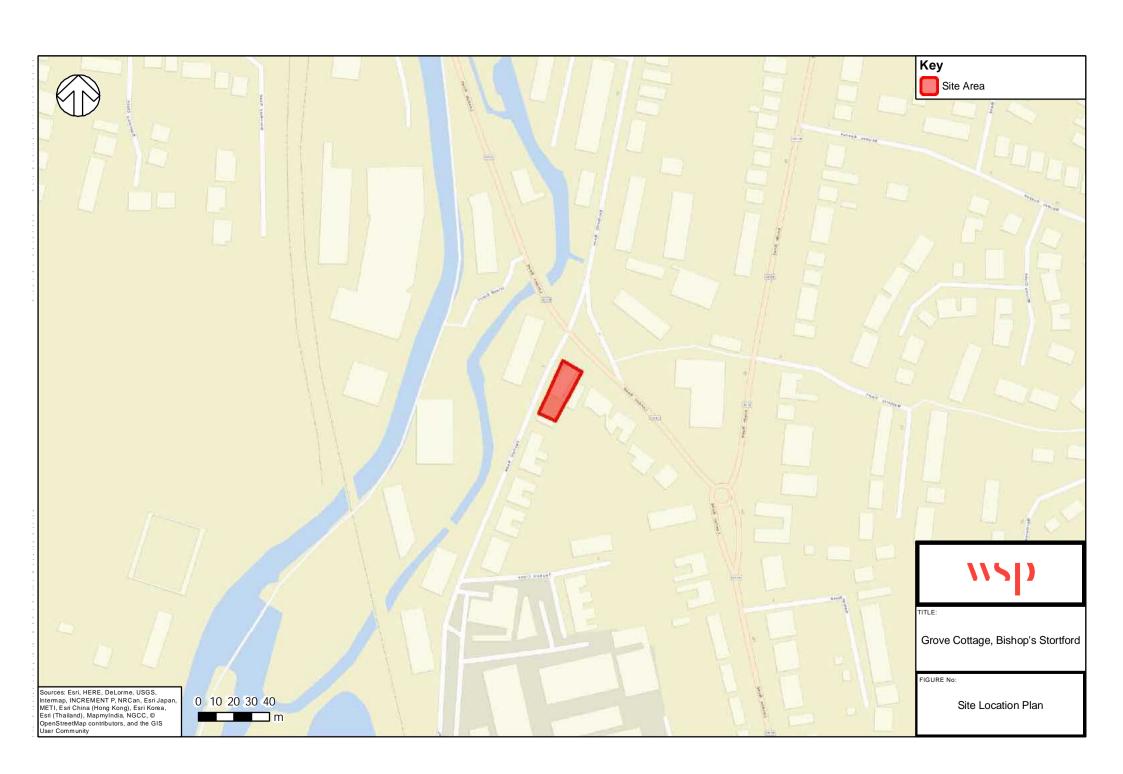
Appendix A SITE LOCATION PLAN



Appendix B

EXISTING & PROPOSED SITE PLANS



TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

Arch Head Height	ER	Earth Rod	RSD	Roller Shutter Door
Air Brick	ET	EP+Transformer	RSJ	Rolled Steel Joist
Assumed Route	FB	Flower Bed	SI	Sign Post
Air Valve	FBD	Floor Board Direction	SP	Arch Spring Point Height
Belisha Beacon	FH	Fire Hydrant	SV	Stop Valve
Bore Hole	FL	Floor Level	SW	Surface Water
Bed Level	FP	Flag Pole	SY	Cable Stay
Bollard	FW	Foul Water	Tac	Tactile Paving
Brace Post	GG	Gully Grate	TC	Telecom Cover
Bus Stop	GV	Gas Valve	TH	Trial Pit
Bush	HH	Head Height	THL	Threshold Level
Barbed Wire Fence	IC	Inspection Cover	TL	Traffic Light
Box (Utilities)	IL	Invert Level	ToW	Top of Wall
Close Board Fence	I/R	Iron Railings	TP	Telegraph Pole
Cill Height	KO	Kerb Outlet	TS	Traffic Signal Cover
Cover Level	LP	Lamp Post	TV	Cable TV Cover
Chain Link Fence	MH	Manhole	UB	Universal Beam
Ceiling Level	MP	Marker Post	UC	Unknown Cover
Column	NB	Name Board	UK	Unknown Tree
Chestnut Paling Fence	OHL	Overhead Line (approx)	UMG	Unmade Ground
Cable Riser	Pan	Panel Fence	USB	Under Side Beam
Chicken Wire	PB	Post Box	UTL	Unable To Lift
Drainage Channel	PM	Parking Meter	UTS	Unable To Survey
Door Head Height	PO	Post	VP	Vent Pipe
Dilapidated	P/R	Post & Rail Fence	WB	Waste Bin
Down Pipe	P/W	Post & Wire Fence	WH	Weep Hole
Drain	P/Wall	Partition Wall	WL	Water Level
Electric Box	RE	Rodding Eye	WM	Water Meter
Electric Supply Cover	RL	Ridge Level	WO	Wash Out
Eaves Level	RP	Reflector Post	(XXX)	Floor to Ceiling Height
Electric Pole	RS	Road Sign	(XX)F/C	Floor to False Ceiling Ht
			_	

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

Cill heights are measured as floor to the cill and head heights are measured from cill to the top of window.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

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Do not scale from this drawing.



LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING SITE ENGINEERING MONITORING

0845 040 5969 survey-solutions.co.uk

IPSWICH BRENTWOOD COVENTRY GLASGOW NORWICH NOTTINGHAM YEOVIL

PROJECT TITLE
GROVE COTTAGE, 151 LODON RD,
BISHOP'S STORTFORD, ESSEX, CM23 3JX.

DRAWING DETAIL

TOPOGRAPHICAL SURVEY

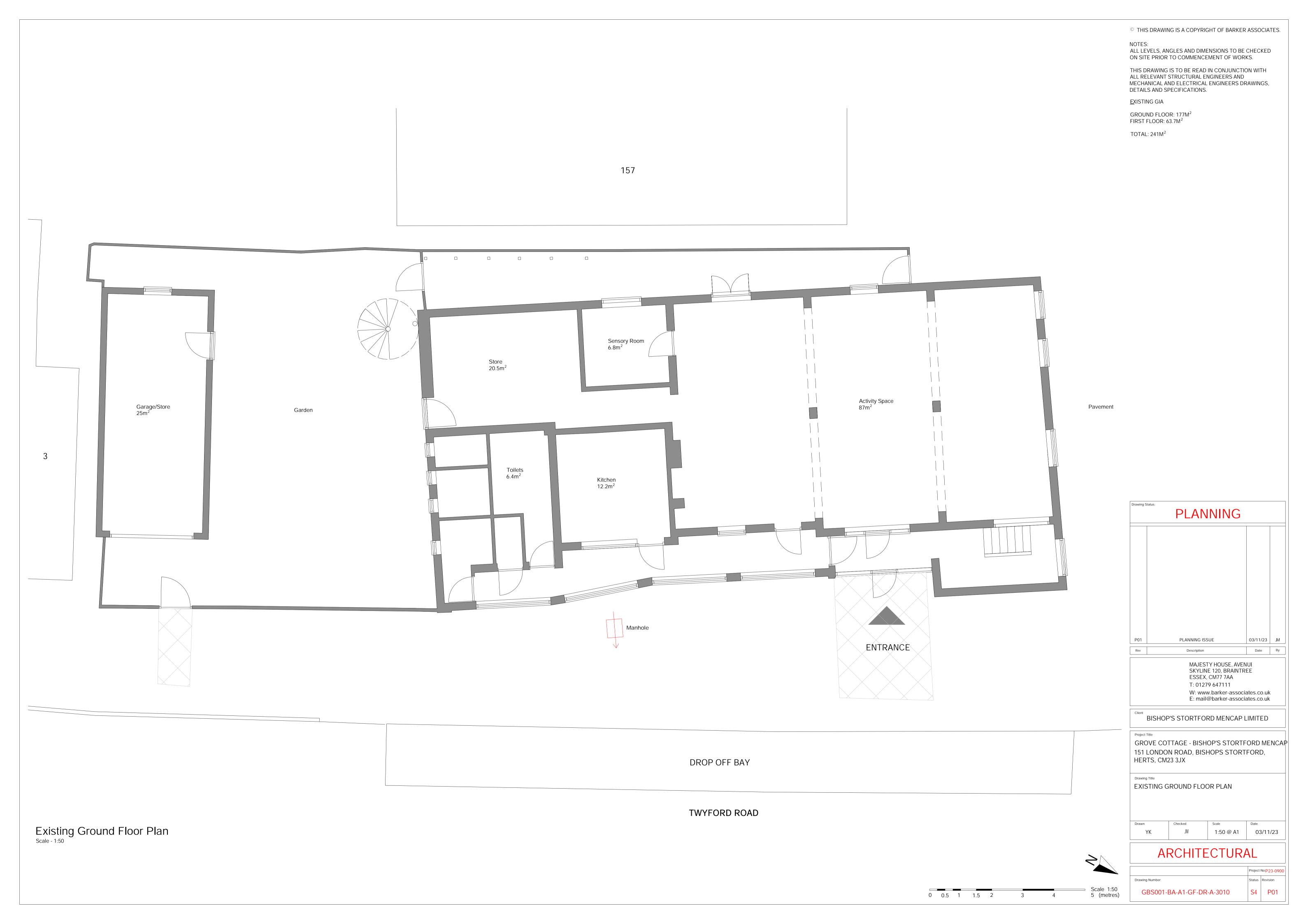
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SURVEYOR PMB	DWG STATUS FINAL			
DRAWING NUM 36579se-01		REVISION A	19.11.2021	

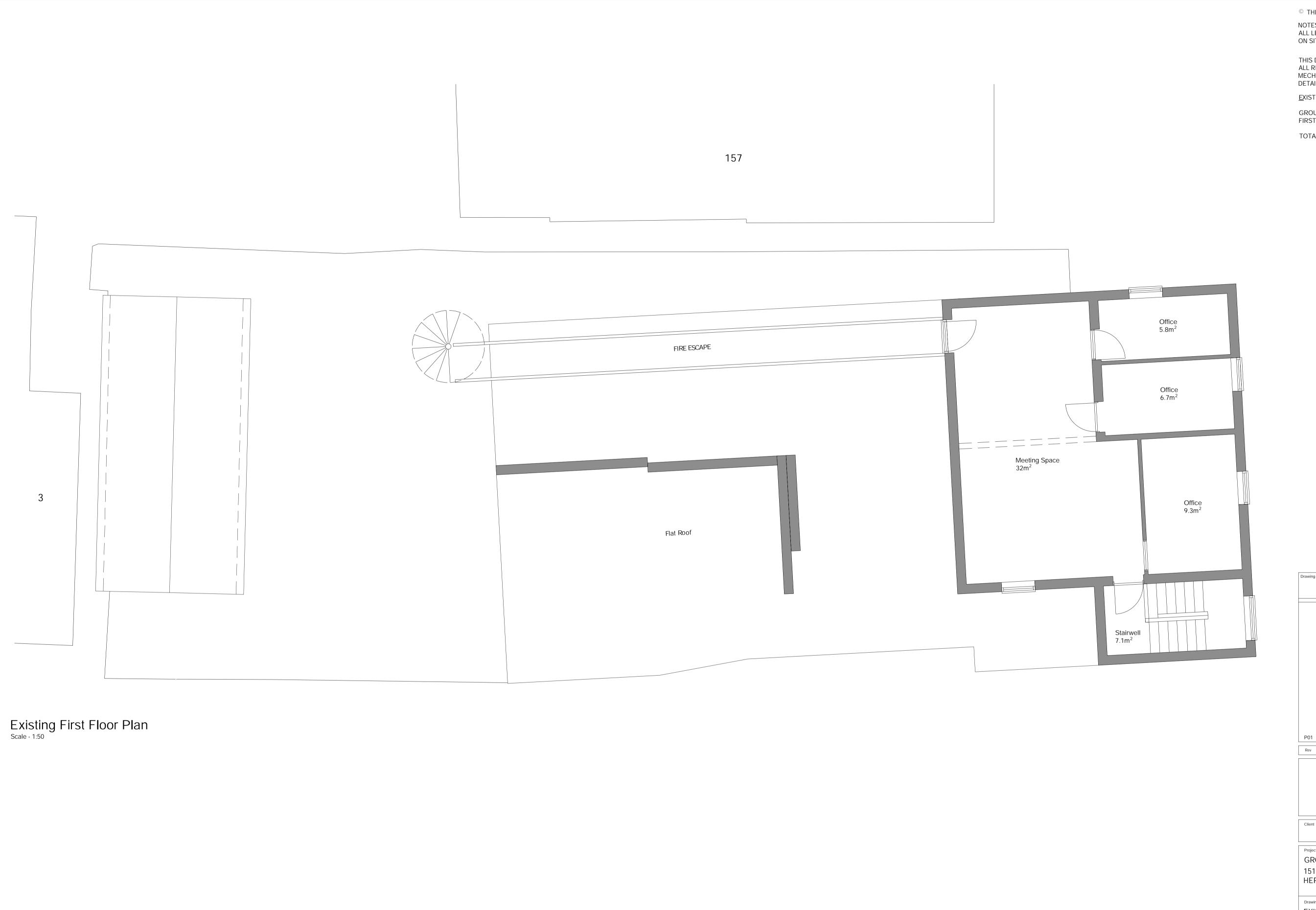












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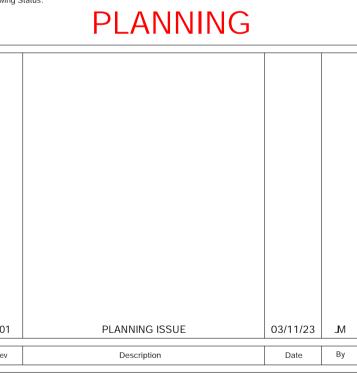
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EXISTING GIA

GROUND FLOOR: 177M² FIRST FLOOR: 63.7M²

TOTAL: 241M²



MAJESTY HOUSE, AVENUE SKYLINE 120, BRAINTREE ESSEX, CM77 7AA T: 01279 647111

W: www.barker-associates.co.uk E: mail@barker-associates.co.uk

BISHOP'S STORTFORD MENCAP LIMITED

GROVE COTTAGE - BISHOP'S STORTFORD MENCAP 151 LONDON ROAD, BISHOPS STORTFORD, HERTS, CM23 3JX

EXISTING FIRST FLOOR PLAN

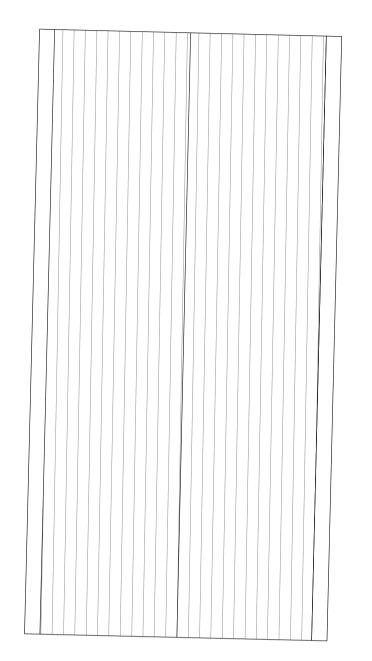
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0 0.5 1 1.5 2 3 4

ARCHITECTURAL

1:50 @ A1 03/11/23

GBS001-BA-A1-01-DR-A-3011





Existing Roof Plan
Scale - 1:50

PLANNING 03/11/23 JM PLANNING ISSUE Date By

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BISHOP'S STORTFORD MENCAP LIMITED

GROVE COTTAGE - BISHOP'S STORTFORD MENCAP 151 LONDON ROAD, BISHOPS STORTFORD, HERTS, CM23 3JX

EXISTING ROOF PLAN

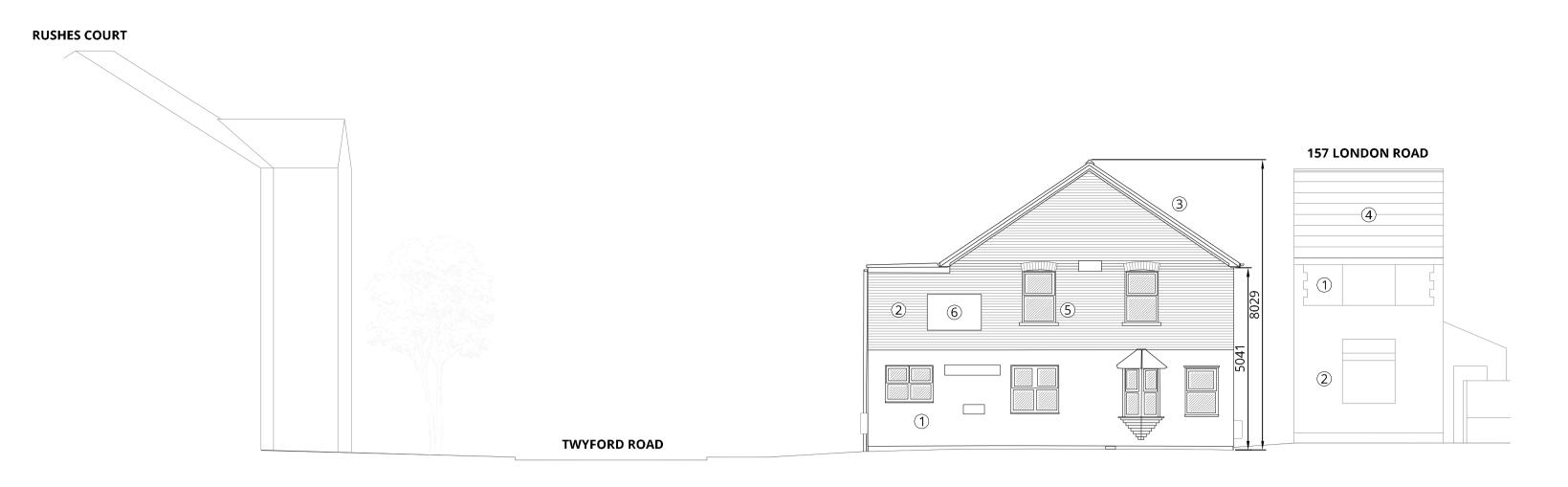
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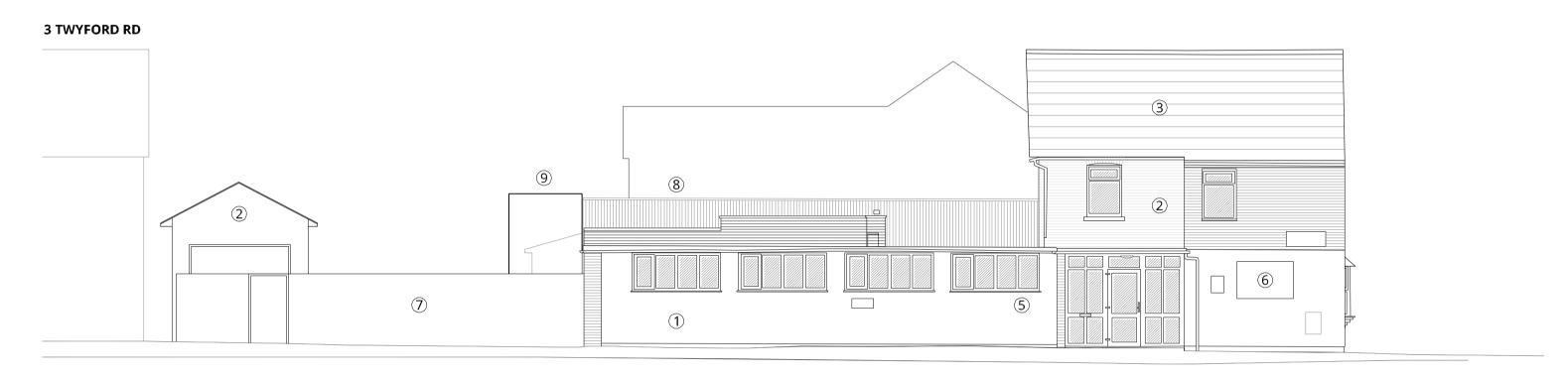
ARCHITECTURAL

1:50 @ A1 03/11/23

Status Revision GBS001-BA-A1-RF-DR-A-3012



Existing North Elevation Scale - 1:100



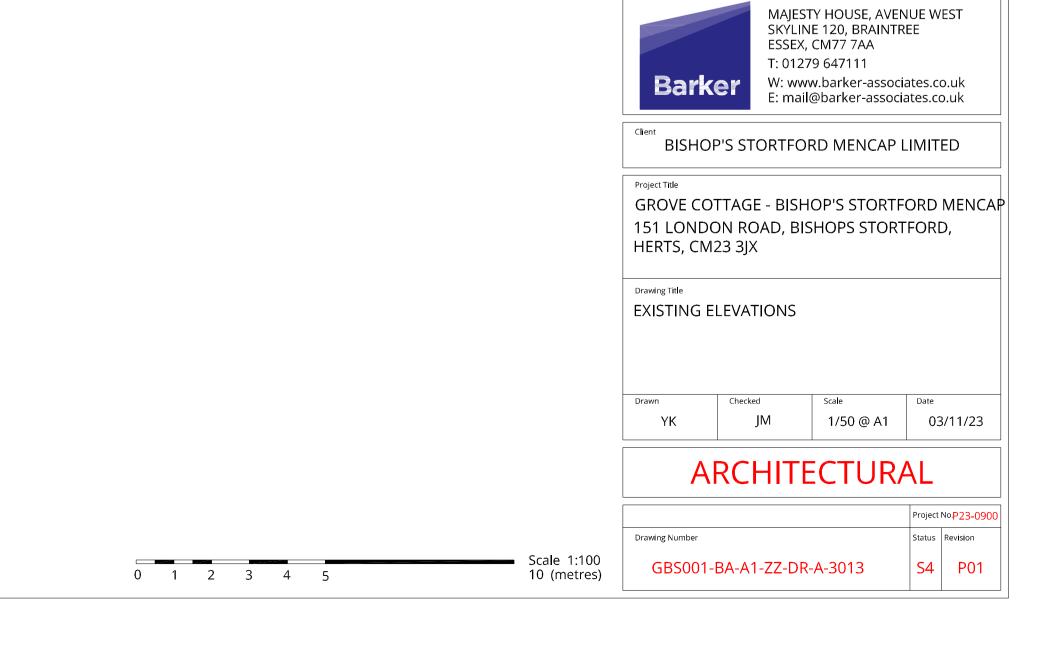
Existing East Elevation Scale - 1:100



Existing South Elevation Scale - 1:100



Existing West Elevation
Scale - 1:100



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PLANNING

PLANNING ISSUE

Description

03/11/23 JM

Date By

ON SITE PRIOR TO COMMENCEMENT OF WORKS.

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8. EXTERNAL FIRE ESCAPE GANTRY

9. OUTLINE OF STAIRCASE

KEY

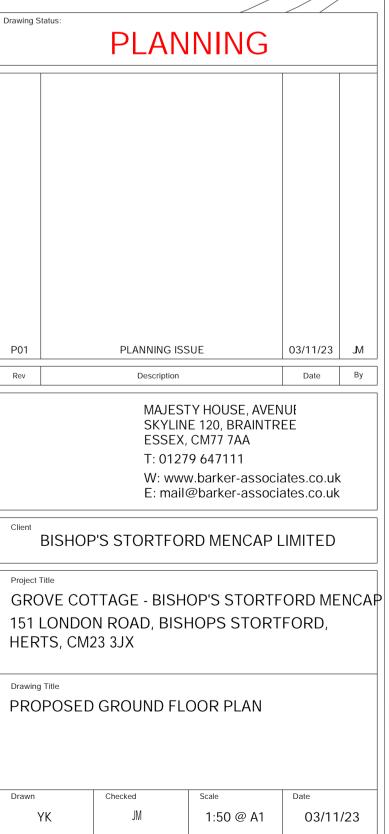
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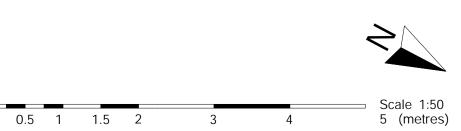
SLATE ROOF
 TILE ROOF
 UPVC WINDOW
 SIGNAGE
 TIMBER FENCE

2. FACING BRICKWORK



Proposed Ground Floor plan Scale 1:50

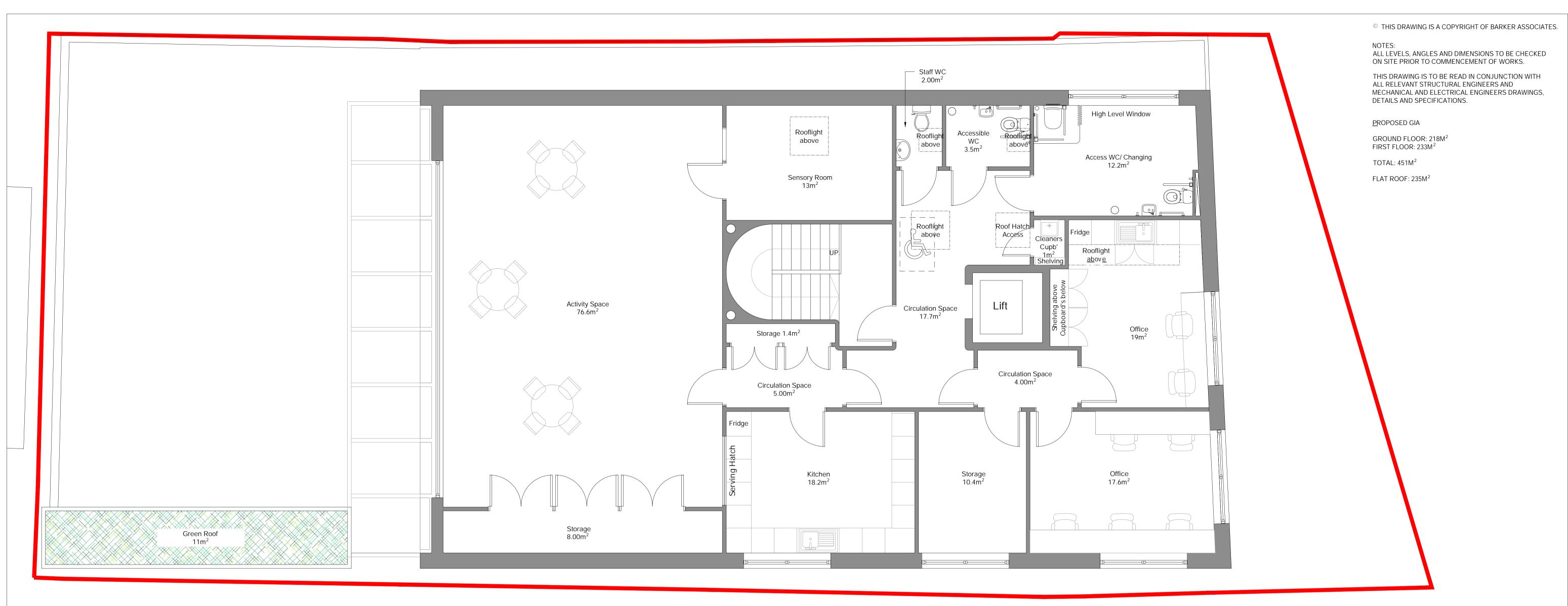




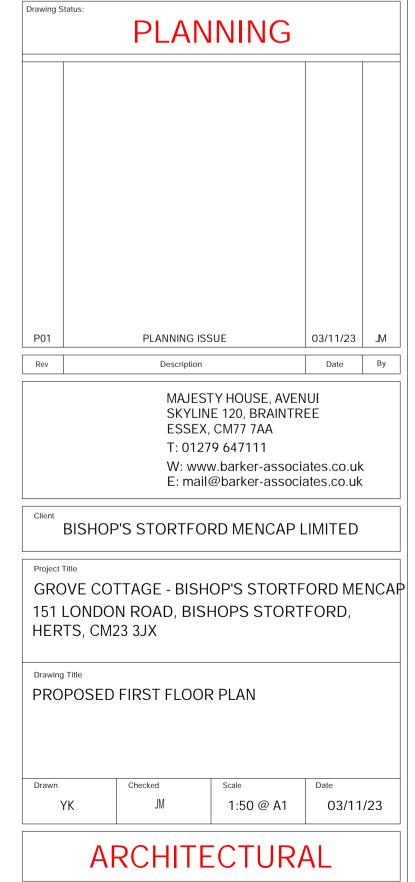
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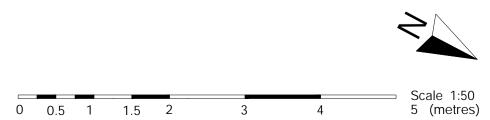
ARCHITECTURAL

GBS001-BA-A1-GF-DR-A-3210



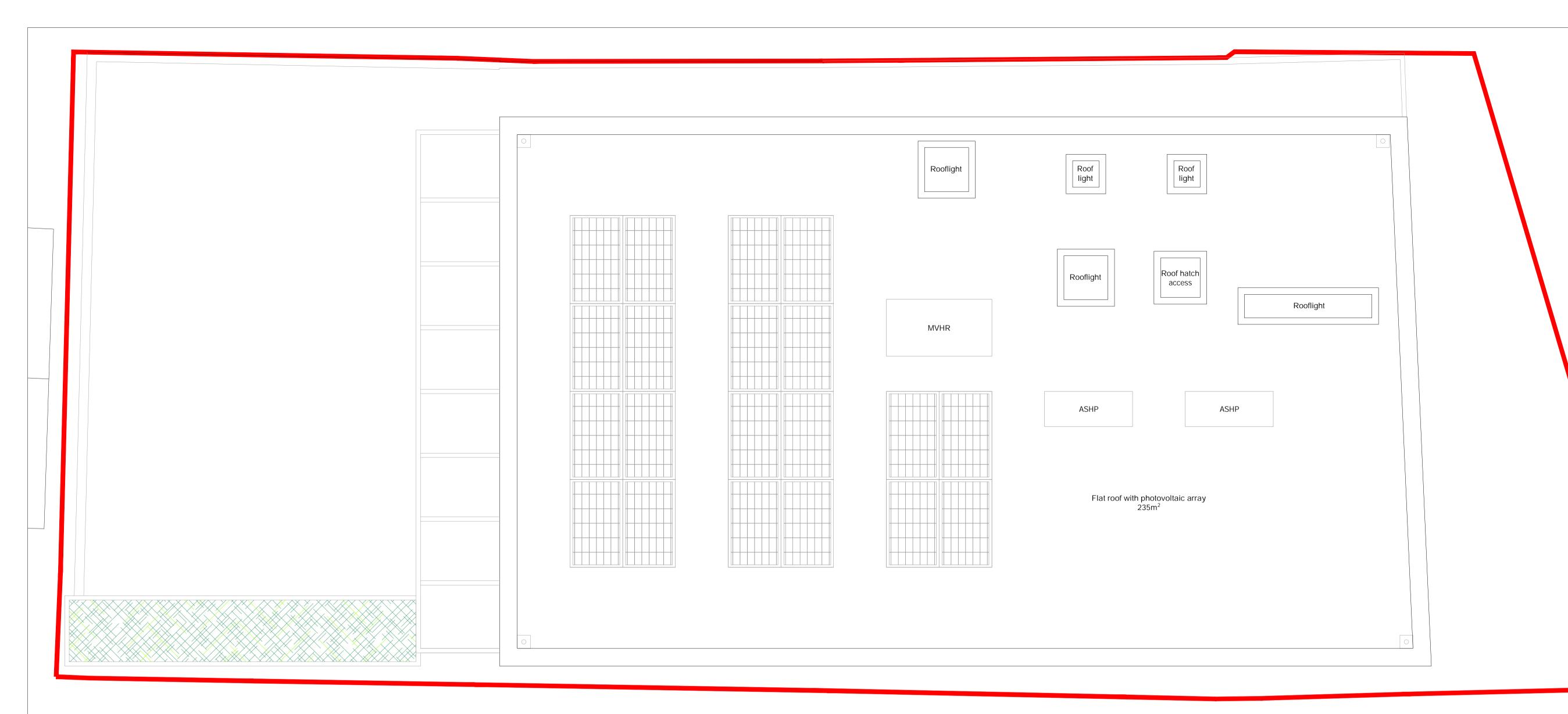
Proposed First Floor Plan Scale 1:50





ARCHITECTURAL				
	Project	No. <mark>P23</mark> -		
rawing Number	Status	Revision		

GBS001-BA-A1-01-DR-A-3211



Proposed Roof Plan
Scale 1:50

PLANNING PLANNING ISSUE 03/11/23 JM Date By Description MAJESTY HOUSE, AVENUI SKYLINE 120, BRAINTREE ESSEX, CM77 7AA T: 01279 647111 W: www.barker-associates.co.uk E: mail@barker-associates.co.uk BISHOP'S STORTFORD MENCAP LIMITED GROVE COTTAGE - BISHOP'S STORTFORD MENCAP 151 LONDON ROAD, BISHOPS STORTFORD, HERTS, CM23 3JX PROPOSED ROOF PLAN 1:50 @ A1 03/11/23 ARCHITECTURAL

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ALL RELEVANT STRUCTURAL ENGINEERS AND

DETAILS AND SPECIFICATIONS.

NOTES:

<u>P</u>ROPOSED GIA

TOTAL: 451M²

FLAT ROOF: 235M²

GROUND FLOOR: 218M²

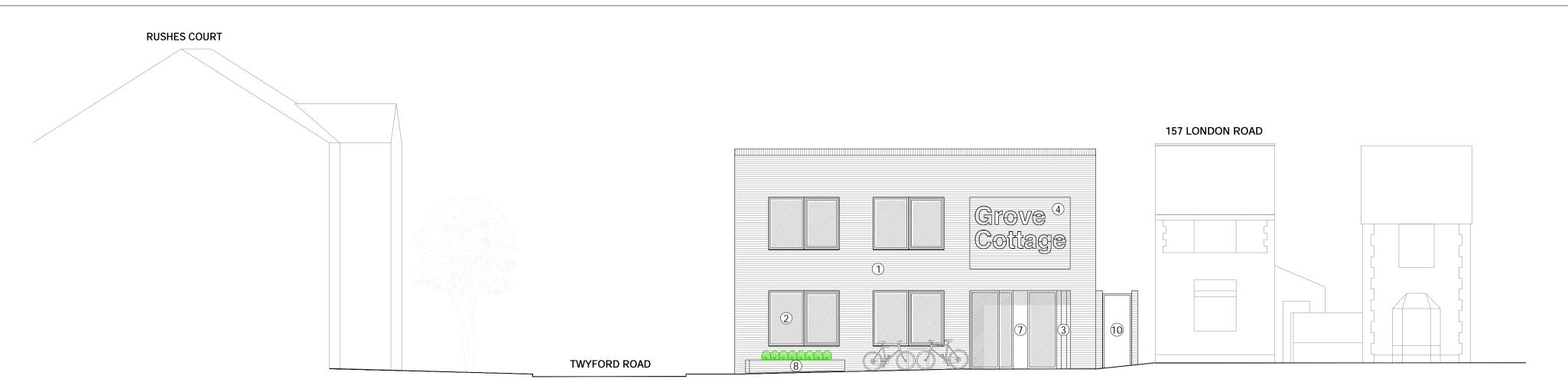
FIRST FLOOR: 233M²

Project No.P23-0
ing Number

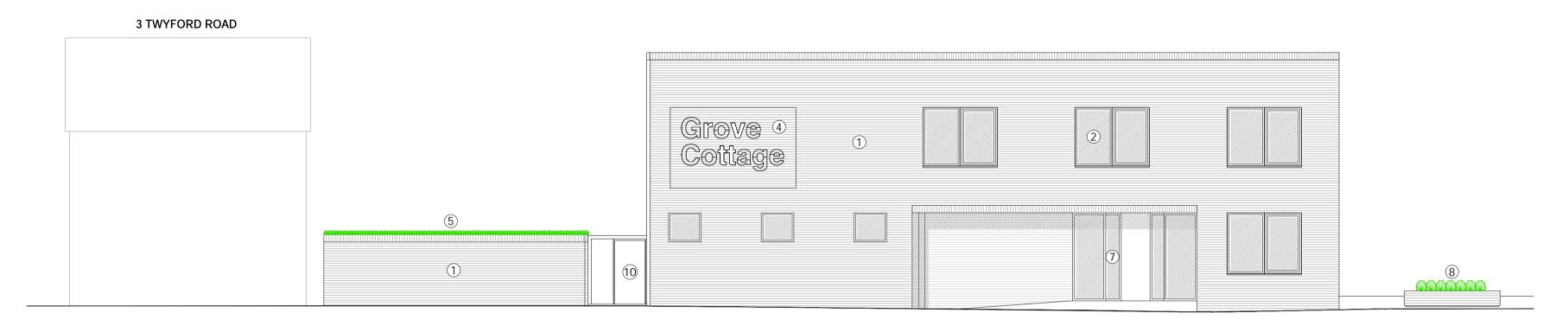
Status Revision

S4 P01

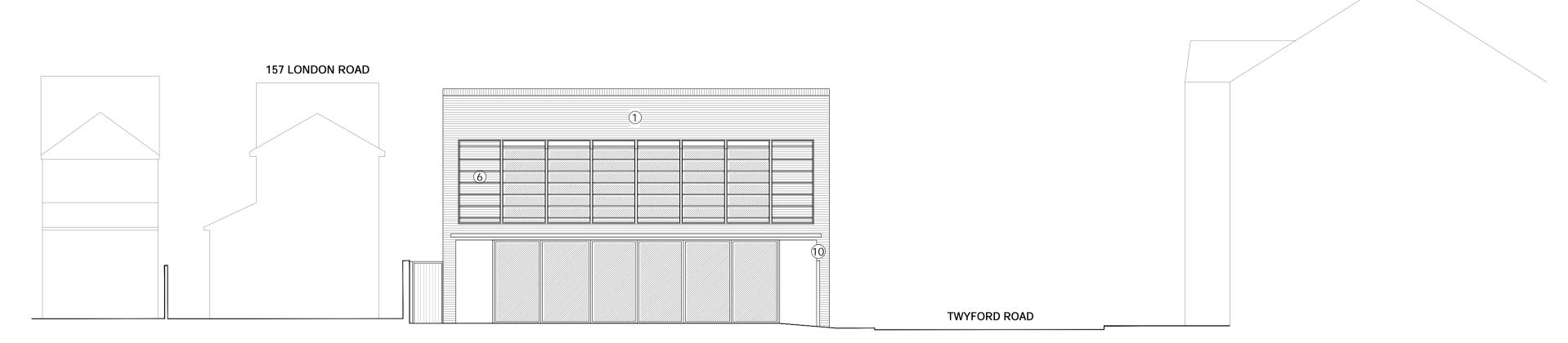
Scale 1:50 GBS001-BA-A1-RF-DR-A-3212



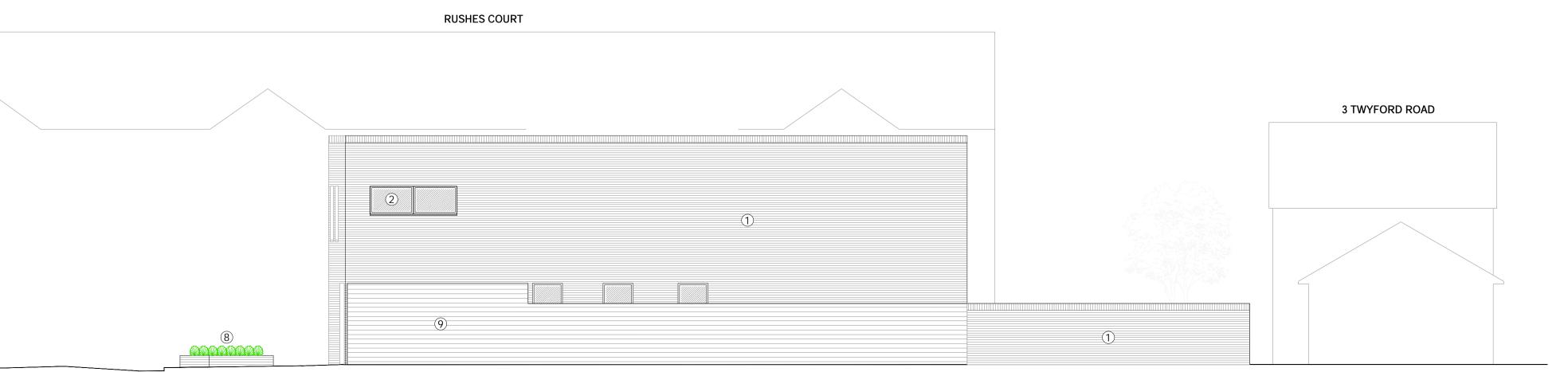
Proposed North Elevation Scale - 1:100



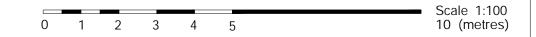
Proposed East Elevation Scale - 1:100



Proposed South Elevation Scale - 1:100



Proposed West Elevation
Scale - 1:100



RUSHES COURT

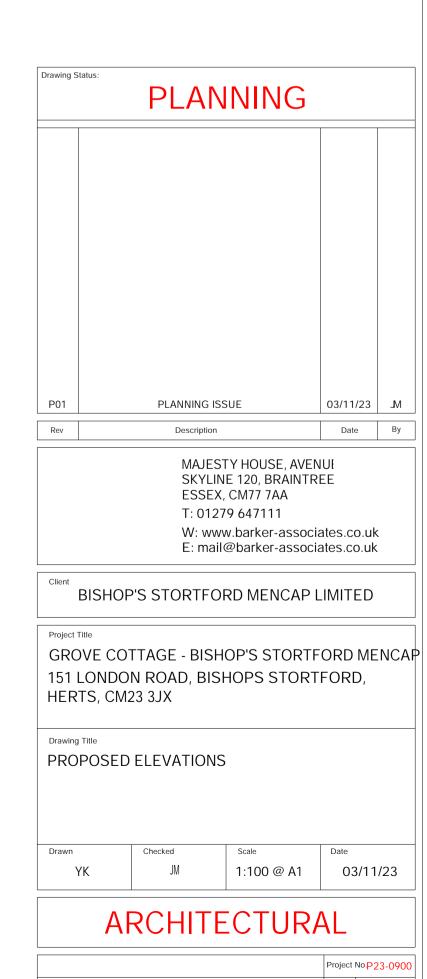
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1. FACING STOCK BRICKWORK

- 2. ALUMINIUM/ TIMBER COMPOSITE WINDOWS
- 3. GLAZED BRICKWORK TO RECESSED ENTRANCE 4. RECESSED BRICK PANEL WITH CARVED BRICK SIGNAGE
- 5. GREEN ROOF
- TIMBER LOUVRES
- 7. ALUMINIUM SLIDING DOORS (COLOUR TO MATCH ADJACENT GLAZED BRICKS)
- 8. 'PERMEABLE' TIMBER SEATING WITH PLANTER
- 9. NEW HORIZONTAL CLAD TIMBER FENCE
- 10. METAL SECURITY GATE (COLOUR TO MATCH ENTRANCE DOOR)



GBS001-BA-A1-ZZ-DR-A-3214

Appendix C

ENVIRONMENT AGENCY CORRESPONDENCE

Fagnano, Mattia

Subject: RE: HNL 267488 JH - Product 4 - Grid ref: 549242,220229 - customer ref:

8AGYWJA2V3VP (Grove Cottage)

From: NET Enquiries
Sent: 17 June 2022 16:07

To: Mostyn, Stephen

Subject: HNL 267488 JH - Product 4 - Grid ref: 549242,220229 - customer ref: 8AGYWJA2V3VP

Dear Stephen

Enquiry regarding *Product 4* for FRA for Grid ref: 549242,220229

Thank you for your enquiry which was received on 24 May 2022.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004. The information is attached.

We are still awaiting the explanation from your question 14 June and will pass the response on as soon as available.

Name	Product 4
Description	Basic Flood Risk Assessment Map for Grid ref: 549242,220229
Licence	Open Government Licence
Information Warnings	None.
Information Warning - OS background mapping	The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sublicense, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

Here is the link to the climate change allowances: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Following the Flood and Water Management Act 2010, Lead Local Flood Authorities (LLFA) are responsible for the management of groundwater and surface water flooding. They also maintain a register of property flooding incidents. You may want to seek further advice from the LLFA – Hertfordshire County Council.

Please use the following link for details of reports for known problems regarding groundwater flooding issues https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk if there is not one for your site this means that we don't know about any problems in our records.

You can also view and print surface water flood maps online at: http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

You can view the reservoir maps on our website: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?map=SurfaceWater

These give information on the indicative extent, depth and velocity of reservoir flooding. Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. However, if a large reservoir failed it would cause widespread flooding with serious consequences which could include endangering people's lives. This is why we share and discuss the hazard presented by flooding from reservoirs with partners and are making this information available to the public.

Further details about the Environment Agency information supplied can be found on the GOV.UK website: https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Info

https://www.gov.uk/planning-applications-assessing-flood-risk https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning including (<u>Flood Zone 2</u>, <u>Flood Zone 3</u>, <u>Flood Storage Areas</u>, <u>Flood Defences</u>, <u>Areas</u>
 Benefiting from Defences)
- Risk of Flooding from Rivers and Sea
- Historic Flood Map
- Assets and Defences
- Current Flood Warnings

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely

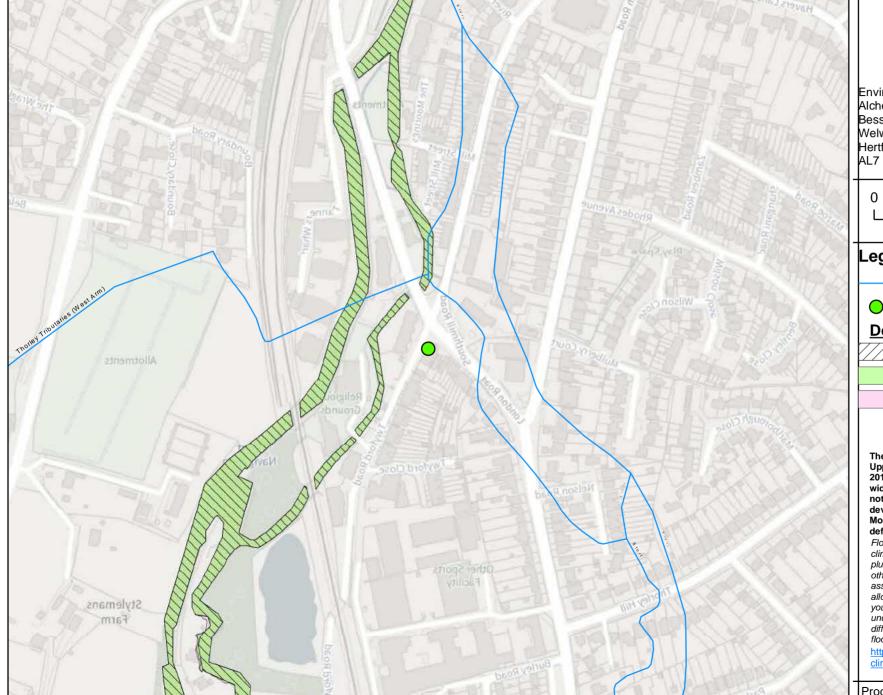
James Hammett

Environment Agency, Herts and North London Office, Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE

Pronouns: he/his (why is this here?)

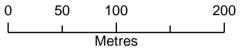
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Detailed FRA centred on: 549242,220229 - 17/06/2022 - HNL 267488 JH



Environment

Environment Agency Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE



Legend

Main Rivers



Site location

Defended Flood Outlines

1 in 5 (20%) Defended

1 in 20 (5%) Defended

1 in 100 (1%) Defended

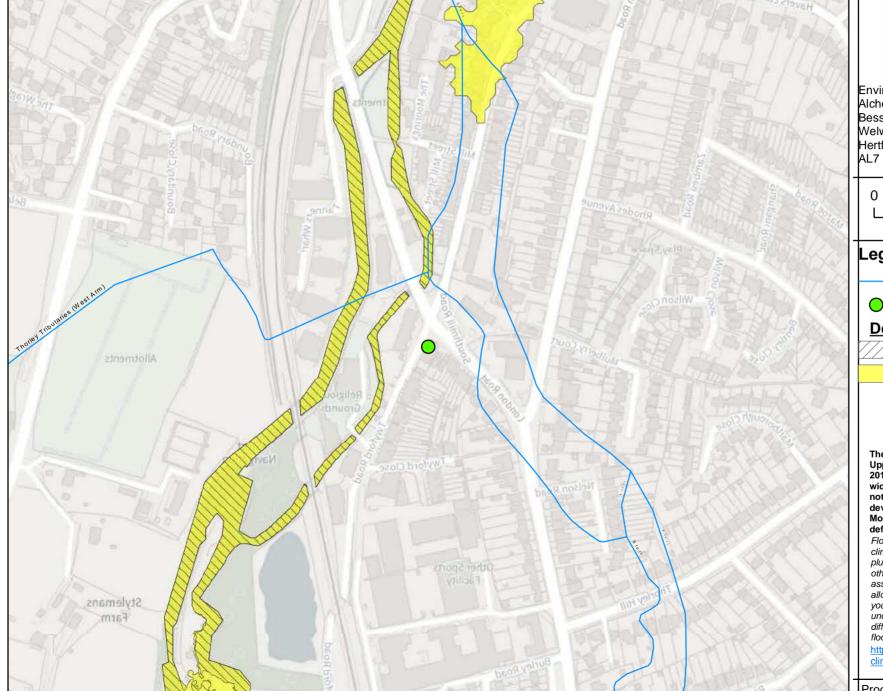
The data in this map has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. https://www.gov.uk/guidance/flood-risk-assessmentsclimate-change-allowances

Produced by:

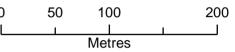
Partnerships & Strategic Overview, Hertfordshire & North London

Detailed FRA centred on: 549242,220229 - 17/06/2022 - HNL 267488 JH





Environment Agency Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE



Legend

Main Rivers



Defended Flood Outlines

1 in 100+20% (*CC) Defended

1 in 1000 (0.1%) Defended

The data in this map has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

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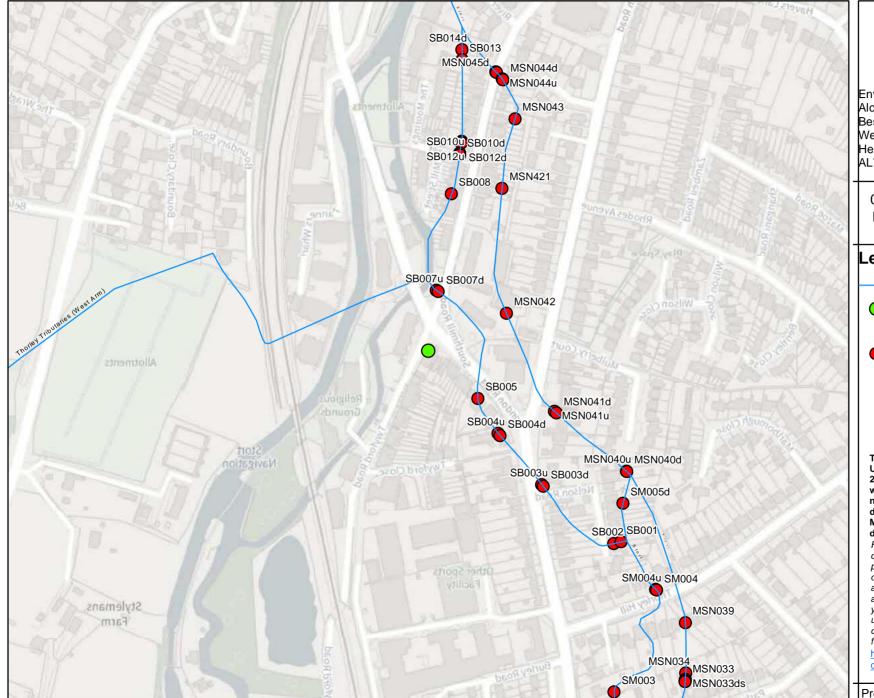
Produced by:

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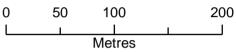
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Detailed FRA centred on: 549242,220229 - 17/06/2022 - HNL 267488 JH



Environment Agency

Environment Agency Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE



Legend

Main Rivers

Site location

1D Node Results

Node Results

The data in this map has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Produced by:

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Environment Agency ref: HNL 267488 JH

The following information has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010)

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Caution:

Although this is a detailed model, please be aware that it was not originally created to assess flood levels at particular development sites.

All flood levels are given in metres Above Ordnance Datum (mAOD) All flows are given in cubic metres per second (cumecs)

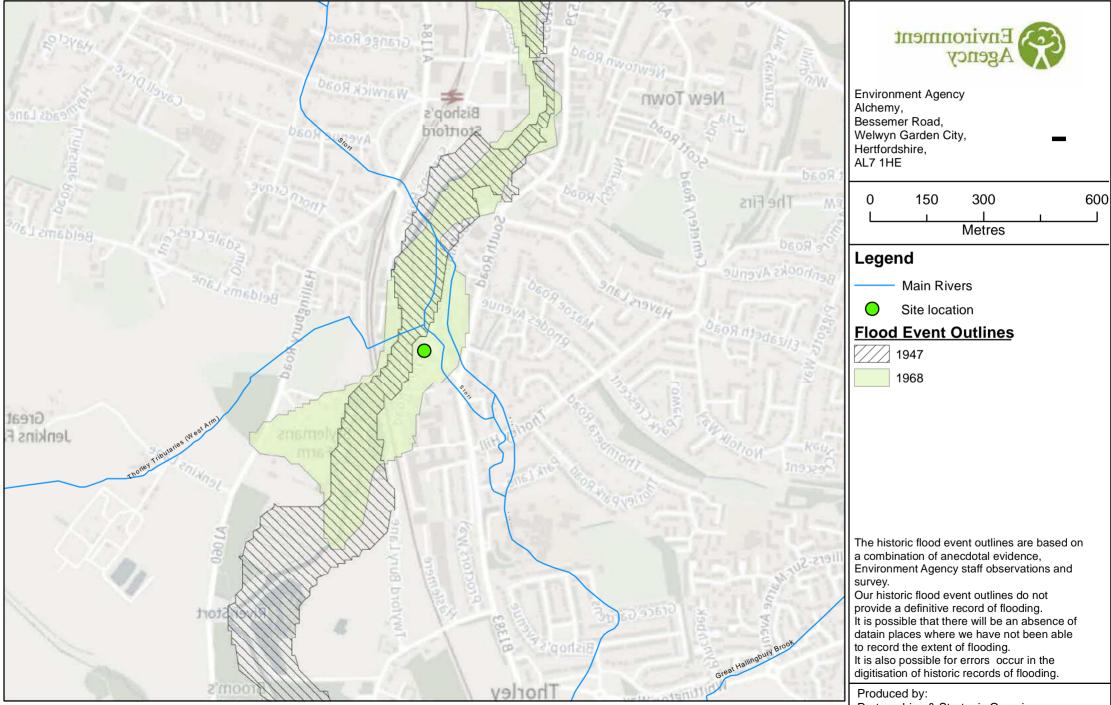
MODELLED FLOOD LEVEL

			Return Period							
Node Label	Easting	Northing	5yr	10yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSN045u	549304	220487	55.53	55.58	55.63	55.70	55.75	55.83	55.80	55.95
MSN045d	549305	220487	55.53	55.58	55.63	55.70	55.75	55.83	55.80	55.95
MSN044u	549310	220481	55.52	55.56	55.61	55.67	55.71	55.79	55.76	55.88
MSN044d	549311	220480	55.52	55.56	55.61	55.67	55.71	55.79	55.76	55.88
MSN043	549322	220444	55.52	55.56	55.62	55.67	55.72	55.80	55.77	55.91
MSN421	549310	220379	55.51	55.55	55.60	55.65	55.70	55.77	55.74	55.86
MSN042	549314	220264	55.49	55.53	55.57	55.62	55.66	55.71	55.69	55.79
MSN041u	549359	220173	55.49	55.52	55.57	55.61	55.65	55.70	55.68	55.78
MSN041d	549361	220171	55.49	55.52	55.57	55.61	55.65	55.70	55.68	55.78
MSN040u	549425	220118	55.48	55.51	55.55	55.58	55.62	55.66	55.64	55.73
MSN040d	549426	220117	55.48	55.51	55.55	55.58	55.62	55.66	55.64	55.73
MSN039	549480	219977	55.48	55.51	55.55	55.58	55.62	55.66	55.64	55.73
MSN034	549480	219931	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
MSN033us	549480	219925	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
MSN033	549480	219924	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
MSN033ds	549480	219923	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
SB014d	549273	220508	55.53	55.58	55.63	55.69	55.75	55.83	55.80	55.95
SB013	549273	220499	55.53	55.58	55.63	55.69	55.75	55.83	55.80	55.94
SB012u	549273	220423	55.53	55.57	55.63	55.69	55.74	55.82	55.79	55.93
SB012d	549272	220421	55.52	55.57	55.62	55.68	55.73	55.80	55.77	55.91
SB010u	549271	220412	55.52	55.57	55.62	55.68	55.73	55.80	55.77	55.91
SB010d	549271	220410	54.31	54.37	54.45	54.53	54.61	54.73	54.68	54.90
SB008	549263	220374	54.30	54.36	54.44	54.53	54.61	54.73	54.68	54.90
SB007u	549249	220285	54.26	54.33	54.40	54.49	54.57	54.69	54.64	54.86
SB007d	549251	220284	54.26	54.33	54.40	54.49	54.57	54.69	54.64	54.86
SB005	549288	220185	54.21	54.28	54.36	54.45	54.54	54.66	54.61	54.83
SB004u	549307	220153	54.20	54.27	54.35	54.44	54.52	54.64	54.59	54.82
SB004d	549309	220150	54.20	54.27	54.35	54.44	54.52	54.64	54.59	54.82
SB003u	549347	220105	54.18	54.25	54.34	54.43	54.51	54.63	54.58	54.81
SB003d	549348	220103	54.18	54.25	54.34	54.43	54.51	54.63	54.58	54.81
SB002	549414	220051	54.17	54.24	54.33	54.42	54.50	54.62	54.57	54.80
SB001	549421	220052	54.18	54.25	54.33	54.42	54.51	54.63	54.58	54.80
SM005d	549422	220088	54.20	54.28	54.37	54.47	54.56	54.69	54.64	54.88
SM004u	549453	220008	54.18	54.25	54.33	54.42	54.51	54.63	54.58	54.80
SM004	549453	220007	54.18	54.25	54.33	54.42	54.51	54.63	54.58	54.80
SM003	549414	219913	54.12	54.18	54.25	54.32	54.39	54.49	54.44	54.62

MODELLED FLOWS

ODELLED FLO			Return Period							
Node Label	Easting	Northing	5yr	10yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSN045u	549304.4192	220487.3254	11.25	13.25	15.72	18.39	20.85	24.52	23.01	29.89
MSN045d	549305.1283	220486.6756	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.39
MSN044u	549310.4051	220480.8173	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN044d	549310.9823	220479.8376	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN043	549322.2533	220443.7779	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.39
MSN421	549310.2567	220379.3163	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN042	549314.4947	220263.5895	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN041u	549358.7954	220173.0854	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN041d	549360.7412	220171.3359	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN040u	549425.4814	220117.5513	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN040d	549425.836	220117.2214	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.33
MSN039	549479.9648	219977.3914	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
MSN034	549480.3935	219930.6548	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
MSN033us	549479.9483	219924.7465	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
MSN033	549479.9071	219923.7467	0.30	0.31	0.30	0.30	0.30	0.30	0.30	0.31
MSN033ds	549479.8659	219922.857	11.34	13.34	15.82	18.52	21.01	24.72	23.18	30.14
SB014d	549273.2199	220507.6496	1.12	1.35	1.63	1.96	2.27	2.75	2.55	3.50
SB013	549273.2859	220498.6322	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB012u	549272.717	220422.8339	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB012d	549272.4861	220421.3743	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB010u	549271.1834	220411.877	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB010d	549270.9525	220410.4274	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB008	549263.4825	220374.3677	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB007u	549249.4659	220285.0233	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB007d	549251.2963	220283.7437	1.34	1.58	1.88	2.20	2.57	3.09	2.88	3.98
SB005	549287.8714	220184.782	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB004u	549306.7443	220152.5213	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB004d	549308.5335	220150.3419	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB003u	549347.0874	220105.0848	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB003d	549348.3819	220103.4553	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB002	549413.7652	220050.6504	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB001	549420.5427	220052.19	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SM005d	549422.2329	220087.8498	9.83	11.61	13.79	16.15	18.30	21.50	20.18	26.12
SM004u	549452.6572	220008.1826	9.83	11.62	13.79	16.15	18.30	21.50	20.18	26.12
SM004	549453.4322	220007.4228	11.05	13.05	15.53	18.24	20.73	24.44	22.91	29.87
SM003	549413.9301	219913.2098	11.05	13.05	15.53	18.24	20.73	24.44	22.91	29.87

Historic Flood Map centred on: 549242,220229 17/06/2022 - HNL 267488 JH

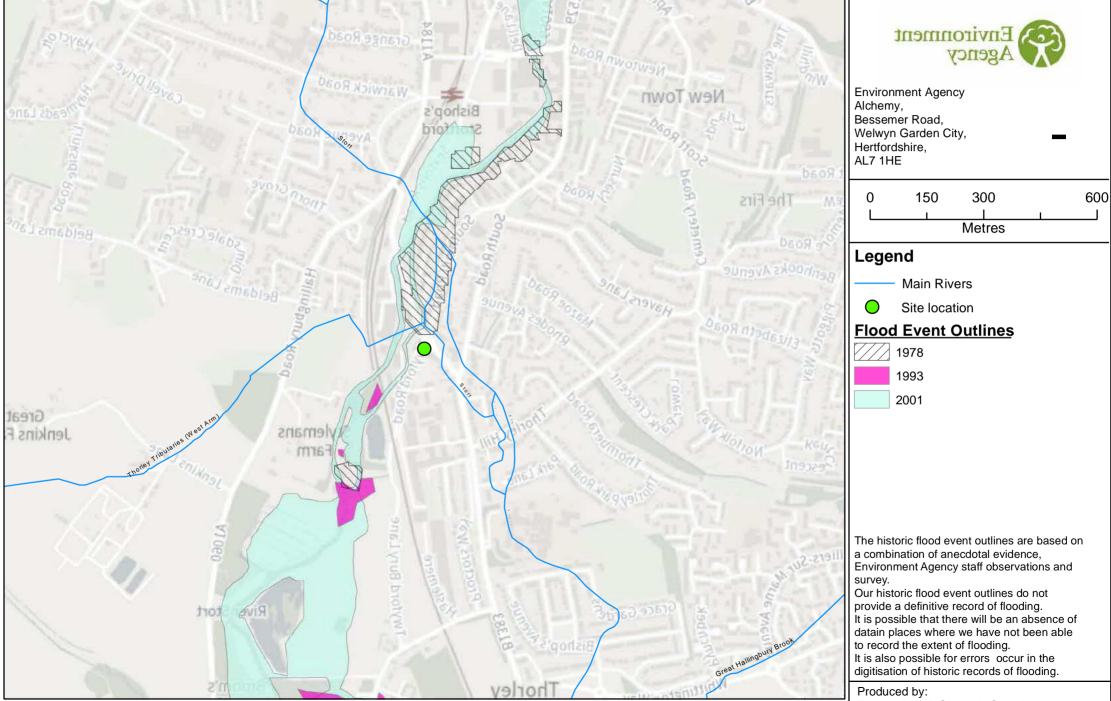


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Partnerships & Strategic Overview, Hertfordshire & North London

Forsdyke, James

From: NET Enquiries

Sent: 05 December 2017 13:58

To: Forsdyke, James

Subject: HNL67499/AS - Enquiry regarding Grove Cottage, Bishop's Stortford,

Hertfordshire

Attachments: Bishop Stortford Groundwater and Surfacewater data.zip; HNL67499AS.pdf; Flood

Alert Area HNL67499.pdf; Flood Warning Area HNL67499.pdf;

flood_warnings_LIT_5215.pdf; HNL67499AS.pdf; Flood Alert Area HNL67499.pdf;

Flood Warning Area HNL67499.pdf; flood_warnings_LIT_5215.pdf; Open

Government Licence.pdf

Dear Mr Forsdyke

Enquiry regarding Grove Cottage, Bishop's Stortford, Hertfordshire

Thank you for your enquiry received 7 November 2017.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Your data can be downloaded from the following link, **which will expire within 30 days:** https://ea.sharefile.com/d-s2e759c053d741de8

The information is not available with the Open Government Licence but we may be able to license to you under the Environment Agency Conditional Licence

However, you must first check the supporting information at the above link to determine if the conditions on use are suitable for your purposes.

If they aren't, this information is not provided with a licence for use, and the data is provided for read right only

The following details the model name, any conditions not listed in the Conditional Licence, and any information warnings.

Product 5 / 6 / 7 - Upper & Middle Stort Flood Mapping Model (Halcrow, 2010)

Specific Model Conditions:

This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

General Conditions applying to Models:

S60 Special Conditions applicable when we are we supplying model data and/or software and we have applied our procedure test set out in our Special Licence Pricing Document to determine that we need the outputs created from them by the licensee.

S60.1 You will supply to the Environment Agency copies of any assessments/studies and related outputs created pursuant to the supply of the

Licensed Content (including any model and all input, processing and output data) and any records of historic flooding on the Site regardless of the flood source all of which are hereinafter referred to as "the Data".

S60.2 If any Licensed Content (including model input/outputs) is altered or modified in any way by you, you will, when supplying the Data, enclose documentation detailing the changes "the Changes".

S60.3 You will offer us an opportunity to review and comment on the Data and the Changes and agree not to publish or supply the Data or any part thereof to any third party if we choose to review and comment. If we do choose to review and comment we will do so within 10 Working Days of receipt of the Data.

S60.4 You hereby grant the Environment Agency an unrestricted and perpetual licence to use the Data or any part thereof for all Internal purposes and supply to others as derivatives (such as incorporation into the Environment Agency's products) but supply of the Data "As-Is" to others will be made only as required by law.

Also attached is a map of the flood alert area and flood warning area the property lies in, as well as 'flood_warnings_LIT_5215' which explains what the alerts and warnings are. And a Zip file containing groundwater data for Welcome Break Borehole, and Stage, Flow and Velocity data for Bishop Stortford Castle (along the River Stort).

The attached Open Government licence accompanies the non flood model data.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

I hope this proves to be of help to you however if you have any further queries please feel free to contact me directly.

Kind regards

Annette Smith

Customers and Engagement Officer
Environment Agency, Hertfordshire and North London
Alchemy, Bessemer Boad, Welwyn Garden City, Hertfordshire, AL7 1HE

My usual working hours are 9.30am to 16.30pm, Tuesdays and Thursdays, and 9.30am to 14.30pm Wednesdays.

Did you know that the Environment Agency publishes most of its data via www.data.gov.uk? Using this site you can search for our data alongside other environmental data providers from the Defra Network and local authorities.

We are now Hertfordshire and North London Area

Our new email address for requests for information is HNLenquiries@environment-agency.gov.uk. But don't worry, any emails you send to our old address will still reach us.



Our website has moved. Find us at http://www.gov.uk/environment-agency



Planning for the future of water



From: Forsdyke, James [mailto

Sent: 07 November 2017 10:01

To: Enquiries, Unit - Cc: Berryman, Jame

Subject: 171108/JRB03 - Grove Cottage, Bishop's Stortford, Hertfordshire - Flood Risk Data Enquiry

Dear Sir/Madam

Grove Cottage, Bishop's Stortford, Hertfordshire

Grid Reference: 549244, 220227 Request for Information

I am writing on behalf of our client, with regard to the proposed development at Grove Cottage, Bishop's Stortford, Hertfordshire. Please find attached a location plan indicating the site location. The flood zone map from the EA website shows that the site falls within Flood Zone 2. I understand from looking at the EA website, that we will require product 6. We are in particular need of gauge levels for the River Stort so could you please provide us with the product that includes this data if this is not already contained within product 6.

I have listed below a number of other queries for this site and would be grateful for your attention to them.

- Classification and location of watercourses in the vicinity of the site;
- Details of existing flood defences relevant to the site including estimated standard of protection;
- Details of any flood defence/alleviation improvement schemes and what level of protection they will offer;
- Site specific breached flood level data including flood hazard classifications;
- Time of breached flood waters to enter the site:
- Historic surface water flooding information
- Details of existing flood warning systems;
- Details of any groundwater flooding issues and ground water levels;
- Details of any historic flooding on site;
- Details of any EA apparatus within the site boundary;
- Details of required level of treatment of surface water run-off if any prior to discharge
- Details of required level of climate change to be incorporated into surface water drainage design

Any further information you feel is relevant to assist with the preparation of a FRA.

If you require any further information regarding the site to assist with our queries, please do not hesitate to contact me. I would also be grateful if you could inform me on any associating cost for any data at your earliest possible convenience.

Kind Regards

James Forsdyke

Graduate Engineer



Unit 9 The Chase, Foxholes Business Park, Hertford, SG13 7NN.

wsp.com

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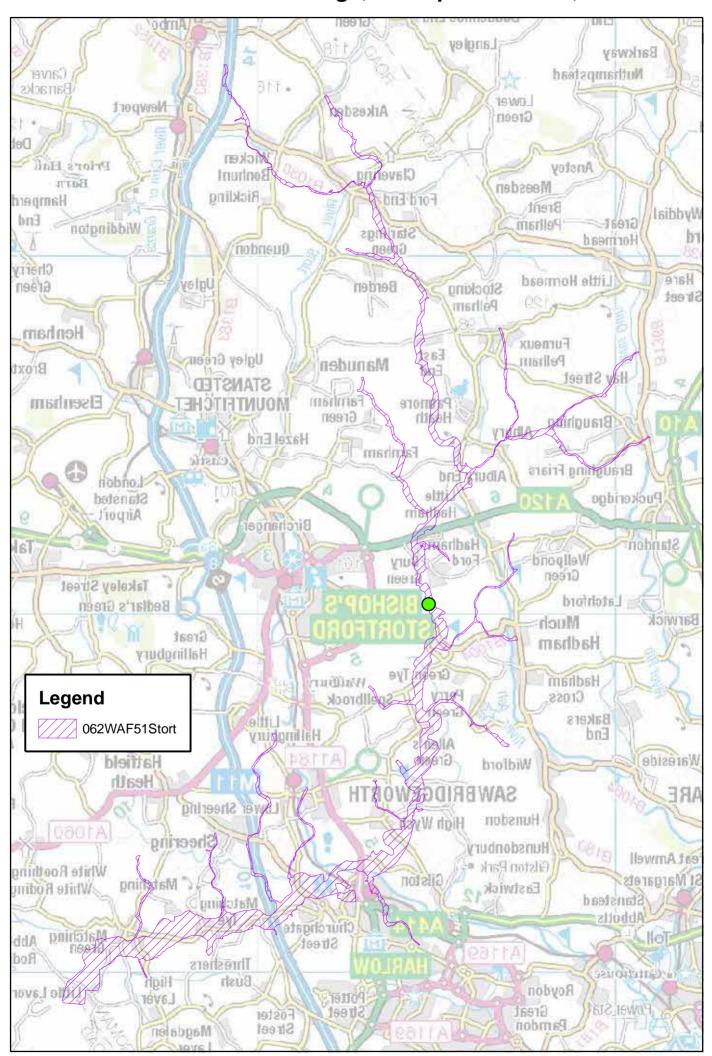
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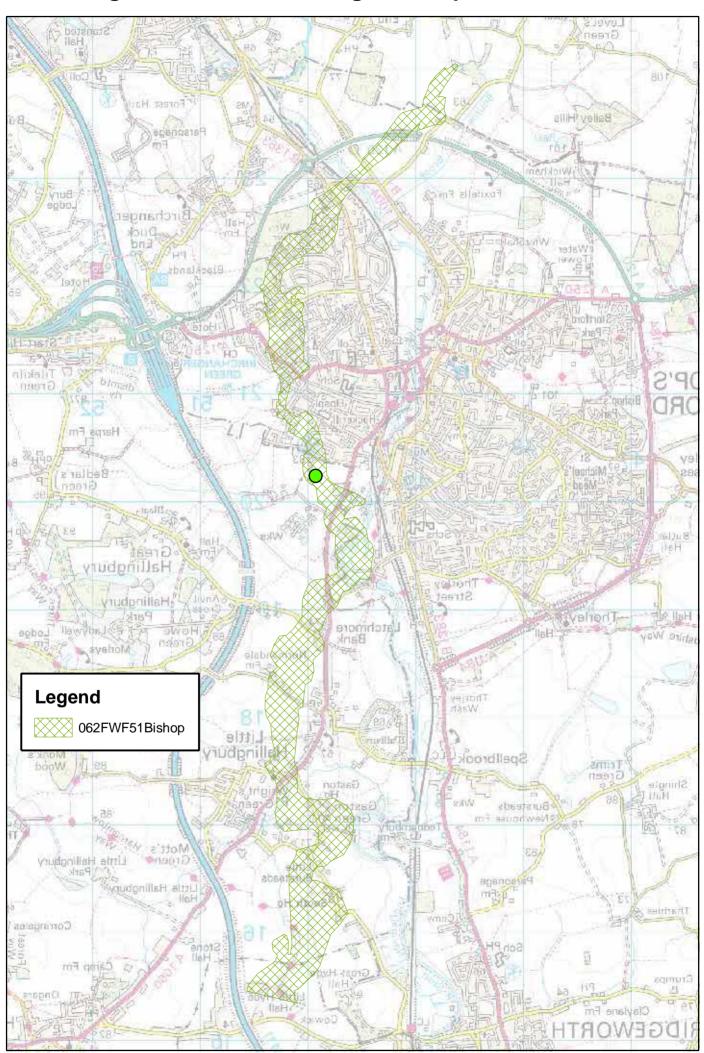
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Flood Alert Area for Grove Cottage, Bishop's Stortford, Hertfordshire



Flood Warning Area for Grove Cottage, Bishop's Stortford, Hertfordshire

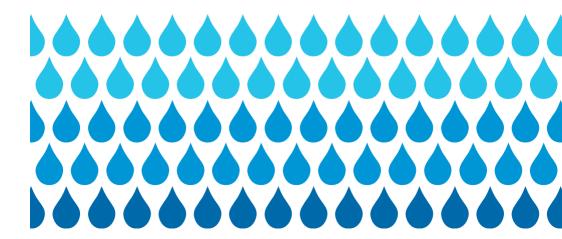




Flood warnings

What they are and what they do

A guide to the Environment Agency's flood warning codes



We are the Environment Agency. It's our job to look after your environment and make it a better place—for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

Published by:

Environment Agency Rio House Waterside Drive, Aztec West Almondsbury, Bristol BS32 4UD

Tel: 0870 8506506*

Email: enquiries@environment-agency.gov.uk

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^{*}Approximate call costs: 8p plus 6p per minute (standard landline). Please note charges will vary across telephone providers.

What counts in a flood is good information you can act on...

Whether we like it or not, floods happen. Over the years, forecasting techniques have improved, giving us more time to prepare for flooding.

The Environment Agency is here to help. We are responsible for issuing flood warnings throughout England and Wales.

We help by:

- Building and maintaining flood defences.
- Issuing flood warnings.
- Working with partners on multi-agency flood response.
- Sharing accurate flood risk information and advice.

Flood Warnings

Everyone needs to understand our flood warnings and know what to do when they receive them. Our service includes three types of warning –Flood Alert, Flood Warning and Severe Flood Warning. Each warning type is triggered by particular weather, river or sea conditions which cause flooding.

The examples in this document are a guide to how the different warnings are used, to provide the public with advance notice of flooding and advice on what to do.

Three-day flood risk forecast	FLOOD ALERT	FLOOD WARNING	SEVERE FLOOD WARNING	Warning no longer in force
What it means Be aware. Think ahead. Keep an eye on the weather situation.	What it means Flooding is possible. Be prepared.	What it means Flooding is expected. Immediate action required.	What it means Severe flooding. Danger to life.	What it means No further flooding is currently expected for your area.
When it's used Daily forecasts of flood risk on our website www.environment-agency.gov.uk. These are updated more frequently for higher flood risk situations.	When it's used Two hours to two days in advance of flooding.	When it's used Half an hour to one day in advance of flooding.	When it's used When flooding poses a significant risk to life or significant disruption to communities.	When it's used When a flood warning or severe flood warning is no longer in force.
 Triggers Information updated daily on the Environment Agency website. The information includes the current and forecast situation and how this is likely to affect each county in England and Wales over the next three days. 	 Triggers Forecasts that indicate that flooding from rivers may be possible. Forecast intense rainfall for rivers that respond very rapidly. Forecasts of high tides, surges or strong winds. 	 Triggers High tides, surges coupled with strong winds. Heavy rainfall forecast to cause flash flooding of rivers. Forecast flooding from rivers. 	 Triggers Actual flooding where the conditions pose a significant risk to life and/or widespread disruption to communities. On-site observations from flooded locations. A breach in defences or failure of a barrier that is likely to cause significant risk to life. Discussions with partners. 	 Triggers Risk of flooding has passed. River or sea levels have dropped back below severe flood warning or flood warning levels. No further flooding is expected. Professional judgment and discussions with partners agree that a severe flood warning status is no longer needed.
Impact on the ground Maps will show one of four levels of risk for each county: • Green = no risk of flooding • Yellow = low risk of flooding • Amber = medium risk of flooding • Red = high risk of flooding	 Impact on the ground Flooding of fields, recreation land and car parks. Flooding of minor roads. Flooding of farmland. Spray or wave overtopping on the coast. 	 Impact on the ground Flooding of homes and businesses. Flooding of rail infrastructure. Flooding of roads with major impacts. Significant waves and spray on the coast. Extensive flood plain inundation (including caravan parks or campsites). Flooding of major tourist/recreational attractions. 	 Impact on the ground Deep and fast flowing water. Debris in the water causing danger. Potential or observed collapse of buildings and structures. Communities isolated by flood waters. Critical infrastructure for communities disabled. Large number of evacuees. Military support. 	 Impact on the ground No new impacts expected from flooding, however there still may be: standing water following flooding; flooded properties; flooding or damaged infrastructure.
Advice to the public/media Check the forecast on our website. Remain aware of the impending weather conditions for your area.	 Advice to the public/media Be prepared to act on your flood plan. Prepare a flood kit of essential items. Avoid walking, cycling or driving through flood water. Farmers should consider moving livestock and equipment away from areas likely to flood. Call Floodline on 0845 988 1188 for up-to-date flooding information. Monitor local water levels on the Environment Agency website www.environment-agency.gov.uk. 	 Advice to the public/media Protect yourself, your family and help others. Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place. If you are caught in a flash flood, get to higher ground. Call Floodline on 0845 988 1188 for up-to-date information. 	 Advice to the public/media Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger. Call Floodline on 0845 988 1188 for up-to-date flooding information. 	 Advice to the public/media Be careful. Flood water may still be around for several days and could be contaminated. If you've been flooded, ring your insurance company as soon as possible.
 Advice to operational organisations The three-day forecast is the public facing version of the Flood Guidance Statement that category 1 and 2 responders receive. Advice for organisations varies depending on the level of flood risk and is provided on the Flood Guidance Statement issued by the Flood Forecasting Centre. 	 Advice to operational organisations Check your flood response plans to see how your organisation needs to respond. Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information. Dial into Flood Advisory Service teleconferences. Advise the public to call Floodline on 0845 988 1188 for up-to-date flooding information. Please report any flooding in your area to your local Environment Agency office. 	 Advice to operational organisations Check flood response plans for actions required at this stage. Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information. Advise the public to call Floodline on 0845 988 1188 for up-to-date flooding information. Please report any flooding in your area to your local Environment Agency office. 	 Advice to operational organisations Check flood response plans for actions required at this stage. Advise the public to put their safety first and to be ready to evacuate should the authorities decide it's needed. Develop clear messages for local communities and the public. 	 Advice to operational organisations Recovery phase will have started. Advise the public to call Floodline on 0845 988 1188 for advice on what to do if they have been affected by flooding.

Would you like to find out more about us, or about your environment?

Then call us on

08708 506 506 (Mon-Fri 8-6)

Approximate call costs: 8p plus 6p per minute (standard landline). Please note charges will vary across telephone providers.

email

enquiries@environment-agency.gov.uk

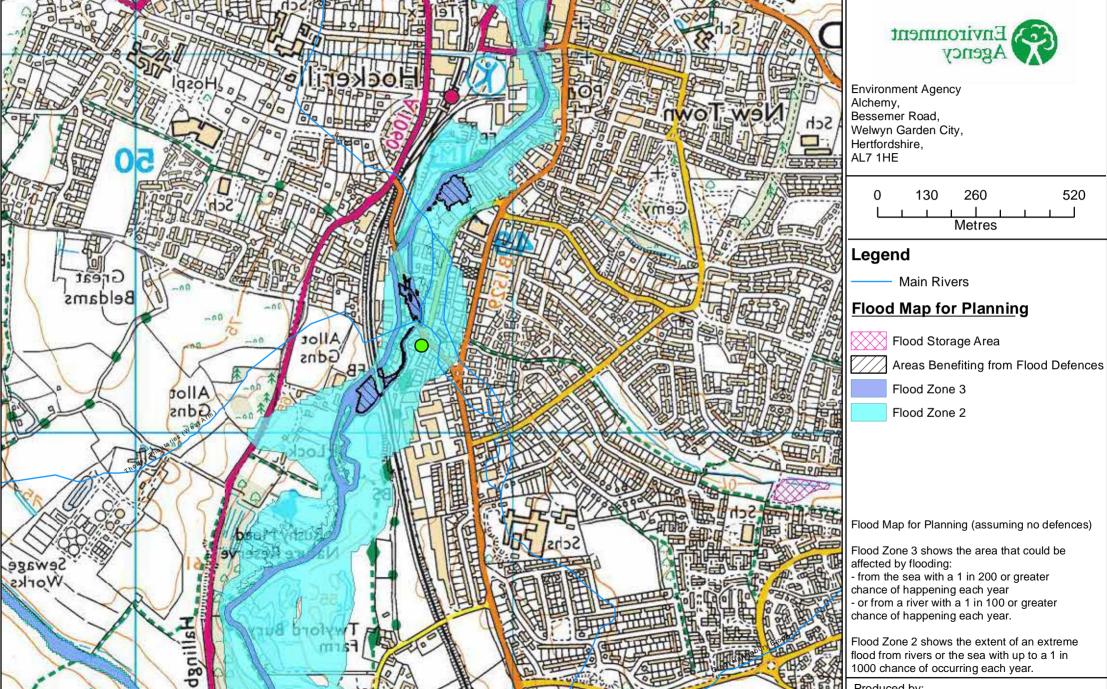
or visit our website

www.environment-agency.gov.uk

incident hotline 0800 80 70 60 (24hrs) floodline 0845 988 1188 (24hrs)

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Flood Map for Planning centred on Grove Cottage, Bishop's Stortford, Hertfordshire - 27/11/2017 - HNL67499AS

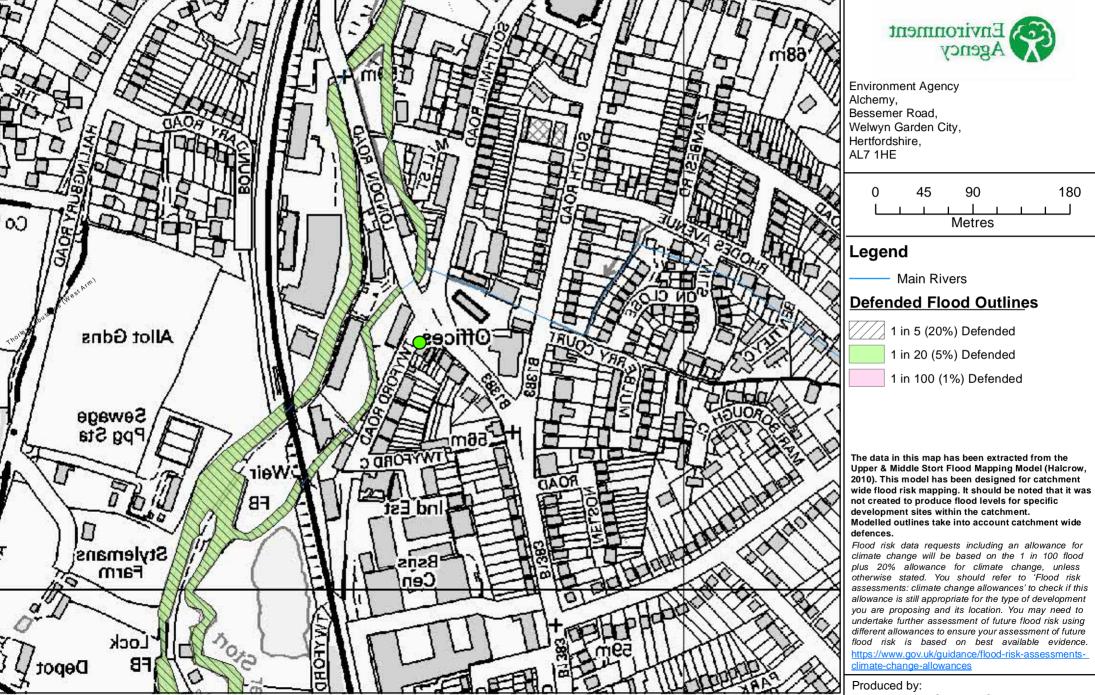


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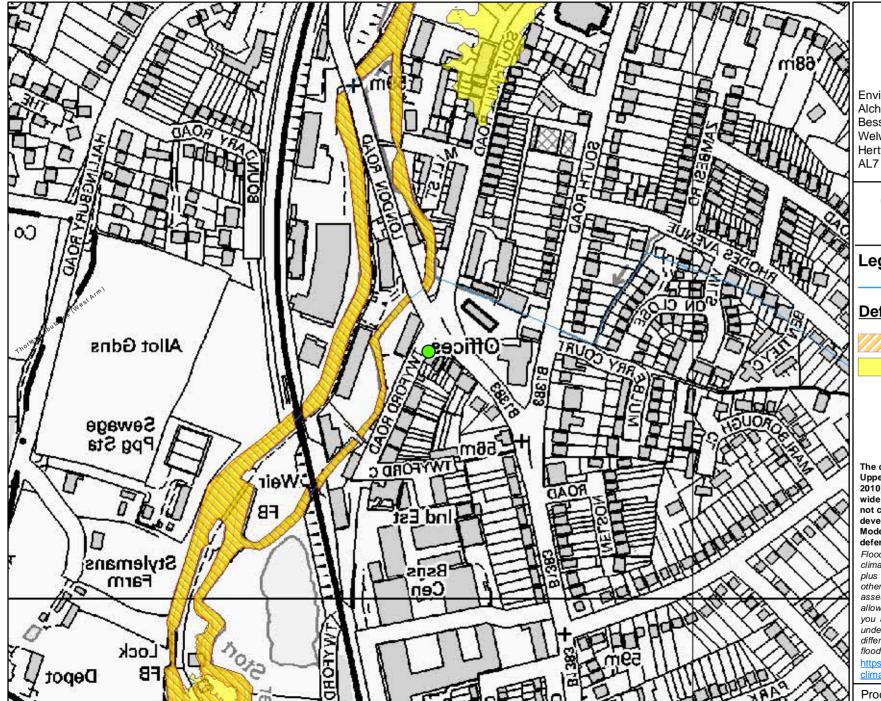
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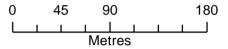
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Environment Agency Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE



Legend

Main Rivers

Defended Flood Outlines



1 in 100+20% (*CC) Defended

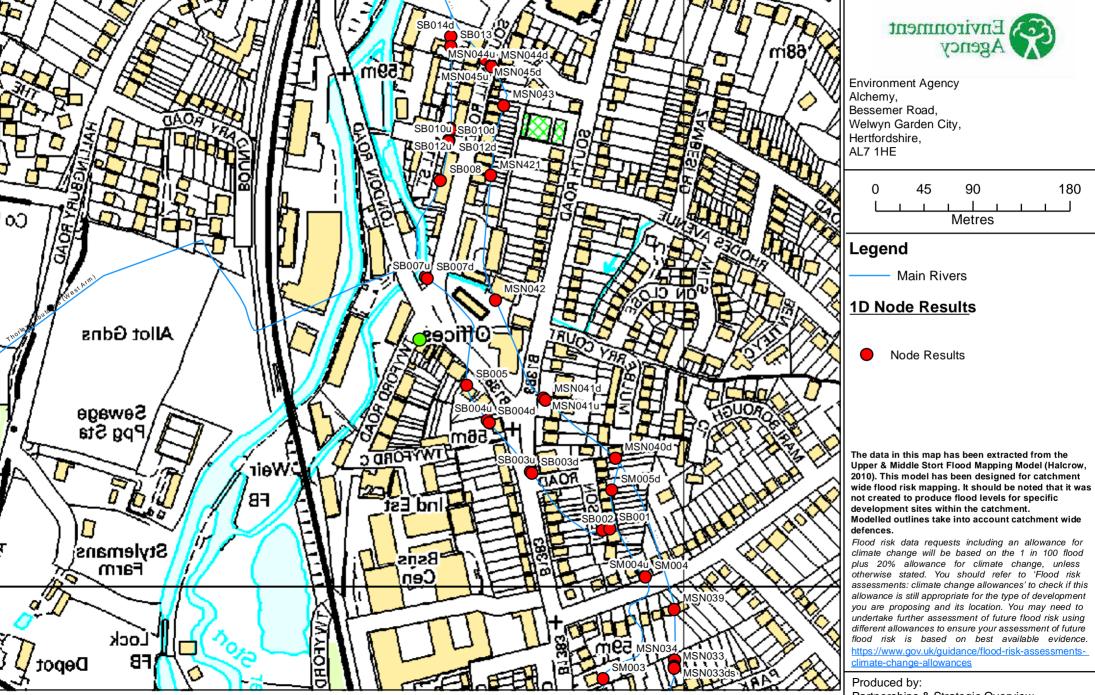
1 in 1000 (0.1%) Defended

The data in this map has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence. https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

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Detailed FRA centred on Grove Cottage, Bishop's Stortford, Hertfordshire - 27/11/2017 - HNL67499AS



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Environment Agency ref: HNL67499AS

The following information has been extracted from the Upper & Middle Stort Flood Mapping Model (Halcrow, 2010)

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Caution:

Although this is a detailed model, please be aware that it was not originally created to assess flood levels at particular development sites.

All flood levels are given in metres Above Ordnance Datum (mAOD) All flows are given in cubic metres per second (cumecs)

MODELLED FLOOD LEVEL

					Return Period					
Node Label	Easting	Northing	5 yr	10 yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSN045u	549304	220487	55.53	55.58	55.63	55.70	55.75	55.83	55.80	55.95
MSN045d	549305	220487	55.53	55.58	55.63	55.70	55.75	55.83	55.80	55.95
MSN044u	549310	220481	55.52	55.56	55.61	55.67	55.71	55.79	55.76	55.88
MSN044d	549311	220480	55.52	55.56	55.61	55.67	55.71	55.79	55.76	55.88
MSN043	549322	220444	55.52	55.56	55.62	55.67	55.72	55.80	55.77	55.91
MSN421	549310	220379	55.51	55.55	55.60	55.65	55.70	55.77	55.74	55.86
MSN042	549314	220264	55.49	55.53	55.57	55.62	55.66	55.71	55.69	55.79
MSN041u	549359	220173	55.49	55.52	55.57	55.61	55.65	55.70	55.68	55.78
MSN041d	549361	220171	55.49	55.52	55.57	55.61	55.65	55.70	55.68	55.78
MSN040u	549425	220118	55.48	55.51	55.55	55.58	55.62	55.66	55.64	55.73
MSN040d	549426	220117	55.48	55.51	55.55	55.58	55.62	55.66	55.64	55.73
MSN039	549480	219977	55.48	55.51	55.55	55.58	55.62	55.66	55.64	55.73
MSN034	549480	219931	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
MSN033us	549480	219925	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
MSN033	549480	219924	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
MSN033ds	549480	219923	54.11	54.17	54.24	54.31	54.38	54.47	54.43	54.61
SB014d	549273	220508	55.53	55.58	55.63	55.69	55.75	55.83	55.80	55.95
SB013	549273	220499	55.53	55.58	55.63	55.69	55.75	55.83	55.80	55.94
SB012u	549273	220423	55.53	55.57	55.63	55.69	55.74	55.82	55.79	55.93
SB012d	549272	220421	55.52	55.57	55.62	55.68	55.73	55.80	55.77	55.91

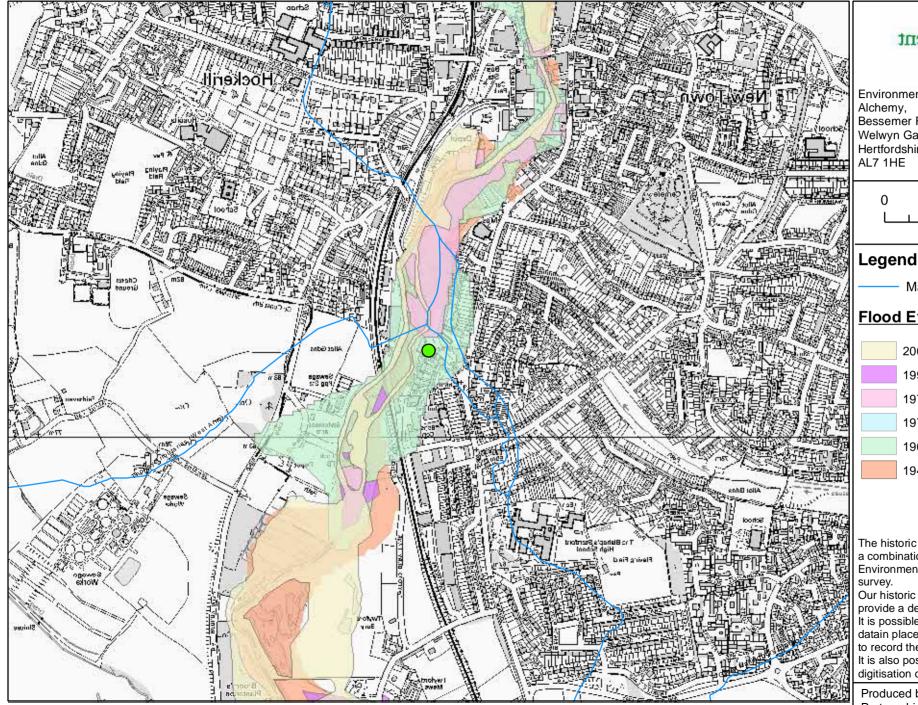
Node Label	Easting	Northing	5 yr	10 yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
SB010u	549271	220412	55.52	55.57	55.62	55.68	55.73	55.80	55.77	55.91
SB010d	549271	220410	54.31	54.37	54.45	54.53	54.61	54.73	54.68	54.90
SB008	549263	220374	54.30	54.36	54.44	54.53	54.61	54.73	54.68	54.90
SB007u	549249	220285	54.26	54.33	54.40	54.49	54.57	54.69	54.64	54.86
SB007d	549251	220284	54.26	54.33	54.40	54.49	54.57	54.69	54.64	54.86
SB005	549288	220185	54.21	54.28	54.36	54.45	54.54	54.66	54.61	54.83
SB004u	549307	220153	54.20	54.27	54.35	54.44	54.52	54.64	54.59	54.82
SB004d	549309	220150	54.20	54.27	54.35	54.44	54.52	54.64	54.59	54.82
SB003u	549347	220105	54.18	54.25	54.34	54.43	54.51	54.63	54.58	54.81
SB003d	549348	220103	54.18	54.25	54.34	54.43	54.51	54.63	54.58	54.81
SB002	549414	220051	54.17	54.24	54.33	54.42	54.50	54.62	54.57	54.80
SB001	549421	220052	54.18	54.25	54.33	54.42	54.51	54.63	54.58	54.80
SM005d	549422	220088	54.20	54.28	54.37	54.47	54.56	54.69	54.64	54.88
SM004u	549453	220008	54.18	54.25	54.33	54.42	54.51	54.63	54.58	54.80
SM004	549453	220007	54.18	54.25	54.33	54.42	54.51	54.63	54.58	54.80
SM003	549414	219913	54.12	54.18	54.25	54.32	54.39	54.49	54.44	54.62

MODELLED FLOWS

					Return Period					
Node Label	Easting	Northing	5 yr	10 yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSN045u	549304	220487	11.25	13.25	15.72	18.39	20.85	24.52	23.01	29.89
MSN045d	549305	220487	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.39
MSN044u	549310	220481	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN044d	549311	220480	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN043	549322	220444	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.39
MSN421	549310	220379	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38

Node Label	Easting	Northing	5 yr	10 yr	20yr	50yr	100yr	100yr +20%	200yr	1000yr
MSN042	549314	220264	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN041u	549359	220173	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN041d	549361	220171	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN040u	549425	220118	10.13	11.91	14.08	16.43	18.58	21.77	20.46	26.38
MSN040d	549426	220117	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.33
MSN039	549480	219977	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
MSN034	549480	219931	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
MSN033us	549480	219925	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
MSN033	549480	219924	0.30	0.31	0.30	0.30	0.30	0.30	0.30	0.31
MSN033ds	549480	219923	11.34	13.34	15.82	18.52	21.01	24.72	23.18	30.14
SB014d	549273	220508	1.12	1.35	1.63	1.96	2.27	2.75	2.55	3.50
SB013	549273	220499	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB012u	549273	220423	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB012d	549272	220421	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB010u	549271	220412	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB010d	549271	220410	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB008	549263	220374	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB007u	549249	220285	1.12	1.34	1.63	1.96	2.27	2.75	2.55	3.50
SB007d	549251	220284	1.34	1.58	1.88	2.20	2.57	3.09	2.88	3.98
SB005	549288	220185	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB004u	549307	220153	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB004d	549309	220150	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB003u	549347	220105	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB003d	549348	220103	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB002	549414	220051	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SB001	549421	220052	1.34	1.58	1.88	2.20	2.56	3.09	2.88	3.97
SM005d	549422	220088	9.83	11.61	13.79	16.15	18.30	21.50	20.18	26.12
SM004u	549453	220008	9.83	11.62	13.79	16.15	18.30	21.50	20.18	26.12
SM004	549453	220007	11.05	13.05	15.53	18.24	20.73	24.44	22.91	29.87
SM003	549414	219913	11.05	13.05	15.53	18.24	20.73	24.44	22.91	29.87

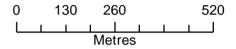
Historic Flood Map centred on Grove Cottage, Bishop's Stortford, Hertfordshire - 27/11/2017 - HNL67499AS



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Environment Agency

Environment Agency Bessemer Road, Welwyn Garden City, Hertfordshire,



Main Rivers

Flood Event Outlines



The historic flood event outlines are based on a combination of anecdotal evidence, Environment Agency staff observations and

Our historic flood event outlines do not provide a definitive record of flooding. It is possible that there will be an absence of datain places where we have not been able to record the extent of flooding. It is also possible for errors occur in the digitisation of historic records of flooding.

Produced by:

Structures and Defences centred on Grove Cottage, Bishop's Stortford, Hertfordshire - 27/11/2017 - HNL67499AS Environment Agency 759m **Environment Agency** Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire. AL7 1HE 45 90 180 Metres Legend Main Rivers **ASSET ID** 203991 Allot Gdns FOffices NAFRA_DEFENCE ASSET_ID 12778 Sewage Ppg Sta 12929 (56m) 41742 TWYFORD C ⊋Weir 41814 41815 Ind Est 42062 42085 Stylemans Bans 115778 Farm Cen/ The following information on defences Lock has been extracted from the Asset Information Management System Depor (AIMS) Produced by:

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Structures and Defences centred on Grove Cottage, Bishop's Stortford, Hertfordshire - 27/11/2017 - HNL67499AS Environment Agency 759m **Environment Agency** Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire. AL7 1HE 45 90 180 Metres Legend Main Rivers NAFRA DEFENCE **ASSET ID** Allot Gdns 127673 130515 130516 Sewage Ppg Sta 130994 ,56m<u>)</u>, TWYFORD C 130995 ⊋Weir 131572 133249 d Ind Est 162590 164065 Stylemans Bans Farm Cen/ The following information on defences Lock has been extracted from the Asset Information Management System Depor (AIMS) Produced by:

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Environment Agency ref: HNL67499AS

The following information on defences has been extracted from the Asset Information Management System (AIMS)

Defences

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
131572	high_ground	fluvial	Steel sheet piling with concrete capping beam. River bank has stone pitching back to tow path level. O & M Manual 51/2.	Natural Bank/ steel sheet piling. SOP est. by Ian Davis.	50	56.13	56.38	3
133249	high_ground	fluvial	steel sheet piling with concrete capping and stone bank protection. O & M Manual 52/1.	Natural Bank/ steel sheet piling SOP est. by Ian Davis.	2	56.22	56.23	3
162590	high_ground	fluvial	Natural bank with rock revetment	Natural Bank	100	54.99	56.32	2
164065	high_ground	fluvial	Bank lined with steel piling and rip-rap stonework to channel side.	low-level piles with 45 degree rip-rap concrete and rock channel side lining.	200	55.01	56.31	2
12929	embankment	fluvial	Earth embankment forms towpath. 0.5- 1.2m above adj ground level. Bank defends populated area with flat development adjacent on land side. Concrete crest sections with canoe access platform	London Road Flood Embankment SOP	200	55.88	57.92	3

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
41742	embankment	fluvial	Double height gabion baskets forming revetment channel side with self set trees, then changes to timber revetment, also with trees.	Mill Street Flood Bank protection. SOP est. by Ian Davis.	100	55.3	55.82	3
41815	wall	fluvial	Man-made raised embankment wall with defending height of 800mm. O & M manual 51/2.	Southmill Road Flood Wall	1000	56.97	56.97	4
42062	high_ground	fluvial	Earth embankment with self set vegetation and tarmac towpath to crest. O & M Manual 51/2. 22-01-10 AP Changed to Raised defence (natural) TC 3	London Road LB Embankment SOP est. by Ian Davis.	200	56.52	56.62	5
12778	embankment	fluvial	Earth embankment with self set vegetation. O & M Manual 51/2.	Southmill Road Flood Embankment SOP est. by Ian Davis.	200	56.13	56.65	4
127673	high_ground	fluvial	Natural earth defence.	Natural Bank.	40	<null></null>	<null></null>	3
115778	high_ground	fluvial	Mixture of culverts, earth channel side and variety of materials to channel side in rear gardens	Natural Bank.	40	<null></null>	<null></null>	3
130516	high_ground	fluvial	Natural earth defence.	Natural Bank.	200	55.49	56.96	3
130515	high_ground	fluvial	Natural earth defence.	Natural Bank.	20	54.71	56.36	3
130994	high_ground	fluvial	Natural earth defence.	Natural Bank.	2	54.53	54.38	3

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
130995	high_ground	fluvial	Approximately 30 metres of steel sheet piling immediately downstream of Southmill lock then natural earth defence. O & M Manual 52/1.	Natural Bank/steel sheet piling. SOP est. by Ian Davis.	2	54.33	56.12	3
41814	embankment	fluvial	Well vegetated earth embankment.	EMBANKMENT Southmill Embankment SOP est. by Ian Davis.	1000	56.31	56.31	2
42085	high_ground	fluvial	2.5m high earth embankment well vegetated with consistent crest level. Trees to bank. Bank forms right bank of perched navigation channel. Boats moor to lower backwater below bank. 13-01-10 AP Changed to NFDS, TC 9 - agreed ASG	Southmill Lock Embankment SOP est. by Ian Davis.	200	56.25	<null></null>	3

Structures

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Condition of Structures (1=Good, 5 = Poor)
203991	control_gate	fluvial	4No manually operated steel lock gates. Insitu concrete channel sides. Footbridge to DS end. O & M Manual 52/1. Gates replaced within last 5 years.	SLUICE GATE Southmill Lock	3





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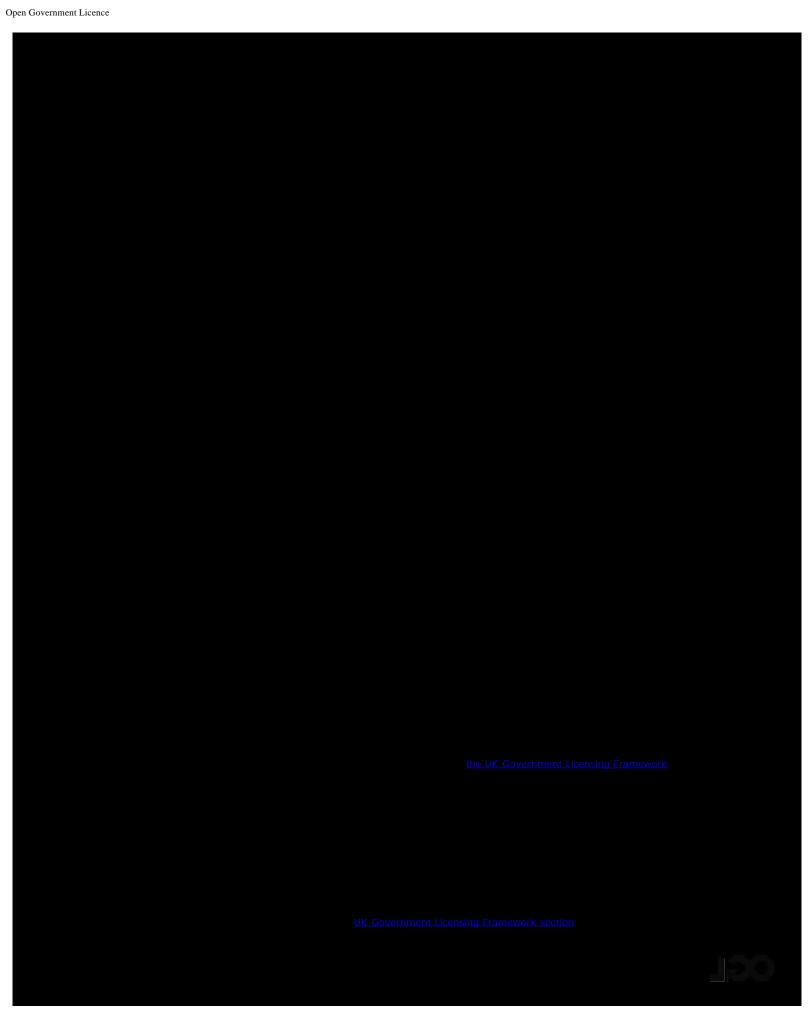












Appendix D

BGS BOREHOLE LOGS



BGS ID: 539976 : BGS Reference: TL41NE1 British National Grid (27700) : 549240,219780

Report an issue with this borehole

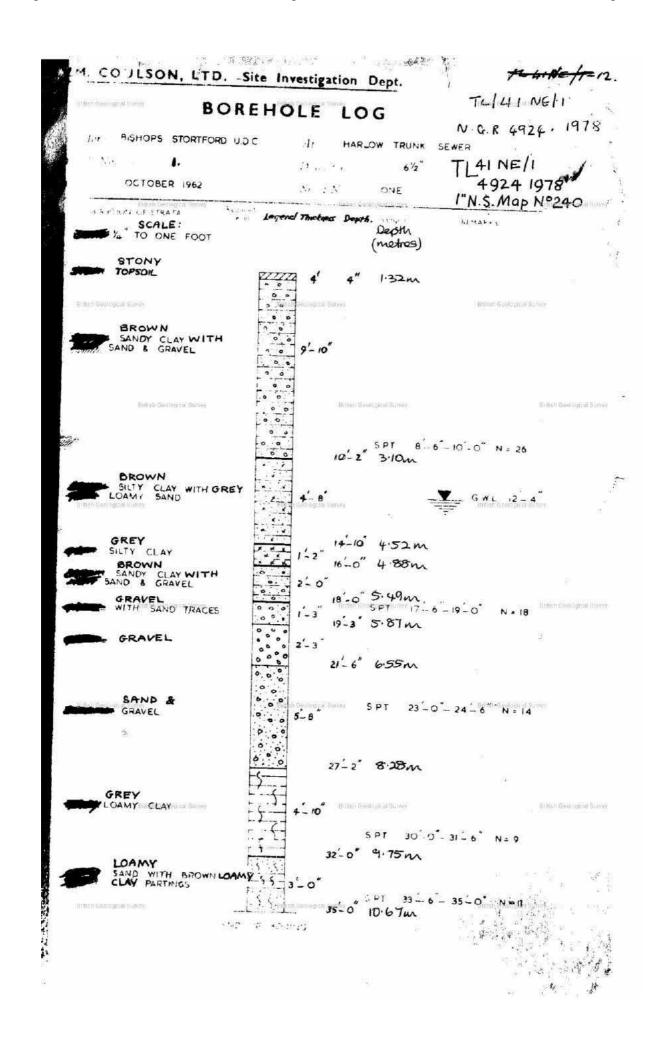
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BGS ID: 541423 : BGS Reference: TL42SE178 British National Grid (27700) : 548960,220770

Report an issue with this borehole

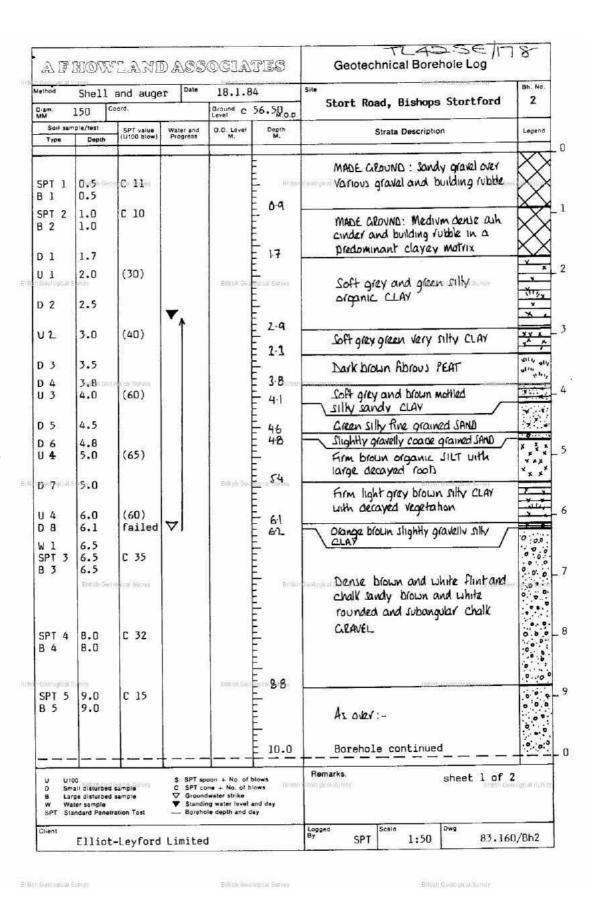
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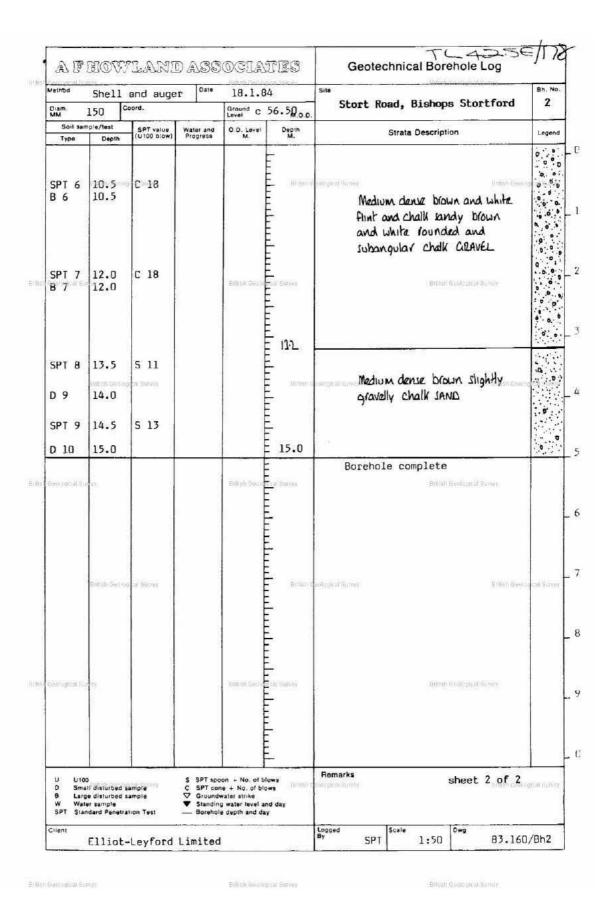
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Appendix E

HERTFORDSHIRE COUNTY COUNCIL LLFA CORRESPONDENCE

Forsdyke, James

From: James Lester on behalf of Flood and Water

Management <

Sent: 09 November 2017 17:16

To: Forsdyke, James

Cc: Flood and Water Management

Subject: RE: LLFA Flood Risk Enquiry - Grove Cottage, Bishop's Stortford, Hertfordshire

James

For a complete record of reported road flooding, please contact the Highway Authority. We can see that the Chief Executive of Grove Cottage reported as a fault to the Highway Authority on 26/11/2014 that the corner of London Road and Twyford Road is consistently flooded for days even after modest rainfall.

The LLFA flood incident record has no information on flooding in this area. No records does not mean no flooding.

There is nearby to your site the River Stort which is a main river. To the north is another main river which is a tributary of the Stort. The LLFA does not have a record of any ordinary watercourses in the nearby area.

We do not hold information on ground water.

Kind regards, James

James Lester

Investigations Officer, Lead Local Flood Authority [HCC]

Postal Point CHN215

Hertfordshire County Council, County Hall, Pegs Lane, Hertford, SG13 8DN

From: Forsdyke, James [mailto Sent: 07 November 2017 10:0]
To: Flood and Water Management

Cc: Berryman, James

Subject: LLFA Flood Risk Enquiry - Grove Cottage, Bishop's Stortford, Hertfordshire

Dear Sir/Madam

Grove Cottage, Bishop's Stortford, Hertfordshire

Grid Reference: 549244, 220227 Request for Information

I am writing on behalf of our client, with regard to the proposed development at Grove Cottage, Bishop's Stortford, Hertfordshire. Please find attached a location plan indicating the site location. As part of a Flood Risk Assessment we are investigating potential flood risk issues at the site in consultation with the Environment Agency and the Water Company. I would be very grateful for your attention to the questions below, and in addition would welcome comments on any additional issues or concerns you may have involving these sites.

1. In your role of highway drainage authority, we would be grateful if you could provide us with:

- Details of any known flooding events of the roads or highway drainage in the area, and details on the history of flooding within the area if available;
- Any available asset records for the existing highway drainage in the area.

2. In your role as lead local flood authority, we would be grateful for any information you can provide on:

- Any known historical flooding at the site. Any known information on the mechanism of flooding (including any studies undertaken) for the area would also be appreciated;
- Any watercourses/ditches that are within the area that may pose a flood risk to the sites? Could you please supply any known contact details of the relevant responsible authority (for example the Internal Drainage Board);
- Any issues related to surface water flooding (including past flooding linked to drainage systems) within the area? We have also contacted the EA/Water Company for their records;
- Any information you possess on groundwater (e.g. groundwater level) and the potential for groundwater flooding within the area, if the site is located within a source protection zone and whether infiltration would be an appropriate means of disposing of surface water.
- Any water quality issues/requirements for the watercourses on site or downstream that we need to take into account?

An early response would be greatly appreciated.

Kind regards

James Forsdyke

Graduate Engineer



Unit 9 The Chase, Foxholes Business Park, Hertford, SG13 7NN.

wsp.com

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Appendix F

GREENFIELD RUNOFF RATES



Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: James Forsdyke

Site name: Grove Cottage

Site location: Bishop's Stortford, Hertfordshire

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude: 51.86066° N

Longitude: 0.16587° E

Reference: 6196027

Date: 2017-12-07T15:02:05

Methodology	IH124
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Site characteristics

Total site area (ha)	1
----------------------	---

Methodology

Qbar estimation method	Calculate from SPR and SAAR				
SPR estimation method	Calculate from SOIL type				
		Default	Edited		
SOIL type		2	2		
HOST class					
SPR/SPRHOST	0.3	0.3			

01 11/01 11/1001	0.0	0.0
Hydrological characteristics	Default	Edited
SAAR (mm)	601	601
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

(1) Is $Q_{BAR} < 2.0 \text{ l/s/ha}$?

Normally limiting discharge rates which are less than 2.0 l/s/ha are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3 ?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite may be a requirement for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Qbar (I/s)	1.52	1.52
1 in 1 year (l/s)	1.3	1.3
1 in 30 years (l/s)	3.51	3.51
1 in 100 years (I/s)	4.86	4.86

Appendix G

MICRODRAINAGE SOURCE CONTROL CALCULATIONS

WSP Group Ltd	Page 1	
	Engineer	
		Micro
Date 13/07/2022	Designed by MSF	Drainage
File Attenuation_FILTER 100	Checked by SM	Dialilade
XP Solutions	Source Control 2019.1	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 21 minutes.

	Storm	Max	Max	Max	Max	M	ax	Max	Status
	Event	Level	Depth	Infiltration	Control	ΣOu	tflow	Volume	
		(m)	(m)	(1/s)	(1/s)	(1	/s)	(m³)	
1.5	min Summe	er 55.095	1.615	0.0	4.5		4.5	7.7	O K
30	min Summe	er 55.202	1.722	0.0	4.7		4.7	8.2	O K
60	min Summe	er 55.103	1.623	0.0	4.5		4.5	7.7	O K
120	min Summe	er 54.781	1.301	0.0	4.1		4.1	6.2	O K
180	min Summe	er 54.466	0.986	0.0	4.1		4.1	4.7	O K
240	min Summe	er 54.085	0.605	0.0	4.1		4.1	2.9	O K
360	min Summe	er 53.741	0.261	0.0	4.0		4.0	1.2	O K
480	min Summe	er 53.627	0.147	0.0	3.5		3.5	0.7	O K
600	min Summe	er 53.588	0.108	0.0	3.1		3.1	0.5	O K
720	min Summe	er 53.573	0.093	0.0	2.7		2.7	0.4	O K
960	min Summe	er 53.555	0.075	0.0	2.1		2.1	0.4	O K
1440	min Summe	er 53.540	0.060	0.0	1.5		1.5	0.3	O K
2160	min Summe	er 53.529	0.049	0.0	1.1		1.1	0.2	O K
2880	min Summe	er 53.523	0.043	0.0	0.9		0.9	0.2	O K
4320	min Summe	er 53.516	0.036	0.0	0.6		0.6	0.2	O K
5760	min Summe	er 53.511	0.031	0.0	0.5		0.5	0.2	O K
7200	min Summe	er 53.508	0.028	0.0	0.4		0.4	0.1	O K
8640	min Summe	er 53.506	0.026	0.0	0.3		0.3	0.1	O K
10080	min Summe	er 53.505	0.025	0.0	0.3		0.3	0.1	O K
15	min Winte	er 55.342	1.862	0.0	4.8		4.8	8.9	ОК

Storm		Rain	Flooded	Discharge	Time-Peak	
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
15	min	Summer	143.169	0.0	11.0	15
30	min	Summer	92.371	0.0	14.2	24
60	min	Summer	56.713	0.0	17.4	42
120	min	Summer	33.671	0.0	20.7	76
180	min	Summer	24.520	0.0	22.6	108
240	min	Summer	19.481	0.0	24.0	136
360	min	Summer	14.011	0.0	25.8	190
480	min	Summer	11.097	0.0	27.3	248
600	min	Summer	9.254	0.0	28.5	306
720	min	Summer	7.976	0.0	29.4	366
960	min	Summer	6.303	0.0	31.0	486
1440	min	Summer	4.519	0.0	33.3	716
2160	min	Summer	3.235	0.0	35.8	1092
2880	min	Summer	2.550	0.0	37.6	1440
4320	min	Summer	1.821	0.0	40.3	2144
5760	min	Summer	1.433	0.0	42.3	2920
7200	min	Summer	1.190	0.0	43.9	3576
8640	min	Summer	1.022	0.0	45.2	4400
10080	min	Summer	0.898	0.0	46.4	5104
15	min	Winter	143.169	0.0	12.3	16

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•		Mirm
Date 13/07/2022	Designed by MSF	Drainage
File Attenuation_FILTER 100	Checked by SM	Dialilade
XP Solutions	Source Control 2019.1	

Summary of Results for 100 year Return Period (+40%)

Storm Event			Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Σ	Max Outflow (1/s)	Max Volume (m³)	Status
30	min V	Winter	55.469	1.989	0.0	5.0		5.0	9.5	ОК
60	min V	Winter	55.303	1.823	0.0	4.8		4.8	8.7	ОК
120	min V	Winter	54.808	1.328	0.0	4.1		4.1	6.3	ОК
180	min V	Winter	54.266	0.786	0.0	4.1		4.1	3.7	ОК
240	min V	Winter	53.820	0.340	0.0	4.1		4.1	1.6	ОК
360	min V	Winter	53.603	0.123	0.0	3.3		3.3	0.6	ОК
480	min V	Winter	53.573	0.093	0.0	2.7		2.7	0.4	ОК
600	min V	Winter	53.559	0.079	0.0	2.2		2.2	0.4	ОК
720	min V	Winter	53.551	0.071	0.0	1.9		1.9	0.3	O K
960	min V	Winter	53.540	0.060	0.0	1.5		1.5	0.3	O K
1440	min V	Winter	53.529	0.049	0.0	1.1		1.1	0.2	O K
2160	min V	Winter	53.521	0.041	0.0	0.8		0.8	0.2	O K
2880	min V	Winter	53.516	0.036	0.0	0.6		0.6	0.2	O K
4320	min V	Winter	53.510	0.030	0.0	0.4		0.4	0.1	O K
5760	min V	Winter	53.506	0.026	0.0	0.3		0.3	0.1	O K
7200	min V	Winter	53.504	0.024	0.0	0.3		0.3	0.1	O K
8640	min V	Winter	53.502	0.022	0.0	0.3		0.3	0.1	O K
10080	min V	Winter	53.501	0.021	0.0	0.2		0.2	0.1	O K

Storm			Rain	Flooded	Discharge	Time-Peak
	Even	t	(mm/hr)	Volume	Volume	(mins)
				(m³)	(m³)	
30	min	Winter	92.371	0.0	15.9	25
60	min	Winter	56.713	0.0	19.5	44
120	min	Winter	33.671	0.0	23.2	80
180	min	Winter	24.520	0.0	25.3	116
240	min	Winter	19.481	0.0	26.8	136
360	min	Winter	14.011	0.0	28.9	188
480	min	Winter	11.097	0.0	30.6	246
600	min	Winter	9.254	0.0	31.9	306
720	min	Winter	7.976	0.0	33.0	360
960	min	Winter	6.303	0.0	34.7	476
1440	min	Winter	4.519	0.0	37.3	710
2160	min	Winter	3.235	0.0	40.1	1084
2880	min	Winter	2.550	0.0	42.1	1436
4320	min	Winter	1.821	0.0	45.2	2164
5760	min	Winter	1.433	0.0	47.4	2928
7200	min	Winter	1.190	0.0	49.2	3608
8640	min	Winter	1.022	0.0	50.7	4480
10080	min	Winter	0.898	0.0	52.0	5088

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	Engineer				
		Mirro			
Date 13/07/2022	Designed by MSF	Drainage			
File Attenuation_FILTER 100	Checked by SM	Diali lade			
XP Solutions	Source Control 2019.1				

Model Details

Storage is Online Cover Level (m) 55.780

Cellular Storage Structure

Invert Level (m) 53.480 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.000)	15.9			0.0	2.	.300		15.9			0.0
2.000)	15.9			0.0							

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0092-5000-2000-5000 Design Head (m) 2.000 Design Flow (1/s) 5.0 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 92 Invert Level (m) 53.480 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200

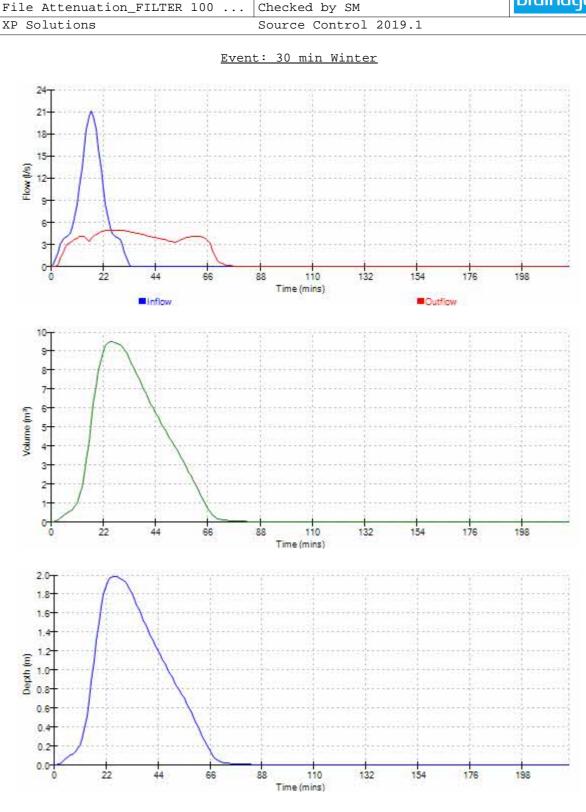
Control Points	Head (m)	Flow (1/s)
Design Point (Calculat	zed) 2.000	5.0
Flush-F	Flo™ 0.398	4.1
Kick-F	Flo® 0.816	3.3
Mean Flow over Head Ra	ange -	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (1/s)	Depth (m) Flow	w (1/s)	Depth (m) Flow	v (1/s)	Depth (m)	Flow (1/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

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· -		Micro
Date 13/07/2022	Designed by MSF	Drainage
File Attenuation_FILTER 100	Checked by SM	Diali lade
XP Solutions	Source Control 2019.1	



WSP Group Ltd				
	Engineer	Micco		
Date 13/07/2022	Designed by MSF	Drainane		
File Attenuation_FILTER 30.SRCX	Checked by SM	Dialilads		
XP Solutions	Source Control 2019.1			

Summary of Results for 30 year Return Period

Half Drain Time : 9 minutes.

	Storm Event		Max Level (m)	Max Depth (m)	Max Infiltratio (1/s)	Max n Control (1/s)	Σ Οι	Max utflow L/s)	Max Volume (m³)	Status
15	min Su	ummer	54.207	0.727	0.	0 4.1		4.1	3.5	O K
30	min Su	ummer	54.205	0.725	0.	0 4.1		4.1	3.5	O K
60	min Su	ummer	54.051	0.571	0.	0 4.1		4.1	2.7	O K
120	min Su	ummer	53.791	0.311	0.	0 4.1		4.1	1.5	O K
180	min Su	ummer	53.661	0.181	0.	0 3.7		3.7	0.9	O K
240	min Su	ummer	53.602	0.122	0.	0 3.3		3.3	0.6	O K
360	min Su	ımmer	53.568	0.088	0.	0 2.5		2.5	0.4	O K
480	min Su	ımmer	53.553	0.073	0.	0 2.0		2.0	0.4	O K
600	min Su	ımmer	53.545	0.065	0.	0 1.7		1.7	0.3	O K
720	min Su	ummer	53.539	0.059	0.	0 1.5		1.5	0.3	O K
960	min Su	ummer	53.531	0.051	0.	0 1.2		1.2	0.2	O K
1440	min Su	ummer	53.523	0.043	0.	0.9		0.9	0.2	O K
2160	min Su	ummer	53.516	0.036	0.	0.6		0.6	0.2	O K
2880	min Su	ummer	53.511	0.031	0.	0 0.5		0.5	0.2	O K
4320	min Su	ımmer	53.506	0.026	0.	0 0.3		0.3	0.1	O K
5760	min Su	ummer	53.503	0.023	0.	0 0.3		0.3	0.1	O K
7200	min Su	ummer	53.501	0.021	0.	0 0.2		0.2	0.1	O K
8640	min Su	ımmer	53.500	0.020	0.	0 0.2		0.2	0.1	O K
10080	min Su	ummer	53.498	0.018	0.	0 0.2		0.2	0.1	O K
15	min Wi	inter	54.342	0.862	0.	0 4.1		4.1	4.1	O K

	Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15	min	Summer	78.700	0.0	6.0	14
30	min	Summer	50.384	0.0	7.7	22
60	min	Summer	30.811	0.0	9.5	38
120	min	Summer	18.296	0.0	11.2	68
180	min	Summer	13.357	0.0	12.3	96
240	min	Summer	10.644	0.0	13.1	124
360	min	Summer	7.699	0.0	14.2	184
480	min	Summer	6.118	0.0	15.0	244
600	min	Summer	5.117	0.0	15.7	302
720	min	Summer	4.420	0.0	16.3	364
960	min	Summer	3.507	0.0	17.3	488
1440	min	Summer	2.528	0.0	18.7	734
2160	min	Summer	1.821	0.0	20.2	1100
2880	min	Summer	1.442	0.0	21.3	1448
4320	min	Summer	1.037	0.0	23.0	2196
5760	min	Summer	0.820	0.0	24.2	2888
7200	min	Summer	0.684	0.0	25.2	3632
8640	min	Summer	0.589	0.0	26.1	4344
10080	min	Summer	0.519	0.0	26.8	5112
15	min	Winter	78.700	0.0	6.8	15

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Date 13/07/2022	Designed by MSF	Drainage
File Attenuation_FILTER 30.SRCX	Checked by SM	Dialilade
XP Solutions	Source Control 2019.1	

Summary of Results for 30 year Return Period

	Storm Event		Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	ration Control Σ Outflow		Max Volume (m³)	Status
30	min V	Winter	54.315	0.835	0.0	4.1	4.1	4.0	O K
60	min V	Winter	54.040	0.560	0.0	4.1	4.1	2.7	O K
120	min V	Winter	53.693	0.213	0.0	3.9	3.9	1.0	O K
180	min V	Winter	53.592	0.112	0.0	3.2	3.2	0.5	O K
240	min V	Winter	53.569	0.089	0.0	2.6	2.6	0.4	ОК
360	min V	Winter	53.549	0.069	0.0	1.9	1.9	0.3	ОК
480	min V	Winter	53.539	0.059	0.0	1.5	1.5	0.3	ОК
600	min V	Winter	53.533	0.053	0.0	1.2	1.2	0.3	ОК
720	min V	Winter	53.529	0.049	0.0	1.1	1.1	0.2	ОК
960	min V	Winter	53.523	0.043	0.0	0.9	0.9	0.2	ОК
1440	min V	Winter	53.516	0.036	0.0	0.6	0.6	0.2	ОК
2160	min V	Winter	53.510	0.030	0.0	0.4	0.4	0.1	ОК
2880	min V	Winter	53.506	0.026	0.0	0.3	0.3	0.1	ОК
4320	min V	Winter	53.502	0.022	0.0	0.3	0.3	0.1	ОК
5760	min V	Winter	53.500	0.020	0.0	0.2	0.2	0.1	ОК
7200	min V	Winter	53.498	0.018	0.0	0.2	0.2	0.1	ОК
8640	min V	Winter	53.497	0.017	0.0	0.1	0.1	0.1	ОК
0800	min V	Winter	53.496	0.016	0.0	0.1	0.1	0.1	ОК

	Stor Even		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30	min	Winter	50.384	0.0	8.7	24
60	min	Winter	30.811	0.0	10.6	40
120	min	Winter	18.296	0.0	12.6	68
180	min	Winter	13.357	0.0	13.8	94
240	min	Winter	10.644	0.0	14.7	124
360	min	Winter	7.699	0.0	15.9	182
480	min	Winter	6.118	0.0	16.9	246
600	min	Winter	5.117	0.0	17.6	308
720	min	Winter	4.420	0.0	18.3	362
960	min	Winter	3.507	0.0	19.3	478
1440	min	Winter	2.528	0.0	20.9	734
2160	min	Winter	1.821	0.0	22.6	1068
2880	min	Winter	1.442	0.0	23.8	1452
4320	min	Winter	1.037	0.0	25.7	2156
5760	min	Winter	0.820	0.0	27.1	2800
7200	min	Winter	0.684	0.0	28.3	3576
8640	min	Winter	0.589	0.0	29.2	4432
10080	min	Winter	0.519	0.0	30.0	5080

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	Engineer			
		Mirro		
Date 13/07/2022	Designed by MSF	Drainage		
File Attenuation_FILTER 30.SRCX	Checked by SM	Dialilade		
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Model Details

Storage is Online Cover Level (m) 55.780

Cellular Storage Structure

Invert Level (m) 53.480 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) 0.000 15.9 0.0 2.300 15.9 0.0 2.000 15.9

<u>Hydro-Brake® Optimum Outflow Control</u>

Unit Reference MD-SHE-0092-5000-2000-5000 Design Head (m) 2.000 5.0 Design Flow (1/s) Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 92 Invert Level (m) 53.480 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200

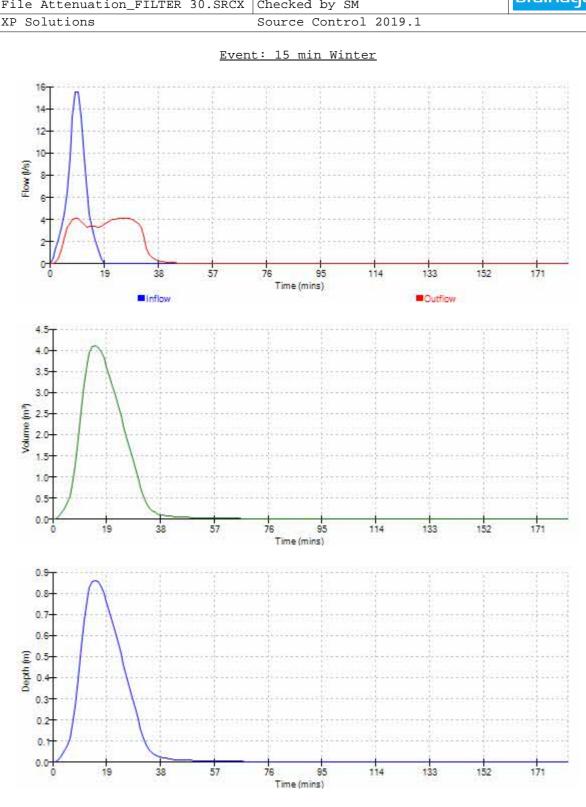
Control Points	Head (m)	Flow (1/s)
Design Point (Calculated)	2.000	5.0
Flush-Flo™	0.398	4.1
Kick-Flo®	0.816	3.3
Mean Flow over Head Range	_	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (1/s)	Depth (m) Flo	w (1/s)	Depth (m) Flow	(l/s)	Depth (m)	Flow (1/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

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		Mirro
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File Attenuation_FILTER 30.SRCX	Checked by SM	niamade
XP Solutions	Source Control 2019.1	•



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Date 13/07/2022	Designed by MSF	Drainage
File Attenuation_FILTER 1.SRCX	Checked by SM	niailiads
XP Solutions	Source Control 2019.1	

Summary of Results for 1 year Return Period

Half Drain Time : 2 minutes.

	Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15	min Summ	ner 53.671	0.191	0.0	3.8	3.8	0.9	ОК
30	min Summ	ner 53.649	0.169	0.0	3.7	3.7	0.8	O K
60	min Summ	ner 53.598	0.118	0.0	3.3	3.3	0.6	O K
120	min Summ	ner 53.563	0.083	0.0	2.4	2.4	0.4	O K
180	min Summ	ner 53.549	0.069	0.0	1.9	1.9	0.3	O K
240	min Summ	ner 53.540	0.060	0.0	1.5	1.5	0.3	O K
360	min Summ	mer 53.531	0.051	0.0	1.2	1.2	0.2	O K
480	min Summ	ner 53.525	0.045	0.0	0.9	0.9	0.2	O K
600	min Summ	ner 53.521	0.041	0.0	0.8	0.8	0.2	O K
720	min Summ	mer 53.518	0.038	0.0	0.7	0.7	0.2	O K
960	min Summ	ner 53.514	0.034	0.0	0.6	0.6	0.2	O K
1440	min Summ	ner 53.509	0.029	0.0	0.4	0.4	0.1	O K
2160	min Summ	ner 53.504	0.024	0.0	0.3	0.3	0.1	O K
2880	min Summ	ner 53.502	0.022	0.0	0.2	0.2	0.1	O K
4320	min Summ	ner 53.499	0.019	0.0	0.2	0.2	0.1	O K
5760	min Summ	ner 53.497	0.017	0.0	0.1	0.1	0.1	O K
7200	min Summ	ner 53.495	0.015	0.0	0.1	0.1	0.1	O K
8640	min Summ	ner 53.494	0.014	0.0	0.1	0.1	0.1	O K
10080	min Summ	ner 53.493	0.013	0.0	0.1	0.1	0.1	O K
15	min Wint	er 53.687	0.207	0.0	3.8	3.8	1.0	O K

Storm Event			Rain (mm/hr)		Discharge Volume (m³)	Time-Peak (mins)
15	min	Summer	32.060	0.0	2.5	12
30	min	Summer	20.597	0.0	3.2	19
60	min	Summer	12.800	0.0	3.9	34
120	min	Summer	7.782	0.0	4.8	64
180	min	Summer	5.786	0.0	5.3	94
240	min	Summer	4.682	0.0	5.8	124
360	min	Summer	3.465	0.0	6.4	184
480	min	Summer	2.785	0.0	6.8	244
600	min	Summer	2.350	0.0	7.2	306
720	min	Summer	2.046	0.0	7.5	366
960	min	Summer	1.644	0.0	8.1	488
1440	min	Summer	1.208	0.0	8.9	726
2160	min	Summer	0.888	0.0	9.8	1092
2880	min	Summer	0.714	0.0	10.5	1452
4320	min	Summer	0.524	0.0	11.6	2180
5760	min	Summer	0.421	0.0	12.4	2840
7200	min	Summer	0.355	0.0	13.1	3672
8640	min	Summer	0.309	0.0	13.7	4368
10080	min	Summer	0.275	0.0	14.2	5048
15	min	Winter	32.060	0.0	2.8	12

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Date 13/07/2022	Designed by MSF	Drainage
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XP Solutions	Source Control 2019.1	

Summary of Results for 1 year Return Period

Storm Event		Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control	Max Σ Outflow (1/s)	Max Volume (m³)	Status	
30	min V	Winter	53.640	0.160	0.0	3.6	3.6	0.8	ОК
60	min V	Winter	53.580	0.100	0.0	2.9	2.9	0.5	ОК
120	min V	Winter	53.548	0.068	0.0	1.8	1.8	0.3	ОК
180	min V	Winter	53.537	0.057	0.0	1.4	1.4	0.3	ОК
240	min V	Winter	53.530	0.050	0.0	1.1	1.1	0.2	ОК
360	min V	Winter	53.522	0.042	0.0	0.8	0.8	0.2	ОК
480	min V	Winter	53.518	0.038	0.0	0.7	0.7	0.2	O K
600	min V	Winter	53.514	0.034	0.0	0.6	0.6	0.2	O K
720	min V	Winter	53.512	0.032	0.0	0.5	0.5	0.2	O K
960	min V	Winter	53.508	0.028	0.0	0.4	0.4	0.1	O K
1440	min V	Winter	53.504	0.024	0.0	0.3	0.3	0.1	O K
2160	min V	Winter	53.501	0.021	0.0	0.2	0.2	0.1	ОК
2880	min V	Winter	53.498	0.018	0.0	0.2	0.2	0.1	O K
4320	min V	Winter	53.496	0.016	0.0	0.1	0.1	0.1	O K
5760	min V	Winter	53.494	0.014	0.0	0.1	0.1	0.1	O K
7200	min V	Winter	53.493	0.013	0.0	0.1	0.1	0.1	O K
8640	min V	Winter	53.492	0.012	0.0	0.1	0.1	0.1	O K
0800.	min V	Winter	53.491	0.011	0.0	0.1	0.1	0.1	ОК

Storm			Rain	Flooded	Discharge	Time-Peak	
Event			(mm/hr)	Volume	Volume	(mins)	
				(m³)	(m³)		
30	min	Winter	20.597	0.0	3.5	20	
60	min	Winter	12.800	0.0	4.4	34	
120	min	Winter	7.782	0.0	5.4	64	
180	min	Winter	5.786	0.0	6.0	94	
240	min	Winter	4.682	0.0	6.4	124	
360	min	Winter	3.465	0.0	7.2	186	
480	min	Winter	2.785	0.0	7.7	244	
600	min	Winter	2.350	0.0	8.1	306	
720	min	Winter	2.046	0.0	8.5	368	
960	min	Winter	1.644	0.0	9.1	482	
1440	min	Winter	1.208	0.0	10.0	718	
2160	min	Winter	0.888	0.0	11.0	1088	
2880	min	Winter	0.714	0.0	11.8	1456	
4320	min	Winter	0.524	0.0	13.0	2232	
5760	min	Winter	0.421	0.0	13.9	2888	
7200	min	Winter	0.355	0.0	14.7	3664	
8640	min	Winter	0.309	0.0	15.3	4360	
10080	min	Winter	0.275	0.0	15.9	5056	

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Model Details

Storage is Online Cover Level (m) 55.780

Cellular Storage Structure

Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) 0.000 15.9 0.0 2.300 15.9 0.0 2.000 15.9

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0092-5000-2000-5000 Design Head (m) 2.000 Design Flow (1/s) 5.0 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 92 Invert Level (m) 53.480 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200

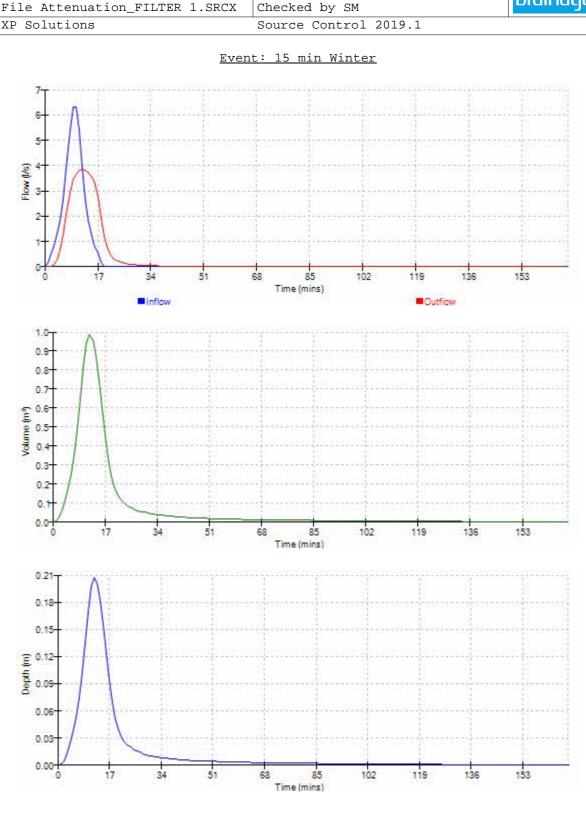
Control Points	Head (m)	Flow (1/s)
Design Point (Calculated)	2.000	5.0
$Flush-Flo^{TM}$	0.398	4.1
Kick-Flo®	0.816	3.3
Mean Flow over Head Range	_	3.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (1/s)	Depth (m) F	low (l/s)	Depth (m) Fl	ow (1/s) I	Depth (m)	Flow (1/s)
0.100	2.9	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.8	1.400	4.2	3.500	6.5	7.500	9.3
0.300	4.1	1.600	4.5	4.000	6.9	8.000	9.6
0.400	4.1	1.800	4.8	4.500	7.3	8.500	9.9
0.500	4.1	2.000	5.0	5.000	7.7	9.000	10.2
0.600	4.0	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.4	2.400	5.4	6.000	8.4		
1.000	3.6	2.600	5.6	6.500	8.7		

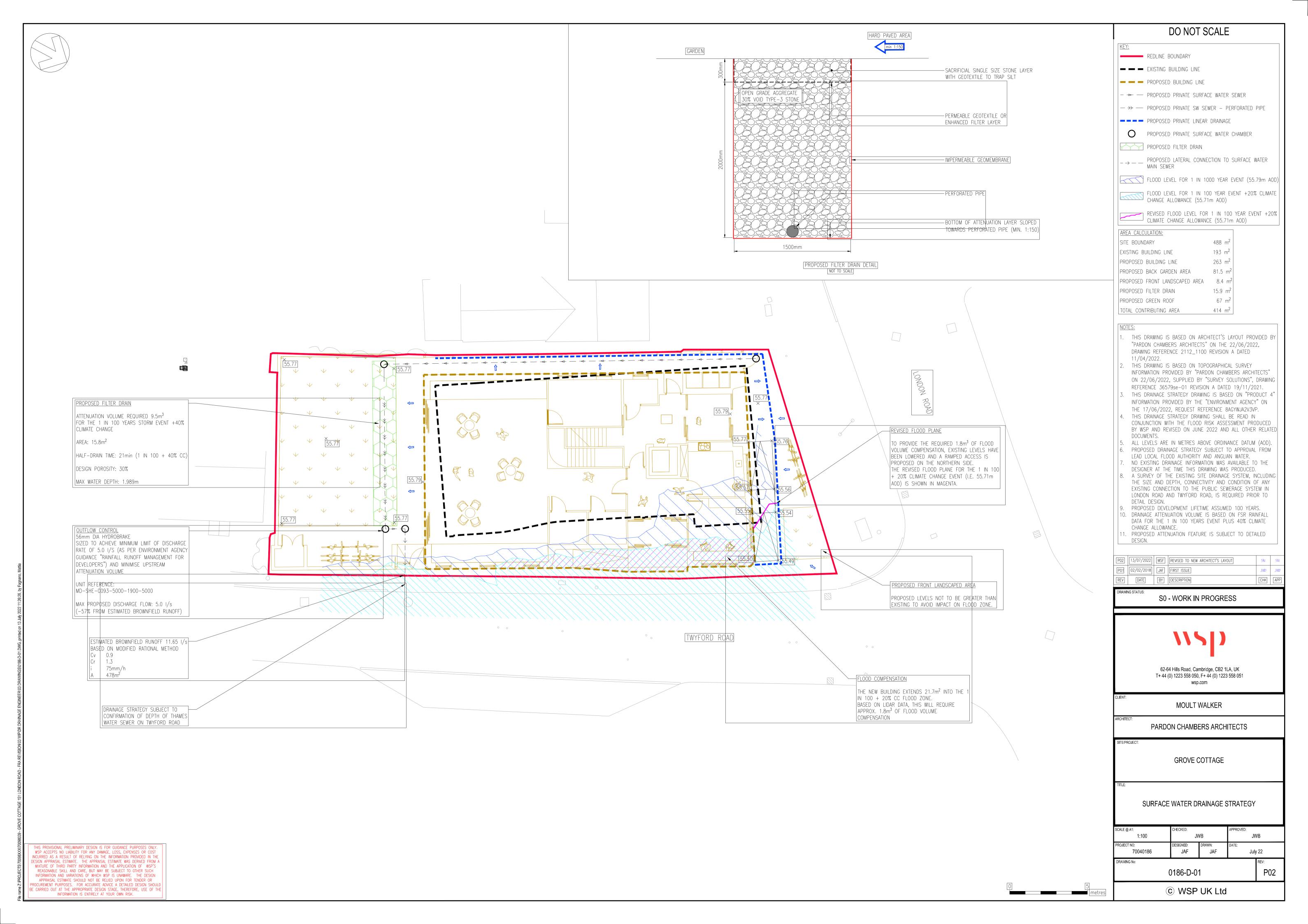
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Appendix H

PROPOSED SURFACE WATER DRAINAGE STRATEGY



Appendix I

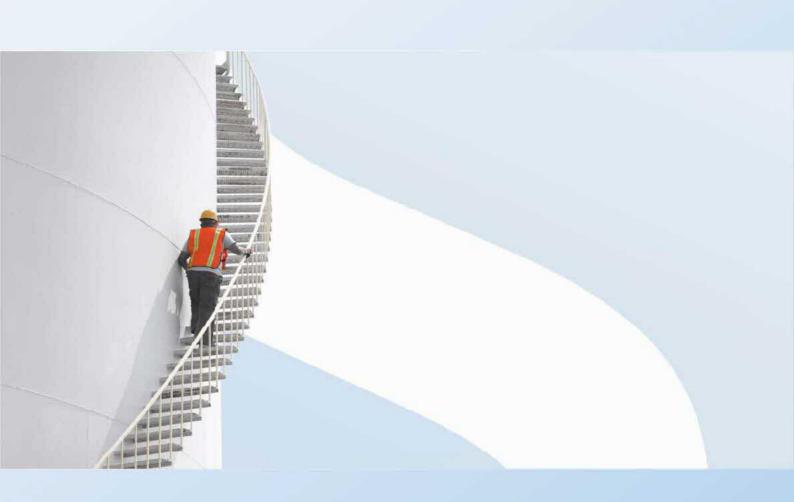
SUDS MAINTENANCE AND MANAGEMENT PLAN



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GROVE COTTAGE, BISHOP'S STORTFORD

SuDS Maintenance and Management Plan





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PROJECT NO. 70040186

OUR REF. NO. MMP001

JULY 2022



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GROVE COTTAGE, BISHOP'S STORTFORD

SuDS Maintenance and Management Plan

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Draft	Amended to suit revised FRA due to changes in Architect's layout		
Date	02/02/2018	19/07/2022		
Prepared by	James Forsdyke	Mattia Fagnano		
Signature				
Checked by	James Berryman	Stephen Mostyn		
Signature				
Authorised by	James Berryman	Livio Martelli		
Signature				
Project number	70042635	70098039		
Report number	MMP001			
File reference	\\uk.wspgroup.com\central data\Projects\70098xxx\70098039 - Grove Cottage 151 London Road - FRA Revision\03 WIP\DR Drainage Engineer\05 Reports\FRA\Appendices\Appendix G - SuDS Maintenance and Management Plan			

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2.1.	FILTER DRAIN	5
2.2.	ORIFICE FLOW CONTROLS	5
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1

INTRODUCTION





1. INTRODUCTION

1.1. INTRODUCTION

- 1.1.1. This document has been produced on behalf of Moult Walker to support an outline planning application for a proposed non-residential development at Grove Cottage, Bishops Stortford.
- 1.1.2. This report gives guidance on the maintenance of Sustainable Drainage Systems (SuDS) and outlines who will be responsible for the maintenance.

2

METHOD STATEMENT





METHOD STATEMENT 2.

2.1. **FILTER DRAIN**

- 2.1.1. Filter drains are shallow trenches filled with stone/gravel that create temporary subsurface storage for the attenuation, conveyance and filtration of surface water runoff.
- 2.1.2. The operation and maintenance requirements are given in the table below:

Table 2-2 – Filter Drain Maintenance Requirements

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Remove litter (including leaf litter) and debris from filter drain surface and access chambers	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

2.2. **ORIFICE FLOW CONTROLS**

- 2.2.1. These are proprietary systems which are custom made to control the onsite flows. Some of the proposed flow controls may be prone to blocking and should be monitored closely.
- 2.2.2. The operation and maintenance requirements are given in the table below:

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Table 2-2 - Orifice Flow Control Maintenance Requirements

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Remove litter and debris and grass cutting and removal of cuttings from the upstream SuDS to prevent these being washed into the control. Inspection of control chamber and removal of any sediments, debris etc.	Quarterly or as required following Monitoring
Remedial Actions	Check the orifice flow control fixings to manhole chamber and access into the control chamber is functional.	Quarterly or as required following Monitoring
Monitoring	Inspect flow controls and overflows and check flow are not impeded.	Monthly or after periods of heavy rainfall

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2.3. DESIGN LIFE

- 2.3.1. The design life of the development is likely to exceed the design life of each of the SuDS components listed above.
- 2.3.2. During the routine inspections of any drainage components it may become apparent that they have reached the end of their functional lifetime. In the interest of sustainability repairs should be the first choice solution where practicable. If this is not the case then it will be necessary for the property owners to undertake complete replacement of the component in question.
- 2.3.3. Maintenance of the system will be the responsibility of a private management company set up by the developer.





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