FLOOD RISK ASSESSMENT & SUDS REPORT FOR

151 STATION ROAD, WEST DRAYTON, UB7 7NG

DOCUMENT NUMBER: C3898-R1-REV-A

PREPARED BY

Nimbus
ENGINEERING CONSULTANTS

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1. SITE DETAILS

Site Name	151 Station Road
Site Address	151 Station Road, West Drayton, UB7 7NG
Purpose of Development	Residential
Existing Land Use	Brownfield
County	Greater London
Country	England
Local Planning Authority	London Borough of Hillingdon

1.1 Site Location

The location of the project site is shown in Figure 1 overleaf, and on the location plan provided in Appendix A.



Figure 1- Location of Project Site

1.2 Proposed Development

The following report has been written to accompany the planning application for the demolition of the existing bungalow and ancillary buildings, and the re-development of the site to provide 6 dwellings, along with associated landscaping, car parking, and cycle storage.

1.3 Geology of The Area

According to the British Geological Survey, the superficial deposit at the site is of the Langley Silt Member, consisting of clay and silt, as shown in Figure 2 below. The bedrock at the area consists of the clay, silt and sand, and is part of the London Clay formation, as shown in Figure 3 below.



Figure 2 - Superficial Deposits at the site. (Source: British Geological Survey website (contains British Geological Survey materials © NERC2026).

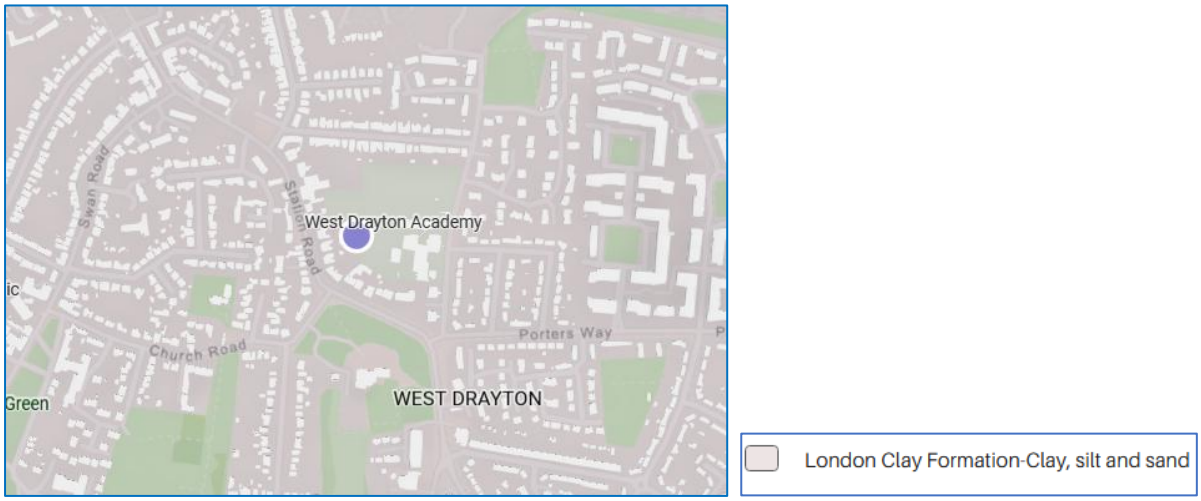


Figure 3 - Bedrock at the site. (Source: British Geological Society Website (contains British Geological Survey materials © NERC2026).

2. PLANNING POLICIES

2.1 National Planning Policies

- National Planning Policy Framework (August 2026)

2.2 Local Planning Policy

The report has been written in conjunction with the following local planning policies:

- London Borough of Hillingdon Local Plan, adopted November 2012 - 2026.
- London Borough of Hillingdon Local Flood Risk Management Strategy (June 2024).
- West London Strategic Flood Risk Assessment;
- The London Plan (2021), Policy S1 12, which states:

A Current and expected flood risk from all sources (as defined in paragraph 9.2.12) across London should be managed in a sustainable and cost-effective way in collaboration with the Environment Agency, the Lead Local Flood Authorities, developers and infrastructure providers.

B Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local

Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks. Boroughs should cooperate and jointly address cross-boundary flood risk issues including with authorities outside London.

C Development proposals should ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses.

D Developments Plans and development proposals should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan. The Mayor will work with the Environment Agency and relevant local planning authorities, including authorities outside London, to safeguard an appropriate location for a new Thames Barrier.

E Development proposals for utility services should be designed to remain operational under flood conditions and buildings should be designed for quick recovery following a flood.

F Development proposals adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading. Unless exceptional circumstances are demonstrated for not doing so, development proposals should be set

back from flood defences to allow for any foreseeable future maintenance and upgrades in a sustainable and cost-effective way.

G Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.

- The London Plan, Policy SI 13 Sustainable drainage, which states:

A Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed.

B Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

1. Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)

2. Rainwater infiltration to ground at or close to source

3. Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)

4. Rainwater discharge direct to a watercourse (unless not appropriate)

5. Controlled rainwater discharge to a surface water sewer or drain

6. Controlled rainwater discharge to a combined sewer.

C Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.

D Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

- The London Local Plan, Core Strategic Policy CS 18 Flood Risk, which states:

A. Minimising river flooding risk, requiring development in the City Flood Risk Area to seek opportunities to deliver a reduction in flood risk compared with the existing situation:

   1. applying the sequential test and exception test as set out in the NPPF and Planning Practice Guidance and requiring Flood Risk Assessments to be submitted, in support of all planning applications in the City Flood Risk Area (Environment Agency Flood Zones 2 and 3 and surface water flood risk hotspots) and for major development proposals elsewhere;
   2. protecting and enhancing existing flood defences along the riverside, particularly those identified as fair or poor in the current City of London SFRA. Development adjacent to the River Thames must be designed to allow for maintenance of flood defences.

B. Reducing the risks of flooding from surface water throughout the City, ensuring that development proposals minimise water use and reduce demands on the combined surface water and sewerage network by applying the London Plan drainage hierarchy.

C. Reducing rainwater run-off, through the use of suitable Sustainable Drainage Systems (SuDS), such as green roofs and rainwater attenuation measures throughout the City.

D. Ensuring that wider flood defences afford the highest category of protection for the City, participating in the development and implementation of the Environment Agency's Thames Estuary 2100 project.

E. Reviewing and updating the City of London's Strategic Flood Risk Assessment at least every 5 years or more frequently if circumstances require, to ensure that changes in flood risk are identified and suitable responses implemented.

- The London Local Plan, Policy DM 18.1 Development in the City Flood Risk Area, which states:

  - Where development is proposed within the City Flood Risk Area evidence must be presented to demonstrate that:

    - the site is suitable for the intended use (see table 18.1), in accordance with Environment Agency and Lead Local Flood Authority advice;

    - the benefits of the development outweigh the flood risk to future occupants;

- the development will be safe for occupants and visitors and will not compromise the safety of other premises or increase the risk of flooding elsewhere.

- Development proposals, including change of use, must be accompanied by a site-specific flood risk assessment for:

    1. all sites within the City Flood Risk Area as shown on the Policies Map; and

    2. all major development elsewhere in the City.

- Site-specific flood risk assessments must address the risk of flooding from all sources and take account of the City of London Strategic Flood Risk Assessment. Necessary mitigation measures must be designed into and integrated with the development and may be required to provide protection from flooding for properties beyond the site boundaries, where feasible and viable.

- Where development is within the City Flood Risk Area, the most vulnerable uses must be located in those parts of the development which are at least risk. Safe access and egress routes must be identified.

- For minor development outside the City Flood Risk Area, an appropriate flood risk statement may be included in the Design and Access Statement.

- Flood resistant and resilient designs which reduce the impact of flooding and enable efficient recovery and business continuity will be encouraged.

- The London Local Plan, Policy DM 18.2 Sustainable drainage systems (SuDS), which states:

A. The design of the surface water drainage system should be integrated into the design of proposed buildings or landscaping, where feasible and practical, and should follow the SuDS management train and London Plan drainage hierarchy.

B. SuDS designs must take account of the City's archaeological heritage, complex underground utilities, transport infrastructure and other underground structures, incorporating suitable SuDS elements for the City's high density urban situation.

C. SuDS should be designed, where possible, to maximise contributions to water resource efficiency, biodiversity enhancement and the provision of multifunctional open spaces.

- The London Local Plan, Policy DM 18.3 Flood Protection and climate change resilience, which states:

A. Development must protect the integrity and effectiveness of structures intended to minimise flood risk and, where appropriate, enhance their effectiveness.

B. Wherever practicable, development should contribute to an overall reduction in flood risk within and beyond the site boundaries, incorporating flood alleviation measures for the public realm, where feasible.

3. FLOOD RISK

The possible causes of flooding set out in NPPF are considered in this section in relation to flood risk to the site itself and the effects of the development of the site on the flood risk elsewhere.

3.1 Flood Zones

The Environment Agency has developed a flood risk map, shown below, which shows the relative risk of flooding for different return periods. Flood zones assume that no defences are present and so where these do exist, they are only indicative of the potential for flooding.

The proposed development site lies within a Flood Zone 1 of the Environment Agency's flood risk map, as shown below. Land located within Flood Zone 1 extents is at low risk of flooding, having an associated annual probability of flooding of less than 1 in 1000.

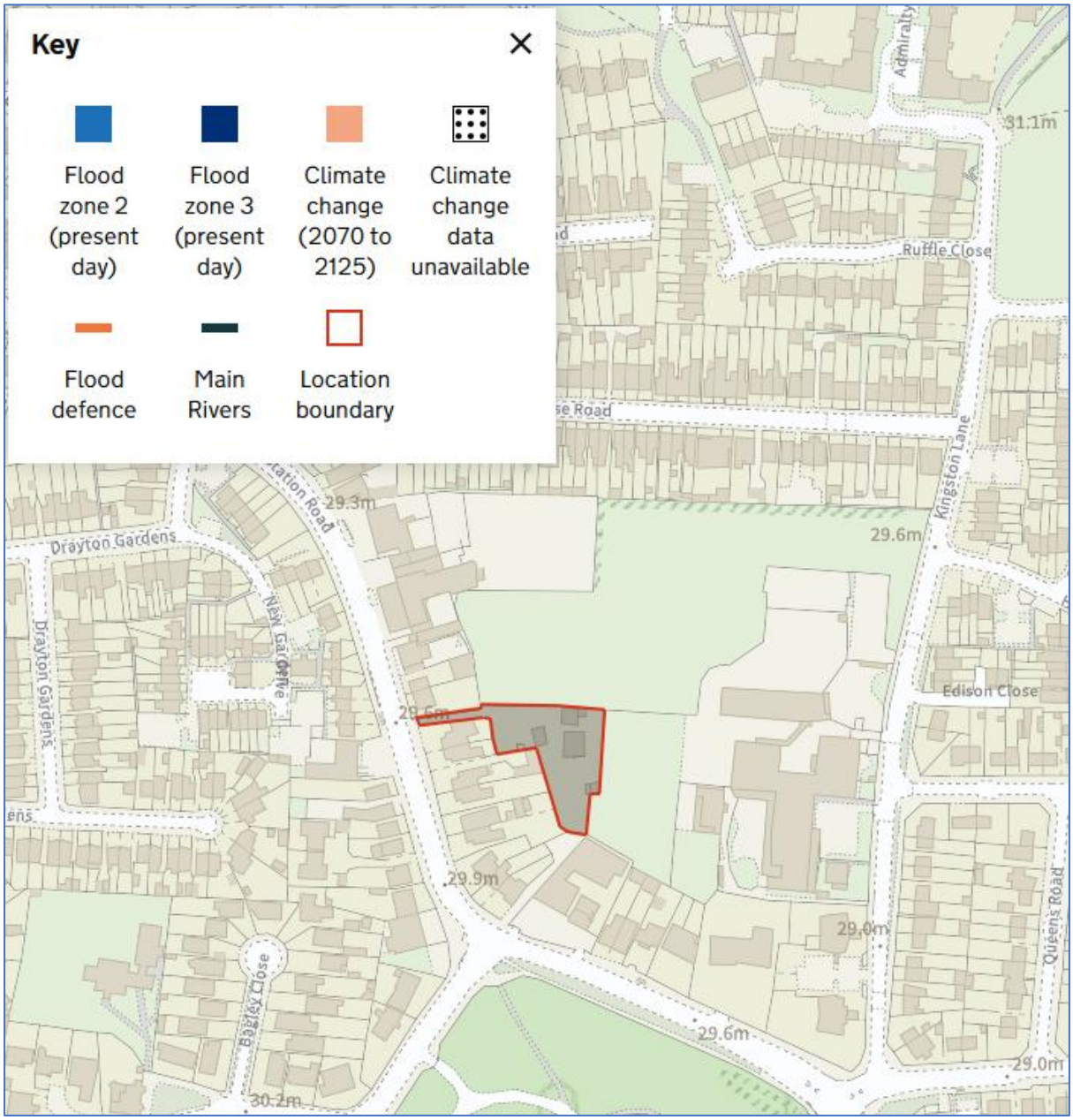


Figure 4 – Environment Agency Flood Map for flooding extent from rivers and sea for the proposed development

3.2 Flooding from Land (Overland Flow)

The proposed development site is shown to be at a medium risk of surface water flooding as can be seen from the Environment Agency's flood maps shown below and overleaf.

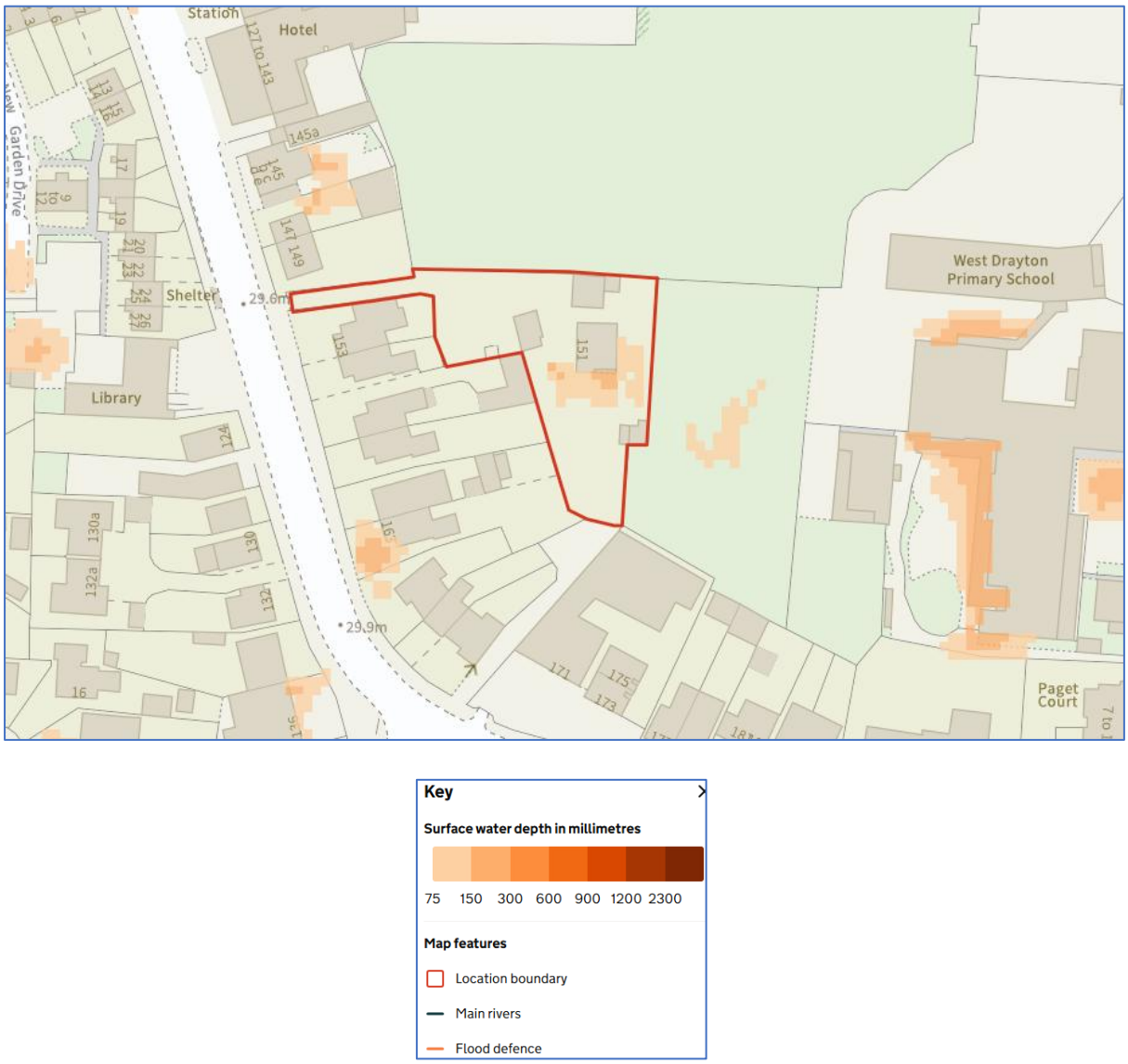


Figure 5 – Environment Agency Surface Water Flood Map (1 in 30 year with Climate Change) for the proposed development.

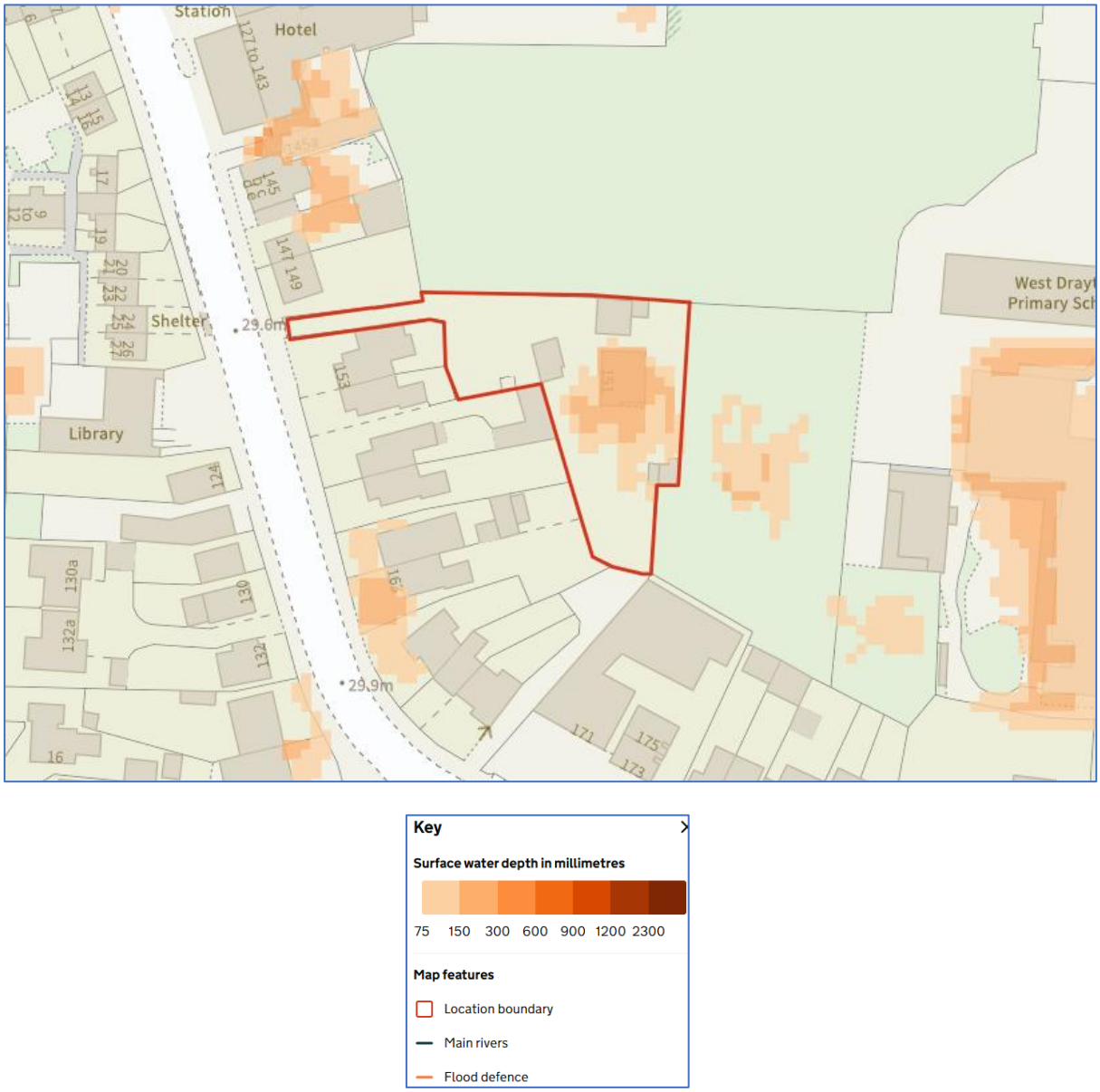


Figure 6 – Environment Agency Surface Water Flood Map (1 in 100 year with Climate Change) for the proposed development.

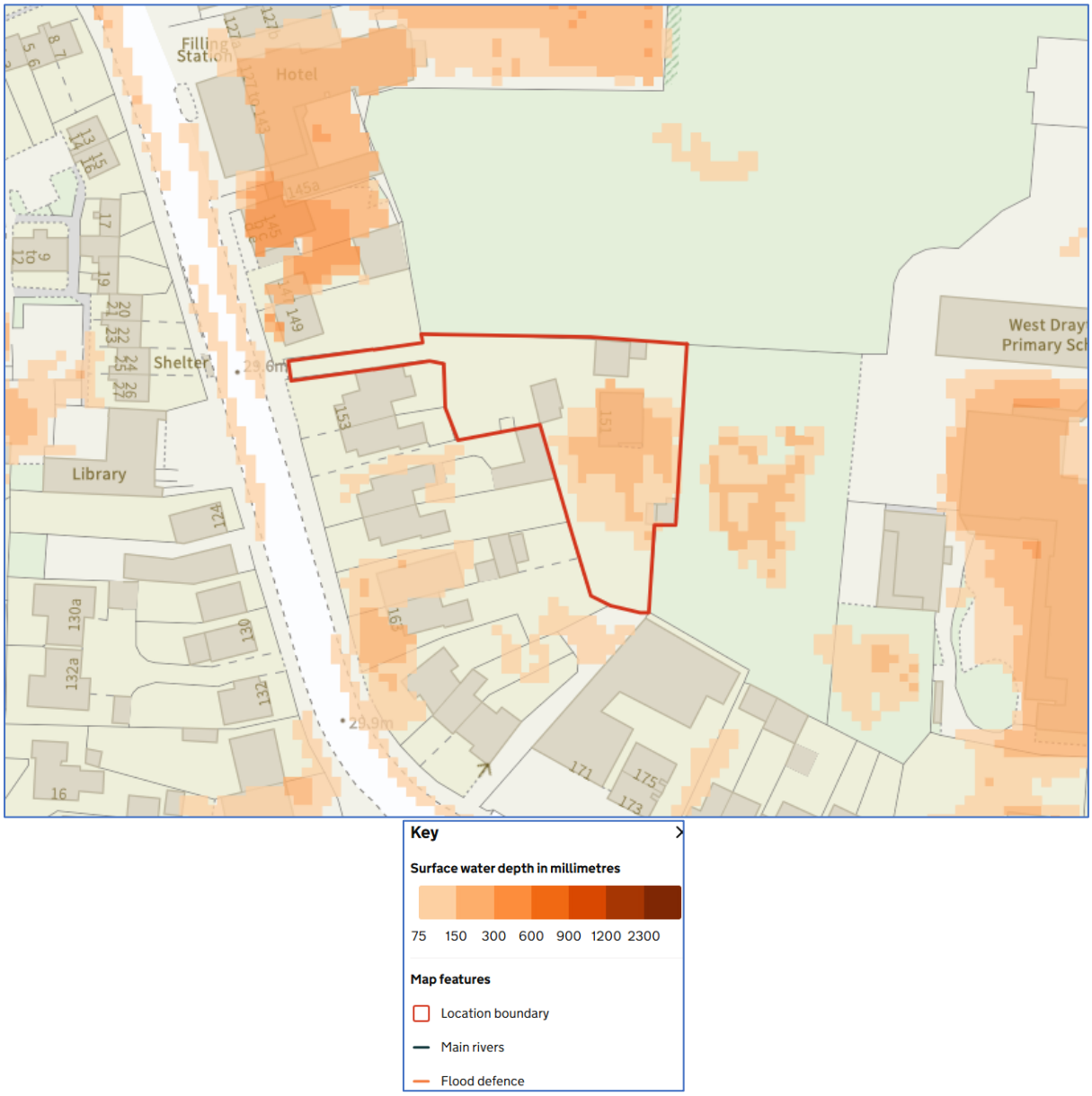


Figure 7 – Environment Agency Surface Water Flood Map (1 in 1000 year with Climate Change) for the proposed development.

There are small areas of flood risk depths of up to 300mm shown for the 1 in 30 year plus climate change and 1 in 100 year plus climate change events shown, with these areas becoming larger for the 1 in 1000 year plus climate change events.

Therefore, the maximum flood depth at the site will be 300mm at the location of the proposed dwellings. However, this flooding is caused by surface water ponding in naturally low lying areas of the site, and the site will be levelled following the development proposals.

To avoid any risk of flooding to the proposed development, we have proposed that the minimum FFL for the properties shall be raised by 150mm above the exterior ground levels, however these cannot be raised any further due to planning height restrictions.

Therefore, together with the levelling of the ground, no flood water should enter the dwellings during an extreme pluvial storm event, resulting in no risk of life for any residents within their respective properties.

However, to ensure that any future flood risk developments for the proposals have been accounted for, various resilience measures will be incorporated into the fabric of the proposed dwellings. Fixtures and fittings will be put in place to ensure that if any flood water does enter the ground floor during an unlikely flood event, these measures will ensure drying and cleaning is simpler, and that the structural integrity of the building is not compromised, and ultimately, they will reduce the time required until the properties can be re-occupied.

The resilience measures to be adopted, are as follows:

- Self-closing air bricks to be used;
- Electricity consumer unit and mains connection point to be located 500mm above the FFL of each dwelling, with all feeds to go down the building from the ceiling;
- Non return valves to be used in drainage design to prevent back up of flow;
- Adequate sealing of joints between the internal units required to prevent any penetration of water behind fittings;
- Walls will have closed-cell cavity insulation;
- The construction of the ground floor slab to be waterproofed, and the finished surfaces of the ground floor of all properties are to be waterproof;
- Flood barriers or flood proof doors are to be used for each dwelling;

Additionally, residents will be provided with a copy of this flood risk assessment in order to understand the risks associated with access and egress from the site during a severe pluvial flooding event. As the predicted pluvial flood depth is only up to 300mm, and much less once the ground has been levelled, there will be no danger to life when accessing or egressing the dwellings.

However, it is essential that any safe access and egress routes are planned in advance and that residents do not put themselves at risk by walking through flood water, which, has the potential to knock them off their feet, where possible. It also imperative that residents are made aware of the hidden dangers of raised flood water, such as blown manholes.

3.3 Flooding from Groundwater

The West London Strategic Flood Risk Assessment identifies the proposed development site to have a 50% to 75% susceptibility to groundwater flooding, as shown overleaf. The contractor will need to be undertake long term groundwater monitoring, so they are made aware if any over pumping maybe required during the construction process.

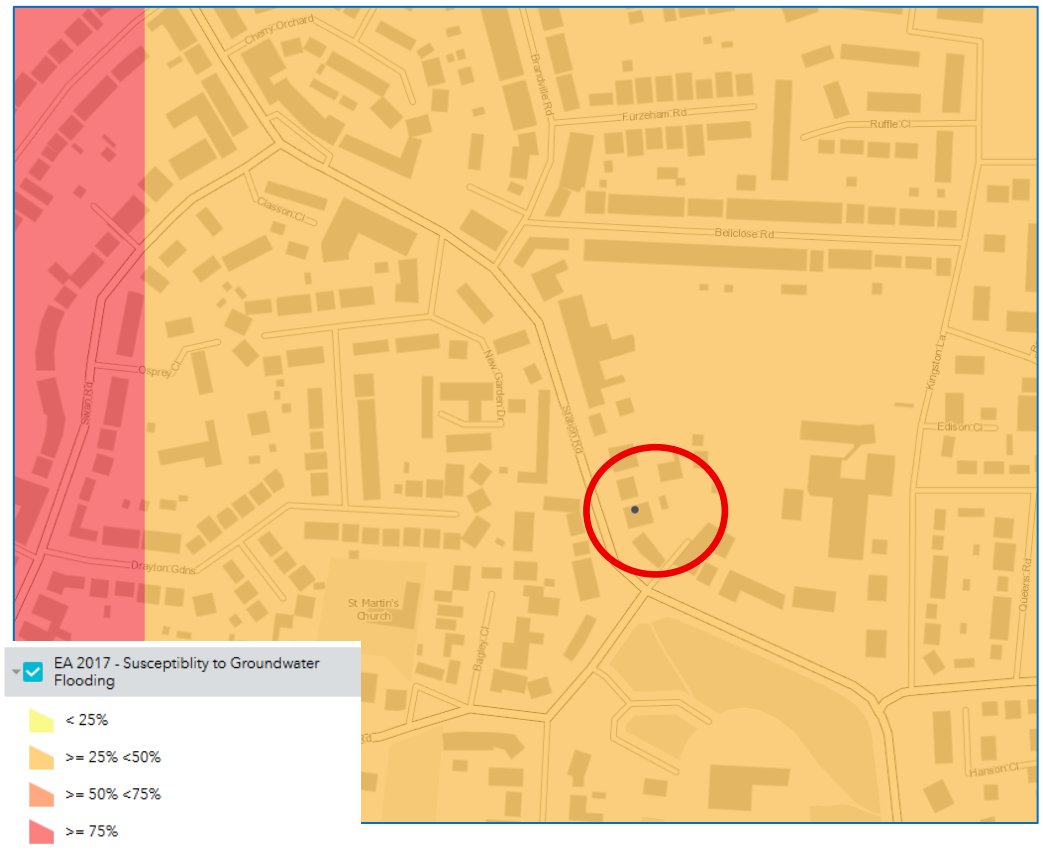


Figure 8 - BGS Groundwater Flood Map, Extracted from the SFRA

3.4 Flooding from Sewers

The West London Strategic Flood Risk Assessment mapping shows that there have been no incidents of sewer flooding within the vicinity of the site. Therefore, it is considered unlikely that there is any risk of flooding of the site due to surcharge of sewers.

Additionally, the proposed SUDs solution as shown in Section 5, shows that the peak rate of surface water runoff leaving the proposed development site, will be restricted to 0.797 l/s, therefore the proposed development will not increase any surface water leaving the existing site, and not increase flood risk at the site or elsewhere.

3.5 Flooding from Reservoirs, Canals or Other Artificial Sources

There is no risk of flooding to this site from any reservoirs, canals or other artificial sources in the vicinity, of the site. This can also be confirmed by the Environment Agency's Flood map shown overleaf.



Figure 9 – Environment Agency Flood Map from reservoirs for the proposed development

4. SUSTAINABLE URBAN DRAINAGE SYSTEMS

The total site area is 1893m^2, and the impermeable areas of the site prior to development are also 882m^2. Following the proposed development at the site, the impermeable areas will increase to 1101m^2, comprising of the roof areas of the proposed dwellings, as well as the contributing hardstanding areas.

The pre and post development surface water runoff calculations showing the peak flow rate leaving the site can be found in Appendix B.

Surface water arising from a developed site should, as far as 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 the 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 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 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 the fine soils and the roots of specially selected plants, pollutants washed of the hard landscaping by rainfall will be safely removed before the water reaches the natural water course.

- A sympathetic approach to the environmental setting by providing the 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.

The SuDS management train is shown in Figure 10 below, this has been followed when proposing the proposed Sustainable Urban Drainage Systems for this site.

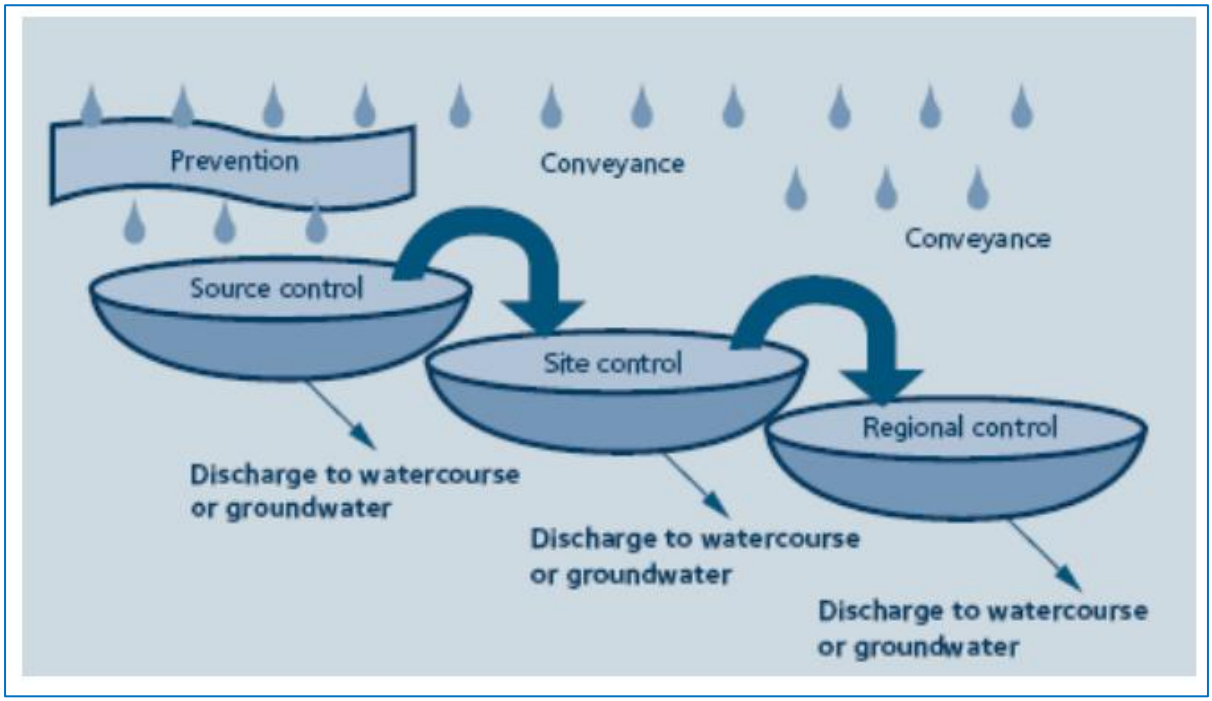


Figure 10 – SuDS Management Train

5. PROPOSED SuDS SOLUTION

The preferred method of dealing with surface water run off would be to treat and deal with it at source through soakaways. However, due to the existing ground conditions this was determined to be unfeasible.

In order to ensure that the SuDS management train has been considered fully, a rainwater harvesting tank will be provided for each dwelling, where possible, to ensure that rainwater re-use is promoted and also to provide source control.

Additionally, all new hardstanding areas will be formed of a permeable paving in order to deal with as much of the surface water at the source, with the surface water runoff from all areas sloping greater than 1:20 to be caught by slot drains. A significant area of attenuating gravel subbase has been proposed in the car parking areas of the dwellings to the south, as can be seen in the plans provided in Appendix A.

The remaining surface water runoff will be collected in a below ground, crate-style attenuation tank, before discharging at a controlled rate to the nearby Surface Water Sewer. Hydrograph storage calculations were carried out for a 1 in 100 year storm event plus 45% climate change, using a peak flow rate of 0.797 l/s leaving the site, and these show that a net storage of 82.4m^3 of storage is required. This can be seen as provided in the plans within Appendix A, along with all supporting runoff calculations in Appendix B of this report.

We believe the Sustainable Urban Drainage System hierarchy has been considered fully with respect to the type of development.

6. TIMESCALE AND MAINTENANCE OF DRAINAGE 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 a management company will be formed to be responsible for overseeing the long-term maintenance of the communal drains.

The following outline maintenance strategy sets out recommended timescales for maintenance of the proposed drainage works, in line with CIRIA SuDS Design Guide:

- Regular inspection will comprise the inspection and cleaning of catchment, gutters, filters and tanks to reduce the likelihood of contamination, this is recommended to be carried out every 3 to 6 months.

- Any flow control device should be checked every 3 months for the accumulation of debris/ silt, in order to ensure that there are no blockages.

- The catchpit chamber and flow control to the attenuation tank should be checked and cleaned every 3 months for the accumulation of debris/ silt, in order to ensure that there are no blockages.

- Jet washing of permeable surfaces should be undertaken every 3 to 6 months in order to ensure that the system works properly

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 1: Operation and maintenance requirements for pervious pavements.

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 2: Operation and maintenance requirement for RWH systems.

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 blockages by sediment, algae or other matter: remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from 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 the 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

Table 3: Operation and maintenance requirements for attenuation storage tanks.

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect from surface and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then 6 monthly intervals
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Orifice plates within plastic chambers or vortex controls to be jetted from the surface after heavy rainfall events to remove any debris or silt	As required
	Empty catchpits upstream of SuDS features to ensure no debris is passed downstream	3 months or as required
Remedial actions*	In the event of a blockage, a vortex flow control can be removed from the chamber via the lifting cabled located at the access, this will be cleaned at surface level and reinstalled into its original location	As required
	In the event of a blockage, the orifice plate should be jetted from surface, and if blockage is not cleared the orifice plate can be removed by removing fixing bolts. These fixing bolts should be checked and replaced if needed.	As required
Monitoring	Following installation it is important that any extraneous materials i.e. building materials: granular backfill, in-situ pour concrete etc are removed from the unit and the new flow control chamber is fully jetted down	Upon installation
	Inspect/check chamber channel for any debris or silt build-up. Upstream chambers should be checked at the same time as these monitoring works to ensure network is operating at full capacity.	Annually

Table 4: Operation and maintenance requirements for flow control chambers

*All Remedial Works should be carried out by a competent and certified contractor, with no access to chambers or removal of parts to be undertaken by homeowners

If upstream network of flow control chamber is regularly maintained, little maintenance is required within the chamber as there are no moving parts

7. CONCLUSIONS

The site is at very low risk from flooding from ground water, reservoir, fluvial or tidal flooding. However, there are areas of the site showing risk of pluvial flooding of depths up to 300mm, in naturally low lying areas of the existing site. Therefore, the proposed FFL will be raised by 150mm from existing ground levels, and further mitigation and resilience measures have been proposed in order to ensure that there is no risk to life from an extreme pluvial flooding event.

The proposals will not impact on any known flood flow route or flood storage area.

A suitable Sustainable Urban Drainage systems solution has been proposed, which follows the SuDS hierarchy. All components of the SuDS management train have been considered and utilised and this proposed development will greatly reduce the surface water run off leaving the site and therefore reduce flood risk at the site and elsewhere.

APPENDIX A – DRAWINGS



Existing Red Boundary Total Area is Approx. 1893m²
Existing Impermeable Total Area is Approx. 882m²
Existing Permeable Total Area is Approx. 1011m²
Existing Impermeable Area represent Approx. 47% from Total Considered Area.

DRAWING TO BE PRINTED IN COLOUR.

KEY:

- Existing Roof Area
- Existing Hardstanding Area
- Proposed Site Boundary
- Exceedance Route Arrow

NOT FOR CONSTRUCTION

IMPORTANT

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REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	09-04-26	M.HAM	For Information.	S.L	S.L

151 Station Road, West Drayton, UB7 7NG

Pre Development and Impermeable Area and Exceedance Route Plan

Kearns Development Ltd

Nimbus ENGINEERING CONSULTANTS

S.L	09-04-26	S.L	09-04-26
M.HAM	1:250	C3753-01	A
09-04-26	A1		



Proposed Red Boundary Total Area is Approx. 1893m²

Proposed Impermeable Total Area is Approx. 1101m²

Proposed Permeable Total Area is Approx. 792m²

Proposed Impermeable Area represent Approx. 58% from Total Considered Area.

DRAWING TO BE PRINTED IN COLOUR.

KEY:

- Proposed Hardstanding Areas
- Proposed Roof Areas
- Proposed Site Boundary
- Exceedance Route Arrow

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REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	06-10-26	L.B	For Information.	S.L	S.L

151 Station Road, West Drayton, UB7 7NG

Post Development and Impermeable Area and Exceedance Route Plan

Kearns Development Ltd

Nimbus ENGINEERING CONSULTANTS

S.L	06-10-26	S.L	06-10-26
L.B	1:250	C3898-02	A
06-10-26	A1		

NORTH
Indicative

SWC-06
Proposed Orifice Flow Control Chamber to have a Ø21mm orifice to restrict the flow to a maximum of 1l/s for 1:100 +45% climate change. Flow rate as per previous approved drainage strategy appoved by the council.

Surface Water Underground Attenuation Tank from Polystorm Deep or similar approved product to with 95% void ratio to provide minimum 83m³ of net storage to avoid any flooding for 1:100 storm event +45% Climate Change.
CL: Approx. 29.993m AOD
Top of tank: 29.493m AOD
IL of tank: 29.093m AOD
Supplier of tank to provide structural and floatation calculations and contractor to follow their recommendations regarding storing, handling and installation. Attenuation tank to be wrapped on sides and on bottom with welded impermeable membrane and on top to have geotextile to allow infiltration from the permeable pavement. Buildup on top of attenuation tank to be made from suitable granular material to allow infiltration.

Proposed connection to Existing Thames Water Surface Water Chamber 2603
IL: 28.89m AOD
Location & IL as per TW Asset Plans

STATION ROAD

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KEY:

- Proposed Attenuating Permeable Paving
- Proposed Site Boundary
- SW Inspection / Catchpit Chambers
- Surface Water UPVC Pipes
- Foul Water Pipe
- Surface Water Pipe
- Proposed Attenuation Tank

NOT FOR CONSTRUCTION

IMPORTANT

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A	04-11-26	L.B	For Information.	S.L	S.L

151 Station Road, West Drayton, UB7 7NG

SuDS Layout and Location Plan

Kearns Development Ltd

Nimbus ENGINEERING CONSULTANTS

S.L	04-11-26	S.L	04-11-26
L.B	1:250	C3898-03	A
04-11-26	A1		

APPENDIX B – SURFACE WATER RUNOFF CALCULATIONS

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Job No.	C3898
Sheet no.	1
Date	02/11/26

MasterDrain
HY 10.01

Project	151 Station Road, West Drayton, UB7 7NG	By	SL
Title	Pre & post dev't Surface Water run off calcs prior to SuDS mitigation	Checked	
		Reviewed	

Data:-

Hydrology (FSR):-

Location = UXBRIDGE		WRAP	= 4
Long reference = 505183		Grid reference	= TQ0583
M5-60 (mm)	= 20	SAAR (mm/yr)	= 675
r	= 0.43	Soil	=0.47
Hyd. area	= 6	Hyd. zone	= 8
Hydrograph	= Winter	Area = England & Wales	

Site values used in design:-

Total site area	= 0.1893 ha	Climate change factor	= 45%
Pre-dev area drained	= 0.0882 ha	Post-dev area drained	= 0.1101 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 = 0.110 ha
Equiv. Post-dev Imperm. area = 0.110 ha
Equiv. Post-dev Perm. area = 0.016 ha
Total Pre-dev equiv. area ha = 0.108 ha
Total Post-dev equiv. area ha = 0.126 ha
100 yr 6 hour mean intensity = 10.13mm/hr

Results:-

Pre-dev peakflow runoff (l/s) (m³/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	24.1	15.8	9.6	5.9	3.6	2.7	2.2	1.8	24.1	N/A	24.1	1
30	58.7	37.7	23.2	13.8	8.1	5.9	4.7	3.9	58.7	N/A	58.7	30
100	76.2	49.4	30.5	18.2	10.6	7.6	6.0	5.1	76.2	N/A	76.2	100

Post-dev peakflow runoff (l/s)

R.P.	15	30	60	120	240	360	480	600	Max	CCF	Final	R.P.
1	28.0	18.3	11.2	6.9	4.2	3.2	2.5	2.1	28.0	45	40.5	1
30	68.1	43.8	26.9	16.1	9.4	6.8	5.4	4.5	68.1	45	98.8	30
100	88.5	57.4	35.4	21.1	12.3	8.9	7.0	5.9	88.5	45	128.3	100

100 year 6 hour (x Climate Change Factor) storm gives:-
Pre-dev runoff volume m³ = 65.9m³
Post-dev rainfall volume = 110.9m³
Post-dev volume m³ (excess above SUDS) = 110.9m³
100 yr 6 hour mean intensity = 10.13mm/hr
Pre-dev volume to drain at 0 l/s = 0.0 m³
Post-dev volume to drain at 0 l/s = 0.0 m³
Post-dev storage volume = 110.9m³
Post-dev 5mm imperm volume = 5.5 m³
Post-dev 5mm perm volume = 4.0 m³

$Q_{BAR(rural)}$ = 0.876 l/s or 4.627 l/s/ha or 0.001 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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Project	151 Station Road, West Drayton, UB7 7NG	By	SL
Title	Pre & post dev't Surface Water run off calcs prior to SuDS mitigation	Checked	
		Reviewed	

Data summary.

Use the data below for the SUR1 form

Site areas:-

Total site area =	0.1893 ha ;1893.0 m²	[3A]
Pre-development impermeable area =	0.0882 ha	[3B]
Pre-development permeable area =	0.1011 ha	
Post-development impermeable area =	0.1101 ha	[3C]
Post-development permeable area =	0.0792 ha	

Peak runoff:-

Pre-development 1 year storm (15min) =	24.1 l/s	[6A]
Pre-development 100 year storm (15min) =	76.2 l/s	[6C]
Post-development 1 year storm (15min) =	28.0 l/s	[6B]
Post-development 100 year storm (15min)=	88.51 l/s	[6D]

Greenfield runoff:-

$Q_{BAR(rural)}$ = 0.876 l/s or 4.627 l/s/ha or 0.001 cumecs - from IoH 124.

Climate change factor:-
CCF = 45%

Volumes:-
Pre-development 100 yr/6hr storm [12A]= 95.5m³
Post-development 100 yr/6hr storm (add. volume with no SUDS) [12B]= 110.9m³
Post-development 100 yr/6hr storm (add. volume with SUDS) = 110.9m³
Post-development add. predicted volume (No SUDS) [12C] = 15.4m³

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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Job No.	C3898
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Project	151 Station Road, West Drayton, UB7 7NG	By	SL
Title	Pre & post dev't Surface Water run off calcs prior to SuDS mitigation	Checked	
		Reviewed	

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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Sheet no.	1
Date	02/11/26

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Project	151 Station Road, West Drayton, UB7 7NG	By	Checked	Reviewed
Title	IoH 124 (Qbar(urban))Runoff calcs	SL		

Hydrological Data:-

FSR Hydrology:-

Location	= UXBRIDGE	Grid reference	= TQ0583
M5-60 (mm)	= 20	r	= 0.43
Soil runoff	= 0.45	SAAR (mm/yr)	= 675
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 = 0.001893 Km² - 0.189 Ha - 1893 m² % Urbanisation = 47.00%

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 =31.046 CWI =71.307 NC =0.758

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 0.004

$Q_{BAR(rural)}$ = 0.797 (l/s)

$Q_{BAR(urban)}$ = 1.682 (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.	C3898
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Date	02/11/26
Project	151 Station Road, West Drayton, UB7 7NG
Title	IoH 124 (Qbar(urban))Runoff calcs
By	SL
Checked	
Reviewed	

MasterDrain
HY 10.01

Calculated data:-

Mean Annual Peak Flow $Q_{BAR(urban)}$ = 1.68 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	0.001	1.430	7.553	100yr	0.005	5.298	27.990
2yr	0.001	1.480	7.819	100yr+20%	0.006	6.358	33.588
5yr	0.002	2.153	11.374	100yr+30%	0.007	6.888	36.387
10yr	0.003	2.725	14.395	200yr	0.006	6.224	32.877
30yr	0.004	3.751	19.815	200yr + 30%	0.008	8.091	42.740
50yr	0.004	4.407	23.281	500yr	0.008	7.552	39.897
				1000yr	0.009	8.679	45.850

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).

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Job No.	C3898
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MasterDrain SW

Project	151 Station Road, West Drayton, UB7 7NG	By	SL
Title	Hydrograph storage calcs with Qbar discharge	Checked	
		Reviewed	

Data:-

Location = UXBRIDGE
M5-60 (mm) = 20
Soil index = 0.45
Return period = 100
UCWI = 0.0

Grid reference = TQ0583
r = 0.43
SAAR (mm/yr) = 675
WRAP = 4
Climate change = 45%

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 = 1101 m²
Total area = 1101 m²
Total runoff = 100.0 m³

Pervious area = 0 m²
Equiv area = 1101 m² (Tot. area x % runoff).
Discharge rate = 0.797 l/s

Storage (m³) = 82.4 m³ (Sum of all balance quantities)

Total rainfall depth = 90.8 mm

Calculations :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
0.070	20.0	2.6	0.200	0.201	0.000	0.000
0.140	20.0	2.6	0.200	0.201	0.000	0.000
0.210	21.0	2.7	0.210	0.201	0.009	0.009
0.280	21.0	2.7	0.210	0.201	0.009	0.018
0.350	22.0	2.9	0.220	0.201	0.019	0.037
0.420	23.0	3.0	0.230	0.201	0.029	0.066
0.490	24.0	3.1	0.240	0.201	0.039	0.106
0.560	26.0	3.4	0.260	0.201	0.059	0.165
0.630	27.0	3.5	0.270	0.201	0.069	0.234
0.700	29.0	3.8	0.290	0.201	0.089	0.323
0.770	31.0	4.0	0.310	0.201	0.109	0.432
0.840	32.0	4.2	0.320	0.201	0.119	0.551
0.910	33.0	4.3	0.330	0.201	0.129	0.680
0.980	34.0	4.4	0.340	0.201	0.139	0.819
1.050	36.0	4.7	0.360	0.201	0.159	0.978
1.120	38.0	4.9	0.380	0.201	0.179	1.157
1.190	39.0	5.1	0.390	0.201	0.189	1.346
1.260	40.0	5.2	0.400	0.201	0.199	1.545
1.330	42.0	5.4	0.420	0.201	0.219	1.764
1.400	45.0	5.8	0.450	0.201	0.249	2.013
1.470	49.0	6.4	0.490	0.201	0.289	2.302
1.540	53.0	6.9	0.530	0.201	0.329	2.632
1.610	57.0	7.4	0.570	0.201	0.369	3.001
1.680	62.0	8.0	0.620	0.201	0.419	3.420
1.750	66.0	8.6	0.660	0.201	0.459	3.879
1.820	71.0	9.2	0.710	0.201	0.509	4.388
1.890	77.0	10.0	0.770	0.201	0.569	4.956
1.960	84.0	10.9	0.840	0.201	0.639	5.595
2.030	91.0	11.8	0.910	0.201	0.709	6.304
2.100	98.0	12.7	0.980	0.201	0.779	7.083
2.170	105.0	13.6	1.050	0.201	0.849	7.932
2.240	114.0	14.8	1.140	0.201	0.939	8.871
2.310	125.0	16.2	1.250	0.201	1.049	9.920
2.380	135.0	17.5	1.350	0.201	1.149	11.069
2.450	143.0	18.6	1.430	0.201	1.229	12.298
2.520	154.0	20.0	1.540	0.201	1.339	13.636
2.590	164.0	21.3	1.640	0.201	1.439	15.075
2.660	173.0	22.4	1.730	0.201	1.529	16.604
2.730	183.0	23.7	1.830	0.201	1.629	18.233
2.800	194.0	25.2	1.940	0.201	1.739	19.971

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MasterDrain SW

Project: 151 Station Road, West Drayton, UB7 7NG

Title: Hydrograph storage calcs with Qbar discharge

Calculations (cont.) :-

Time (hrs)	%Mean intens	Rain mm/hr	Inflow (m3)	Outflow (m3)	Balance (m3)	Cumulative (m3)
2.870	204.0	26.5	2.040	0.201	1.839	21.810
2.940	212.0	27.5	2.119	0.201	1.919	23.729
3.010	219.0	28.4	2.189	0.201	1.989	25.717
3.080	226.0	29.3	2.259	0.201	2.059	27.776
3.150	233.0	30.2	2.329	0.201	2.129	29.904
3.220	239.0	31.0	2.389	0.201	2.189	32.093
3.290	244.0	31.7	2.439	0.201	2.239	34.332
3.360	248.0	32.2	2.479	0.201	2.279	36.610
3.430	249.0	32.3	2.489	0.201	2.289	38.899
3.500	250.0	32.4	2.499	0.201	2.299	41.197
3.570	250.0	32.4	2.499	0.201	2.299	43.496
3.640	249.0	32.3	2.489	0.201	2.289	45.784
3.710	248.0	32.2	2.479	0.201	2.279	48.063
3.780	244.0	31.7	2.439	0.201	2.239	50.301
3.850	239.0	31.0	2.389	0.201	2.189	52.490
3.920	233.0	30.2	2.329	0.201	2.129	54.619
3.990	226.0	29.3	2.259	0.201	2.059	56.677
4.060	219.0	28.4	2.189	0.201	1.989	58.666
4.130	212.0	27.5	2.119	0.201	1.919	60.584
4.200	204.0	26.5	2.040	0.201	1.839	62.423
4.270	194.0	25.2	1.940	0.201	1.739	64.162
4.340	183.0	23.7	1.830	0.201	1.629	65.790
4.410	173.0	22.4	1.730	0.201	1.529	67.319
4.480	164.0	21.3	1.640	0.201	1.439	68.758
4.550	154.0	20.0	1.540	0.201	1.339	70.097
4.620	143.0	18.6	1.430	0.201	1.229	71.326
4.690	135.0	17.5	1.350	0.201	1.149	72.474
4.760	125.0	16.2	1.250	0.201	1.049	73.523
4.830	114.0	14.8	1.140	0.201	0.939	74.462
4.900	105.0	13.6	1.050	0.201	0.849	75.311
4.970	98.0	12.7	0.980	0.201	0.779	76.090
5.040	91.0	11.8	0.910	0.201	0.709	76.799
5.110	84.0	10.9	0.840	0.201	0.639	77.438
5.180	77.0	10.0	0.770	0.201	0.569	78.007
5.250	71.0	9.2	0.710	0.201	0.509	78.516
5.320	66.0	8.6	0.660	0.201	0.459	78.975
5.390	62.0	8.0	0.620	0.201	0.419	79.394
5.460	57.0	7.4	0.570	0.201	0.369	79.763
5.530	53.0	6.9	0.530	0.201	0.329	80.092
5.600	49.0	6.4	0.490	0.201	0.289	80.381
5.670	45.0	5.8	0.450	0.201	0.249	80.630
5.740	42.0	5.4	0.420	0.201	0.219	80.849
5.810	40.0	5.2	0.400	0.201	0.199	81.048
5.880	39.0	5.1	0.390	0.201	0.189	81.237
5.950	38.0	4.9	0.380	0.201	0.179	81.416
6.020	36.0	4.7	0.360	0.201	0.159	81.575
6.090	34.0	4.4	0.340	0.201	0.139	81.714
6.160	33.0	4.3	0.330	0.201	0.129	81.843
6.230	32.0	4.2	0.320	0.201	0.119	81.962
6.300	31.0	4.0	0.310	0.201	0.109	82.072
6.370	29.0	3.8	0.290	0.201	0.089	82.161
6.440	27.0	3.5	0.270	0.201	0.069	82.230
6.510	26.0	3.4	0.260	0.201	0.059	82.289
6.580	24.0	3.1	0.240	0.201	0.039	82.328
6.650	23.0	3.0	0.230	0.201	0.029	82.357
6.720	22.0	2.9	0.220	0.201	0.019	82.376
6.790	21.0	2.7	0.210	0.201	0.009	82.385
6.860	21.0	2.7	0.210	0.201	0.009	82.394
6.930	20.0	2.6	0.200	0.201	0.000	82.393
7.000	20.0	2.6	0.200	0.201	0.000	82.393

Storage volume (m^3) = 82.4 m^3 (Sum of all balance quantities)

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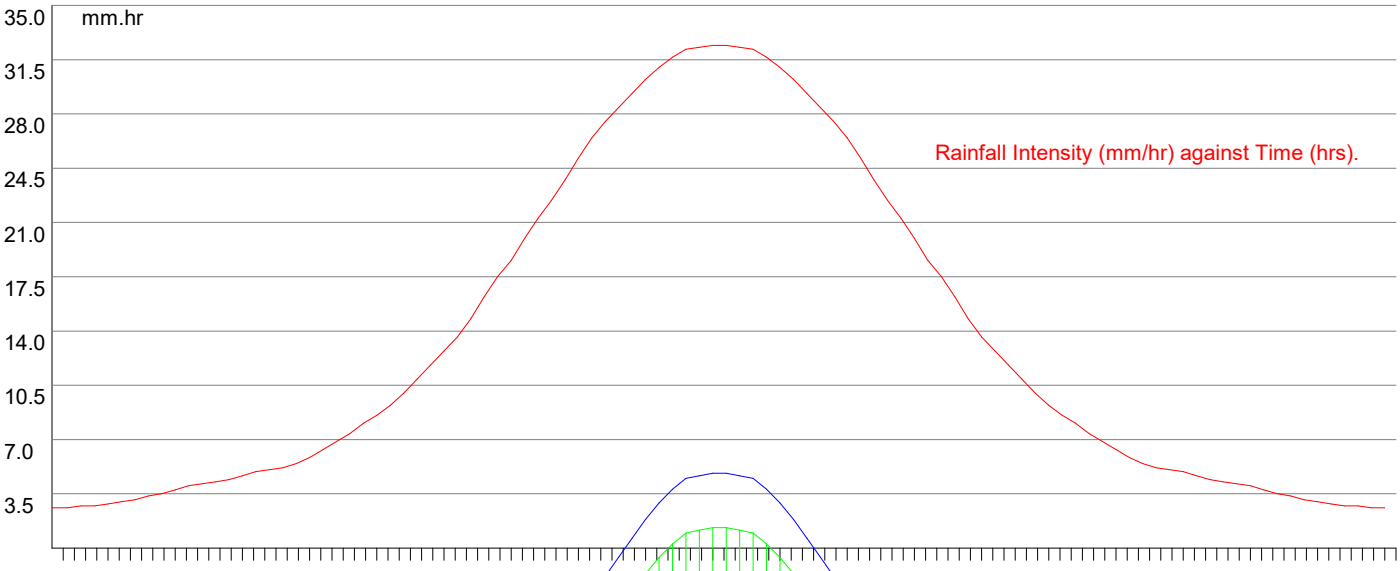
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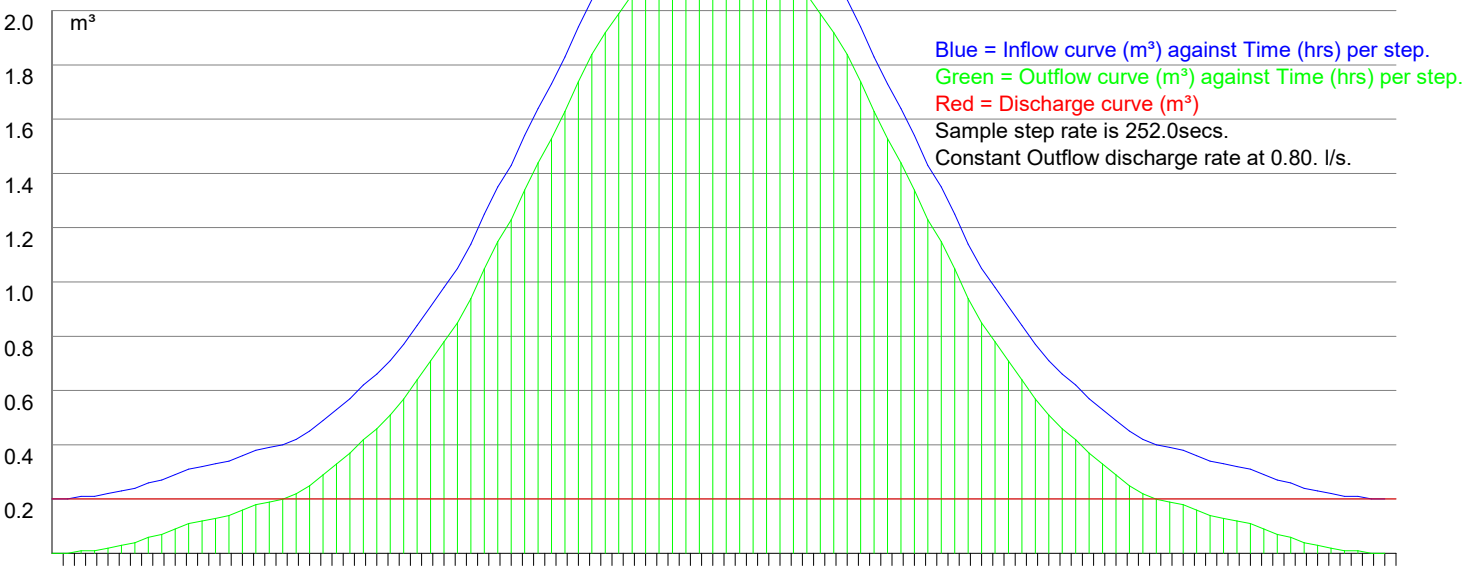
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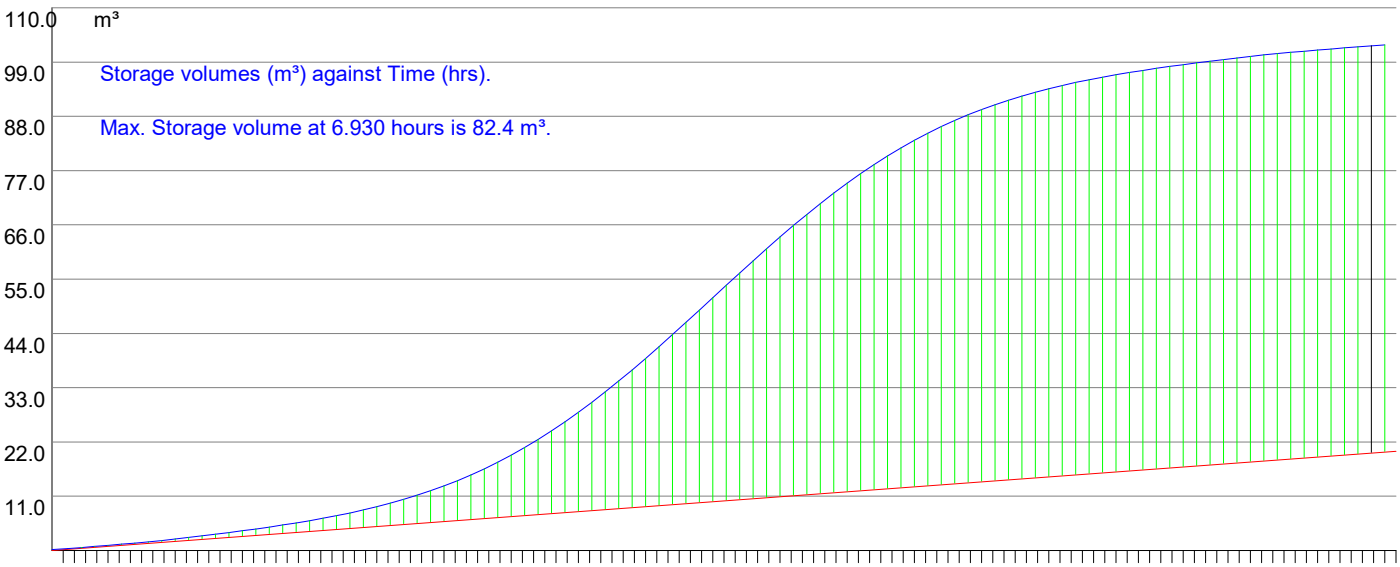
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Reviewed	

Project: 151 Station Road, West Drayton, UB7 7NG

Title: Hydrograph storage calcs with Qbar discharge







MasterDrain SW

Nimbus Engineering Consultants Ltd
www.nimbusengineering.co.uk

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Job No.	C3898
Sheet no.	4
Date	02/11/26

Project	By	Checked	Reviewed
151 Station Road, West Drayton, UB7 7NG	SL		

Title: **Hydrograph storage calcs with Qbar 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	40.68	0.25	146.75	0.2	
0.5	52.26	0.50	95.16	0.3	
1	63.42	1.00	58.74	0.6	
2	73.36	2.00	35.05	1.2	
3	78.01	3.00	25.59	1.8	
4	80.42	4.00	20.36	2.4	
5	81.56	5.00	17.00	3.0	
6	82.20	6.00	14.68	3.6	
7	82.39	7.00	12.97	4.2	Peak found
8	82.38	---	11.65	4.8	
9	82.22	---	10.59	5.4	
10	81.90	---	9.73	6.0	
12	80.96	---	8.39	7.2	
15	79.20	---	7.00	9.0	
18	77.28	---	6.04	10.8	
20	75.92	---	5.54	12.0	
24	72.97	---	4.77	14.4	
30	68.27	---	3.98	18.0	
36	63.51	---	3.43	21.6	
42	58.73	---	3.02	25.2	
48	53.99	---	2.70	28.8	
54	49.38	---	2.45	32.4	
60	44.91	---	2.25	36.0	
66	40.52	---	2.08	39.6	
72	36.27	---	1.94	43.2	
84	28.31	---	1.70	50.4	
96	21.08	---	1.53	57.6	
120	9.05	---	1.27	72.0	
150	0.16	---	1.05	90.0	
175	0.00	---	0.93	105.0	
200	0.00	---	0.83	120.0	
250	0.00	---	0.69	150.0	
300	0.00	---	0.59	180.0	
375	0.00	---	0.49	225.0	
500	0.00	---	0.39	300.0	
750	0.00	---	0.28	450.0	
1000	0.00	---	0.22	600.0	
1250	0.00	---	0.18	750.0	
1500	0.00	---	0.16	900.0	
1570	0.00	---	0.15	942.0	
2000	0.00	---	0.12	1200.0	
2500	0.00	---	0.10	1500.0	
3000	0.00	---	0.09	1800.0	
3500	0.00	---	0.08	2100.0	
4000	0.00	---	0.07	2400.0	

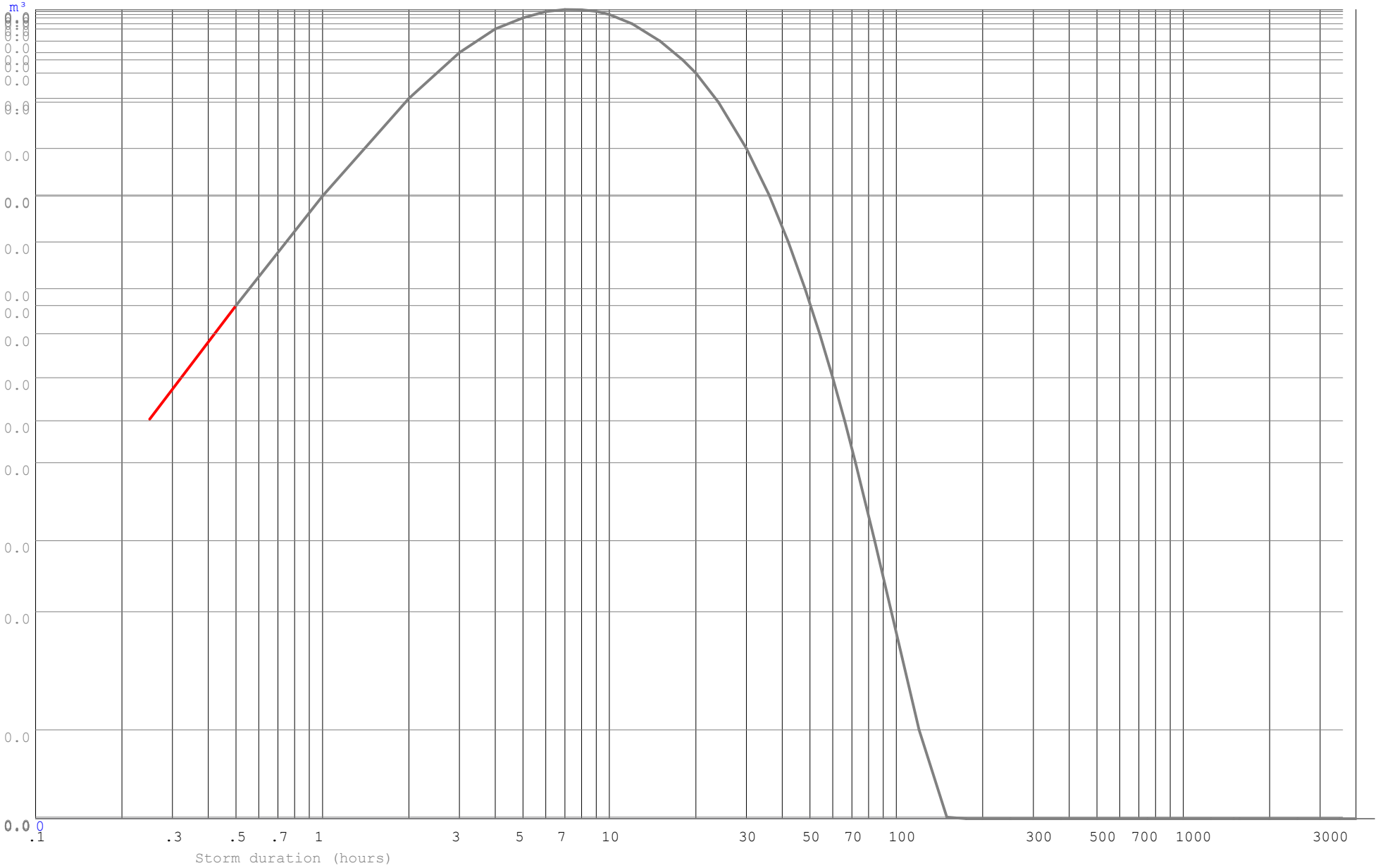
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Job No. C3898			
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Project 151 Station Road, West Drayton, UB7 7NG	By SL	Checked	Reviewed
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Sequential storage volume at specific storm durations.



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Job No. C3898			
Sheet no. 6			
Date 02/11/26			
Project 151 Station Road, West Drayton, UB7 7NG	By SL	Checked	Reviewed
Title Hydrograph storage calcs with Qbar 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.

APPENDIX C – LOCAL WATER AUTHORITY ASSET PLANS

Asset Location Search

Property Searches

Nimbus Engineering Consultants Limited
CAPITAL OFFICE LTD, GROUND FLO
LONDON
EC1V 2NX

Search address supplied 151
Station Road
West Drayton
UB7 7NG

Your reference C3753

Our reference ALS/ALS Standard/2026_5313101

Search date 9 April 2026

Keeping you up-to-date

Notification of price changes

We're changing our report prices from 4th June 2025. The price will increase by 3.5% based on Retail Price Index (RPI).

Find our new prices on our website thameswater.co.uk/property-searches

Any Questions? We're happy to talk through the changes with you – give our Property Searches team a call on 0800 009 4540 .

Thames Water Utilities Ltd
Property Searches,
Clearwater Court, Vastern Road, Reading RG1 8DB

property.searches@thameswater.co.uk
thameswater.co.uk/propertysearches

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: 151, Station Road, West Drayton, UB7 7NG

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 search provides maps showing the position and 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 0800 009 4540, or use the contact details below:

Thames Water Utilities Ltd
Property Searches
Clearwater Court
Vastern Road
Reading
RG1 8DB

Email: property.searches@thameswater.co.uk
Web: thameswater.co.uk/propertysearches

Asset Location Search

Thames Water Property Searches

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. The public sewer map 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.

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

Affinity Water Ltd
Tamblin Way

Hatfield
AL10 9EZ
Tel: 0845 7823333

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.

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. You can do this by emailing customer.feedback@thameswater.co.uk with the email subject header 'Enquiry – TWOSA', along with details of the request.

If you have any questions regarding sewer connections, budget estimates, diversions or building over 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

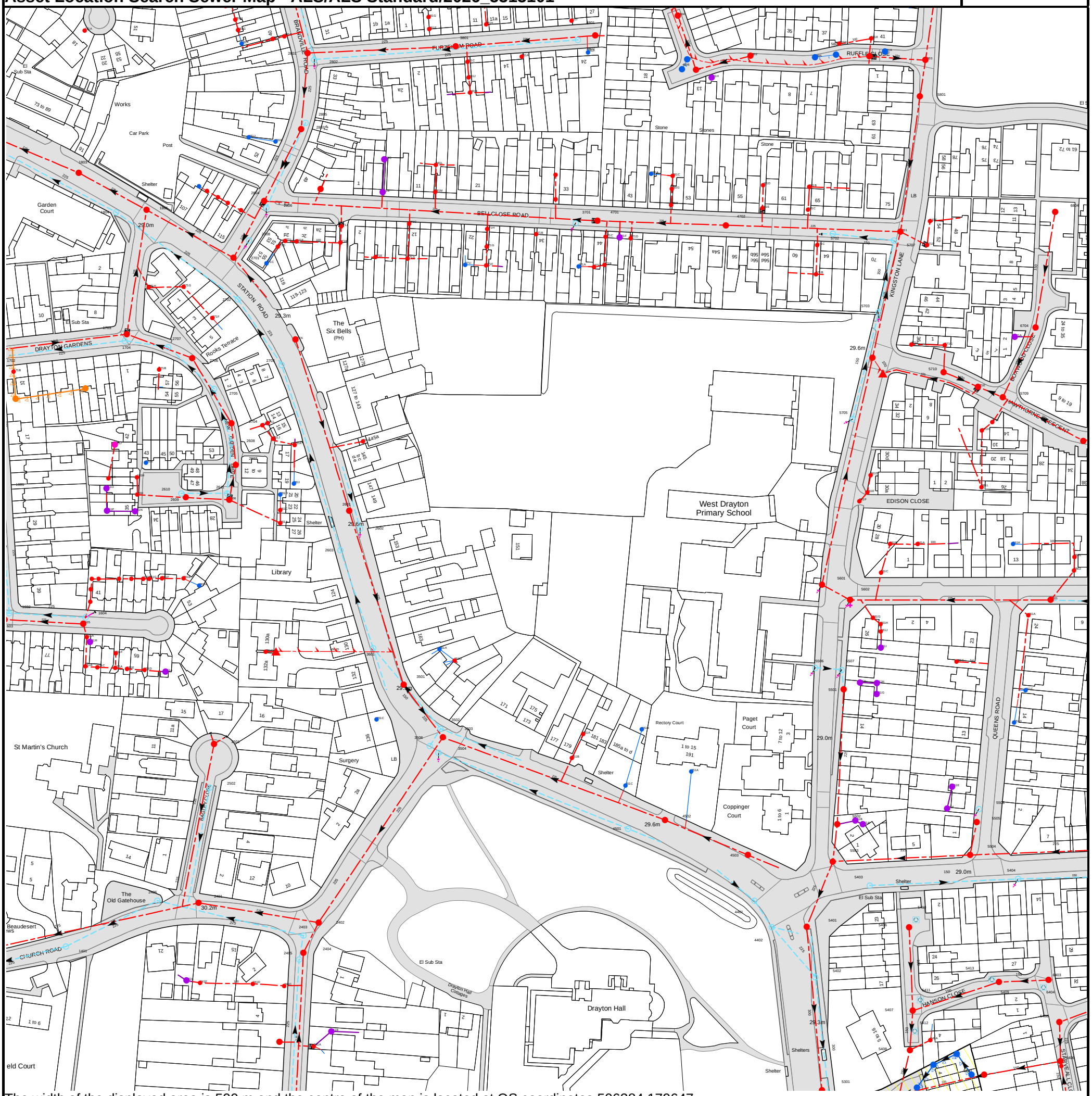
Clean Water queries

Should you require any advice concerning clean water 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

Asset Location Search Sewer Map - ALS/ALS Standard/2026_5313101



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 506384,179647

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 and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2024) with the Sanction of the controller of H.M. Stationery Office, License no. AC0000849556 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
581E	n/a	n/a
581H	29	28.29
6406	29.53	26.63
5406	29.61	27.75
5408	29.65	26.54
5407	29.69	26.71
5412	n/a	n/a
5410	n/a	n/a
5411	n/a	n/a
541A	n/a	n/a
n/a	4.15	2.802
5413	n/a	n/a
5409	29.68	27.12
5404	29.18	28.1
6404	n/a	n/a
6403	29.74	27.35
6408	29.79	26.71
561B	n/a	n/a
571F	n/a	n/a
561A	n/a	n/a
5710	n/a	n/a
571G	n/a	n/a
571E	n/a	n/a
561L	n/a	n/a
571H	n/a	n/a
571I	n/a	n/a
5709	n/a	n/a
561K	n/a	n/a
661L	n/a	n/a
6605	n/a	n/a
581A	n/a	n/a
5707	n/a	n/a
5701	30.01	27.22
5801	30.6	27.27
5803	30.82	27.27
571D	n/a	n/a
581F	n/a	n/a
571A	n/a	n/a
6704	n/a	n/a
6804	n/a	n/a
5504	29.02	26.2
5505	28.38	26.25
5508	n/a	n/a
551F	n/a	n/a
551E	n/a	n/a
551D	n/a	n/a
651C	n/a	n/a
551C	n/a	n/a
561I	n/a	n/a
561J	n/a	n/a
561H	n/a	n/a
661A	n/a	n/a
6601	28.2	26.84
561C	n/a	n/a
6602	n/a	n/a
n/a	4.15	2.802
n/a	4.15	2.802
5420	28.8	26.46
n/a	4.15	2.802
471A	n/a	n/a
4701	28.82	26.67
471B	n/a	n/a
471C	n/a	n/a
471F	n/a	n/a
471D	n/a	n/a
481A	n/a	n/a
481B	n/a	n/a
481G	n/a	n/a
481C	n/a	n/a
4806	n/a	n/a
4805	n/a	n/a
4803	28.47	26.5
481H	n/a	n/a
4702	n/a	n/a
4802	28.54	26.68
481E	n/a	n/a
481D	n/a	n/a
581C	n/a	n/a
581B	n/a	n/a
5805	n/a	n/a
571B	n/a	n/a
571C	n/a	n/a
5702	29.37	27.57
5804	n/a	n/a
581D	n/a	n/a
5802	29.13	27.58
5301	29.18	25.6
371A	n/a	n/a
371F	n/a	n/a
371I	n/a	n/a
371D	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
371G	n/a	n/a
371B	n/a	n/a
371H	n/a	n/a
371C	n/a	n/a
3701	28.75	27.25
3804	n/a	n/a
381E	n/a	n/a
381M	n/a	n/a
3803	n/a	n/a
381L	n/a	n/a
381D	n/a	n/a
381B	n/a	n/a
381J	n/a	n/a
381C	n/a	n/a
381A	n/a	n/a
481F	n/a	n/a
3801	28.97	27.9
2407	n/a	n/a
241C	n/a	n/a
2405	30.39	28.15
2403	30.74	28
241A	n/a	n/a
2402	30.77	25.79
241B	n/a	n/a
3506	29.98	28.68
3504	30.01	28.28
3503	29.91	26.09
351B	n/a	n/a
351A	n/a	n/a
451C	n/a	n/a
4501	29.72	28.44
451B	n/a	n/a
4502	29.46	27.03
451A	n/a	n/a
4503	29.68	27.41
4401	29.18	28.26
4402	29.21	28.16
5401	29.8	25.81
5402	29.58	28.23
5503	29.18	25.9
5502	n/a	n/a
551B	n/a	n/a
551A	n/a	n/a
5403	29.12	28.17
2608	n/a	n/a
2607	n/a	n/a
2702	29.28	27.73
261C	n/a	n/a
261D	n/a	n/a
261A	n/a	n/a
2703	29.4	27.83
2603	30.74	29.21
2602	29.65	28.89
3601	29.88	28.36
351C	n/a	n/a
3501	29.85	26.47
361A	n/a	n/a
3502	29.77	28.27
351D	n/a	n/a
5506	29.24	27.26
5601	29.41	27.54
5507	28.24	26.36
5501	28.36	26.24
5602	28.81	26.37
5705	29.77	27.79
561F	n/a	n/a
551I	n/a	n/a
561E	n/a	n/a
561D	n/a	n/a
5714	29.81	27.25
561G	n/a	n/a
551G	n/a	n/a
551H	n/a	n/a
5703	29.84	27.65
181A	n/a	n/a
381H	n/a	n/a
381G	n/a	n/a
381F	n/a	n/a
381K	n/a	n/a
381I	n/a	n/a
3802	n/a	n/a
4801	n/a	n/a
4804	28.62	26.32
281F	n/a	n/a
281B	n/a	n/a
281C	n/a	n/a
281G	n/a	n/a
281H	n/a	n/a
281E	n/a	n/a
271C	n/a	n/a
2701	29.33	25.47
371E	n/a	n/a
271D	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
271K	n/a	n/a
271E	n/a	n/a
271I	n/a	n/a
2708	29.16	27.93
271J	n/a	n/a
2812	n/a	n/a
2806	29.76	26.79
2811	n/a	n/a
2804	n/a	n/a
2807	n/a	n/a
281K	n/a	n/a
281J	n/a	n/a
2803	28.89	26.79
2805	n/a	n/a
2802	29.01	27.51
2801	29.03	27.71
161O	n/a	n/a
161K	n/a	n/a
161J	n/a	n/a
1704	29.4	27.75
161H	n/a	n/a
161E	n/a	n/a
271B	n/a	n/a
2707	n/a	n/a
2706	n/a	n/a
2705	n/a	n/a
2704	n/a	n/a
271M	n/a	n/a
271L	n/a	n/a
261J	n/a	n/a
261I	n/a	n/a
261K	n/a	n/a
271N	n/a	n/a
261B	n/a	n/a
1606	n/a	n/a
1607	n/a	n/a
161P	n/a	n/a
2613	n/a	n/a
2612	n/a	n/a
161N	n/a	n/a
161I	n/a	n/a
161Q	n/a	n/a
261G	n/a	n/a
261F	n/a	n/a
2610	n/a	n/a
261E	n/a	n/a
2609	n/a	n/a
261H	n/a	n/a
2611	n/a	n/a
2606	n/a	n/a
2601	29.54	27.08
241D	n/a	n/a
241F	n/a	n/a
241E	n/a	n/a
2404	32.51	27.82
2401	30.34	25.23
2406	30.41	26.96
2502	29.9	29
2501	30	27.87
251A	n/a	n/a
151D	n/a	n/a
151E	n/a	n/a
151A	n/a	n/a
151C	n/a	n/a
151F	n/a	n/a
251C	30.08	29.37
161R	n/a	n/a
161A	n/a	n/a
1401	n/a	n/a
151B	n/a	n/a
1605	28.59	26.44
1603	28.03	25.26
1604	28.61	26.45
1602	28.1	25.32
1609	n/a	n/a
1608	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
171B	n/a	n/a
1803	29.13	25.12
1804	29.14	27.5
1703	30.46	25.62
1805	29.18	25.26
271H	n/a	n/a
271G	n/a	n/a
2808	n/a	n/a
2809	n/a	n/a
271F	n/a	n/a
2810	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level

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 and established on site before any works are undertaken.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

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

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

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

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

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
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

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

- Ancillary
- Drop Pipe
- Control Valve
- 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.

- Inlet
- Outfall
- Undefined End

Other Symbols

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

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the 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 indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. 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, please contact Property Searches on 0800 009 4540.