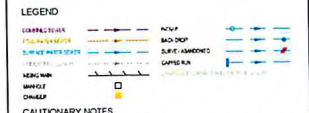


TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644

Drainage
All drainage was fitted with pipe sizes and invert levels recorded. Wherever possible the chamber manholes have been located and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been shown wherever possible and marked with invert levels. Drains / sewers between manholes are assumed to be straight. All sub surface drainage positions should be cross checked in critical areas by RD or GPR survey or hand digging holes.

- Notes:
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD. JOB NO. APH/17/19 DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
 2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
 3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES/CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

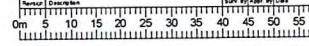
ABBREVIATIONS		DRAINAGE KEY	
ACPI	ASSUMED CONNECTION POINT	UH	LAMP HOLE
AG	ABOVE GROUND	NP	NO PIPES VISIBLE
AR	ASSUMED ROUTE	OP	OUTLET
BD	BACK DROP	OU	OUTLET
BL	BRICK	PP	POLYPROPYLENE
BL	BASE LEVEL	PPW	PIPE ON WALL
CL	CAST IRON	PT	PIPE
CL	COVER LEVEL	PTG	PIPE TO GROUND
CL	CONCRETE	PVC	POLYVINYL CHLORIDE
CU	CULVERT	PVCU	ULTRA RIB (PVC)
CP	CATCHPIT	R	ROOFING PIPE
CWG	COMBINED WATER SEWER	RAN	RIBBON MAN
CH	DRAINAGE CHANNEL	RWP	RIBBON WATER PIPE
DI	DUCTILE IRON	SOP	SOFFIT
FD	FLY TIE DRAIN	SPP	SOLID VENT PIPE
FWS	FULL WATER SEWER	SWS	SURFACE WATER SEWER
GT	GULLY	UL	UNABLE TO LIFT
IC	INVERT COVER	ULS	UNABLE TO SURVEY
IL	INVERT LEVEL	VC	VITRIFIED CLAY
IR	INTERCEPTOR	VP	VENT PIPE
IT	INLET	VE	VENTER LEVEL
KD	KEYS OUTLET		



CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from existing information. Pipe sizes are recorded in information and depths in meters.
2. Connections between manholes have been proven using gas testing or acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please note that the survey is a CCTV survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



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INSURANCE

16 REVENGE ROAD
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PERSIMMON

Toddington Lane
Littlehampton
West Sussex

Drainage Survey

Scale	1:500	Sheet Size	A0	Sheet Number	2	Date	February 2015
Project Number	20644	Rev	-	Surveyed By	CP	Approved By	NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644

Drainage
All drainage was traced with pipe size and invert levels recorded. Wherever possible the chamber spots have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible by inspection and lower down. Down / sewer / level markers are assumed to be straight. All sub surface drainage positions should be cross checked in critical areas by RD or GPR survey or hand dug trial holes.

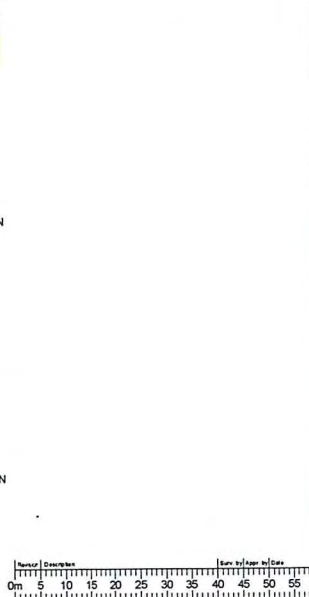
Notes:
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY WATER BROWN LTD. JOB NO. A/P/LITTLE 268. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT HAVING ENTERED INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROJECT.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTED CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS		DRAINAGE KEY	
ACPP	ASSIGNED CONNECTION POINT	UH	LAMP HOLE
AGD	ABOVE GROUND	MH	MANHOLE
AR	ASSIGNED ROUTE	NPV	NO FREE VEGETATION
BD	BACK DROP	CL	OUTLET
BL	BRICK	CU	CUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CL	EAST RISE	PP	PIPE TO WALL
CL	COVER LEVEL	PT	P-TRAP
CO	CONCRETE	PD	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
CU	CATCHMENT	RE	ROOFING EYE
CWS	COVERED WATER SEWER	RE	ROOFING EYE
DCH	DRAINAGE CHANNEL	RMAN	RISING MAIN
D	DRAIN	RWP	RAIN WATER PIPE
FD	FEEDER DRAIN	SOP	SOFFIT
PWS	FOUL WATER SEWER	SVP	SOIL VENT PIPE
DY	DRAIN	SWS	SURFACE WATER SEWER
IC	INSPECTION COVER	UTL	UNABLE TO LIFT
IL	INVERT LEVEL	UTL	UNABLE TO SURVEY
IT	INTERCEPTOR	VC	VERIFIED CLAY
IT	INTERCEPTOR	VP	VENT PIPE
KO	KERS OUTLET	VA	WATER LEVEL

LEGEND
CAUTIONARY NOTES
1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in dimensions and depths in meters.
2. Connections between manholes have been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.
ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



CAUTIONARY NOTES
1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in dimensions and depths in meters.
2. Connections between manholes have been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.
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Toddington Lane
Littlehampton
West Sussex

Drainage Survey			
Scale	Sheet Size	Sheet Number	Date
1:500	A0	3	February 2015
Project Number:	Rev:	Surveyed By:	Approved By:
20644	-	CP	NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage: All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external downpipes and external wet stacks have been proven wherever possible into manholes and sewer runs. Drainage / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by R2 or CPM survey or hand dug trial holes.



Notes:

- DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY
- PRODUCED BY MAYER BROWN LTD. JOB NO. APM/LITTLE 20644 DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS
- DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL
- ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES / CONNECTIVITY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED AS APPROXIMATE AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS

ACDP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
AGD	ABOVE GROUND	MM	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OL	OUTLET
BR	BRICK	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CL	CAST IRON	POW	PIPE ON WALL
CL	COVER LEVEL	PTD	P-TRAP
CO	CONCRETE	PVC	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
CP	CATCHPIT	RE	ROOFING EYE
CWS	COMBINED WATER SEWER	UL	ULTRA RISE (PVC)
DI	DRAINAGE CHANNEL	VE	VENT
DCH	DRAINAGE CHANNEL	WM	WATER MAIN
DI	DRAINAGE CHANNEL	WV	WATER VENT
FD	FILTER DRAIN	WV	WATER VENT
FWS	FULL WATER SEWER	WV	WATER VENT
GY	GULLY	WV	WATER VENT
IC	INVERT COVER	WV	WATER VENT
INT	INTERCEPTOR	WV	WATER VENT
LD	LEAKY DRAIN	WV	WATER VENT
MD	MANHOLE	WV	WATER VENT

LEGEND

COMBINED SEWER	ICDP	NO PIPES VISIBLE
FULL WATER SEWER	MD	NO PIPES VISIBLE
SURFACE WATER SEWER	MD	NO PIPES VISIBLE
INVERT	MD	NO PIPES VISIBLE
WHOLE	MD	NO PIPES VISIBLE
CHAMBER	MD	NO PIPES VISIBLE

CAUTIONARY NOTES

- Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
- Connectivity between Manholes has been proven using data logging / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please refer to further details if a CCTV Survey is required.

CAUTIONARY NOTES

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

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INSURANCE

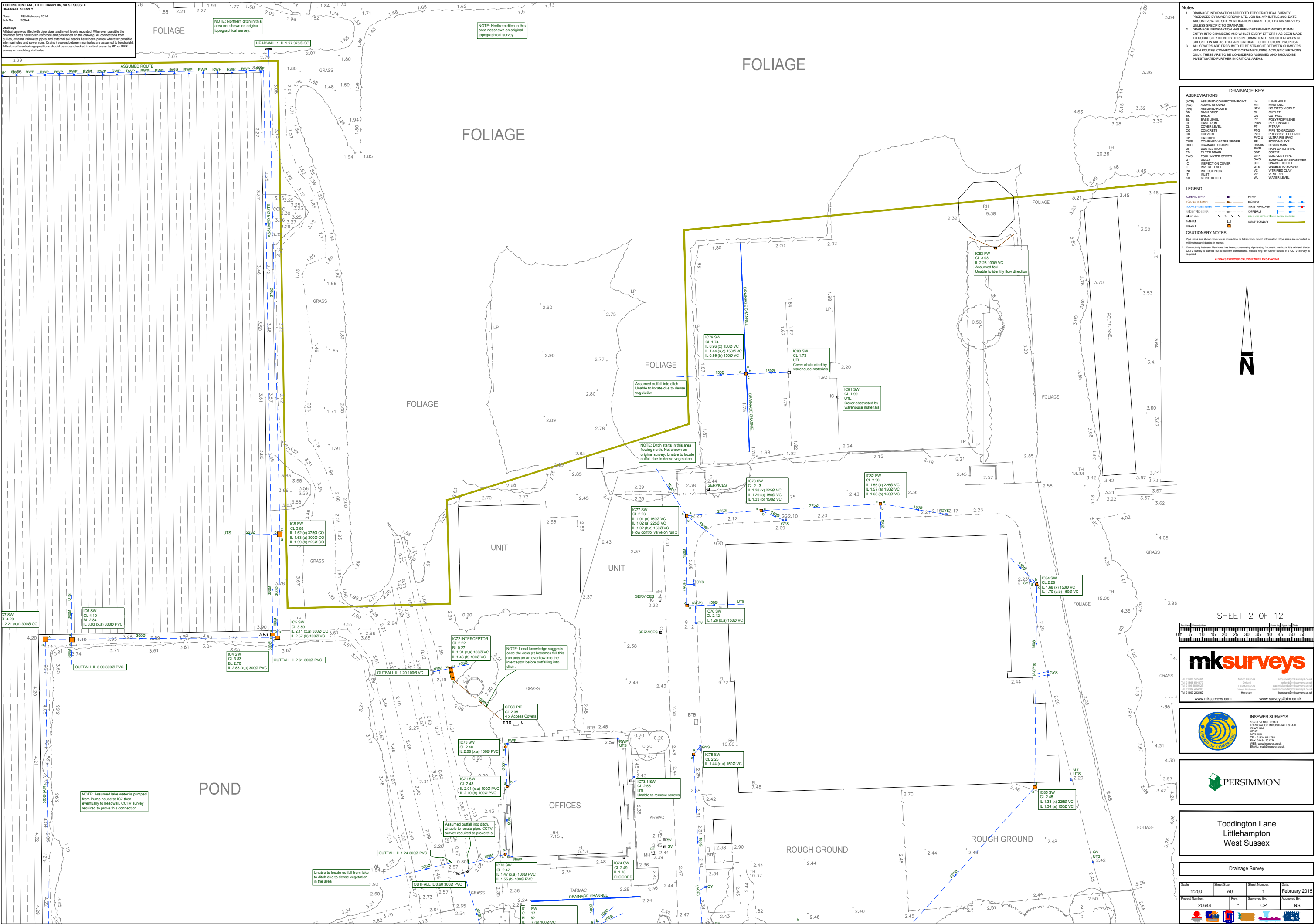
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PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey

Scale: 1:250	Sheet Size: A0	Sheet Number: 1	Date: February 2015
Project Number: 20644	Rev: -	Surveyed By: CP	Approved By: NS



Notes :

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD. JOB NO. APM/LITTLE 200. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
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ABBREVIATIONS

ADCP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
AGD	ABOVE GROUND	MM	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROPP	OL	OUTLET
BL	BRICK	OU	OUTFALL
CL	BASE LEVEL	PP	POLYPROPYLENE
CO	CAST IRON	POW	PIPE ON WALL
CU	CONCRETE	PT	P-T JUMP
CW	CULVERT	PTD	PIPE TO GROUND
CP	CATCHPIT	PVC	POLYVINYL CHLORIDE
DWS	COMBINED WATER SEWER	RE	ROOFING EYE
DCH	DRAINAGE CHANNEL	RM	ROOFING MAN
DI	DITCH	RWP	RAIN WATER PIPE
FD	FILTER DRAIN	SOF	SOFT
FWS	FULL WATER SEWER	SVP	SOIL VENT PIPE
GY	GULLY	SW	SURFACE WATER SEWER
IC	INSPECTION COVER	UTL	UNABLE TO LIFT
INT	INVERT LEVEL	UTS	UNABLE TO SURVEY
INT	INTERCEPTOR	VC	VENT PIPE
IO	INLET	WL	WATER LEVEL
IO	INLET OUTLET		

LEGEND

COMBINED SEWER	ADCP	ASSUMED CONNECTION POINT
CULVERT	AGD	ABOVE GROUND
SURFACE WATER SEWER	AR	ASSUMED ROUTE
BRICK	BD	BACK DROPP
CAST IRON	BL	BRICK
CONCRETE	CL	BASE LEVEL
CULVERT	CO	CAST IRON
CATCHPIT	CW	CULVERT
COMBINED WATER SEWER	DWS	COMBINED WATER SEWER
DRAINAGE CHANNEL	DCH	DRAINAGE CHANNEL
DITCH	DI	DITCH
FILTER DRAIN	FD	FILTER DRAIN
FULL WATER SEWER	FWS	FULL WATER SEWER
GULLY	GY	GULLY
INSPECTION COVER	IC	INSPECTION COVER
INVERT LEVEL	INT	INVERT LEVEL
INTERCEPTOR	INT	INTERCEPTOR
INLET	IO	INLET
INLET OUTLET	IO	INLET OUTLET

CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
2. Connectivity between chambers has been proven using data logging / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

mk surveys

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ROOFING
CARPENTRY
JOINERY
FLOORING
PAINTING
DECORATING
GARDENING
LANDSCAPING
CONCRETE
PAVING
ROOFING
CARPENTRY
JOINERY
FLOORING
PAINTING
DECORATING

PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey

Scale	Sheet Size	Sheet Number	Date
1:250	A0	1	February 2015
Project Number	Rev	Surveyed By	Approved By
20644	-	CP	NS

1000 PVC pipe evident in trench. Assumed existing drainage from polytunnels.

NOTE: This building has been demolished and is currently under earthworks. No evidence of original drainage.

100Ø PVC pipe evident in trench. Assumed existing drainage from polytunnels. Assumed redundant

Year	Grass	Grass
7.46	7.51	

A horizontal number line with arrows at both ends. A single tick mark is labeled with the number 6.52.

DRAINAGE KEY			
ABBREVIATIONS			
(ACP)	ASSUMED CONNECTION POINT	LMP	LAMP HOUSE
AB	ABOVE GROUND	LN	MANHOLE
AD	ASSUMED ROUTE	NP	NO PIPES VISIBLE
BD	BACK DRAIN	OP	OPEN
BR	BRICK	OU	OUTFALL
BS	BASE LEVEL	PO	POLYPROPYLENE
CR	CAST IRON	POW	Pipe ON WALL
CS	COVER LEVEL	PS	PEST
CU	CONCRETE	PTB	Pipe TO BE PROVIDED
DU	DUCTILE IRON	PLV	POLYVINYL CHLORIDE
CP	CATCHPIPE	PVC-U	ULTRA RIGID PVC
CWS	COMBINED WASTEWATER SEWER	RC	RECORDING EYE
DC	DOWN DRAIN CHANNEL	RS	ROBING MAN
DL	DUCTILE IRON	RN	RUN
DS	DOWN SLOPE	RNP	RUN IN RAIN PIPE
FWS	FLOW WATER SEWER	SO	SOFT
FS	FRANKLIN	SUP	SURFACE WATER SEWER
INS	INSPECTION CHQUR	SVL	VENT LINE
INJ	INLET	UNL	UNABLE TO SURVEY
INT	INTERCEPTOR	V	VENT
INLT	INLET	VF	VENTIFIED FLAT
KO	KERBS OUTLET	VN	VENT PIPE
		WL	WATER LEVEL

CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
2. Connectivity between Manholes has been proven using dye testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV Survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

Exam	Description	Surv. by	Appr. by	Date
m	5 10 15 20 25 30 35 40 45 50 55			

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01865 594079 Oxford oxford@mksurveys.co.uk
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Toddington Lane
Littlehampton
West Sussex

Scale 1:250	Sheet Size: A0	Sheet Number: 1	Date: February 2015
Project Number: 20644	Rev: -	Surveyed By: CP	Approved By: NS
     			

Notes :

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD. JOB NO. APHILLTLE 309, DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITH MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. DRAWINGS ARE PREPARED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES/CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

[illegible]

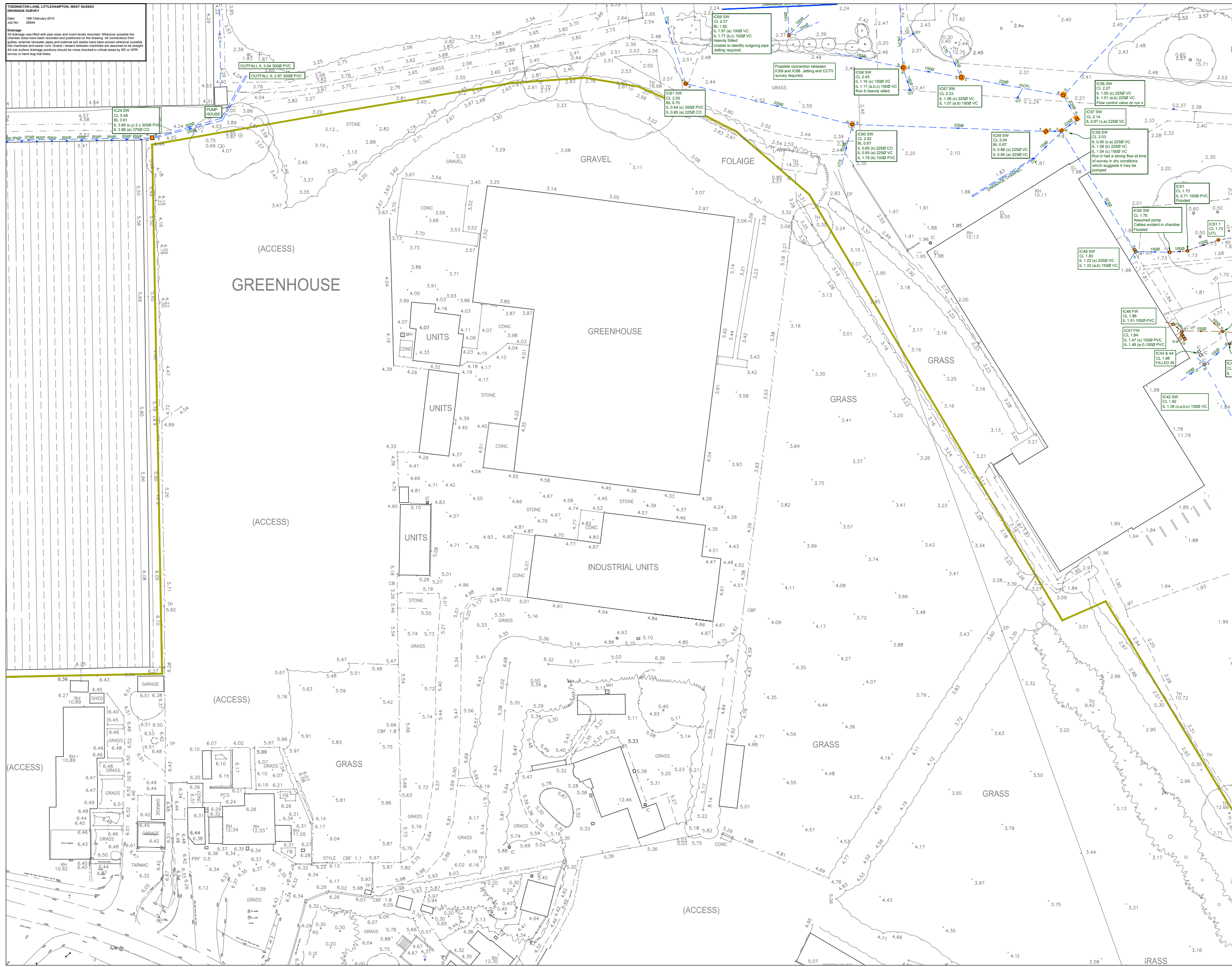
LEGEND

COMBINED SENDER		INTERU	
POLY WATER SENDER		BACK STOP	
DIFFERENTIAL WATER SENDER		SURVEY ANCHORED	
COMBINED POLY SENDER		CAPTED RUL	
INTERU		PRODUCES INTERU AND POLY SENDER INTERU	
WATER		SURVEY SENDER	
CHANGING			

CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from record drawings. Pipe sizes are recorded in intermediate well depths in meters.
2. Connectivity between Manholes has been proven using dye testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV Survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



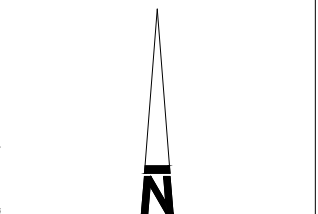
TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was fitted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external sewer pipes and external soil stacks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RD or CPN survey or hand dug trial holes.



Notes :
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYHEW BROWN LTD. JOB NO. APM/LITTLE 2008. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
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DRAINAGE KEY			
ABBREVIATIONS		LAMP HOLE	
ACDP	ASSUMED CONNECTION POINT	LM	MANHOLE
AGD	ABOVE GROUND	NPV	NO PIPES VISIBLE
AR	ASSUMED ROUTE	OU	OUTLET
BR	BRICK	PP	POLYPROPYLENE
BL	BASE LEVEL	POW	PIPE ON WALL
CL	CAST IRON	PT	P-TRAP
CO	CONCRETE	PTD	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
CP	CATCHMENT	PVC-U	ULTRA RISE (PVC)
CWS	COMBINED WATER SEWER	RE	RECORDING EYE
DCH	DRAINAGE CHANNEL	REMAN	REINFORCED MAN
DI	DRAINAGE INLET	RWP	RAN WATER PIPE
FD	FILTER DRAIN	SOF	SOFT
FW	FULL WATER SEWER	SVP	SOIL VENT PIPE
GY	GULLY	SW	SURFACE WATER SEWER
IC	INLET COVER	UL	UNABLE TO LIFT
INT	INTERCEPTOR	UTS	UNABLE TO SURVEY
IO	INLET OUTLET	VP	VENT PIPE
LD	LAND	WL	WATER LEVEL

LEGEND
CORRECTED SURVEY
SURFACE WATER SEWER
INVERTED SURVEY
WHOLE
CHAMBER
CAUTIONARY NOTES
1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
2. Connectivity between Manholes has been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV Survey is required.
ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



SHEET 5 OF 12
0m 5 10 15 20 25 30 35 40 45 50 55

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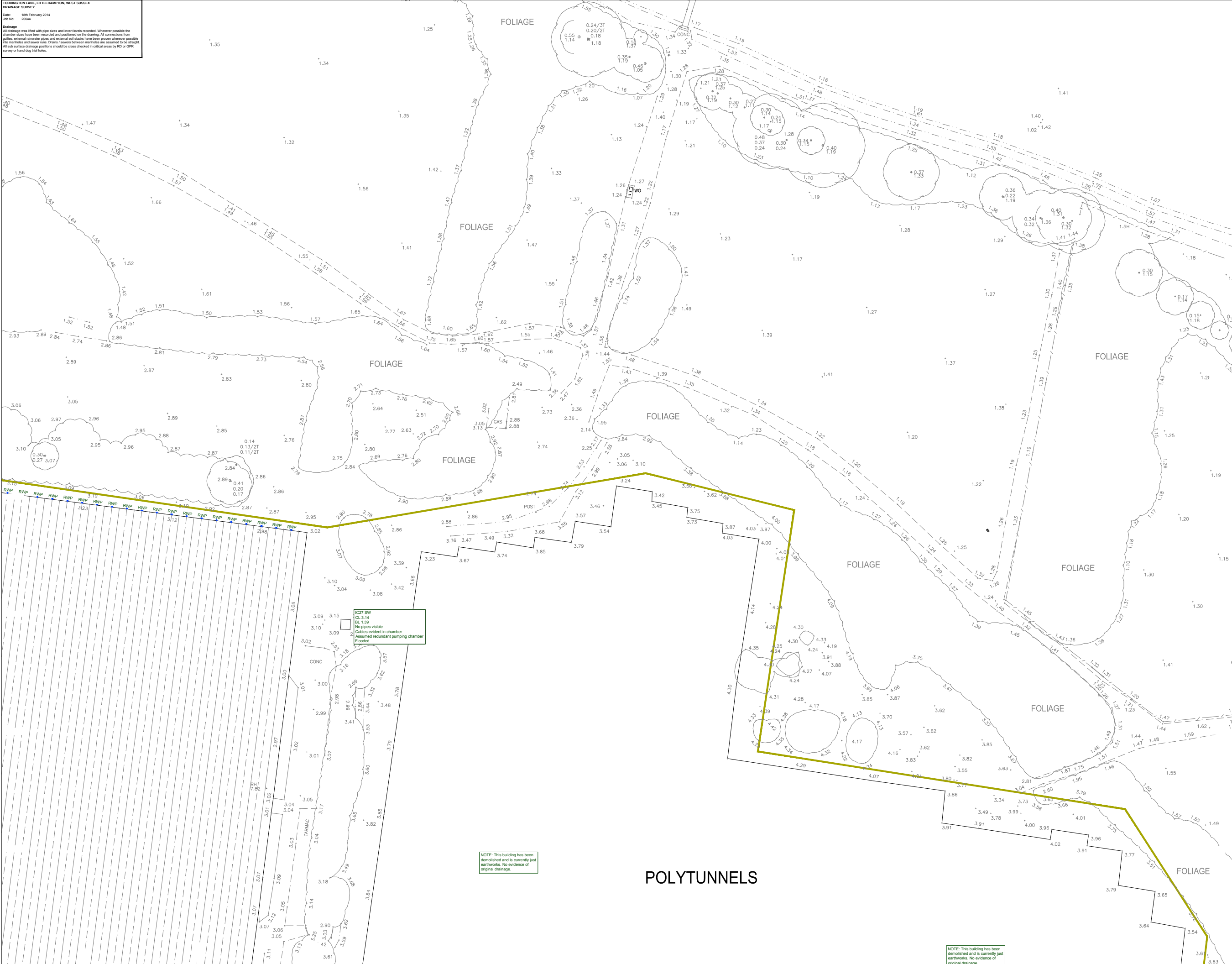
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PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey			
Scale: 1:250	Sheet Size: A0	Sheet Number: 2	Date: February 2015
Project Number: 20644	Rev: -	Surveyed By: CP	Approved By: NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was fitted with pipe sizes and invert levels recorded. Whenever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external sewer pipes and external soil stacks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RQ or CPM survey or hand dug trial holes.



Notes :
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYHEW BROWN LTD. JOB NO. APM/LITTLE 200. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES / CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS

ACDP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
AGD	ABOVE GROUND	MM	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DRAIN	OL	OUTLET
BR	BRICK	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CL	CAST IRON	POW	PIPE ON WALL
CU	CULVERT	PT	P-TJUNCTION
CO	CONCRETE	PTD	PIPE TO GROUND
CS	COBBLER	PVC	POLYVINYL CHLORIDE
CP	CATCHMENT	PVC-U	ULTRA RISE (PVC)
CWS	COMBINED WATER SEWER	RE	ROOFING EYE
DCH	DRAINAGE CHANNEL	RM	REINFORCED MAN
DI	DUCTILE IRON	RWP	RAIN WATER PIPE
FD	FILTER DRAIN	SOF	SOFT
FWS	FOLI WATER SEWER	SVP	SOIL VENT PIPE
G	GULLY	SW	SURFACE WATER SEWER
IC	INSPECTION COVER	U	UNABLE TO SURVEY
INT	INTERCEPTOR	VC	VENT PIPE
IO	INLET	VP	VENT PIPE
MD	MANHOLE	WL	WATER LEVEL

LEGEND

CONCRETE	ASSUMED CONNECTION POINT	NO PIPES VISIBLE
POLYPROPYLENE	BACK DRAIN	OUTLET
SURFACE WATER SEWER	ASSUMED ROUTE	OUTFALL
CAST IRON	BASE LEVEL	POLYPROPYLENE
CULVERT	CAST IRON	PIPE ON WALL
CONCRETE	CULVERT	P-TJUNCTION
COBBLER	CONCRETE	PIPE TO GROUND
COMBINED WATER SEWER	COBBLER	POLYVINYL CHLORIDE
DUCTILE IRON	COMBINED WATER SEWER	ULTRA RISE (PVC)
FILTER DRAIN	DRAINAGE CHANNEL	ROOFING EYE
FOLI WATER SEWER	DUCTILE IRON	REINFORCED MAN
GULLY	FD	RAIN WATER PIPE
INSPECTION COVER	FWS	SOFT
INTERCEPTOR	G	SOIL VENT PIPE
INLET	IC	SURFACE WATER SEWER
MANHOLE	INT	UNABLE TO SURVEY
NO PIPES VISIBLE	IO	VENT PIPE
OUTLET	MD	WATER LEVEL

CAUTIONARY NOTES

- Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
- Connectivity between Manholes has been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



SHEET 6 OF 12

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TEL: 01323 840003
TEL: 01323 840004
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PERSIMMON

Toddington Lane
Littlehampton
West Sussex

Drainage Survey

Scale	Sheet Size	Sheet Number	Date
1:250	A0	2	February 2015
Project Number	Rev	Surveyed By	Approved By
20644	-	CP	NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external sewer pipes and external water pipes have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RQ or CPM survey or hand dug trial holes.

NOTE: This building has been demolished and is currently just earthworks. No evidence of original drainage.

Notes :
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYHEW BROWN LTD. JOB NO. APM/LITTLE 2008. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES / CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

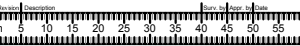
DRAINAGE KEY			
ABBREVIATIONS		DRAINAGE KEY	
ACDP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
AGD	ABOVE GROUND	MM	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OU	OUTLET
BK	BRICK	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CL	CAST IRON	PPW	PIPE ON WALL
CU	CULVERT	PT	P-T JUNCTION
CO	CONCRETE	PTD	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
CP	CATCHPIT	RE	REINFORCED
DCH	COMBINED WATER SEWER	RE	REINFORCED
DI	DUCTILE IRON	RH	RISING MAIN
FD	FILTER DRAIN	RS	RISING MAIN
FWS	FULL WATER SEWER	SOP	SOIL VENT PIPE
GY	GULLY	SW	SURFACE WATER SEWER
IC	INSPECTION COVER	UTL	UNABLE TO LIFT
INT	INTERCEPTOR	VC	VERTICAL CURVE
MD	MANHOLE	WL	WATER LEVEL

LEGEND	
COMBINED SEWER	ICDP
SOIL WATER SEWER	NO PIPES
SURFACE WATER SEWER	SURVEY ARMOR
INSPECTION COVER	CATCHPIT
MANHOLE	UNABLE TO LIFT
WHOLE	
CHAMBER	

CAUTIONARY NOTES
1. Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
2. Connectivity between Manholes has been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please refer to further details if a CCTV Survey is required.
ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



SHEET 7 OF 12



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Email: mail@insewer.co.uk

PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey

Scale: 1:250	Sheet Size: A0	Sheet Number: 2	Date: February 2015
Project Number: 20644	Rev: -	Surveyed By: CP	Approved By: NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was lifted with pipe sizes and invert levels recorded. Whenever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external sewer pipes and external wet checks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub surface drainage positions should be cross checked in critical areas by RQ or CPM survey or hand dug trial holes.

NOTE: This building has been demolished and is currently just earthworks. No evidence of original drainage.

POLYTUNNELS

NOTE: This building has been demolished and is currently just earthworks. No evidence of original drainage.

Notes :
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYHEW BROWN LTD. JOB NO. APLITTLE2008. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
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DRAINAGE KEY	
ABBREVIATIONS	ASSUMED CONNECTION POINT
ADP	ASSUMED CONNECTION POINT
AGD	ABOVE GROUND
AR	ASSUMED ROUTE
BD	BACK DROP
BK	BRICK
BL	BASE LEVEL
CL	CAST IRON
CO	CONCRETE
CU	CULVERT
CP	CATCHPIT
CWS	COMBINED WATER SEWER
DI	DRAINAGE CHANNEL
DO	DRAINAGE DUCTILE IRON
FD	FILTER DRAIN
FWS	FULL WATER SEWER
GY	GULLY
IC	INVERT COVER
INT	INTERCEPTOR
IO	INVERT OUTLET
LH	LAMP HOLE
MM	MANHOLE
NPV	NO PIPES VISIBLE
OL	OUTLET
OP	OUTFALL
PP	POLYPROPYLENE
POW	PIPE ON WALL
PT	P-TRAP
PTD	PIPE TO GROUND
PVC	POLYVINYL CHLORIDE
PVC-U	ULTRA RISE (PVC)
RE	REISING EYE
REMAN	REISING MAN
RWP	RAN WATER PIPE
SOF	SOFT
SVP	SOIL VENT PIPE
SW	SURFACE WATER SEWER
UTL	UNABLE TO LIFT
UTS	UNABLE TO SURVEY
VC	VENT PIPE
WL	WATER LEVEL

LEGEND	
COMBINED SEWER	ADP
GULLY TO CHAMBER	BD
SURFACE WATER SEWER	PP
INVERT LEVEL	IC
MANHOLE	MM
WHOLE	WH
CHAMBER	CH

CAUTIONARY NOTES
1. Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
2. Connectivity between Manholes has been proven using dye testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm construction. Please ring for further details if a CCTV survey is required.
ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

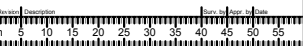


RESERVOIR

GREENHOUSE

LAKE

SHEET 8 OF 12



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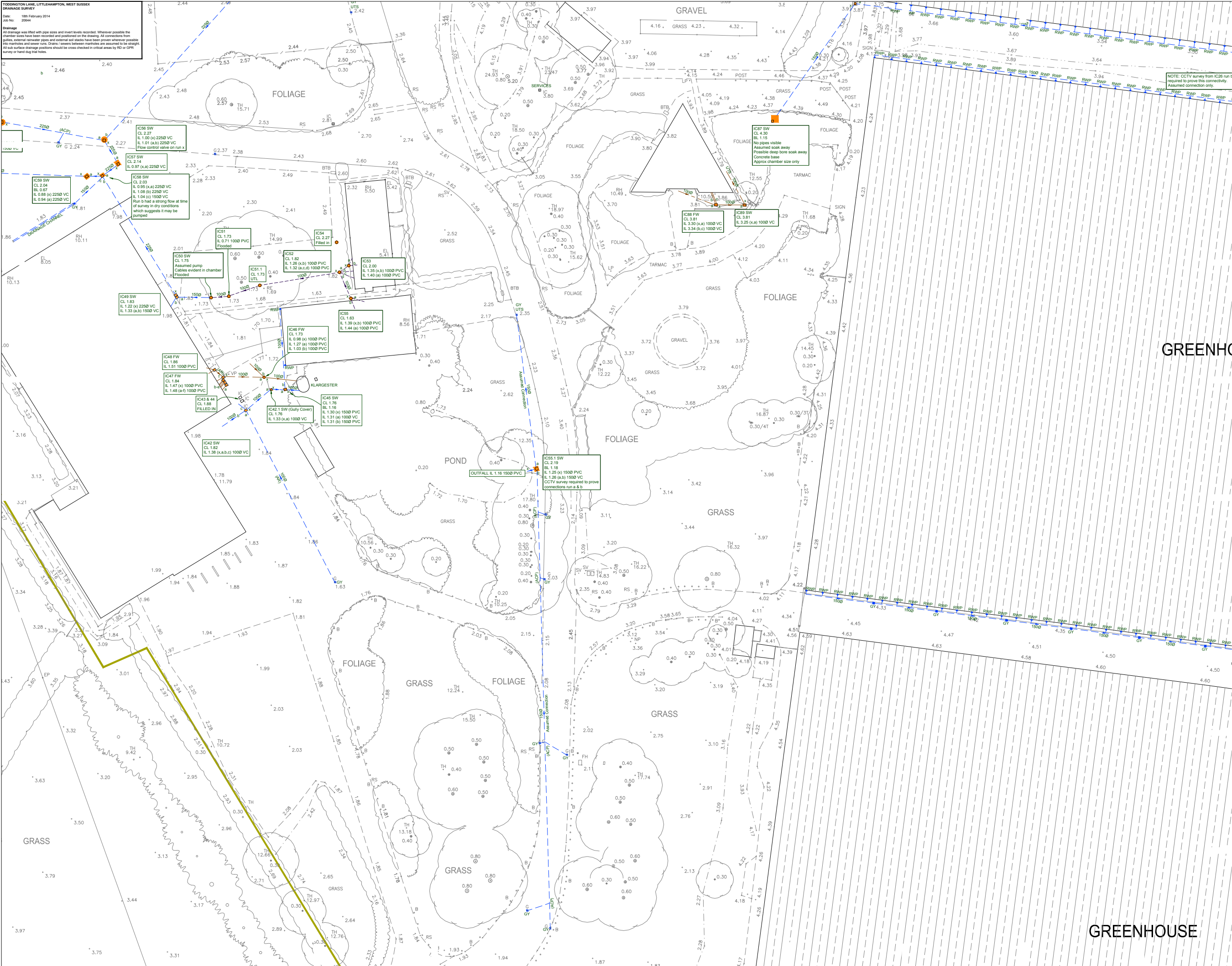
PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

Drainage Survey

Scale: 1:250	Sheet Size: A0	Sheet Number: 2	Date: February 2015
Project Number: 20644	Rev: -	Surveyed By: CP	Approved By: NS

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was filled with pipe sizes and invert levels recorded. Whenever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external sewer pipes and external soil stacks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RQ or CPQ survey or hand dug trial holes.



Notes:
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY
PRODUCED BY MRS MARY BROWN LTD. JOB NO. APM/LITTLE 2008 DATE
AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS
UNLESS SPECIFIC TO DRAINAGE.
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ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE
TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE
CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS.
WITH ROUTES CONNECTIVITY OBTAINED USING ACUSTIC METHODS
ONLY. THESE ARE TO BE CONSIDERED AS APPROXIMATE AND SHOULD BE
INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS

ACPT	ASSUMED CONNECTION POINT	LH	LAMP HOLE
AGD	ABOVE GROUND	MM	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OU	OUTLET
BR	BRICK	PP	POLYPROPYLENE
BL	BASE LEVEL	POT	PIPE ON WALL
CL	CAST IRON	PST	PIPE TO GROUND
CO	CONCRETE	PVC	POLYVINYL CHLORIDE
CU	CULVERT	PVC-U	ULTRA RIGID (PVC)
CP	CATCHPIT	RE	ROOFING EYE
CWS	COMBINED WATER SEWER	RH	RAIN WATER PIPE
DCH	DUCTILE IRON	RS	ROOFING EYE
FD	FILTER DRAIN	SOF	SOFT
FWS	FULL WATER SEWER	SVP	SOIL VENT PIPE
GY	GULLY	SW	SURFACE WATER SEWER
IC	INVERT COVER	UL	UNABLE TO LIFT
INT	INTERCEPTOR	VC	UNABLE TO SURVEY
IT	INLET	VP	VENT PIPE
MD	MANHOLE	WL	WATER LEVEL

LEGEND

1. Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.

2. Connectivity between Manholes has been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV Survey is required.

CAUTIONARY NOTES

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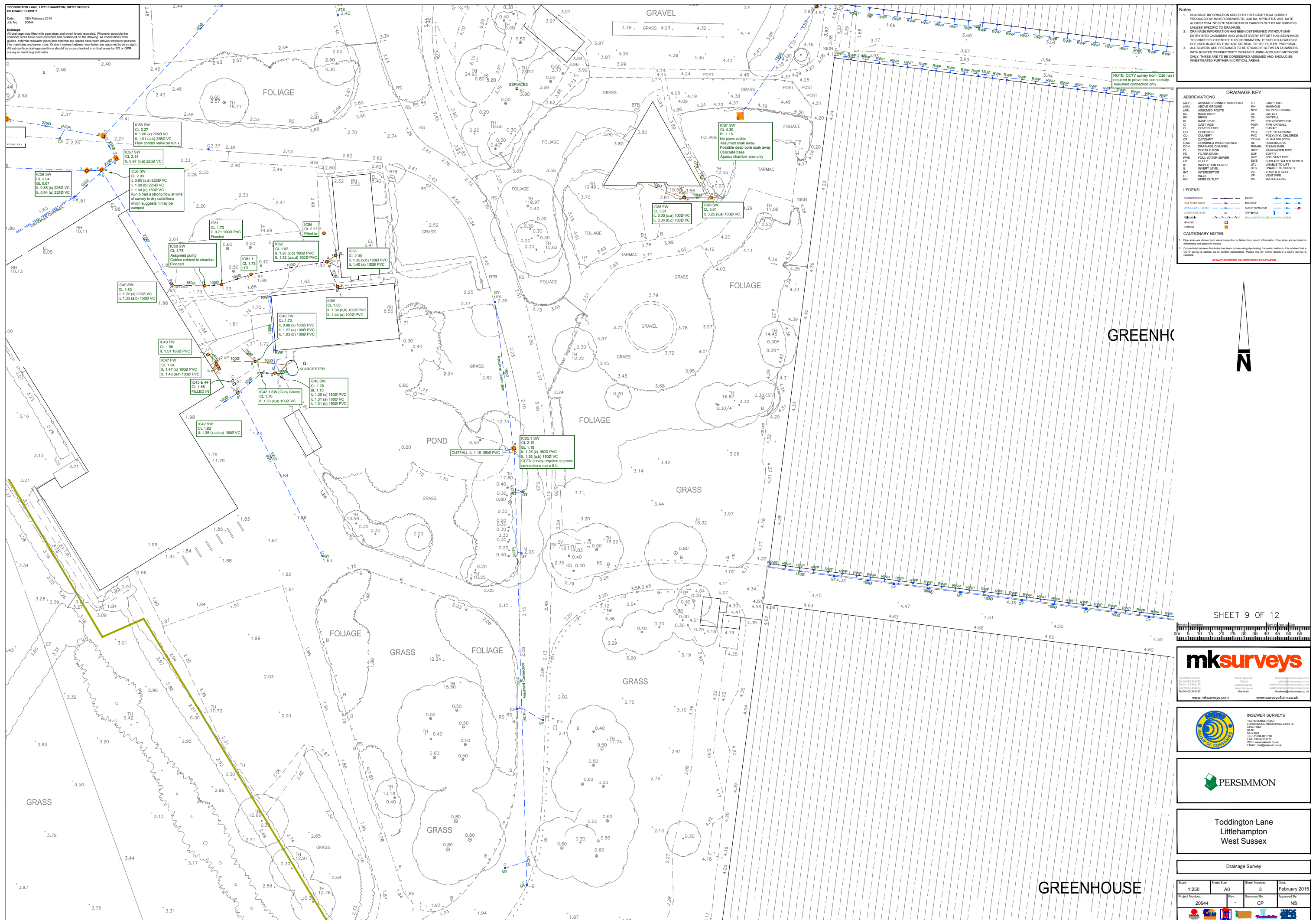
ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

SHEET 9 OF 12

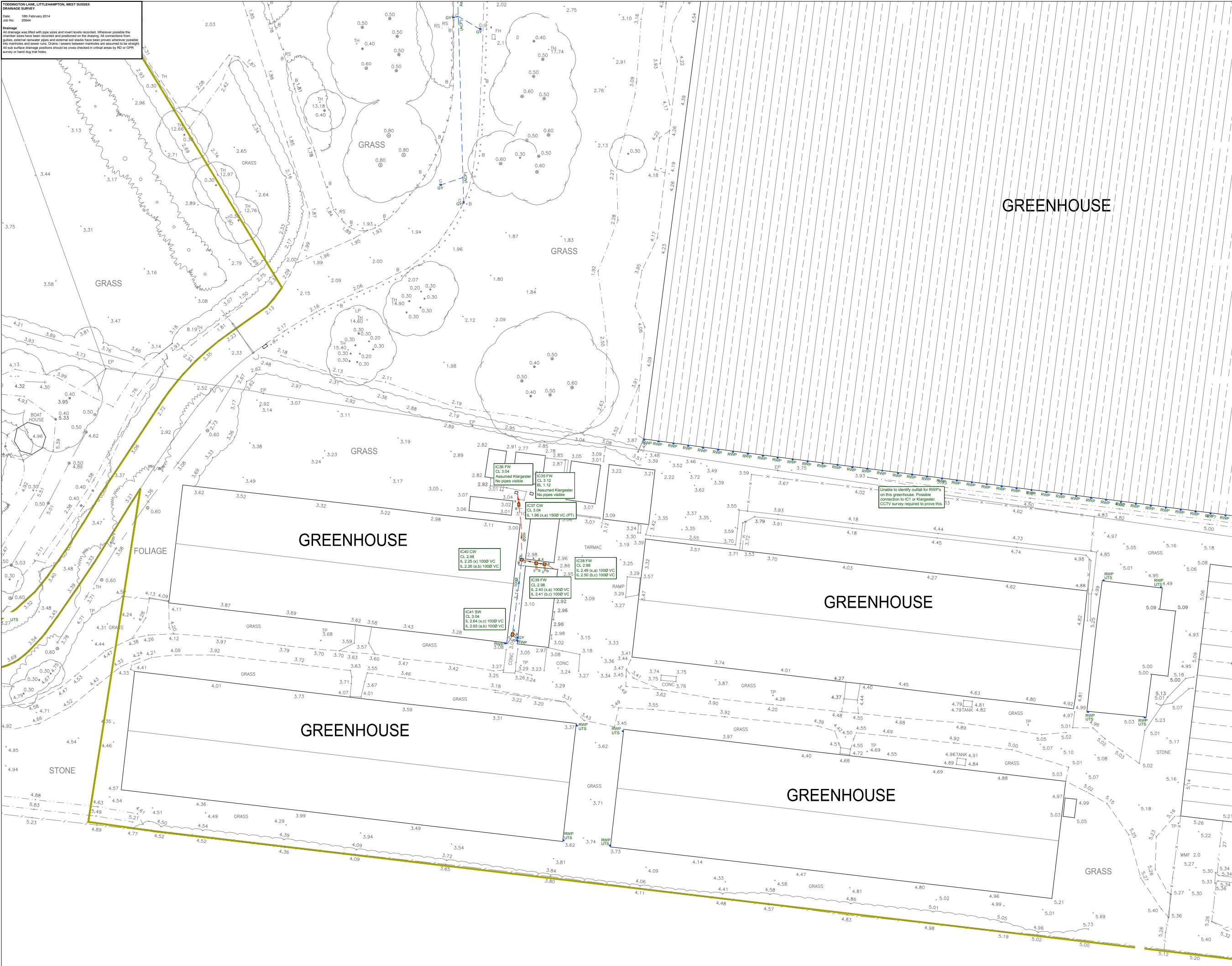
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mksurveys

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TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external sewer pipes and external soil stacks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RDI or GPS survey or hand dug trial holes.



Notes :

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYHEW BROWN LTD. JOB NO. APM/LITTLE 2008. DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILE EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES / CONNECTIVITY OBTAINED USING ACOUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

ABBREVIATIONS

ACPP	ASSUMED CONNECTION POINT	LH	LAMP HOLE
AGD	ABOVE GROUND	MM	MANHOLE
AR	ASSUMED ROUTE	NPV	NO PIPES VISIBLE
BD	BACK DROP	OL	OUTLET
BL	BRICK	OU	OUTFALL
CL	CAST IRON	PP	POLYPROPYLENE
CL	COVER LEVEL	POW	PIPE ON WALL
CO	CONCRETE	PTD	PIPE TO GROUND
CU	CULVERT	PVC	POLYVINYL CHLORIDE
CP	CATCHPIT	PVC-U	ULTRA RISE (PVC)
CWS	COMBINED WATER SEWER	RE	ROOFING EYE
DI	DRAINAGE CHANNEL	REMAN	REINFORCED MAN
DCH	DRAINAGE CHANNEL	RWP	RAIN WATER PIPE
FD	FILTER DRAIN	SOF	SOFT
FWS	FULL WATER SEWER	SVP	SOIL VENT PIPE
GY	GULLY	SW	SURFACE WATER SEWER
IC	INSPECTION COVER	UTL	UNABLE TO LIFT
INT	INTERCEPTOR	VC	UNABLE TO SURVEY
MD	MANHOLE	VP	VENT PIPE
MD	MANHOLE	WL	WATER LEVEL

LEGEND

COMBINED SEWER	—	ACPP	—	NPV
SOIL WATER SEWER	—	AGD	—	MD
SURFACE WATER SEWER	—	AR	—	MD
UNABLE TO SURVEY	—	BD	—	MD
UNABLE TO SURVEY	—	CL	—	MD
UNABLE TO SURVEY	—	CO	—	MD
UNABLE TO SURVEY	—	CU	—	MD
UNABLE TO SURVEY	—	CP	—	MD
UNABLE TO SURVEY	—	CWS	—	MD
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UNABLE TO SURVEY	—	FD	—	MD
UNABLE TO SURVEY	—	FWS	—	MD
UNABLE TO SURVEY	—	GY	—	MD
UNABLE TO SURVEY	—	IC	—	MD
UNABLE TO SURVEY	—	INT	—	MD
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UNABLE TO SURVEY	—	MD	—	MD

CAUTIONARY NOTES

1. Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
2. Connectivity between Manholes has been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please refer to further details if a CCTV survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

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mk surveys

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TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX
DRAINAGE SURVEY
Date: 18th February 2014
Job No: 20644
Drainage: All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external downpipes and external soil stacks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by R2 or GPR survey or hand dug trial holes.



Notes:
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ABBREVIATIONS

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BK	BRICK	OU	OUTFALL
BL	BASE LEVEL	PP	POLYPROPYLENE
CI	CAST IRON	POW	PIPE ON WALL
CL	CONCRETE	PT	P-TIE
CO	CONCRETE	PTD	PIPE TO DRAIN
CU	CULVERT	PVC	POLYVINYL CHLORIDE
CP	CATCHMENT	PVC-U	ULTRA RISE (PVC)
CWS	COMBINED WATER SEWER	RE	ROOFING EYE
DCH	DRAINAGE CHANNEL	RM	REINFORCED MAN
DI	DUCTILE IRON	RWP	RIGID WALL PIPE
FD	FILTER DRAIN	SOF	SOFT
FWS	FOLIAGE WATER SEWER	SVP	SOIL VENT PIPE
GY	GULLY	SW	SURFACE WATER SEWER
HC	INSPECTION COVER	UTL	UNABLE TO LOCATE
INT	INTERCEPTOR	VC	VENT PIPE
IO	INLET	VF	VENT PIPE
MD	MANHOLE OUTLET	WL	WATER LEVEL

LEGEND

CONCRETE SEWER	ADP	NO PIPES VISIBLE
CAST IRON SEWER	BD	NO PIPES VISIBLE
POLYPROPYLENE	BL	NO PIPES VISIBLE
POLYVINYL CHLORIDE	CI	NO PIPES VISIBLE
ULTRA RISE (PVC)	CL	NO PIPES VISIBLE
REINFORCED MAN	CO	NO PIPES VISIBLE
RIGID WALL PIPE	CU	NO PIPES VISIBLE
SOFT	CP	NO PIPES VISIBLE
SOIL VENT PIPE	CWS	NO PIPES VISIBLE
SURFACE WATER SEWER	DCH	NO PIPES VISIBLE
UNABLE TO LOCATE	DI	NO PIPES VISIBLE
VENT PIPE	FD	NO PIPES VISIBLE
VENT PIPE	FWS	NO PIPES VISIBLE
WATER LEVEL	GY	NO PIPES VISIBLE

CAUTIONARY NOTES

- Pipe sizes and depths from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.
- Connectivity between Manholes has been proven using gas testing / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please refer to further details if a CCTV Survey is required.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.

SHEET 12 OF 12

mk surveys

100 RICHMOND ROAD
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PO14 3AB

01323 660001
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01323 660005

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PERSIMMON

**Toddington Lane
Littlehampton
West Sussex**

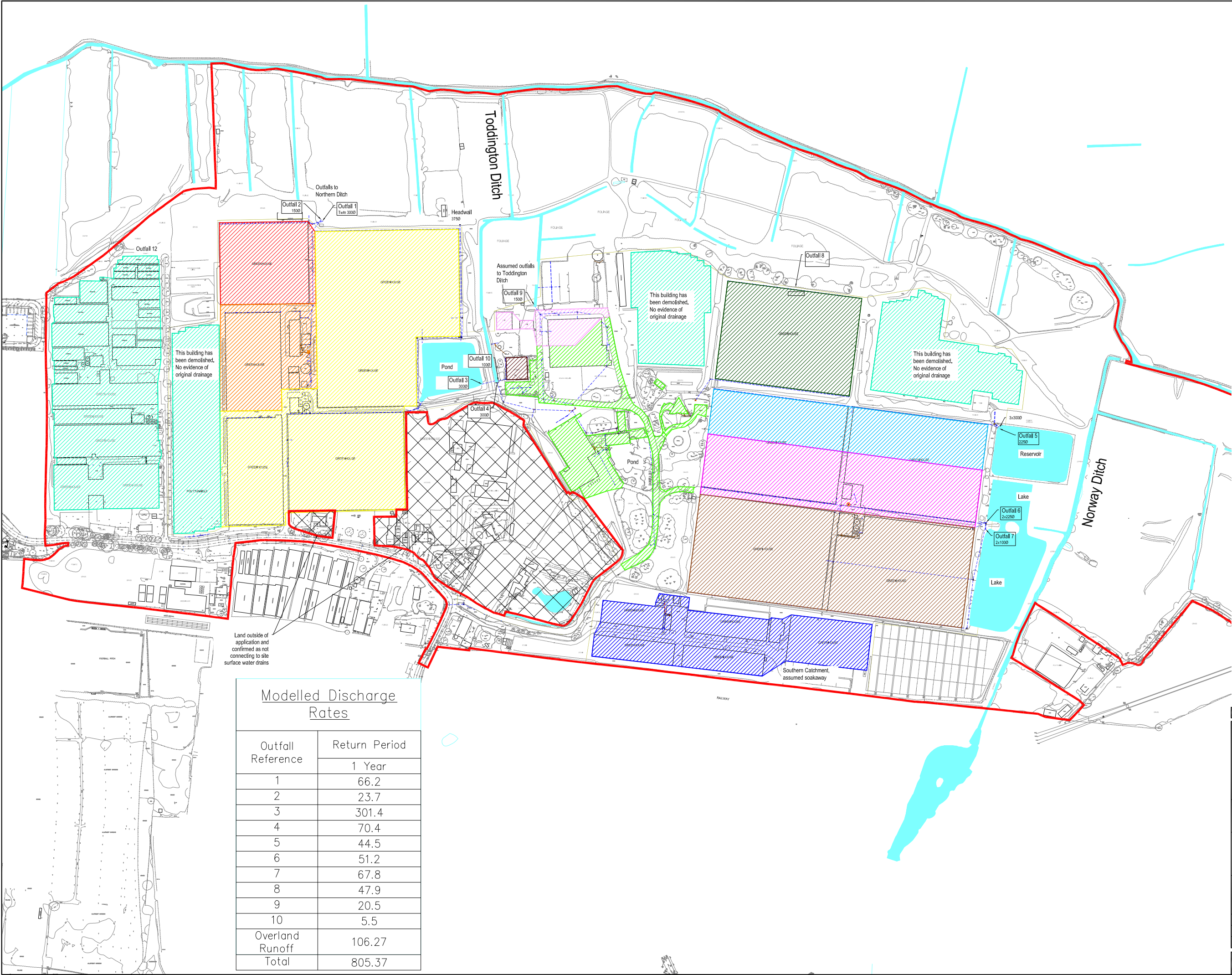
Drainage Survey

Scale: 1:250	Sheet Size: A0	Sheet Number: 3	Date: February 2015
Project Number: 20644	Rev: -	Surveyed By: CP	Approved By: NS

Appendix G
Greenfield Runoff Calculation

Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 15:20 File	Designed by jokelly Checked by	
Micro Drainage Source Control 2015.1		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 1 Soil 0.500 Area (ha) 1.000 Urban 0.750 SAAR (mm) 739 Region Number Region 7 Results l/s QBAR Rural 5.9 QBAR Urban 15.0 Q1 year 12.7 Q1 year 12.7 Q30 years 26.0 Q100 years 30.4		
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Appendix H
Existing Discharge Rates



- NOTES
1. This drawing is to be read in conjunction with all other relevant documents and specifications.
 2. Dimensions not to be scaled.
 3. All drainage catchments are indicative only and based on the drainage survey drawing completed by mksurveys, job no. 20644.
 4. Simulation modelling using WinDes has been undertaken based on the existing network identified by mksurveys.
 5. Simulation modelling has included surcharged outfalls in accordance with the modelled flood levels provided by the Environment Agency.
 6. Overland runoff from areas where no positive drainage connection was identified has been undertaken.

KEY TO IMPERMEABLE AREAS

[Red hatched box]	Outfall 1
[Orange hatched box]	Outfall 2
[Yellow hatched box]	Outfall 3
[Light green hatched box]	Outfall 4
[Light blue hatched box]	Outfall 5
[Pink hatched box]	Outfall 6
[Brown hatched box]	Outfall 7
[Dark green hatched box]	Outfall 8
[Purple hatched box]	Outfall 9
[Dark brown hatched box]	Outfall 10
[Light blue hatched box]	Overland runoff
[Blue hatched box]	Soakaway catchment
[Dashed blue line]	Assumed flow direction
[Red line]	Site Boundary
[Blue line]	Existing ditches and ponds

Modelled Discharge Rates	
Outfall Reference	Return Period
	1 Year
1	66.2
2	23.7
3	301.4
4	70.4
5	44.5
6	51.2
7	67.8
8	47.9
9	20.5
10	5.5
Overland Runoff	106.27
Total	805.37

Rev.	Description	Date	Chkd
 Glanville Cornerstone House 62 Foxhall Road, Didcot Oxon, OX11 7AD Tel: (01235) 515550 Fax: (01235) 817799 postbox@glanvillegroup.com www.glanvillegroup.com			
Client :		Persimmon Homes	
Project :		North Littlehampton	
Title :		Existing Surface Water Drainage Rates	
Project Engineer :		S.Hudson	Scale : 1:2000 @ A1
Project Director :		K.Rayner	Date : February 2015
Status :		PRELIMINARY	
Drawing No.		8140927/121	Rev

Appendix L

Windes Calculations Existing Rates

Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
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Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	10.000	0.050	200.0	0.500	4.00	0.0	0.600	oo	41	
1.001	20.000	0.500	40.0	0.000	0.00	0.0	0.600	oo	41	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.15	3.050	0.500	0.0	0.0	0.0	1.11	156.0	0.0
1.001	0.00	4.28	3.000	0.500	0.0	0.0	0.0	2.49	351.0	0.0

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Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
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Micro Drainage Network 2015.1		

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	30/15 Summer				3.210
1.001	2	15 Winter	1	+0%					3.092

PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap. (l/s)	Pipe Flow (l/s)	Status	Level
							Exceeded
1.000	1	-0.140	0.000	0.54	65.4	OK	
1.001	2	-0.208	0.000	0.22	66.2	OK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	85.000	0.570	149.1	0.800	4.00	0.0	0.600	o	150	
1.001	20.000	0.780	25.6	0.000	0.00	0.0	0.600	o	150	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.73	3.050	0.800	0.0	0.0	0.0	0.82	14.5	0.0
1.001	0.00	5.89	2.480	0.800	0.0	0.0	0.0	2.00	35.3	0.0

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Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	1	+0%	1/15 Summer	2/30 Winter			4.211
1.001	2	30 Winter	1	+0%					2.574

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	1.011	0.000	1.66		23.7	FLOOD RISK	58
1.001	2	-0.056	0.000	0.71		23.7	OK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	40.000	0.660	60.6	2.500	4.00	0.0	0.600	∞	41	
2.000	40.000	0.610	65.6	3.300	4.00	0.0	0.600	∞	41	
1.001	20.000	0.760	26.3	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.33	3.800	2.500	0.0	0.0	0.0	2.02	284.8	0.0
2.000	0.00	4.34	2.610	3.300	0.0	0.0	0.0	1.94	273.7	0.0
1.001	0.00	4.45	2.000	5.800	0.0	0.0	0.0	3.08	217.5	0.0

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Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	1/15 Summer	30/15 Winter			4.151
2.000	2	15 Winter	1	+0%	1/15 Summer	2/15 Winter			3.531
1.001	3	15 Winter	1	+0%	1/15 Summer	99/15 Winter			3.454

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.051	0.000	1.04		275.5	SURCHARGED	15
2.000	2	0.621	0.000	0.87		220.8	FLOOD RISK	46
1.001	3	1.154	0.000	1.59		301.4	SURCHARGED	16

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Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	36.000	0.210	171.4	1.230	4.00	0.0	0.600	o	225	
1.001	23.000	0.040	575.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.60	0.850	1.230	0.0	0.0	0.0	1.00	39.6	0.0
1.001	0.00	5.19	0.640	1.230	0.0	0.0	0.0	0.65	45.8	0.0

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Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	1/15 Summer	30/15 Summer			1.763
1.001	2	15 Winter	1	+0%	1/15 Summer				1.006

Surcharged Flooded				Pipe		Level
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Flow / (l/s)	Status
1.000	1	0.688	0.000	1.89	70.6	SURCHARGED
1.001	2	0.066	0.000	1.94	70.4	SURCHARGED

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Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	160.000	0.640	250.0	1.700	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	7.24	3.240	1.700	0.0	0.0	0.0	0.82	32.7	0.0
1.001	0.00	7.41	2.600	1.700	0.0	0.0	0.0	1.19	47.4	0.0

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Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	1	+0%	1/15 Summer	2/15 Winter			4.071
1.001	2	60 Winter	1	+0%	1/30 Summer				2.834

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.606	0.000	1.38		44.6	FLOOD RISK	69
1.001	2	0.009	0.000	1.10		44.5	SURCHARGED	

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Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:19 File OUTFALL 6.MDX	Designed by jokelly Checked by	
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	162.000	0.820	197.6	2.220	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	6.91	3.270	2.220	0.0	0.0	0.0	0.93	36.8	0.0
1.001	0.00	7.08	2.450	2.220	0.0	0.0	0.0	1.19	47.4	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:19 File OUTFALL 6.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	1	+0%	1/15 Summer	2/15 Winter			4.368
1.001	2	60 Winter	1	+0%	1/15 Summer				2.724

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.873	0.000	1.41		51.3	FLOOD RISK	73
1.001	2	0.049	0.000	1.26		51.2	SURCHARGED	

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Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:20 File OUTFALL 7.MDX	Designed by jokelly Checked by	
Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	55.500	0.060	925.0	3.720	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	6.19	2.230	3.720	0.0	0.0	0.0	0.42	16.8	0.0
1.001	0.00	6.36	2.170	3.720	0.0	0.0	0.0	1.19	47.4	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:20 File OUTFALL 7.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	1	+0%	1/15 Summer	1/30 Winter			3.619
1.001	2	60 Winter	1	+0%	1/15 Summer				2.563

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	1.164	39.094	4.19		67.8	FLOOD	92
1.001	2	0.168	0.000	1.67		67.8	SURCHARGED	

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Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:21 File OUTFALL 8.MDX	Designed by jokelly Checked by	
Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	80.000	0.600	133.3	1.800	4.00	0.0	0.600	o	225	
1.001	12.000	0.100	120.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.18	3.300	1.800	0.0	0.0	0.0	1.13	45.0	0.0
1.001	0.00	5.35	2.700	1.800	0.0	0.0	0.0	1.19	47.4	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:21 File OUTFALL 8.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	1	+0%	1/15 Summer	2/15 Winter			3.861
1.001	2	60 Winter	1	+0%	1/15 Summer				3.140

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.336	0.000	1.09		47.9	FLOOD RISK	69
1.001	2	0.215	0.000	1.18		47.9	SURCHARGED	

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Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:22 File OUTFALL 9.MDX	Designed by jokelly Checked by	
Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	50.000	0.200	250.0	1.380	4.00	0.0	0.600	o	300	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.84	3.600	1.380	0.0	0.0	0.0	0.99	70.0	0.0
1.001	0.00	4.95	3.400	1.380	0.0	0.0	0.0	1.57	111.1	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:22 File OUTFALL 9.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	1	+0%	1/15 Summer	2/30 Winter			4.134
1.001	2	15 Winter	1	+0%	1/15 Summer	100/15 Winter			3.927

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.234	0.000	1.05	69.0	FLOOD RISK	43
1.001	2	0.227	0.000	0.74	58.7	FLOOD RISK	

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Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:23 File OUTFALL 10.MDX	Designed by jokelly Checked by	
Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	43.000	0.540	79.6	0.350	4.00	0.0	0.600	o	225	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.49	1.550	0.350	0.0	0.0	0.0	1.47	58.3	0.0
1.001	0.00	4.62	1.010	0.350	0.0	0.0	0.0	1.31	52.0	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:23 File OUTFALL 10.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	1	+0%	1/15 Summer	30/15 Summer			2.126
1.001	2	30 Winter	1	+0%	1/15 Summer				2.052

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.351	0.000	0.37		20.3	FLOOD RISK	33
1.001	2	0.817	0.000	0.47		20.3	FLOOD RISK	

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Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:24 File OUTFALL 11.MDX	Designed by jokelly Checked by	
Micro Drainage Network 2015.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.300	Minimum Backdrop Height (m)	0.200
Ratio R	0.350	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	0	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	24.000	0.610	39.3	0.065	4.00	0.0	0.600	o	100	
1.001	10.000	0.100	100.0	0.000	0.00	0.0	0.600	o	225	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.32	2.080	0.065	0.0	0.0	0.0	1.23	9.7	0.0
1.001	0.00	4.45	1.345	0.065	0.0	0.0	0.0	1.31	52.0	0.0

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Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD		
Date 31/03/2015 10:24 File OUTFALL 11.MDX		
Designed by jokelly Checked by		
Micro Drainage		Network 2015.1

1 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	5.000
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	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.350
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	19.300	Cv (Winter)	0.840

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
Return Period(s) (years)	1, 2, 30, 99, 100
Climate Change (%)	0, 0, 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%	1/15 Summer	30/15 Summer			2.204
1.001	2	15 Summer	1	+0%	1/15 Summer				2.016

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.024	0.000	0.56		5.3	FLOOD RISK	19
1.001	2	0.446	0.000	0.12		5.2	FLOOD RISK	

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APPENDIX I: Drainage Strategy, West of Wetlands