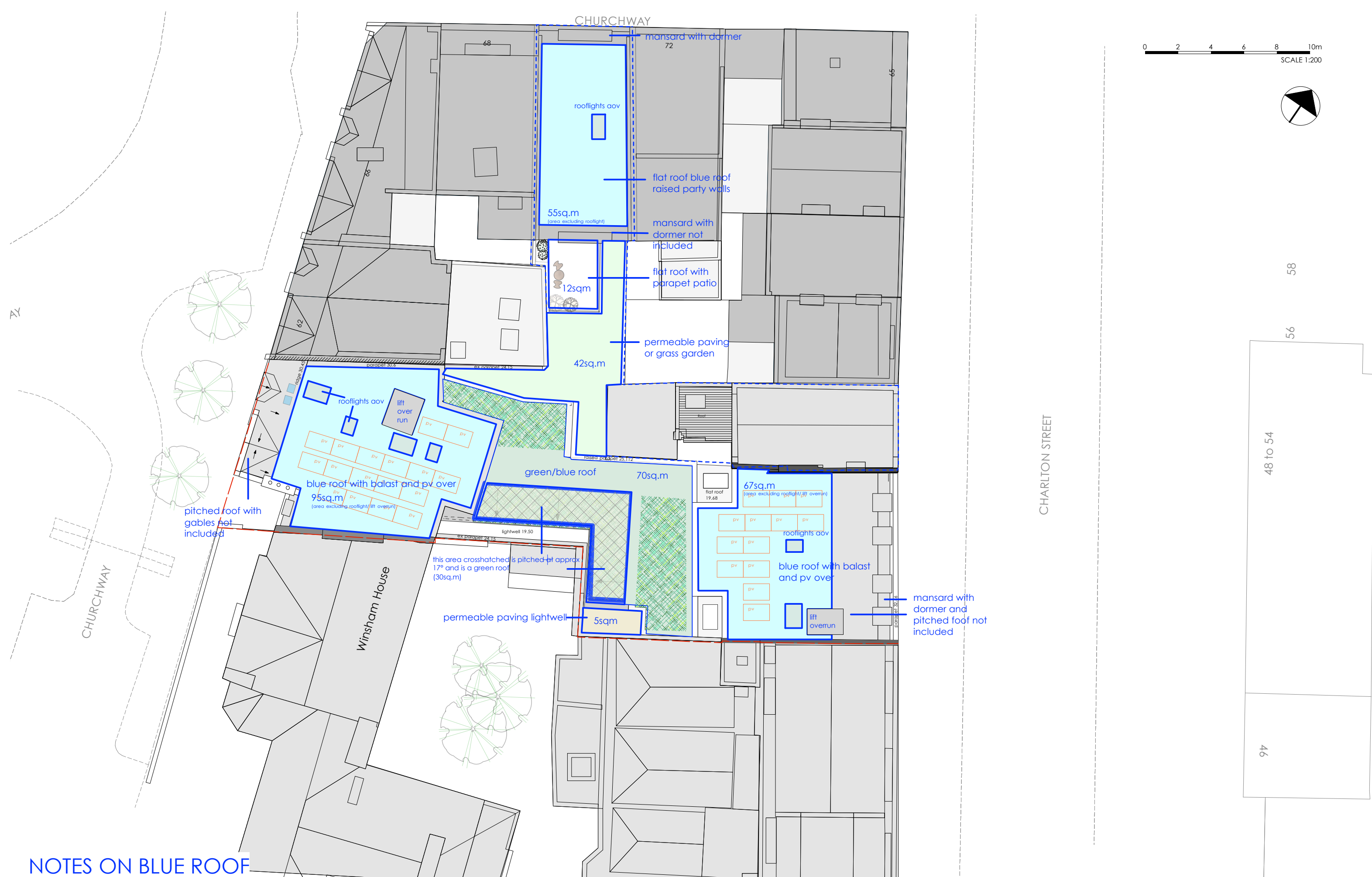




it Mark



NOTES ON BLUE ROOF

Notes

Client

RangePAY Ltd

Project

53-55 Chalton Street NW1 1HY &
60 Churchway NW1 1LT

Status

Revised Planning Application - September 2016

Drawing

Proposed Roof Plan

Project Number

1103-A

Drawing Ref

206

Revision

E

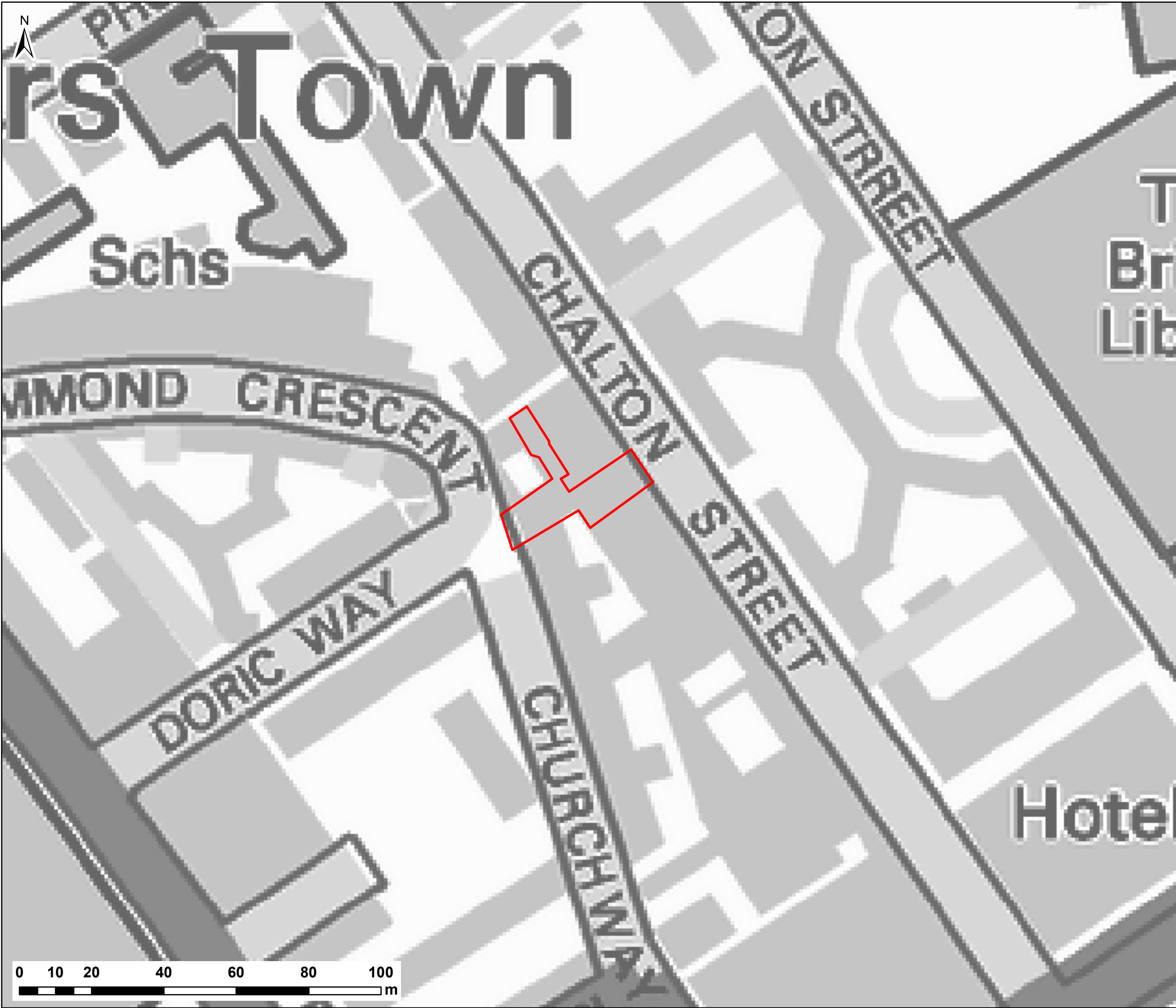
Scale

1:200

Page size

A3

Appendix G – EA Flood mapping



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- EA Main Rivers
- EA Flood Zone 3
- EA Flood Zone 2

CLIENT:

RANGEPAY LTD

www.waterco.co.uk

SCHEME:

**CHALTON ST & CHURCHWAY,
LONDON**

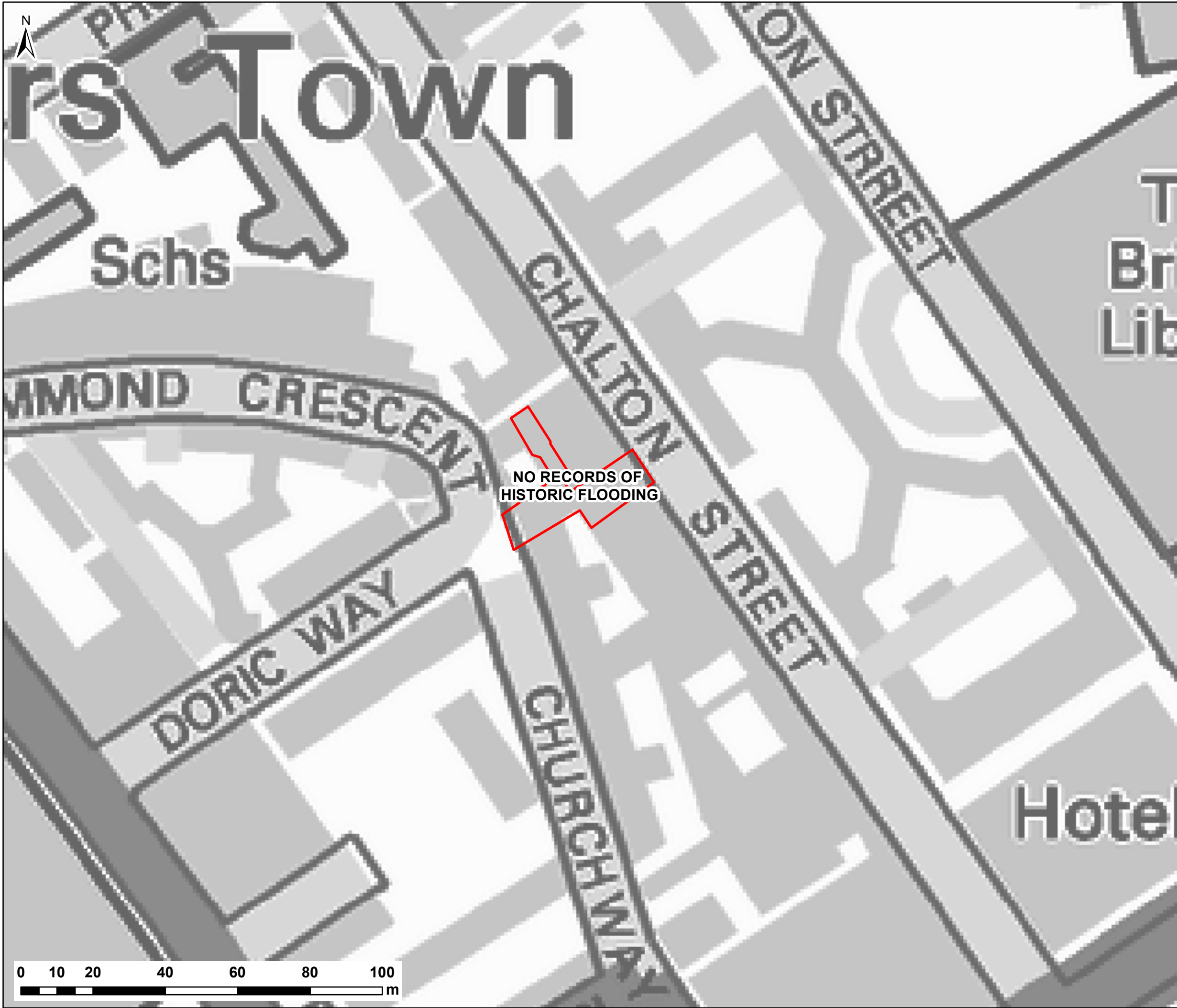
PLOT TITLE:

**EA FLOOD MAP FOR PLANNING
JANUARY 2019**

PLOT STATUS:			DATE:
FINAL			22/01/2019

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RP	AW	VG	1:1,000
			(UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w10253_FZ	-



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

Site Boundary

Historic Flood Map

CLIENT:

RANGEPAY LTD

www.waterco.co.uk

SCHEME:

**CHALTON ST & CHURCHWAY,
LONDON**

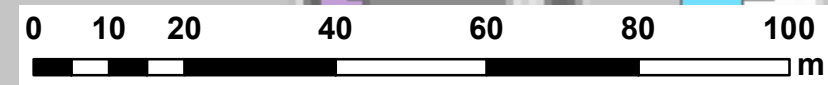
PLOT TITLE:

EA HISTORIC FLOOD MAP

PLOT STATUS:			DATE:
FINAL			22/01/2019

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RP	AW	VG	1:1,000
			(UNLESS STATED OTHERWISE)

PLOT NAME:	REV:
w10253_EA_His	-



NOTES:
1) ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS STATED OTHERWISE

LEGEND

- Site Boundary
- Very Low (less than 0.1%)
- Low (between 0.1% and 1.0%)
- Medium (between 1.0% and 3.3%)
- High (3.3% or greater)

CLIENT:

RANGEPAY LTD

www.waterco.co.uk

SCHEME:

**CHALTON ST & CHURCHWAY,
LONDON**

PLOT TITLE:

**EA FLOOD RISK FROM
SURFACE WATER**
JANUARY 2019

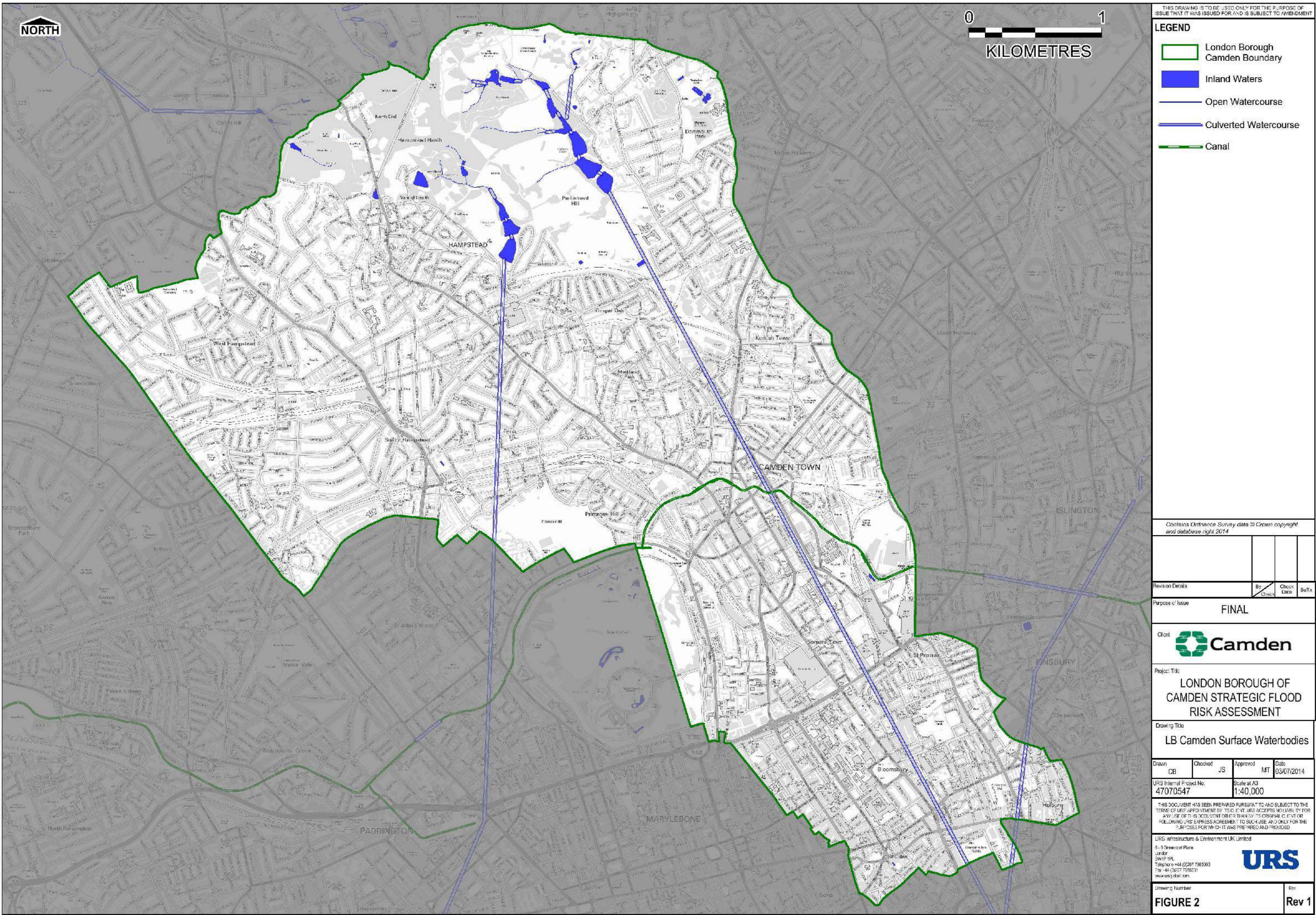
PLOT STATUS:			DATE:
FINAL			22/01/2019

DRAWN:	CHECKED:	APPROVED:	PLOT SCALE @ A3:
RP	AW	VG	1:1,000 (UNLESS STATED OTHERWISE)

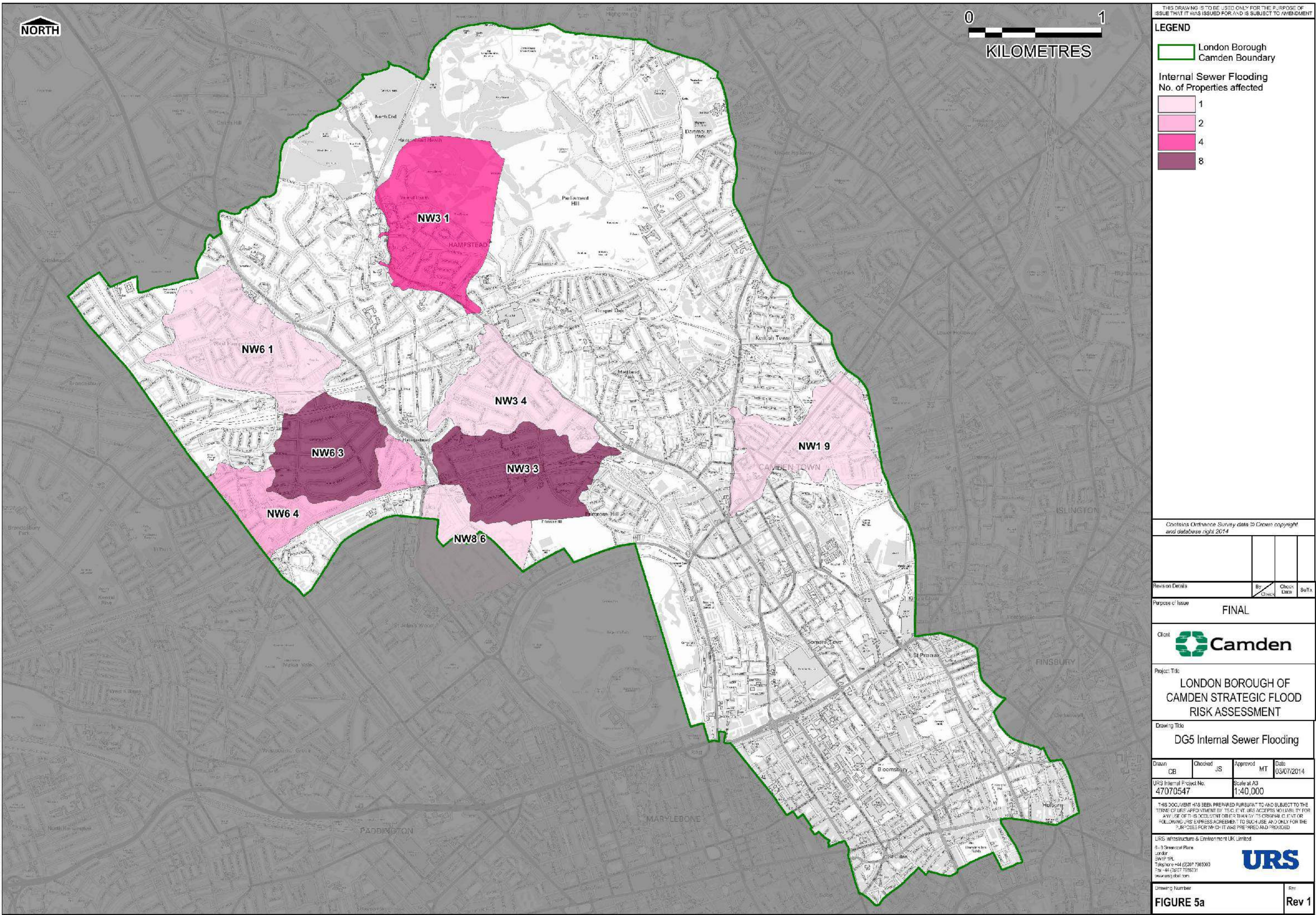
PLOT NAME:	REV:
w10253_SWFM	-

Appendix H – SFRA Maps

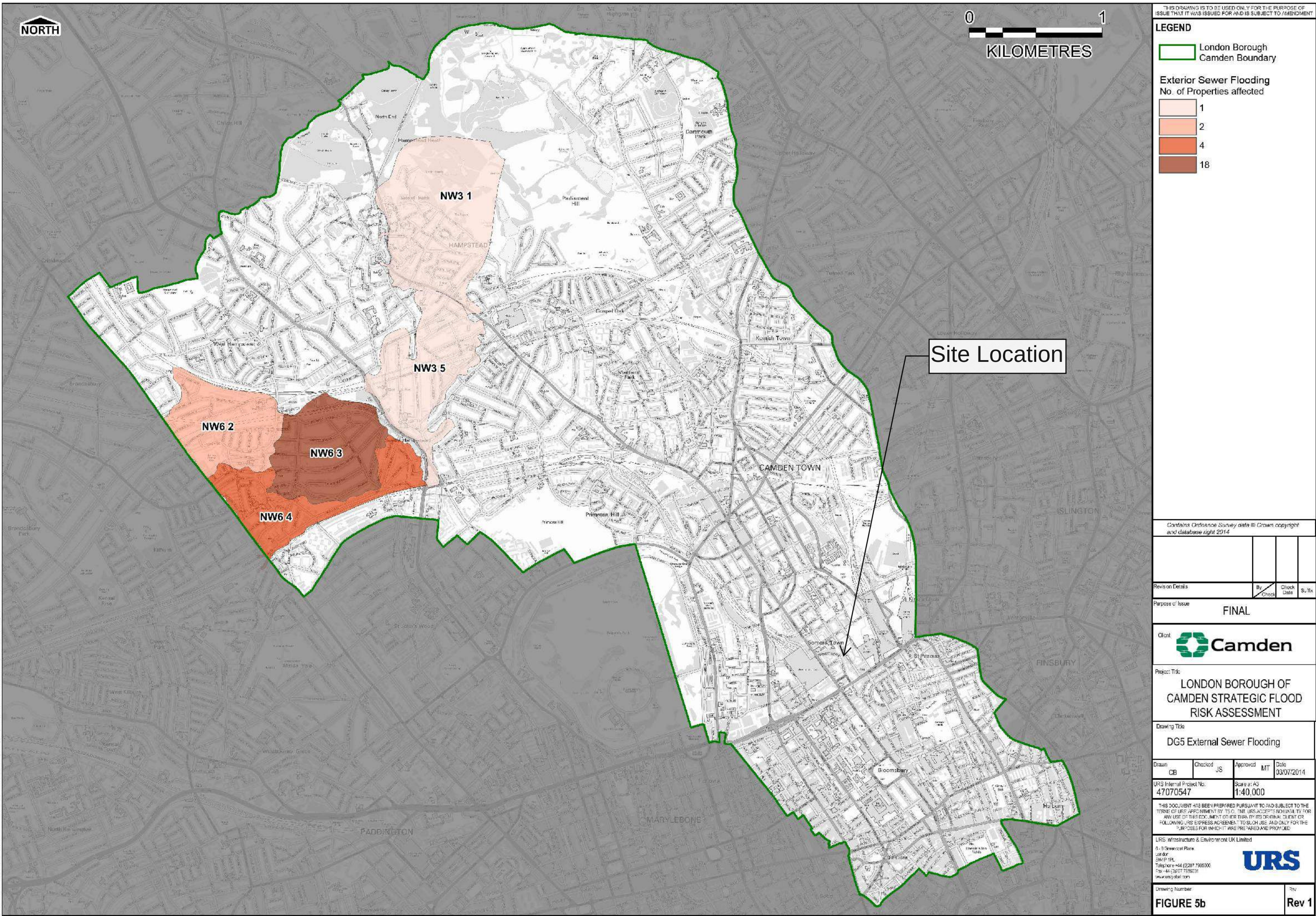
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N:\Work\Current Projects\47070547 Camden Strategic Flood Risk Assessment\GIS Data\01 - WIP\01_03-Project_Files\WORKS



Appendix I – Greenfield Runoff Rates

DOCUMENT VERIFICATION RECORD	
Project:	Chalton Street and Churchway, London
Client:	RangePAY Ltd
Report Title:	Proposed hotel and residential development – Flood Risk Assessment & Drainage Strategy
Date:	17 th January 2019

DOCUMENT REVIEW & APPROVAL	
Author:	Sally Pettit BSc
Checker:	Aled Williams BSc (Hons) MCIWEM
Approver:	Victoria Griffin BSc (Hons) MSc CEnv MEnvSc

Return Period (Years)	As-rural Peak Flow (l/s)
1	7.48E-02
2	8.83E-02
5	1.34E-01
10	1.68E-01
30	2.31E-01
50	2.68E-01
75	3.04E-01
100	3.33E-01
200	4.13E-01
1000	6.17E-01

*Runoff Rates printed from the ReFH Flood Modelling software package

Appendix J – MicroDrainage Storage Volumes

Waterco Ltd					Page 1	
Eden Court		w10253				
Lon Parcwr Business Park		70 Churchway				
Denbighshire LL15 1NJ		1 in 100 year+40%CC				
Date 23/01/2019		Designed by SJP				
File 70 Churchway 1 in 100 y...		Checked by AW				
XP Solutions		Source Control 2018.1				
<u>Summary of Results for 100 year Return Period (+40%)</u>						
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer		9.943	0.043	0.7	1.7	Flood Risk
30 min Summer		9.948	0.048	0.8	1.9	Flood Risk
60 min Summer		9.951	0.051	0.8	2.0	Flood Risk
120 min Summer		9.952	0.052	0.8	2.1	Flood Risk
180 min Summer		9.950	0.050	0.8	2.0	Flood Risk
240 min Summer		9.947	0.047	0.8	1.9	Flood Risk
360 min Summer		9.942	0.042	0.7	1.7	Flood Risk
480 min Summer		9.937	0.037	0.6	1.5	Flood Risk
600 min Summer		9.934	0.034	0.5	1.4	Flood Risk
720 min Summer		9.931	0.031	0.4	1.3	Flood Risk
960 min Summer		9.927	0.027	0.4	1.1	Flood Risk
1440 min Summer		9.922	0.022	0.3	0.9	Flood Risk
2160 min Summer		9.918	0.018	0.2	0.7	Flood Risk
2880 min Summer		9.915	0.015	0.2	0.6	Flood Risk
4320 min Summer		9.912	0.012	0.1	0.5	Flood Risk
5760 min Summer		9.910	0.010	0.1	0.4	Flood Risk
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer		179.200	0.0	2.0	15	
30 min Summer		115.272	0.0	2.6	23	
60 min Summer		70.337	0.0	3.1	40	
120 min Summer		45.133	0.0	4.0	74	
180 min Summer		34.200	0.0	4.6	106	
240 min Summer		27.801	0.0	5.0	138	
360 min Summer		20.401	0.0	5.5	200	
480 min Summer		16.173	0.0	5.8	260	
600 min Summer		13.426	0.0	6.0	320	
720 min Summer		11.494	0.0	6.2	382	
960 min Summer		8.943	0.0	6.4	502	
1440 min Summer		6.240	0.0	6.7	748	
2160 min Summer		4.326	0.0	7.0	1104	
2880 min Summer		3.336	0.0	7.2	1472	
4320 min Summer		2.322	0.0	7.5	2204	
5760 min Summer		1.805	0.0	7.8	2912	
©1982-2018 Innovyze						

Waterco Ltd					Page 2																																																																																																						
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8640 min Winter	9.906	0.006	0.0	0.2	Flood Risk																																										
10080 min Winter	9.905	0.005	0.0	0.2	Flood Risk																																										
<table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>2880 min Winter</td><td>3.336</td><td>0.0</td><td>8.1</td><td>1468</td></tr><tr><td>4320 min Winter</td><td>2.322</td><td>0.0</td><td>8.4</td><td>2180</td></tr><tr><td>5760 min Winter</td><td>1.805</td><td>0.0</td><td>8.7</td><td>3000</td></tr><tr><td>7200 min Winter</td><td>1.494</td><td>0.0</td><td>9.0</td><td>3672</td></tr><tr><td>8640 min Winter</td><td>1.285</td><td>0.0</td><td>9.3</td><td>4472</td></tr><tr><td>10080 min Winter</td><td>1.137</td><td>0.0</td><td>9.6</td><td>5144</td></tr></table>						Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	2880 min Winter	3.336	0.0	8.1	1468	4320 min Winter	2.322	0.0	8.4	2180	5760 min Winter	1.805	0.0	8.7	3000	7200 min Winter	1.494	0.0	9.0	3672	8640 min Winter	1.285	0.0	9.3	4472	10080 min Winter	1.137	0.0	9.6	5144							
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)																																											
2880 min Winter	3.336	0.0	8.1	1468																																											
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5760 min Winter	1.805	0.0	8.7	3000																																											
7200 min Winter	1.494	0.0	9.0	3672																																											
8640 min Winter	1.285	0.0	9.3	4472																																											
10080 min Winter	1.137	0.0	9.6	5144																																											
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Eden Court	w10253	
Lon Parcwr Business Park	70 Churchway	
Denbighshire LL15 1NJ	1 in 100 year+40%CC	
Date 23/01/2019	Designed by SJP	
File 70 Churchway 1 in 100 y...	Checked by AW	
XP Solutions		Source Control 2018.1

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 529783 182863	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.006

Time (mins)	Area
From:	To: (ha)
0	1 0.006

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XP Solutions		Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	40.0	0.100	40.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0059-1000-0100-1000
Design Head (m)	0.100
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	9.895
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

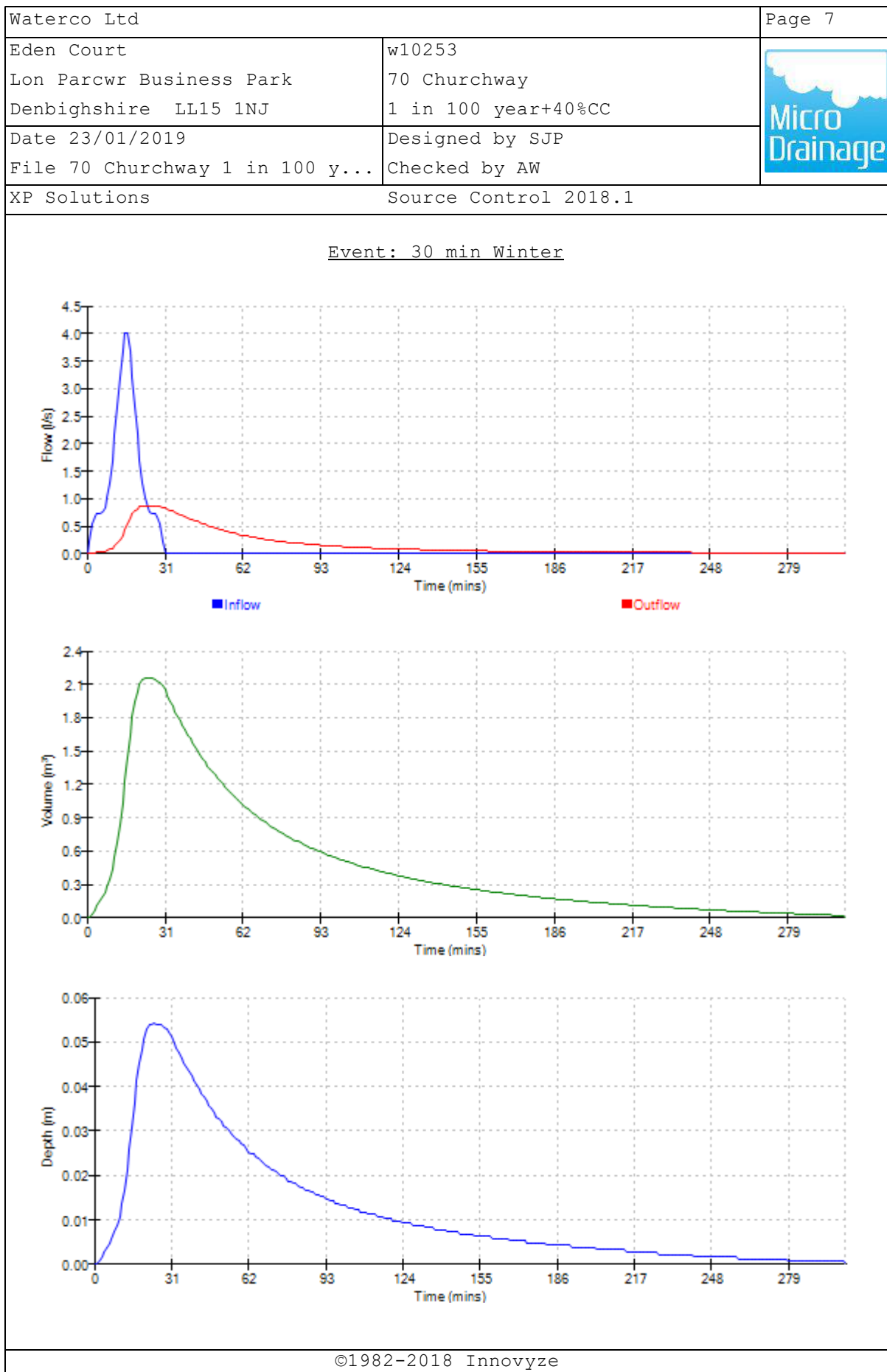
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.100	1.0
Flush-Flo™	0.074	1.0
Kick-Flo®	0.094	1.0
Mean Flow over Head Range	-	0.6

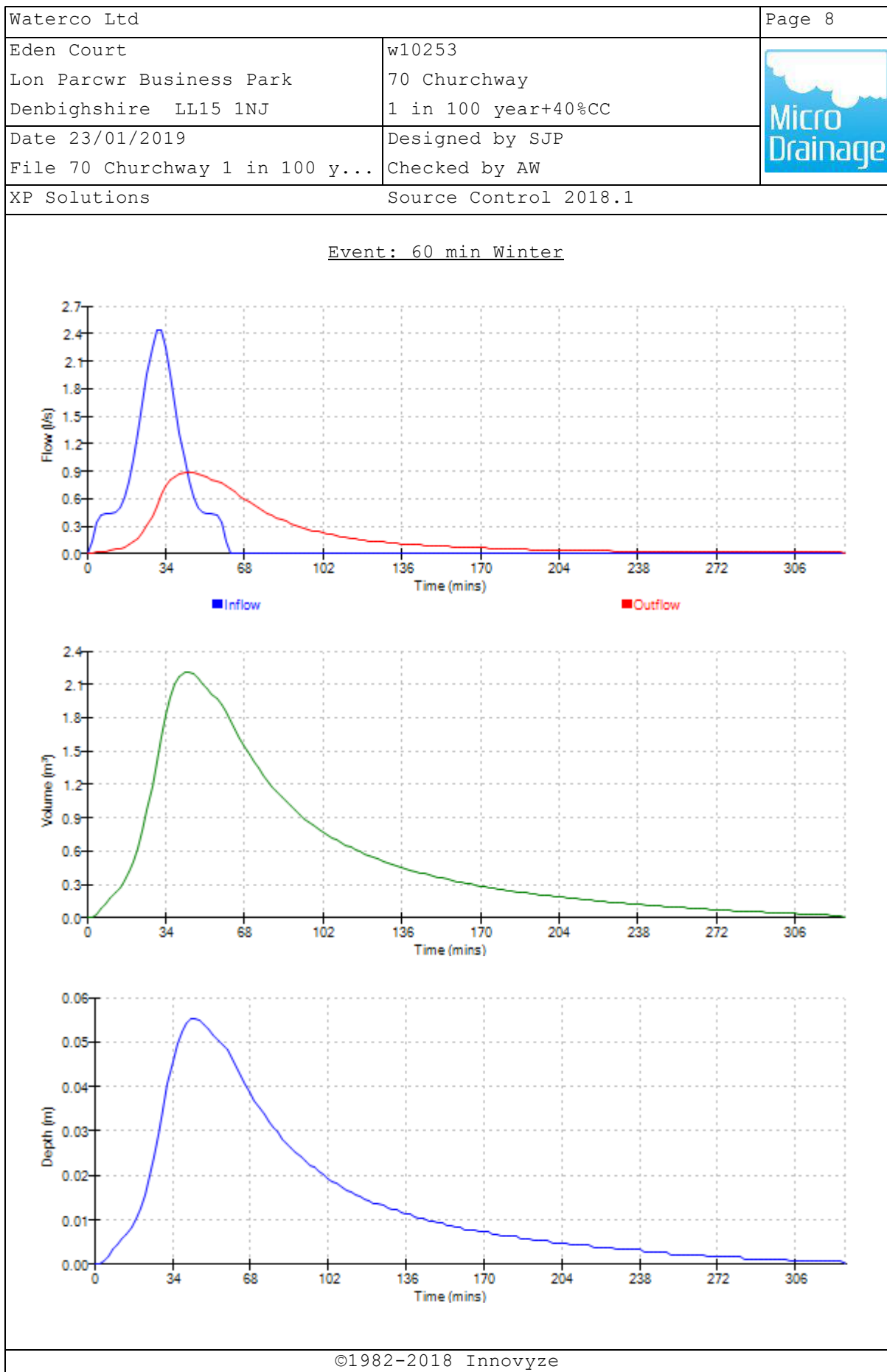
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	0.600	2.2	1.600	3.5	2.600	4.5
0.200	1.4	0.800	2.6	1.800	3.8	3.000	4.9
0.300	1.6	1.000	2.8	2.000	4.0	3.500	5.3
0.400	1.9	1.200	3.1	2.200	4.2	4.000	5.6
0.500	2.1	1.400	3.3	2.400	4.4	4.500	6.0

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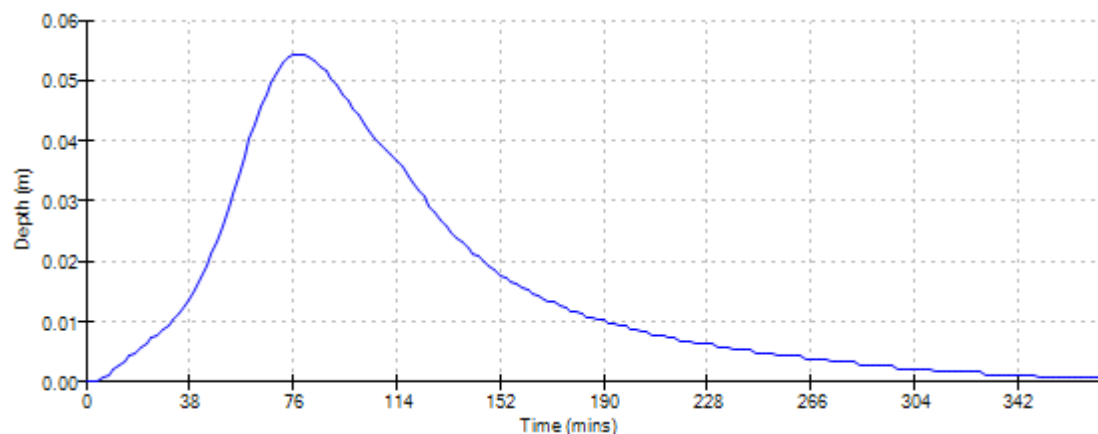
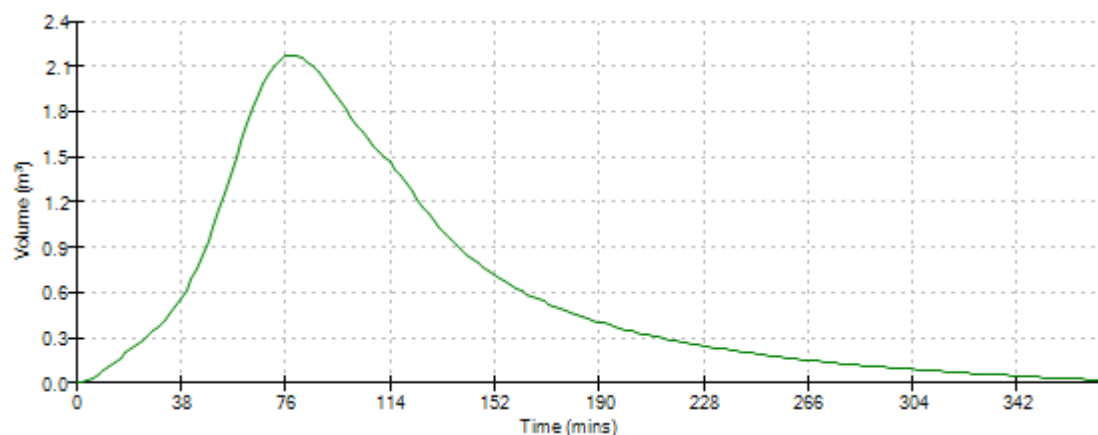
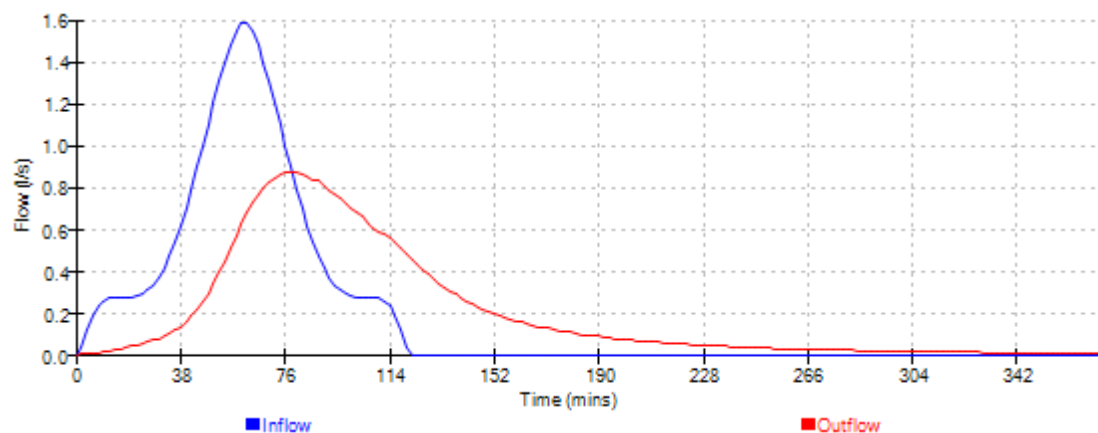
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File 70 Churchway 1 in 100 y...	Checked by AW						
XP Solutions		Source Control 2018.1					
<u>Hydro-Brake® Optimum Outflow Control</u>							
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
5.000	6.3	6.500	7.2	8.000	8.0	9.500	8.7
5.500	6.6	7.000	7.5	8.500	8.2		
6.000	6.9	7.500	7.7	9.000	8.5		
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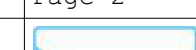


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Event: 120 min Winter



Waterco Ltd				Page 1	
Eden Court		w10253			
Lon Parcwr Business Park		60 Churchway			
Denbighshire LL15 1NJ		1 in 100 year plus 40% CC			
Date 22/01/2019		Designed by SJP			
File 60 Churchway-1 in 100 y...		Checked by AW			
XP Solutions		Source Control 2018.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.954	0.054	0.9	3.0	Flood Risk
30 min Summer	9.962	0.062	1.0	3.4	Flood Risk
60 min Summer	9.966	0.066	1.0	3.7	Flood Risk
120 min Summer	9.972	0.072	1.0	3.9	Flood Risk
180 min Summer	9.970	0.070	1.0	3.9	Flood Risk
240 min Summer	9.967	0.067	1.0	3.7	Flood Risk
360 min Summer	9.959	0.059	0.9	3.3	Flood Risk
480 min Summer	9.953	0.053	0.8	2.9	Flood Risk
600 min Summer	9.948	0.048	0.8	2.6	Flood Risk
720 min Summer	9.944	0.044	0.7	2.4	Flood Risk
960 min Summer	9.938	0.038	0.6	2.1	Flood Risk
1440 min Summer	9.931	0.031	0.4	1.7	Flood Risk
2160 min Summer	9.925	0.025	0.3	1.4	Flood Risk
2880 min Summer	9.921	0.021	0.2	1.2	Flood Risk
4320 min Summer	9.917	0.017	0.2	0.9	Flood Risk
5760 min Summer	9.914	0.014	0.1	0.8	Flood Risk
7200 min Summer	9.912	0.012	0.1	0.7	Flood Risk
8640 min Summer	9.911	0.011	0.1	0.6	Flood Risk
10080 min Summer	9.910	0.010	0.1	0.6	Flood Risk
15 min Winter	9.960	0.060	1.0	3.3	Flood Risk
30 min Winter	9.971	0.071	1.0	3.9	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	179.200	0.0	3.3	15	
30 min Summer	115.272	0.0	4.3	26	
60 min Summer	70.337	0.0	5.2	42	
120 min Summer	45.133	0.0	6.7	78	
180 min Summer	34.200	0.0	7.7	112	
240 min Summer	27.801	0.0	8.3	144	
360 min Summer	20.401	0.0	9.2	206	
480 min Summer	16.173	0.0	9.7	266	
600 min Summer	13.426	0.0	10.0	326	
720 min Summer	11.494	0.0	10.3	390	
960 min Summer	8.943	0.0	10.7	510	
1440 min Summer	6.240	0.0	11.2	750	
2160 min Summer	4.326	0.0	11.7	1120	
2880 min Summer	3.336	0.0	12.0	1476	
4320 min Summer	2.322	0.0	12.5	2204	
5760 min Summer	1.805	0.0	13.0	2936	
7200 min Summer	1.494	0.0	13.4	3672	
8640 min Summer	1.285	0.0	13.8	4384	
10080 min Summer	1.137	0.0	14.3	5112	
15 min Winter	179.200	0.0	3.7	15	
30 min Winter	115.272	0.0	4.8	29	
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Denbighshire LL15 1NJ	1 in 100 year plus 40% CC	
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File 60 Churchway-1 in 100 y...	Checked by AW	
XP Solutions	Source Control 2018.1	

Source Control 2018.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	9.974	0.074	1.0	4.1	Flood Risk
120 min Winter	9.978	0.078	1.0	4.3	Flood Risk
180 min Winter	9.973	0.073	1.0	4.0	Flood Risk
240 min Winter	9.967	0.067	1.0	3.7	Flood Risk
360 min Winter	9.957	0.057	0.9	3.1	Flood Risk
480 min Winter	9.949	0.049	0.8	2.7	Flood Risk
600 min Winter	9.943	0.043	0.7	2.4	Flood Risk
720 min Winter	9.939	0.039	0.6	2.2	Flood Risk
960 min Winter	9.933	0.033	0.5	1.8	Flood Risk
1440 min Winter	9.926	0.026	0.4	1.5	Flood Risk
2160 min Winter	9.921	0.021	0.2	1.1	Flood Risk
2880 min Winter	9.917	0.017	0.2	1.0	Flood Risk
4320 min Winter	9.914	0.014	0.1	0.7	Flood Risk
5760 min Winter	9.911	0.011	0.1	0.6	Flood Risk
7200 min Winter	9.910	0.010	0.1	0.5	Flood Risk
8640 min Winter	9.909	0.009	0.1	0.5	Flood Risk
10080 min Winter	9.908	0.008	0.1	0.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	70.337	0.0	5.9	46
120 min Winter	45.133	0.0	7.6	84
180 min Winter	34.200	0.0	8.6	120
240 min Winter	27.801	0.0	9.3	152
360 min Winter	20.401	0.0	10.3	214
480 min Winter	16.173	0.0	10.8	276
600 min Winter	13.426	0.0	11.3	336
720 min Winter	11.494	0.0	11.6	396
960 min Winter	8.943	0.0	12.0	520
1440 min Winter	6.240	0.0	12.6	764
2160 min Winter	4.326	0.0	13.1	1124
2880 min Winter	3.336	0.0	13.4	1500
4320 min Winter	2.322	0.0	14.0	2212
5760 min Winter	1.805	0.0	14.5	2960
7200 min Winter	1.494	0.0	15.0	3568
8640 min Winter	1.285	0.0	15.5	4392
10080 min Winter	1.137	0.0	16.0	4896

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Lon Parcwr Business Park	60 Churchway	
Denbighshire LL15 1NJ	1 in 100 year plus 40% CC	
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File 60 Churchway-1 in 100 y...	Checked by AW	
XP Solutions	Source Control 2018.1	

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	55.0	0.100	55.0

Hydro-Brake® Optimum Outflow Control

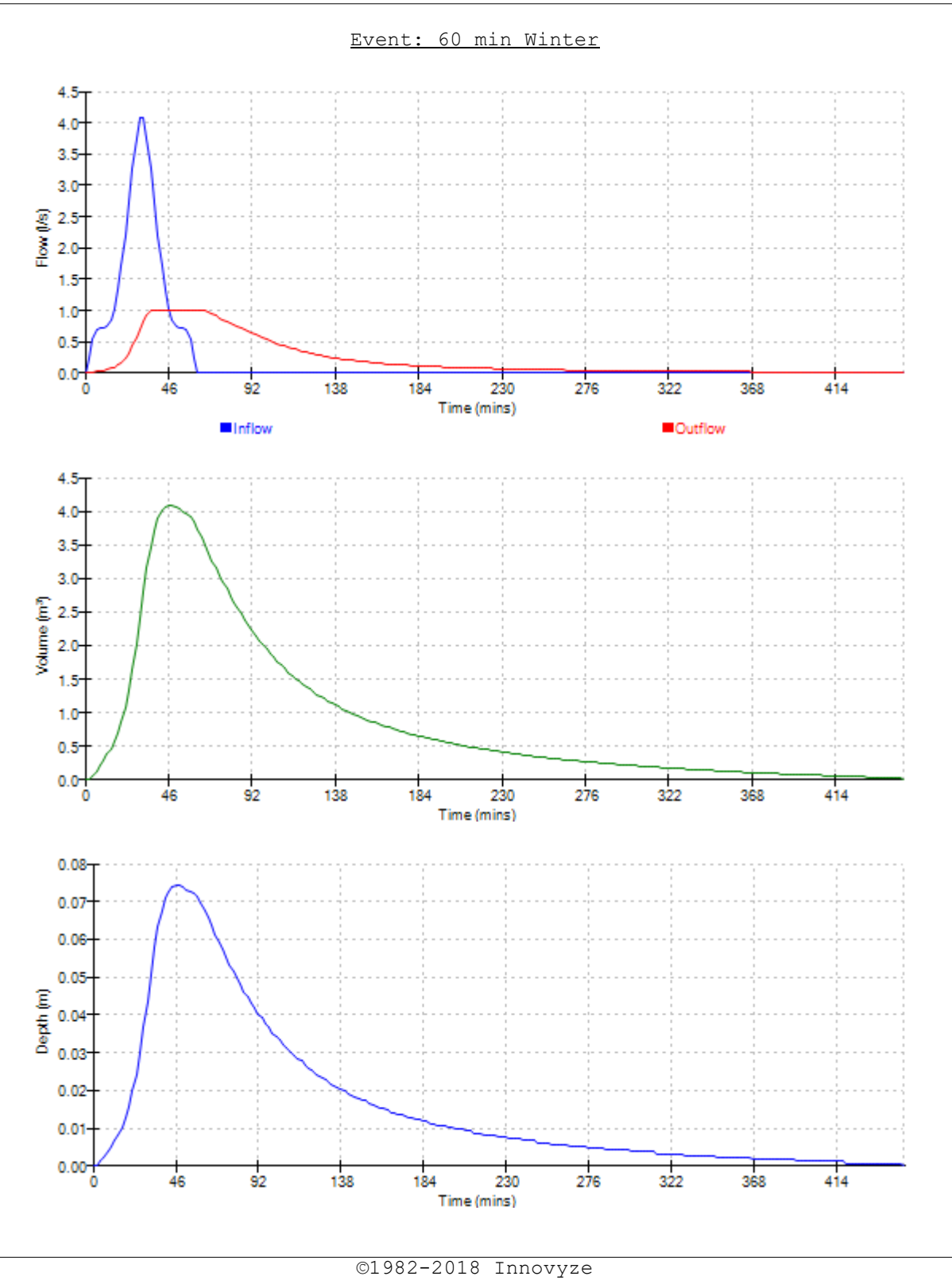
Unit Reference	MD-SHE-0059-1000-0100-1000
Design Head (m)	0.100
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	9.895
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.100	1.0
Flush-Flo™	0.074	1.0
Kick-Flo®	0.094	1.0
Mean Flow over Head Range	-	0.6

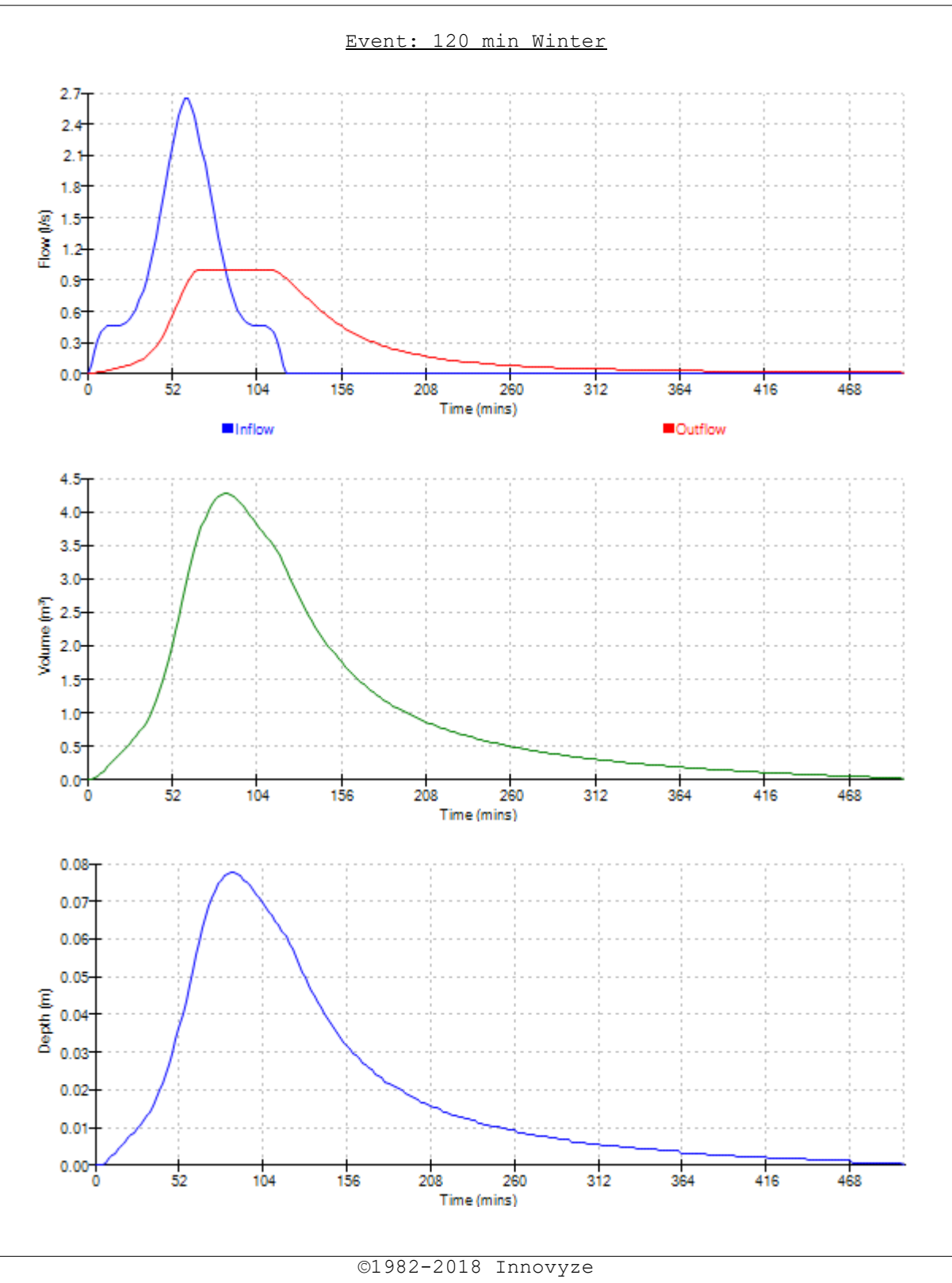
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	3.1	3.000	4.9	7.000	7.5
0.200	1.4	1.400	3.3	3.500	5.3	7.500	7.7
0.300	1.6	1.600	3.5	4.000	5.6	8.000	8.0
0.400	1.9	1.800	3.8	4.500	6.0	8.500	8.2
0.500	2.1	2.000	4.0	5.000	6.3	9.000	8.5
0.600	2.2	2.200	4.2	5.500	6.6	9.500	8.7
0.800	2.6	2.400	4.4	6.000	6.9		
1.000	2.8	2.600	4.5	6.500	7.2		

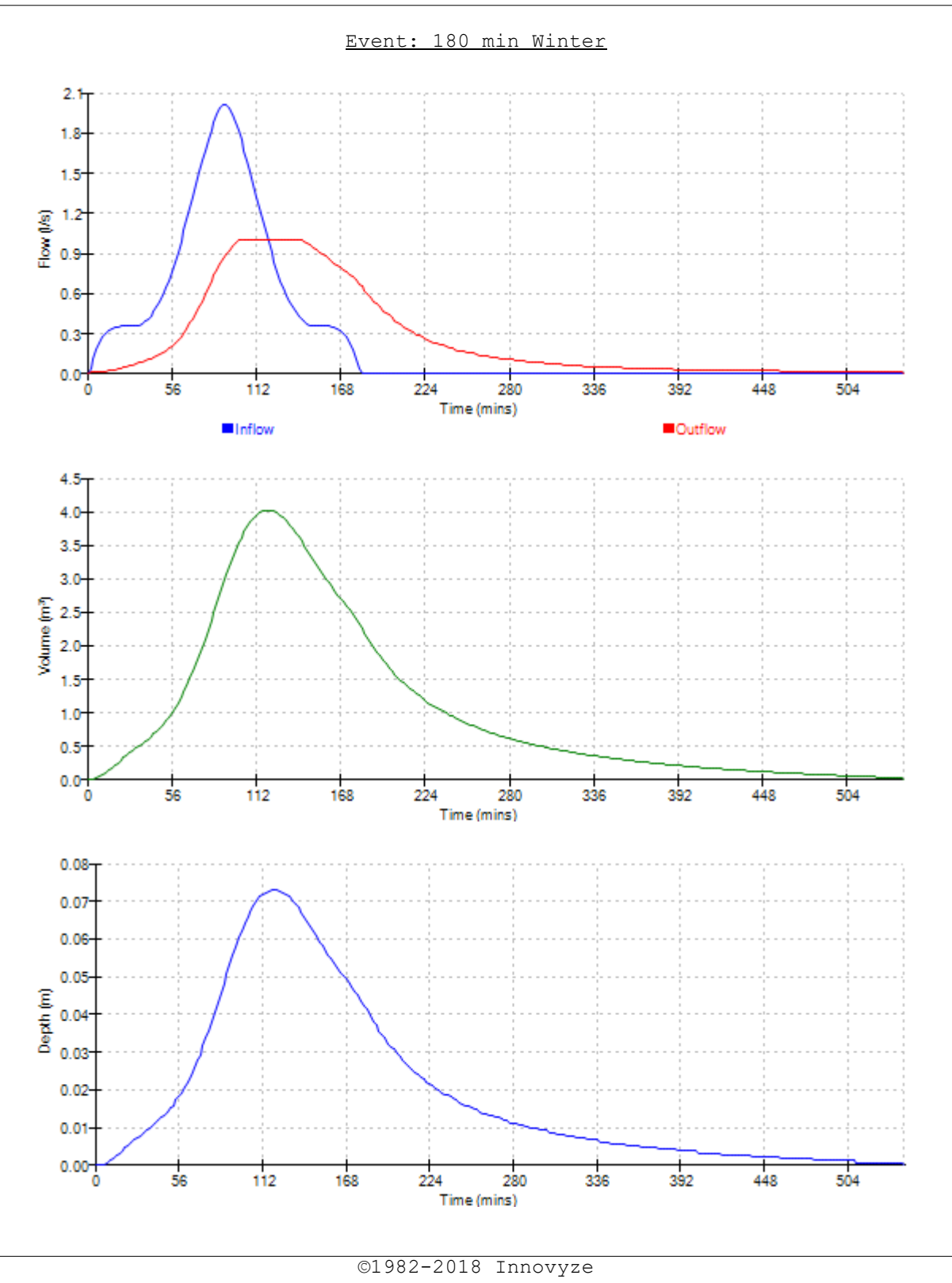
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	60 Churchway 1 in 100 year plus 40% CC	
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XP Solutions		Source Control 2018.1



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Lon Parcwr Business Park		53-55 Chalton Street			
Denbighshire LL15 1NJ		1 in 100 year+40%CC			
Date 23/01/2019		Designed by SJP			
File 53-55 Chalton Street- 1...		Checked by AW			
XP Solutions		Source Control 2018.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.945	0.045	0.7	2.0	Flood Risk
30 min Summer	9.951	0.051	0.8	2.3	Flood Risk
60 min Summer	9.954	0.054	0.9	2.4	Flood Risk
120 min Summer	9.957	0.057	0.9	2.5	Flood Risk
180 min Summer	9.955	0.055	0.9	2.5	Flood Risk
240 min Summer	9.952	0.052	0.8	2.3	Flood Risk
360 min Summer	9.946	0.046	0.7	2.1	Flood Risk
480 min Summer	9.941	0.041	0.7	1.9	Flood Risk
600 min Summer	9.937	0.037	0.6	1.7	Flood Risk
720 min Summer	9.934	0.034	0.5	1.6	Flood Risk
960 min Summer	9.930	0.030	0.4	1.4	Flood Risk
1440 min Summer	9.924	0.024	0.3	1.1	Flood Risk
2160 min Summer	9.919	0.019	0.2	0.9	Flood Risk
2880 min Summer	9.916	0.016	0.2	0.7	Flood Risk
4320 min Summer	9.913	0.013	0.1	0.6	Flood Risk
5760 min Summer	9.911	0.011	0.1	0.5	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	179.200	0.0	2.3	15	
30 min Summer	115.272	0.0	3.0	24	
60 min Summer	70.337	0.0	3.7	40	
120 min Summer	45.133	0.0	4.7	74	
180 min Summer	34.200	0.0	5.4	108	
240 min Summer	27.801	0.0	5.8	140	
360 min Summer	20.401	0.0	6.4	202	
480 min Summer	16.173	0.0	6.8	262	
600 min Summer	13.426	0.0	7.0	324	
720 min Summer	11.494	0.0	7.2	384	
960 min Summer	8.943	0.0	7.5	508	
1440 min Summer	6.240	0.0	7.8	750	
2160 min Summer	4.326	0.0	8.2	1124	
2880 min Summer	3.336	0.0	8.4	1472	
4320 min Summer	2.322	0.0	8.8	2208	
5760 min Summer	1.805	0.0	9.1	2936	
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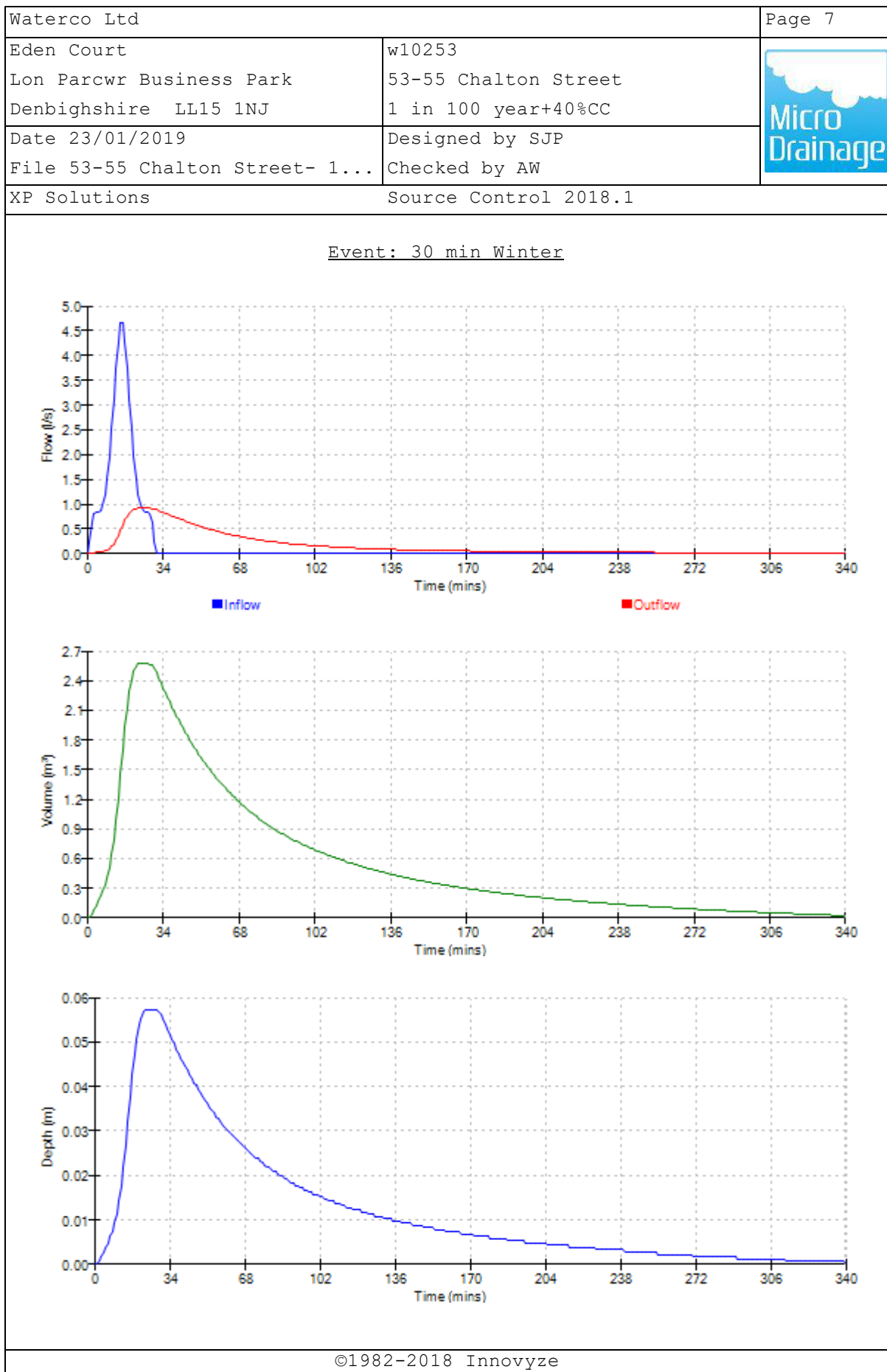
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Denbighshire LL15 1NJ		1 in 100 year+40%CC			
Date 23/01/2019		Designed by SJP			
File 53-55 Chalton Street- 1...		Checked by AW			
XP Solutions		Source Control 2018.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
7200 min Summer	9.909	0.009	0.1	0.4	Flood Risk
8640 min Summer	9.908	0.008	0.1	0.4	Flood Risk
10080 min Summer	9.908	0.008	0.1	0.3	Flood Risk
15 min Winter	9.950	0.050	0.8	2.3	Flood Risk
30 min Winter	9.957	0.057	0.9	2.6	Flood Risk
60 min Winter	9.959	0.059	0.9	2.7	Flood Risk
120 min Winter	9.959	0.059	0.9	2.7	Flood Risk
180 min Winter	9.955	0.055	0.9	2.5	Flood Risk
240 min Winter	9.951	0.051	0.8	2.3	Flood Risk
360 min Winter	9.943	0.043	0.7	1.9	Flood Risk
480 min Winter	9.938	0.038	0.6	1.7	Flood Risk
600 min Winter	9.934	0.034	0.5	1.5	Flood Risk
720 min Winter	9.931	0.031	0.4	1.4	Flood Risk
960 min Winter	9.926	0.026	0.4	1.2	Flood Risk
1440 min Winter	9.921	0.021	0.2	0.9	Flood Risk
2160 min Winter	9.916	0.016	0.2	0.7	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
7200 min Summer	1.494	0.0	9.4	3672	
8640 min Summer	1.285	0.0	9.7	4408	
10080 min Summer	1.137	0.0	10.0	5128	
15 min Winter	179.200	0.0	2.6	15	
30 min Winter	115.272	0.0	3.4	25	
60 min Winter	70.337	0.0	4.1	44	
120 min Winter	45.133	0.0	5.3	80	
180 min Winter	34.200	0.0	6.0	114	
240 min Winter	27.801	0.0	6.5	146	
360 min Winter	20.401	0.0	7.2	208	
480 min Winter	16.173	0.0	7.6	270	
600 min Winter	13.426	0.0	7.9	330	
720 min Winter	11.494	0.0	8.1	390	
960 min Winter	8.943	0.0	8.4	510	
1440 min Winter	6.240	0.0	8.8	752	
2160 min Winter	4.326	0.0	9.1	1124	
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Date 23/01/2019		Designed by SJP																																																																																
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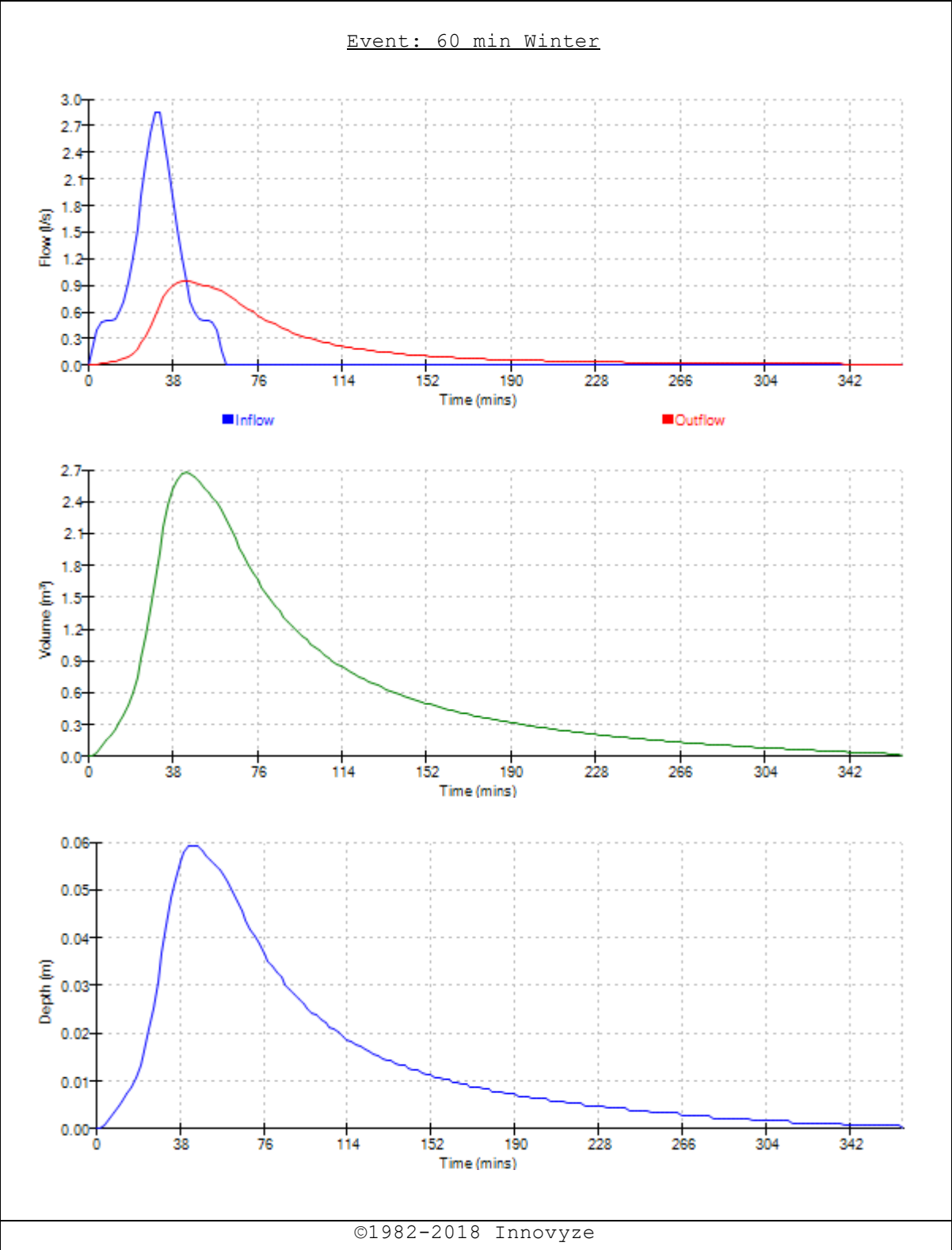
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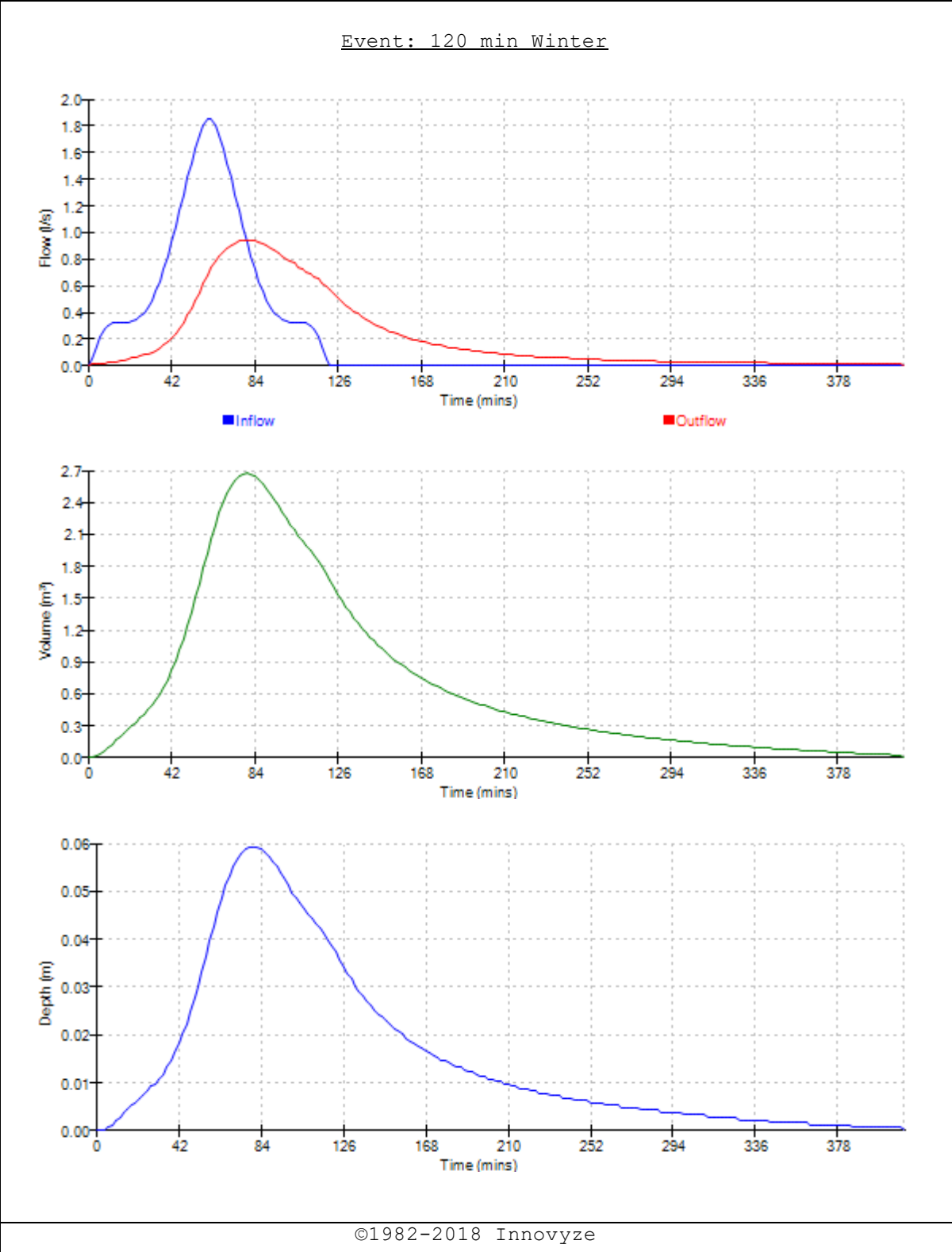
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	9.954	0.054	0.9	3.0	Flood Risk
30 min Summer	9.962	0.062	1.0	3.4	Flood Risk
60 min Summer	9.966	0.066	1.0	3.7	Flood Risk
120 min Summer	9.972	0.072	1.0	3.9	Flood Risk
180 min Summer	9.970	0.070	1.0	3.9	Flood Risk
240 min Summer	9.967	0.067	1.0	3.7	Flood Risk
360 min Summer	9.959	0.059	0.9	3.3	Flood Risk
480 min Summer	9.953	0.053	0.8	2.9	Flood Risk
600 min Summer	9.948	0.048	0.8	2.6	Flood Risk
720 min Summer	9.944	0.044	0.7	2.4	Flood Risk
960 min Summer	9.938	0.038	0.6	2.1	Flood Risk
1440 min Summer	9.931	0.031	0.4	1.7	Flood Risk
2160 min Summer	9.925	0.025	0.3	1.4	Flood Risk
2880 min Summer	9.921	0.021	0.2	1.2	Flood Risk
4320 min Summer	9.917	0.017	0.2	0.9	Flood Risk
5760 min Summer	9.914	0.014	0.1	0.8	Flood Risk
7200 min Summer	9.912	0.012	0.1	0.7	Flood Risk
8640 min Summer	9.911	0.011	0.1	0.6	Flood Risk
10080 min Summer	9.910	0.010	0.1	0.6	Flood Risk
15 min Winter	9.960	0.060	1.0	3.3	Flood Risk
30 min Winter	9.971	0.071	1.0	3.9	Flood Risk
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	179.200	0.0	3.3	15	
30 min Summer	115.272	0.0	4.3	26	
60 min Summer	70.337	0.0	5.2	42	
120 min Summer	45.133	0.0	6.7	78	
180 min Summer	34.200	0.0	7.7	112	
240 min Summer	27.801	0.0	8.3	144	
360 min Summer	20.401	0.0	9.2	206	
480 min Summer	16.173	0.0	9.7	266	
600 min Summer	13.426	0.0	10.0	326	
720 min Summer	11.494	0.0	10.3	390	
960 min Summer	8.943	0.0	10.7	510	
1440 min Summer	6.240	0.0	11.2	750	
2160 min Summer	4.326	0.0	11.7	1120	
2880 min Summer	3.336	0.0	12.0	1476	
4320 min Summer	2.322	0.0	12.5	2204	
5760 min Summer	1.805	0.0	13.0	2936	
7200 min Summer	1.494	0.0	13.4	3672	
8640 min Summer	1.285	0.0	13.8	4384	
10080 min Summer	1.137	0.0	14.3	5112	
15 min Winter	179.200	0.0	3.7	15	
30 min Winter	115.272	0.0	4.8	29	
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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
60 min Winter	9.974	0.074	1.0	4.1	Flood Risk
120 min Winter	9.978	0.078	1.0	4.3	Flood Risk
180 min Winter	9.973	0.073	1.0	4.0	Flood Risk
240 min Winter	9.967	0.067	1.0	3.7	Flood Risk
360 min Winter	9.957	0.057	0.9	3.1	Flood Risk
480 min Winter	9.949	0.049	0.8	2.7	Flood Risk
600 min Winter	9.943	0.043	0.7	2.4	Flood Risk
720 min Winter	9.939	0.039	0.6	2.2	Flood Risk
960 min Winter	9.933	0.033	0.5	1.8	Flood Risk
1440 min Winter	9.926	0.026	0.4	1.5	Flood Risk
2160 min Winter	9.921	0.021	0.2	1.1	Flood Risk
2880 min Winter	9.917	0.017	0.2	1.0	Flood Risk
4320 min Winter	9.914	0.014	0.1	0.7	Flood Risk
5760 min Winter	9.911	0.011	0.1	0.6	Flood Risk
7200 min Winter	9.910	0.010	0.1	0.5	Flood Risk
8640 min Winter	9.909	0.009	0.1	0.5	Flood Risk
10080 min Winter	9.908	0.008	0.1	0.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
60 min Winter	70.337	0.0	5.9	46
120 min Winter	45.133	0.0	7.6	84
180 min Winter	34.200	0.0	8.6	120
240 min Winter	27.801	0.0	9.3	152
360 min Winter	20.401	0.0	10.3	214
480 min Winter	16.173	0.0	10.8	276
600 min Winter	13.426	0.0	11.3	336
720 min Winter	11.494	0.0	11.6	396
960 min Winter	8.943	0.0	12.0	520
1440 min Winter	6.240	0.0	12.6	764
2160 min Winter	4.326	0.0	13.1	1124
2880 min Winter	3.336	0.0	13.4	1500
4320 min Winter	2.322	0.0	14.0	2212
5760 min Winter	1.805	0.0	14.5	2960
7200 min Winter	1.494	0.0	15.0	3568
8640 min Winter	1.285	0.0	15.5	4392
10080 min Winter	1.137	0.0	16.0	4896

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Eden Court	w10253	
Lon Parcwr Business Park	Central Area	
Denbighshire LL15 1NJ	1 in 100 year+40%CC	
Date 25/01/2019	Designed by SJP	
File Central Area -1 in 100 ...	Checked by AW	
XP Solutions	Source Control 2018.1	

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 529783 182863	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.010

Time (mins)	Area
From:	To: (ha)

0	1 0.010
---	---------

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Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	55.0	0.100	55.0

Hydro-Brake® Optimum Outflow Control

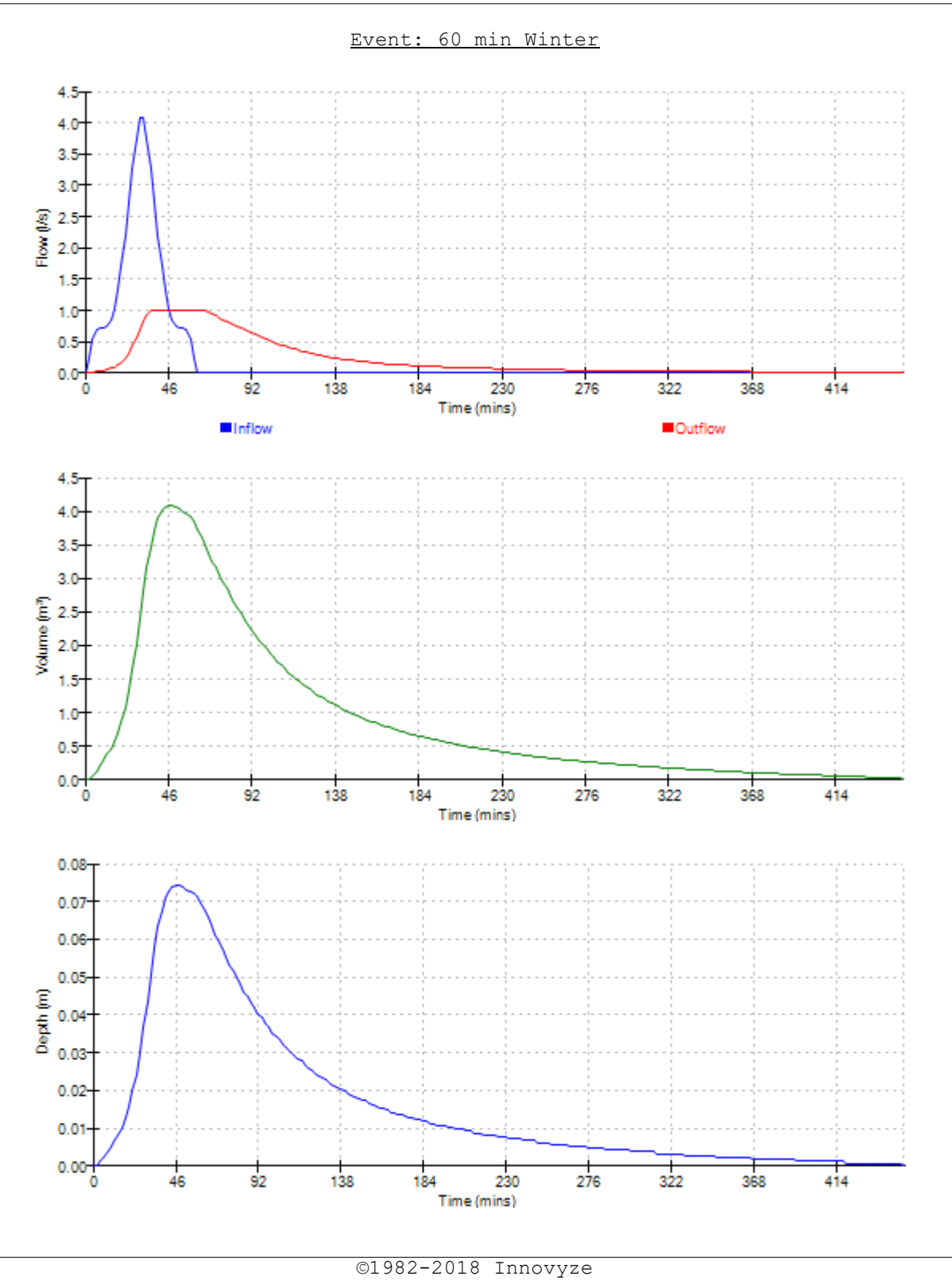
Unit Reference	MD-SHE-0059-1000-0100-1000
Design Head (m)	0.100
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	59
Invert Level (m)	9.895
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.100	1.0
Flush-Flo™	0.074	1.0
Kick-Flo®	0.094	1.0
Mean Flow over Head Range	-	0.6

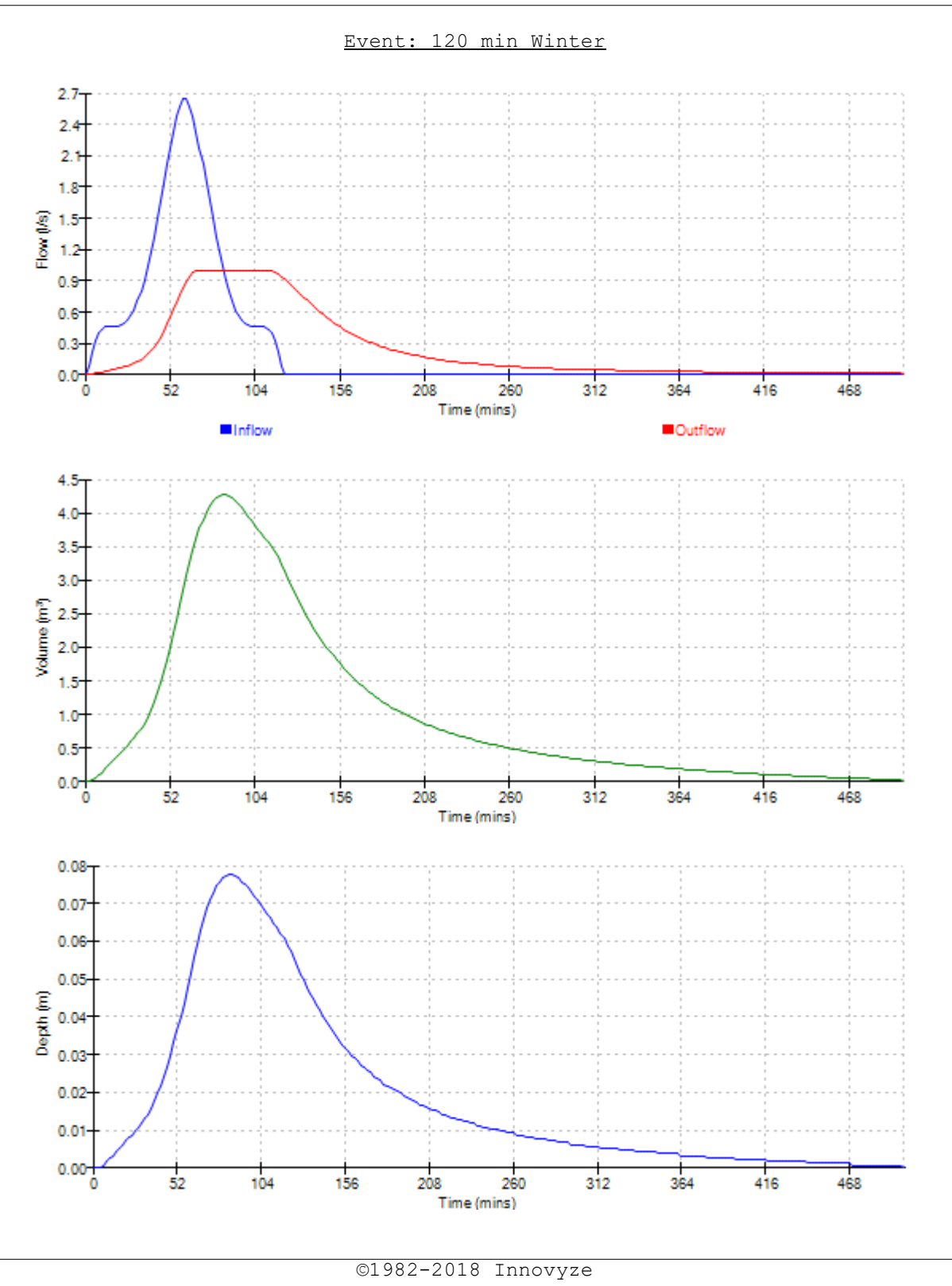
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	3.1	3.000	4.9	7.000	7.5
0.200	1.4	1.400	3.3	3.500	5.3	7.500	7.7
0.300	1.6	1.600	3.5	4.000	5.6	8.000	8.0
0.400	1.9	1.800	3.8	4.500	6.0	8.500	8.2
0.500	2.1	2.000	4.0	5.000	6.3	9.000	8.5
0.600	2.2	2.200	4.2	5.500	6.6	9.500	8.7
0.800	2.6	2.400	4.4	6.000	6.9		
1.000	2.8	2.600	4.5	6.500	7.2		

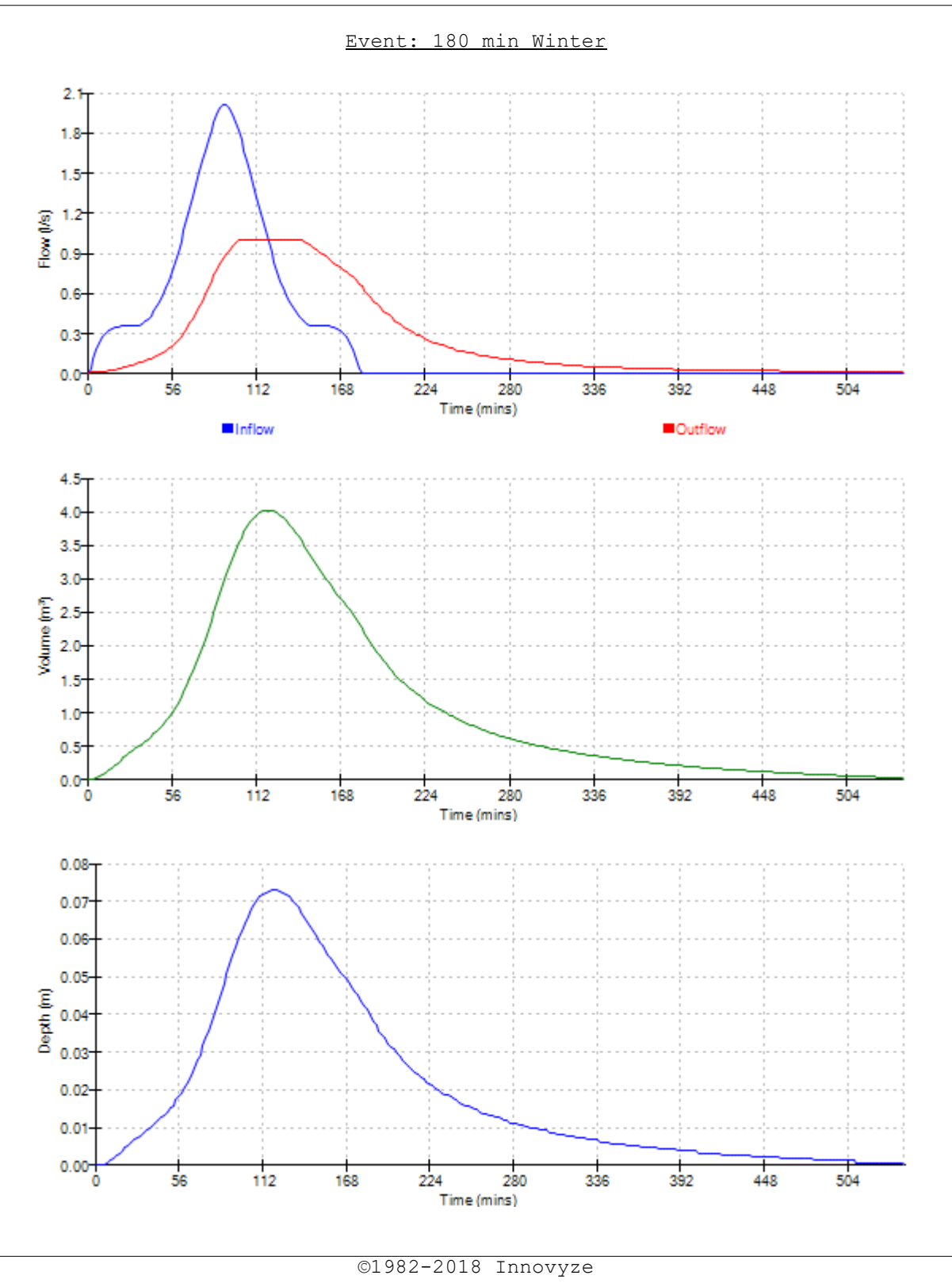
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	Central Area 1 in 100 year+40%CC	
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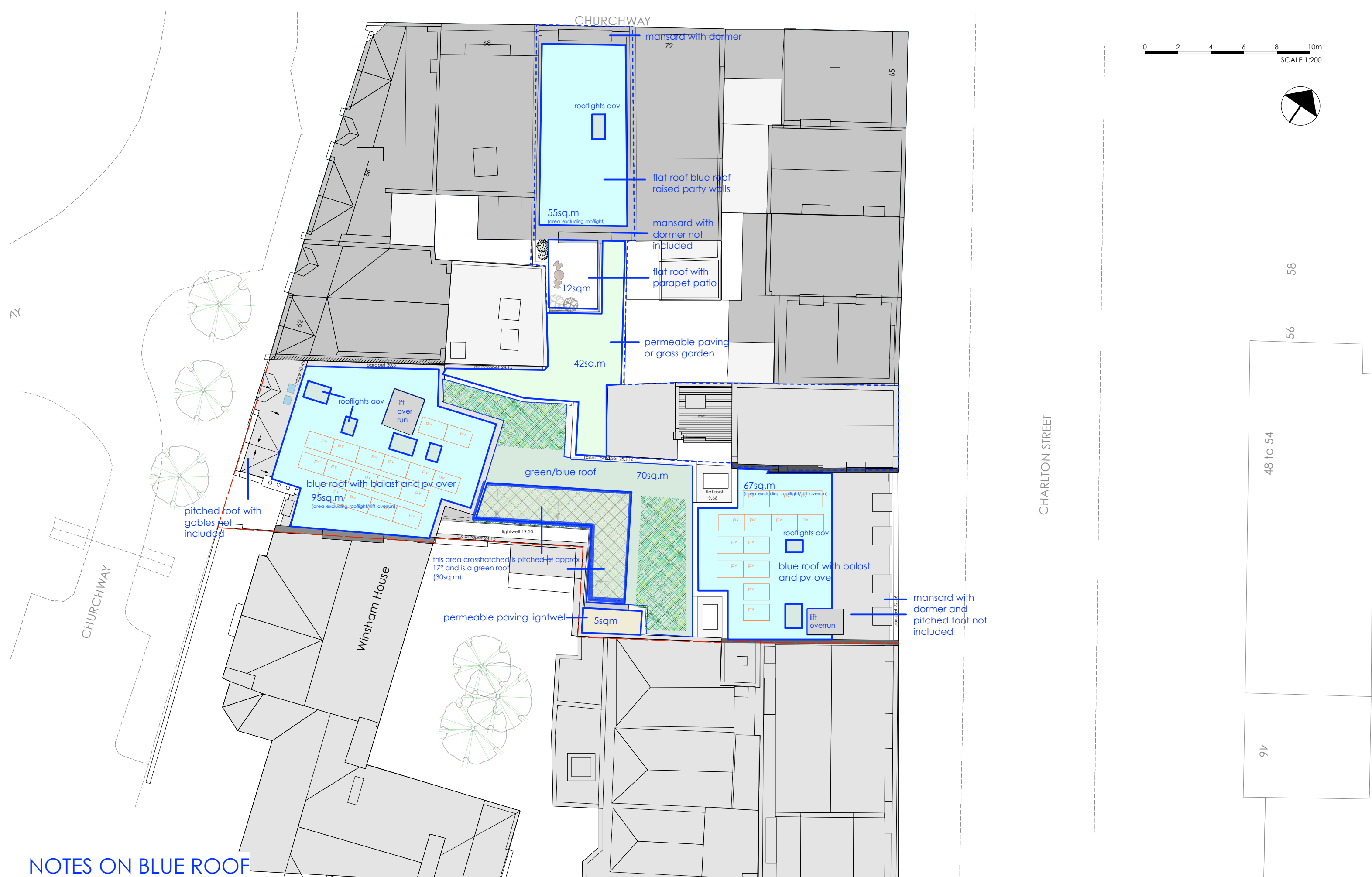
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Appendix K – Blue / Green Roof Plan



NOTES ON BLUE ROOF

Notes

Client

RangePAY Ltd

Project

53-55 Chalton Street NW1 1HY &
60 Churchway NW1 1LT

Status

Revised Planning Application - September 2016

Drawing

Proposed Roof Plan

Project Number

1103-A

Drawing Ref

206

Revision

E

Scale

1:200

Page size

A3

Appendix L – Maintenance Schedule

Operation and Maintenance Requirements for Green Roofs

Maintenance Schedule	Required Action	Typical Frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (i.e. year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as requirement (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material and sources of erosion damage should be identified and controlled	As required
	If drainage inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Ref. Table 12.5, CIRIA C753 'The SuDS Manual

The maintenance requirements detailed above are to be undertaken by the site owner

Name:

Position:

Date:

**Signed on behalf
Of the site owner**