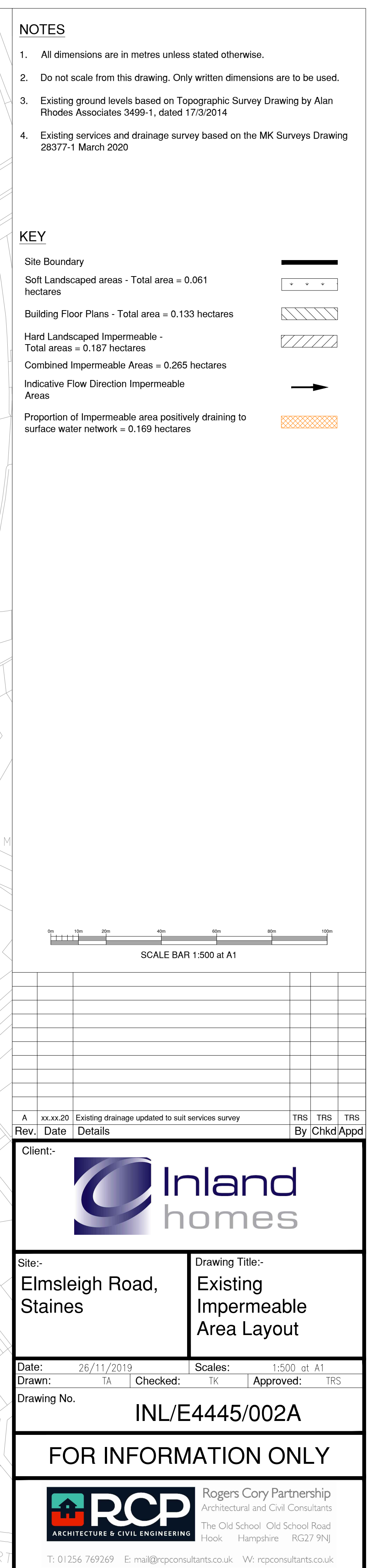


Appendix (F)

Existing Drainage Regime



Equipment	Manufacturer	Model	Serial Number	MKS REF	Date of Calibration
EMI Tx Transmitter	SPX Radiodetection	RD8000	10/TX-10B-5221	RD10	09/12/2019
EMI Rx Receiver	SPX Radiodetection	RD8000	10/8KPOLB-14596	RD10	09/12/2019
GPR	IDS Geosradar	Opera	8921A	GPR7	22/05/2020

DETECTION SURVEY REPORT

GENERAL

This survey was carried out in accordance with PAS 128:2014 (Publicly Available Specification from BSI). After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology M1 as per Table 2 of the PAS 128:2014. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP

Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey less than 90 days old in accordance with the requirements of the PAS 128:2014. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report.

DETECTIO

DRAINAGE

Drainage was lit 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 manholes, road drains, etc. have been drawn wherever possible into manholes, and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only upon proven and/or. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as CB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A. Unable to survey drainage assets that have been buried or filled following site demolition work.

WATER

Water utilities located using EML with electronically derived depths or GPR derived depths to the crown of the pipe. Where utilities have not been successfully detected, the position has been drawn in relation to the supplied utility records information. Recommend trial excavations to confirm depth and position in critical areas.

GAS

Unable to locate the gas utilities within the site boundary using EML or GPR methods. Missing utilities have been added to the drawing through supplied utility records. Recommend trial excavations to confirm depth and position in critical areas.

ELECTRIC

Electric cables within the survey area have been located using EML methods with electronically derived depths recorded. Unable to confirm amount of cables within ducts from surface inspection. Recommend trial excavations to confirm depths and position in critical areas.

TELECOM
Telecom d

Research ducts have been located using remote detection techniques only and compared with record information. Chamber sizes have been recorded using GPR techniques wherever possible. For further information regarding BT apparatus please contact Openreach directly.

CATV
CATV-11

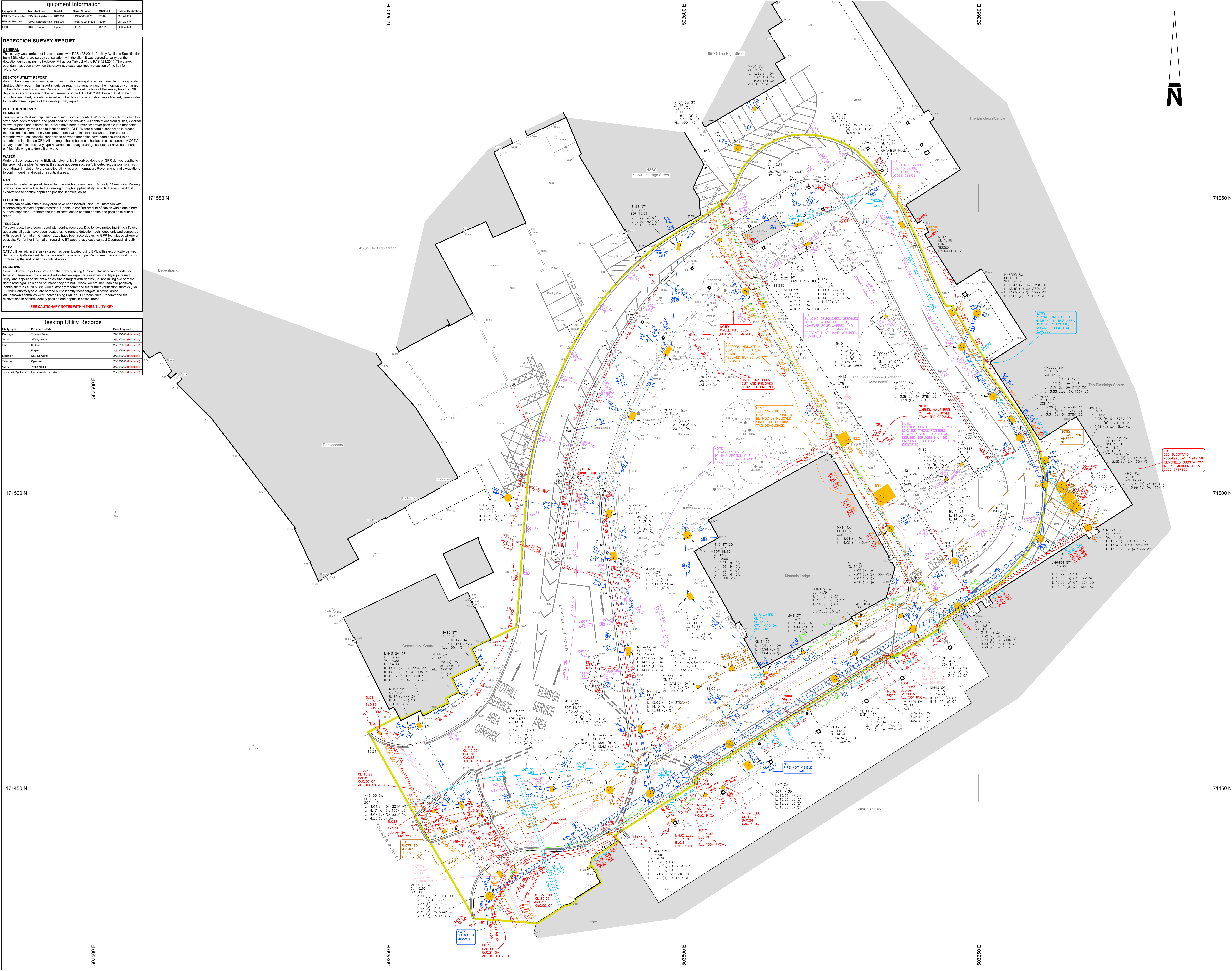
CAT V utilizes within the survey area has been located using EMI with electrocyclic derived depths and GPR derived depths recorded to crown of pipe. Recommend trial excavations to confirm depths and position in critical areas.

UNKNOWN

Some unknown targets identified on the drawing using GPR are classified as "non-linear targets". These are not consistent with what we expect to see when identifying a buried utility, and appear on the drawing as single targets with depths (i.e. not linking two or more depth readings). This does not mean they are not utilities, we are just unable to positively identify them as a utility. We would strongly recommend that further verification surveys (PAS 128 2014 survey type A) are carried out to identify these targets in critical areas. All unknown anomalies were located using EML or GPR techniques. Recommend trial excavations to confirm identity position and depth in critical areas.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

Desktop Utility Records		
Utility Type	Provider Details	Date Acquired
Drainage	Thames Water	21/03/2020 (Historical)
Water	Activty Water	26/02/2020 (Historical)
Gas	Cadent	26/02/2020 (Historical)
	Eagles	26/03/2020 (Historical)
Electricity	EEE Networks	26/02/2020 (Historical)
Telecoms	Openreach	26/02/2020 (Historical)
CATV	Virgin Media	27/03/2020 (Historical)
Tunnels & Pipelines	LinsearchbeforeUdig	26/02/2020 (Historical)



Notes

1. UTILITY AND SERVICE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY ALAN RHODES ASSOCIATES. JOB No. 4169. DATE 14/11/19. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS.
2. THIS SURVEY SHOULD ALWAYS BE READ IN CONJUNCTION WITH THE DESKTOP UTILITY REPORT, THAT WAS CARRIED OUT AS A PREREQUISITE TO THE DETECTION SURVEY.

KEY

[illegible]

L

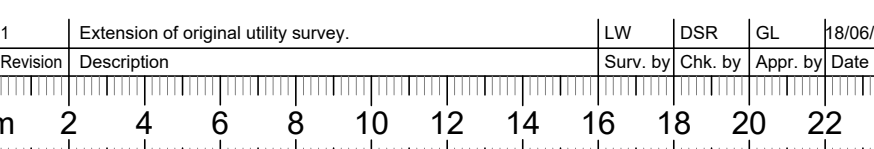
[illegible]

R5	ROAD SIGN
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- [illegible]

S 128:2014 Quality Level Guide

Level	Description	Accuracy
Q5A	A utility is expected to exist but cannot be detected. (AR), (R), (N)	Undefined
Q2D	Horizontal location only using one geophysical technique.	+/- 500m Horizontal
Q2D3P	No depth information - NDI	Undefined Vertical
Q2D	Horizontal and vertical location only using one geophysical technique.	+/- 250cm or +/- 40% of depth whichever is greater
Q2D3P	Horizontal and vertical location only using two geophysical techniques.	+/- 150cm or +/- 15% of depth whichever is greater
QA	Service verified in an open excavation, inside an existing chamber / draw pit, or at the point the service enters / exits the ground.	+/- 50mm Horizontal +/- 20mm Vertical



Tel 01908 565561
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Tel 0116 2849127
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horsham@mksurveys.co.uk

www.mksurveys.com www.surveys4bim.co.uk



Elmsleigh Road
Staines
Surrey

PAS 128:2014 Utility Survey

Scale 1:200	Sheet Size: A0	Sheet Number: 1	Date: March 2020	
Project Number: 28377		Rev: 1	Surveyed By: LW	Checked By: TW
			Approved By DSR	
				

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The Old School Old School Road Hook Hampshire RG27 9NJ		
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Innovyze	Network 2017.1.2	

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	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.405	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.840	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	5.000	0.050	100.0	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	5.000	0.001	9900.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.08	14.000	0.000	0.0	0.0	0.0	1.00	17.8	0.0
S1.001	50.00	5.17	13.950	0.000	0.0	0.0	0.0	1.00	17.8	0.0
S1.002	50.00	6.06	13.900	0.000	0.0	0.0	0.0	0.09	1.6	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)
S1.002	S	14.800	13.899	0.000	0	0

Rogers Cory Partnership		Page 2																				
The Old School Old School Road Hook Hampshire RG27 9NJ																						
Date 22/09/2020 13:34 File EXISTING SW.MDX	Designed by Terry Checked by																					
Innovyze Network 2017.1.2																						
<u>Simulation Criteria for Storm</u> Volumetric Runoff Coeff 0.840 Additional Flow - % of Total Flow 0.000 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000 Hot Start (mins) 0 Inlet Coefficient 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 0 Number of Online Controls 0 Number of Time/Area Diagrams 1 Number of Offline Controls 0 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Profile Type</td> <td>Summer</td> </tr> <tr> <td>Return Period (years)</td> <td>2</td> <td>Cv (Summer)</td> <td>0.840</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>20.000</td> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Ratio R</td> <td>0.405</td> <td></td> <td></td> </tr> </table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	2	Cv (Summer)	0.840	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	20.000	Storm Duration (mins)	30	Ratio R	0.405		
Rainfall Model	FSR	Profile Type	Summer																			
Return Period (years)	2	Cv (Summer)	0.840																			
Region	England and Wales	Cv (Winter)	0.840																			
M5-60 (mm)	20.000	Storm Duration (mins)	30																			
Ratio R	0.405																					
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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	2.000
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	1
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.405
Region England and Wales	Cv (Summer)		0.840
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080	Summer and Winter
Return Period(s) (years)	1, 30, 100	
Climate Change (%)	0, 0, 0	

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	30	+0%	1/15 Summer	30/15 Summer			14.805
S1.001	S2	30 Summer	30	+0%	1/15 Summer				14.551
S1.002	S3	30 Summer	30	+0%	1/15 Summer				14.299

PN	US/MH Name	Depth (m)	Surcharged Flooded		Pipe		Status	Level Exceeded
			Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S1.000	S1	0.655	4.994	2.34	32.7	FLOOD	11	
S1.001	S2	0.451	0.000	2.25	31.6	FLOOD RISK		
S1.002	S3	0.249	0.000	3.49	31.6	SURCHARGED		

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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	2.000
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	1
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.405
Region England and Wales Cv (Summer)	0.840		
M5-60 (mm)	20.000	Cv (Winter)	0.840

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

Profile(s)

Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080	Summer and Winter
Return Period(s) (years)	1, 30, 100	
Climate Change (%)	0, 0, 0	

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	100	+0%	1/15 Summer	30/15 Summer			14.811
S1.001	S2	15 Summer	100	+0%	1/15 Summer				14.554
S1.002	S3	15 Summer	100	+0%	1/15 Summer				14.300

PN	US/MH Name	Depth (m)	Surcharged Flooded		Pipe		Status	Level Exceeded
			Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
S1.000	S1	0.661	10.630	2.32	32.5	FLOOD	11	
S1.001	S2	0.454	0.000	2.26	31.7	FLOOD RISK		
S1.002	S3	0.250	0.000	3.50	31.7	SURCHARGED		

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Appendix (G)

Proposed Surface Water Strategy



- NOTES**
- 1. All dimensions are in metres unless stated otherwise.
 - 2. Do not scale from this drawing. Only written dimensions are to be used.
 - 3. Site layout based on Assael Architecture ground floor plan (ERS-ASS-ALL-00-DR-A-0200-P12)

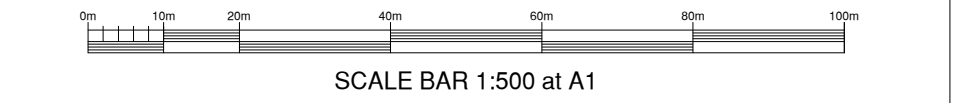
KEY

Site Boundary

Impermeable Areas - Building = 0.2415 heclares

Impermeable Areas - External Hardstanding (outside of highway) = 0.047 hectares

Combined total area = 0.2885 hectares



B	24.09.20	Planning Issue	TRS	TRS	TRS
A	22.09.20	Site Layout Updated	TRS	TRS	TRS
Rev.	Date	Details	By	Chkd	Appd

Client:-

Site:-
Emsleigh Road,
Staines

Drawing Title:-
Proposed
Impermeable
Area Layout

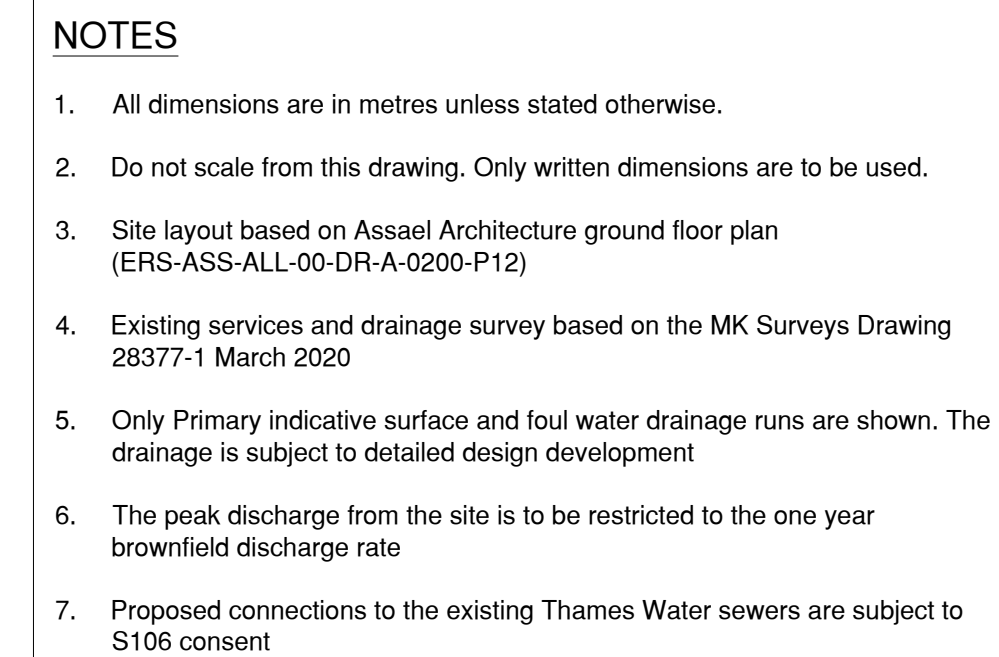
Date: 26/11/2019
Drawn: TA
Checked: TK
Approved: TRS

Scales: 1:500 at A1

Drawing No. INL/E4445/003B

FOR INFORMATION ONLY

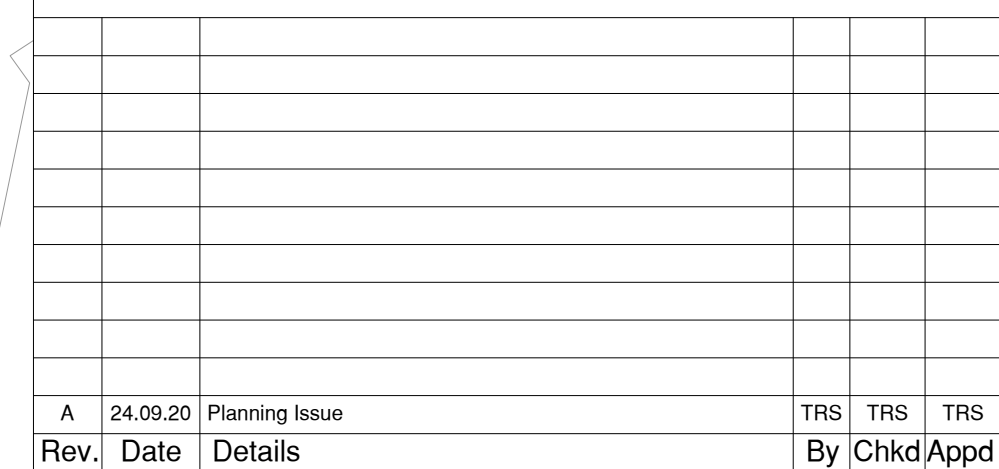
Rogers Cory Partnership
Architectural and Civil Consultants
The Old School Old School Road
Hook Hampshire RG27 9NJ
T: 01256 769269 E: mail@rcpconsultants.co.uk W: rcpconsultants.co.uk



Proposed Below Ground Attenuation Tank

Proposed Surface Water

Proposed Foul Water



Appendix (H)

Micro Drainage Hydraulic Model

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Micro Drainage		Network 2017.1.2

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)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	10
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	30.912	0.155	199.4	0.242	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	27.910	0.140	199.4	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	7.793	0.039	200.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	6.133	0.031	197.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.56	13.890	0.242	0.0	0.0	3.3	0.92	36.7	36.0
S1.001	50.00	5.98	13.660	0.289	0.0	0.0	3.9	1.11	78.5	43.0
S1.002	50.00	6.09	13.520	0.289	0.0	0.0	3.9	1.11	78.3	43.0
S1.003	50.00	6.21	13.481	0.289	0.0	0.0	3.9	0.93	36.8«	43.0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.242	0.242	0.242
1.001	-	-	100	0.047	0.047	0.047
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.289	0.289	0.289

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

S1.003	S	14.500	13.450	13.555	0	0
--------	---	--------	--------	--------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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)	120
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	60
Ratio R	0.400		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2, DS/PN: S1.001, Volume (m³): 2.7

Unit Reference	MD-SHE-0199-2110-1300-2110
Design Head (m)	1.300
Design Flow (l/s)	21.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	199
Invert Level (m)	13.735
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	21.1
Flush-Flo™	0.403	21.0
Kick-Flo®	0.882	17.6
Mean Flow over Head Range	-	18.0

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	6.9	1.200	20.3	3.000	31.5	7.000	47.4
0.200	18.8	1.400	21.9	3.500	33.9	7.500	49.0
0.300	20.7	1.600	23.3	4.000	36.2	8.000	50.6
0.400	21.0	1.800	24.6	4.500	38.3	8.500	52.1
0.500	20.9	2.000	25.9	5.000	40.3	9.000	53.5
0.600	20.5	2.200	27.1	5.500	42.2	9.500	55.0
0.800	19.1	2.400	28.3	6.000	44.0		
1.000	18.6	2.600	29.4	6.500	45.7		

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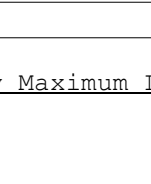
Storage Structures for Storm

Cellular Storage Manhole: S1, DS/PN: S1.000

Invert Level (m) 13.890 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	150.0	0.0	0.501	0.0	0.0
0.500	150.0	0.0			

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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	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	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	0.400
Region England and Wales Cv (Summer)	0.750		
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
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, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	30 Winter	1	+0%	30/30 Winter	100/60 Winter		
S1.001	S2	30 Winter	1	+0%	30/15 Summer	100/60 Winter		
S1.002	S3	30 Winter	1	+0%				
S1.003	S4	30 Winter	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	13.978	-0.137	0.000	0.32		11.1	OK	1
S1.001	S2	13.890	-0.070	0.000	0.20		13.8	OK	1
S1.002	S3	13.619	-0.201	0.000	0.24		13.8	OK	
S1.003	S4	13.593	-0.113	0.000	0.49		13.8	OK	

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Page 6

The Old School
 Old School Road
 Hook RG27 9NJ

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 Checked by

Micro Drainage

Network 2017.1.2

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	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
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, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	30 Winter	30	+0%	30/30 Winter	100/60 Winter		
S1.001	S2	30 Winter	30	+0%	30/15 Summer	100/60 Winter		
S1.002	S3	30 Winter	30	+0%				
S1.003	S4	30 Winter	30	+0%				

PN	US/MH Name	Water			Surcharged		Flooded		Pipe		Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status			
S1.000	S1	14.125	0.010	0.000	0.59		20.1	SURCHARGED		1	
S1.001	S2	14.082	0.122	0.000	0.30		20.9	SURCHARGED		1	
S1.002	S3	13.649	-0.171	0.000	0.36		20.9	OK			
S1.003	S4	13.626	-0.080	0.000	0.74		20.9	OK			

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The Old School Old School Road Hook RG27 9NJ		
Date 24/09/2020 17:58 File PROPOSED SW.MDX		
Designed by Terry Checked by		
Micro Drainage		Network 2017.1.2

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	2.000
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	1
Number of Online Controls	1	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	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
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, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	60 Winter	100	+40%	30/30 Winter	100/60 Winter		
S1.001	S2	60 Winter	100	+40%	30/15 Summer	100/60 Winter		
S1.002	S3	180 Winter	100	+40%				
S1.003	S4	180 Winter	100	+40%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	15.100	0.985	0.071	0.79		27.1	FLOOD	1
S1.001	S2	15.002	1.042	2.452	0.30		21.0	FLOOD	1
S1.002	S3	13.649	-0.171	0.000	0.36		21.0	OK	
S1.003	S4	13.626	-0.080	0.000	0.75		21.0	OK	

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localised area of flood volume retained within basement and secondary drainage

Appendix (I)

Flood Plan



**ELMSLEIGH ROAD
STAINES**

FLOOD PLAN

SEPTEMBER 2020

Document Control Sheet

Project name: Elmsleigh Road, Staines

Project ref: INL/E4445

Report Title Flood Plan

Doc. ref: TRS/INL/E4445/17601

Date: 21st September 2020

	Name	Position	Signature	Date
Prepared by:	Terry Seymour	Director		20.09.2020
Reviewed by:	Terry Seymour	Director		22.09.2020
Approved by:	Terry Seymour	Director		22.09.2020

Flood Plan

1.0 Introduction and Objectives

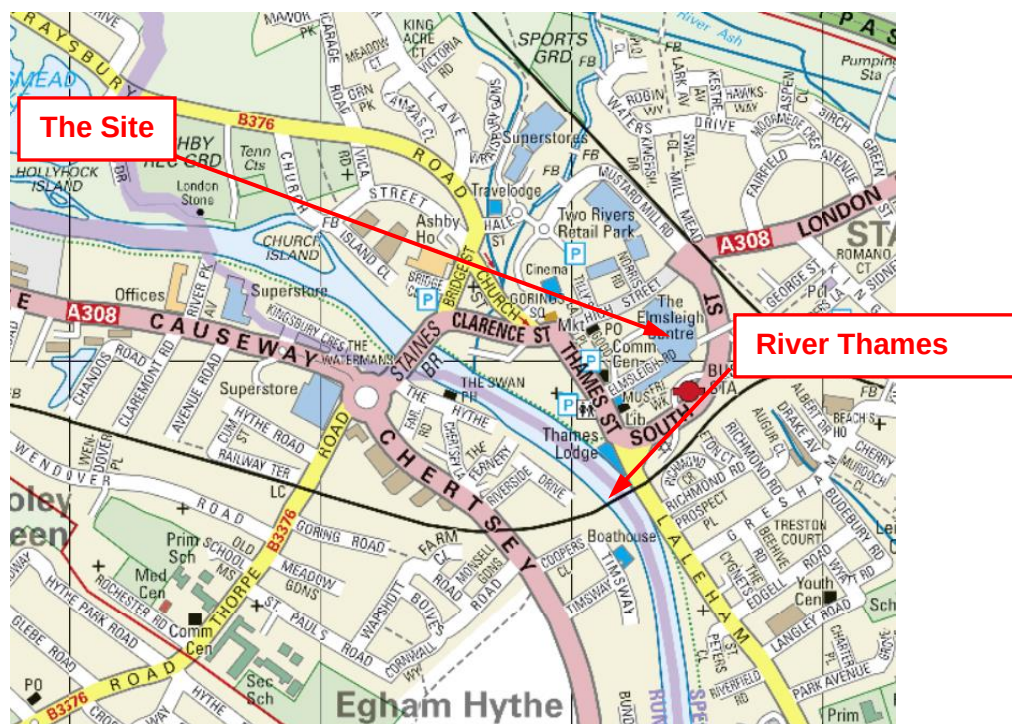
Rogers Cory Partnership Limited have been instructed on behalf of Inland Homes to prepare a Flood Plan in support of the residential development on this brownfield site.

The intention of this flood plan is to provide an initial proposal to highlight the potential flood hazards and provide outline procedures to enable future occupants and users of the site to avoid being directly exposed to the hazard in any future flood events that may affect the site. This flood plan should be regularly reviewed and updated during the life of the development, by the appointed Management Company to ensure it takes into consideration any changes to legislation and the flood hazard to the site.

Site Location

The site comprises of the former Telephone Exchange (now demolished) and the Staines Masonic Hall with open parking areas. The existing site is considered Brownfield.

The site is located off Elmsleigh Road, east of the A308. The River Thames is approximately 200m west of the site. The site is surrounded by the Elmsleigh Shopping Centre on the south and eastern sides and further retail units to the north.



Flood Plan

Objectives

The objective of the site flood plan is to raise awareness of the risk of flooding from fluvial flood events from the adjacent River Thames. The Flood Plan has been produced in accordance with the mitigation proposals detailed in the approved Site-Specific Flood Risk Assessment compiled by Rogers Cory Partnership Limited (ref: to be confirmed).

The site falls within an area where the Environment Agency issue flood warnings. In addition to all future occupants being signed up to the Environment Agency's Flood Warning Service, the appointed Management Company will also play an active role in ensuring both flood mitigation requirements are in place and also provide assistance for safe access and egress in the event of a fluvial flood. The flood plan will highlight what mitigation measures should be implemented by the future users of the site.

2.0 Flood Risk to the Site

Fluvial Flood Risk

The EA flood maps indicate that this site falls within Flood Zones 2 and 3 considered to have a medium to high risk of flooding from rivers (see **figure 2** below):

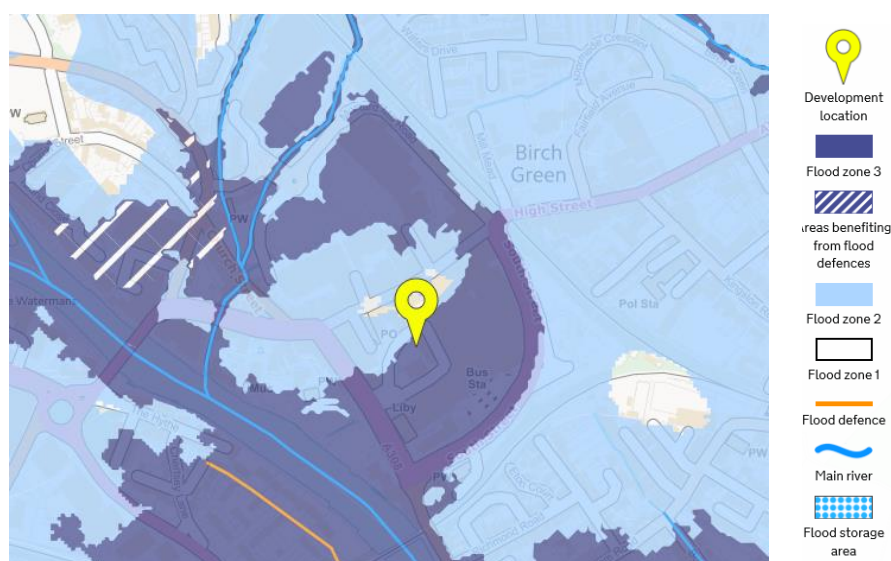


Figure 2- Extract from EA Website- Flood Map for Planning (Rivers and Sea)

The EA modelled flood information was obtained in 2016 and indicated that the 1 in 100 year + 20% (climate change) fluvial flood level was approximately 15.92mAOD.

Updated EA modelling flood information, which accounts for the new Climate Change factor has been produced by the EA and determined the 1 in 100 year plus 35% level at **15.753mAOD**. The minimum habitable FFL for the new development should be set at **16.053mAOD** which is 300mm above the 1 in 100 year plus 35% fluvial flood level.

Flood Plan

A minimum finished floor level of **16.053mAOD** for any habitable dwellings and safe dry refuge areas where commercial use is being proposed. As the current proposals include for setting the residential dwellings at 1st floor and above then this ensures that all habitable dwellings are already conservatively above this level.

Table 1 below outlines the proposed residual flood mitigation measures which will be implemented in the construction of the development.

Land use	Min Finished Floor Level	Further mitigation requirements
Residential	The minimum finished habitable floor levels are at first floor level to be set at 19.0mAOD	Buildings to be constructed with flood resilience measures in accordance with the Communities and Local Government Guidance - Flood Resilient Construction document (May 2007)

Table 1 – Proposed site wide minimum finished floor levels and further mitigation requirements

Flood Plan

Table 2 provides residual mitigation measures proposed for the future users and occupants of the site.

Land use	Further mitigation requirements
Residential	Residents will need to register with the EA flood warning services. This will provide occupants sufficient warning to leave the site should they wish to via the routes detailed below Should the occupants decide to remain, as the dwellings themselves are to be set at first floor level at 19.0mAOD (which is approximately 2.9m above the peak fluvial flood event), this provides an area of safe refuge for the future occupants.

Table 2 – Proposed site wide residual mitigation measures

Preparation for a Flood Event

Whilst the floor levels within the building are designed to be above the 1 in 100 year plus climate change flood level, residents are still encouraged to evacuate the site in the event of a fluvial flood.

Should the residents choose to remain onsite during such an event they face the possible residual risks:

- Contaminated flood water – due to below ground foul sewers backing up and flooding;
- Electrical power cuts;
- Electrical hazards;
- Lack of access to potable water, food or medical care;
- Floating debris, including vehicles;

Flood warnings and associated actions

The Environment Agency are the competent warning authority and operate a flood warning service covering all areas at risk of flooding from tidal and fluvial sources. More information is available from www.environment-agency.gov.uk

Flood Plan

Flood Warnings direct service provided by the Environment agency including the 24 hours Flood line service and the ability to use quick dial code to reach location specific information

All residents will be encouraged to sign up by any of the following methods to the free Environment Agency Flood Watch Scheme that will provide advance alerts to residents and to the management company.

Online: <https://www.gov.uk/sign-up-for-flood-warnings>

Telephone: 0345 988 1188 24-hour service

Each home will be provided with information concerning the level of flood warnings and strategy, how to register their details with floodline and alongside this information, how to contact the property manager and the Emergency out of Hours contacts as laid out below;

Contacts: Management Company – Inland Homes to confirm in due course

Senior Property Manager: Inland Homes to confirm in due course

Telephone: Inland Homes to confirm in due course

Email: Inland Homes to confirm in due course

Emergency Out of Hours Number: Inland Homes to confirm in due course

It will be the resident's responsibility to ensure that they register with the EA Flood Warning Service

In addition to this the Management Company will display contact details for the Environment Agency Flood Line on posters in shared corridors to encourage residents to sign up to the early flood warning EA service.

As a matter of course the Management Company will review and update (as necessary) details on the flood plan on an annual basis and submit this to all the residents via a letter drop.

Flood Alerts

The EA flood alert messages are categorized into three levels of significance with the following suggested actions accordingly:

Flood Alert Response (flooding expected; evacuation not yet necessary:

- Monitor local news and forecasts;
- Be aware of water levels in the nearby rivers;
- Be prepared to act on your personal flood plan;
- Make arrangement for possible alternative accommodation;

Flood Plan

Flood Warning Response (flooding expected; all vulnerable persons should prepare to leave the site immediately:

- Monitor local news and forecasts;
- Be aware of water levels in the nearby rivers;
- Move cars to higher ground;
- Collect pets, valuables and important documents and move them to safety;
- Turn off gas, electricity and water;
- Should residents choose to remain on site, then ensure you have sufficient provisions to last at least 7 days
- Act on your personal flood plan;

Severe Flood Warning Response

- Listen to emergency services advice
- Avoid walking or driving through flood water
- Act on your personal flood plan;
- Evacuate the site if safe to do so
- If in danger call 999

Actions in preparation for an emergency

The following equipment is advised recommended to be kept in your homes at all times:

- Bottled water;
- Medication including a first aid kit;
- Portable radio;
- Non-perishable food;
- Cooking equipment and lighting (candles/torches)

Further preparation:

- Identify where to turn off your water, electricity and gas supplies to the flat;
- Discuss with your family and friends how you will stay in contact and where you intend to go in the event of an evacuation;
- Know how to tune into the local radio station to receive any emergency evacuation announcements.

Flood Plan

Safe means of access and egress.

In the event of immediate danger, residents will be advised to leave via local radio and if possible, by flat to flat calls

In the event of a short-term evacuation, local schools or community centers or churches may provide safety and shelter for people. For longer emergencies, the residents are encouraged to make their own arrangements for accommodation, failing this predesignated schools in the Borough will be opened up to provide emergency rest centers with sleeping and welfare facilities. Transport will be provided to these centers.

As detailed in the approved site-specific flood risk assessment (document reference to be confirmed), a safe means of emergency access and egress is proposed for pedestrian traffic (**green arrows**) and will include the following: northwards along Goodman Place onto the High Street, eastwards along the High Street then onto the A308 High Street and then finally onto the A30 London Road. For vehicular Traffic (**red arrows**) including emergency vehicle access and egress this will be as above but from the site using Elmsleigh street westwards onto Thames Street, then northwards on to the High Street.

The outline routes are shown below in **figure 3**.

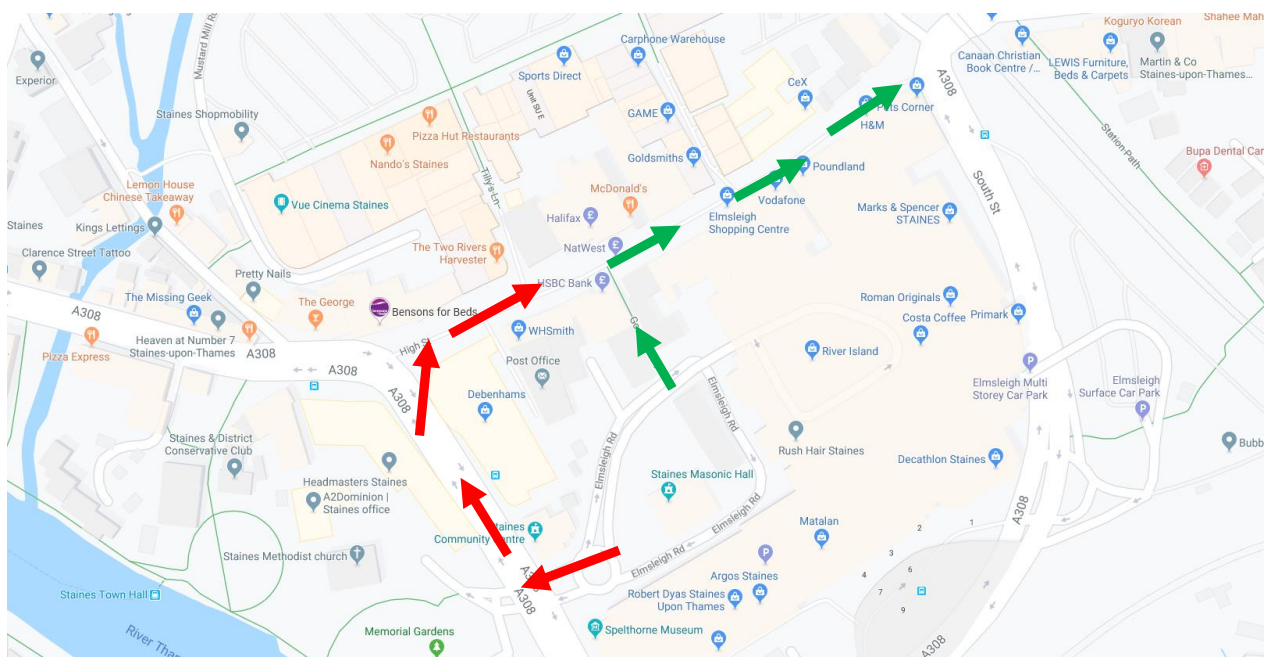


Figure 3- Flood Evacuation Route via A4

The pedestrian dry route of access and egress denoted in figure 3, follows Spelthorne Borough Councils (SBC) requirements for ensuring the route is clear of Flood Zone 3, based on the flood map information provided by SBC per extract in **Figure 4**. Reviewing this flood map against the topographic survey levels, the flood level reflective of Flood Zone 3 has been provided in the updated EA model as **15.421mAOD.**

Flood Plan

As such the development proposals have sought to provide two key means for evacuation. One through the northern entrance set at the Flood Zone 3 level in accordance to SBC's requirements and the second at a higher level of 16.5mAOD to provide a higher dry refuge platform in the event of a more extreme fluvial event in compliance with the Environment Agency's recommendations as well. These are shown on **figure 5**.

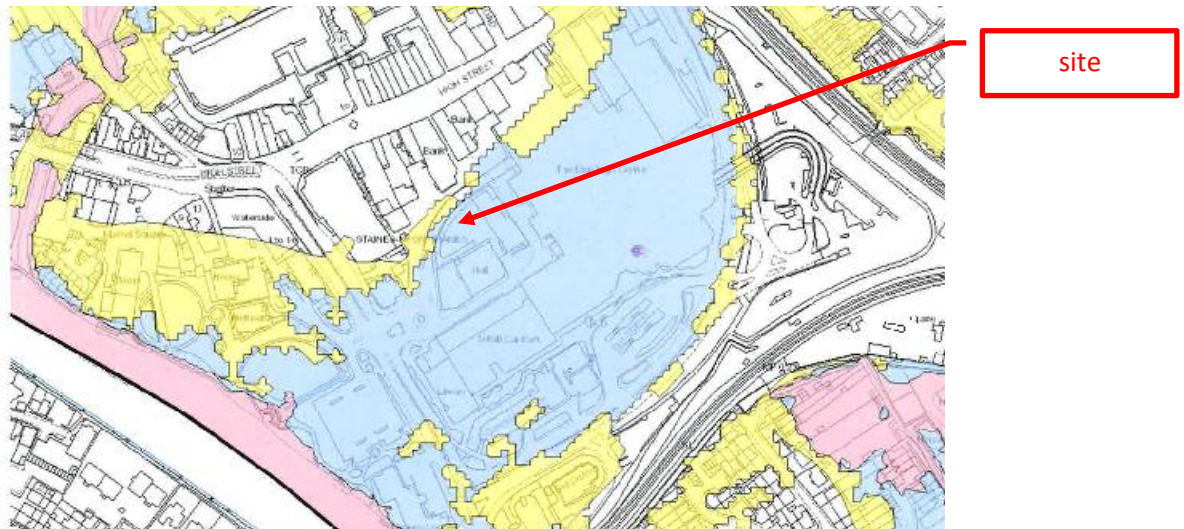


Figure 4- Extract from SBC Flood Map (Flood Zone 3 – blue area)

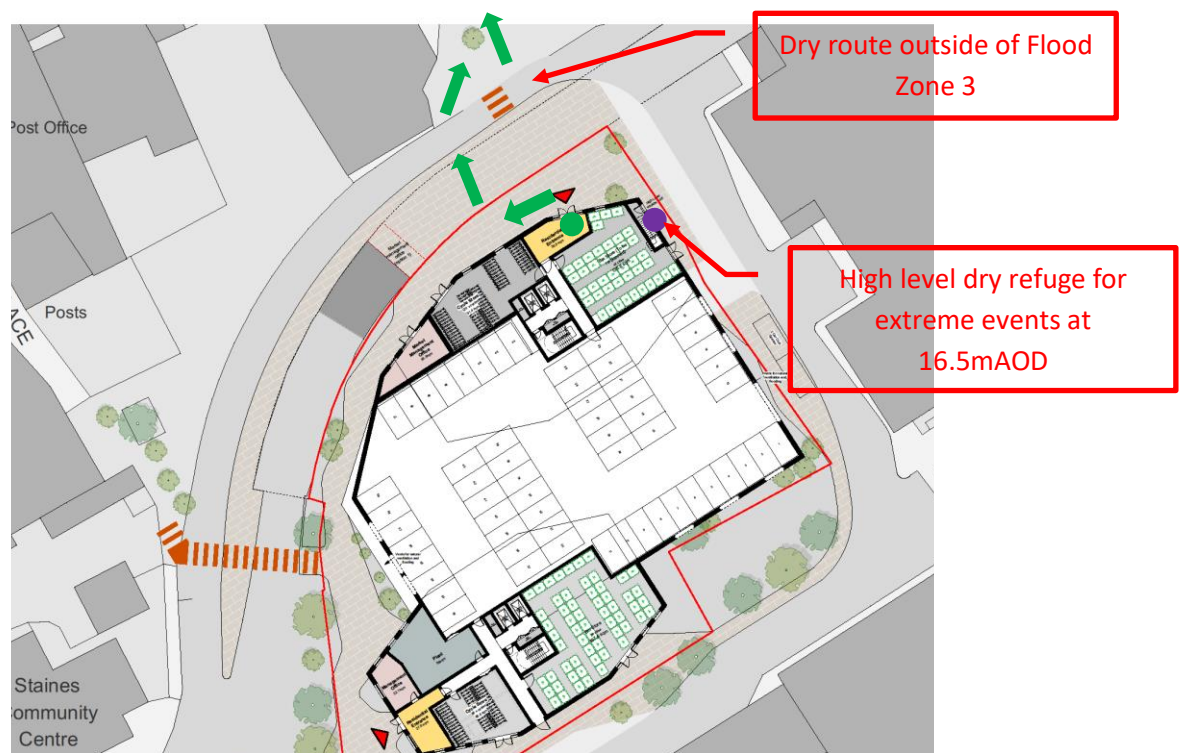


Figure 5- Extract from Proposed Ground floor Plan

Flood Plan

Residents are encouraged to prepare their personal flood plans, using the information provided within this Flood Plan. A template provided by the Environment Agency is contained in **Appendix B**.

The response to a major flood event will involve a number of organizations working together at a local level including the emergency services, local authority, the Environment Agency and utility companies.

Useful Contact

Business	Number
The Environment Agency Floodline Quick Dial Code	0345 988 1188
Site Management	<i>to be advised by Inland Homes</i>
Spelthorne Borough Council	Tel: 01784 451499 Emergency: 01932 425060 0345 600 9009 (Surrey County Council)
Surrey Police	Emergency: 999 Non-Emergency: 101
Surrey Fire and Rescue	Emergency: 999 Non-Emergency: 101
Utility Suppliers	Cadent: 0800 111 999 Scottish and Southern: 0800 072 7282
Local Public Transport information	https://www.spelthorne.gov.uk/article/17067/Accessible-Transport-Guide
Buildings Insurance Provider	<i>to be advised by Inland Homes</i>

Appendix A: The general roles of the main bodies in relation to a major flood event in the Spelthorne Borough Council

It should be noted that this is a general list, and specific duties may vary between different bodies.

Surrey Police:

- Overall coordination of the multi-agency response at a major flood event.
- Coordinate any multi agency decision to evacuate in consultation with key partner agencies.
- Save life in cooperation with other emergency services.

Surrey Fire and Rescue Service:

- Assist with evacuation and coordinate search and rescue operations.
- Provide and/or obtain specialist advice and assistance where hazardous materials are involved.
- Assist other relevant agencies, particularly the local authority, to minimize the effects of major flooding on the community.

Spelthorne Borough Council as the Local Authority:

Before, during and after flooding incidents, the council will help wherever possible by:

- Providing sandbags to homes (but only where there is an imminent risk of flooding).
- Closing roads if flooded.
- Looking after the elderly and vulnerable.
- Providing evacuation centres' if large numbers of people are made homeless

The Environment Agency:

- Issue flood alerts/warnings and/or Operational Messages using their Flood Warning services to warn and inform the public and partners.
- Responsibility for maintenance and operation of Environment Agency owned flood defenses. Checking defenses and undertaking essential repairs and maintenance on Environmental Agency owned flood defenses and advise other owners on their maintenance responsibilities.

Flood Plan

- Monitor water levels and flows, assessing risk, clearing obstructions from known pinch points and advising the emergency services and the local authority.
- Along with partners, deploy temporary flood defenses where impacts can be mitigated.
- Support the police and local authority by providing materials, equipment and manpower as far as resources and other duties permit, once own systems and flood defenses are secure.

Utility Companies:

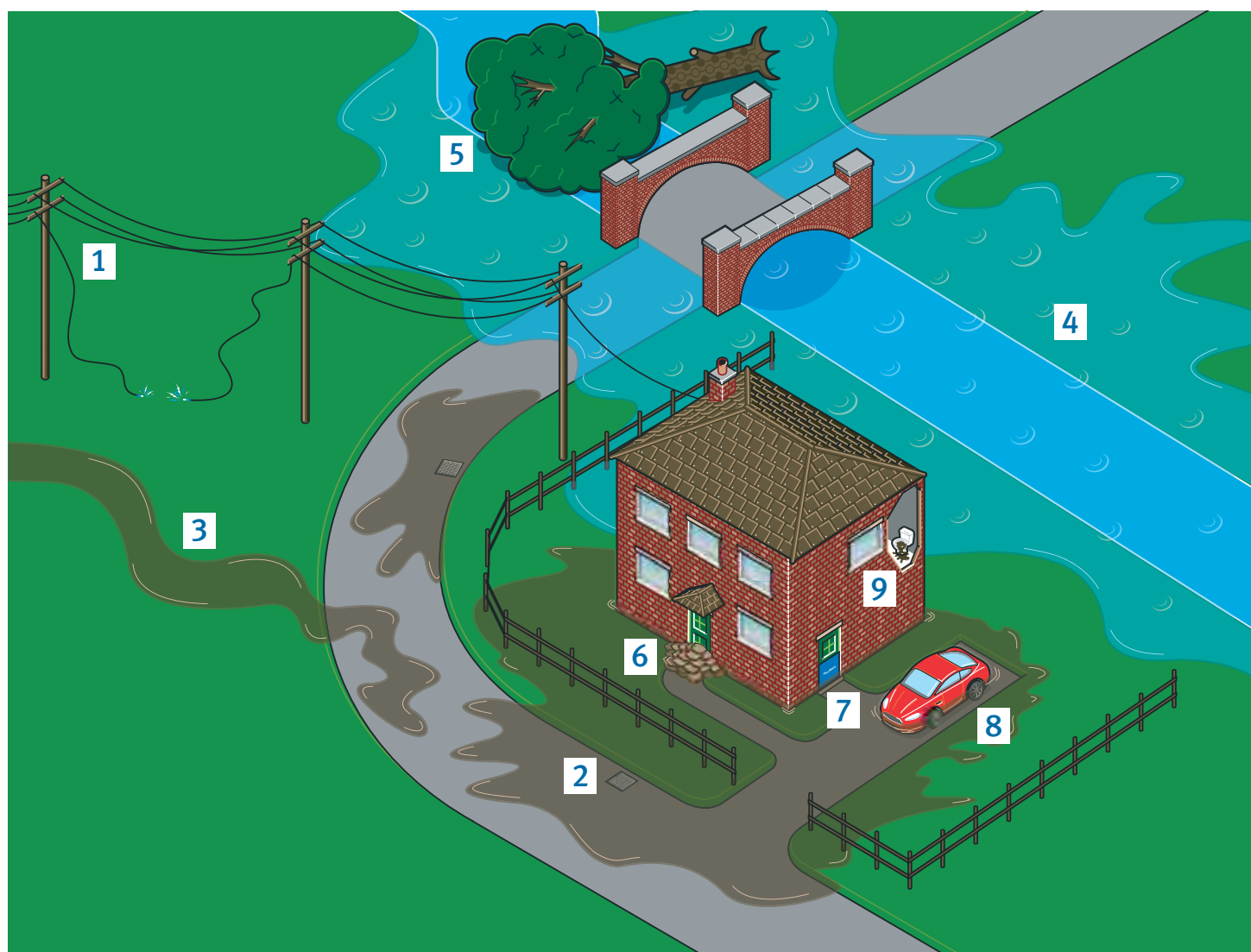
- Maintain the safety and integrity of the electricity/gas/water supply system.
- Liaise with partner agencies and obtain pumps to maintain the supply at key locations.
- Repair services and seek alternative means of supply during any disruption and restore supplies as soon as possible.

Appendix B: Personal Flood Plan

Flooding - who can help?

Contact:

- 1 Your supplier if you are concerned about floodwater affecting your gas, electricity or sewerage supplies.
- 2 Your local council or Highways Agency for flooding caused by blocked drains.
- 3 Your local council or Highways Agency if you are concerned about flooding caused by water running off fields.
- 4 The Environment Agency for advice on flooding from rivers and the sea.
- 5 The Environment Agency if you notice an obstruction in the river.
- 6 Your local council to see if they provide sandbags or buy your own supply from local builder's merchants.
- 7 The Environment Agency for advice on flood protection products.
- 8 Your insurance company to check whether your property is covered for flood damage.
- 9 Your local water company if your toilet is backing up during floods.



Personal flood plan

Name



Are you signed up to receive flood warnings?

If not call Floodline on 0845 988 1188 to see if your area receives free flood warnings.

☐

Let us know when you've completed your flood plan by calling Floodline on **0845 988 1188**. This will help us learn more about how people are preparing for flooding.

General contact list	Company name	Contact name	Telephone
Floodline	Environment Agency		0845 988 1188
Electricity provider			
Gas provider			
Water company			
Telephone provider			
Insurance company and policy number			
Local council			
Local radio station			
Travel/weather info			

Key locations

Service cut-off	Description of location
Electricity	
Gas	
Water	

Who can help/who can you help?

Relationship	Name	Contact details	How can they/you help?
Relative			
Friend or neighbour			

Be prepared for flooding. Act now

Personal flood plan

What can I do NOW?



Put important documents out of flood risk and protect in polythene

☐

Look at the best way of stopping floodwater entering your property

☐

Find out where you can get sandbags

☐

Identify what you would need to take with you if you had to leave your home

☐

Check your insurance covers you for flooding

☐

Make a flood plan and prepare a flood kit

☐

Identify who can help you/ who you can help

☐

Understand the flood warning codes

☐

What can you do if a flood is expected in your area?

Actions	Location
Home	
• Move furniture and electrical items to safety	
• Put flood boards, polythene and sandbags in place	
• Make a list now of what you can move away from the risk	
• Turn off electricity, water and gas supplies	
• Roll up carpets and rugs	
• Unless you have time to remove them hang curtains over rods	
• Move sentimental items to safety	
• Put important documents in polythene bags and move to safety	
Garden and outside	
• Move your car out of the flood risk area	
• Move any large or loose items or weigh them down	
Business	
• Move important documents, computers and stock	
• Alert staff and request their help	
• Farmers move animals and livestock to safety	
Evacuation - Prepare a flood kit in advance	
• Inform your family or friends that you may need to leave your home	
• Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons	

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at www.bluepages.org.uk

Be prepared for flooding. Act now

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

Then call us on

08708 506 506* (Mon-Fri 8-6)

email

enquiries@environment-agency.gov.uk

or visit our website

www.environment-agency.gov.uk

incident hotline 0800 80 70 60 (24hrs)

floodline 0845 988 1188

*** Weekday daytime calls cost 8p plus up to 6p/min from BT Weekend Unlimited. Mobile and other providers' charges may vary.**



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Appendix (J)

Hydrology Note

TECHNICAL NOTE

Prepared on behalf of Inland Ltd

Date	29/09/2020
Project	Old Telephone Exchange, Staines
Project Ref	197320
Report Ref	197320-01

DOCUMENT CONTROL

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	For Information	GA	GA	DRAFT	25/09/2020
-	FINAL	GA	GA 	CC 	29/09/2020

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SITE: Old Telephone Exchange, Staines

Environment Agency's Hydraulic Model

The Site falls within the Lower Thames, Jubilee River and River Ash Modelling Study undertaken by JBA on behalf of the Environment Agency (EA) in July 2020.

The project was originally commissioned to update all hydrological modelling of the study reach and to develop a single hydraulic model of the study reach between Hurley and Teddington. Once complete the model was used to revise all flood mapping in the catchment and to enable the assessment of wide range of investigations on both the River Thames and all main tributaries.

A 1D-2D Flood Modeller-TUFLOW model was developed to provide high resolution floodplain mapping of the Lower Thames catchment between Hurley and Hammersmith.

Model Outputs

A review of the model outputs indicated that the site of interest is located within the 100 year + 35% Climate Change flood outline as shown in **Figure 1** below.

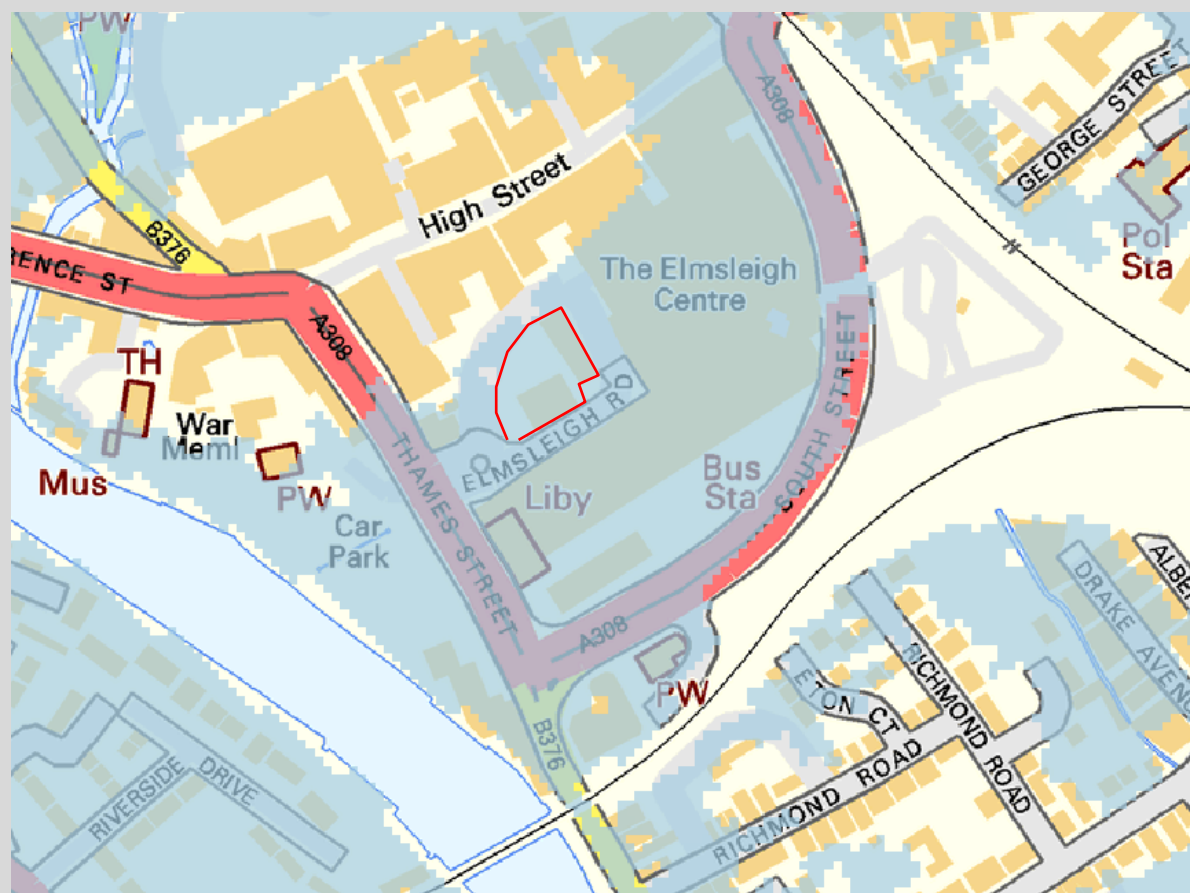


Figure 1: 100 year + 35% CC Flood Extent (defended)

The predicted flood level, within the site, for the 100yr + 35% CC defended scenario is 15.753m AOD. Predicted flood levels on site for the remaining flood events are shown in the **Table 1** below.

Table 1: Predicted flood levels for the defended scenario

Flood Event	Predicted Flood Level	Flood Event	Predicted Flood Level
2yr	N/A	50yr	14.922m AOD
5yr	N/A	75yr	15.354m AOD
10yr	N/A	100yr	15.421m AOD
20yr	N/A	200yr	15.564m AOD

TECHNICAL NOTE

Prepared on behalf of Inland Ltd

30yr	N/A	1000yr	15.776m AOD
40yr	N/A	100yr+70%CC	15.852m AOD