DRAINAGE STRATEGY REPORT FOR 10 EVELINA ROAD, NUNHEAD, LONDON, SE15 2DX

DOCUMENT NUMBER – C2465-R1-REV-A

Prepared by

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ENGINEERING CONSULTANTS

Contents

APPENDICES

1. INTRODUCTION

1.1 Appointment

Nimbus Engineering Consultants Ltd have been appointed by Toucan Lofts Limited to provide a proposed Drainage Strategy solution on the management of Foul and Surface Water run off at 10 Evelina Road, Nunhead, London, SE15 2DX.

1.2 Objectives

This report will address the concerns raised by the Borough and provide details on a suitable drainage strategy.

1.3 Limitations

The general limitations of this report are:

- A number of data and information sources have been used to prepare this report. Whilst Nimbus Engineering believes them to be trustworthy, Nimbus Engineering is unable to guarantee the accuracy of data and information that has been provided by others;

- This report has been prepared using best data and information that was available at the time of writing. There is the potential for further information or data to become available, leading to changes in the conclusions drawn by this report, for which Nimbus Engineering cannot be held responsible.

2. SUSTAINABLE URBAN DRAINAGE SYSTEMS

Surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

Reducing the rate of surface water discharge from urban sites is one of the most effective ways of reducing and managing flood risk.

Traditional piped surface water systems work by removing surface water from our developments as quickly as possible, however this can cause various adverse impacts:

- Increased downstream flooding, and sudden rises in flow rates and water levels in local water courses.
- Reduction in groundwater levels and dry weather flows in watercourses.
- Reduce amenity and adversely affect biodiversity due to the surface water run-off containing contaminants such as oil, organic matter and toxic materials.

SuDS are defined as a sequence of management principles and control structures designed to drain surface water in a more sustainable fashion than conventional piped

drainage techniques. SuDS should utilise the natural landscape of an area which as well as slowing down the rate of runoff provides a number of environmental, ecological and social benefits.

These include:

Protection and enhancement of water quality – As well as providing on-site attenuation, SuDS treat the water, resulting in an improved quality of water leaving the site. This is achieved when the water passes through fine soils and the roots of specially selected plants, pollutants washed off the hard landscaping by rainfall will be safely removed before the water reaches the natural receiving water course.

- A sympathetic approach to the environmental setting by providing opportunities to create habitats for flora and fauna in urban watercourses and open spaces.
- Meeting the amenity and social needs of the local community and residents in the creation of attractive green spaces.

The various types of SuDS include:

Permeable paving	
Soakaways;	
Swales and basins;	
Bioretention/ rain gardens;	
Green roofs and rainwater re-use;	

Infiltration trenches and filter drains	
Ponds and wetlands.	

Preferably a combination of these techniques should be used as part of the surface water management train, and it is important for all stakeholders, such as developers, architects, landscape architects and engineers to work together at the planning stage in order to determine a feasible solution.

3. PROPOSED SUDS SOLUTION

The total site area is 212m^2, with the impermeable areas at the existing site being approximately 212m^2. Following the development at this site, the impermeable areas will have decreased to 203m^2.

Pre and post development peak flow rate of run off and peak flow storage calculations were carried out using these pre and post development impermeable area figures in order to determine a suitable surface water management solution. All surface water calculations are included in Appendix A.

In order to ensure that the SuDS Management train has been followed, the proposed solution involves a small area of green roof, where the roof is not pitched. One wall mounted rainwater harvesting tank will be provided at each rear amenity area.

Due to the underlying geology consisting of London Clay and the size of the dwelling, and small surrounding areas within the property extents it was deemed a BRE365 Percolation test would be counterproductive as infiltration would be unsuitable for the site. Therefore, surface water had to be attenuated on site with restricted flow leaving the site at a calculated rate of 1 l/s.

Hydrograph storage calculations were carried out for a 1 in 100 year storm event with a 40% allowance for climate change, with a flow restriction of 1 l/s and these show that

8.4m^3 of storage will be required, these calculations can be found in Appendix A, and this storage will be provided in the attenuation tank, the manholes, catchpit chamber, flow control and pipes. This proposed surface water and SuDS solution can be found on drawing number C2465-01, which can be found in Appendix B.

We believe the Sustainable Urban Drainage System hierarchy has been considered fully and is proportionate to the nature and scale of the development.

4. PROPOSED FOUL DRAINAGE STRATEGY

The proposed foul drainage strategy can be found on drawing number C2465-01 in Appendix B. The peak flow rate leaving the proposed site has been calculated as 0.19 l/s, using Sewers for adoption formula.

5. TIMESCALE AND MAINTENANCE OF WORKS

All drainage works shall be completed prior to first occupation and there shall be no adoption of any of the drainage works within the site and the homeowner will be responsible to oversee the long-term maintenance their drains.

- Regular inspection and cleaning of catchment, gutters reduce the likelihood of contamination, typically every 3 to 6 months.

- The catch pit chamber to the attenuation tank and flow control chamber from the attenuation tank should be emptied every 3 months, and after every large storm event to ensure that there are no blockages.

The following table outlines the maintenance requirements for the proposed attenuation tank:

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance).	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment pre-treatment structures and/or internal forebays.	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required
	Inspect slit accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 1: Operation and maintenance requirements for proposed attenuation tank.

The following table outlines the maintenance requirements for the permeable paving:

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

	Inspect slit accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 2: Operation and maintenance requirements for permeable paving.

The following table outlines the maintenance requirements for the rainwater harvesting tanks:

Maintenance schedule	Required action	Typical Frequency
Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdraw devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters. Withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional maintenance	Cleaning and/ or replacement of any filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Table 3: Operation and maintenance requirement for RWH systems.

The following table outlines the maintenance requirements for the green roof:

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
	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 required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required

Regular Maintenance	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 e stabilised with extra soil substrate similar to the original material and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked, or moved, investigate and repair as appropriate	As required

Table 4: Operation and maintenance requirements for sedum/green roofs.

6. CONCLUSIONS

The purpose of this report and associated drawings, is to present a drainage strategy solution to satisfy the local planning authority that the proposed development will not increase surface water flows, and hence increase flood risk in the surrounding area.

All surface water will be conveyed into the attenuation tank with restricted flow leaving the site at 1 l/s.

This proposed development will reduce the surface water run off leaving the site, and therefore reduce flood risk at the site and elsewhere.

The foul flows leaving the development have also been considered with a solution evaluated.

The timetable of works is to complete all drainage prior to occupation of dwellings, and maintenance requirements are also included in this report, therefore it is considered that all requirements of the drainage strategy solution have been met, and therefore can be discharged.

APPENDIX A – SURFACE WATER RUN OFF CALCULATIONS

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Job No.	Sheet no.	Date
C2465	1	07/01/21

MasterDrain
HY 10.01

Project	By	Checked	Reviewed
10 Evelina Road, Nunhead, London, SE15 2DX	S.L		

Title: **Pre & post dev't SW Calcs prior to SuDS mitigation**

Data:-

Hydrology (FSR):-

Location = LONDON (SOUTH)		WRAP	= 4
Long reference = 540175		Grid reference	= TQ4075
M5-60 (mm)	= 20.1	SAAR (mm/yr)	= 600
r	= 0.44	Soil	=0.47
Hyd. area	= 6	Hyd. zone	= 8
Hydrograph	= Winter	Area = England & Wales	

Site values used in design:-

Total site area	= 0.0212 ha	Climate change factor	= 40%
Pre-dev area drained	= 0.0212 ha	Post-dev area drained	= 0.0203 ha
Imperm runoff factor	= 100%	Perm runoff factor	= 20%

Pre-development

Area to soakaways	= 0.0000 ha	Area to other SUDS	= 0.0000 ha
Perv. area to SUDS	= 0.0000 ha	Pre-dev flow to drain	= 0.00 l/s

Post-development

Area to soakaways	= 0.0000 ha	Area to other SUDS	= 0.0000 ha
Perv. area to SUDS	= 0.0000 ha	Post-dev flow to drain	= 0.00 l/s

Calculations:-

Revised Post-dev Imperm. area = 0.020 ha
Equiv. Post-dev Imperm. area = 0.020 ha
Equiv. Post-dev Perm. area = 0.000 ha
Total Pre-dev equiv. area ha = 0.021 ha
Total Post-dev equiv. area ha = 0.020 ha
100 yr 6 hour mean intensity = 10.08mm/hr

Results:-

Pre-dev peakflow runoff (l/s) (m^3/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	4.8	3.1	1.9	1.2	0.7	0.5	0.4	0.4	4.8	N/A	4.8	1
30	11.6	7.4	4.6	2.7	1.6	1.1	0.9	0.8	11.6	N/A	11.6	30
100	15.1	9.7	6.0	3.6	2.1	1.5	1.2	1.0	15.1	N/A	15.1	100

Post-dev peakflow runoff (l/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	4.6	3.0	1.9	1.1	0.7	0.5	0.4	0.3	4.6	40	6.4	1
30	11.2	7.2	4.4	2.6	1.5	1.1	0.9	0.7	11.2	40	15.7	30
100	14.6	9.4	5.8	3.4	2.0	1.4	1.1	0.9	14.6	40	20.4	100

100 year 6 hour (x Climate Change Factor) storm gives:-
Pre-dev runoff volume m^3 = 12.8m^3
Post-dev rainfall volume = 17.3m^3
Post-dev volume m^3 (excess above SUDS) = 17.3m^3
100 yr 6 hour mean intensity = 10.08mm/hr
Pre-dev volume to drain at 0 l/s = 0.0 m^3
Post-dev volume to drain at 0 l/s = 0.0 m^3
Post-dev storage volume = 17.3m^3
Post-dev 5mm imperm volume = 1.0 m^3
Post-dev 5mm perm volume = 0.0 m^3

$Q_{BAR(rural)}$ = 0.085 l/s or 4.031 l/s/ha or 0.000 cumecs - from IoH 124.

The rainfall rates are calculated using the location specific values above in accordance with the Wallingford procedure.

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Job No.	C2465
Sheet no.	2
Date	07/01/21

MasterDrain
HY 10.01

Project	10 Evelina Road, Nunhead, London, SE15 2DX	By	S.L
Title	Pre & post dev't SW Calcs prior to SuDS mitigation	Checked	
		Reviewed	

Data summary.

Use the data below for the SUR1 form

Site areas:-

Total site area	=	0.0212 ha ;211.6 m² [3A]
Pre-development impermeable area	=	0.0212 ha [3B]
Pre-development permeable area	=	0.0000 ha
Post-development impermeable area	=	0.0203 ha [3C]
Post-development permeable area	=	0.0009 ha

Peak runoff:-

Pre-development 1 year storm (15min)	=	4.8 l/s [6A]
Pre-development 100 year storm (15min)	=	15.1 l/s [6C]
Post-development 1 year storm (15min)	=	4.6 l/s [6B]
Post-development 100 year storm (15min)	=	14.58 l/s [6D]

Greenfield runoff:-

$Q_{BAR(rural)}$ = 0.085 l/s or 4.031 l/s/ha or 0.000 cumecs - from IoH 124.

Climate change factor:-

CCF = 40%

Volumes:-

Pre-development 100 yr/6hr storm [12A]= 17.9m³
Post-development 100 yr/6hr storm (add. volume with no SUDS) [12B]= 17.3m³
Post-development 100 yr/6hr storm (add. volume with SUDS) = 17.3m³
Post-development add. predicted volume (No SUDS) [12C] = -0.6m³

You may also require

Data relating to the infiltration test calculations (if applicable)
Evidence to show runoff reduction (if applicable)
Information on calculation methods (if applicable see next sheet)

Note

Numbers in square brackets relate to the
Nov. 2010 v1.1 / issued 11/02/10 copy of SUR1

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Project	10 Evelina Road, Nunhead, London, SE15 2DX	By	S.L
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Definitions and methods

Hydrology

The hydrological constants are derived from the Wallingford maps. They are used to calculate location specific rainfall figures.

Site values and factors

Areas of the site should be entered in hectares (10000 m²). If the Pre-development site is a green field, this box is blank.
Climate Change Factor is initially set at 20% - this may be changed as required.
Greenfield runoff is calculated using the method described in IoH 124.
Runoff factors

The impermeable runoff factor is initially set at 98%
The permeable runoff factor is initially set at 20%

Note: the CCF and the runoff factors may be changed by the user to suit the development
The areas draining to soakaways and other SUDS are entered in the appropriate box (in hectares)

Calculations

The post-development area is reduced by subtracting the areas that drain to soakaways or other SUDS, to give a revised figure.
All areas are then multiplied by the appropriate runoff factor to give an equivalent area with 100% runoff.
These are then summated.
This gives a total pre-development equivalent area, and a similar figure for the post-development area.
The 'Post-dev volume to drain (no SUDS)' gives the total runoff to drain if no SUDS were used.

Results

The pre- and post-development areas are subjected to 1,30 and 100 year return period storms with a duration of 15 to 600 minutes.
The Revised Post-dev Imperm. area is the area (in ha) that is not going to SUDS x impervious runoff factor.
The runoff rates are calculated for the chosen hydrograph (Summer or Winter) as l/s. Figures in red indicate m³/s
The peak value is measured, multiplied by the CCF and the total maximum rate is shown.
The pre- and post-development volumes for a 100 year / 6 hour storm are calculated from the area under the hydrograph curve.
Post-dev volume (i.e. excess above SUDS) is that volume produced by the drained area that does not go to SUDS.
Qbar(rural) is calculated in accordance with the procedure laid down in IoH 124

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Job No.	Sheet no.	Date	By	Checked	Reviewed
C2465	1	07/01/21	S.L		

MasterDrain SW

Project: 10 Evelina Road, Nunhead, London, SE15 2DX

Title: Hydrograph storage calcs with 1 l/s discharge

Data:-

Location = LONDON (SOUTH)
M5-60 (mm) = 20.1
Soil index = 0.45
Return period = 100
UCWI = 0.0

Grid reference = TQ4075
r = 0.44
SAAR (mm/yr) = 600
WRAP = 4
Climate change = 40%

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Pipeline storage = 0.0 m³
Offline storage = 0.0 m³

Available MH storage = 0.0 m³

Percentage runoff = 100.0% (manual setting)

Imperv. area = 203 m²
Total area = 203 m²
Total runoff = 11.6 m³

Pervious area = 0 m²
Equiv area = 203 m² (Tot. area x % runoff).
Discharge rate = 1.000 l/s

Storage (m³) = 8.4 m³ (Sum of all balance quantities)

Total rainfall depth = 57.0 mm

Calculations :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.010	20.0	11.4	0.023	0.036	0.000	0.000
0.020	20.0	11.4	0.023	0.036	0.000	0.000
0.030	21.0	12.0	0.024	0.036	0.000	0.000
0.040	21.0	12.0	0.024	0.036	0.000	0.000
0.050	22.0	12.5	0.025	0.036	0.000	0.000
0.060	23.0	13.1	0.027	0.036	0.000	0.000
0.070	24.0	13.7	0.028	0.036	0.000	0.000
0.080	26.0	14.8	0.030	0.036	0.000	0.000
0.090	27.0	15.4	0.031	0.036	0.000	0.000
0.100	29.0	16.5	0.034	0.036	0.000	0.000
0.110	31.0	17.7	0.036	0.036	0.000	0.000
0.120	32.0	18.2	0.037	0.036	0.001	0.001
0.130	33.0	18.8	0.038	0.036	0.002	0.003
0.140	34.0	19.4	0.039	0.036	0.003	0.007
0.150	36.0	20.5	0.042	0.036	0.006	0.012
0.160	38.0	21.7	0.044	0.036	0.008	0.020
0.170	39.0	22.2	0.045	0.036	0.009	0.029
0.180	40.0	22.8	0.046	0.036	0.010	0.040
0.190	42.0	23.9	0.049	0.036	0.013	0.052
0.200	45.0	25.7	0.052	0.036	0.016	0.068
0.210	49.0	27.9	0.057	0.036	0.021	0.089
0.220	53.0	30.2	0.061	0.036	0.025	0.114
0.230	57.0	32.5	0.066	0.036	0.030	0.144
0.240	62.0	35.3	0.072	0.036	0.036	0.180
0.250	66.0	37.6	0.076	0.036	0.040	0.220
0.260	71.0	40.5	0.082	0.036	0.046	0.267
0.270	77.0	43.9	0.089	0.036	0.053	0.320
0.280	84.0	47.9	0.097	0.036	0.061	0.381
0.290	91.0	51.9	0.105	0.036	0.069	0.450
0.300	98.0	55.9	0.113	0.036	0.077	0.528
0.310	105.0	59.9	0.122	0.036	0.086	0.613
0.320	114.0	65.0	0.132	0.036	0.096	0.709
0.330	125.0	71.3	0.145	0.036	0.109	0.818
0.340	135.0	77.0	0.156	0.036	0.120	0.938
0.350	143.0	81.5	0.165	0.036	0.129	1.067
0.360	154.0	87.8	0.178	0.036	0.142	1.210
0.370	164.0	93.5	0.190	0.036	0.154	1.363
0.380	173.0	98.6	0.200	0.036	0.164	1.528
0.390	183.0	104.3	0.212	0.036	0.176	1.703
0.400	194.0	110.6	0.224	0.036	0.188	1.892

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Title: Hydrograph storage calcs with 1 l/s discharge

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Calculations (cont.) :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.410	204.0	116.3	0.236	0.036	0.200	2.092
0.420	212.0	120.9	0.245	0.036	0.209	2.301
0.430	219.0	124.8	0.253	0.036	0.217	2.519
0.440	226.0	128.8	0.262	0.036	0.226	2.744
0.450	233.0	132.8	0.270	0.036	0.234	2.978
0.460	239.0	136.2	0.277	0.036	0.241	3.218
0.470	244.0	139.1	0.282	0.036	0.246	3.465
0.480	248.0	141.4	0.287	0.036	0.251	3.716
0.490	249.0	141.9	0.288	0.036	0.252	3.968
0.500	250.0	142.5	0.289	0.036	0.253	4.221
0.510	250.0	142.5	0.289	0.036	0.253	4.474
0.520	249.0	141.9	0.288	0.036	0.252	4.727
0.530	248.0	141.4	0.287	0.036	0.251	4.978
0.540	244.0	139.1	0.282	0.036	0.246	5.224
0.550	239.0	136.2	0.277	0.036	0.241	5.464
0.560	233.0	132.8	0.270	0.036	0.234	5.698
0.570	226.0	128.8	0.262	0.036	0.226	5.924
0.580	219.0	124.8	0.253	0.036	0.217	6.141
0.590	212.0	120.9	0.245	0.036	0.209	6.350
0.600	204.0	116.3	0.236	0.036	0.200	6.550
0.610	194.0	110.6	0.224	0.036	0.188	6.739
0.620	183.0	104.3	0.212	0.036	0.176	6.915
0.630	173.0	98.6	0.200	0.036	0.164	7.079
0.640	164.0	93.5	0.190	0.036	0.154	7.233
0.650	154.0	87.8	0.178	0.036	0.142	7.375
0.660	143.0	81.5	0.165	0.036	0.129	7.504
0.670	135.0	77.0	0.156	0.036	0.120	7.625
0.680	125.0	71.3	0.145	0.036	0.109	7.733
0.690	114.0	65.0	0.132	0.036	0.096	7.829
0.700	105.0	59.9	0.122	0.036	0.086	7.915
0.710	98.0	55.9	0.113	0.036	0.077	7.992
0.720	91.0	51.9	0.105	0.036	0.069	8.061
0.730	84.0	47.9	0.097	0.036	0.061	8.123
0.740	77.0	43.9	0.089	0.036	0.053	8.176
0.750	71.0	40.5	0.082	0.036	0.046	8.222
0.760	66.0	37.6	0.076	0.036	0.040	8.262
0.770	62.0	35.3	0.072	0.036	0.036	8.298
0.780	57.0	32.5	0.066	0.036	0.030	8.328
0.790	53.0	30.2	0.061	0.036	0.025	8.353
0.800	49.0	27.9	0.057	0.036	0.021	8.374
0.810	45.0	25.7	0.052	0.036	0.016	8.390
0.820	42.0	23.9	0.049	0.036	0.013	8.403
0.830	40.0	22.8	0.046	0.036	0.010	8.413
0.840	39.0	22.2	0.045	0.036	0.009	8.422
0.850	38.0	21.7	0.044	0.036	0.008	8.430
0.860	36.0	20.5	0.042	0.036	0.006	8.436
0.870	34.0	19.4	0.039	0.036	0.003	8.439
0.880	33.0	18.8	0.038	0.036	0.002	8.441
0.890	32.0	18.2	0.037	0.036	0.001	8.442
0.900	31.0	17.7	0.036	0.036	0.000	8.442
0.910	29.0	16.5	0.034	0.036	0.000	8.440
0.920	27.0	15.4	0.031	0.036	0.000	8.435
0.930	26.0	14.8	0.030	0.036	0.000	8.429
0.940	24.0	13.7	0.028	0.036	0.000	8.421
0.950	23.0	13.1	0.027	0.036	0.000	8.411
0.960	22.0	12.5	0.025	0.036	0.000	8.401
0.970	21.0	12.0	0.024	0.036	0.000	8.389
0.980	21.0	12.0	0.024	0.036	0.000	8.377
0.990	20.0	11.4	0.023	0.036	0.000	8.365
1.000	20.0	11.4	0.023	0.036	0.000	8.352

Storage volume (m^3) = 8.4 m^3 (Sum of all balance quantities)

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Job No.	Sheet no.	Date
C2465	3	07/01/21

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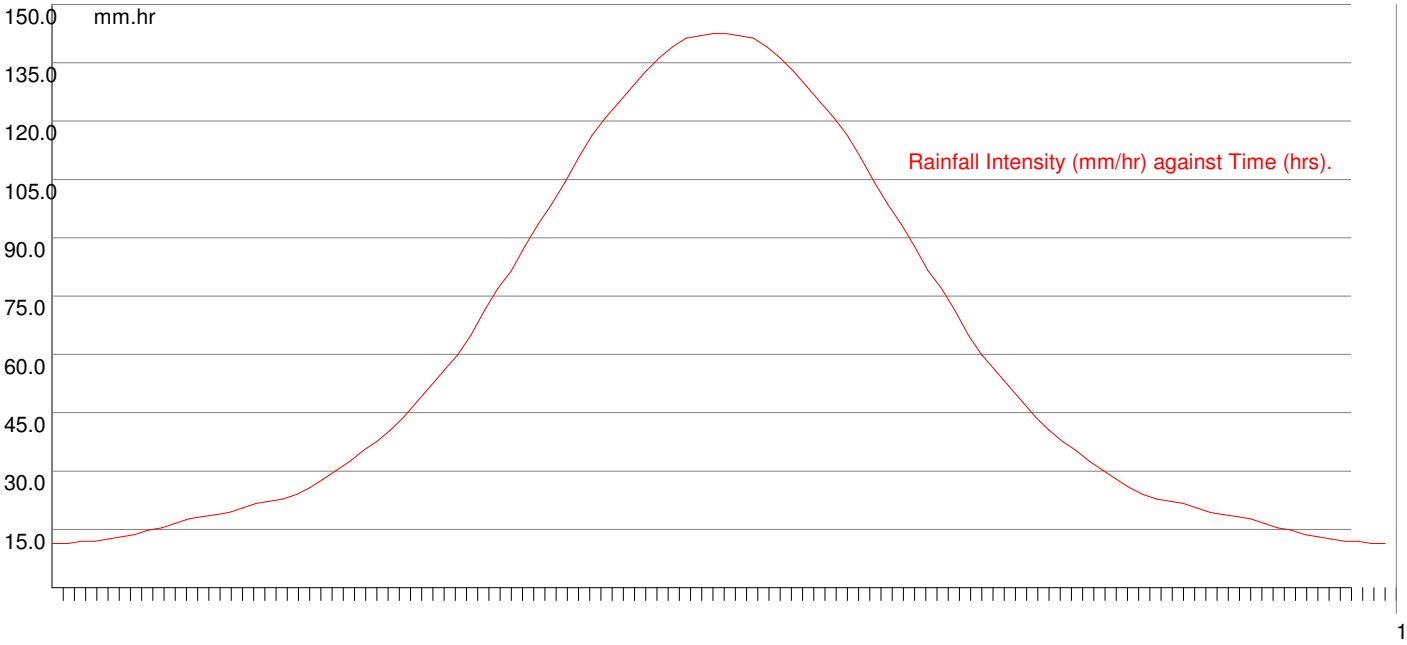
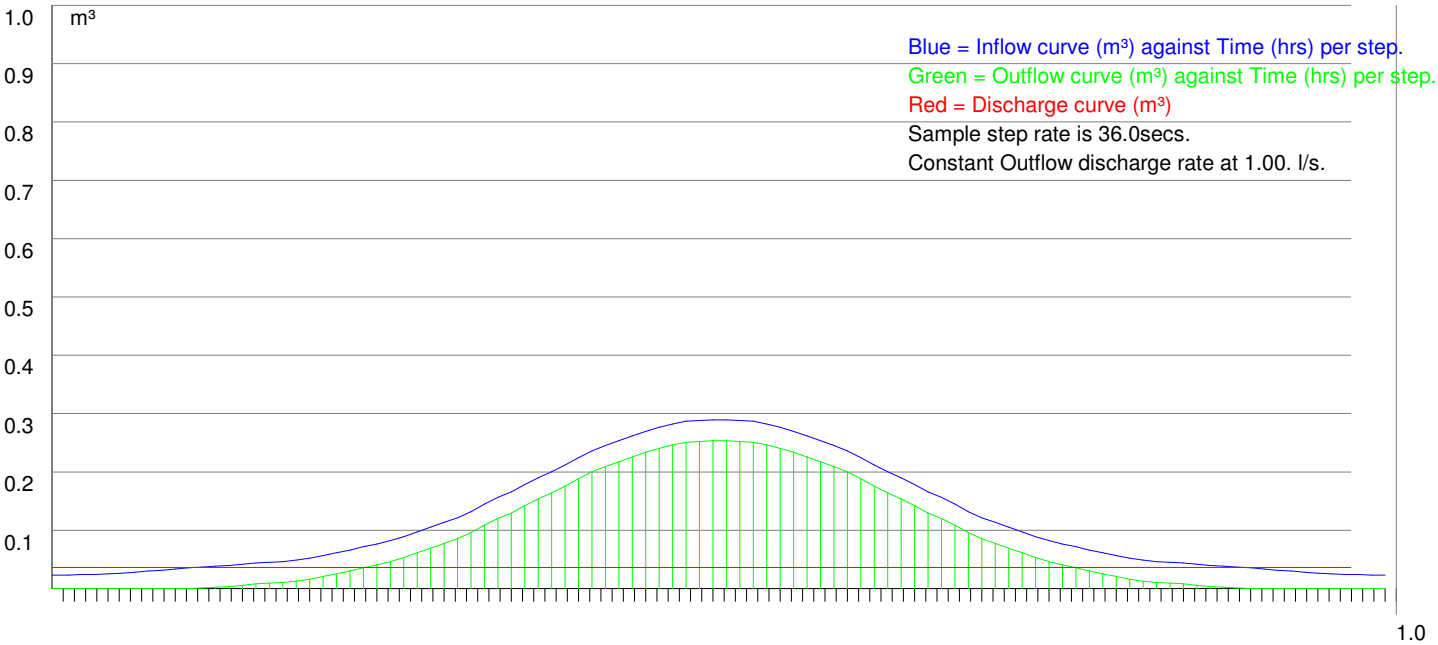
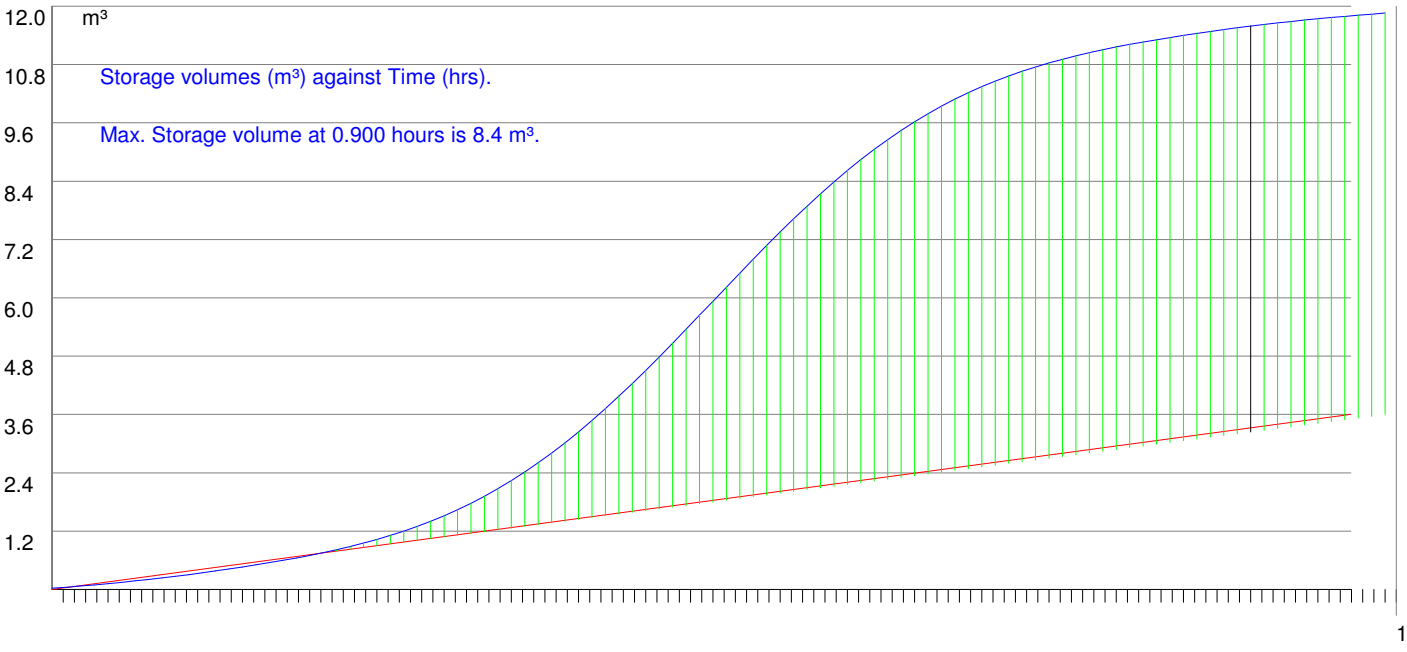
Project	By	Checked	Reviewed
10 Evelina Road, Nunhead, London, SE15 2DX	S.L		

Title: **Hydrograph storage calcs with 1 l/s discharge**







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Job No.	C2465
Sheet no.	4
Date	07/01/21

Project	By	Checked	Reviewed
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Title: **Hydrograph storage calcs with 1 l/s discharge**

Maximum storage volumes for varying duration storms.

Storm length (hrs)	Max. Vol (m^3)	Max. Vol time	Mean intens (mm/hr)	Step time. (mins)	Peak found
0.25	6.57	0.25	143.61	0.2	
0.5	7.85	0.50	92.75	0.3	
1	8.44	1.00	57.00	0.6	Peak found
2	8.13	---	33.87	1.2	
3	7.33	---	24.67	1.8	
4	6.41	---	19.60	2.4	
5	5.47	---	16.35	3.0	
6	4.58	---	14.11	3.6	
7	3.74	---	12.46	4.2	
8	2.97	---	11.18	4.8	
9	2.25	---	10.16	5.4	
10	1.61	---	9.33	6.0	
12	0.57	---	8.04	7.2	
15	0.00	---	6.70	9.0	
18	0.00	---	5.77	10.8	
20	0.00	---	5.29	12.0	
24	0.00	---	4.56	14.4	
30	0.00	---	3.79	18.0	
36	0.00	---	3.26	21.6	
42	0.00	---	2.87	25.2	
48	0.00	---	2.57	28.8	
54	0.00	---	2.33	32.4	
60	0.00	---	2.14	36.0	
66	0.00	---	1.98	39.6	
72	0.00	---	1.84	43.2	
84	0.00	---	1.62	50.4	
96	0.00	---	1.45	57.6	
120	0.00	---	1.20	72.0	
150	0.00	---	1.00	90.0	
175	0.00	---	0.88	105.0	
200	0.00	---	0.78	120.0	
250	0.00	---	0.65	150.0	
300	0.00	---	0.56	180.0	
375	0.00	---	0.46	225.0	
500	0.00	---	0.36	300.0	
750	0.00	---	0.26	450.0	
1000	0.00	---	0.20	600.0	
1250	0.00	---	0.17	750.0	
1500	0.00	---	0.15	900.0	
1570	0.00	---	0.14	942.0	
2000	0.00	---	0.11	1200.0	
2500	0.00	---	0.10	1500.0	
3000	0.00	---	0.08	1800.0	
3500	0.00	---	0.07	2100.0	
4000	0.00	---	0.06	2400.0	

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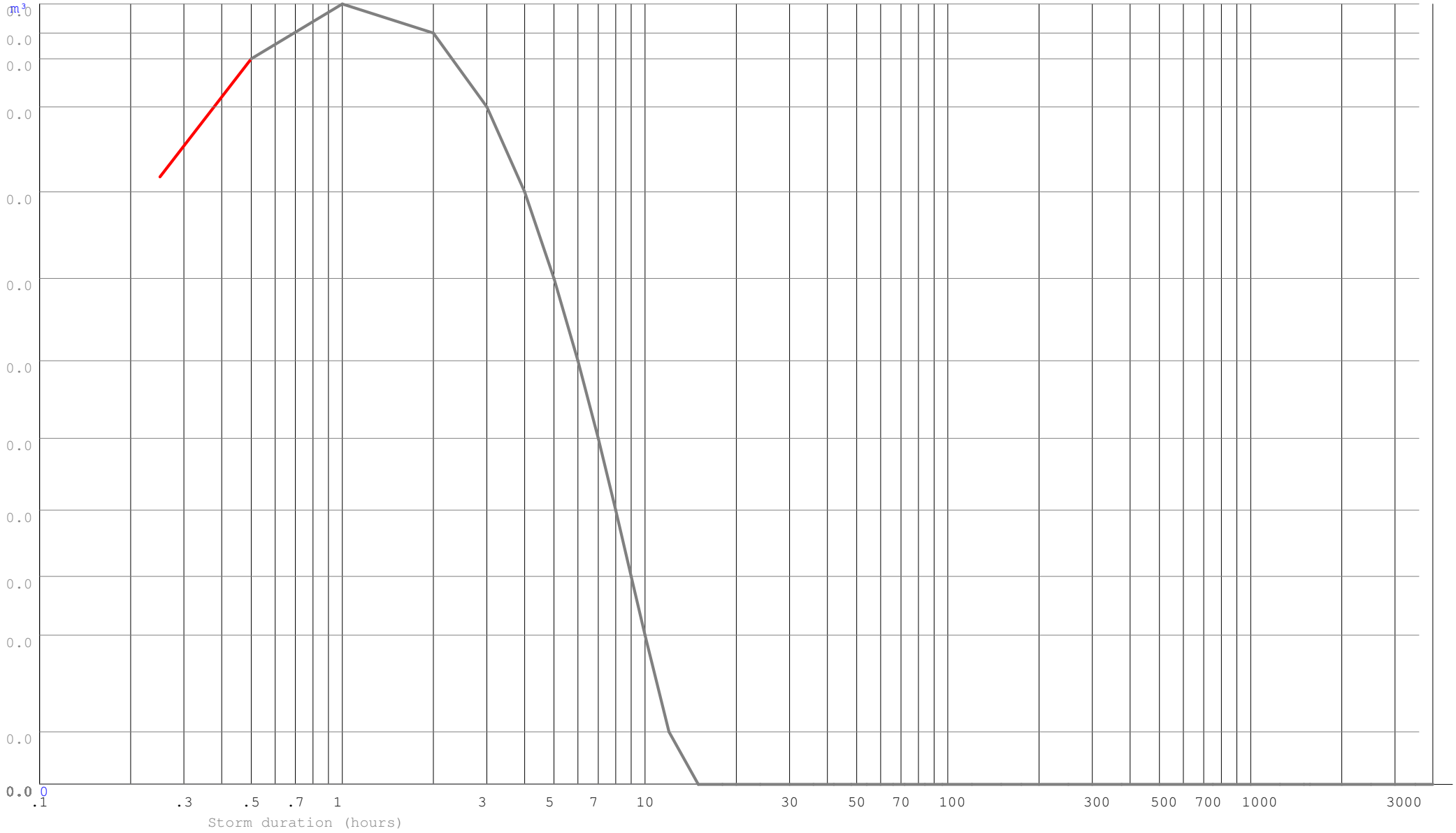
Job No.	C2465
Sheet no.	5
Date	07/01/21
By	S.L
Checked	
Reviewed	

Project: **10 Evelina Road, Nunhead, London, SE15 2DX**

Title: **Hydrograph storage calcs with 1 l/s discharge**

Sequential storage volume at specific storm durations.



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Job No. C2465			
Sheet no. 6			
Date 07/01/21			
Project 10 Evelina Road, Nunhead, London, SE15 2DX	By S.L	Checked	Reviewed
Title Hydrograph storage calcs with 1 l/s discharge			

Explanatory notes for Peak Flow Storage

1) This system uses the rainfall intensity/ duration curve calculated using either the Wallingford or FEH method as selected.
2) The balance is calculated from the inflow minus the outflow.
3) The storage volume is the maximum value of the balance curve.
4) This method was described by Davis (1963) - see Butler & Davies, 2nd edition, p294
5) References to 'storm duration' relate only to the hydrograph method (qv).
6) There are always 600 steps in the calculation process, thus a 'run' time of 10 hours will be sampled every minute,

Explanatory notes for Hydrograph Storage

1) The user has the choice of Summer or Winter curves
2) The mean intensity varies with the duration of the storm curve
3) There are always 120 steps in the calculation process, irrespective of storm duration.
4) The balance is calculated from the inflow minus the outflow.
5) The storage volume is the sum of the balance values for each step.
6) Varying durations should be tried to find the maximum storage value - this can be narrowed down very closely.

*Modelling using the flow characteristics of the restrictor is available using Vortex Control modelling function. Please be aware that this function needs the full design data file to function.

Why do the two methods give different results?

The rainfall characteristics for each method are very different.

The Peak flow (using the Intensity/Duration/Frequency curve) does not model the actual rainfall. This curve is joined points which represent the mean intensity of a storm at a given duration i.e. a value of 19.5 mm/hr for a 60 minute storm indicates that over the sixty minute period, the mean intensity was 19.5 mm/hr. The calculation method samples the IDF curve for a given location and frequency (Return Period) and calculates the storage for that rate and duration less the outflow volume. The maximum value is displayed as the 'worst case' storage.

The hydrograph method uses a standard curve for either Winter or Summer storms. Traditionally these are symmetrical about the central peak. UK rainfall does not fit into this convenient curve, so the calculations are dealing with a stylised set of data. The mean intensity for the storm is calculated from the IDF curve and applied to the curve data, calculating the storage for that step less the outflow volume. The final storage volume is the sum of the storage for all the steps.

It can be seen that these two methods are very different, and the user may have the choice of which result to use. This is not an exact science, though is often treated as such by those that do not understand the principles of the calculations.

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Job No. C2465			
Sheet no. 1			
Date 07/01/21			
Project 10 Evelina Road, Nunhead, London, SE15 2DX	By S.L	Checked	Reviewed
Title IoH 124 (Qbar(urban))Runoff calcs			

Hydrological Data:-

FSR Hydrology:-

Location	= LONDON (SOUTH)	Grid reference	= TQ4075
M5-60 (mm)	= 20.1	r	= 0.44
Soil runoff	= 0.45	SAAR (mm/yr)	= 600
WRAP	= 4	Area = England & Wales	
Hydrological area = 6		Hydrological zone = 8	

Soil classification for WRAP type 4
Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Design data:-

Area = 0.000212 Km² - 0.021 Ha - 212 m² % Urbanisation = 100.00%

Calculation method:-

Runoff is calculated from:-

$$Q_{BAR(urban);} = Q_{BAR(rural)} (1 + URBAN)^{2NC}[1 + URBAN\{(21/CIND) - 0.3\}]$$

where:-

NC varies with the value of SAAR:-
for 500<SAAR<1100 mm then NC = 0.92 - 0.00024SAAR
for 1100<SAAR<3000 mm then NC = 0.74 - 0.000082SAAR

CIND = 102.4SOIL + 0.28(CWI - 125) CWI = Catchment Wetness Index

so

CIND =28.107 CWI =60.811 NC =0.776

For areas less than 50Ha, a modified calculation which multiplies the 50Ha runoff value by the ratio of the site area to 50Ha is used
Reducing factor used for these calculations is 0.000

$Q_{BAR(rural)}$ = 0.078 (l/s)

$Q_{BAR(urban)}$ = 0.329 (l/s)

$Q_{BAR(urban)}$ is then multiplied by a growth factor - GC(T) - for different storm return periods derived from EA publication W5-074/A.

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Job No.	C2465
Sheet no.	2
Date	07/01/21
Project	10 Evelina Road, Nunhead, London, SE15 2DX
Title	IoH 124 (Qbar(urban))Runoff calcs
By	S.L
Checked	
Reviewed	

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HY 10.01
Calculated data:-

Mean Annual Peak Flow $Q_{BAR(urban)}$ = 0.33 l/s

Values for $Q_{BAR(urban)}$

Ret. per.	m³/hr	l/s	l/s/ha	Ret. per.	m³/hr	l/s	l/s/ha
1yr	0.000	0.280	13.230	100yr	0.001	1.037	49.030
2yr	0.000	0.290	13.697	100yr+20%	0.001	1.245	58.836
5yr	0.000	0.422	19.923	100yr+30%	0.001	1.349	63.739
10yr	0.001	0.534	25.216	200yr	0.001	1.219	57.591
30yr	0.001	0.734	34.710	200yr + 30%	0.002	1.584	74.869
50yr	0.001	0.863	40.781	500yr	0.001	1.479	69.888
				1000yr	0.002	1.699	80.316

Growth factors -

1yr	2yr	5yr	10yr	30yr	50yr	100yr	200yr	500yr	1000yr
0.85	0.88	1.28	1.62	2.23	2.62	3.15	3.70	4.49	5.16

The above is based on the Institute of Hydrology Report 124 to which you are referred for further details (see Sect 7). Note that the 200 year growth curve was taken from W5-074/A.

For WRAP type 1 soils, CIND can become negative for lower values of SAAR. In this case the CIND value is multiplied by -1 to return a positive value (CIND is very small at this point).

APPENDIX B – DRAWINGS

*Site Boundary to be confirmed on site.

REV	DATE	INITIALS	DESCRIPTION

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PROJECT: Residential Development at:
10 Evelina Road
London, SE15 2DX

CLIENT:

DWG TITLE: **Location Plan**

DWG NO: **1023-MB-000-100** | REV: | DATE: DECEMBER 2020

SCALE: 1:1250 @ A3 | IN

14

12

8

9

BATH ROOM 4.6 SQMT

S

DOUBLE BEDROOM 13 SQMT

LIVING ROOM KITCHEN 30 SQMT

FLAT 1 1 BED 2 PER. 54 SQMT

AMENITY SPACE 8 SQMT

SINGLE BEDROOM 11 SQMT

AMENITY SPACE 22 SQMT

660L BIN

240L

240L

BIKE STORE 12NO. BIKES

UTILITIES ROOM

FLAT 2 2 BED 3 PER. 70 SQMT

RESIDENTIAL LOBBY

post boxes

LIVING ROOM KITCHEN 32 SQMT

Boundary line to be agreed with the council and adjacent properties according to pavement line on site.

Proposed Schedule of Accommodation

FLAT	TYPE	GIA (sqmt)
01	1Bed/2Per	54 sqmt
02	2Bed/3Per	70 sqmt
03	2Bed/3Per	61 sqmt
04	1Bed/2Per	52 sqmt
05	2Bed/3Per	61 sqmt
06	1Bed/2Per	52 sqmt
07	Studio	39 sqmt
08	Studio	37 sqmt

REV	DATE	INITIALS	DESCRIPTION

0 5 10m

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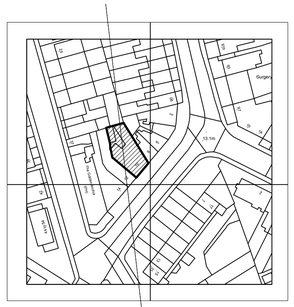
PROJECT: Residential Development at:
10 Evelina Road
London, SE15 2DX

CLIENT:

DWG TITLE: **Proposed Ground Floor Plan**

DWG NO: **1023-MB-00-100** REV: DATE: DECEMBER 2020

SCALE: 1:100 @ A3 IN



EVELINA ROAD

12

Flat Roof

S.W. Side Elev

×18.04

AMENITY
6 SQMT

LIVING ROOM
KITCHEN
26 SQMT

BATH
ROOM
4.6 SQMT

S

SINGLE
BEDROOM
11 SQMT

FLAT 3
2 BED 3 PER.
61 SQMT

S

DOUBLE
BEDROOM
13 SQMT

S

AMENITY
5 SQMT

LIVING ROOM
KITCHEN
26 SQMT

FLAT 4
1 BED 2 PER.
52 SQMT

S

DOUBLE
BEDROOM
15 SQMT

BATH
ROOM
4.4 SQMT

S

S

DOUBLE
BEDROOM
14 SQMT

S

Corrugated Metal Lean - To

×15.09

A
B

8

9

×17.93

×15.21

×16.48

Roof Terrace

Flat Roof

Rooflight

Slate Pitched Roof

Proposed Schedule of Accommodation

FLAT	TYPE	GIA (sqmt)
01	1Bed/2Per	54 sqmt
02	2Bed/3Per	70 sqmt
03	2Bed/3Per	61 sqmt
04	1Bed/2Per	52 sqmt
05	2Bed/3Per	61 sqmt
06	1Bed/2Per	52 sqmt
07	Studio	39 sqmt
08	Studio	37 sqmt

REV	DATE	INITIALS	DESCRIPTION

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CLIENT:

DWG TITLE: **Proposed First Floor Plan**

DWG NO: **1023-MB-00-101** | REV: | DATE: DECEMBER 2020

SCALE: 1:100 @ A3 | IN

EVELINA ROAD

12

8

9

AMENITY
6 SQMT

LIVING ROOM
KITCHEN
26 SQMT

BATH
ROOM
4.6 SQMT

S

SINGLE
BEDROOM
11 SQMT

FLAT 5
2 BED 3 PER.
61 SQMT

S

DOUBLE
BEDROOM
13 SQMT

S

AMENITY
5 SQMT

LIVING ROOM
KITCHEN
26 SQMT

FLAT 6
1 BED 2 PER.
52 SQMT

S

DOUBLE
BEDROOM
15 SQMT

BATH
ROOM
4.4 SQMT

S

A
B

Slate Pitched Roof

Proposed Schedule of Accommodation

FLAT	TYPE	GIA (sqmt)
01	1Bed/2Per	54 sqmt
02	2Bed/3Per	70 sqmt
03	2Bed/3Per	61 sqmt
04	1Bed/2Per	52 sqmt
05	2Bed/3Per	61 sqmt
06	1Bed/2Per	52 sqmt
07	Studio	39 sqmt
08	Studio	37 sqmt

REV	DATE	INITIALS	DESCRIPTION

0 5 10m

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London, SE15 2DX

CLIENT:

DWG TITLE: **Proposed Second Floor Plan**

DWG NO: **1023-MB-00-102** | REV: | DATE: DECEMBER 2020

SCALE: 1:100 @ A3 | IN

12

8

6

W/M

F

S

LIVING ROOM
KITCHEN
22 SQMT

AMENITY
10 SQMT

SHOWER
ROOM
3.6 SQMT

BEDROOM

FLAT.7
STUDIO FLAT
1 PERSON
39 SQMT

GREEN
ROOF

LIVING ROOM
KITCHEN

AMENITY
10 SQMT

FLAT.8
STUDIO FLAT
37 SQMT

BEDROOM

SHOWER
ROOM
3.2 SQMT

Proposed Schedule of Accommodation

FLAT	TYPE	GIA (sqmt)
01	1Bed/2Per	54 sqmt
02	2Bed/3Per	70 sqmt
03	2Bed/3Per	61 sqmt
04	1Bed/2Per	52 sqmt
05	2Bed/3Per	61 sqmt
06	1Bed/2Per	52 sqmt
07	Studio	39 sqmt
08	Studio	37 sqmt

REV	DATE	INITIALS	DESCRIPTION

0 5 10m

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PROJECT: Residential Development at:
10 Evelina Road
London, SE15 2DX

CLIENT:

DWG TITLE: **Proposed Third Floor Plan**

DWG NO: **1023-MB-00-103** REV: DATE: DECEMBER 2020

SCALE: 1:100 @ A3 IN

14

12

37

23no. PV PANELS
0.25 kWp

REV	DATE	INITIALS	DESCRIPTION

0 5 10m

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Residential Development at:
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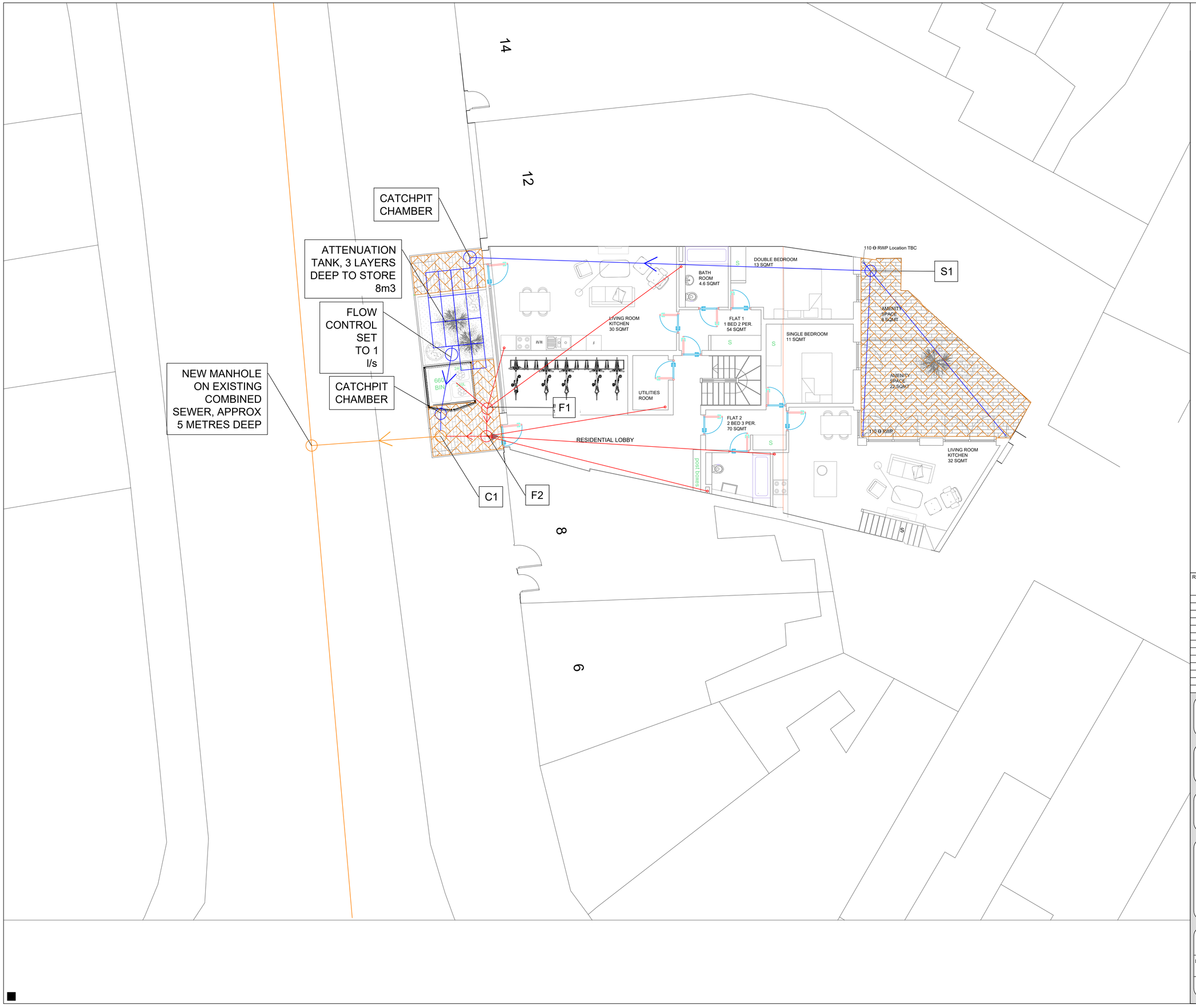
CLIENT:

DWG TITLE: **Proposed Roof Plan**

DWG NO: **1023-MB-00-104** REV: DATE: DECEMBER 2020

SCALE: 1:50 @ A1 1:100 @ A3 IN



KEY

- SURFACE WATER UPVC PIPES
- SURFACE WATER INSPECTION CHAMBERS
- FOUL UPVC WATER PIPES
- FOUL WATER INSPECTION CHAMBERS
- COMBINED UPVC WATER PIPES
- COMBINED WATER INSPECTION CHAMBERS
- PERMEABLE PAVING

REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	07-01-21	S,L	For Information	SL	SL

PROJECT:
10 EVELINA ROAD

TITLE:
FOUL & SURFACE WATER DRAINAGE LAYOUT PLAN

CLIENT:
TOUCAN LOFTS LIMITED

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CHECKED BY:	DATE:	APPROVED BY:	DATE:
S.L	07-01-21	S.L	07-01-21
DRN BY: S.L	SCALE: N.T.S	DRAWING NUMBER: C2465-01	REV: A
DATE: 07-01-21	SIZE: A1		

Asset location search

Property Searches

Nimbus Engineering Consultants LTD
Kemp House
152City road
LONDON
EC1V 2NX

Search address supplied 10
Evelina Road
London
SE15 2DX

Your reference C2465

Our reference ALS/ALS Standard/2020_4323752

Search date 15 December 2020

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Asset location search

Property Searches

Search address supplied: 10, Evelina Road, London, SE15 2DX

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

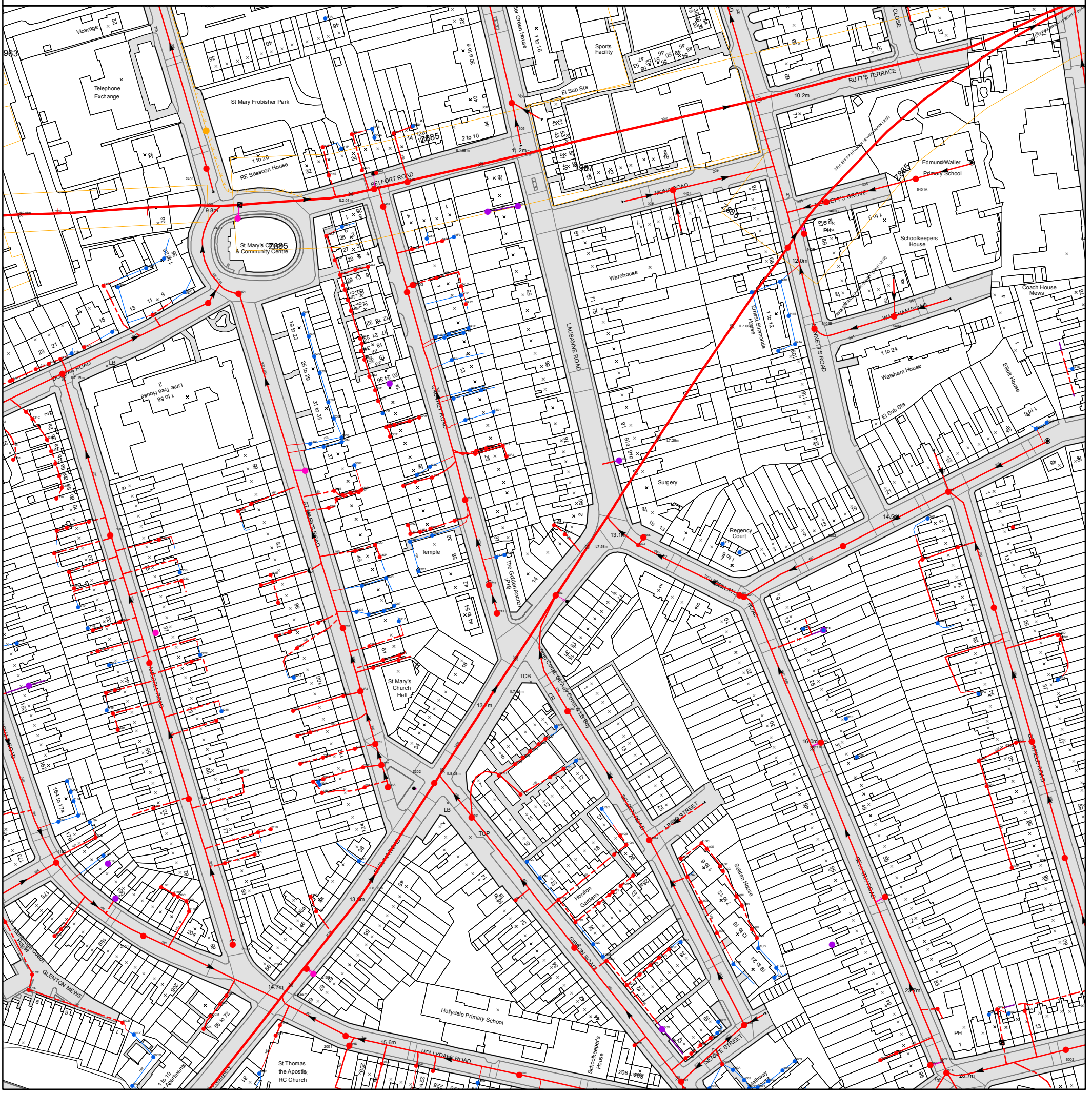
Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2020_4323752



0 10 20 40 60 80 Meters

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified before any works are undertaken. Crown copyright Reserved

Scale:	1:1792
Width:	500m
Printed By:	G1KANAGA
Print Date:	15/12/2020
Map Centre:	535391,176313
Grid Reference:	TQ3576SW

Comments:

ALS/ALS Standard/2020_4323752

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
230D		
122E		
141C		
132E		
344X		
354C		
231G		
341A		
33D2		
14GE		
22E2		
4404	11.41	9.35
402B	11.24	7.76
3501	10.56	7.59
402A	38.68	
211G		
121U		
330E		
4004		
41QU		
5301	14.56	12
3203		
5006		
41QJ		
41QA		
41GB		
41GK		
41QD		
41GP		
41GD		
50ZG		
41QH		
42ZI		
41QS		
41QI		
31QG		
41GM		
31QL		
41GH		
3204	13.46	
3206		
41QP		
41UD		
41GA		
3202	13.79	
001B	19.61	16.25
5302	14.35	11.47
42ZD		
32ZH		
3205		
40GA		
63CB		
41QQ		
50QA		
41GN		
121C		
331F		
2404	10.39	6.56
230E		
24D2		
1401		
3203	13.25	10.24
33A1		
33J1		
33G3		
33E2		
332M		
34A1		
341B		
354Y		
34G2		
33N2		
33C2		
33DH		
33N1		
34C2		
3202		
22B2		
321A		
221A		
22D1		

REFERENCE	COVER LEVEL	INVERT LEVEL
122D		
212K		
141B		
132D		
354Z		
231H		
134B		
13B1		
631A		
122J		
33O1		
2105	14.31	
403B	13.19	8.74
401A	11.19	8.24
211F		
221A		
33K1		
233A		
41QV		
41QM		
501A		
40GH		
41GF		
41QK		
41GC		
31QN		
3207		
41QB		
41GI		
3201		
4003		
41GL		
4005		
41QO		
41QC		
4303		
41QF		
41GJ		
41GE		
41QR		
40ZC		
41QT		
41GG		
540B		22.49
101A	15.56	12.18
430A	13.6	9.77
4203	13.96	10.7
31ZG		
32ZO		
32ZJ		
63CA		
40GC		
50QB		
41QE		
511A		
121D		
431B		
3401		
122F		
34A2		
134C		
230F		
33H3		
33I1		
33F2		
331M		
242P		
341C		
354W		
354B		
33M1		
34M2		
33B2		
34L1		
34J2		
22G1		
22C2		
32A1		
221B		
22E1		
32F2		

ALS/ALS Standard/2020_4323752

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
320Z		
320X		
22A1		
221D		
221F		
320V		
320S		
330P		
330N		
230J		
330D		
231B		
230M		
240C		
211D		
211B		
223H		
223K		
222E		
233B		
132B		
132A		
122I		
14GA		
341Y		
344D		
34H2		
220A		
2301	11.16	7.95
2202		
2201		
2402	10.16	6.71
121A		
33H2		
33F1		
33D1		
33B1		
131C		
131F		
24GF		
131H		
331I		
33H1		
33G1		
341G		
341F		
34F3		
34E3		
33EH		
33AH		
230A		
230B		
131A		
24E2		
34F2		
3301	12.9	9.54
24GC		
2403	9.91	
2104		
30HD		
20CZ		
20CM		
21CJ		
21BF		
21BD		
11QE		
11QG		
11QA		
01QL		
30BA		
20CH		
20CC		
11CA		
11CG		
12KD		
11BF		
4001	20.06	16.78
4101		
3001		
1102	14.8	10.74
40CE		

REFERENCE	COVER LEVEL	INVERT LEVEL
320Y		
320W		
22C1		
221E		
320T		
320U		
232B		
330O		
330K		
230I		
230A		
330F		
230L		
240H		
211C		
211A		
22GA		
223E		
223C		
132F		
132C		
122H		
132F		
141A		
32A2		
242O		
2103	14.21	11.12
2205		
2203		
3201		
2102		
1305	12.09	8.6
121B		
33G2		
33E1		
33C1		
131D		
613G		
242Q		
131B		
341J		
331K		
331I		
341H		
341D		
341E		
34A3		
34D3		
33F4		
240G		
2401	8.43	5.58
131E		
24B2		
354A		
3403	11.75	7.84
3402		
24GB		
431A		
20CY		
20CF		
20CK		
21CL		
21BE		
21BC		
21BB		
01QK		
11QC		
11QB		
30QI		
12BA		
20CD		
10CB		
11BC		
12KA		
11BB		
11CF		
2001		
3101	13.98	10.47
2101		
40GI		
420A	14.1	10.84

ALS/ALS Standard/2020_4323752

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
4201		
62AI		
62AF		
62BA		
62BD		
53AB		
52AE		
510A	19.79	
60NA		
5201	16.33	13.85
6301	23.17	20.32
322A		
24GD		
521E		
244F		
241P		
320R		
322B		
221W		
32D1		
332Q		
40ZB		
40QZ		
521G		
40QW		
521H		
121V		
5102		
601V		
431E		
251A		
111U		
631E		
441A		
541B		
441C		
342B		

REFERENCE	COVER LEVEL	INVERT LEVEL
61AH		
62AG		
52ZA		
62BC		
53AD		
53AA		
520C	15.94	
6203	19.08	15.86
6002	28.58	25.49
500B	25.68	
321Z		
1304	10.81	7.12
311A		
521F		
244E		
111T		
320Q		
221V		
2203		
122G		
332R		
40ZA		
40QY		
521I		
40QX		
5404	12.93	9.33
121W		
601U		
502L		
431F		
341Z		
332S		
311F		
541A		
441B		
342A		

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

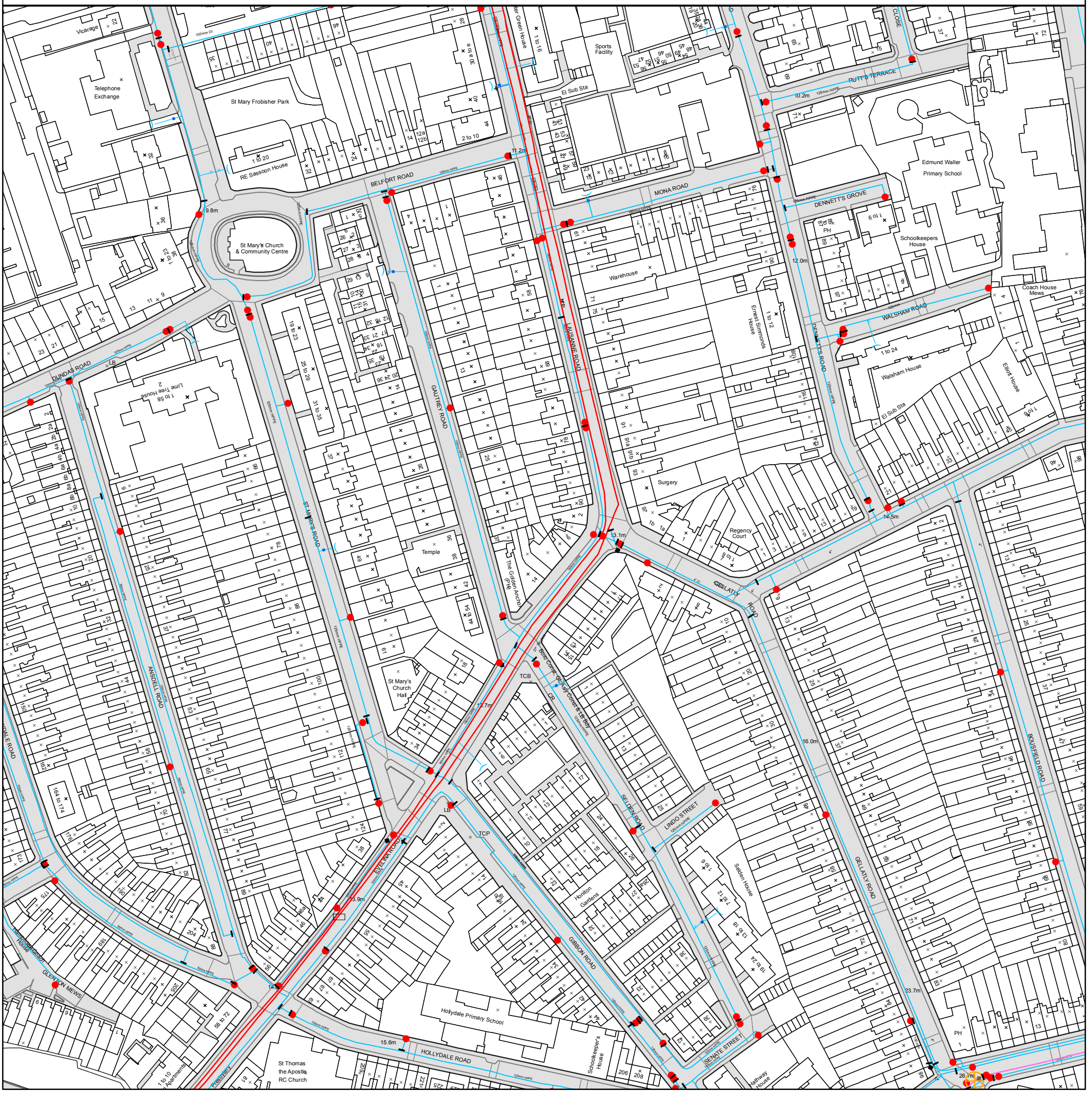
Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2020_4323752



0 10 20 40 60 80 Meters

Scale:	1:1792
Width:	500m
Printed By:	G1KANAGA
Print Date:	15/12/2020
Map Centre:	535391,176313
Grid Reference:	TQ3576SW

Comments:

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**