Notes

1. This map shows the predicted likelihood of surface water flooding based on the Environment Agency's Risk of Flooding from Surface Water (ROFSW) data, which may be subject to further analysis in the future. Further information is provided on the Environment Agency website (www.gov.uk/environment-agency).
2. The Risk from Surface Water Flooding is divided into categories:
High: each year, the chance of flooding is greater than 1 in 30 (3.3%).
Medium: each year, the chance of flooding is between 1 in 100 (1%) and 1 in 30 (3.3%).
Low: each year, the chance of flooding is between 1 in 1000 (0.1%) and 1 in 100 (1%).
Very Low: each year, the chance of flooding is less than 1 in 1000 (0.1%).
3. The potential impact of surface water flooding can vary according to the depth of the water, and its velocity (speed and direction that it is flowing in).
4. Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. This type of flooding can be difficult to predict as it is hard to forecast exactly where or how much rain will fall in any storm.

Intended Use

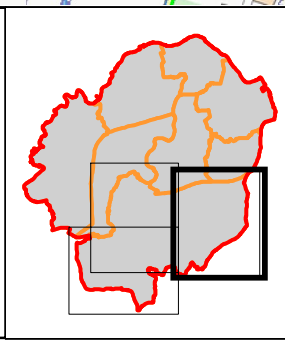
This map is intended to provide a strategic overview of surface water flood risk and should not be used to assess flood risk for individual properties.

LEGEND

- Borough Boundary
- LPAS
- Settlement Areas
- Surrey Wetspots

Watercourses
- Main River
- Elmbridge Ditches

Risk of Flooding from Surface Water
- High Risk of Flooding
- Medium Risk of Flooding
- Low Risk of Flooding



Purpose of Issue: FINAL

Revision Details	By Chk	Check Date	Suffix

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

Scale at A3:	1:15,000
Drawn	HB
Checked	SL
Approved	SK
Date	September 2018

Project Title: Elmbridge Borough Council Level 1 Strategic Flood Risk Assessment

Client: Elmbridge Borough Council ... bridging the communities ...

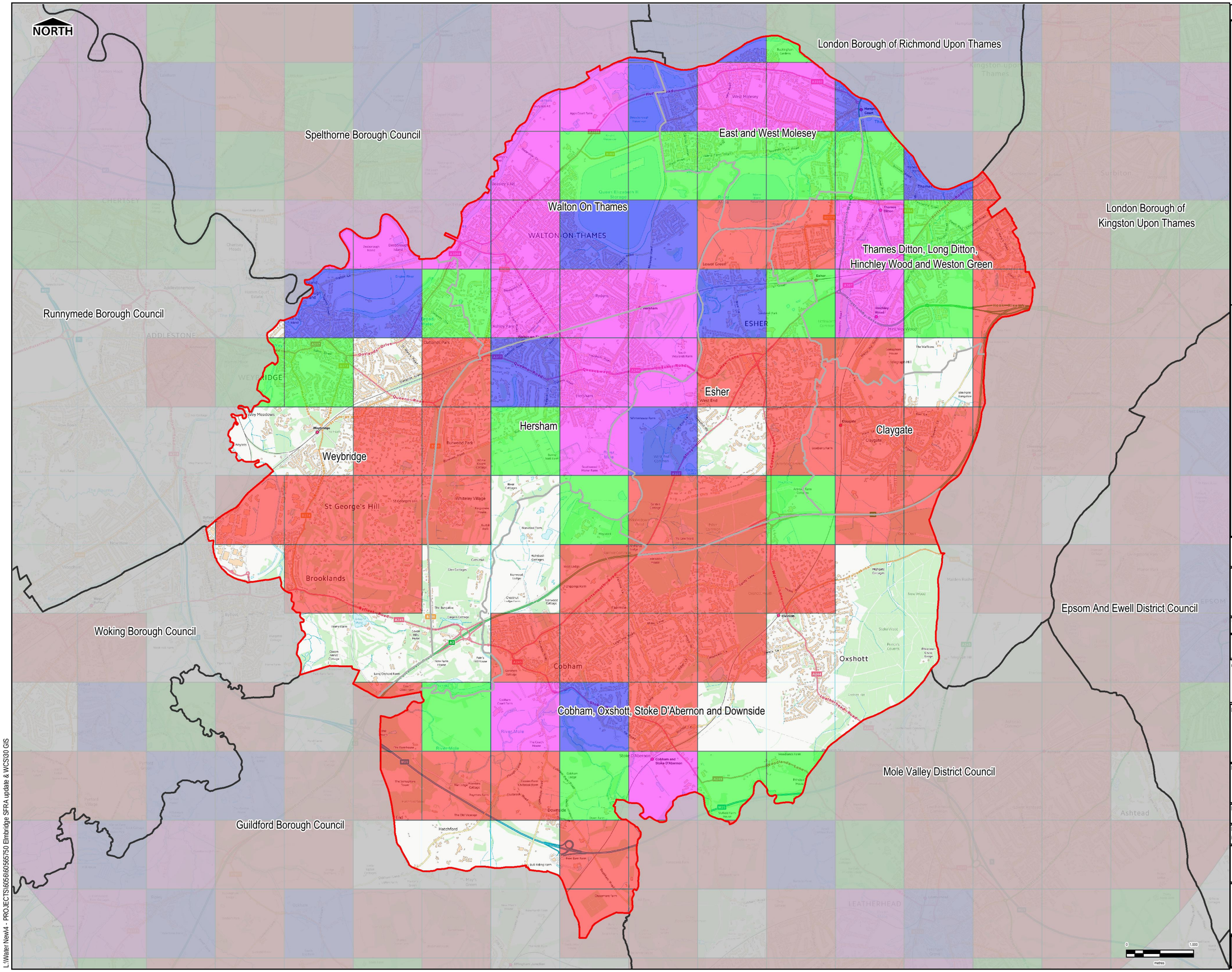
Drawing Title: Flood Risk from Surface Water Cobham, Oxshott, Stoke D'Abernon & Downside (View 1)

AECOM Infrastructure & Environment UK Limited
Midpoint
Alencon Link
Basingstoke
RG21 7PP
Telephone 01256 310300

Drawing Number: FIGURE F7

Rev: 01

L:\Water New\4 - PROJECTS\60560\60565750 Elmbridge SFRA update & WCS\30 GIS\Workspaces



L:\Water New\4 - PROJECTS\60560\60565750 Elmbridge SFRA update & WCS\30 GIS

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE AND IS SUBJECT TO AMENDMENT

LEGEND

- Elmbridge BC boundary
- Settlement Area boundary
- Local Planning Authority boundary

Areas Susceptible to Groundwater Flooding

- < 25%
- >= 25% <50%
- >= 50% <75%
- >= 75%
- Not considered to be prone to groundwater flooding

Notes

1. Areas Susceptible to Groundwater Flooding (AStGWF) is a strategic scale map showing where groundwater flooding could occur on a 1km square grid. It shows the proportion of each 1km grid square where geological and hydrogeological conditions show that groundwater flooding could occur. The susceptible areas are represented by one of four categories showing the proportion of each 1km square that is susceptible to groundwater emergence. It does not show the likelihood of groundwater flooding occuring.
2. The absence of values for any grid square means that no part of that square is identified as being susceptible to groundwater emergence.
3. The map identifies areas where further investigation is needed to assess whether groundwater flooding may affect property or infrastructure.
4. This data shown is the Environment Agency dataset 'Areas Susceptible to Groundwater Flooding.
5.Further information on Groundwater Flooding can be found within Section 2.3 of the Level 1 SFRA

Intended Use

The 1:50 000 scale digital map data is generalised and the geological interpretation should be used only as a guide to the geology at a local level, not as a site-specific geological plan based on detailed site investigations.

This map is intended to provide a strategic overview of susceptibility to groundwater flooding and should not be used to assess flood risk for individual properties.

Revision Details	By / Check	Check Date	Suffix

Purpose of Issue: FINAL

Client: Elmbridge Borough Council — bridging the communities...

Project Title: Elmbridge Borough Council Strategic Flood Risk Assessment

Drawing Title: Areas Susceptible to Groundwater Flooding

Drawn	Checked	Approved	Date
HB	SL	SK	September 2018

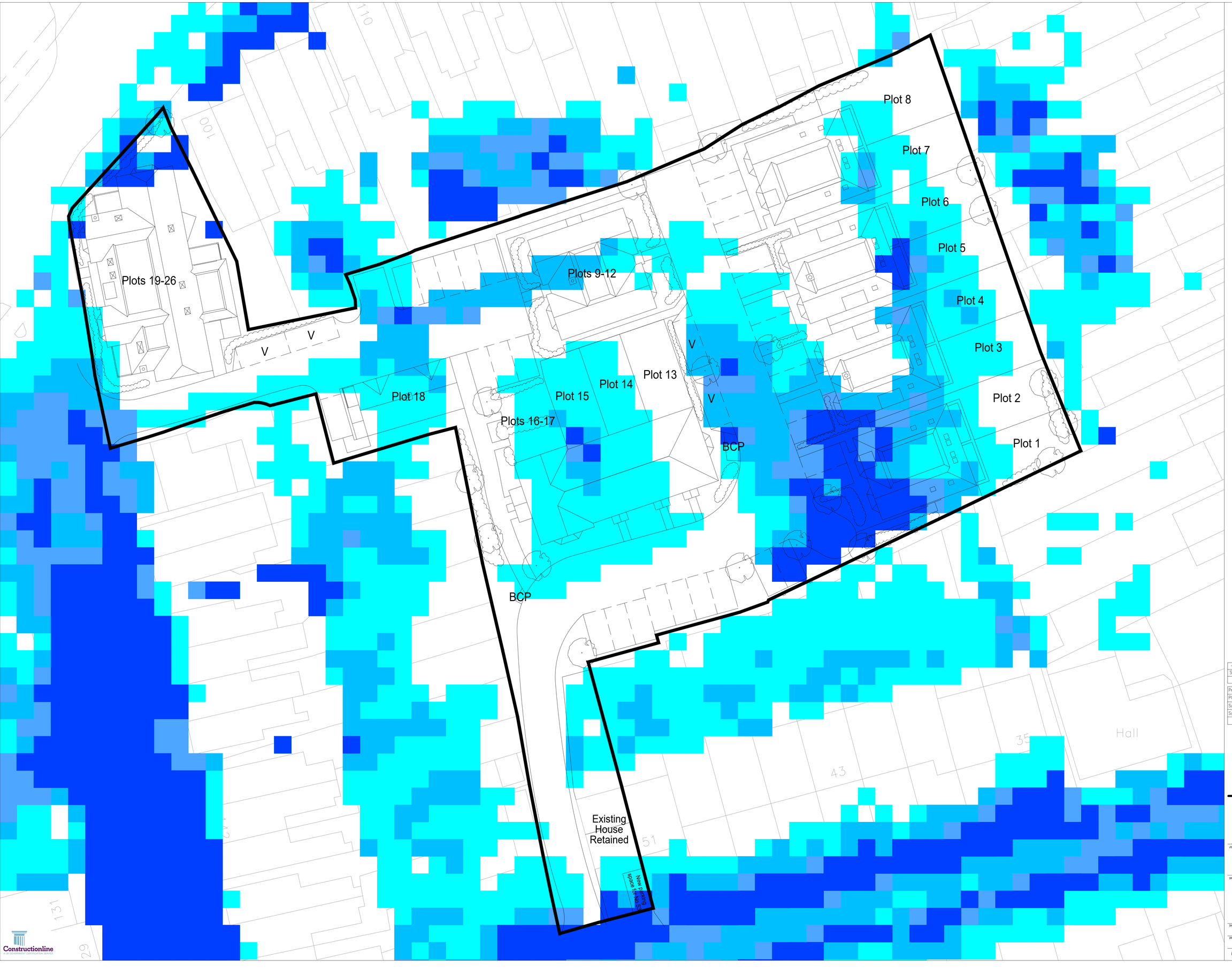
Internal Project No.	Scale at A3
60565750	1:50,000

AECOM Infrastructure & Environment UK Limited
Midpoint
Alencon Link
Basingstoke
RG21 7PP
Telephone 01256 310300

Drawing Number	Rev
FIGURE B5	01

APPENDIX G

Surface Water Flood Risk Drawings



KEY

(EXISTING SURFACE WATER FLOOD RISK)

- SITE BOUNDARY
- (HIGH RISK) 30-YR
- (HIGH RISK) 30-YR+35%cc
- (MED RISK) 100-YR
- (MED RISK) 100-YR+40%cc
- (LOW RISK) 1000-YR

ST	Rev	Description	Drn	Chk	Date
–	–				

REVISIONS

Preliminary Issue	✓	Submitted for S104	
Planning Issue		Issued for Tender	
Submitted for S38		Issued for Construction	
Submitted for S278		As Built	

DRAWING STATUS

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SHANLY HOMES

JOB TITLE

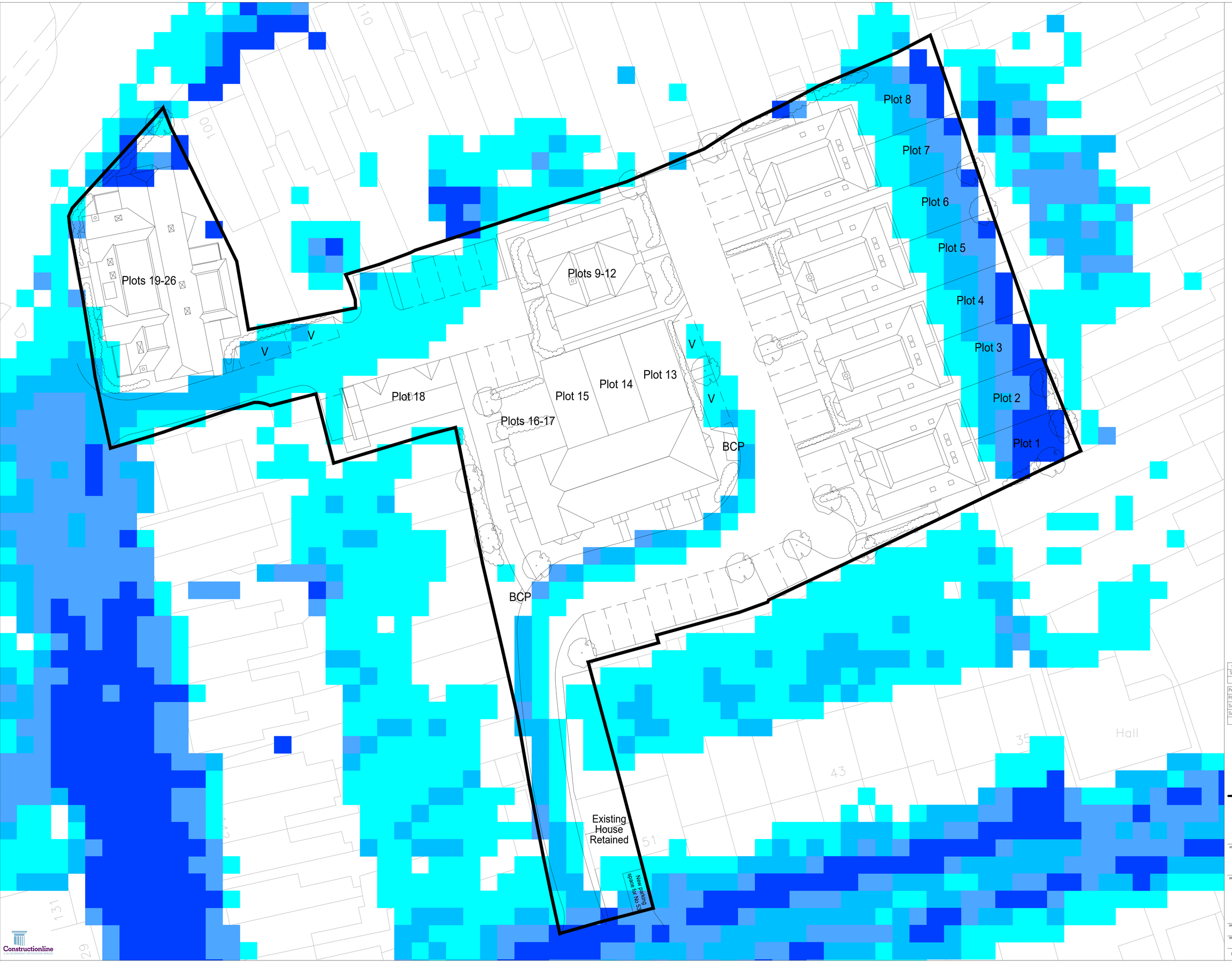
ANYARDS ROAD, COBHAM

DRAWING TITLE

SURFACE WATER FLOOD RISK
EXISTING/PRE-DEVELOPMENT

DATE	DRAWN	CHECKED	SCALE	
SEPT. 2023	TSW	TSW	1:200	@A1

DRAWING No.	REV	STATUS
7073.450	–	P



KEY

(PROPOSED SURFACE WATER FLOOD RISK)

- SITE BOUNDARY
- (HIGH RISK) 30-YR
- (HIGH RISK) 30-YR+35%cc
- (MED RISK) 100-YR
- (MED RISK) 100-YR+40%cc
- (LOW RISK) 1000-YR

ST	Rev	Description	Drn	Chk	Date
–	–				

REVISIONS

Preliminary Issue	✓	Submitted for S104	
Planning Issue		Issued for Tender	
Submitted for S38		Issued for Construction	
Submitted for S278		As Built	

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SHANLY HOMES

JOB TITLE

ANYARDS ROAD, COBHAM

DRAWING TITLE

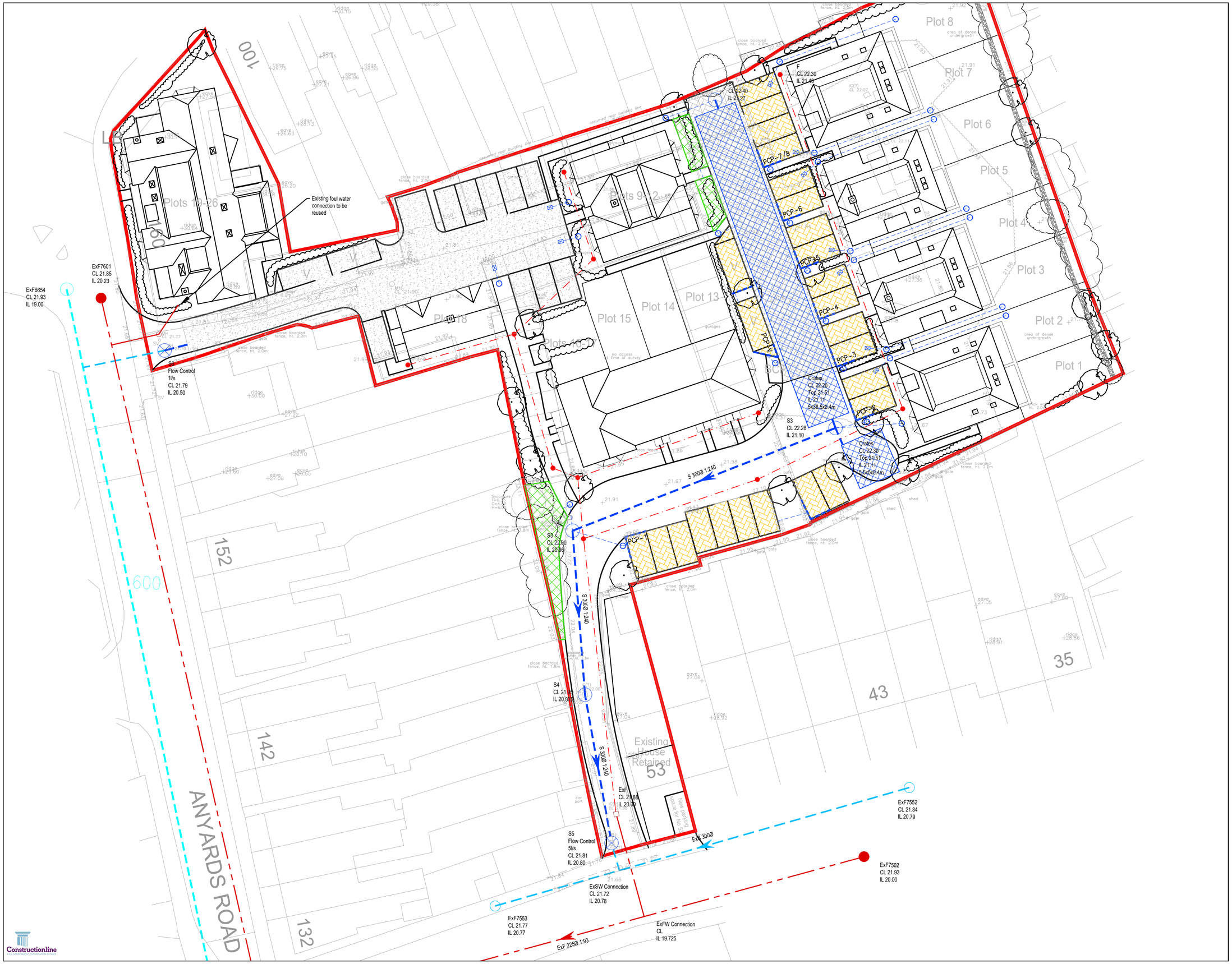
SURFACE WATER FLOOD RISK
PROPOSED/POST-DEVELOPMENT

DATE	DRAWN	CHECKED	SCALE	
SEPT. 2023	TSW	TSW	1:200	@A1

DRAWING No.	REV	STATUS
7073.451	–	P

APPENDIX H

Drainage Strategy



KEY

- EXISTING THAMES WATER FOUL WATER SEWER
- FOUL WATER DRAIN
- SURFACE WATER DRAIN
- EXISTING THAMES WATER SURFACE WATER SEWER
- BLOCK PAVING
- POROUS BLOCK PAVING
- POROUS MACADAM
- BIO RETENTION AREA
- CELLULAR STORAGE

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SHANLY HOMES

JOB TITLE
ANYARDS ROAD, COBHAM

DRAWING TITLE
DRAINAGE STRATEGY

DATE	DRAWN	CHECKED
OCT 2023	CG	JOK

DRAWING No.	REV	SCALE	
7073.400		1:1000	@A1

APPENDIX I

Surface Water Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	2
FEH Rainfall Version	2013
Site Location GB 510777 160638 TQ 10777 60638	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	4.524	0.050	90.5	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S1.001	5.944	0.100	59.4	0.020	0.00	0.0	0.600		o	150	Pipe/Conduit	
S2.000	3.310	0.050	66.2	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S2.001	6.033	0.100	60.3	0.011	0.00	0.0	0.600		o	150	Pipe/Conduit	
S3.000	3.556	0.050	71.1	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S3.001	5.775	0.100	57.8	0.011	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.07	21.570	0.000	0.0	0.0	0.0	1.06	18.7	0.0
S1.001	50.00	5.15	21.520	0.020	0.0	0.0	0.0	1.31	23.1	2.7
S2.000	50.00	5.04	21.530	0.000	0.0	0.0	0.0	1.24	21.9	0.0
S2.001	50.00	5.12	21.480	0.011	0.0	0.0	0.0	1.30	22.9	1.5
S3.000	50.00	5.05	21.500	0.000	0.0	0.0	0.0	1.19	21.1	0.0
S3.001	50.00	5.12	21.450	0.011	0.0	0.0	0.0	1.33	23.4	1.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	3.993	0.050	79.9	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S4.001	5.833	0.100	58.3	0.011	0.00	0.0	0.600		o	150	Pipe/Conduit	
S5.000	4.201	0.050	84.0	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S5.001	5.369	0.100	53.7	0.011	0.00	0.0	0.600		o	150	Pipe/Conduit	
S6.000	14.762	0.080	184.5	0.009	5.00	0.0		0.060	→|⁂|		Bio-Retention Area	
S6.001	6.125	0.070	87.5	0.000	0.00	0.0	0.600		o	100	Pipe/Conduit	
S1.002	39.902	0.170	234.7	0.007	0.00	0.0	0.600		o	300	Pipe/Conduit	
S7.000	3.789	0.050	75.8	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S7.001	6.379	0.100	63.8	0.012	0.00	0.0	0.600		o	150	Pipe/Conduit	
S8.000	3.923	0.050	78.5	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S8.001	4.357	0.050	87.1	0.013	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.003	32.888	0.140	234.9	0.007	0.00	0.0	0.600		o	300	Pipe/Conduit	
S9.000	22.829	0.160	142.7	0.016	5.00	0.0		0.060	→|⁂|		Bio-Retention Area	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.000	50.00	5.06	21.470	0.000	0.0	0.0	0.0	1.13	19.9	0.0
S4.001	50.00	5.13	21.420	0.011	0.0	0.0	0.0	1.32	23.3	1.5
S5.000	50.00	5.06	21.450	0.000	0.0	0.0	0.0	1.10	19.4	0.0
S5.001	50.00	5.13	21.400	0.011	0.0	0.0	0.0	1.38	24.3	1.5
S6.000	50.00	5.75	21.420	0.009	0.0	0.0	0.0	0.33	173.0	1.2
S6.001	50.00	5.88	21.340	0.009	0.0	0.0	0.0	0.82	6.5	1.2
S1.002	50.00	6.53	21.270	0.080	0.0	0.0	0.0	1.02	72.2	10.8
S7.000	50.00	5.05	21.450	0.000	0.0	0.0	0.0	1.16	20.4	0.0
S7.001	50.00	5.14	21.400	0.012	0.0	0.0	0.0	1.26	22.3	1.6
S8.000	50.00	5.06	21.450	0.000	0.0	0.0	0.0	1.14	20.1	0.0
S8.001	50.00	5.12	21.410	0.013	0.0	0.0	0.0	1.08	19.0	1.8
S1.003	50.00	7.06	21.100	0.112	0.0	0.0	0.0	1.02	72.2	15.2
S9.000	50.00	5.89	21.140	0.016	0.0	0.0	0.0	0.43	277.2	2.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S9.001	5.245	0.020	262.3	0.016	0.00	0.0	0.600		o	300	Pipe/Conduit	
S10.000	5.545	0.050	110.9	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S10.001	6.948	0.100	69.5	0.011	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.004	19.159	0.085	225.4	0.026	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.005	17.519	0.075	233.6	0.007	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.006	5.212	0.020	260.6	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
S11.000	4.482	0.050	89.6	0.000	5.00	0.0	0.600		o	150	Pipe/Conduit	
S11.001	3.995	0.900	4.4	0.086	0.00	0.0	0.600		o	150	Pipe/Conduit	
S11.002	9.587	0.100	95.9	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S9.001	50.00	5.98	20.980	0.032	0.0	0.0	0.0	0.97	68.3	4.3
S10.000	50.00	5.10	21.440	0.000	0.0	0.0	0.0	0.95	16.9	0.0
S10.001	50.00	5.19	21.390	0.011	0.0	0.0	0.0	1.21	21.3	1.5
S1.004	50.00	7.37	20.960	0.181	0.0	0.0	0.0	1.04	73.7	24.5
S1.005	50.00	7.65	20.875	0.188	0.0	0.0	0.0	1.02	72.4	25.5
S1.006	50.00	7.74	20.800	0.188	0.0	0.0	0.0	0.97	68.5	25.5
S11.000	50.00	5.07	21.300	0.000	0.0	0.0	0.0	1.06	18.8	0.0
S11.001	50.00	5.08	21.250	0.086	0.0	0.0	0.0	4.82	85.1	11.6
S11.002	50.00	5.24	20.500	0.086	0.0	0.0	0.0	1.03	18.1	11.6

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.020	0.020	0.020
2.000	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.011	0.011	0.011
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.011	0.011	0.011
4.000	-	-	100	0.000	0.000	0.000
4.001	-	-	100	0.011	0.011	0.011
5.000	-	-	100	0.000	0.000	0.000
5.001	-	-	100	0.011	0.011	0.011
6.000	-	-	100	0.009	0.009	0.009
6.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.007	0.007	0.007
7.000	-	-	100	0.000	0.000	0.000
7.001	-	-	100	0.012	0.012	0.012
8.000	-	-	100	0.000	0.000	0.000
8.001	-	-	100	0.013	0.013	0.013
1.003	-	-	100	0.007	0.007	0.007
9.000	-	-	100	0.016	0.016	0.016
9.001	-	-	100	0.016	0.016	0.016
10.000	-	-	100	0.000	0.000	0.000
10.001	-	-	100	0.011	0.011	0.011
1.004	-	-	100	0.026	0.026	0.026
1.005	-	-	100	0.007	0.007	0.007
1.006	-	-	100	0.000	0.000	0.000
11.000	-	-	100	0.000	0.000	0.000
11.001	-	-	100	0.086	0.086	0.086
11.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.274	0.274	0.274

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	21.720	20.780	0.000	0	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S11.002	S	21.700	20.400	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 11 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 510777 160638 TQ 10777 60638
Data Type	Point
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Storm

Orifice Manhole: SPCP7/8, DS/PN: S1.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.520

Orifice Manhole: SPCP6, DS/PN: S2.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.480

Orifice Manhole: SPCP5, DS/PN: S3.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.450

Orifice Manhole: SPCP4, DS/PN: S4.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.420

Orifice Manhole: SPCP3, DS/PN: S5.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.400

Orifice Manhole: SPCP2, DS/PN: S7.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.400

Orifice Manhole: SPCP-V, DS/PN: S8.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.410

Orifice Manhole: SPCP1, DS/PN: S10.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.390

Hydro-Brake® Optimum Manhole: S5, DS/PN: S1.006, Volume (m³): 2.3

Unit Reference	MD-SHE-0105-5000-1010-5000
Design Head (m)	1.010
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	20.800
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Hydro-Brake® Optimum Manhole: S5, DS/PN: S1.006, Volume (m³): 2.3

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.010	5.0	Kick-Flo®	0.644	4.1
Flush-Flo™	0.300	5.0	Mean Flow over Head Range	-	4.3

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 (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	5.4	3.000	8.3	7.000	12.4
0.200	4.8	1.400	5.8	3.500	8.9	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.5	8.000	13.3
0.400	4.9	1.800	6.5	4.500	10.1	8.500	13.6
0.500	4.8	2.000	6.9	5.000	10.6	9.000	14.0
0.600	4.4	2.200	7.2	5.500	11.1	9.500	14.4
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.0		

Orifice Manhole: SPCP, DS/PN: S11.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 21.250

Hydro-Brake® Optimum Manhole: S6, DS/PN: S11.002, Volume (m³): 1.5

Unit Reference	MD-SHE-0044-1000-1290-1000
Design Head (m)	1.290
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	44
Invert Level (m)	20.500
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.290	1.0	Kick-Flo®	0.393	0.6
Flush-Flo™	0.193	0.7	Mean Flow over Head Range	-	0.8

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 (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.7	0.300	0.7	0.500	0.7	0.800	0.8
0.200	0.7	0.400	0.6	0.600	0.7	1.000	0.9

Hydro-Brake® Optimum Manhole: S6, DS/PN: S11.002, Volume (m³): 1.5

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	1.0	2.400	1.3	5.000	1.8	8.000	2.3
1.400	1.0	2.600	1.4	5.500	1.9	8.500	2.4
1.600	1.1	3.000	1.5	6.000	2.0	9.000	2.4
1.800	1.2	3.500	1.6	6.500	2.1	9.500	2.5
2.000	1.2	4.000	1.7	7.000	2.2		
2.200	1.3	4.500	1.8	7.500	2.2		

Storage Structures for Storm

Porous Car Park Manhole: SPCP7/8, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	10.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.520	Membrane Depth (mm)	0

Porous Car Park Manhole: SPCP6, DS/PN: S2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.480	Membrane Depth (mm)	0

Porous Car Park Manhole: SPCP5, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.450	Membrane Depth (mm)	0

Porous Car Park Manhole: SPCP4, DS/PN: S4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.420	Membrane Depth (mm)	0

Porous Car Park Manhole: SPCP3, DS/PN: S5.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	6.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.400	Membrane Depth (mm)	0

Bio-Retention Area Pipe: S6.000

Manning's N 0.060 Infiltration Coefficient Base (m/hr) 0.00000
Invert Level (m) 21.420 Infiltration Coefficient Side (m/hr) 0.00000
Porosity 1.00 Safety Factor 2.0

Under Drain Details
Base Area (m²) 30.0 Diameter (m) 0.300
Base Perimeter (m) 38.200 Number of Pipes 1
Top Area (m²) 30.0 Manning's N 0.015
Depth above Invert Level (m) 0.000

Filtration Layers
Filter Side Infiltration (m/hr) 0.00000

Name	Depth (mm)	Porosity	Rate (m/hr)	Safety Factor
Void	100	1.00	10.00000	2.0
Mulch	100	0.30	1.00000	2.0
Filtration	300	0.10	0.03600	2.0
Transition	100	0.10	0.18000	2.0
Storage	300	0.30	1.00000	2.0

Porous Car Park Manhole: SPCP2, DS/PN: S7.001

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 5.0
Membrane Percolation (mm/hr) 1000 Length (m) 5.0
Max Percolation (l/s) 6.9 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 21.400 Membrane Depth (mm) 0

Porous Car Park Manhole: SPCP-V, DS/PN: S8.001

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 3.5
Membrane Percolation (mm/hr) 1000 Length (m) 10.0
Max Percolation (l/s) 9.7 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 21.410 Membrane Depth (mm) 0

Cellular Storage Manhole: S2, DS/PN: S1.003

Invert Level (m) 21.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	220.0	220.0	0.500	0.0	259.2
0.400	220.0	259.2			

Bio-Retention Area Pipe: S9.000

Manning's N	0.060	Infiltration Coefficient Base (m/hr)	0.00000
Invert Level (m)	21.140	Infiltration Coefficient Side (m/hr)	0.00000
Porosity	1.00	Safety Factor	2.0

Under Drain Details

Base Area (m²)	41.0	Diameter (m)	0.300
Base Perimeter (m)	42.000	Number of Pipes	1
Top Area (m²)	41.0	Manning's N	0.015
Depth above Invert Level (m)	0.000		

Filtration Layers

Filter Side Infiltration (m/hr) 0.00000

Name	Depth (mm)	Porosity	Rate (m/hr)	Safety Factor
Void	200	1.00	10.00000	2.0
Mulch	100	0.30	1.00000	2.0
Filtration	300	0.10	0.03600	2.0
Transition	100	0.10	0.18000	2.0
Storage	300	0.30	1.00000	2.0

Porous Car Park Manhole: SPCP1, DS/PN: S10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	22.5
Max Percolation (l/s)	31.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.390	Membrane Depth (mm)	0

Porous Car Park Manhole: SPCP, DS/PN: S11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	42.0
Max Percolation (l/s)	116.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	21.250	Membrane Depth (mm)	0

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 11 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 510777 160638 TQ 10777 60638
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.000	SDUMMY	180 minute 2 year Summer I+0%	22.420	21.676	-0.044	0.000	0.00		0.0
S1.001	SPCP7/8	180 minute 2 year Summer I+0%	22.420	21.676	0.006	0.000	0.03		0.5
S2.000	SDUMMY	120 minute 2 year Summer I+0%	22.380	21.603	-0.077	0.000	0.00		0.0
S2.001	SPCP6	120 minute 2 year Summer I+0%	22.380	21.603	-0.027	0.000	0.02		0.4
S3.000	SDUMMY	120 minute 2 year Summer I+0%	22.350	21.573	-0.077	0.000	0.00		0.0
S3.001	SPCP5	120 minute 2 year Summer I+0%	22.350	21.573	-0.027	0.000	0.02		0.4
S4.000	SDUMMY	120 minute 2 year Summer I+0%	22.320	21.543	-0.077	0.000	0.00		0.0
S4.001	SPCP4	120 minute 2 year Summer I+0%	22.320	21.543	-0.027	0.000	0.02		0.4
S5.000	SDUMMY	120 minute 2 year Summer I+0%	22.300	21.522	-0.078	0.000	0.00		0.0
S5.001	SPCP3	120 minute 2 year Summer I+0%	22.300	21.522	-0.028	0.000	0.02		0.4
S6.000	SBio	15 minute 2 year Summer I+0%	22.320	21.450	-0.870	0.000	0.01		1.8
S6.001	SBio	15 minute 2 year Summer I+0%	22.240	21.378	-0.062	0.000	0.30		1.7
S1.002	S1	30 minute 2 year Summer I+0%	22.400	21.318	-0.252	0.000	0.06		4.2
S7.000	SDUMMY	120 minute 2 year Summer I+0%	22.300	21.536	-0.064	0.000	0.00		0.0
S7.001	SPCP2	120 minute 2 year Summer I+0%	22.300	21.536	-0.014	0.000	0.02		0.5
S8.000	SDUMMY	180 minute 2 year Summer I+0%	22.160	21.530	-0.070	0.000	0.00		0.0

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status
S1.000	SDUMMY	OK
S1.001	SPCP7/8	SURCHARGED
S2.000	SDUMMY	OK
S2.001	SPCP6	OK
S3.000	SDUMMY	OK
S3.001	SPCP5	OK
S4.000	SDUMMY	OK
S4.001	SPCP4	OK
S5.000	SDUMMY	OK
S5.001	SPCP3	OK
S6.000	SBio	OK
S6.001	SBio	OK
S1.002	S1	OK
S7.000	SDUMMY	OK
S7.001	SPCP2	OK
S8.000	SDUMMY	OK

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S8.001	SPCP-V	180 minute 2 year Summer I+0%	22.160	21.530	-0.030	0.000	0.03		0.4
S1.003	S2	240 minute 2 year Summer I+0%	22.280	21.142	-0.258	0.000	0.05		3.1
S9.000	SBio	15 minute 2 year Summer I+0%	22.140	21.190	-0.950	0.000	0.01		3.0
S9.001	SBio	30 minute 2 year Summer I+0%	21.980	21.085	-0.195	0.000	0.10		4.8
S10.000	SDUMMY	15 minute 2 year Summer I+0%	22.140	21.440	-0.150	0.000	0.00		0.0
S10.001	SPCP1	360 minute 2 year Summer I+0%	22.140	21.431	-0.109	0.000	0.01		0.2
S1.004	S3	30 minute 2 year Summer I+0%	22.000	21.084	-0.176	0.000	0.13		8.5
S1.005	S4	30 minute 2 year Summer I+0%	21.950	21.079	-0.096	0.000	0.11		7.1
S1.006	S5	30 minute 2 year Summer I+0%	21.810	21.074	-0.026	0.000	0.11		4.9
S11.000	SDUMMY	720 minute 2 year Summer I+0%	22.000	21.402	-0.048	0.000	0.00		0.0
S11.001	SPCP	720 minute 2 year Summer I+0%	22.000	21.402	0.002	0.000	0.01		0.5
S11.002	S6	720 minute 2 year Summer I+0%	21.790	20.552	-0.098	0.000	0.03		0.5

PN	US/MH Name	Status
S8.001	SPCP-V	OK
S1.003	S2	OK
S9.000	SBio	OK
S9.001	SBio	OK
S10.000	SDUMMY	OK
S10.001	SPCP1	OK
S1.004	S3	OK
S1.005	S4	OK
S1.006	S5	OK
S11.000	SDUMMY	OK
S11.001	SPCP	SURCHARGED
S11.002	S6	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 11 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 510777 160638 TQ 10777 60638
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S1.000	SDUMMY	180 minute 30 year Summer I+0%	22.420	21.900	0.180	0.000	0.00		0.0
S1.001	SPCP7/8	180 minute 30 year Summer I+0%	22.420	21.900	0.230	0.000	0.04		0.8
S2.000	SDUMMY	120 minute 30 year Summer I+0%	22.380	21.800	0.120	0.000	0.00		0.0
S2.001	SPCP6	120 minute 30 year Summer I+0%	22.380	21.800	0.170	0.000	0.04		0.7
S3.000	SDUMMY	120 minute 30 year Summer I+0%	22.350	21.770	0.120	0.000	0.00		0.0
S3.001	SPCP5	120 minute 30 year Summer I+0%	22.350	21.770	0.170	0.000	0.04		0.7
S4.000	SDUMMY	120 minute 30 year Summer I+0%	22.320	21.739	0.119	0.000	0.00		0.0
S4.001	SPCP4	120 minute 30 year Summer I+0%	22.320	21.739	0.169	0.000	0.04		0.7
S5.000	SDUMMY	120 minute 30 year Summer I+0%	22.300	21.719	0.119	0.000	0.00		0.0
S5.001	SPCP3	120 minute 30 year Summer I+0%	22.300	21.719	0.169	0.000	0.04		0.7
S6.000	SBio	15 minute 30 year Summer I+0%	22.320	21.495	-0.825	0.000	0.02		3.7
S6.001	SBio	15 minute 30 year Summer I+0%	22.240	21.403	-0.037	0.000	0.61		3.5
S1.002	S1	15 minute 30 year Summer I+0%	22.400	21.346	-0.224	0.000	0.14		9.4
S7.000	SDUMMY	120 minute 30 year Summer I+0%	22.300	21.754	0.154	0.000	0.00		0.0
S7.001	SPCP2	120 minute 30 year Summer I+0%	22.300	21.754	0.204	0.000	0.04		0.8
S8.000	SDUMMY	120 minute 30 year Summer I+0%	22.160	21.714	0.114	0.000	0.00		0.0

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Status
S1.000	SDUMMY	SURCHARGED
S1.001	SPCP7/8	SURCHARGED
S2.000	SDUMMY	SURCHARGED
S2.001	SPCP6	SURCHARGED
S3.000	SDUMMY	SURCHARGED
S3.001	SPCP5	SURCHARGED
S4.000	SDUMMY	SURCHARGED
S4.001	SPCP4	SURCHARGED
S5.000	SDUMMY	SURCHARGED
S5.001	SPCP3	SURCHARGED
S6.000	SBio	OK
S6.001	SBio	OK
S1.002	S1	OK
S7.000	SDUMMY	SURCHARGED
S7.001	SPCP2	SURCHARGED
S8.000	SDUMMY	SURCHARGED

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
S8.001	SPCP-V	120 minute 30 year Summer I+0%	22.160	21.714	0.154	0.000	0.05		0.7
S1.003	S2	240 minute 30 year Summer I+0%	22.280	21.248	-0.152	0.000	0.07		4.4
S9.000	SBio	15 minute 30 year Summer I+0%	22.140	21.341	-0.799	0.000	0.02		4.2
S9.001	SBio	15 minute 30 year Summer I+0%	21.980	21.339	0.059	0.000	0.14		6.3
S10.000	SDUMMY	240 minute 30 year Summer I+0%	22.140	21.488	-0.102	0.000	0.00		0.0
S10.001	SPCP1	240 minute 30 year Summer I+0%	22.140	21.488	-0.052	0.000	0.02		0.4
S1.004	S3	30 minute 30 year Summer I+0%	22.000	21.284	0.024	0.000	0.17		10.9
S1.005	S4	30 minute 30 year Summer I+0%	21.950	21.277	0.102	0.000	0.14		9.0
S1.006	S5	480 minute 30 year Summer I+0%	21.810	21.285	0.185	0.000	0.11		5.0
S11.000	SDUMMY	480 minute 30 year Winter I+0%	22.000	21.580	0.130	0.000	0.00		0.0
S11.001	SPCP	480 minute 30 year Winter I+0%	22.000	21.581	0.181	0.000	0.01		0.7
S11.002	S6	600 minute 30 year Summer I+0%	21.790	21.112	0.462	0.000	0.04		0.7

PN	US/MH Name	Status
S8.001	SPCP-V	SURCHARGED
S1.003	S2	OK
S9.000	SBio	OK
S9.001	SBio	SURCHARGED
S10.000	SDUMMY	OK
S10.001	SPCP1	OK
S1.004	S3	SURCHARGED
S1.005	S4	SURCHARGED
S1.006	S5	SURCHARGED
S11.000	SDUMMY	SURCHARGED
S11.001	SPCP	SURCHARGED
S11.002	S6	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 11 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 510777 160638 TQ 10777 60638
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
S1.000	SDUMMY	180 minute 100 year Summer I+0%	22.420	22.037	0.317	0.000	0.00	
S1.001	SPCP7/8	180 minute 100 year Summer I+0%	22.420	22.037	0.367	0.000	0.05	
S2.000	SDUMMY	120 minute 100 year Summer I+0%	22.380	21.918	0.238	0.000	0.00	
S2.001	SPCP6	120 minute 100 year Summer I+0%	22.380	21.919	0.289	0.000	0.04	
S3.000	SDUMMY	120 minute 100 year Summer I+0%	22.350	21.888	0.238	0.000	0.00	
S3.001	SPCP5	120 minute 100 year Summer I+0%	22.350	21.888	0.288	0.000	0.04	
S4.000	SDUMMY	120 minute 100 year Summer I+0%	22.320	21.858	0.238	0.000	0.00	
S4.001	SPCP4	120 minute 100 year Summer I+0%	22.320	21.858	0.288	0.000	0.04	
S5.000	SDUMMY	120 minute 100 year Summer I+0%	22.300	21.837	0.237	0.000	0.00	
S5.001	SPCP3	120 minute 100 year Summer I+0%	22.300	21.837	0.287	0.000	0.04	
S6.000	SBio	15 minute 100 year Summer I+0%	22.320	21.552	-0.768	0.000	0.02	
S6.001	SBio	15 minute 100 year Summer I+0%	22.240	21.423	-0.017	0.000	0.63	
S1.002	S1	15 minute 100 year Summer I+0%	22.400	21.354	-0.216	0.000	0.17	
S7.000	SDUMMY	120 minute 100 year Summer I+0%	22.300	21.886	0.286	0.000	0.00	
S7.001	SPCP2	120 minute 100 year Summer I+0%	22.300	21.886	0.336	0.000	0.05	
S8.000	SDUMMY	120 minute 100 year Summer I+0%	22.160	21.823	0.223	0.000	0.00	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status
S1.000	SDUMMY	0.0	SURCHARGED
S1.001	SPCP7/8	0.9	SURCHARGED
S2.000	SDUMMY	0.0	SURCHARGED
S2.001	SPCP6	0.9	SURCHARGED
S3.000	SDUMMY	0.0	SURCHARGED
S3.001	SPCP5	0.9	SURCHARGED
S4.000	SDUMMY	0.0	SURCHARGED
S4.001	SPCP4	0.9	SURCHARGED
S5.000	SDUMMY	0.0	SURCHARGED
S5.001	SPCP3	0.9	SURCHARGED
S6.000	SBio	3.9	OK
S6.001	SBio	3.6	OK
S1.002	S1	11.3	OK
S7.000	SDUMMY	0.0	SURCHARGED
S7.001	SPCP2	0.9	SURCHARGED
S8.000	SDUMMY	0.0	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)
S8.001	SPCP-V	120 minute 100 year Summer I+0%	22.160	21.823	0.263	0.000	0.06	
S1.003	S2	240 minute 100 year Summer I+0%	22.280	21.341	-0.059	0.000	0.08	
S9.000	SBio	30 minute 100 year Summer I+0%	22.140	21.637	-0.503	0.000	0.02	
S9.001	SBio	30 minute 100 year Summer I+0%	21.980	21.636	0.356	0.000	0.17	
S10.000	SDUMMY	240 minute 100 year Summer I+0%	22.140	21.524	-0.066	0.000	0.00	
S10.001	SPCP1	240 minute 100 year Summer I+0%	22.140	21.524	-0.016	0.000	0.03	
S1.004	S3	480 minute 100 year Summer I+0%	22.000	21.616	0.356	0.000	0.10	
S1.005	S4	480 minute 100 year Summer I+0%	21.950	21.651	0.476	0.000	0.09	
S1.006	S5	480 minute 100 year Summer I+0%	21.810	21.682	0.582	0.000	0.11	
S11.000	SDUMMY	600 minute 100 year Winter I+0%	22.000	21.708	0.258	0.000	0.00	
S11.001	SPCP	600 minute 100 year Winter I+0%	22.000	21.708	0.308	0.000	0.01	
S11.002	S6	600 minute 100 year Winter I+0%	21.790	21.316	0.666	0.000	0.05	

PN	US/MH Name	Pipe Flow (l/s)	Status
S8.001	SPCP-V	0.8	SURCHARGED
S1.003	S2	5.3	OK
S9.000	SBio	4.5	OK
S9.001	SBio	7.6	SURCHARGED
S10.000	SDUMMY	0.0	OK
S10.001	SPCP1	0.5	OK
S1.004	S3	6.6	SURCHARGED
S1.005	S4	5.9	FLOOD RISK
S1.006	S5	5.0	FLOOD RISK
S11.000	SDUMMY	0.0	FLOOD RISK
S11.001	SPCP	0.9	FLOOD RISK
S11.002	S6	0.8	SURCHARGED

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 11 Number of Storage Structures 12 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location GB 510777 160638 TQ 10777 60638	
Data Type	Point
Cv (Summer)	0.950
Cv (Winter)	0.950

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
S1.000	SDUMMY	240 minute 100 year Summer I+40%	22.420	22.284	0.564	0.000	0.00	
S1.001	SPCP7/8	240 minute 100 year Summer I+40%	22.420	22.284	0.614	0.000	0.06	
S2.000	SDUMMY	120 minute 100 year Summer I+40%	22.380	22.134	0.454	0.000	0.00	
S2.001	SPCP6	120 minute 100 year Summer I+40%	22.380	22.134	0.504	0.000	0.05	
S3.000	SDUMMY	120 minute 100 year Summer I+40%	22.350	22.104	0.454	0.000	0.00	
S3.001	SPCP5	120 minute 100 year Summer I+40%	22.350	22.104	0.504	0.000	0.05	
S4.000	SDUMMY	120 minute 100 year Summer I+40%	22.320	22.073	0.453	0.000	0.00	
S4.001	SPCP4	120 minute 100 year Summer I+40%	22.320	22.073	0.503	0.000	0.05	
S5.000	SDUMMY	120 minute 100 year Summer I+40%	22.300	22.053	0.453	0.000	0.00	
S5.001	SPCP3	120 minute 100 year Summer I+40%	22.300	22.053	0.503	0.000	0.05	
S6.000	SBio	15 minute 100 year Summer I+40%	22.320	21.688	-0.632	0.000	0.03	
S6.001	SBio	480 minute 100 year Summer I+40%	22.240	21.622	0.182	0.000	0.25	
S1.002	S1	480 minute 100 year Summer I+40%	22.400	21.696	0.126	0.000	0.10	
S7.000	SDUMMY	120 minute 100 year Summer I+40%	22.300	22.123	0.523	0.000	0.00	
S7.001	SPCP2	120 minute 100 year Summer I+40%	22.300	22.123	0.573	0.000	0.06	
S8.000	SDUMMY	180 minute 100 year Summer I+40%	22.160	22.021	0.421	0.000	0.00	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Pipe Flow (l/s)	Status
S1.000	SDUMMY	0.0	FLOOD RISK
S1.001	SPCP7/8	1.1	FLOOD RISK
S2.000	SDUMMY	0.0	FLOOD RISK
S2.001	SPCP6	1.0	FLOOD RISK
S3.000	SDUMMY	0.0	FLOOD RISK
S3.001	SPCP5	1.0	FLOOD RISK
S4.000	SDUMMY	0.0	FLOOD RISK
S4.001	SPCP4	1.0	FLOOD RISK
S5.000	SDUMMY	0.0	FLOOD RISK
S5.001	SPCP3	1.0	FLOOD RISK
S6.000	SBio	4.4	OK
S6.001	SBio	1.4	SURCHARGED
S1.002	S1	6.6	SURCHARGED
S7.000	SDUMMY	0.0	FLOOD RISK
S7.001	SPCP2	1.1	FLOOD RISK
S8.000	SDUMMY	0.0	FLOOD RISK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)
S8.001	SPCP-V	180 minute 100 year Summer I+40%	22.160	22.021	0.461	0.000	0.07	
S1.003	S2	480 minute 100 year Summer I+40%	22.280	21.703	0.303	0.000	0.17	
S9.000	SBio	30 minute 100 year Summer I+40%	22.140	21.871	-0.269	0.000	0.02	
S9.001	SBio	30 minute 100 year Summer I+40%	21.980	21.858	0.578	0.000	0.19	
S10.000	SDUMMY	480 minute 100 year Summer I+40%	22.140	21.651	0.061	0.000	0.00	
S10.001	SPCP1	480 minute 100 year Summer I+40%	22.140	21.651	0.111	0.000	0.02	
S1.004	S3	1440 minute 100 year Summer I+40%	22.000	21.887	0.627	0.000	0.13	
S1.005	S4	1440 minute 100 year Summer I+40%	21.950	21.880	0.705	0.000	0.13	
S1.006	S5	1440 minute 100 year Summer I+40%	21.810	21.813	0.713	4.075	0.11	
S11.000	SDUMMY	600 minute 100 year Winter I+40%	22.000	21.931	0.481	0.000	0.00	
S11.001	SPCP	600 minute 100 year Winter I+40%	22.000	21.931	0.531	0.000	0.02	
S11.002	S6	600 minute 100 year Winter I+40%	21.790	21.472	0.822	0.000	0.05	

PN	US/MH Name	Pipe Flow (l/s)	Status
S8.001	SPCP-V	1.0	FLOOD RISK
S1.003	S2	10.9	SURCHARGED
S9.000	SBio	6.0	FLOOD RISK
S9.001	SBio	8.7	FLOOD RISK
S10.000	SDUMMY	0.0	SURCHARGED
S10.001	SPCP1	0.4	SURCHARGED
S1.004	S3	8.1	FLOOD RISK
S1.005	S4	8.1	FLOOD RISK
S1.006	S5	5.0	FLOOD
S11.000	SDUMMY	0.0	FLOOD RISK
S11.001	SPCP	0.9	FLOOD RISK
S11.002	S6	0.9	SURCHARGED

APPENDIX J

Overland Flow Routes

KEY

SURFACE WATER EXCEEDANCE ROUTES

PRELIMINARY ISSUE

–	–				
ST	Rev	Description	Drn	Chk	Date

REVISIONS

Preliminary Issue	✓	Submitted for S104	
Planning Issue		Issued for Tender	
Submitted for S38		Issued for Construction	
Submitted for S278		As Built	

DRAWING STATUS

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SHANLY HOMES

JOB TITLE
ANYARDS ROAD, COBHAM

DRAWING TITLE
EXCEEDANCE FLOW ROUTES

DATE	DRAWN	CHECKED	SCALE	
OCT. 2023	EL	JOK	1:200	@A1

DRAWING No.	REV	STATUS
7073.401	–	SO

Constructionline
A UK GOVERNMENT CERTIFICATION SERVICE

APPENDIX K

SuDS Maintenance and Management

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Table 18.3 Operation and maintenance requirements for bioretention systems

Maintenance Schedule	Required action	Frequency
Regular Inspections	Inspect infiltration surfaces for sitting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary.	Quarterly
	Check operation of underdrains by inspection of flows after rain.	Annually
	Assess plants for disease, infection, poor growth, invasive species etc and replace as necessary.	Quarterly
	Inspect inlets and outlets for blockage.	Quarterly
Regular maintenance	Remove litter and surface debris and weeds.	Quarterly (or more frequently for tardiness or aesthtic reasons)
	Reolace any plants, to maintain planting density.	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays.	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required.	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and	As required.
Remedial actions	Remove and replace filter medium and vegetation above.	As required (but likely to be > 20 years)

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Table 16.1 Operation and maintenance requirements for filter drains

Maintenance Schedule	Required action	Frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices.	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, 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, romove surface geotextile and replace, and wash or replace overlying filter medium.	Five yearly, or as required
	Clear perforated pipework of blockages	As required

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Table 20.15 Operation and maintenance requirementsfor pervious pavements

Maintenance Schedule	Required action	Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface).	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying.	As required - once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required.
	Rehabilitation of surface and upper sub-structure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging).
Monitoring	Initial inspection.	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action.	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Anually.
	Monitor inspection chambers	Anually.