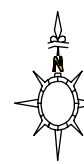


Appendix C

Topographic Survey

NOTES:
Drainage:
 Inverted Covers are fitted where possible and all drainage Invert Information has been obtained through visual inspection only, with the exception of manholes, which are surveyed and certified as per the guarantee. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.
 Every effort has been made to identify and detail all trees on site and to provide a list of trees and their species.
 The survey is not intended to be used as a basis for a tree or landscape specialist such as an arborist. Tree spread and heights are indicative.
GPS:
 The detail is relative to the time and date of survey, GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey.
 The survey is based on the following factors: 1. Horizontal and Vertical Datum are established from a central site fix and the datum station is utilising ONSD centre line.
Survey notes:
 Survey specification is limited to the original purpose of the survey and is not intended to be used as a basis for any other purpose.
 Survey is accurate within limitations of site conditions at the time of survey.
 The survey is not intended to be used as a basis for any other purpose, for example, design of new vegetation, critical dimensions and positions should be verified following suitable drainage.
 The detail obtained and shown is relative to the plotting scale.
Copyright:
 This survey information is Copyright Encropment Surveys Ltd (2009).



LEGEND

Alder	ALD	LOCUST	LOC
Ash	ASH	LONDON PLANE	LON
Ashen	ASH	MANCINI	MAN
Beech	BCH	NARLE	NAR
Cedar	CAR	OAK	OAK
Cherry	CHY	PINE	PIE
Cherry	CHY	POPLAR	POP
Elm	ELM	PRULUS	PRU
Fir	FER	RHO-DO-DEN-DRON	RDO
Fruit	FRU	ROBIN	ROB
Hawthorn	HAW	SILVER BIRCH	SILV
Holly	HOL	SORBUS	SOR
Madly	MAL	SWEET CHESTNUT	SCH
Norfolk Chestnut	NCH	SYCAMORE	SYC
Norway Spruce	NOR	WALNUT	WAL
Laburnum	LAB	WELSH	WEL
Larch	LAR	YEW	YEW
Lime	LIM	SPECIES UNKNOWN	UNK
		COPSEID	COP

TREE ANNOTATIONS: Tree Species / Tree Ball Size / No of Balls
 Tree Height / Tree Canopy Spread

FENCE INFORMATION		LEVEL INFORMATION	
INTERESTED WARD FENCE	WFP	BASSMENT LEVEL	BTB
CORROGATED IRON FENCE	CTF	BD LEVEL	BL
CLOSE BOARD FENCE	CBF	CD LEVEL	CL
CHAIN LINK FENCE	CLF	CONC. PROOF COURSE	CPC
CUTTING RAILING	CRF	FLOOR SLAB	FL
CRASH BARRIER	CBF	INVERT LEVEL	IL
HANDRAIL	HOL	OUTRILL LEVEL	OL
IRON RAILINGS	IRF	THRESHOLD LEVEL	THL
LATCH LAP FENCE	LFL	TOP. WATER	FW
NON-LANDED FENCE	NLF	SUBGRADE	SG
PAVING FENCE	PSF	UNABLE TO LIFT	UL
POCKET FENCE	PFF	WATER LEVEL	WL

POST AND CHAIN FENCE	PCF	SURFACE INFORMATION	
POST AND RAIL FENCE	PRF		
POST AND WIRE FENCE	PWF		
STOCK WIRE FENCE	SWF		
TRIPLE STRIKING	TSF	CONCRETE	Concrete

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BUS TELECOM BOX	ETB	POST	
BUS/TELECOM IC	ETIC	RAIN WATER PIPE	RWP
BUS STOP		RAISED FLOERBOARD	RFB
CABLE TELEVISION BOX	QTB	ROAD SIGN	RS
CABLE TELEVISION IC	CAV	ROOFCING EYE	RE
CLIMATE CONTROL	CC	SERVICE HATCH/POST	SH
ELECTRICITY CABLE FIT	ELCP	SOIL VENT PIPE	SV
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
FLYHUB HYDRANT	PH	TELEGRAPH POLE	TP
FLYHUB COVER	IC	TELEPHONE CABLE BOX	TCB
LAMP "NO"		TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNALS IC	TSIC
LITTER BIN	RB	WATER METER	WM
KERB OUTLET	KO	WATER TAP	Tap

Level Datum:

Grid:
Grid is related to GFCB1E, diagonal from the C9C, not from the

Northpoint:



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Tel: 023 80692022 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

Client: Croudace Homes

Survey	Partridge Green
Location	W. of Partridge Green

Location: West Sussex
RH13 8EQ

Survey type: Topographical	Scale: 1:200@A0
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Drawing ref:	EMC/030031/00/00/00	Date:	September 2002
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Drawing Ref.	ENC 07/0921/9KRS/1	Date:	September 2002

Drawn/QA: CH/DH	Plot No. Plot 8 of 10
-----------------	-----------------------

NOTES:

Drainage:
Inverted Covers are fitted where possible and all drainage Invert Information has been obtained through visual inspection only, with no excavation or testing carried out. The above information is provided as guaranteed. Where drainage is of critical importance we suggest you get the services of a specialist drainage expert be used.

Soils:
Every effort has been made to identify and detail all trees on site and their condition. However, it is not possible to provide a detailed soil specialist such as an arborist. Tree spread and heights are indicative.

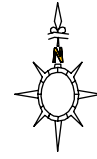
GPS:
A detailed plan relative to the time and date of survey, GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey.

Survey Data:
The following data was collected by the Surveyor: Factor 1 (Horizontal) and Vertical Datum are established from a central site fix and the datum station location utilizing GNSS control system.

Survey notes:
Survey specification is limited to the original purpose of the survey. Any additional survey work may be possible for this purpose only.
Survey is accurate within limitations of site conditions at the time of survey. It is not intended to be used for legal purposes.
No sight or dense vegetation, critical dimensions and positions should be verified following suitable distance.

Disclaimer:
This document and drawings is relative to the plotting scale.

Copyright:
This survey information is Copyright Encropment Surveys Ltd (2009).



LEGEND

TREE SPECIES INFORMATION

ALDER	AUL	LOOSET	LOC
ASH	ASH	LONDON PLANE	LYN
ASTEN	ASP	MACAOA	MAG
BEDCH	BCH	MAPLE	MPL
CEDAR	CSD	CMK	CMK
CHERRY	CHY	PIRE	PIE
CHIPPERS	CHP	POPULAR	POP
CLIM	CLM	PLUMUS	PLS
FRUIT	FRU	RHODODENDRONS	RDN
FRUIT	FRU	ROVER	RWN
HAUTHORN	HAN	SILVER BIRCH	SBR
HAZEL	HZL	SCABUS	SCR
HOLLY	HOL	SWEET CHESTNUT	SCH
HORSE CHESTNUT	HCH	SWANEO	SWC
HORNBEAM	HBN	WILMUT	WMT
LABURNUM	LYN	WELLOW	WLY
LARCH	LAR	YEW	YEW
LEIGH	LEH	SPECIES UNKNOWN	SPK
		STREPTA	STR

TREE ANNOTATIONS: Tree Species / Tree Ball Size / No of Balls
Tree Height / Tree Canopy Spread

FENCE INFORMATION

BARRIED WIRE FENCE	BWP	BASINMENT LEVEL	BTL
CORRUGATED IRON FENCE	CBT	BED LEVEL	BL
CLOSE BOARD FENCE	CBF	COVER LEVEL	CL
OSAN LATH FENCE	CLF	DAMP PROOF COURSE	DPC
CRYSTALL PAILING	CP	FLOOR LEVEL	FL
CRASH BARRIER	CBB	IMPORT LEVEL	IL
HANDRAIL	HOL	OUTFILL LEVEL	OL
IRON PAILINGS	IPL	THRESHOLD LEVEL	TL
LARCH LATH FENCE	LSF	TOILE WATER	FW
MISCELLANEOUS FENCE	MLF	SURFACE WATER	SW
PALEADE FENCE	PSF	UNABLE TO LIFT	UTL
PICKET FENCE	PWF	WATER LEVEL	WL

LEVEL INFORMATION

BARRIED WIRE FENCE	BWP	BASINMENT LEVEL	BTL
CORRUGATED IRON FENCE	CBT	BED LEVEL	BL
CLOSE BOARD FENCE	CBF	COVER LEVEL	CL
OSAN LATH FENCE	CLF	DAMP PROOF COURSE	DPC
CRYSTALL PAILING	CP	FLOOR LEVEL	FL
CRASH BARRIER	CBB	IMPORT LEVEL	IL
HANDRAIL	HOL	OUTFILL LEVEL	OL
IRON PAILINGS	IPL	THRESHOLD LEVEL	TL
LARCH LATH FENCE	LSF	TOILE WATER	FW
MISCELLANEOUS FENCE	MLF	SURFACE WATER	SW
PALEADE FENCE	PSF	UNABLE TO LIFT	UTL
PICKET FENCE	PWF	WATER LEVEL	WL

POST AND RAIL FENCE	PRF	SURFACE INFORMATION
POST AND RAIL FENCE	RAE	

STOCK WIRE FENCE	SWF	CONCRETE	Conc
TRELIS FENCING	TUF	BRICK PAVING	BP
		FLOWERBED	FB
		PAVING SLABS	PS
		RETAINING WALL	RWall
		TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BUS TELECOM BOX	BTB	POST	P
BUS STOP TELEVISION IC	BS	RATE WATER PUMP	RWP
BUS STOP	BS	RAISED FLOORBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CAV	ROCKINGE EYE	RE
CARDING BOX	CB	STREET MARKER POST	SMPP
ELECTRICITY CABLE PFT	ECF	SIDE WALK	SW
ELECTRICITY CONTROL BOX	ELCB	STOP COCK	SC
ELECTRICITY POLE	ELP	TRUCK	T
FIRE HYDRANT	FM	TELEPHONE BOX	TP
FIRE SIGNAL	FS	TELEPHONE CAB BOX	TSCB
FIRE TRUCK	FT	TRAFFIC SIGNAL	TS
LAMP POST	LP	TRAFFIC SIGNAL IC	TSCIC
LITTER BOX	LB	WATER PUMP	WP
LITTER BIN	IBN	WATER METER	WM
WATER OUTLET	WO	WATER TAP	WT
WATER POST	WP		

Level Datum:
Levels are related to OSGB15 derived from the GPS network

Grid:
Grid is related to OSGB15 derived from the GPS network.

Northpoint



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Tel: 023 80692002 Email: info@encompass-surveys.co.uk

Client:	Croudace Homes
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Survey Location:	Partridge Green West Sussex
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Survey type:	Topographical
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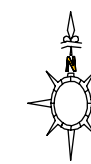
Drawing ref: ENC/070921/9R

Drawn/QA: CH/DH

Date:	September 202
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Plot No. Plot 5 of 10

NOTES:
Drainage:
 Inverted Covers are fitted where possible and all drainage Invert Information has been obtained through visual inspection only, with the exception of manholes, which are surveyed and certified as per the guarantee. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.
 Every effort has been made to identify and detail all trees on site and to provide a list of trees and their species. The surveyor is not a specialist such as an arborist. Tree spread and heights are indicative.
GPS:
 A detailed plan relative to the time and date of survey, GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey.
 Survey data is stored on a computer using the factors 1 and 10 and Vertical Datum are established from a central site fix and the datum station is utilized using ONSD centre point.
Survey notes:
 Survey specification is limited to the original purpose of the survey and is not intended as a warranty or guarantee for the use of the survey.
 Survey is accurate within limitations of site conditions at the time of survey and is not intended as a warranty or guarantee for the use of the survey.
 The survey is not intended to be used for the purpose of the design or design of new vegetation, critical dimensions and positions should be verified following suitable drainage.
 The survey is not intended to be used for the purpose of the design or design of new vegetation, critical dimensions and positions should be verified following suitable drainage.
Copyright:
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LEGEND

TREE SPECIES INFORMATION

ALDER	ALD	ECOLOGIST	LOC
ASH	ASH	LONDON PLANE	LUN
ASHLEY	ASP	MAGNOLIA	MAG
BEECH	BSP	MAPLE	MAP
CEDAR	CED	OAK	OAK
CHERRY	CHY	PINE	PIN
CYPRESS	CYP	POPPAR	POP
ELM	ELM	PLUM	PLM
FIR	FIR	RHODODENDRON	RHS
FRUIT	FRT	ROBIN	ROB
HAWTHORN	HAW	SILVER BIRCH	SIB
HOLLY	HOL	SWEET	SWE
HEDGE CHESTNUT	HCH	SYCAMORE	SYC
HORNBEAM	HBM	WALNUT	WNT
LAVENDER	LAV	WILLOW	WIL
LARCH	LAR	YEW	YEW
LYRRE	LYR	SPECIES UNKNOWN	SPU
		UNKNOWN	UNK

TREE ANNOTATIONS: Tree Species / Tree Bolt Size / No of Bolts

FENCE INFORMATION

BARBED WIRE FENCE	BMW	BASEMENT LEVEL
CORRUGATED IRON FENCE	CBF	2ND LEVEL
CLOSE BOARD FENCE	CLF	COVER LEVEL
CHAIN LINK FENCE	CLP	DAMP PROOF COURSE
CHISTMUT PALING	CLP	FLOOR LEVEL
CRASH BARRIER	COR	INVERT LEVEL
HANDRAIL	INDL	OUTLET LEVEL
IRON RAILINGS	IRF	THRESHOLD LEVEL
LARCH PAL FENCE	LAF	TOILET WATER
MASON LAMBRIDGE FENCE	LSF	SURFACE WATER
PALETTE FENCE	PSF	UNABLE TO LIFT
RAILWAY SERVICE	RWS	WATER LEVEL

SURFACE INFORMATION

POST AND RAIL FENCE	PWF	DOGS AND CATS
STOCK WIRE FENCE	SWF	
TRELLIS FENCING	TLF	CONCRETE

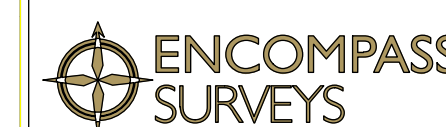
FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD
BROADCAST TELECOM BOX	BTB	POST
BURFISH TELECOM IC	BTIC	RAIN WATER PIPE
BUS STOP	BS	RAISED FLOORED
CABLE TELEVISION BOX	CATB	ROAD SIGN
CABLE TELEVISION JC	CATV	ROCKING EYE
EARTHING RCD	ER	SERVICE HANDBOOK STOP
ELECTRICITY CABLE PIT	ELCP	SOL VENT PIPE
ELECTRICITY CONTROL BOX	ECB	STOP COCK
ELECTRICITY POLE	EP	STOP MARK
PIRE MOUNT	PM	TELEGRAPH POLE
INSPECTION COVER	IC	TELEPHONE CALL BOX
LAMP POST	LP	TRAFFIC SIGNAL
LETTER BOX	LB	TRAFFIC SIGNAL JC
LITTER BIN	LBIN	WATER METER
WATER OUTLET	WO	WATER TAP

Level Datum:
Levels are related to OSGB15 derived from the GPS network

Grid:
Grid is related to OSGB15 derived from the GPS network

Northpoint



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Website: encompass-surveys.co.uk

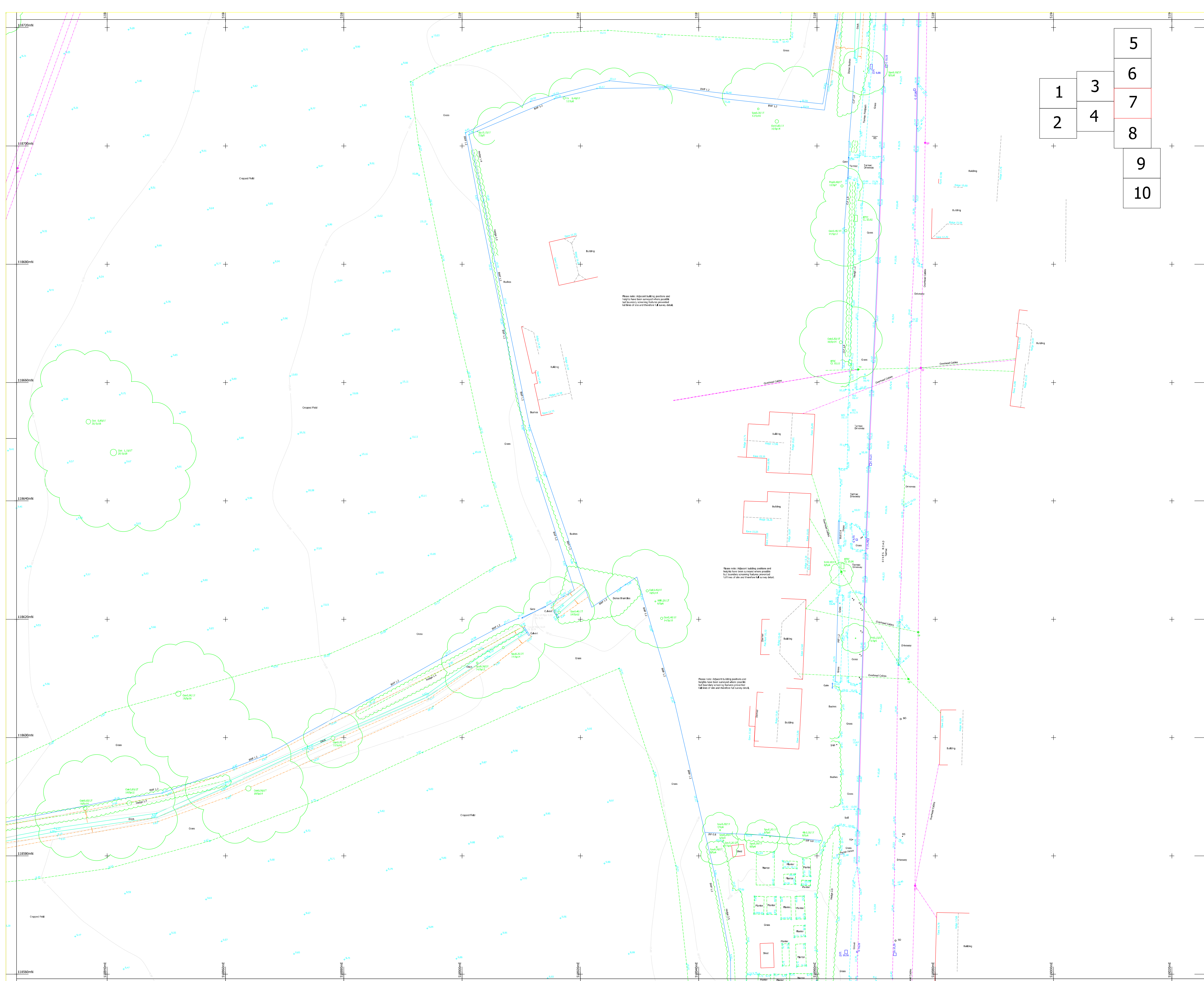
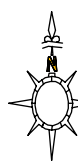
Client: Croudace Homes

Survey Location:	Partridge Green West Sussex
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RM13 8EQ	
Survey type: Topographical	Scale: 1:200@A

Drawing ref:	ENC/070921/9RR9/T	Date:	September
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Drawn/QA:	CH/DH	Plot No.	Plot 6 of 7
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[illegible]

LEGEND

TREE SPECIES INFORMATION			
ALDI	A.DI	LOCUST	LOC
ASH	ASH	LIRIODENDRUM	LIR
ASPEN	ASP	NOGAL	NAG
BEECH	BCH	PAWLE	PWL
CEDAR	CED	PAE	PAE
CHESTNUT	CHE	PIN	PIN
CYPRESS	CYP	POINAR	POP
ELM	ELM	PLUM	PLS
FRAXINUS	FRX	SPICEWOOD	SPC
FRUIT	FRU	ROVANA	ROV
HAWTHORN	HWN	SILVER BIRCH	SBI
HOLM	HOL	SOR	SOR
MAPLE	MAP	STICK CHESTNUT	SCS
HEDGE CHESTNUT	HCH	STAGHORN	SHG
HORNBEAM	HOB	WALNUT	WAL
LARICINUS	LRI	YEW	YEW
LARCH	LAR	YEW	YEW
LIME	LIM	SPECIES UNKNOWN	SUO
		COPIED	COU

TREE ANNOTATIONS: Tree Species / Tree Ball Size / No of Balls

[illegible]

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BURFISH TELECOM BOX	BTB	POST	P
BURFISH TELECOM IC	BTIC	RAIN WATER PUMP	RWP
BURFISH TELECOM BOX	BTB	RAISED FLOORSHEET	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CATV	ROOFING EIT	RE
EARTHING ROD	ELR	SERVICE MANAGER POST	SMP
ELECTRICITY GEAR FET	EFG	SOIL VENT PIPE	SVF
ELECTRICITY CONTROL BOX	ECB	STOP SIGN	SC
ELECTRICITY POLE	EP	STOMP VALE	SV
FIRE HYDRANT	FM	TELEPHONE POLE	TP
FIRE INSPECTION COVER	LI	TELEPHONE SIGNAL	TCS
LETTER BOX	LB	TRAFFIC SIGNAL IC	TSC
LITTER BIN	LB	WATER METER	WM
WATER OUTFLET	KO	WATER TAP	WT

Level Datum:

Levels are related to OSGB15 derived from the GPS netw

Grid:
Grid is related to GECB1E, derived from the GEC network.

Northpoint



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Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Croudace Homes
---------	----------------

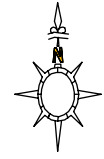
Survey Location: Partridge Green
West Sussex

RH13 8EQ	
1	2

Survey type:	Topographical	Scale:	1:200,000

Drawing ref:	ENC/070921/9RR9/T	Date:	September

Drawn/QA:	CH/DH	Plot No.	Plot 7 of 10
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[illegible]

LEGEND

TREE SPECIES INFORMATION

AUDER	AUD	LOOSET	LOC
ASH	ASH	LONDON PLANE	LTH
ASTEN	ASP	MANGOLA	MAG
BEDCH	BCH	MAPLE	MPL
CEGAR	CED	OAK	OAK
CHERRY	CHY	PINE	PIN
CYPRESS	CYP	POKAR	POK
ELM	ELM	MULBIS	MIS
FER	FER	RHODOCORONDS	RDN
FRUIT	FRW	ROBIN	RWN
HAITHORN	HWN	SILVER BUNCH	SBS
HATTEL	HAT	SORBUS	SOS
HOLL	HOL	SWEET CHESTNUT	SCS
HORN OF ESTIMAT	HCH	SYCAMORE	SYC
HOISINMAN	HPI	WALNUT	WNT
LAUBERMAN	LPI	WELLOW	WLV
LARCH	LAR	YEW	YEW
LOPES	LPI	SPECIES UNKNOWN	SFU

TREE ANNOTATIONS: Tree Species / Tree Ball Size / No of Balls

FENCE INFORMATION

BARBED WIRE FENCE	BMF	BASINMENT LEVEL	BL
CORRUGATED IRON FENCE	CI	BED LEVEL	BL
CLOSE BOARD FENCE	CBF	COVER LEVEL	CL
CHAIN LINK FENCE	CLF	DAMP ROOF COURSE	DC
CHESTNUT RAILING	CRF	FLOOR LEVEL	FL
CRACK BARBER	CRB	GRAVE LEVEL	GL
HANDRAIL	HOL	OUTRILL LEVEL	OL
IRON RAILINGS	IRF	THRESHOLD LEVEL	THL
LARCH LAP FENCE	LLF	POLE WATER	FW
MISCELLANEOUS FENCE	MSF	SURFACE WATER	SW
PALEADE FENCE	PDF	UNABLE TO LIFT	UL
POST-AND-RAIL	PAR	WATER LEVEL	WL

UNCE PRF GUIDANCE

STOCK WIRE FENCE	SWF		
TRELLIS FENCING	TUF	CONCRETE	Conc
		BRICK PAVERS	BP
		FLOWERBED	FB
		PAVING SLABS	PS
		RETAINING WALL	RWall
		TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	AB
BATTLES TELECOM BOX	BTE	BOX	P
BATTLES TELECOM JC	BTJ	RAIN WATER PIPES	RP
BUS STOP	BS	RANDED FLOURENCE	RF
CABLE TELEVISION BOX	CAB	ROCK SIGN	RS
CABLE TELEVISION JC	CAJ	ROCKING EYE	RE
EARTHING ROD	ER	SEWAGE MANHOLE STOP	SMP
ELECTRICITY CABLE	ELC	SOL VINT PIPE	SV
FLY TIGHTENITY CONTROL BOX	FCB	SP	SC
ELECTRICITY POLE	EP	STOP VALVE	SV
PIST MIDSTANT	PM	TELEGRAPH POLE	TP
INSCRIPTION COVER	IC	TELEPHONE CALL BOX	TCB
LAMP POST	LP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNAL SIGN	TSS
LETTER BIN	BN	WATER METER	WM
KERN OUTLET	KO	WATER TAP	WT

Level Datum:
Levels are related to OSGB15 derived from the GPS network

Grid:
Grid is related to OSGB15 derived from the GPS network

Northpoint



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Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Coudane Homes
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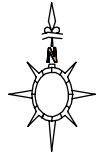
Survey	Partridge Green
--------	-----------------

Location:	West Sussex RH13 8EQ
-----------	-------------------------

Survey type: Topographical	Scale: 1:200@A0

Drawing ref:	ENC/070921/9RR9/T	Date:	September 2021
Rev:	001	Rev:	001

NOTES:
Drainage:
 Inverted Covers are fitted where possible and all drainage Invert Information has been obtained through visual inspection only, with the exception of manholes, which are surveyed and certified as per the guarantee. Where drainage is of critical importance we suggest the services of a specialist drainage expert be used.
 Every effort has been made to identify and detail all trees on site and to provide a list of all trees on site.
 The survey is not intended to be used as a basis for any legal or specialist such as an arborist. Tree spread and heights are indicative.
GPS:
 The survey is relative to the time and date of survey. GPS levels and grid are obtained using industry standard guidelines and can vary according to the quality of the GPS network at the time of survey.
 The survey is based on the following factors: 1. Horizontal and Vertical Datum are established from a central site fix and the datum station is utilized using GNSS control data.
Survey notes:
 Survey specification is limited to the original purpose of the survey. The information is not intended to be used for any other purpose.
 Survey is accurate within limitations of site conditions at the time of survey.
 The survey is not intended to be used as a basis for any legal or specialist or design of vegetation, critical dimensions and positions should be verified following suitable drainage.
 The survey is not intended to be used as a basis for any legal or specialist or design of vegetation, critical dimensions and positions should be verified following suitable drainage.
Copyright:
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LEGEND

TREE SPECIES INFORMATION

ALDER	AUL	LOOSEST	LOC
ASH	ASH	LONDON PLANE	LON
ASPEN	ASP	MACAOA	MAG
BIRCH	BCH	MAPLE	MPL
CECILI	CEB	MAK	CAK
CHERRY	CHP	PINE	CHP
CYPRESS	CYP	POPLAR	POP
ELM	ELM	PRUNUS	PRS
FIR	FSR	ROBIN	RBN
FRUIT	FRT	ROBIN	RBN
HEARTHORN	HBN	SILVER BIRCH	SBR
HAWTH	HWT	SORBUS	SOR
HOLLY	HLY	SWEET CHESTNUT	SCN
HORSE CHESTNUT	HCH	SYCAMORE	SYC
HORN	HBN	WALNUT	WNT
LABURNUM	LBN	YELLOW	YLN
LARCH	LAS	YEW	YEW
LYME	LYM	SPECIES UNKNOWN	SPU
		COPPED	COP

TREE ANNOTATIONS: Tree Species / Tree Bolt Size / No of Bolts
Tree Height / Tree Canopy Spread

FENCE INFORMATION

SHARDED WOOD FENCE	BMF	BASINMENT LEVEL	BTB
CORRUGATED IRON FENCE	CT	RED LEVEL	BL
CLOSE BOARD FENCE	CBF	COVER LEVEL	CL
CHAIN LINK FENCE	CLF	CARP PROOF COURSE	CPC
CHESTNUT PALING	CPF	FLOOR LEVEL	FL
CHALK MARKER	CMK	INVERT LEVEL	IL
HANDRAIL	HND	OUTTALL LEVEL	OTL
IRON RAILINGS	IRI	THRESHOLD LEVEL	THL
LARCH LATH FENCE	LIF	FOUL WATER	FW
SLIP LAMINOUS FENCE	NSL	SURFACE WATER	SW
PAVEMENT FENCE	PSF	UNABLE TO LIFT	UL
PICKET FENCE	PNF	WATER LEVEL	WL

LEVEL INFORMATION

SHARDED WOOD FENCE	BMF	BASINMENT LEVEL	BTB
CORRUGATED IRON FENCE	CT	RED LEVEL	BL
CLOSE BOARD FENCE	CBF	COVER LEVEL	CL
CHAIN LINK FENCE	CLF	CARP PROOF COURSE	CPC
CHESTNUT PALING	CPF	FLOOR LEVEL	FL
CHALK MARKER	CMK	INVERT LEVEL	IL
HANDRAIL	HND	OUTTALL LEVEL	OTL
IRON RAILINGS	IRI	THRESHOLD LEVEL	THL
LARCH LATH FENCE	LTF	FOUL WATER	FWW
SLIP LAMINUS FENCE	NSL	SURFACE WATER	SWW
PAVEMENT FENCE	PSF	UNABLE TO LIFT	UL
PICKET FENCE	PNF	WATER LEVEL	WL

POST AND RAIL FENCE	PRF	SURFACE
POST AND WIRE FENCE	PWF	

STOCK WIRE FENCE	SWF	CONCRETE	Conc
TRELIS FENCING	TLF	BRICK PAVING	BP
		FLOWERBED	FB
		PAVING SLABS	PS
		RETAINING WALL	RWall
		TACTILE PAVING	Tac

FEATURE INFORMATION

BOLLARD	BO	NOTICE BOARD	NB
BUS TELECOM BOX	BTB	POST	P
BUS STOP TELEVISION IC	BS	RATE WATER PUMP	RWP
BUS STOP	BS	RAISED FLOORBED	RFB
CABLE TELEVISION BOX	CATB	ROAD SIGN	RS
CABLE TELEVISION IC	CAV	ROCKING CHAIR	RC
CARDPHONE BOX	CB	SEWER MANHOLE POST	SMPP
ELECTRICITY CABLE JET	EJC	SIDE WALK	SW
ELECTRICITY CONTROL BOX	ECB	STOP COCK	SC
ELECTRICITY POLE	EP	TRUCK	T
FIRE HYDRANT	FH	TELEPHONE BOX	TP
FIRE TRUCK	FT	TELEPHONE CAB BOX	TCB
GAS LAMP POST	GLP	TRAFFIC SIGNAL	TS
LETTER BOX	LB	TRAFFIC SIGNAL IC	TIC
LITTER BIN	IBN	WATER METER	WM
WATER OUTLET	WO	WATER TAP	WT
WATER	W		

Level Datum:
Levels are related to OSGB15 derived from the GPS network

Grid:
Grid is related to OSGB15 derived from the GPS network

Northpoint



Encompass Surveys Ltd
Unit 2
Talisman Business Centre
Duncan Road
Park Gate, Southampton
Hampshire SO31 7GA

Tel: 023 80692002 Email: info@encompass-surveys.co.uk
Fax: 023 80697125 Website: encompass-surveys.co.uk

Client:	Croudace Homes
---------	----------------

Survey Location:	Partridge Green
------------------	-----------------

	RH13 8EQ
--	----------

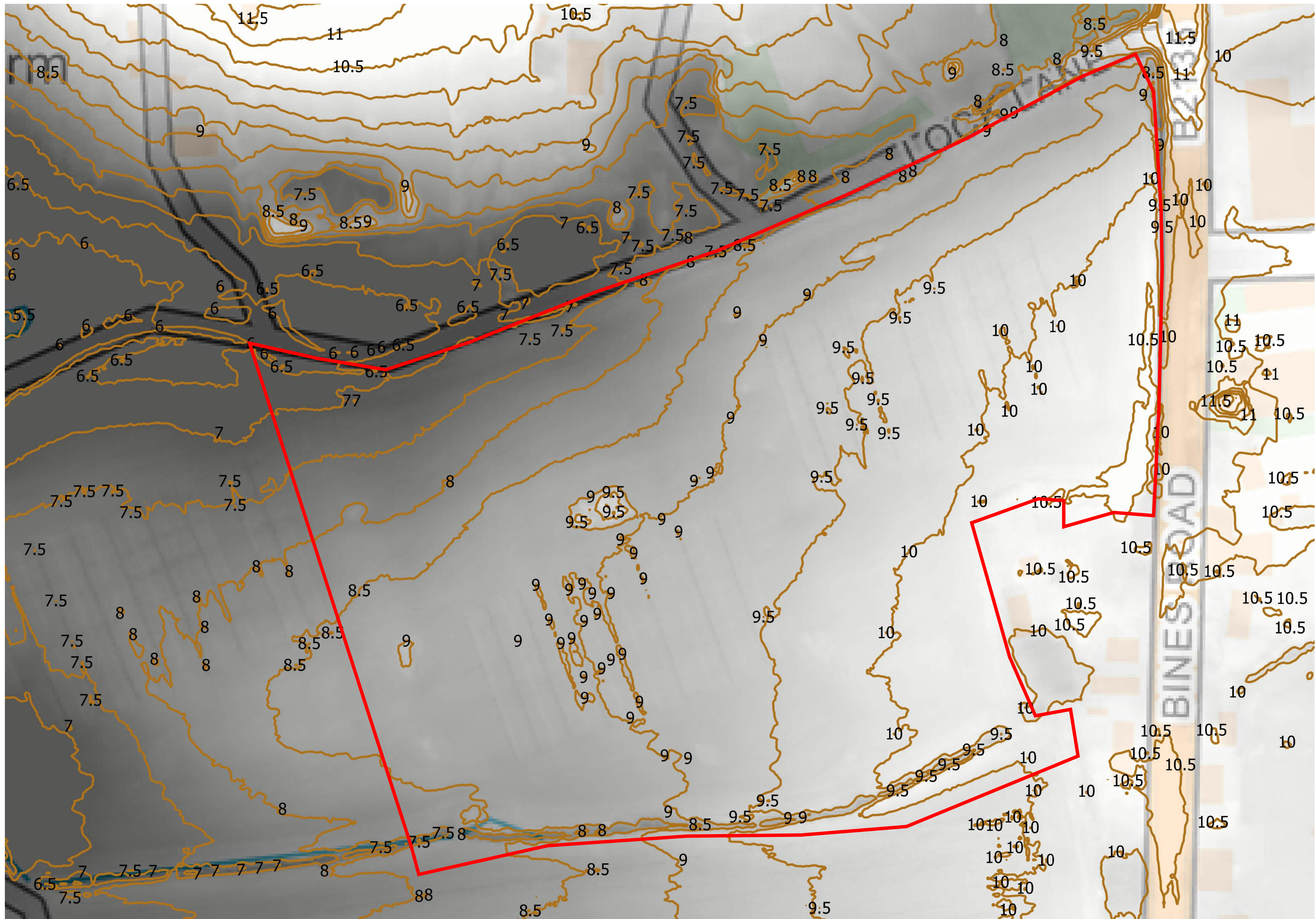
[illegible]

Drawn (DA): CM/DM Plot No. Plot 10 of 10

--	--

Appendix D

LiDAR Contour Plan



Appendix E

Southern Water Asset Location Plan



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

pallen@motion.co.uk

1crpar



[illegible][illegible][illegible]

Appendix F

Environment Agency Flood Map for Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
Unspecified	518818/118696	5 November 2025 12:19

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2025 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Unspecified

Location (easting/northing)
518818/118696

Scale
1:2,500

Created
5 Nov 2025 12:19

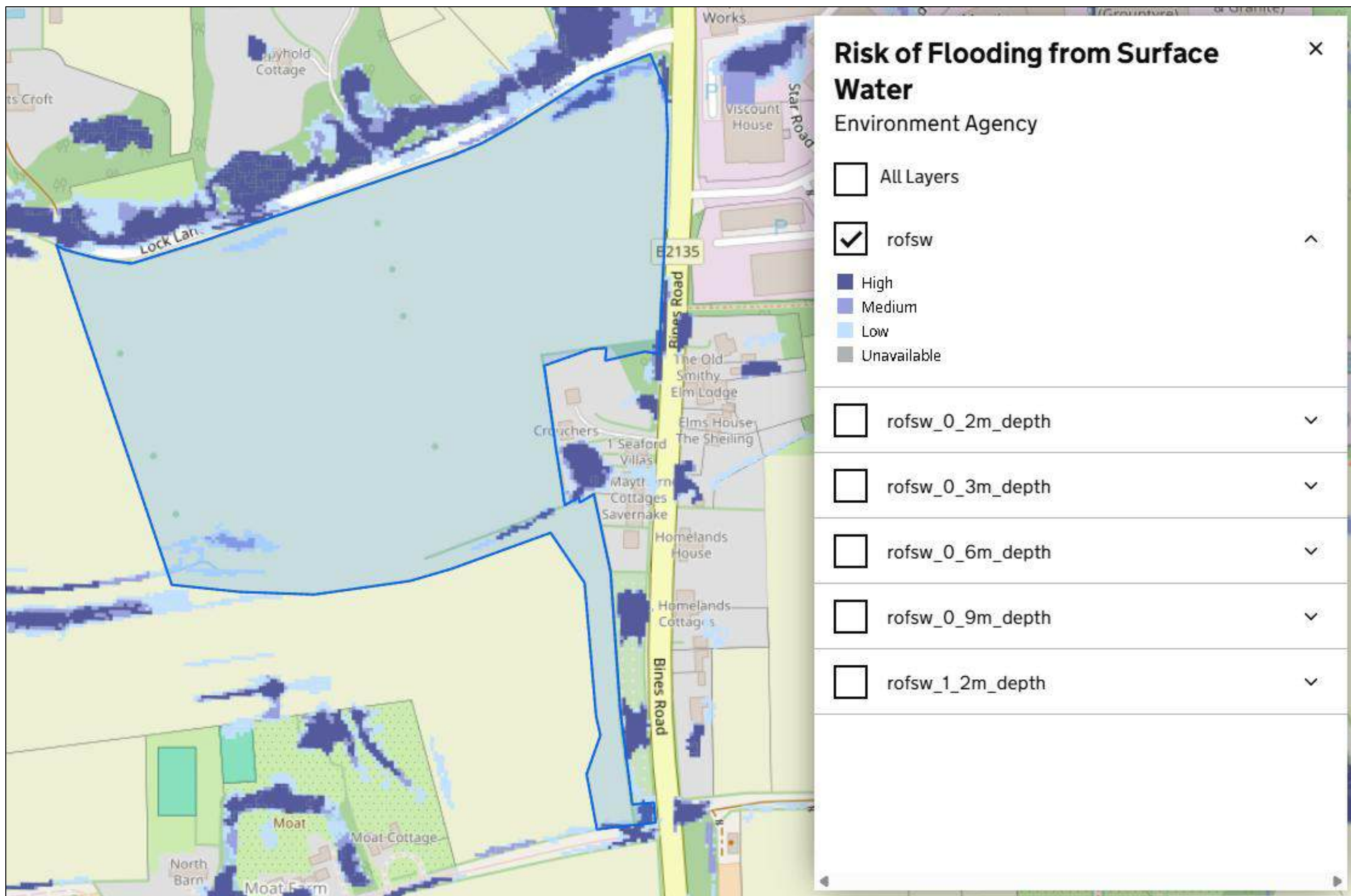
-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

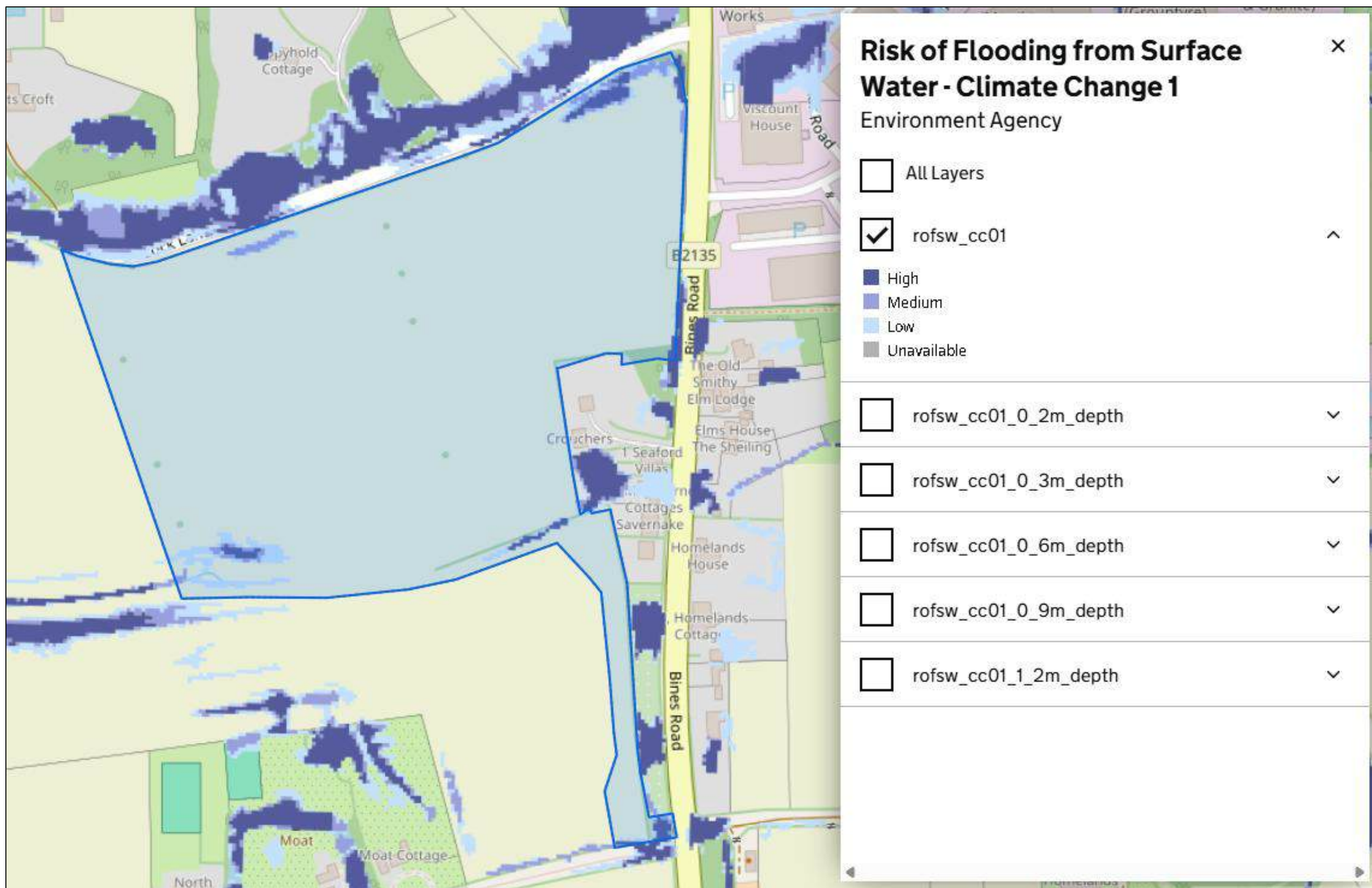


0 20 40 60m

Appendix G

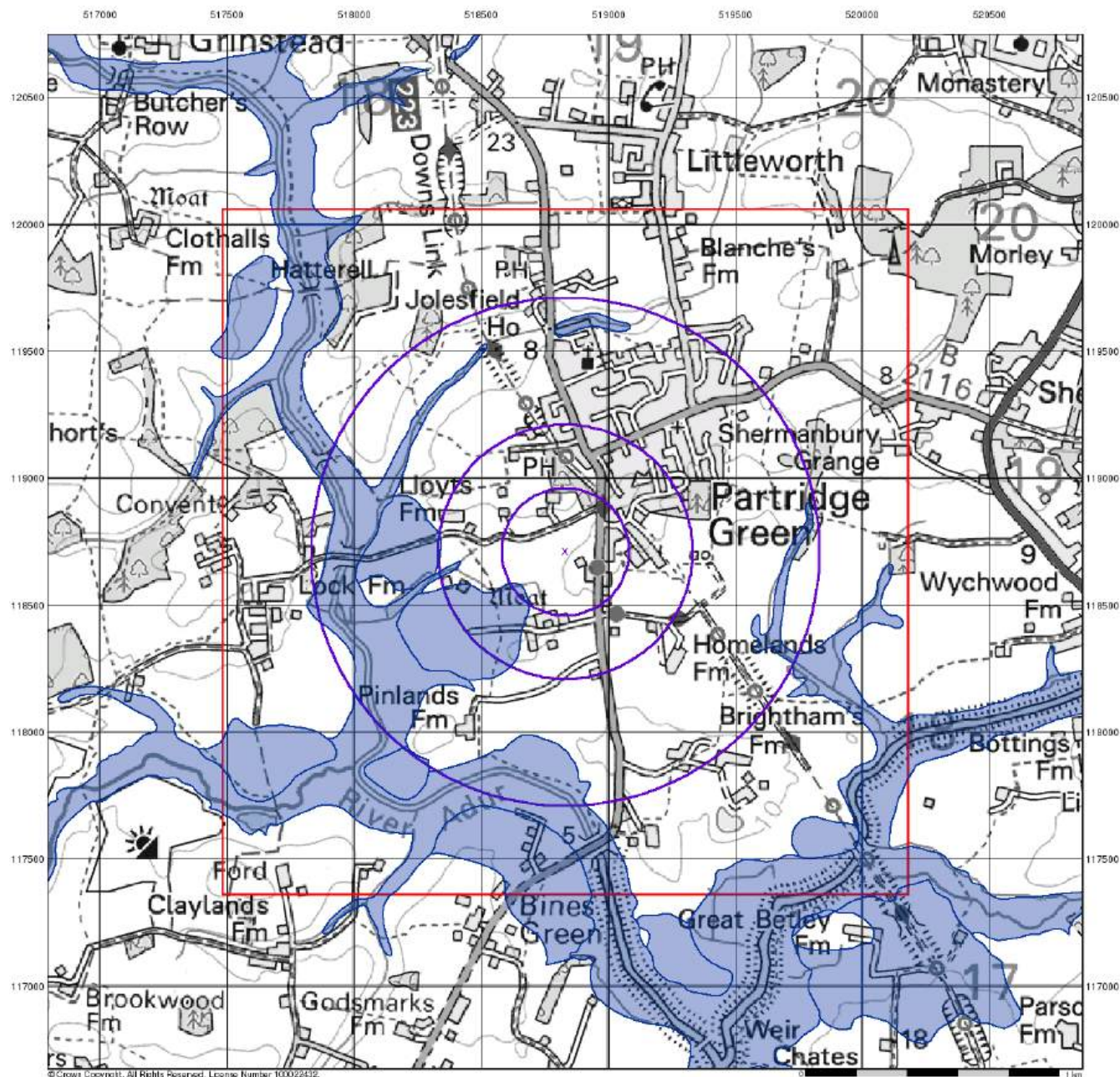
Environment Agency Risk of Flooding from Surface Water Maps





Appendix H

Groundwater Susceptibility Mapping



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motion

BGS Flood Data (1:50,000)

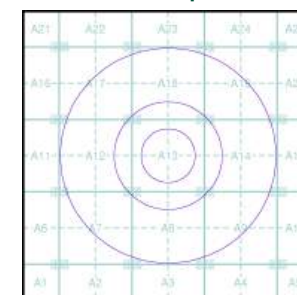
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

BGS Geological Indicators of Flooding

- Coastal
- Inland
- Bodies of Water

BGS Flood Data Map - Slice A



Order Details

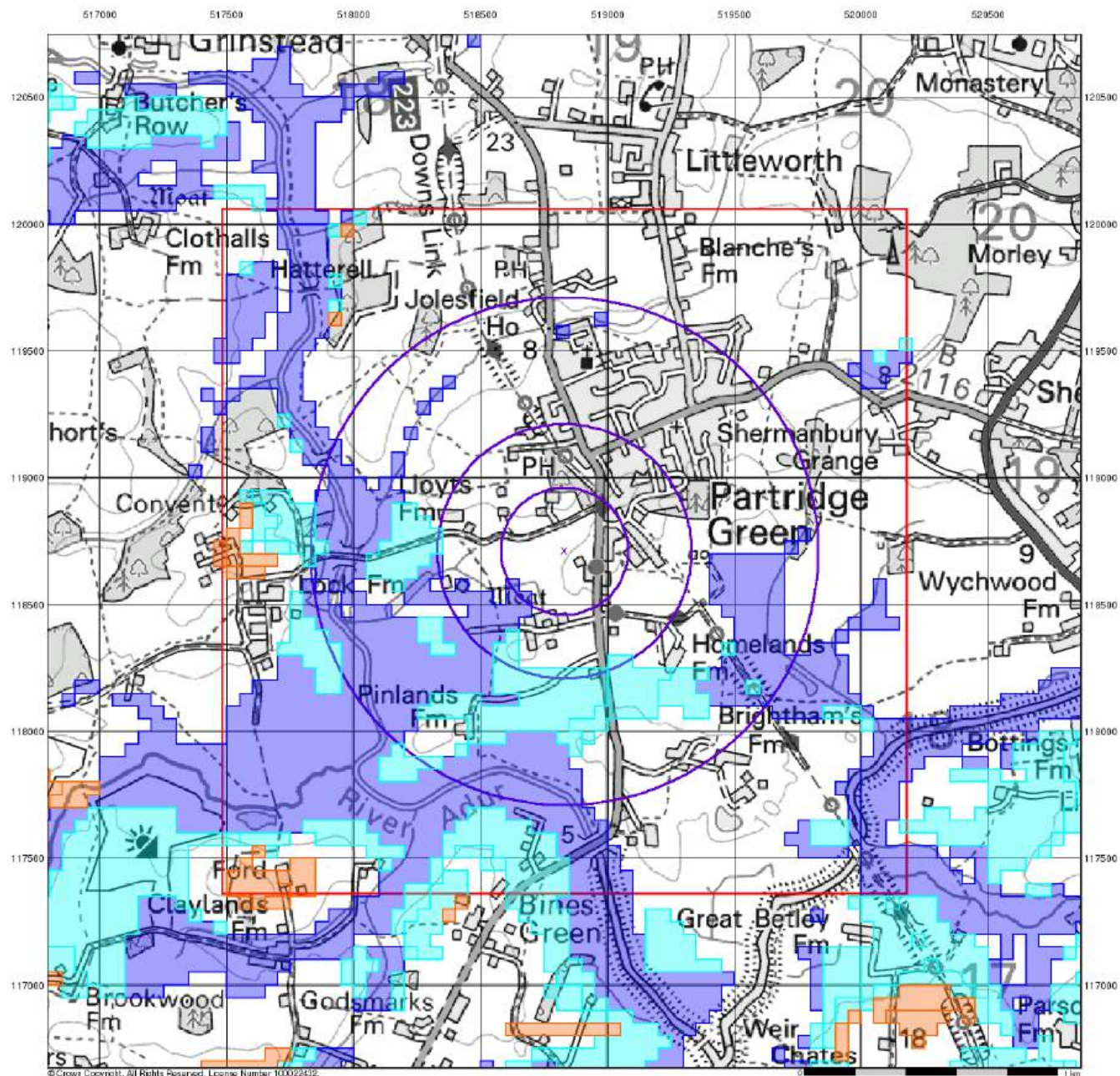
Order Number: 356970744_1_1
 Customer Ref: 1cpar/2403075
 National Grid Reference: 518830, 118710
 Slice: A
 Site Area (Ha): 0.01
 Search Buffer (m): 1000

Site Details

, Annexe, Crouchers Cottage, Bines Road, Partridge Green, RH13 8EQ

Landmark
 INFORMATION GROUP

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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motion BGS Flood Data (1:50,000)

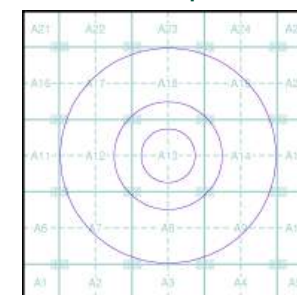
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Slice
-  Map ID

BGS Groundwater Flooding Susceptibility

-  Potential for Groundwater Flooding to Occur at Surface
-  Potential for Groundwater Flooding of Property Situated Below Ground Level
-  Limited Potential for Groundwater Flooding to Occur

BGS Flood Data Map - Slice A



Order Details

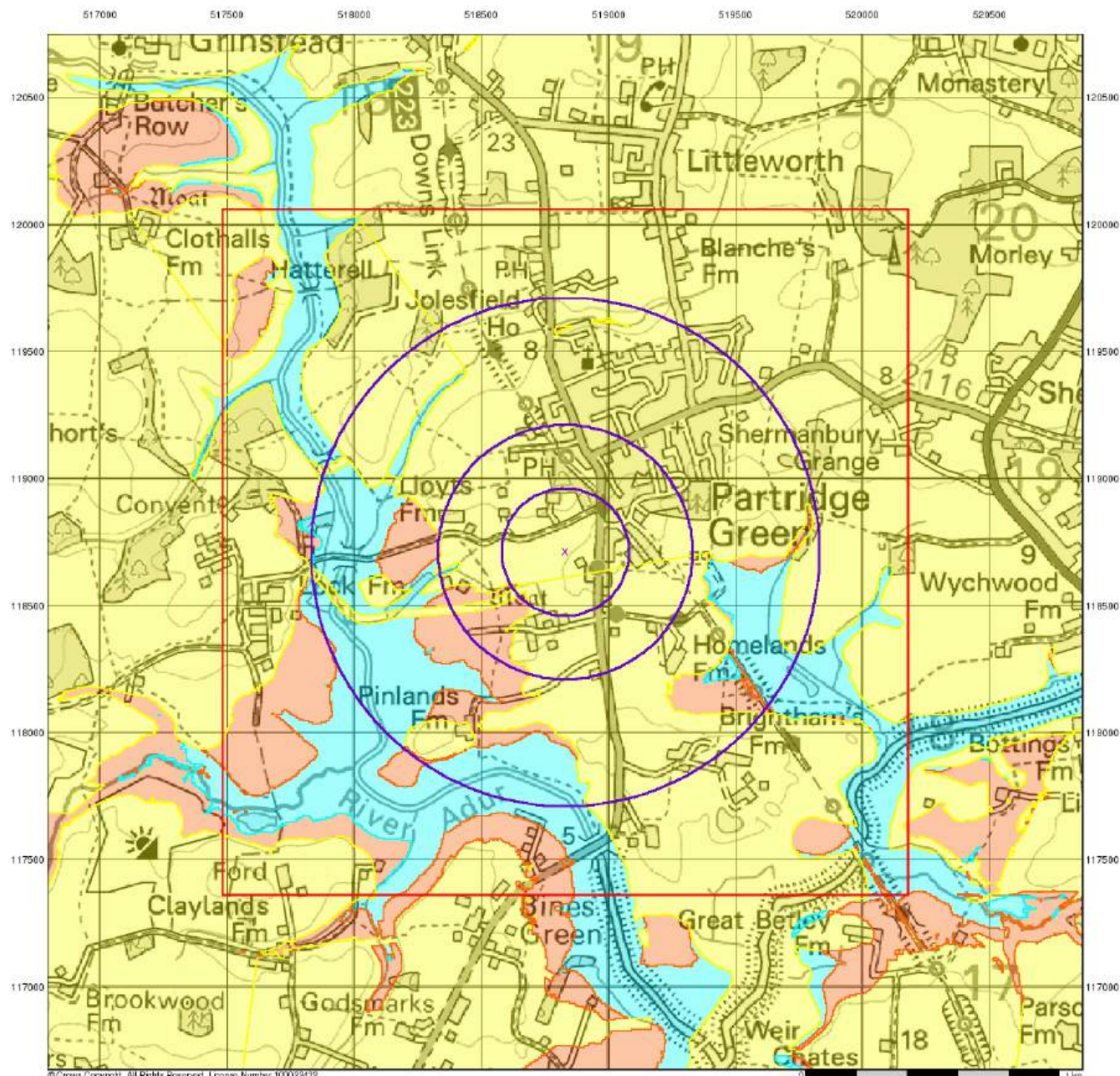
Order Number: 356970744_1_1
 Customer Ref: 1cpar/2403075
 National Grid Reference: 518830, 118710
 Slice: A
 Site Area (Ha): 0.01
 Search Buffer (m): 1000

Site Details

, Annexe, Crouchers Cottage, Bines Road, Partridge Green, RH13 8EQ

Landmark
 INFORMATION GROUP

Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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GeoSmart Information Groundwater Flood Map (1:50,000)

General

Specified Site Specified Buffer(s) X Bearing Reference Point

Slice

GeoSmart Information Groundwater Flooding Risk

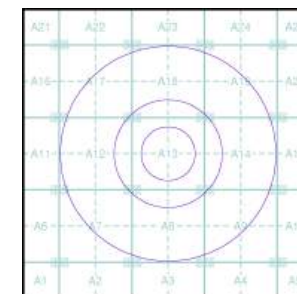
High Risk

Moderate Risk

Low Risk

Negligible Risk

GeoSmart Information Groundwater Flood Map - Slice A



Order Details

Order Number: 356970744_1_1
Customer Ref: 1cpar/2403075
National Grid Reference: 518830, 118710
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

, Annexe, Crouchers Cottage, Bines Road, Partridge Green, RH13 8EQ

Landmark
INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Appendix I

QMED Runoff Calculations

Motion		Page 1												
84 North Street														
Guildford														
Surrey GU1 4AU														
Date 06/11/2025 10:27	Designed by commonuser													
File	Checked by													
Innovyze	Source Control 2020.1.3													
<u>FEH Mean Annual Flood</u> Input <table> <tr> <td>QMED Method</td> <td>2008 URBEXT (1990)</td> <td>0.1814</td> </tr> <tr> <td>Site Location GB 518400 118650 TQ 18400 18650</td> <td>SPRHOST</td> <td>48.290</td> </tr> <tr> <td>Area (ha)</td> <td>0.332</td> <td>BFIHOST 0.251</td> </tr> <tr> <td>SAAR (mm)</td> <td>797</td> <td>FARL 1.000</td> </tr> </table> Results QMED Rural (l/s) 5.1 QMED Urban (l/s) 6.1			QMED Method	2008 URBEXT (1990)	0.1814	Site Location GB 518400 118650 TQ 18400 18650	SPRHOST	48.290	Area (ha)	0.332	BFIHOST 0.251	SAAR (mm)	797	FARL 1.000
QMED Method	2008 URBEXT (1990)	0.1814												
Site Location GB 518400 118650 TQ 18400 18650	SPRHOST	48.290												
Area (ha)	0.332	BFIHOST 0.251												
SAAR (mm)	797	FARL 1.000												
©1982-2020 Innovyze														

Motion		Page 1												
84 North Street														
Guildford														
Surrey GU1 4AU														
Date 06/11/2025 10:29	Designed by commonuser													
File	Checked by													
Innovyze	Source Control 2020.1.3													
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QMED Method	2008 URBEXT (1990)	0.1814												
Site Location GB 518400 118650 TQ 18400 18650	SPRHOST	48.290												
Area (ha)	1.643	BFIHOST 0.251												
SAAR (mm)	797	FARL 1.000												
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Appendix J

Proposed Drainage Strategy Layout and Sections



Notes

1. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
2. This drawing has been based upon survey information supplied by Trocenus Surveys and Motion cannot guarantee the accuracy of the data provided.
3. This drawing should be read in conjunction with all other relevant architect and engineering details, drawings and specifications.
4. All pipes shall be laid sufficient to suffice with outgoing pipes unless otherwise stated.
5. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.
6. For construction details refer to Motion drawing series 2403075-0800.

Legend

- New Surface Water Gravity Pipe
- New Surface Water Manhole
- New Surface Water Flow Control Manhole
- New Pond
- Proposed Headwall
- Permeable Pavement
- Maintenance buffer zone
- New Foul Rising Main
- New Foul Water Gravity Pipe
- New Foul Water Manhole

Revision table:

Rev.	Description	Date
P05	November 2025 Submission Update	PA, PA, PA, 06/11/2025
P04	Updated following LFA comments	CC, PA, NJ, 10/01/2025
P03	Site layout updated	CC, PA, NJ, 25/09/2024
P02	Site layout updated	CC, PA, NJ, 20/09/2024
P01	First Issue	CC, PA, NJ, 06/09/2024
Rev.	Description	Date

Covering Status:

FOR PLANNING
NOT FOR CONSTRUCTION

motion
Gulford - Reading - London
www.motion.co.uk

Client:
Croudice Homes Ltd

Project:
Land West of Bines Road
Partridge Green, West Sussex

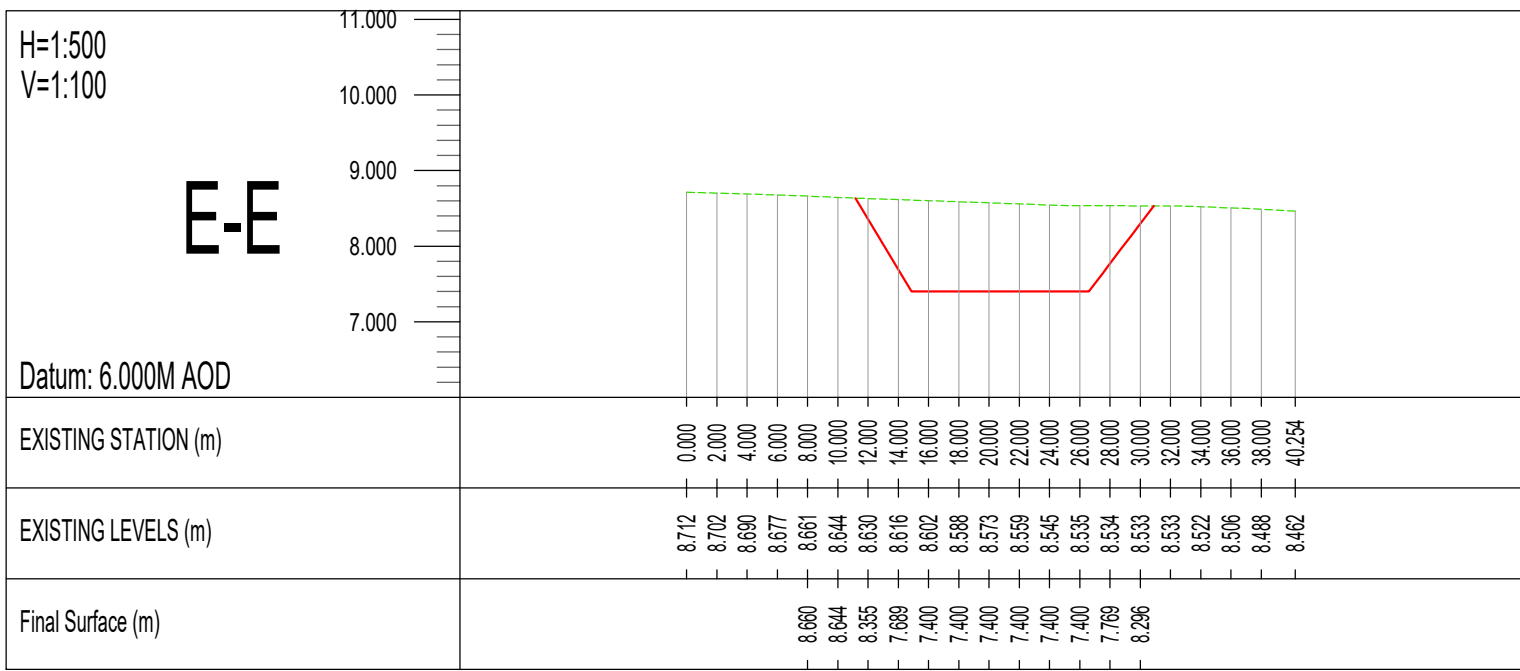
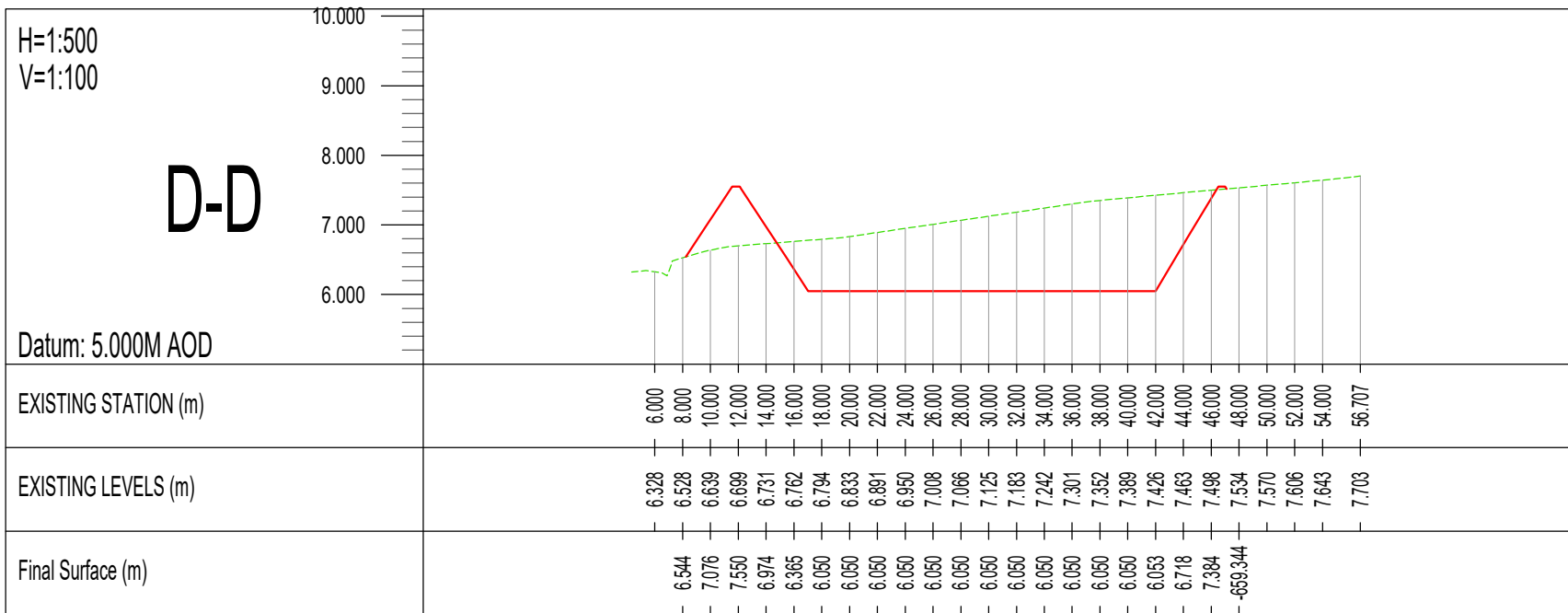
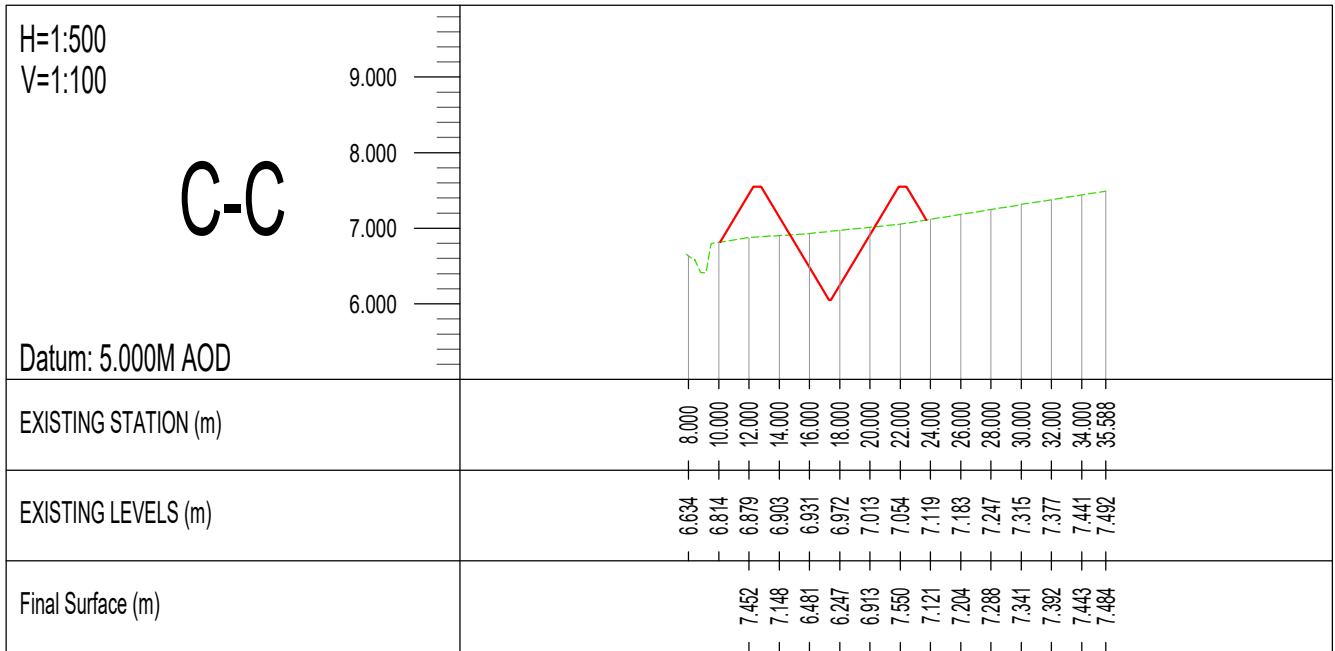
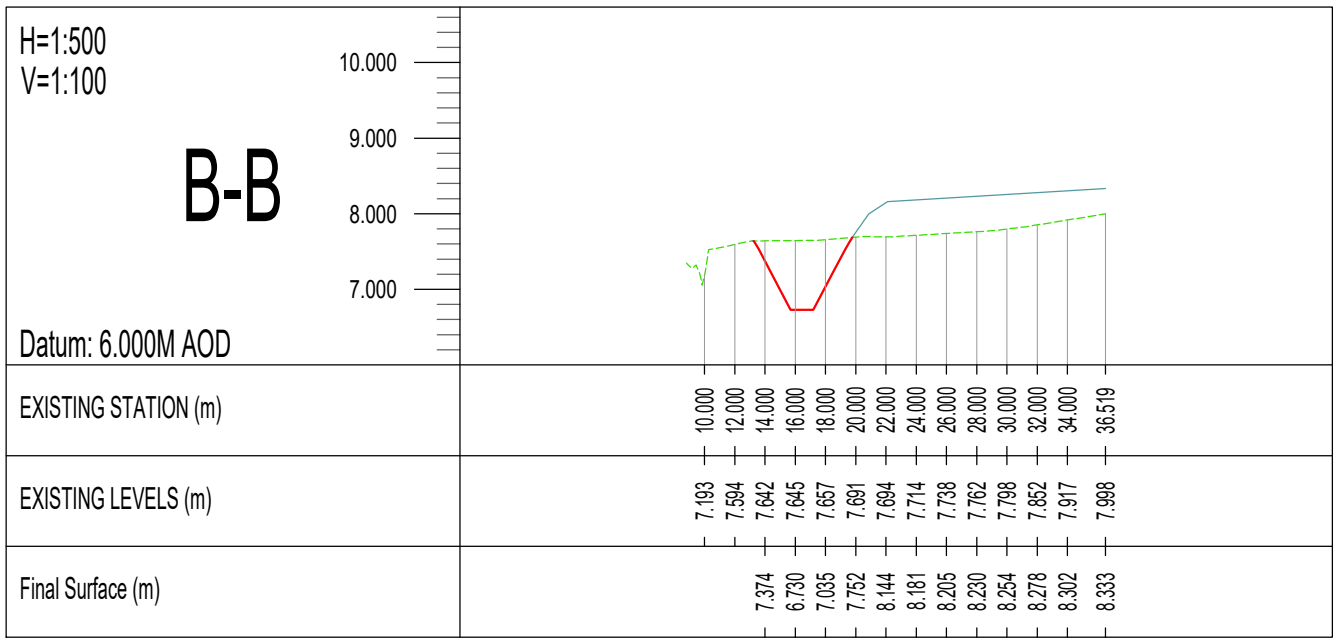
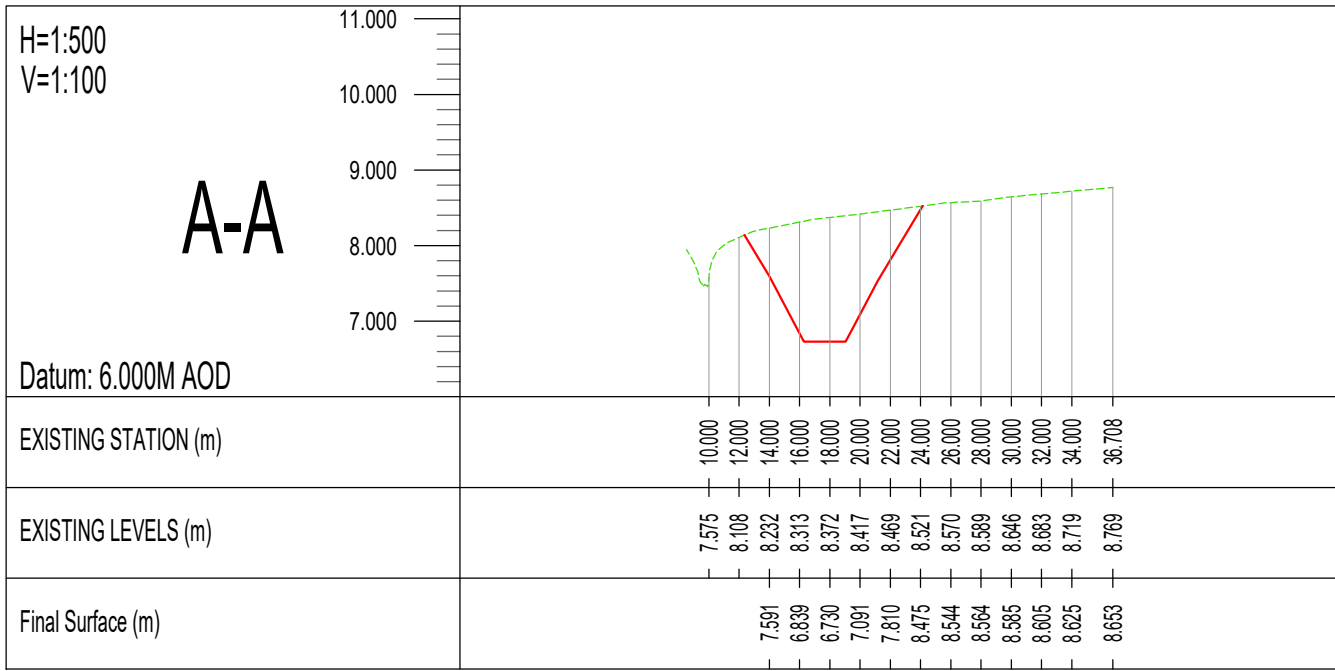
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Drainage Strategy

Scale: 1:500 (@ A0)

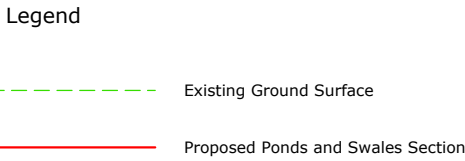
Drawing:
2403075-9001

Revision:
P05

C:\Users\cabazaki\Motion\GardSite - Lrpar 2403075\Drawings\2403075-9003-Drainage Cross Sections.dwg



- Notes
1. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
 2. This drawing has been based upon survey information supplied by Encompass Surveys and Motion cannot guarantee the accuracy of the data provided.
 3. This drawing should be read in conjunction with all other relevant architect and engineering details, drawings and specification.
 4. All pipes shall be laid soffit to soffit with outgoing pipes unless otherwise stated.
 5. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.
 6. For construction details refer to Motion drawing series 2403075-0800.



P01	First Issue	CC	PA	N3	01/10/2024
Rev.	Description	Drm	Chk	App	Date

Drawing Status:

FOR PLANNING
NOT FOR CONSTRUCTION



Client:

Croudace Homes Ltd

Project:

Land West of Bines Road
Partridge Green, West Sussex

Title:

Drainage Strategy
Cross Sections

Scale: As Shown(@ A1)

Drawing:

2403075-9003

Revision:

P01

Appendix K

MicroDrainage Network Hydraulic Model Outputs

Motion		Page 1
84 North Street Guildford Surrey GU1 4AU		
Date 06/11/2025 14:41	Designed by commonuser	
File 1crpar-MD-NW-06.11.2025.MDX	Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location GB 518400 118650 TQ 18400 18650	
Data Type	Catchment
Maximum Rainfall (mm/hr)	550
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	1.000
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

Time Area Diagram for Storm at outfall Outfall 1 (pipe 1.002)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.315	4-8	0.050

Total Area Contributing (ha) = 0.364

Total Pipe Volume (m³) = 0.828

Time Area Diagram at outfall Outfall12 (pipe 3.006)

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.925	4-8	0.876	8-12	0.002

Total Area Contributing (ha) = 1.803

Total Pipe Volume (m³) = 46.862

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Motion		Page 6
84 North Street Guildford Surrey GU1 4AU		
Date 06/11/2025 14:41	Designed by commonuser	
File 1crpar-MD-NW-06.11.2025.MDX	Checked by	
Innovyze	Network 2020.1.3	

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)
1.002	Outfall 1	7.500	7.167	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)
3.006	Outfall12	6.520	5.975	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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 Storage Structures	13
Number of Online Controls	12	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 518400 118650 TQ 18400 18650
Data Type	Catchment
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	1.000
Cv (Winter)	1.000
Storm Duration (mins)	30

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Motion		Page 7
84 North Street Guildford Surrey GU1 4AU		
Date 06/11/2025 14:41	Designed by commonuser	
File 1crpar-MD-NW-06.11.2025.MDX	Checked by	
Innovyze	Network 2020.1.3	

Online Controls for Storm

Orifice Manhole: 35, DS/PN: 1.001, Volume (m³): 0.7

Diameter (m) 0.091 Discharge Coefficient 0.600 Invert Level (m) 8.100

Hydro-Brake® Optimum Manhole: 33, DS/PN: 1.002, Volume (m³): 1.7

Unit Reference	MD-SHE-0107-5100-1000-5100
Design Head (m)	1.000
Design Flow (l/s)	5.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	107
Invert Level (m)	7.400
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.1	Kick-Flo®	0.640	4.2
Flush-Flo™	0.297	5.1	Mean Flow over Head Range	-	4.4

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	5.6	3.000	8.5	7.000	12.8
0.200	5.0	1.400	6.0	3.500	9.2	7.500	13.2
0.300	5.1	1.600	6.3	4.000	9.8	8.000	13.6
0.400	5.0	1.800	6.7	4.500	10.3	8.500	14.0
0.500	4.9	2.000	7.0	5.000	10.9	9.000	14.4
0.600	4.5	2.200	7.4	5.500	11.4	9.500	14.8
0.800	4.6	2.400	7.7	6.000	11.9		
1.000	5.1	2.600	8.0	6.500	12.3		

Orifice Manhole: 26, DS/PN: 3.001, Volume (m³): 0.7

Diameter (m) 0.072 Discharge Coefficient 0.600 Invert Level (m) 8.570

Motion

84 North Street

Guildford

Surrey GU1 4AU

Date 06/11/2025 14:41

File 1crpar-MD-NW-06.11.2025.MDX

Designed by commonuser

Checked by

Page 8



Innovyze

Network 2020.1.3

Orifice Manhole: 24, DS/PN: 4.001, Volume (m³): 0.7

Diameter (m) 0.060

Discharge Coefficient 0.600

Invert Level (m) 8.820

Orifice Manhole: 28, DS/PN: 6.001, Volume (m³): 0.7

Diameter (m) 0.061

Discharge Coefficient 0.600

Invert Level (m) 8.280

Orifice Manhole: 30, DS/PN: 7.001, Volume (m³): 0.7

Diameter (m) 0.027

Discharge Coefficient 0.600

Invert Level (m) 7.910

Orifice Manhole: 22, DS/PN: 8.001, Volume (m³): 0.7

Diameter (m) 0.077

Discharge Coefficient 0.600

Invert Level (m) 6.820

Hydro-Brake® Optimum Manhole: 12, DS/PN: 9.001, Volume (m³): 0.7

Unit Reference MD-SHE-0218-2300-0450-2300

Design Head (m) 0.450

Design Flow (l/s) 23.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 218

Invert Level (m) 8.220

Minimum Outlet Pipe Diameter (mm) 300

Suggested Manhole Diameter (mm) 1200

Control Points

Head (m)

Flow (l/s)

Control Points

Head (m)

Flow (l/s)

Design Point (Calculated)

0.450

23.0

Kick-Flo®

0.406

21.9

Flush-Flo™

0.291

23.0

Mean Flow over Head Range

-

16.4

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

7.4

1.000

33.7

2.400

51.4

5.500

76.4

0.200

21.4

1.200

36.8

2.600

53.4

6.000

79.8

0.300

23.0

1.400

39.6

3.000

57.3

6.500

83.2

0.400

22.0

1.600

42.2

3.500

61.7

7.000

86.3

0.500

24.2

1.800

44.7

4.000

65.9

7.500

89.4

0.600

26.4

2.000

47.1

4.500

69.8

8.000

92.4

0.800

30.3

2.200

49.3

5.000

72.7

8.500

95.3

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Hydro-Brake® Optimum Manhole: 12, DS/PN: 9.001, Volume (m³): 0.7

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
9.000	98.1	9.500	100.8				

Hydro-Brake® Optimum Manhole: 14, DS/PN: 9.003, Volume (m³): 1.3

Unit Reference MD-SHE-0158-1200-1000-1200

Design Head (m) 1.000

Design Flow (l/s) 12.0

Flush-Flo™ Calculated

Objective Minimise upstream storage

Application Surface

Sump Available Yes

Diameter (mm) 158

Invert Level (m) 6.730

Minimum Outlet Pipe Diameter (mm) 225

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	12.0	Kick-Flo®	0.687	10.1
Flush-Flo™	0.312	12.0	Mean Flow over Head Range	-	10.2

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	5.7	1.200	13.1	3.000	20.2	7.000	30.4
0.200	11.6	1.400	14.1	3.500	21.8	7.500	31.4
0.300	12.0	1.600	15.0	4.000	23.2	8.000	32.4
0.400	11.8	1.800	15.8	4.500	24.6	8.500	33.4
0.500	11.6	2.000	16.7	5.000	25.8	9.000	34.3
0.600	11.1	2.200	17.4	5.500	27.0	9.500	35.2
0.800	10.8	2.400	18.2	6.000	28.2		
1.000	12.0	2.600	18.9	6.500	29.3		

Orifice Manhole: 18, DS/PN: 10.001, Volume (m³): 0.7

Diameter (m) 0.072

Discharge Coefficient 0.600

Invert Level (m) 6.950

Orifice Manhole: 20, DS/PN: 11.001, Volume (m³): 0.7

Diameter (m) 0.061

Discharge Coefficient 0.600

Invert Level (m) 6.820

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Hydro-Brake® Optimum Manhole: 10, DS/PN: 3.006, Volume (m³): 10.2

Unit Reference MD-SHE-0195-1980-1200-1980

Design Head (m)1.200

Design Flow (l/s)19.8

Flush-Flo™Calculated

ObjectiveMinimise upstream storage

ApplicationSurface

Sump AvailableYes

Diameter (mm)195

Invert Level (m)6.050

Minimum Outlet Pipe Diameter (mm)225

Suggested Manhole Diameter (mm)1500

Control Points

Head (m)

Flow (l/s)

Design Point (Calculated)1.20019.8

Flush-Flo™0.38019.7

Control Points

Head (m)

Flow (l/s)

Kick-Flo®0.82916.6

Mean Flow over Head Range-16.9

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 (l/s)

Depth (m)

Flow (l/s)

Depth (m)

Flow (l/s)

Depth (m)

Flow (l/s)

0.1006.81.20019.83.00030.67.00046.1

0.20018.21.40021.33.50033.07.50047.7

0.30019.61.60022.74.00035.28.00049.2

0.40019.71.80024.04.50037.38.50050.7

0.50019.52.00025.25.00039.29.00052.1

0.60019.12.20026.45.50041.19.50053.5

0.80017.22.40027.56.00042.8

1.00018.12.60028.66.50044.5

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Storage Structures for Storm

Porous Car Park Manhole: 35, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)

0.00000

Width (m)

5.0

Membrane Percolation (mm/hr)

1000

Length (m)

36.0

Max Percolation (l/s)

50.0

Slope (1:X)

0.0

Safety Factor

2.0

Depression Storage (mm)

5

Porosity

0.30

Evaporation (mm/day)

3

Invert Level (m)

8.100

Cap Volume Depth (m)

0.450

Porous Car Park Manhole: 32, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)

0.00000

Width (m)

5.0

Membrane Percolation (mm/hr)

1000

Length (m)

146.0

Max Percolation (l/s)

202.8

Slope (1:X)

0.0

Safety Factor

2.0

Depression Storage (mm)

5

Porosity

0.30

Evaporation (mm/day)

3

Invert Level (m)

8.030

Cap Volume Depth (m)

0.450

Tank or Pond Manhole: 33, DS/PN: 1.002

Invert Level (m)

7.400

Depth (m)

Area (m²)

Depth (m)

Area (m²)

0.000

118.5

1.200

323.1

Porous Car Park Manhole: 26, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)

0.00000

Width (m)

5.0

Membrane Percolation (mm/hr)

1000

Length (m)

66.0

Max Percolation (l/s)

91.7

Slope (1:X)

0.0

Safety Factor

2.0

Depression Storage (mm)

5

Porosity

0.30

Evaporation (mm/day)

3

Invert Level (m)

8.570

Cap Volume Depth (m)

0.450

Porous Car Park Manhole: 24, DS/PN: 4.001

Infiltration Coefficient Base (m/hr)

0.00000

Width (m)

5.0

Membrane Percolation (mm/hr)

1000

Length (m)

52.0

Max Percolation (l/s)

72.2

Slope (1:X)

0.0

Safety Factor

2.0

Depression Storage (mm)

5

Porosity

0.30

Evaporation (mm/day)

3

Invert Level (m)

8.820

Cap Volume Depth (m)

0.450

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<u>Porous Car Park Manhole: 28, DS/PN: 6.001</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00000</td> <td>Width (m)</td> <td>5.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>32.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>44.4</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>8.280</td> <td>Cap Volume Depth (m)</td> <td>0.450</td> </tr> </table> <u>Porous Car Park Manhole: 30, DS/PN: 7.001</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00000</td> <td>Width (m)</td> <td>5.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>32.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>44.4</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>7.910</td> <td>Cap Volume Depth (m)</td> <td>0.450</td> </tr> </table> <u>Porous Car Park Manhole: 22, DS/PN: 8.001</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00000</td> <td>Width (m)</td> <td>5.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>32.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>44.4</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>6.820</td> <td>Cap Volume Depth (m)</td> <td>0.450</td> </tr> </table> <u>Porous Car Park Manhole: 12, DS/PN: 9.001</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00000</td> <td>Width (m)</td> <td>5.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>1000</td> <td>Length (m)</td> <td>364.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>505.6</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>5</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>3</td> </tr> <tr> <td>Invert Level (m)</td> <td>8.220</td> <td>Cap Volume Depth (m)</td> <td>0.450</td> </tr> </table> <u>Swale Manhole: 14, DS/PN: 9.003</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.00000</td> <td>Length (m)</td> <td>68.0</td> </tr> <tr> <td>Infiltration Coefficient Side (m/hr)</td> <td>0.00000</td> <td>Side Slope (1:X)</td> <td>3.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Slope (1:X)</td> <td>0.0</td> </tr> <tr> <td>Porosity</td> <td>1.00</td> <td>Cap Volume Depth (m)</td> <td>0.000</td> </tr> <tr> <td>Invert Level (m)</td> <td>6.730</td> <td>Cap Infiltration Depth (m)</td> <td>0.000</td> </tr> <tr> <td>Base Width (m)</td> <td>0.5</td> <td>Include Swale Volume</td> <td>Yes</td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	32.0	Max Percolation (l/s)	44.4	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	8.280	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	32.0	Max Percolation (l/s)	44.4	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	7.910	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	32.0	Max Percolation (l/s)	44.4	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	6.820	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0	Membrane Percolation (mm/hr)	1000	Length (m)	364.0	Max Percolation (l/s)	505.6	Slope (1:X)	0.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.30	Evaporation (mm/day)	3	Invert Level (m)	8.220	Cap Volume Depth (m)	0.450	Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	68.0	Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0	Safety Factor	2.0	Slope (1:X)	0.0	Porosity	1.00	Cap Volume Depth (m)	0.000	Invert Level (m)	6.730	Cap Infiltration Depth (m)	0.000	Base Width (m)	0.5	Include Swale Volume	Yes
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Porous Car Park Manhole: 18, DS/PN: 10.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	120.0
Max Percolation (l/s)	166.7	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	6.950	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: 20, DS/PN: 11.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	80.0
Max Percolation (l/s)	111.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	6.820	Cap Volume Depth (m)	0.450

Tank or Pond Manhole: 10, DS/PN: 3.006

Invert Level (m) 6.050

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1008.1	1.200	1508.5

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Volume Summary (Static) Length Calculations based on Centre-Centre <table><thead><tr><th>Pipe Number</th><th>USMH Name</th><th>Manhole Volume (m³)</th><th>Pipe Volume (m³)</th><th>Storage Structure Volume (m³)</th><th>Total Volume (m³)</th></tr></thead><tbody><tr><td>1.000</td><td>34</td><td>0.696</td><td>0.028</td><td>0.000</td><td>0.724</td></tr><tr><td>1.001</td><td>35</td><td>0.656</td><td>0.088</td><td>24.300</td><td>25.044</td></tr><tr><td>2.000</td><td>31</td><td>0.000</td><td>0.031</td><td>0.000</td><td>0.031</td></tr><tr><td>2.001</td><td>32</td><td>0.656</td><td>0.237</td><td>98.550</td><td>99.443</td></tr><tr><td>1.002</td><td>33</td><td>1.357</td><td>0.444</td><td>254.942</td><td>256.744</td></tr><tr><td>3.000</td><td>25</td><td>0.624</td><td>0.022</td><td>0.000</td><td>0.647</td></tr><tr><td>3.001</td><td>26</td><td>0.656</td><td>0.038</td><td>44.550</td><td>45.244</td></tr><tr><td>4.000</td><td>23</td><td>0.630</td><td>0.018</td><td>0.000</td><td>0.648</td></tr><tr><td>4.001</td><td>24</td><td>0.656</td><td>0.068</td><td>35.100</td><td>35.824</td></tr><tr><td>5.000</td><td>1</td><td>1.188</td><td>0.323</td><td>0.000</td><td>1.511</td></tr><tr><td>5.001</td><td>2</td><td>1.247</td><td>1.369</td><td>0.000</td><td>2.617</td></tr><tr><td>5.002</td><td>3</td><td>1.414</td><td>3.038</td><td>0.000</td><td>4.451</td></tr><tr><td>5.003</td><td>4</td><td>1.854</td><td>4.174</td><td>0.000</td><td>6.028</td></tr><tr><td>4.002</td><td>5</td><td>2.111</td><td>3.368</td><td>0.000</td><td>5.479</td></tr><tr><td>3.002</td><td>6</td><td>2.218</td><td>7.997</td><td>0.000</td><td>10.216</td></tr><tr><td>6.000</td><td>27</td><td>0.623</td><td>0.023</td><td>0.000</td><td>0.646</td></tr><tr><td>6.001</td><td>28</td><td>0.656</td><td>0.058</td><td>21.600</td><td>22.314</td></tr><tr><td>3.003</td><td>7</td><td>2.219</td><td>4.791</td><td>0.000</td><td>7.010</td></tr><tr><td>3.004</td><td>8</td><td>2.872</td><td>9.009</td><td>0.000</td><td>11.881</td></tr><tr><td>7.000</td><td>29</td><td>0.648</td><td>0.029</td><td>0.000</td><td>0.677</td></tr><tr><td>7.001</td><td>30</td><td>0.656</td><td>0.118</td><td>21.600</td><td>22.374</td></tr><tr><td>3.005</td><td>9</td><td>2.872</td><td>7.829</td><td>0.000</td><td>10.700</td></tr><tr><td>8.000</td><td>21</td><td>0.657</td><td>0.039</td><td>0.000</td><td>0.696</td></tr><tr><td>8.001</td><td>22</td><td>0.656</td><td>0.113</td><td>21.600</td><td>22.369</td></tr><tr><td>9.000</td><td>11</td><td>0.475</td><td>0.059</td><td>0.000</td><td>0.534</td></tr><tr><td>9.001</td><td>12</td><td>0.656</td><td>0.493</td><td>245.700</td><td>246.849</td></tr><tr><td>9.002</td><td>13</td><td>0.740</td><td>0.199</td><td>0.000</td><td>0.938</td></tr><tr><td>9.003</td><td>14</td><td>1.131</td><td>0.601</td><td>238.000</td><td>239.732</td></tr><tr><td>10.000</td><td>17</td><td>1.340</td><td>0.011</td><td>0.000</td><td>1.351</td></tr><tr><td>10.001</td><td>18</td><td>0.656</td><td>0.413</td><td>81.000</td><td>82.069</td></tr><tr><td>9.004</td><td>15</td><td>0.938</td><td>0.580</td><td>0.000</td><td>1.518</td></tr><tr><td>11.000</td><td>19</td><td>1.396</td><td>0.021</td><td>0.000</td><td>1.416</td></tr><tr><td>11.001</td><td>20</td><td>0.656</td><td>0.127</td><td>54.000</td><td>54.783</td></tr><tr><td>9.005</td><td>16</td><td>1.019</td><td>0.530</td><td>0.000</td><td>1.549</td></tr><tr><td>3.006</td><td>10</td><td>2.121</td><td>1.403</td><td>1499.900</td><td>1503.424</td></tr><tr><td colspan="2">Total</td><td>38.947</td><td>47.690</td><td>2640.842</td><td>2727.480</td></tr></tbody></table>						Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)	1.000	34	0.696	0.028	0.000	0.724	1.001	35	0.656	0.088	24.300	25.044	2.000	31	0.000	0.031	0.000	0.031	2.001	32	0.656	0.237	98.550	99.443	1.002	33	1.357	0.444	254.942	256.744	3.000	25	0.624	0.022	0.000	0.647	3.001	26	0.656	0.038	44.550	45.244	4.000	23	0.630	0.018	0.000	0.648	4.001	24	0.656	0.068	35.100	35.824	5.000	1	1.188	0.323	0.000	1.511	5.001	2	1.247	1.369	0.000	2.617	5.002	3	1.414	3.038	0.000	4.451	5.003	4	1.854	4.174	0.000	6.028	4.002	5	2.111	3.368	0.000	5.479	3.002	6	2.218	7.997	0.000	10.216	6.000	27	0.623	0.023	0.000	0.646	6.001	28	0.656	0.058	21.600	22.314	3.003	7	2.219	4.791	0.000	7.010	3.004	8	2.872	9.009	0.000	11.881	7.000	29	0.648	0.029	0.000	0.677	7.001	30	0.656	0.118	21.600	22.374	3.005	9	2.872	7.829	0.000	10.700	8.000	21	0.657	0.039	0.000	0.696	8.001	22	0.656	0.113	21.600	22.369	9.000	11	0.475	0.059	0.000	0.534	9.001	12	0.656	0.493	245.700	246.849	9.002	13	0.740	0.199	0.000	0.938	9.003	14	1.131	0.601	238.000	239.732	10.000	17	1.340	0.011	0.000	1.351	10.001	18	0.656	0.413	81.000	82.069	9.004	15	0.938	0.580	0.000	1.518	11.000	19	1.396	0.021	0.000	1.416	11.001	20	0.656	0.127	54.000	54.783	9.005	16	1.019	0.530	0.000	1.549	3.006	10	2.121	1.403	1499.900	1503.424	Total		38.947	47.690	2640.842	2727.480
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Innovyze	Network 2020.1.3	

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 0.000

Hot Start (mins) 0
MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0
Inlet Coefficient 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 Storage Structures 13

Number of Online Controls 12
Number of Time/Area Diagrams 0

Number of Offline Controls 0
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 518400 118650 TQ 18400 18650

Data Type Catchment

Cv (Summer) 1.000

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0
DVD Status ON

Analysis Timestep Fine Inertia Status ON

DTS Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760

Return Period(s) (years) 2, 10, 30, 100

Climate Change (%) 0, 40, 40, 45

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water			Surcharged Flooded	
					Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	
1.000	34	120 minute 2 year Summer I+0%	120	8.750	8.210	-0.025	0.000	0.01	
1.001	35	120 minute 2 year Summer I+0%	120	8.680	8.210	0.010	0.000	0.33	
2.000	31	15 minute 2 year Summer I+0%	15	8.610	8.130	-0.100	0.000	0.00	
2.001	32	120 minute 2 year Summer I+0%	120	8.610	8.118	-0.062	0.000	0.63	
1.002	33	360 minute 2 year Summer I+0%	360	8.600	7.756	0.206	0.000	0.31	
3.000	25	240 minute 2 year Summer I+0%	240	9.150	8.686	-0.012	0.000	0.00	
3.001	26	240 minute 2 year Summer I+0%	240	9.150	8.686	0.016	0.000	0.15	
4.000	23	240 minute 2 year Summer I+0%	240	9.400	8.933	-0.010	0.000	0.00	
4.001	24	240 minute 2 year Summer I+0%	240	9.400	8.933	0.013	0.000	0.14	
5.000	1	15 minute 2 year Summer I+0%	15	10.340	9.290	-0.150	0.000	0.00	
5.001	2	15 minute 2 year Summer I+0%	15	10.135	9.093	-0.164	0.000	0.16	
5.002	3	15 minute 2 year Summer I+0%	15	9.930	8.781	-0.199	0.000	0.24	

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Innovyze		Network 2020.1.3	
2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm			

Motion		Page 17
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Innovyze	Network 2020.1.3	

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

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
5.003	4	15 minute 2 year Summer I+0%	15	9.600	8.421	-0.259	0.000	0.20
4.002	5	15 minute 2 year Summer I+0%	15	9.320	7.993	-0.227	0.000	0.33
3.002	6	15 minute 2 year Summer I+0%	15	9.080	7.688	-0.293	0.000	0.26
6.000	27	180 minute 2 year Summer I+0%	180	8.860	8.384	-0.025	0.000	0.00
6.001	28	180 minute 2 year Summer I+0%	180	8.860	8.384	0.004	0.000	0.13
3.003	7	15 minute 2 year Summer I+0%	15	8.810	7.461	-0.249	0.000	0.41
3.004	8	15 minute 2 year Summer I+0%	15	8.680	7.211	-0.369	0.000	0.19
7.000	29	360 minute 2 year Summer I+0%	360	8.520	8.016	-0.031	0.000	0.00
7.001	30	360 minute 2 year Summer I+0%	360	8.490	8.016	0.006	0.000	0.03
3.005	9	15 minute 2 year Summer I+0%	15	8.250	6.793	-0.357	0.000	0.22
8.000	21	120 minute 2 year Summer I+0%	120	7.450	6.928	-0.041	0.000	0.01
8.001	22	120 minute 2 year Summer I+0%	120	7.400	6.928	0.008	0.000	0.28
9.000	11	15 minute 2 year Summer I+0%	15	8.840	8.420	-0.100	0.000	0.00
9.001	12	360 minute 2 year Summer I+0%	360	8.800	8.343	-0.102	0.000	0.24
9.002	13	360 minute 2 year Summer I+0%	360	8.600	7.984	-0.187	0.000	0.07
9.003	14	360 minute 2 year Summer I+0%	360	7.730	6.891	-0.064	0.000	0.23
10.000	17	360 minute 2 year Summer I+0%	360	8.200	7.069	-0.046	0.000	0.00
10.001	18	360 minute 2 year Summer I+0%	360	7.530	7.069	-0.031	0.000	0.27
9.004	15	360 minute 2 year Summer I+0%	360	7.400	6.666	-0.130	0.000	0.37
11.000	19	240 minute 2 year Summer I+0%	240	8.130	6.937	-0.059	0.000	0.00
11.001	20	240 minute 2 year Summer I+0%	240	7.400	6.937	-0.033	0.000	0.15
9.005	16	360 minute 2 year Summer I+0%	360	7.300	6.480	-0.219	0.000	0.17
3.006	10	600 minute 2 year Summer I+0%	600	7.250	6.308	0.033	0.000	0.85

PN	US/MH Name	Overflow (l/s)	Infil. Vol (m ³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
5.003	4				40.9	OK
4.002	5				51.1	OK
3.002	6				56.3	OK
6.000	27				0.0	OK
6.001	28		0.000	66	2.1	SURCHARGED
3.003	7				73.9	OK
3.004	8				82.7	OK
7.000	29				0.0	OK
7.001	30		0.000	192	0.5	SURCHARGED
3.005	9				94.9	OK
8.000	21				0.0	OK
8.001	22		0.000	52	3.2	SURCHARGED
9.000	11				0.0	OK
9.001	12		0.000	180	10.5	OK

Motion

84 North Street
Guildford
Surrey GU1 4AU

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Network 2020.1.3

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

Simulation Criteria

Areal Reduction Factor 1.000

Hot Start (mins) 0

Hot Start Level (mm) 0

Manhole Headloss Coeff (Global) 0.500

Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000

MADD Factor * 10m³/ha Storage 0.000

Inlet Coefficient 0.800

Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0

Number of Online Controls 12

Number of Offline Controls 0

Number of Storage Structures 13

Number of Time/Area Diagrams 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH

FEH Rainfall Version 2013

Site Location GB 518400 118650 TQ 18400 18650

Data Type Catchment

Cv (Summer) 1.000

Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep Fine

DTS Status OFF

DVD Status ON

Inertia 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

Return Period(s) (years) 2, 10, 30, 100

Climate Change (%) 0, 40, 40, 45

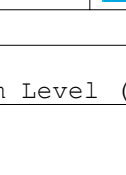
PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	34	60 minute 10 year Summer I+40%	60	8.750	8.341	0.106	0.000	0.02
1.001	35	60 minute 10 year Summer I+40%	60	8.680	8.341	0.141	0.000	0.63
2.000	31	30 minute 10 year Summer I+40%	30	8.610	8.230	0.000	0.000	0.01
2.001	32	60 minute 10 year Summer I+40%	60	8.610	8.240	0.060	0.000	1.07
1.002	33	240 minute 10 year Winter I+40%	240	8.600	8.135	0.585	0.000	0.31
3.000	25	180 minute 10 year Summer I+40%	180	9.150	8.832	0.134	0.000	0.01
3.001	26	180 minute 10 year Summer I+40%	180	9.150	8.832	0.162	0.000	0.26
4.000	23	180 minute 10 year Summer I+40%	180	9.400	9.081	0.138	0.000	0.01
4.001	24	180 minute 10 year Summer I+40%	180	9.400	9.081	0.161	0.000	0.23
5.000	1	15 minute 10 year Summer I+40%	15	10.340	9.290	-0.150	0.000	0.00
5.001	2	15 minute 10 year Summer I+40%	15	10.135	9.147	-0.110	0.000	0.51
5.002	3	15 minute 10 year Summer I+40%	15	9.930	8.879	-0.101	0.000	0.75

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Motion		Page 20
84 North Street Guildford Surrey GU1 4AU		
Date 06/11/2025 14:41	Designed by commonuser	
File 1crpar-MD-NW-06.11.2025.MDX	Checked by	
Innovyze	Network 2020.1.3	

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

		Half Drain		Pipe		
PN	US/MH Name	Overflow (l/s)	Infil. Vol (m³)	Time (mins)	Flow (l/s)	Status
1.000	34				0.1	SURCHARGED
1.001	35		0.000	32	7.6	SURCHARGED
2.000	31				0.1	SURCHARGED*
2.001	32		0.000	30	31.5	SURCHARGED
1.002	33				5.1	SURCHARGED
3.000	25				0.0	SURCHARGED
3.001	26		0.000	90	5.1	SURCHARGED
4.000	23				0.0	SURCHARGED
4.001	24		0.000	96	3.6	SURCHARGED
5.000	1				0.0	OK
5.001	2				22.5	OK
5.002	3				64.6	OK

Motion		Page 23
84 North Street Guildford Surrey GU1 4AU		
Date 06/11/2025 14:41	Designed by commonuser	
File 1crpar-MD-NW-06.11.2025.MDX	Checked by	
Innovyze	Network 2020.1.3	

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 0.000
Hot Start (mins) 0	MADD Factor * 10m³/ha Storage 0.000
Hot Start Level (mm) 0	Inlet Coefficient 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 Storage Structures 13
Number of Online Controls 12	Number of Time/Area Diagrams 0
Number of Offline Controls 0	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location GB 518400 118650 TQ 18400 18650	
Data Type	Catchment
Cv (Summer)	1.000
Cv (Winter)	1.000

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 40, 40, 45

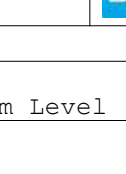
PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Surcharged Flooded			
					Level (m)	Depth (m)	Volume (m³)	Flow / Cap.
1.000	34	60 minute 30 year Summer I+40%	60	8.750	8.426	0.191	0.000	0.03
1.001	35	60 minute 30 year Summer I+40%	60	8.680	8.426	0.226	0.000	0.76
2.000	31	15 minute 30 year Summer I+40%	15	8.610	8.230	0.000	0.000	0.02
2.001	32	60 minute 30 year Summer I+40%	60	8.610	8.326	0.146	0.000	1.16
1.002	33	360 minute 30 year Winter I+40%	360	8.600	8.233	0.683	0.000	0.31
3.000	25	180 minute 30 year Summer I+40%	180	9.150	8.910	0.212	0.000	0.01
3.001	26	180 minute 30 year Summer I+40%	180	9.150	8.910	0.240	0.000	0.30
4.000	23	180 minute 30 year Summer I+40%	180	9.400	9.159	0.216	0.000	0.01
4.001	24	180 minute 30 year Summer I+40%	180	9.400	9.159	0.239	0.000	0.26
5.000	1	15 minute 30 year Summer I+40%	15	10.340	9.290	-0.150	0.000	0.00
5.001	2	15 minute 30 year Summer I+40%	15	10.135	9.167	-0.090	0.000	0.67
5.002	3	15 minute 30 year Summer I+40%	15	9.930	8.925	-0.055	0.000	0.96

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84 North Street Guildford Surrey GU1 4AU		
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Innovyze	Network 2020.1.3	

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

		Half Drain		Pipe		
PN	US/MH Name	Overflow (l/s)	Infil. Vol (m³)	Time (mins)	Flow (l/s)	Status
1.000	34				0.1	SURCHARGED
1.001	35		0.000	34	9.1	FLOOD RISK
2.000	31				0.1	SURCHARGED*
2.001	32		0.000	40	34.0	FLOOD RISK
1.002	33				5.1	SURCHARGED
3.000	25				0.1	FLOOD RISK
3.001	26		0.000	96	6.0	FLOOD RISK
4.000	23				0.0	FLOOD RISK
4.001	24		0.000	105	4.2	FLOOD RISK
5.000	1				0.0	OK
5.001	2				29.2	OK
5.002	3				83.3	OK

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84 North Street Guildford Surrey GU1 4AU			
Date 06/11/2025 14:41			
File 1crpar-MD-NW-06.11.2025.MDX			
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Checked by			
Innovyze		Network 2020.1.3	

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	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coefficient	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 Storage Structures	13
Number of Online Controls	12	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 518400 118650 TQ 18400 18650
Data Type	Catchment
Cv (Summer)	1.000
Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 40, 40, 45

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	34	60 minute 100 year Summer I+45%	60	8.750	8.545	0.310	0.000
1.001	35	60 minute 100 year Summer I+45%	60	8.680	8.545	0.345	0.000
2.000	31	15 minute 100 year Summer I+45%	15	8.610	8.230	0.000	0.000
2.001	32	60 minute 100 year Summer I+45%	60	8.610	8.450	0.270	0.000
1.002	33	360 minute 100 year Winter I+45%	360	8.600	8.371	0.821	0.000
3.000	25	120 minute 100 year Summer I+45%	120	9.150	9.080	0.382	0.000
3.001	26	120 minute 100 year Summer I+45%	120	9.150	9.087	0.417	0.000
4.000	23	180 minute 100 year Summer I+45%	180	9.400	9.270	0.327	0.000
4.001	24	180 minute 100 year Summer I+45%	180	9.400	9.270	0.350	0.000
5.000	1	15 minute 100 year Summer I+45%	15	10.340	9.627	0.187	0.000
5.001	2	15 minute 100 year Summer I+45%	15	10.135	9.648	0.391	0.000
5.002	3	15 minute 100 year Summer I+45%	15	9.930	9.535	0.555	0.000

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84 North Street Guildford Surrey GU1 4AU		
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File 1crpar-MD-NW-06.11.2025.MDX	Checked by	
Innovyze	Network 2020.1.3	

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

		US/MH Flow / Overflow		Infil.	Half Drain	Pipe	Status
PN	Name	Cap.	(l/s)	Vol (m³)	Time (mins)	Flow (l/s)	
1.000	34	0.03				0.1	FLOOD RISK
1.001	35	0.90		0.000	46	10.8	FLOOD RISK
2.000	31	0.02				0.2	SURCHARGED*
2.001	32	1.25		0.000	58	36.6	FLOOD RISK
1.002	33	0.31				5.1	FLOOD RISK
3.000	25	0.06				0.3	FLOOD RISK
3.001	26	0.37		0.000	100	7.5	FLOOD RISK
4.000	23	0.01				0.1	FLOOD RISK
4.001	24	0.31		0.000	114	4.9	FLOOD RISK
5.000	1	0.25				4.1	SURCHARGED
5.001	2	0.76				33.2	SURCHARGED
5.002	3	1.07				92.4	SURCHARGED

Appendix L

WSCC LLFA Objection (18th December 2024)

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH



Lead Local Flood Authority

Date 18th December 2024

Giles Holbrook
Development Control
Horsham District Council
Parkside
Chart Way
Horsham
RH14 1RL

Dear Giles,

RE: DC/24/1699 – Land at 518724 118628, Bines Road, Partridge Green, West Sussex, RH13 8EQ

Thank you for your consultation on the above site, received on 14th November 2024. We have reviewed the application as submitted and wish to make the following comments.

This is a full planning application for the development of 101 dwellings, creation of new access, public open space, creation of a cycle path, allotments and associated landscaping.

We **object** to this planning application in the absence of an acceptable Flood Risk Assessment & Drainage Strategy relating to:

- The application is not in accordance with NPPF, PPG Flood Risk and Coastal Change and Policy 38 in Horsham District Planning Framework.

Reason

To prevent flooding in accordance with National Planning Policy Framework paragraph 173, 175 and 180 by ensuring the satisfactory management of local flood risk, surface water flow paths, storage and disposal of surface water from the site in a range of rainfall events and ensuring the SuDS proposed operates as designed for the lifetime of the development.

We will consider reviewing this objection if the issues highlighted below are adequately addressed:

1. It appears no groundwater monitoring has taken place on site. As this is a full planning application, groundwater monitoring is required at this stage of planning. We can confirm that the request for a pre-commencement condition stipulating BRE365 soakage testing is acceptable in principle.

2. It is noted that the drainage strategy plan is incorrectly labelled as the exceedance plan, please amend this.
3. The proposed attenuation basins on the drainage strategy plan do not show a clearly demonstrated 3m maintenance easement buffer, please amend the plan to include the buffer zones.
4. Outfall 1 appears to be outside of the redline boundary of the site. Please clarify that this is the case and provide information as to why this is not within the site boundary, with any details on granted easements etc for the adjacent land.
5. The tree that is below the attenuation basin in the north-western corner is surrounded by two buffer zones. It is unclear if these are root protection areas which could affect pipe number 3.005.
6. There is some use of oversized pipes, which is not prioritising the use of SuDS.
7. For the calculations in the simulation criteria and synthetic rainfall details, FEH2022 rainfall and Cv value 1 for both summer and winter.
8. The outfalls are not clearly labelled to match the calculations.
9. The design details of all the SuDS features (swales, basins and permeable paving) needs to be on the drainage layout.
10. Cross sections of the basins and swale are required.

Yours sincerely,

Eleanor Read
Flood Risk Management Team
FRM@westsussex.gov.uk

Annex

The following documents have been reviewed, which have been submitted to support the application;

Flood Risk Assessment and Surface Water Drainage by Motion, 25th October 2024, Issue Final B

Appendix M

WSCC LLFA Comments Tracker

FRA / Drainage Strategy Comments Tracker

Application Reference: DC/24/1699 Site Name: Land at 518724 118628, Bines Road, Partridge Green, West Sussex, RH13 8EQ Designer: Motion			Comments Received: 18/12/2024 Date of Response: January 2025 Response By: Phil Allen MCIWEM C.WEM	
Item	1 - Regulator Comment	2 - Designer Response	3 - Regulator Response	4 - 2nd Designer Response
1	<i>It appears no groundwater monitoring has taken place on site. As this is a full planning application, groundwater monitoring is required at this stage of planning. We can confirm that the request for a pre-commencement condition stipulating BRE365 soakage testing is acceptable in principle.</i>	This is noted. However, we would query why groundwater monitoring is needed on a site where no infiltraiton is proposed? The permeable paviours are clearly identified as a tanked system (thus there cannot be groundwater ingress) and the weight of the crushed stone would offset any groundwater uplift. Additionally, the SuDS features are relativley shallow and would be clay lined, so again, groundwater ingress would not be an issue. With reference to para's 2.10 - 2.12 of the drainage strategy, the site is on an area of Weald Clay, which is known to be hydraulically unproductive, thus groundwater is likely to be very low risk to any SuDS features. That is why we would like to enquire why groundwater monitoring is being requested in this instance as it is inconsequential to the success of the drainage strategy.		
2	<i>It is noted that the drainage strategy plan is incorrectly labelled as the exceedance plan, please amend this.</i>	Noted - Changed. See updated drawing no. 2403075-9001 P04		
3	<i>The proposed attenuation basins on the drainage strategy plan do not show a clearly demonstrated 3m maintenance easement buffer, please amend the plan to include the buffer zones.</i>	Noted. Areas where three metre maintenance buffer has been included have been added to updated drawing no. 2403075-9001 P04 It should be noted that a three metre easement is not necessary on all sides of the SuDS basin and the swale, nor is it appropriate due to the site levels and because the SuDS features must include embankments on their northern boundary due to the site's gradient. A full consideration of site constraints needs to be had when asking for such inclusions to the site layout. The SuDS basin and the swale have a three metre easement on their entire southern boundaries. Because these are natural features, they do not require maintenance access around all sides. Any grasscutting machinery would be able to access from the southern boundary as the SuDS basin and swale have shallow side slopes (1 in 4 and 1 in 3, respectively) and if any access is needed to service the inlet/outlet structures, this can also be achieved from the southern boundary - a 360-degree maintenance strip is therefore not needed for the maintenance of a single structure.		
4	<i>Outfall 1 appears to be outside of the redline boundary of the site. Please clarify that this is the case and provide information as to why this is not within the site boundary, with any details on granted easements etc for the adjacent land.</i>	Outfall 1 has been moved inside the site boundary (although all land falls within the same land ownership). See updated drawing no. 2403075-9001 P04		
5	<i>The tree that is below the attenuation basin in the north-western corner is surrounded by two buffer zones. It is unclear if these are root protection areas which could affect pipe number 3.005.</i>	This could be hand-dug, but for the avoidance of conflict with RPA's, pipe 3.005 has been realigned to avoid the RPA. See updated drawing no. 2403075-9001 P04.		
6	<i>There is some use of oversized pipes, which is not prioritising the use of SuDS.</i>	This is noted. Not all of the site and areas of the drainage system are suitable for SuDS and some parts of the site necessitate the use of piped drainage. The 'oversized' pipes are along the line of the main access road and are not 'oversized' for storage, but are necessary for conveyance, as designed in MicroDrainage. They are preceeded by permeable paving in many cases, so the size of the pipes are actually lesser than they would be if permeable paviours were not used, so SuDS are helping to reduce the size of the piped network already. The need for this road to potentially adoptable also defines that the drainage within it has to be piped, which SuDS are not. It should also be borne in mind that other parts of the site utilise SuDS for conveyance where it is suitable (the swale) and offers SuDS as attenuation (the basin) so SuDS have been prioritised and used wherever they are suitable.		
7	<i>For the calculations in the simulation criteria and synthetic rainfall details, FEH2022 rainfall and Cv value 1 for both summer and winter.</i>	FEH2022 Been used in Design Criteria and Seasonal Return Period Wizard with CV of 1 for both summer and winter storms. As has been described in other projects, there is a quirk in the dropdown menu in MicroDrainage's Network module that only allows the choice of 1999 data and 2013 data but allows the upload of any data – including FEH2022. Therefore, the user can use FEH2022 data but is forced to do it under the label of 2013 data. It makes no difference to the outcome of the hydraulic model, but disguises what data is being used. To confirm that we have used FEH2022 data in the hydraulic model of the drainage strategy, we herewith attach the FEH2022 data used within the MicroDrainage hydraulic modelling.		
8	<i>The outfalls are not clearly labelled to match the calculations.</i>	Noted, these will be amended to match the calculations. See updated drawing no. 2403075-9001 P04.		
9	<i>The design details of all the SuDS features (swales, basins and permeable paving) needs to be on the drainage layout.</i>	Noted, these will be added to the drawing. See callouts on the updated drawing no. 2403075-9001 P04.		
10	<i>Cross sections of the basins and swale are required.</i>	Noted. These have been included and supplied with this response.		

VERSION	"FEH Web Service (2.0.0.0) "	Version	1.0.0	exported at	14:52:21 GMT	Fri	30-Aug-24								
Parameters															
Rainfall model=	FEH22														
Calculation type=	Design rainfall														
Calculation mode=	Typical point in catchment														
Calculation location=	Catchment	GB	518400	118650 TQ 18400 18650											
Catchment area=		0.51 km**2													
Fixed duration=	no														
Annual maximum=	yes														
Duration hours	Duration days	2 year rainf	5 year rainf	10 year rainfall (mm)	20 year rain	30 year rain	50 year rain	75 year rainfall (mm)	100 year ra	150 year ra	200 year ra	500 year ra	1000 year r	10000 year	
0.25		0.010416667	7.68	12.1	15.08	17.89	19.59	21.72	23.44	24.66	26.35	27.61	31.97	35.57	51.79
0.5		0.020833333	10.18	16	20.06	23.94	26.3	29.28	31.73	33.5	35.93	37.74	43.93	49.34	72.96
0.75		0.03125	11.68	18.45	23.27	27.83	30.58	34.15	37.04	39.1	42.01	44.15	51.62	58.03	86.41
1		0.041666667	12.89	20.41	25.58	30.72	33.76	37.76	40.94	43.22	46.53	48.96	57.23	64.34	96.22
1.25		0.052083333	14.36	22.38	27.79	33.24	36.43	40.6	43.93	46.33	49.82	52.39	61.2	68.88	103.14
1.5		0.0625	15.84	24.17	29.76	35.4	38.69	42.95	46.39	48.89	52.5	55.16	64.43	72.63	108.74
1.75		0.072916667	17.24	25.78	31.51	37.28	40.65	44.96	48.5	51.07	54.78	57.53	67.2	75.86	113.5
2		0.083333333	18.54	27.23	33.08	38.95	42.37	46.73	50.34	52.99	56.79	59.61	69.67	78.76	117.69
2.25		0.09375	19.56	28.43	34.43	40.4	43.89	48.34	52.04	54.76	58.67	61.59	72.08	81.62	121.75
2.5		0.104166667	20.48	29.51	35.63	41.7	45.27	49.79	53.57	56.35	60.39	63.4	74.3	84.26	125.45
2.75		0.114583333	21.32	30.49	36.73	42.89	46.51	51.11	54.96	57.82	61.96	65.06	76.37	86.73	128.85
3		0.125	22.08	31.39	37.73	43.96	47.65	52.33	56.25	59.16	63.42	66.61	78.3	89.03	131.99
3.25		0.135416667	22.79	32.21	38.65	44.95	48.69	53.45	57.44	60.41	64.77	68.05	80.12	91.18	134.91
3.5		0.145833333	23.45	32.98	39.5	45.87	49.66	54.49	58.54	61.57	66.04	69.4	81.83	93.22	137.63
3.75		0.15625	24.06	33.69	40.28	46.72	50.56	55.46	59.58	62.66	67.22	70.67	83.45	95.14	140.19
4		0.166666667	24.63	34.36	41.02	47.51	51.4	56.37	60.55	63.69	68.34	71.87	84.99	96.95	142.58
4.25		0.177083333	25.16	34.98	41.69	48.24	52.17	57.21	61.46	64.64	69.39	73	86.45	98.64	144.81
4.5		0.1875	25.66	35.56	42.32	48.92	52.9	58.01	62.31	65.55	70.38	74.07	87.83	100.24	146.91
4.75		0.197916667	26.13	36.11	42.92	49.57	53.58	58.76	63.13	66.41	71.33	75.09	89.16	101.76	148.89
5		0.208333333	26.57	36.63	43.48	50.18	54.23	59.47	63.9	67.23	72.23	76.06	90.42	103.21	150.77
5.25		0.21875	26.99	37.12	44.01	50.75	54.85	60.15	64.63	68.01	73.09	76.99	91.63	104.6	152.55
5.5		0.229166667	27.39	37.59	44.52	51.3	55.43	60.79	65.33	68.75	73.91	77.89	92.79	105.92	154.25
5.75		0.239583333	27.78	38.03	45	51.83	55.99	61.41	66	69.47	74.7	78.74	93.9	107.2	155.87
6		0.25	28.14	38.46	45.45	52.33	56.52	62	66.64	70.15	75.46	79.57	94.98	108.42	157.42
6.25		0.260416667	28.47	38.86	45.88	52.8	57.03	62.56	67.25	70.81	76.19	80.36	96.01	109.61	158.9
6.5		0.270833333	28.79	39.23	46.29	53.26	57.51	63.09	67.84	71.44	76.9	81.13	97	110.76	160.31
6.75		0.28125	29.1	39.6	46.68	53.69	57.97	63.6	68.4	72.04	77.58	81.87	97.95	111.86	161.67
7		0.291666667	29.4	39.95	47.06	54.11	58.42	64.09	68.94	72.63	78.23	82.59	98.87	112.93	162.97
7.25		0.302083333	29.68	40.29	47.42	54.52	58.85	64.57	69.47	73.2	78.87	83.28	99.77	113.95	164.22
7.5		0.3125	29.96	40.61	47.77	54.91	59.27	65.03	69.98	73.75	79.49	83.96	100.63	114.95	165.42
7.75		0.322916667	30.22	40.92	48.11	55.29	59.67	65.48	70.47	74.28	80.09	84.61	101.47	115.91	166.58
8		0.333333333	30.48	41.23	48.44	55.65	60.06	65.91	70.95	74.8	80.67	85.24	102.28	116.84	167.7
8.25		0.34375	30.73	41.52	48.75	56.01	60.44	66.33	71.41	75.3	81.23	85.86	103.07	117.74	168.78
8.5		0.354166667	30.97	41.8	49.06	56.35	60.81	66.73	71.86	75.78	81.78	86.46	103.84	118.62	169.83
8.75		0.364583333	31.2	42.08	49.36	56.69	61.16	67.13	72.29	76.26	82.32	87.05	104.59	119.47	170.84
9		0.375	31.43	42.35	49.65	57.01	61.51	67.51	72.72	76.72	82.84	87.62	105.31	120.29	171.82
9.25		0.385416667	31.65	42.61	49.93	57.33	61.85	67.89	73.13	77.17	83.35	88.18	106.02	121.1	172.76
9.5		0.395833333	31.87	42.86	50.21	57.64	62.18	68.25	73.54	77.6	83.84	88.72	106.71	121.88	173.68
9.75		0.40625	32.08	43.11	50.48	57.94	62.5	68.61	73.93	78.03	84.33	89.25	107.38	122.64	174.58
10		0.416666667	32.28	43.35	50.74	58.23	62.81	68.95	74.31	78.45	84.8	89.77	108.04	123.38	175.44
10.25		0.427083333	32.48	43.58	50.99	58.52	63.12	69.29	74.69	78.85	85.26	90.27	108.68	124.1	176.29
10.5		0.4375	32.68	43.81	51.24	58.79	63.42	69.62	75.06	79.25	85.72	90.77	109.31	124.8	177.11
10.75		0.447916667	32.87	44.03	51.49	59.07	63.71	69.95	75.41	79.64	86.16	91.26	109.92	125.48	177.9
11		0.458333333	33.06	44.25	51.73	59.33	63.99	70.26	75.76	80.02	86.59	91.73	110.52	126.15	178.68
11.25		0.46875	33.24	44.46	51.96	59.59	64.27	70.57	76.11	80.39	87.02	92.2	111.1	126.8	179.44
11.5		0.479166667	33.42	44.67	52.19	59.85	64.55	70.88	76.44	80.76	87.43	92.65	111.68	127.44	180.18
11.75		0.489583333	33.6	44.87	52.41	60.1	64.81	71.17	76.77	81.12	87.84	93.1	112.24	128.06	180.9
12		0.5	33.77	45.07	52.63	60.34	65.08	71.47	77.1	81.47	88.24	93.54	112.79	128.67	181.6
12.25		0.510416667	33.94	45.27	52.85	60.58	65.33	71.75	77.41	81.81	88.64	93.98	113.33	129.25	182.27
12.5		0.520833333	34.11	45.46	53.06	60.82	65.59	72.04	77.72	82.14	89.02	94.4	113.86	129.82	182.93
12.75		0.53125	34.28	45.64	53.28	61.05	65.84	72.31	78.03	82.47	89.4	94.82	114.38	130.38	183.58
13		0.541666667	34.44	45.83	53.48	61.27	66.08	72.59	78.33	82.79	89.77	95.23	114.89	130.93	184.21
13.25		0.552083333	34.6	46.01	53.69	61.49	66.32	72.86	78.62	83.11	90.14	95.63	115.39	131.46	184.82
13.5		0.5625	34.76	46.19	53.89	61.71	66.56	73.12	78.91	83.43	90.5	96.03	115.88	131.99	185.43
13.75		0.572916667	34.92	46.36	54.08	61.93	66.79	73.38	79.2	83.73	90.85	96.42	116.36	132.5	186.02
14		0.583333333	35.07	46.53	54.28	62.14	67.02	73.64	79.48	84.03	91.2	96.8	116.84	133	186.6
14.25		0.59375	35.23	46.7	54.47	62.35	67.25	73.89	79.75	84.33	91.55	97.18	117.3	133.5	187.17
14.5		0.604166667	35.38	46.87	54.66	62.56	67.47	74.14	80.03	84.63	91.88	97.55	117.76	133.98	187.73
14.75		0.614583333	35.52	47.04	54.85	62.76	67.69	74.38	80.29	84.91	92.21	97.92	118.21	134.46	188.27
15		0.625	35.67	47.2	55.03	62.96	67.91	74.62	80.56	85.2	92.54	98.27	118.65	134.93	188.81
15.25		0.635416667	35.81	47.36	55.21	63.16	68.12	74.86	80.82	85.48	92.86	98.63	119.08	135.39	189.34
15.5		0.645833333	35.96	47.52	55.39	63.35	68.33	75.09	81.08	85.76	93.18	98.97	119.5	135.84	189.85
15.75		0.65625	36.1	47.68	55.57	63.54	68.54	75.33	81.33	86.03	93.49	99.32	119.92	136.28	190.36
16		0.666666667	36.24	47.83	55.75	63.73	68.75	75.55	81.58	86.3	93.8	99.65	120.33	136.72	190.86
16.25		0.677083333	36.37	47.99	55.92	63.92	68.95	75.78	81.83	86.57	94.1	99.99	120.74	137.15	191.35
16.5		0.6875	36.51	48.14	56.09	64.11	69.15	76	82.07	86.83	94.4	100.31	121.14	137.57	191.84
16.75		0.697916667	36.64	48.29	56.26	64.29	69.35	76.22	82.31	87.09	94.7	100.63	121.53	137.99	192.31
17		0.708333333	36.78	48.44	56.43	64.47	69.54	76.44	82.55	87.34	94.99	100.95	121.91	138.4	192.78
17.25		0.71875	36.91	48.58	56.59	64.65	69.73	76.65	82.78	87.6	95.27	101.26	122.29	138.8	193.24
17.5		0.729166667	37.04	48.73	56.75	64.83	69.92	76.86	83.02	87.84	95.56	101.57	122.67	139.2	193.69
17.75		0.739583333	37.17	48.87	56.92	65.01	70.11	77.07	83.24	88.09	95.84	101.88	123.04	139.59	194.14
18		0.75	37.29	49.02	57.08	65.18	70.3	77.28	83.47	88.34	96.11	102.18	123.4	139.97	194.58
18.25		0.760416667	37.42	49.16	57.24	65.36	70.48	77.48	83.7						

23.5	0.979166667	39.89	52.01	60.33	68.75	74.01	81.37	87.98	93.19	101.41	107.83	130.13	147.28	202.95
23.75	0.989583333	40	52.14	60.47	68.9	74.17	81.54	88.17	93.39	101.63	108.06	130.4	147.56	203.28
24	1	40.11	52.26	60.61	69.05	74.32	81.7	88.35	93.58	101.84	108.28	130.66	147.85	203.6
24.25	1.010416667	40.21	52.39	60.74	69.19	74.47	81.87	88.53	93.77	102.04	108.5	130.92	148.12	203.91
24.5	1.020833333	40.32	52.51	60.87	69.34	74.62	82.03	88.71	93.96	102.25	108.72	131.17	148.39	204.22
24.75	1.03125	40.43	52.63	61	69.48	74.77	82.2	88.88	94.14	102.45	108.93	131.41	148.66	204.52
25	1.041666667	40.53	52.75	61.13	69.62	74.92	82.36	89.06	94.33	102.65	109.15	131.66	148.92	204.82
25.25	1.052083333	40.64	52.87	61.26	69.76	75.07	82.52	89.23	94.51	102.85	109.36	131.9	149.18	205.12
25.5	1.0625	40.74	52.99	61.39	69.9	75.22	82.68	89.4	94.69	103.05	109.56	132.14	149.44	205.42
25.75	1.072916667	40.84	53.11	61.52	70.04	75.36	82.83	89.57	94.88	103.24	109.77	132.38	149.7	205.71
26	1.083333333	40.95	53.23	61.64	70.18	75.51	82.99	89.74	95.05	103.44	109.98	132.62	149.95	206
26.25	1.09375	41.05	53.35	61.77	70.32	75.65	83.15	89.91	95.23	103.63	110.18	132.85	150.2	206.28
26.5	1.104166667	41.15	53.47	61.9	70.46	75.8	83.3	90.08	95.41	103.82	110.38	133.08	150.45	206.56
26.75	1.114583333	41.25	53.59	62.02	70.59	75.94	83.46	90.24	95.58	104.01	110.58	133.31	150.7	206.84
27	1.125	41.35	53.7	62.14	70.73	76.08	83.61	90.41	95.76	104.2	110.78	133.54	150.94	207.12
27.25	1.135416667	41.45	53.82	62.27	70.86	76.22	83.76	90.57	95.93	104.38	110.98	133.77	151.18	207.4
27.5	1.145833333	41.56	53.93	62.39	71	76.36	83.91	90.73	96.1	104.57	111.17	133.99	151.42	207.67
27.75	1.15625	41.66	54.05	62.51	71.13	76.5	84.07	90.9	96.27	104.75	111.37	134.21	151.66	207.94
28	1.166666667	41.75	54.16	62.64	71.27	76.64	84.22	91.06	96.44	104.94	111.56	134.43	151.89	208.21
28.25	1.177083333	41.85	54.28	62.76	71.4	76.78	84.36	91.22	96.61	105.12	111.75	134.65	152.13	208.48
28.5	1.1875	41.95	54.39	62.88	71.53	76.92	84.51	91.37	96.78	105.3	111.94	134.87	152.36	208.74
28.75	1.197916667	42.05	54.5	63	71.66	77.06	84.66	91.53	96.94	105.48	112.13	135.08	152.59	209
29	1.208333333	42.15	54.62	63.12	71.79	77.19	84.81	91.69	97.11	105.66	112.32	135.3	152.82	209.26
29.25	1.21875	42.25	54.73	63.24	71.92	77.33	84.95	91.85	97.27	105.83	112.51	135.51	153.04	209.52
29.5	1.229166667	42.34	54.84	63.36	72.05	77.46	85.1	92	97.44	106.01	112.69	135.72	153.27	209.77
29.75	1.239583333	42.44	54.95	63.48	72.18	77.6	85.24	92.15	97.6	106.18	112.87	135.92	153.49	210.02
30	1.25	42.54	55.06	63.59	72.31	77.73	85.39	92.31	97.76	106.36	113.06	136.13	153.71	210.27
30.25	1.260416667	42.63	55.17	63.71	72.43	77.87	85.53	92.46	97.92	106.53	113.24	136.34	153.93	210.52
30.5	1.270833333	42.73	55.28	63.83	72.56	78	85.67	92.61	98.08	106.7	113.42	136.54	154.15	210.77
30.75	1.28125	42.82	55.39	63.94	72.69	78.13	85.81	92.76	98.24	106.87	113.6	136.74	154.36	211.02
31	1.291666667	42.92	55.5	64.06	72.81	78.26	85.96	92.91	98.39	107.04	113.77	136.94	154.58	211.26
31.25	1.302083333	43.01	55.61	64.17	72.94	78.39	86.1	93.06	98.55	107.21	113.95	137.14	154.79	211.5
31.5	1.3125	43.11	55.72	64.29	73.06	78.52	86.24	93.21	98.7	107.37	114.13	137.34	155	211.74
31.75	1.322916667	43.2	55.83	64.4	73.19	78.65	86.38	93.36	98.86	107.54	114.3	137.54	155.21	211.98
32	1.333333333	43.3	55.93	64.52	73.31	78.78	86.51	93.51	99.01	107.71	114.47	137.73	155.42	212.22
32.25	1.34375	43.39	56.04	64.63	73.43	78.91	86.65	93.65	99.17	107.87	114.65	137.93	155.63	212.45
32.5	1.354166667	43.48	56.15	64.75	73.55	79.04	86.79	93.8	99.32	108.03	114.82	138.12	155.83	212.68
32.75	1.364583333	43.57	56.25	64.86	73.68	79.17	86.93	93.94	99.47	108.2	114.99	138.31	156.04	212.91
33	1.375	43.67	56.36	64.97	73.8	79.3	87.06	94.09	99.62	108.36	115.16	138.5	156.24	213.14
33.25	1.385416667	43.76	56.46	65.08	73.92	79.42	87.2	94.23	99.77	108.52	115.33	138.69	156.44	213.37
33.5	1.395833333	43.85	56.57	65.19	74.04	79.55	87.33	94.37	99.92	108.68	115.49	138.88	156.64	213.6
33.75	1.40625	43.94	56.68	65.31	74.16	79.68	87.47	94.51	100.07	108.84	115.66	139.07	156.84	213.82
34	1.416666667	44.03	56.78	65.42	74.28	79.8	87.6	94.66	100.22	108.99	115.83	139.25	157.04	214.05
34.25	1.427083333	44.13	56.88	65.53	74.4	79.93	87.73	94.8	100.36	109.15	115.99	139.44	157.23	214.27
34.5	1.4375	44.22	56.99	65.64	74.52	80.05	87.87	94.94	100.51	109.31	116.15	139.62	157.43	214.49
34.75	1.447916667	44.31	57.09	65.75	74.64	80.18	88	95.08	100.65	109.46	116.32	139.8	157.62	214.71
35	1.458333333	44.4	57.19	65.86	74.76	80.3	88.13	95.22	100.8	109.62	116.48	139.98	157.81	214.93
35.25	1.46875	44.49	57.3	65.96	74.87	80.42	88.26	95.35	100.94	109.77	116.64	140.16	158.01	215.15
35.5	1.479166667	44.58	57.4	66.07	74.99	80.55	88.39	95.49	101.09	109.93	116.8	140.34	158.2	215.36
35.75	1.489583333	44.67	57.5	66.18	75.11	80.67	88.52	95.63	101.23	110.08	116.96	140.52	158.38	215.58
36	1.5	44.76	57.6	66.29	75.22	80.79	88.65	95.77	101.37	110.23	117.12	140.7	158.57	215.79
36.25	1.510416667	44.85	57.71	66.4	75.34	80.91	88.78	95.9	101.51	110.38	117.28	140.87	158.76	216
36.5	1.520833333	44.94	57.81	66.5	75.46	81.03	88.91	96.04	101.65	110.53	117.43	141.05	158.94	216.21
36.75	1.53125	45.02	57.91	66.61	75.57	81.15	89.04	96.17	101.79	110.68	117.59	141.22	159.13	216.42
37	1.541666667	45.11	58.01	66.72	75.69	81.27	89.16	96.31	101.93	110.83	117.74	141.39	159.31	216.63
37.25	1.552083333	45.2	58.11	66.82	75.8	81.39	89.29	96.44	102.07	110.98	117.9	141.57	159.5	216.83
37.5	1.5625	45.29	58.21	66.93	75.91	81.51	89.42	96.57	102.21	111.13	118.05	141.74	159.68	217.04
37.75	1.572916667	45.38	58.31	67.04	76.03	81.63	89.55	96.71	102.35	111.27	118.21	141.91	159.86	217.24
38	1.583333333	45.46	58.41	67.14	76.14	81.75	89.67	96.84	102.49	111.42	118.36	142.08	160.04	217.45
38.25	1.59375	45.55	58.51	67.25	76.26	81.87	89.8	96.97	102.62	111.56	118.51	142.24	160.21	217.65
38.5	1.604166667	45.64	58.61	67.35	76.37	81.99	89.92	97.1	102.76	111.71	118.66	142.41	160.39	217.85
38.75	1.614583333	45.73	58.71	67.46	76.48	82.11	90.05	97.23	102.9	111.85	118.81	142.58	160.57	218.05
39	1.625	45.81	58.81	67.56	76.59	82.22	90.17	97.36	103.03	112	118.96	142.74	160.74	218.25
39.25	1.635416667	45.9	58.91	67.66	76.7	82.34	90.29	97.49	103.17	112.14	119.11	142.91	160.92	218.45
39.5	1.645833333	45.99	59	67.77	76.82	82.46	90.42	97.62	103.3	112.28	119.26	143.07	161.09	218.64
39.75	1.65625	46.07	59.1	67.87	76.93	82.58	90.54	97.75	103.43	112.42	119.4	143.24	161.27	218.84
40	1.666666667	46.16	59.2	67.98	77.04	82.69	90.66	97.88	103.57	112.56	119.55	143.4	161.44	219.03
40.25	1.677083333	46.24	59.3	68.08	77.15	82.81	90.79	98.01	103.7	112.7	119.7	143.56	161.61	219.23
40.5	1.6875	46.33	59.39	68.18	77.26	82.92	90.91	98.13	103.83	112.84	119.84	143.72	161.78	219.42
40.75	1.697916667	46.42	59.49	68.28	77.37	83.04	91.03	98.26	103.96	112.98	119.99	143.88	161.95	219.61
41	1.708333333	46.5	59.59	68.39	77.48	83.15	91.15	98.39	104.09	113.12	120.13	144.04	162.12	219.8
41.25	1.71875	46.59	59.69	68.49	77.59	83.27	91.27	98.51	104.22	113.26	120.28	144.2	162.28	219.99
41.5	1.729166667	46.67	59.78	68.59	77.7	83.38	91.39	98.64	104.35	113.4	120.42	144.36	162.45	220.18
41.75	1.739583333	46.76	59.88	68.69	77.81	83.49	91.51	98.76	104.48	113.54	120.56	144.51	162.62	220.37
42	1.75	46.84	59.97	68.79	77.92	83.61	91.63	98.89	104.61	113.67	120.7	144.67	162.78	220.55
42.25	1.760416667	46.93	60.07	68.89	78.02	83.72	91.75	99.01	104.74	113.81	120.85	144.82	162.95	220.74
42.5	1.770833333	47.01	60.17	68.99	78.13	83.83	91.87	99.14	104.87	11				

49.25	2.052083333	49.25	62.69	71.65	80.97	86.79	94.96	102.35	108.18	117.42	124.59	148.92	167.27	225.62
49.5	2.0625	49.33	62.78	71.75	81.07	86.9	95.08	102.47	108.3	117.55	124.71	149.06	167.41	225.78
49.75	2.072916667	49.42	62.87	71.85	81.18	87.01	95.19	102.58	108.42	117.67	124.84	149.2	167.56	225.95
50	2.083333333	49.5	62.96	71.95	81.28	87.11	95.3	102.7	108.53	117.79	124.97	149.33	167.7	226.11
50.25	2.09375	49.58	63.06	72.05	81.38	87.22	95.41	102.81	108.65	117.91	125.09	149.47	167.85	226.27
50.5	2.104166667	49.67	63.15	72.14	81.49	87.33	95.52	102.93	108.77	118.04	125.22	149.61	167.99	226.44
50.75	2.114583333	49.75	63.24	72.24	81.59	87.43	95.63	103.04	108.89	118.16	125.34	149.74	168.13	226.6
51	2.125	49.83	63.33	72.34	81.69	87.54	95.74	103.15	109	118.28	125.47	149.88	168.28	226.76
51.25	2.135416667	49.91	63.42	72.44	81.79	87.65	95.85	103.27	109.12	118.4	125.59	150.01	168.42	226.92
51.5	2.145833333	50	63.51	72.53	81.9	87.75	95.96	103.38	109.24	118.52	125.71	150.15	168.56	227.08
51.75	2.15625	50.08	63.61	72.63	82	87.86	96.07	103.49	109.35	118.64	125.84	150.28	168.7	227.24
52	2.166666667	50.16	63.7	72.73	82.1	87.96	96.18	103.61	109.47	118.76	125.96	150.42	168.84	227.4
52.25	2.177083333	50.24	63.79	72.82	82.2	88.07	96.29	103.72	109.58	118.88	126.08	150.55	168.98	227.55
52.5	2.1875	50.33	63.88	72.92	82.31	88.17	96.4	103.83	109.7	119	126.21	150.68	169.12	227.71
52.75	2.197916667	50.41	63.97	73.02	82.41	88.28	96.51	103.94	109.81	119.12	126.33	150.82	169.26	227.87
53	2.208333333	50.49	64.06	73.11	82.51	88.38	96.61	104.06	109.93	119.24	126.45	150.95	169.4	228.03
53.25	2.21875	50.57	64.15	73.21	82.61	88.49	96.72	104.17	110.04	119.35	126.57	151.08	169.54	228.18
53.5	2.229166667	50.66	64.24	73.31	82.71	88.59	96.83	104.28	110.16	119.47	126.69	151.21	169.68	228.34
53.75	2.239583333	50.74	64.33	73.4	82.81	88.7	96.94	104.39	110.27	119.59	126.81	151.34	169.81	228.49
54	2.25	50.82	64.42	73.5	82.91	88.8	97.05	104.5	110.38	119.71	126.93	151.47	169.95	228.65
54.25	2.260416667	50.9	64.51	73.59	83.01	88.9	97.15	104.61	110.5	119.82	127.05	151.6	170.09	228.8
54.5	2.270833333	50.98	64.6	73.69	83.11	89.01	97.26	104.72	110.61	119.94	127.17	151.73	170.23	228.96
54.75	2.28125	51.06	64.69	73.79	83.21	89.11	97.37	104.83	110.72	120.06	127.29	151.86	170.36	229.11
55	2.291666667	51.15	64.78	73.88	83.32	89.21	97.47	104.94	110.84	120.17	127.41	151.99	170.5	229.26
55.25	2.302083333	51.23	64.87	73.98	83.42	89.32	97.58	105.05	110.95	120.29	127.53	152.12	170.63	229.42
55.5	2.3125	51.31	64.96	74.07	83.52	89.42	97.69	105.16	111.06	120.41	127.65	152.25	170.77	229.57
55.75	2.322916667	51.39	65.05	74.17	83.61	89.52	97.79	105.27	111.17	120.52	127.77	152.38	170.9	229.72
56	2.333333333	51.47	65.14	74.26	83.71	89.63	97.9	105.38	111.28	120.64	127.89	152.51	171.04	229.87
56.25	2.34375	51.55	65.23	74.36	83.81	89.73	98.01	105.49	111.4	120.75	128	152.63	171.17	230.02
56.5	2.354166667	51.63	65.32	74.45	83.91	89.83	98.11	105.6	111.51	120.87	128.12	152.76	171.3	230.17
56.75	2.364583333	51.71	65.41	74.54	84.01	89.93	98.22	105.71	111.62	120.98	128.24	152.89	171.44	230.32
57	2.375	51.79	65.5	74.64	84.11	90.04	98.32	105.82	111.73	121.1	128.35	153.01	171.57	230.47
57.25	2.385416667	51.88	65.59	74.73	84.21	90.14	98.43	105.92	111.84	121.21	128.47	153.14	171.7	230.62
57.5	2.395833333	51.96	65.67	74.83	84.31	90.24	98.53	106.03	111.95	121.32	128.59	153.27	171.83	230.77
57.75	2.40625	52.04	65.76	74.92	84.41	90.34	98.64	106.14	112.06	121.44	128.7	153.39	171.96	230.92
58	2.416666667	52.12	65.85	75.02	84.51	90.44	98.74	106.25	112.17	121.55	128.82	153.52	172.1	231.07
58.25	2.427083333	52.2	65.94	75.11	84.61	90.54	98.85	106.35	112.28	121.66	128.93	153.64	172.23	231.21
58.5	2.4375	52.28	66.03	75.2	84.7	90.64	98.95	106.46	112.39	121.77	129.05	153.77	172.36	231.36
58.75	2.447916667	52.36	66.12	75.3	84.8	90.75	99.06	106.57	112.5	121.89	129.16	153.89	172.49	231.51
59	2.458333333	52.44	66.2	75.39	84.9	90.85	99.16	106.67	112.61	122	129.28	154.01	172.62	231.65
59.25	2.46875	52.52	66.29	75.48	85	90.95	99.26	106.78	112.72	122.11	129.39	154.14	172.75	231.8
59.5	2.479166667	52.6	66.38	75.58	85.1	91.05	99.37	106.89	112.82	122.22	129.51	154.26	172.88	231.95
59.75	2.489583333	52.68	66.47	75.67	85.19	91.15	99.47	106.99	112.93	122.33	129.62	154.38	173	232.09
60	2.5	52.76	66.56	75.76	85.29	91.25	99.57	107.1	113.04	122.45	129.74	154.51	173.13	232.24
60.25	2.510416667	52.84	66.64	75.86	85.39	91.35	99.68	107.21	113.15	122.56	129.85	154.63	173.26	232.38
60.5	2.520833333	52.92	66.73	75.95	85.48	91.45	99.78	107.31	113.26	122.67	129.96	154.75	173.39	232.52
60.75	2.53125	53	66.82	76.04	85.58	91.55	99.88	107.42	113.36	122.78	130.08	154.87	173.52	232.67
61	2.541666667	53.08	66.91	76.13	85.68	91.65	99.99	107.52	113.47	122.89	130.19	154.99	173.64	232.81
61.25	2.552083333	53.16	66.99	76.23	85.78	91.75	100.09	107.63	113.58	123	130.3	155.12	173.77	232.95
61.5	2.5625	53.24	67.08	76.32	85.87	91.85	100.19	107.73	113.69	123.11	130.41	155.24	173.9	233.1
61.75	2.572916667	53.32	67.17	76.41	85.97	91.95	100.29	107.84	113.79	123.22	130.52	155.36	174.02	233.24
62	2.583333333	53.39	67.25	76.5	86.07	92.05	100.39	107.94	113.9	123.33	130.64	155.48	174.15	233.38
62.25	2.59375	53.47	67.34	76.6	86.16	92.15	100.5	108.05	114.01	123.44	130.75	155.6	174.28	233.52
62.5	2.604166667	53.55	67.43	76.69	86.26	92.24	100.6	108.15	114.11	123.55	130.86	155.72	174.4	233.67
62.75	2.614583333	53.63	67.51	76.78	86.35	92.34	100.7	108.25	114.22	123.65	130.97	155.84	174.53	233.81
63	2.625	53.71	67.6	76.87	86.45	92.44	100.8	108.36	114.32	123.76	131.08	155.96	174.65	233.95
63.25	2.635416667	53.79	67.69	76.96	86.55	92.54	100.9	108.46	114.43	123.87	131.19	156.08	174.78	234.09
63.5	2.645833333	53.87	67.77	77.05	86.64	92.64	101	108.57	114.54	123.98	131.3	156.19	174.9	234.23
63.75	2.65625	53.95	67.86	77.15	86.74	92.74	101.1	108.67	114.64	124.09	131.41	156.31	175.02	234.37
64	2.666666667	54.03	67.95	77.24	86.83	92.84	101.21	108.77	114.75	124.2	131.52	156.43	175.15	234.51
64.25	2.677083333	54.11	68.03	77.33	86.93	92.93	101.31	108.88	114.85	124.3	131.63	156.55	175.27	234.65
64.5	2.6875	54.18	68.12	77.42	87.02	93.03	101.41	108.98	114.96	124.41	131.74	156.67	175.4	234.78
64.75	2.697916667	54.26	68.2	77.51	87.12	93.13	101.51	109.08	115.06	124.52	131.85	156.78	175.52	234.92
65	2.708333333	54.34	68.29	77.6	87.21	93.23	101.61	109.18	115.17	124.62	131.96	156.9	175.64	235.06
65.25	2.71875	54.42	68.38	77.69	87.31	93.32	101.71	109.29	115.27	124.73	132.07	157.02	175.76	235.2
65.5	2.729166667	54.5	68.46	77.78	87.4	93.42	101.81	109.39	115.37	124.84	132.18	157.13	175.89	235.34
65.75	2.739583333	54.58	68.55	77.87	87.5	93.52	101.91	109.49	115.48	124.94	132.29	157.25	176.01	235.47
66	2.75	54.65	68.63	77.97	87.59	93.62	102.01	109.59	115.58	125.05	132.39	157.37	176.13	235.61
66.25	2.760416667	54.73	68.72	78.06	87.69	93.71	102.11	109.7	115.69	125.16	132.5	157.48	176.25	235.75
66.5	2.770833333	54.81	68.8	78.15	87.78	93.81	102.21	109.8	115.79	125.26	132.61	157.6	176.37	235.88
66.75	2.78125	54.89	68.89	78.24	87.88	93.91	102.31	109.9	115.89	125.37	132.72	157.71	176.49	236.02
67	2.791666667	54.97	68.97	78.33	87.97	94	102.41	110	116	125.47	132.83	157.83	176.61	236.16
67.25	2.802083333	55.05	69.06	78.42	88.07	94.1	102.5	110.1	116.1	125.58	132.93	157.94	176.73	236.29
67.5	2.8125	55.12	69.14	78.51	88.16	94.2	102.6	110.2	116.2	125.68	133.04	158.06	176.85	236.43
67.75	2.822916667	55.2	69.23	78.6	88.25	94.29	102.7	110.3	116.3	125.79	133.15	158.17	176.97	236.56
68	2.833333333	55.28	69.31	78.69	88.35	94.39	102.8	110.41	116.41	125.89	133.25	158.29		

75	3.125	57.44	71.66	81.18	90.94	97.05	105.52	113.18	119.22	128.76	136.17	161.4	180.35	240.36
75.25	3.135416667	57.51	71.75	81.27	91.03	97.14	105.62	113.27	119.32	128.86	136.27	161.51	180.46	240.49
75.5	3.145833333	57.59	71.83	81.36	91.12	97.23	105.71	113.37	119.42	128.96	136.37	161.62	180.57	240.62
75.75	3.15625	57.67	71.91	81.44	91.22	97.33	105.81	113.47	119.52	129.06	136.47	161.73	180.68	240.74
76	3.166666667	57.74	72	81.53	91.31	97.42	105.9	113.57	119.62	129.16	136.58	161.83	180.8	240.87
76.25	3.177083333	57.82	72.08	81.62	91.4	97.51	106	113.66	119.71	129.26	136.68	161.94	180.91	241
76.5	3.1875	57.89	72.16	81.71	91.49	97.61	106.09	113.76	119.81	129.36	136.78	162.05	181.02	241.12
76.75	3.197916667	57.97	72.24	81.79	91.58	97.7	106.19	113.86	119.91	129.46	136.88	162.16	181.13	241.25
77	3.208333333	58.05	72.33	81.88	91.67	97.79	106.28	113.95	120.01	129.56	136.98	162.26	181.25	241.37
77.25	3.21875	58.12	72.41	81.97	91.76	97.89	106.38	114.05	120.1	129.66	137.08	162.37	181.36	241.5
77.5	3.229166667	58.2	72.49	82.06	91.85	97.98	106.47	114.14	120.2	129.76	137.18	162.48	181.47	241.63
77.75	3.239583333	58.27	72.57	82.14	91.94	98.07	106.57	114.24	120.3	129.86	137.28	162.58	181.58	241.75
78	3.25	58.35	72.66	82.23	92.03	98.16	106.66	114.34	120.4	129.96	137.38	162.69	181.69	241.88
78.25	3.260416667	58.43	72.74	82.32	92.12	98.26	106.75	114.43	120.49	130.06	137.48	162.8	181.8	242
78.5	3.270833333	58.5	72.82	82.4	92.21	98.35	106.85	114.53	120.59	130.15	137.58	162.9	181.91	242.13
78.75	3.28125	58.58	72.9	82.49	92.3	98.44	106.94	114.62	120.69	130.25	137.68	163.01	182.02	242.25
79	3.291666667	58.65	72.99	82.58	92.39	98.53	107.04	114.72	120.79	130.35	137.78	163.11	182.13	242.37
79.25	3.302083333	58.73	73.07	82.67	92.49	98.63	107.13	114.82	120.88	130.45	137.88	163.22	182.24	242.5
79.5	3.3125	58.8	73.15	82.75	92.58	98.72	107.22	114.91	120.98	130.55	137.98	163.33	182.35	242.62
79.75	3.322916667	58.88	73.23	82.84	92.67	98.81	107.32	115.01	121.08	130.65	138.08	163.43	182.46	242.75
80	3.333333333	58.96	73.31	82.93	92.76	98.9	107.41	115.1	121.17	130.74	138.18	163.54	182.57	242.87
80.25	3.34375	59.03	73.4	83.01	92.85	98.99	107.51	115.2	121.27	130.84	138.28	163.64	182.68	242.99
80.5	3.354166667	59.11	73.48	83.1	92.94	99.09	107.6	115.29	121.36	130.94	138.37	163.75	182.79	243.12
80.75	3.364583333	59.18	73.56	83.19	93.02	99.18	107.69	115.39	121.46	131.04	138.47	163.85	182.9	243.24
81	3.375	59.26	73.64	83.27	93.11	99.27	107.79	115.48	121.56	131.13	138.57	163.95	183.01	243.36
81.25	3.385416667	59.33	73.72	83.36	93.2	99.36	107.88	115.58	121.65	131.23	138.67	164.06	183.12	243.48
81.5	3.395833333	59.41	73.8	83.45	93.29	99.45	107.97	115.67	121.75	131.33	138.77	164.16	183.23	243.61
81.75	3.40625	59.48	73.89	83.53	93.38	99.54	108.07	115.77	121.84	131.42	138.87	164.27	183.34	243.73
82	3.416666667	59.56	73.97	83.62	93.47	99.64	108.16	115.86	121.94	131.52	138.97	164.37	183.44	243.85
82.25	3.427083333	59.63	74.05	83.7	93.56	99.73	108.25	115.95	122.03	131.62	139.06	164.48	183.55	243.97
82.5	3.4375	59.71	74.13	83.79	93.65	99.82	108.35	116.05	122.13	131.72	139.16	164.58	183.66	244.09
82.75	3.447916667	59.78	74.21	83.88	93.74	99.91	108.44	116.14	122.23	131.81	139.26	164.68	183.77	244.21
83	3.458333333	59.86	74.29	83.96	93.83	100	108.53	116.24	122.32	131.91	139.36	164.79	183.88	244.34
83.25	3.46875	59.93	74.38	84.05	93.92	100.09	108.62	116.33	122.42	132	139.45	164.89	183.98	244.46
83.5	3.479166667	60.01	74.46	84.14	94.01	100.18	108.72	116.43	122.51	132.1	139.55	164.99	184.09	244.58
83.75	3.489583333	60.09	74.54	84.22	94.1	100.27	108.81	116.52	122.61	132.2	139.65	165.09	184.2	244.7
84	3.5	60.16	74.62	84.31	94.19	100.36	108.9	116.61	122.7	132.29	139.75	165.2	184.31	244.82
84.25	3.510416667	60.23	74.7	84.39	94.28	100.45	108.99	116.71	122.79	132.39	139.84	165.3	184.41	244.94
84.5	3.520833333	60.31	74.78	84.48	94.36	100.55	109.09	116.8	122.89	132.48	139.94	165.4	184.52	245.06
84.75	3.53125	60.38	74.86	84.56	94.45	100.64	109.18	116.89	122.98	132.58	140.04	165.5	184.63	245.18
85	3.541666667	60.46	74.94	84.65	94.54	100.73	109.27	116.99	123.08	132.68	140.13	165.61	184.73	245.3
85.25	3.552083333	60.53	75.02	84.74	94.63	100.82	109.36	117.08	123.17	132.77	140.23	165.71	184.84	245.42
85.5	3.5625	60.61	75.11	84.82	94.72	100.91	109.45	117.17	123.27	132.87	140.33	165.81	184.94	245.54
85.75	3.572916667	60.68	75.19	84.91	94.81	101	109.55	117.27	123.36	132.96	140.42	165.91	185.05	245.66
86	3.583333333	60.76	75.27	84.99	94.9	101.09	109.64	117.36	123.46	133.06	140.52	166.01	185.16	245.78
86.25	3.59375	60.83	75.35	85.08	94.98	101.18	109.73	117.45	123.55	133.15	140.61	166.12	185.26	245.9
86.5	3.604166667	60.91	75.43	85.16	95.07	101.27	109.82	117.55	123.64	133.25	140.71	166.22	185.37	246.02
86.75	3.614583333	60.98	75.51	85.25	95.16	101.36	109.91	117.64	123.74	133.34	140.81	166.32	185.47	246.13
87	3.625	61.06	75.59	85.33	95.25	101.45	110.01	117.73	123.83	133.44	140.9	166.42	185.58	246.25
87.25	3.635416667	61.13	75.67	85.42	95.34	101.54	110.1	117.82	123.92	133.53	141	166.52	185.68	246.37
87.5	3.645833333	61.21	75.75	85.51	95.43	101.63	110.19	117.92	124.02	133.63	141.09	166.62	185.79	246.49
87.75	3.65625	61.28	75.83	85.59	95.51	101.72	110.28	118.01	124.11	133.72	141.19	166.72	185.89	246.61
88	3.666666667	61.36	75.91	85.68	95.6	101.81	110.37	118.1	124.2	133.81	141.28	166.82	186	246.73
88.25	3.677083333	61.43	75.99	85.76	95.69	101.9	110.46	118.19	124.3	133.91	141.38	166.92	186.1	246.84
88.5	3.6875	61.5	76.07	85.85	95.78	101.99	110.55	118.29	124.39	134	141.47	167.02	186.21	246.96
88.75	3.697916667	61.58	76.15	85.93	95.87	102.08	110.64	118.38	124.48	134.1	141.57	167.12	186.31	247.08
89	3.708333333	61.65	76.23	86.02	95.95	102.17	110.74	118.47	124.58	134.19	141.66	167.22	186.42	247.2
89.25	3.71875	61.73	76.31	86.1	96.04	102.26	110.83	118.56	124.67	134.28	141.76	167.32	186.52	247.31
89.5	3.729166667	61.8	76.4	86.19	96.13	102.35	110.92	118.66	124.76	134.38	141.85	167.42	186.62	247.43
89.75	3.739583333	61.88	76.48	86.27	96.22	102.44	111.01	118.75	124.86	134.47	141.95	167.52	186.73	247.55
90	3.75	61.95	76.56	86.36	96.31	102.53	111.1	118.84	124.95	134.57	142.04	167.62	186.83	247.66
90.25	3.760416667	62.02	76.64	86.44	96.39	102.62	111.19	118.93	125.04	134.66	142.14	167.72	186.94	247.78
90.5	3.770833333	62.1	76.72	86.53	96.48	102.7	111.28	119.02	125.13	134.75	142.23	167.82	187.04	247.9
90.75	3.78125	62.17	76.8	86.61	96.57	102.79	111.37	119.11	125.23	134.85	142.33	167.92	187.14	248.01
91	3.791666667	62.25	76.88	86.69	96.66	102.88	111.46	119.21	125.32	134.94	142.42	168.02	187.25	248.13
91.25	3.802083333	62.32	76.96	86.78	96.74	102.97	111.55	119.3	125.41	135.03	142.51	168.12	187.35	248.25
91.5	3.8125	62.4	77.04	86.86	96.83	103.06	111.64	119.39	125.5	135.13	142.61	168.22	187.45	248.36
91.75	3.822916667	62.47	77.12	86.95	96.92	103.15	111.73	119.48	125.6	135.22	142.7	168.32	187.55	248.48
92	3.833333333	62.54	77.2	87.03	97.01	103.24	111.82	119.57	125.69	135.31	142.8	168.41	187.66	248.59
92.25	3.84375	62.62	77.28	87.12	97.09	103.33	111.91	119.66	125.78	135.4	142.89	168.51	187.76	248.71
92.5	3.854166667	62.69	77.36	87.2	97.18	103.42	112	119.75	125.87	135.5	142.98	168.61	187.86	248.82
92.75	3.864583333	62.77	77.44	87.29	97.27	103.51	112.09	119.85	125.96	135.59	143.08	168.71	187.96	248.94
93	3.875	62.84	77.52	87.37	97.35	103.59	112.18	119.94	126.06	135.68	143.17	168.81	188.07	249.05
93.25	3.885416667	62.91	77.6	87.45	97.44	103.68	112.27	120.03	126.15	135.77	143.26	168.91	188.17	249.17
93.5	3.895833333	62.99	77.68	87.54	97.53	103.77	112.36	120.12	126.24	135.87	143.36	169	188.27	249.28
93.75	3.90625													

Appendix N

WSCC LLFA Objection Removal (15th May 2025)

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH



Lead Local Flood Authority

Date 15th May 2025

Giles Holbrook
Development Control
Horsham District Council
Parkside
Chart Way
Horsham
RH14 1RL

Dear Giles,

RE: DC/24/1699 – Land at 518724 118628, Bines Road, Partridge Green, West Sussex, RH13 8EQ

Thank you for your consultation on the above site, received on 29th April 2025. We have reviewed the application as submitted and wish to make the following comments.

The applicant has provided an updated Flood Risk Assessment (FRA) and Drainage Strategy. We have **no objection** and suggest that the FRA reference is updated to match the most recent FRA.

Condition 1

Prior to the commencement of development, construction drawings of the surface water drainage network, associated sustainable drainage components and flow control mechanisms and a construction method statement shall be submitted and agreed in writing by the Local Planning Authority. The scheme shall then be constructed as per the **Flood Risk Assessment and Drainage Strategy by Motion, 25th April 2025, issue Final C** and remain in perpetuity for the lifetime of the development unless agreed in writing by the Local Planning Authority. No alteration to the agreed drainage scheme shall occur without prior written approval from the Local Planning Authority.

Reason: To ensure that the development achieves a high standard of sustainability and to comply with NPPF and Policy 38 in Horsham District Planning Framework.

The wording of the other conditions recommended previously remains the same.

Yours sincerely,

Eleanor Read
Flood Risk Management Team
FRM@westsussex.gov.uk

Appendix O

Drainage Management and Maintenance Plan



Land West of Bines Road
Partridge Green, West Sussex

Drainage Management and Maintenance
Plan

For

Croudace Homes Ltd

Document Control Sheet

Land West of Bines Road

Partridge Green, West Sussex

Croudace Homes Ltd

This document has been issued and amended as follows:

Date	Issue	Prepared by	Approved by
6 th November 2025	Final	Phil Allen BSc (Hons) MCIWEM C.WEM	Neil Jaques



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4.0 General Maintenance Principles 4

5.0 Inspection and Maintenance Frequency of Components..... 6

6.0 Foul Pump Station..... 9

1.0 Introduction

- 1.1 This document sets out the principles for the long-term management and maintenance of the proposed surface water drainage system on the development proposed on the land west of Bines Road, Partridge Green.
- 1.2 The purpose of this document is to ensure that the site management company or their agents have a robust inspection and maintenance plan going forwards. This ensures the optimum operation of the surface water drainage system and that it will be continually maintained for the lifetime of the development. This will contribute to reducing the risk of surface water flooding both on- and off-site.
- 1.3 All those responsible for maintenance should follow relevant health and safety legislation for all activities listed within this report (including lone working, if relevant). Method statements and risk assessments should always be undertaken and made available, if requested.
- 1.4 This document has been produced by Motion on behalf of their client, Croudace Homes Ltd. This document describes the typical management and maintenance tasks that are known at the design stage (maintenance frequencies and typical tasks, for example). These have been drawn from industry guidance such as CIRIA C753 - The SuDS Manual – and manufacturer's own guidance.
- 1.5 Maintenance is considered as a construction activity under the CDM Regulations 2015. Under the CDM Regulations, it is a requirement that a competent person be appointed to carry out a required role. CDM defines a competent person as an individual with sufficient knowledge of the specific tasks to be undertaken, as well as sufficient experience and ability to carry out their duties in relation to the task in a way that secures health and safety on site.
- 1.6 In recognition of the requirements of the CDM Regulations 2015, this surface water management and maintenance plan expects that the maintenance work will be carried out by a competent person who must have prior knowledge of the drainage components and SuDS systems on site.
- 1.7 There are limitations on what this document can prescribe at this time. At this stage this document cannot name the specific individuals who will carry out the maintenance and what equipment is to be used. Related to this, this document is unable to provide method statements for exactly how maintenance practices will be carried out. These can only be determined at the time of the maintenance being carried out, the exact maintenance need and the methods of working prescribed by those carrying out the maintenance. Therefore, this is to be the responsibility of the site management company and/or the individuals carrying out the work. We urge those who are carrying out the maintenance to record this information and make it available to the Local Planning Authority (LPA), if required to do so. This drainage management and maintenance plan needs to be a living document that is owned and maintained by the adopting site management company.

2.0 Maintenance Categories

2.1 There are three categories of maintenance activities referred to in this report. These are:

Regular maintenance (including inspections and monitoring)

- „ Regular maintenance consists of basic tasks done on a frequent and predictable schedule, including inspections, vegetation management, and litter, silt and debris removal.

Occasional maintenance

- „ Occasional maintenance comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

Remedial maintenance

- „ Remedial maintenance comprises of intermittent tasks that may be required to rectify faults associated with the system. The likelihood of faults can be minimised by correct installation, regular inspection and timely maintenance. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events and, as such, timings are difficult to predict.
- „ This document should be read in conjunction with the design drawings of the drainage system, so that the location and type of each feature can be recognised and understood.

3.0 The Drainage System Components

Surface water

- 3.1 The proposed surface water drainage system is made up of a number of components. These include:
- ” Permeable Paviments
 - ” SuDS Basins
 - ” A Swale
 - ” Catchpit manholes/silt traps
 - ” Hydrobrakes
 - ” Orifice Plates
 - ” Water Butts
 - ” Manholes
 - ” Pipes
- 3.2 All components should be installed in accordance with the manufacturer's instructions and to the levels/arrangement as defined on the designer's drawings. Not doing so will invalidate any warranty provided by the manufacturer.
- 3.3 All maintenance and cleaning must be carried out in accordance with manufacturer's recommendations and by competent and suitably qualified staff, as defined in the CDM regulations 2015.

Foul Water

- 3.4 It is proposed to discharge the foul sewage using a pumped system. All pump maintenance (as well as that of the switch gear and any telemetry stations, etc.) should be carried out by the pump manufacturer and it is recommended that a service agreement is arranged.
- 3.5 The ways in which pump maintenance can be effectively carried out is presented in Section 6, along with other ways in which the efficiency and reliability of the pumps can be maximised.

4.0 General Maintenance Principles

- 4.1 All surface water drainage systems, whether piped gravity systems, Sustainable Drainage Systems (SuDS), or flow control devices and pumps, require regular maintenance to keep them working at optimum efficiency and capacity. The maintenance of the surface water drainage system on the development on the land to the west of Bines Road should be carried out alongside other regular maintenance tasks on site.
- 4.2 Timely and adequate maintenance will increase the lifespan of all the drainage components. Inadequate maintenance will do the reverse. Therefore, the projected lifespan and anticipated replacement date of each drainage component cannot be forecast at the time of this document being produced.
- 4.3 The site management company and/or their agents are responsible for the maintenance of the surface water drainage system.
- 4.4 Construction activities can create and discharge significant quantities of sediment that will quickly clog the surface water drainage system. Therefore, construction-stage sediment removal is required immediately post-construction. This may require several cleans of the system during the first year after installation. The construction site manager should assess this and carry out cleaning as necessary.
- 4.5 Catchpit manholes/silt traps will be specified upstream of the permeable paving. They will remove gross solids and the majority of silts. It is important that any debris build-up in the catchpit manholes/silt traps is removed at regular intervals. This will reduce the risk of the permeable paving becoming silted up. It will maintain its design capacity and function.
- 4.6 Cleaning should also take place after large storms when there have been increased surface water flows and visible entrainment and deposition of debris.
- 4.7 An increased frequency of inspection and maintenance should be programmed into the autumn and winter months in acknowledgement that:
 - „ Leaf fall from deciduous trees in autumn will result in an increased amount of leaf litter and an elevated blockage risk of drainage infrastructure.
 - „ Increased rainfall during winter months will result in greater quantities of water moving through the drainage system and a greater input of silt and other debris.
- 4.8 Table 4.1, on the next page, gives an overview of typical maintenance tasks and the frequency with which they need to be undertaken. Section 5 – Inspection and Maintenance Frequency of Components – will assign typical maintenance frequencies and tasks to the specific components used within the surface water drainage system on the proposed development.

Table 4.1: Typical maintenance tasks and frequencies

Activity	Indicative Frequency	Typical Tasks
Routine/regular maintenance	Monthly to annually	" Litter picking " Silt removal " Inspection of all inlets, outlets and control structures " Weed removal and invasive plant control
Occasional maintenance	Annually up to 25 years	" Silt control around components " Vegetation management around components " Sweeping of pavement areas to remove surface silt " Silt removal from catchpits, cellular storage structures
Remedial maintenance	As required	" Inlet/outlet repairs " Erosion repairs " Reinstatement of edgings " Reinstatement following pollution " Removal of silt build-up and leaf litter after storms " Repair of vandalism " Replacement of any blocked filter membranes/materials

5.0 Inspection and Maintenance Frequency of Components

- 5.1 Table 5.1 below lists each of the components used within the development's surface water drainage system. It suggests an indicative maintenance frequency for each component and ascribes typical maintenance tasks to them.
- 5.2 This list is not exhaustive, nor is it prescriptive. As mentioned in Section 3, additional, unscheduled maintenance may be required following adverse weather conditions or after autumn leaf falls. Additional maintenance tasks may be required to adequately clean and maintain individual components.
- 5.3 The list of components should be cross-referenced with the designer's drawings so that the location of each component can be identified.
- 5.4 It is the responsibility of the site management company and/or their agents to ensure that all necessary maintenance activities are carried out in a timely manner and that the design performance of each drainage component is preserved.
- 5.5 If there is any uncertainty regarding the correct and safe methods of cleaning, or what equipment should be used, the manufacturer should be consulted.

Table 5.1: Maintenance Frequency and Task for Drainage Components

Activity	Indicative Frequency	Anticipated Tasks
Pipes	As required	- Identify any pipes that may not be operating properly and employ a competent, qualified contractor to inspect using CCTV. - If the pipe is blocked with silt or debris, the pipe should be jetted clean from an upstream access point. All silt and debris should be captured and removed at a downstream access point. - Inspect once clean. - If any other defects are encountered (cracks, displaced joints, root ingress), appropriate solutions should be discussed with a competent and qualified contractor. These services are usually provided by the same companies that offer CCTV surveys and pipe jetting services.
Manholes	Annually	- Inspect/identify any damage or areas that are not operating correctly - Remove silt, litter, leaves and other detritus. - Inspect once clean.
Catchpit Manholes/Silt Traps	Twice a year, before and after autumn/winter	- Inspect/identify any damage or areas that are not operating correctly - Remove silt, litter, leaves and other detritus. - Inspect once clean.
Hydrobrake chambers	Every three months for the first year, then annually thereafter	- Contact manufacturer for instruction on approved and safe inspection and maintenance practices. - Inspect Hydrobrake and check functionality. - Remove any detritus as required. - Inspect once clean.

Orifice Plates	Inspections at regular intervals (every 3 – 6 months).	Orifice plates have no moving parts to fail and quality units are made of stainless steel to resist scour, degradation and chemical attack. The orifice plates in this scheme are to be downstream of the permeable pavements, so all contributing flows should be heavily filtered and free of any debris. Debris and silt should be removed if present Check wear on orifice to ensure no enlargement is taking place. Any visible fixing bolts should be checked. If there is a suspected blockage, the housing chamber can be inspected internally, the blockage cleared and the orifice returned to its working position.
Water Butts	Annually in Autumn to Winter	Remove falling leaves and seeds from guttering or those that have found their way into the water butt. Water may stagnate slightly. If so, use a water butt cleaning disc into the tank. In autumn and winter, drain water off every 10 days (or less) to make sure that water butts don't overflow and that water is kept moving. This will stop larvae and flies from using the water butt. Use safe products such as vinegar to clean the outside of the tank and the inside of the lid and be careful not to contaminate water with chemicals. At least once a year, completely empty the water butt and scrub it out with warm soapy water and then rinse thoroughly. This is best done at a time when the water butt is already nearly empty (end of summer) or when it can readily refill (winter).
Permeable paving	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations.	Agitate surface by means of mechanical sweeping or vacuuming to ensure no vegetation or moss is allowed to establish and grow in the joints. Mechanical sweeping of pavements and refilling of joints with the correct aggregate need only be carried out at intervals of 5 years or so Remove weeds from the surface through the application of glyphosate-based weed killers Stabilise and mow contributing and adjacent areas. Inspect once clean. See Table 20.15 of CIRIA C753 for more information. Permeable paving has a nominal 25-year lifespan, if correctly and regularly maintained.

		When subjected to low level oil drips permeable pavements can continue to biodegrade hydrocarbons indefinitely. Major oil spills have the potential to contaminate the surface and the underlying crushed stone. In the event of a major oil spill, the area of block pavements and crushed stone that is affected should be removed, cleaned and reinstalled.
SuDS Basins	Monthly in Summer, as required in Winter	Responsibility should be with landscape contractors. Maintenance tasks are not that different from standard public open space. Adequate access needs to be provided to the area. Regular mowing should take place across maintenance access routes, amenity areas, across embankments and the main storage area. Remaining areas can remain as 'meadow'. Mowed grass lengths of 75 – 100mm are appropriate. Grass clippings should be disposed of off-site. Any dead growth should be cleared before the start of the growing season. Any permanently wet areas with emergent aquatic vegetation should be managed as ponds or wetlands. Remove any sediment build-up as required. Check any inlets and outlets for blockages and clear as required. Check any flow control devices, if present.
Swale	Monthly in Summer, as required in Winter	Maintenance tasks for swales match those of SuDS basins, so please refer to the maintenance tasks, above.

5.6 Upon completion of maintenance activities, a record should be kept of the work carried out. This should be retained, and an annual maintenance report should be compiled, which should include the following:

- Observations resulting from inspections
- Maintenance and operation activities undertaken during the year
- Recommendations for inspections and maintenance programmes for the following year

5.7 On the last page of this document is a table with suggested information that should be recorded and included with the maintenance plan. As mentioned in the introduction to this document, this should be a living document and regularly updated, as required.

6.0 Foul Pump Station

- 6.1 This section will discuss how the maintenance need of the foul pump station will be minimised, but also how it should be maintained to reduce the risk of pump failure.
- 6.2 Poorly designed and maintained pumps can be problematic but, with correct design, specification, monitoring and maintenance, pumped systems can be as reliable as gravity outfalls.
- 6.3 How pump reliability will be guaranteed on the proposed development is detailed below.

Correct Pump Specification

- 6.4 Choosing a suitable pump for the application at hand and correctly specifying it (as well as all infrastructure around the pumping station and any associated control panels and switchgear) is vital to avoiding breakdowns. Failure to do so can lead to blockages or excessive wear on pump components.
- 6.5 Therefore, first and foremost, Motion and Croudace Homes Ltd will work with a leading pump supplier (T-T Pumps) who will control the design, manufacture, supply and installation of the pump and any controls. By doing so, the correct pump for the application will be specified and it will be installed in accordance with the manufacturer's recommendations. This will optimise the efficiency and reliability of the installed pump system, which, in turn, will minimise the risk of wear and failure.

Duty/Standby Pump Arrangement

- 6.6 The system that will be specified for the site will have both a duty and standby pump, which will operate on the following basis:
 - „ Duty only, and;
 - „ Duty and standby basis (with the standby pump acting as a backup in the event of duty pump failing).
- 6.7 With a duty/standby pump set-up, it is only possible for one of the two pumps to be triggered at any one moment. If, for whatever reason, the duty pump fails, the standby pump will then be instructed by the control panel to take over. The pump station will then work as a single pump system until the damaged/blocked pump fixed.
- 6.8 The chances of both the duty and standby pumps failing during the same event is minimal, and this ensures that the pump station will always remain operational.

Control Panels and Alarms

- 6.9 The pump system specified for the proposed development will be monitored by a fully telemetered remote alarm system.
- 6.10 It is proposed that T-T Pumps' products are used and that their 'Seer' remote monitoring system is connected to the pump.
- 6.11 The Seer remote monitoring system uses cloud-based technology to continually communicate the operational status of the pump in real time with live status updates and alarm activation. Seer's historical data-logging, along with T-T monitoring services, means potential issues can be identified early, informing proactive maintenance and avoiding costly breakdowns (and flood risk, in the context of the development).
- 6.12 Seer remote monitoring and telemetry keeps track of the pump system 24-hours a day, 365-days a year and features live status and alarm activation along with an observation of the whole system, which means that the pump equipment's operational performance can be viewed constantly, and pro-active maintenance visits can be scheduled. Any issues that do arise can be identified early and dealt with accordingly.

- 6.13 Some actions can also be performed remotely, such as pump resets, when used with a compatible control panel removing the need for costly breakdown callouts, increasing the sustainability of the system and massively reducing the time that the pump is not operational.

Maintenance

- 6.14 Along with the remote monitoring, telemetry and alarm system, a Pump Maintenance Package (Service Agreement) will be signed up to and implemented to ensure that the foul pump system is kept in optimal working condition.
- 6.15 Because it is proposed to use T-T Pumps' Seer monitoring system, this can be linked to a higher level of bespoke support that goes beyond standard services (at least two per year) and covers all major equipment and mechanical and electrical components so that the pump system will continue to work reliably and efficiently with maximum longevity.
- 6.16 Typical activities carried out in a maintenance service include:
- „ Cleaning and emptying the chamber
 - „ Checking that there are no blockages and if there are any removing them
 - „ Inspecting that there are no defects in the sewage pump system e.g. broken pipes, pump seals, problems with the float switch or impeller
 - „ Testing water alarms, battery backup systems and telemetry systems
 - „ Testing and checking all operating control panels
 - „ Performing electrical insulation resistance tests for longevity

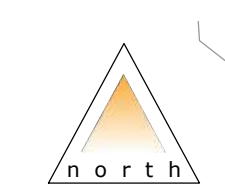
Summary

- 6.17 When the above processes are considered together, they show that the risk of pump failure can be minimised to the point that they become negligible.

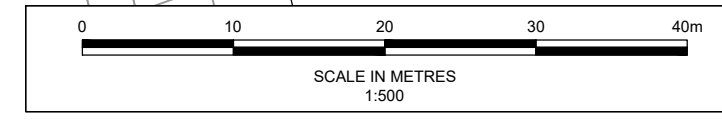
Date	Component requiring maintenance	Issues prompting maintenance	Scheduled maintenance (Y/N)	Maintenance carried out	Additional works required (Y/N). If yes, please detail	Next scheduled date of inspection and maintenance

Appendix P

Exceedance Plan



ts Croft



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- Notes
1. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
 2. This drawing has been based upon survey information supplied by Ecompass Surveys and Motion cannot guarantee the accuracy of the data provided.
 3. This drawing should be read in conjunction with all other relevant architect and engineering details, drawings and specifications.
 4. All pipes shall be laid sufficient to suffice with outgoing pipes unless otherwise stated.
 5. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.
 6. For construction details refer to Motion drawing series 2403075-0800.

Legend

- Surface Water Excessance Flow
- Excessance Storage Area

P03	Site layout updated	CC	PA	NJ	25/09/2024
P02	Site layout updated	CC	PA	NJ	20/09/2024
P01	First Issue	CC	PA	NJ	06/09/2024
Rev.	Description	Rev.	CC	PA	Date

Drawing Status:
FOR PLANNING
NOT FOR CONSTRUCTION



Client:
Croudace Homes Ltd

Project:
Land West of Bines Road
Partridge Green, West Sussex

Title:
Excessance Plan

Scale: 1:500 (© A0)
Drawing:
2403075-9002
Revision:
P03