methodology for disposal of surface water, it is necessary to exhaust all technical options outlined under Sections 3.2 and 3.4 of Part H of the publication 'Building Regulations 2002' which states that disposal should be made through the hierarchical approach which are, in order of preference; infiltration methods, discharge to watercourse and finally conveyance to the public sewer.

Infiltration Methods

6.2 3no. soakaway tests were undertaken on the site in accordance with BRE Digest 365 guidance. These displayed infiltration rates varying between 7.48 x 10^{-5} m/s and 1.01 x 10^{-4} m/s. The test results and photos are included in **Appendix C**.

6.3 Given the successful infiltration tests, it is proposed to dispose of the surface water runoff from the development via a soakaway system. Conservatively, the lowest infiltration rate (7.48 x 10^{-5} m/s) will be used for design purposes.

6.4 The roof drainage will be collected separately to the drainage serving the external hardstanding areas to reduce the potential for contamination of the roof drainage run-off. The roof drainage will gravitate towards a cellular soakaway tank, south west of the building, sited underneath the yard area. This will be located a minimum of 5m away from the proposed building foundations to comply with Building Regs Part H.

6.5 The 68m³ cellular soakaway tank has been sized using microdrainage software to accommodate a 1 in 100 year + 30% climate change storm event. A copy of the cellular soakaway calculations are included in **Appendix F**.

6.6 The runoff from the concrete slab will be drained to an infiltration trench located around the perimeter of the concrete slab. The larger yard areas will be collected by linear drains which pass through manhole chambers fitted with penstocks prior to connecting to the infiltration trenches. This will allow the system to be shut off during washdown operations or if any pollution incidents occur. A copy of the infiltration trench calculations are included in **Appendix E**.

6.7 Drawing CC2013-CAM-ZZ-00-GA-C-52-1101 shows the proposed layout of the drainage strategy and is included in **Appendix D**.

7 CONCLUSIONS

7.1 The foul drainage will be drain via gravity to a septic tank located outside the building. This will be emptied and waste tankered away from the site.

7.2 The roof and hardstanding surface water run-off will be segregated. The roof drainage system will drain to a cellular soakaway tank sited beneath the yard to the south west of the building.

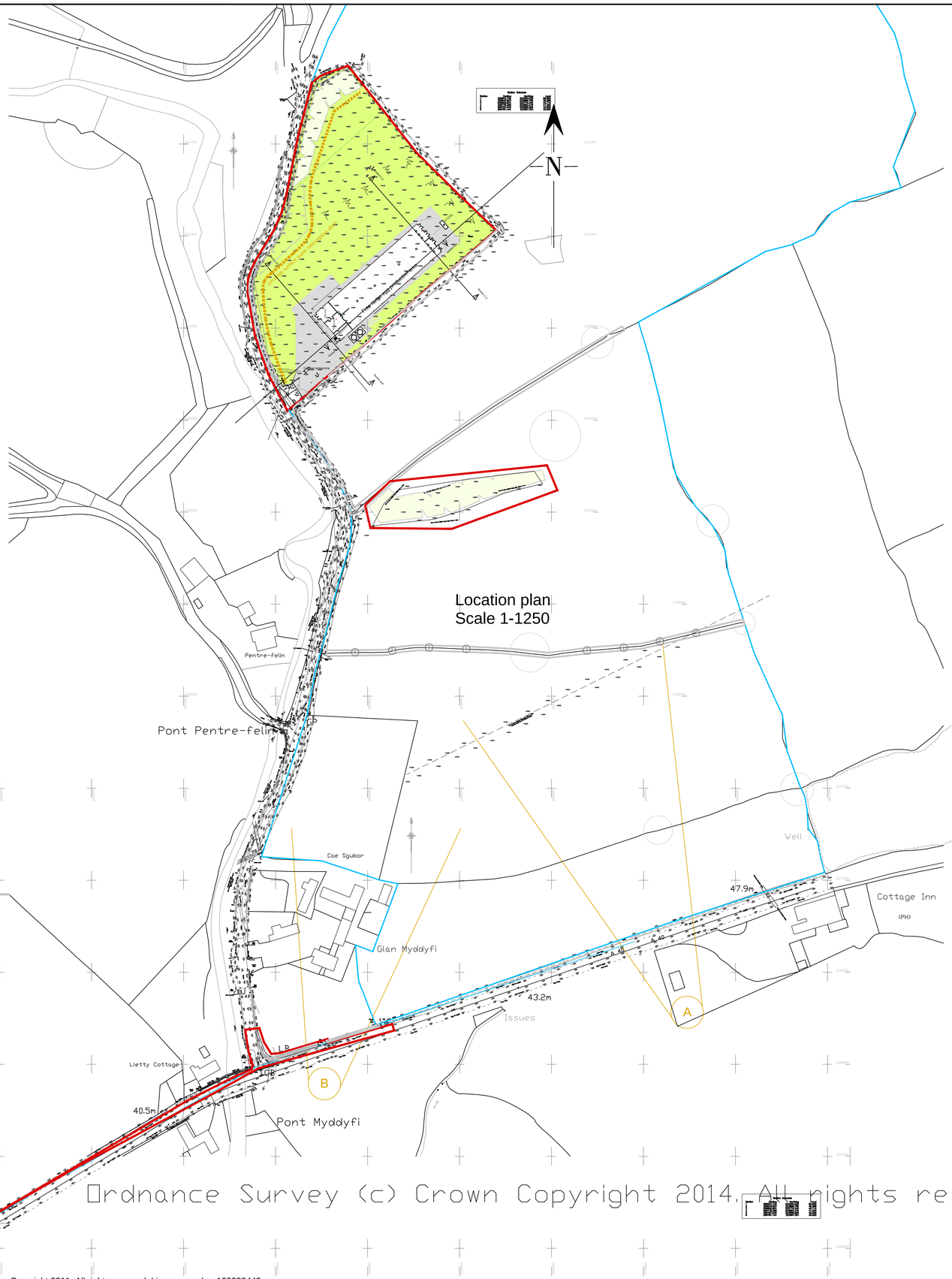
7.3 The runoff from the concrete slab will be piped to an infiltration trench that surrounds the building perimeter. Linear drainage will be installed to capture the runoff from the slab and direct it towards the infiltration trench. A penstock chamber will be installed downstream of the linear channels to allow isolation of the yard areas if any pollution incidents occur.

7.4 The surface water drainage system is designed to accommodate the 1 in 100 year +30% storm event in accordance with best practice.

APPENDIX A – Site Location Plan

DO NOT SCALE FROM THIS DRAWING.

Paper size
A1



ALL DIMENSIONS TO BE CHECKED ON SITE.

Image Montage - A

Image Montage - B

REV	DESCRIPTION	DATE
E	S/W drainage ditch	15.5.18
D	Gable Width	10.11.17
C	Access details	7.6.16
B	Add section	31.7.14
A	Planning	28.7.14

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CLIENT :
Mr T Davies

JOB TITLE :
Proposed free range poultry unit at land to North of Glanmyddyfi Pentrefelin Llandeilo Carmarthenshire

DRAWING TITLE :
Site location plan and photo montage.

Original paper size - A1

SCALE : 1/1250

DRAWN BY : CJW

DATE : March 2014

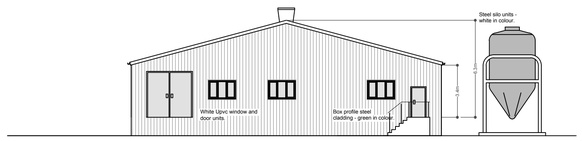
PLAN No
CW415/03

REVISION
E

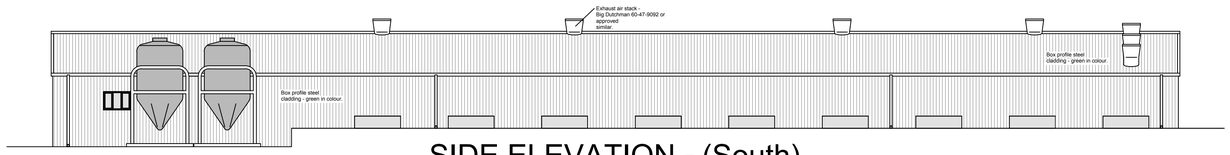
APPENDIX B – Proposed Development Plan

DO NOT SCALE FROM THIS DRAWING.

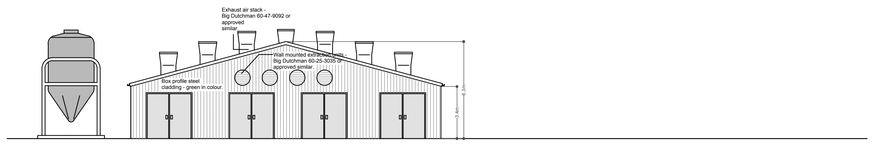
Paper size
A1



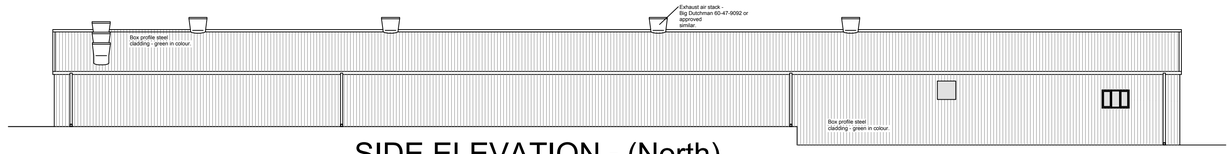
FRONT ELEVATION
(WEST)



SIDE ELEVATION - (South)



REAR ELEVATION
(EAST)



SIDE ELEVATION - (North)

PROPOSED FLOOR PLAN

REV	DESCRIPTION	DATE
G	Dimension	15.5.18
F	Gable Width	10.11.17
E	Extraction system	8.8.17
D	Extraction system	1.3.17
C	Extraction system	7.6.16
B	Extraction system	28.7.15
A	Planning	28.7.14

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CLIENT :
Mr T Davies

JOB TITLE :
Proposed free range poultry unit at land to North of Glanmyddyfi Pentrefelin Llandeilo Carmarthenshire

DRAWING TITLE :
Proposed layout plans and elevations.

Original paper size - A1

SCALE : 1/200

DRAWN BY : CJW

DATE : March 2014

PLAN No
CW415/01

REVISION
G

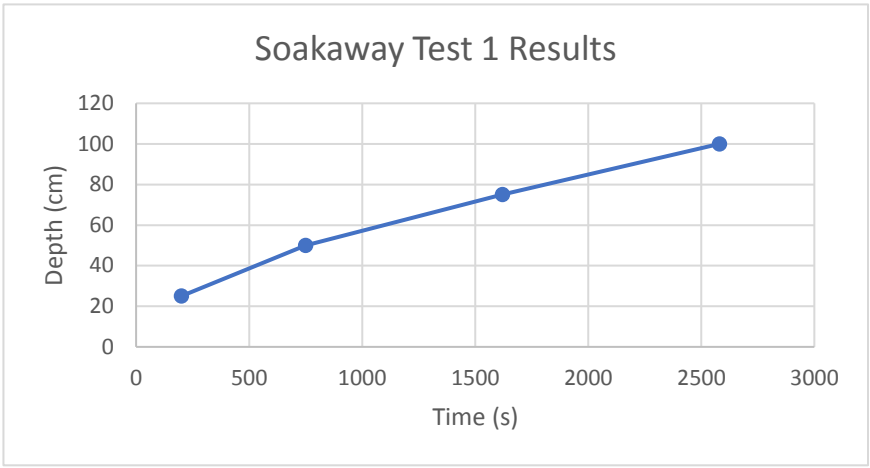
ALL DIMENSIONS TO BE CHECKED ON SITE.

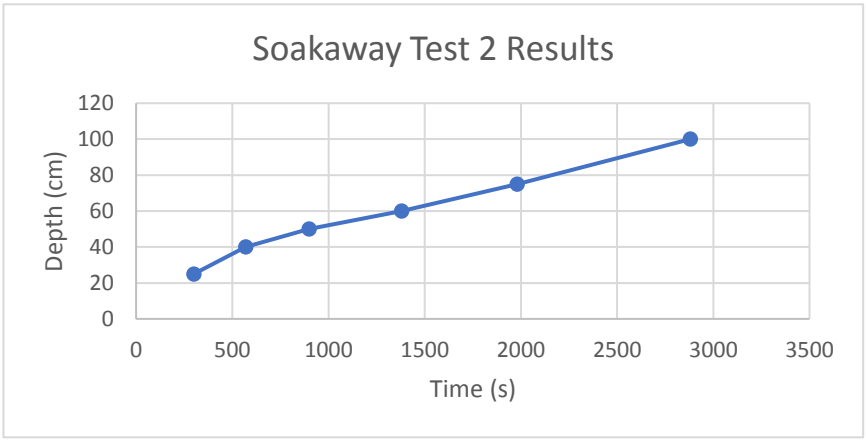
APPENDIX C – Soakaway Test Results

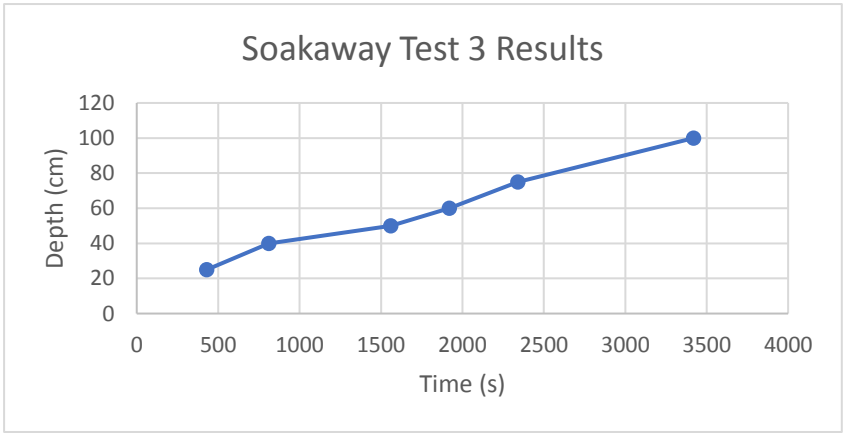
depth	T1
200	25
750	50
1620	75
2580	100

T2	depth
300	25
570	40
900	50
1380	60
1980	75
2880	100

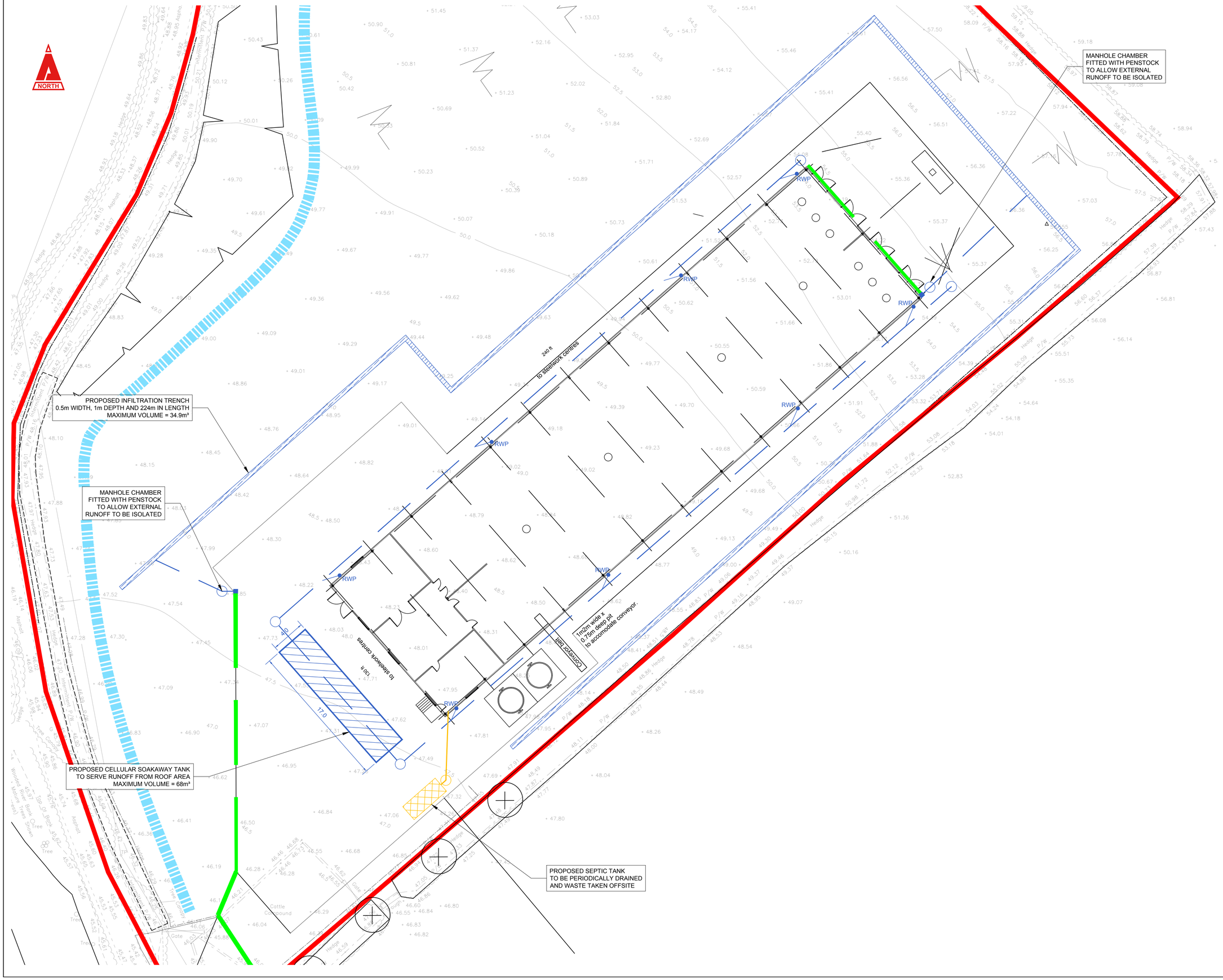
T3	depth
430	25
810	40
1560	50
1920	60
2340	75
3420	100







APPENDIX D – Proposed Drainage Strategy Plan



KEY:

PROPOSED SURFACE WATER DRAIN

PROPOSED FOUL DRAIN

INFILTRATION TRENCH

LINEAR DRAIN

Rev.	Description	By	Chk	App
P02	CELLULAR TANK REVISED. SEPTIC TANK MOVED. PENSTOCK CHAMBERS ADDED.	BW	BW	BW
		02/10/19		
P01	FIRST ISSUE.	JM	BW	BW
		24/09/19		

Client:

JCR PLANNING

Project:

GLAN MYDDYFI,
PENTREFELIN

Drawing Title:

DRAINAGE STRATEGY
PLAN

Drawing No.

CC2013 CAM ZZ 00 GA C 90 1101

Project No.	Org.	Vol.	Level	Type	Dis.	Class	No.

Suitability Status:	Scale @A1:	Rev:
S1 PRELIMINARY	1:200	P02

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APPENDIX E – Infiltration Trench Calculations

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

Half Drain Time : 19 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	47.410	0.660	16.3	23.8	O K
30 min Summer	47.559	0.809	19.0	29.1	Flood Risk
60 min Summer	47.642	0.892	20.5	32.1	Flood Risk
120 min Summer	47.616	0.866	20.0	31.2	Flood Risk
180 min Summer	47.542	0.792	18.7	28.5	Flood Risk
240 min Summer	47.467	0.717	17.4	25.8	Flood Risk
360 min Summer	47.351	0.601	15.3	21.6	O K
480 min Summer	47.260	0.510	13.7	18.4	O K
600 min Summer	47.189	0.439	12.4	15.8	O K
720 min Summer	47.132	0.382	11.3	13.7	O K
960 min Summer	47.045	0.295	9.8	10.6	O K
1440 min Summer	46.932	0.182	7.7	6.5	O K
2160 min Summer	46.839	0.089	6.1	3.2	O K
2880 min Summer	46.798	0.048	5.1	1.7	O K
4320 min Summer	46.786	0.036	3.8	1.3	O K
5760 min Summer	46.779	0.029	3.1	1.1	O K
7200 min Summer	46.775	0.025	2.7	0.9	O K
8640 min Summer	46.772	0.022	2.3	0.8	O K
10080 min Summer	46.770	0.020	2.1	0.7	O K
15 min Winter	47.500	0.750	18.0	27.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	96.852	0.0	15
30 min Summer	69.244	0.0	23
60 min Summer	47.459	0.0	40
120 min Summer	31.336	0.0	74
180 min Summer	24.076	0.0	106
240 min Summer	19.794	0.0	138
360 min Summer	15.027	0.0	200
480 min Summer	12.329	0.0	260
600 min Summer	10.560	0.0	320
720 min Summer	9.297	0.0	382
960 min Summer	7.592	0.0	502
1440 min Summer	5.687	0.0	740
2160 min Summer	4.244	0.0	1104
2880 min Summer	3.446	0.0	1468
4320 min Summer	2.574	0.0	2180
5760 min Summer	2.095	0.0	2904
7200 min Summer	1.788	0.0	3600
8640 min Summer	1.573	0.0	4336
10080 min Summer	1.413	0.0	5088
15 min Winter	96.852	0.0	15

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	47.658	0.908	20.8	32.7	Flood Risk
60 min Winter	47.720	0.970	21.9	34.9	Flood Risk
120 min Winter	47.636	0.886	20.4	31.9	Flood Risk
180 min Winter	47.519	0.769	18.3	27.7	Flood Risk
240 min Winter	47.416	0.666	16.4	24.0	O K
360 min Winter	47.265	0.515	13.7	18.6	O K
480 min Winter	47.160	0.410	11.8	14.8	O K
600 min Winter	47.082	0.332	10.5	12.0	O K
720 min Winter	47.022	0.272	9.4	9.8	O K
960 min Winter	46.936	0.186	7.8	6.7	O K
1440 min Winter	46.834	0.084	6.0	3.0	O K
2160 min Winter	46.793	0.043	4.6	1.5	O K
2880 min Winter	46.785	0.035	3.7	1.2	O K
4320 min Winter	46.776	0.026	2.8	0.9	O K
5760 min Winter	46.771	0.021	2.3	0.8	O K
7200 min Winter	46.768	0.018	2.0	0.7	O K
8640 min Winter	46.766	0.016	1.7	0.6	O K
10080 min Winter	46.764	0.014	1.5	0.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	69.244	0.0	24
60 min Winter	47.459	0.0	42
120 min Winter	31.336	0.0	78
180 min Winter	24.076	0.0	110
240 min Winter	19.794	0.0	142
360 min Winter	15.027	0.0	206
480 min Winter	12.329	0.0	266
600 min Winter	10.560	0.0	328
720 min Winter	9.297	0.0	390
960 min Winter	7.592	0.0	510
1440 min Winter	5.687	0.0	750
2160 min Winter	4.244	0.0	1084
2880 min Winter	3.446	0.0	1468
4320 min Winter	2.574	0.0	2152
5760 min Winter	2.095	0.0	2944
7200 min Winter	1.788	0.0	3648
8640 min Winter	1.573	0.0	4288
10080 min Winter	1.413	0.0	5024

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.100	Shortest Storm (mins)	15
Ratio R	0.246	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.182

Time (mins) From:	To:	Area (ha)
0	4	0.182

Model Details

Storage is Online Cover Level (m) 47.750

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	0.26900	Trench Width (m)	0.5
Infiltration Coefficient Side (m/hr)	0.26900	Trench Length (m)	240.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	46.750	Cap Infiltration Depth (m)	0.000

APPENDIX F – Cellular Crates Calculations

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

Half Drain Time : 143 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	47.131	0.381	3.1	24.6	O K
30 min Summer	47.274	0.524	3.4	33.8	O K
60 min Summer	47.416	0.666	3.6	43.0	O K
120 min Summer	47.516	0.766	3.8	49.5	Flood Risk
180 min Summer	47.543	0.793	3.8	51.3	Flood Risk
240 min Summer	47.547	0.797	3.8	51.5	Flood Risk
360 min Summer	47.537	0.787	3.8	50.9	Flood Risk
480 min Summer	47.517	0.767	3.8	49.5	Flood Risk
600 min Summer	47.491	0.741	3.7	47.8	Flood Risk
720 min Summer	47.461	0.711	3.7	46.0	Flood Risk
960 min Summer	47.400	0.650	3.6	42.0	O K
1440 min Summer	47.281	0.531	3.4	34.3	O K
2160 min Summer	47.128	0.378	3.1	24.4	O K
2880 min Summer	47.010	0.260	2.9	16.8	O K
4320 min Summer	46.860	0.110	2.7	7.1	O K
5760 min Summer	46.800	0.050	2.6	3.2	O K
7200 min Summer	46.792	0.042	2.2	2.7	O K
8640 min Summer	46.787	0.037	2.0	2.4	O K
10080 min Summer	46.784	0.034	1.8	2.2	O K
15 min Winter	47.181	0.431	3.2	27.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	97.030	0.0	18
30 min Summer	69.507	0.0	32
60 min Summer	47.735	0.0	62
120 min Summer	31.566	0.0	106
180 min Summer	24.260	0.0	140
240 min Summer	19.962	0.0	172
360 min Summer	15.168	0.0	244
480 min Summer	12.452	0.0	312
600 min Summer	10.670	0.0	382
720 min Summer	9.397	0.0	450
960 min Summer	7.678	0.0	586
1440 min Summer	5.755	0.0	840
2160 min Summer	4.298	0.0	1212
2880 min Summer	3.493	0.0	1584
4320 min Summer	2.612	0.0	2252
5760 min Summer	2.128	0.0	2928
7200 min Summer	1.818	0.0	3592
8640 min Summer	1.601	0.0	4368
10080 min Summer	1.439	0.0	5072
15 min Winter	97.030	0.0	18

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	47.345	0.595	3.5	38.5	O K
60 min Winter	47.513	0.763	3.8	49.3	Flood Risk
120 min Winter	47.641	0.891	4.0	57.6	Flood Risk
180 min Winter	47.669	0.919	4.0	59.4	Flood Risk
240 min Winter	47.671	0.921	4.0	59.5	Flood Risk
360 min Winter	47.649	0.899	4.0	58.1	Flood Risk
480 min Winter	47.609	0.859	3.9	55.5	Flood Risk
600 min Winter	47.563	0.813	3.8	52.5	Flood Risk
720 min Winter	47.514	0.764	3.8	49.3	Flood Risk
960 min Winter	47.415	0.665	3.6	43.0	O K
1440 min Winter	47.236	0.486	3.3	31.4	O K
2160 min Winter	47.023	0.273	3.0	17.6	O K
2880 min Winter	46.875	0.125	2.7	8.1	O K
4320 min Winter	46.794	0.044	2.3	2.8	O K
5760 min Winter	46.786	0.036	1.9	2.3	O K
7200 min Winter	46.781	0.031	1.6	2.0	O K
8640 min Winter	46.777	0.027	1.4	1.7	O K
10080 min Winter	46.774	0.024	1.3	1.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	69.507	0.0	32
60 min Winter	47.735	0.0	60
120 min Winter	31.566	0.0	116
180 min Winter	24.260	0.0	146
240 min Winter	19.962	0.0	184
360 min Winter	15.168	0.0	262
480 min Winter	12.452	0.0	338
600 min Winter	10.670	0.0	412
720 min Winter	9.397	0.0	484
960 min Winter	7.678	0.0	626
1440 min Winter	5.755	0.0	894
2160 min Winter	4.298	0.0	1256
2880 min Winter	3.493	0.0	1588
4320 min Winter	2.612	0.0	2204
5760 min Winter	2.128	0.0	2896
7200 min Winter	1.818	0.0	3584
8640 min Winter	1.601	0.0	4328
10080 min Winter	1.439	0.0	4992

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.200	Shortest Storm (mins)	15
Ratio R	0.243	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.149

Time (mins) From:	To:	Area (ha)
0	4	0.149

Model Details

Storage is Online Cover Level (m) 47.750

Cellular Storage Structure

Invert Level (m) 46.750 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.26900 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.26900

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	68.0	68.0	0.800	68.0	102.4
0.200	68.0	76.4	1.000	68.0	111.2
0.400	68.0	84.8	1.001	0.0	120.0
0.600	68.0	93.6			

CAMBRIA

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