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FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

Station Road, Hampton
London

CWA-19-207

26.07.19

Prepared by:	**N.Robinson**
Authorised by:	**J.Panesar**
Signed:	
Dated: **Rev A:** **Rev B:** **Rev C:** **Rev D:**	**29.07.19** **02.08.19** **08.08.19** **14.08.19** **02.09.19**

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CONTENTS

APPENDICES

1.00 INTRODUCTION

1.01 CWA have been commissioned to prepare a Flood Risk Assessment and Outline Surface Water Drainage Strategy for a Proposed Care Home development off Station Road, Hampton.

1.02 The Flood Risk Assessment will be part of a Planning Application to be made to London Borough of Richmond Upon Thames Council.

1.03 The development proposes a Care Home with parking and amenity space.

1.04 All new building and external works lie entirely within Flood Zone 1 where there is a low probability of fluvial flooding occurring.

1.05 This Flood Risk Assessment follows government and local guidance on development and flood risk (National Planning Policy Framework NPPF[1]) and is undertaken in consultation with the relevant bodies.

1.06 It is a requirement for development applications to consider the potential risk of flooding to the proposed development over its expected lifetime and any possible impacts on flood risk elsewhere in terms of its effects on flood flows and run off.

1.07 The following aspects of flood risk should be addressed in all planning applications in flood risk areas:

- The area liable to flooding.
- The probability of flooding occurring now and over time.
- The extent and standard of existing flood defences and their effectiveness over time.
- The rates of flow likely to be involved.
- The likelihood of impacts to other areas, properties and habitats.
- The effects of climate change which currently requires designs to include 1 in 100-year rainfall events + climate change allowance.
- The nature and current expected lifetime of the development proposed and the extent to which it is designed to deal with flood risk.

[1] Communities and Local Government, March 2012, National Planning Policy Framework

2.00 SITE LOCATION AND DESCRIPTION

2.01 The development site is situated at Station Road, Hampton at post code TW12 2AX. The Ordnance Survey National Grid reference to the centre of the site is E513712, N169726.

2.02 A Site Location Plan, Aerial View Plan and Red Line Location Plan can be found in Appendix 1.

2.03 The site is irregularly shaped and occupies an approximate area of approximately 0.286 ha.

2.04 The neighbouring land use is as follows:

- North Greenfield Area.
- East Commercial Units.
- South Station Road & Office space.
- West Commercial units & Office Space

2.05 The site slopes from 13.29m to 12.56m with a fall of 0.73m. The site is predominantly flat across the parking area with a gradient of 1 in 168.

2.06 The existing site is currently a police station which comprises of office space along the Western boundary with warehouse parking to the North. An access road runs through the centre of the site with outdoor parking to the East.

2.07 A Topographical Survey can be found in Appendix 3.

3.00 SITE DEVELOPMENT PROPOSALS

3.01 The development proposes the construction of the following:

3.01.01 67 bed care home and 22 care suites

3.01.02 14 no. Parking Spaces

3.01.03 Amenity Areas located to the rear and centre of the development

3.01.04 Access Road Entering in from Station Road

3.02 A copy of the Site Layout, proposed Floor Plan and Elevation can be found in Appendix 2.

4.00 EXISTING GROUND CONDITIONS

4.01 Site Geology and Hydrology

4.01.01 LCM Environmental were commissioned to undertake a site investigation survey at 60-68 Station Road, Hampton (TW12 2DA). Dated 08th October 2014[2].

4.02 Ground Conditions

4.02.01 Ground Geology

The site geology is formed of a deep layer of London Clay which overlays Taplow Gravel.

4.02.02 Groundwater

Groundwater was encountered at 3.65m deep as per ground investigation report studies carried out by LCM Environmental

4.02.03 Soakaway Design

Based upon the findings of LCM it would be assumed that soakaways should not be considered at this point due to the overlying clay which has low permeability. CWA would suggest that further tests be carried out to determine the exact infiltration rate.

[2] 08th October 2019, LCM Environmental Site Investigation Reference 1374-14

5.00 CONSULTATION AND POLICY

5.01 Drainage Authority

5.01.01 Thames Water Ltd has been contacted for information regarding existing public storm and foul water sewers.

5.01.02 A copy of the Thames Water Correspondence and public sewer records in Appendix 5.

5.01.03 Foul Water Drainage

- There is an existing 175mm diameter foul water public sewer in Station Road Which is the recommended point of connection. A discharge rate of 4.09 l/s has been accepted by Thames Water.

5.01.04 Surface Water Drainage

- There is an existing 225mm diameter surface water sewer located in Station Road Which is the recommended point of connection. A rate of 2 l/s has been agreed with Thames Water

5.01.05 Additional note from Thames Water Ltd:

Since 1st October 2011 many private sewers have been transferred into the ownership of Thames Water Limited as public sewers, where two or more properties in separate ownership are served by those sewers. Most of these former private sewers will not be shown on the public sewer records, therefore a full site survey should be carried out prior to any layout design or construction works to identify where these sewers may be and to avoid later delays and possible added costs.

5.01.06 Hydrology

- The River Thames runs along the West to East approximately 350m South of the site. This is classified as a main river and is therefore the responsibility of the Environment Agency.

5.02 Lead Local Flood Authority

5.02.01 The Lead Local Flood Authority (LLFA) is London Borough of Richmond Upon Thames Council

5.02.02 London Borough of Richmond Upon Thames Council have a Strategic Flood Risk Assessment[3] and Local Plan[4] which define flooding and drainage requirements.

5.02.03 Key items within the Flood Risk Assessments: climate change allowances and SFRA are;

- 40% – Climate Change
- Identification of risk levels within the within the county
- Identification of key historical area of flood risk

5.02.04 The key section of the London Borough of Richmond Upon Thames Council Local Plan is Policy Planning which defines:

- All new developments to incorporate Sustainable Drainage Systems (SuDS) unless impractical.
- All new development over 1ha are to be limited to Greenfield runoff rates.
- Building levels to be over 600mm above 1 in 100 year plus climate change flood level, although commercial properties can vary subject to agreement.

5.02.05 An Email and telephone correspondence was held with London Borough of Richmond Upon Thames Council Drainage department, to discuss the main principles of the scheme. The following items were raised:

- New development using new drainage will need to be based on Greenfield runoff derived from IH124 methodology[5].
    - Water Quality
    - Climate Change
    - Method of Discharge
    - Rainfall Data
    - Historical Flooding

[3] March 2016, London Borough of Richmond upon Thames Strategic Flood Risk Assessment.
[4] September 2011, London Borough of Richmond upon Thames Local Plan
[5] Institute of Hydrology, 1975, Flood Studies Report

- Return Period for Drainage Design

5.03 Environment Agency

5.03.01 The Environment Agency (EA) flood mapping data for the site, shows the developable area to be within Flood Risk Zone 1 – with less than 1 in 1000 (0.1%) chance of flooding from rivers in any one year. EA flood mapping can be found in Appendix 4.

5.03.02 A email conversation was held with the Environment Agency to discuss; Awaiting Response

5.04 Applicable Policy

5.04.01 Applicable Planning Policy

- Planning Practice Guidance to the National Planning Policy Framework (NPPF) was introduced in March 2014; it deals specifically with development planning zones. The main study requirement is to identify the flood zones and vulnerability classification relevant to the proposed residential development, based on an assessment of current and future conditions.

5.04.02 Planning Zones

- The overall aim should be to steer new developments to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, local planning and authorities allowing land in local plans or determining planning applications for development at any particular location should consider the flood risk vulnerability of land uses and consider reasonably available sites in Flood Zone 2. Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, considering the flood risk vulnerability of land uses and applying the exception test if required.

Table 1 – Flood Zones

Zone 1: Low Probability	
Definition This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).	**Appropriate Uses** All uses of land are appropriate in this zone. **FRA requirements** For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a flood risk assessment. This need only be brief unless the factors above or other local considerations require particular attention. **Policy Aims** In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development and the appropriate application of sustainable drainage systems.
Zone 2: Medium Probability	
Definition This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5%-0.1%) in any year.	**Appropriate Uses** Essential infrastructure and the water compatible, less vulnerable and more vulnerable uses as set out in table 2 are appropriate in this zone. The highly vulnerable uses are only appropriate in this zone if the Exception Test is passed. **FRA Requirements** All development proposals in this zone should be accompanied by a flood risk assessment. **Policy Aims** In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems.

Zone 3a: High Probability	
Definition This zone comprises land assessed as having between a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.	**Appropriate Uses** The water compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood. **FRA requirements** All development proposals in this zone should be accompanied by a flood risk assessment. **Policy Aims** In this zone, developers and local authorities should seek opportunities to: • Reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems. • Relocate existing development to land in zones with a lower probability of flooding and • Create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b: Functional Floodplain	
Definition This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.	**Appropriate Uses** Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to: • Remain operational and safe for users in times of flood • Result in no net loss of floodplain storage • Not impede water flows • Not increase flood risk elsewhere **FRA Requirements** All development proposals in this zone should be accompanied by a flood risk assessment. **Policy Aims** In this zone, developers and local authorities should seek opportunities to: • Reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems. • Relocate existing development to land with a lower probability of flooding.

Table 2 – Flood Risk Vulnerability Classification

Essential Infrastructure	• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable	• Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent (where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations or need to be located in other high flood risk areas, in these instances the facilities should be classified as “essential infrastructure”).
More Vulnerable	• Hospitals. • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities and hazardous waste.

	• Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	• Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (expect landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Navigations facilities. • Ministry of Defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Water Compatible Development	• Water treatment works which do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place). • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewerage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves.

Table 3 - Flood Risk Vulnerability and Flood Zone Compatibility

Flood risk vulnerability classification (see table 2)		**Essential infrastructure**	**Water compatible**	**Highly vulnerable**	**More vulnerable**	**Less vulnerable**
Flood zone (see table 1)	Zone1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	X	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	X	X	X

Key: ✓ Development is appropriate

X Development should not be permitted

Notes to table:

This table does not show:

a) The application of the Sequential Test which guides development to Flood Zone 1 first, Zone 2 and then Zone 3.
b) Flood Risk Assessment requirements, or
c) The Policy aims for each flood zone.

6.00 FLOOD RISK

6.01 An appraisal was made of the site and surrounding areas to assess the potential risk of flooding at the site from the various sources:

6.01.01 Sea (Tidal) – The site is not located in the vicinity of the coast and is therefore not at risk of flooding due to tidal flows.

6.01.02 River (Fluvial) – The site is located approximately 286m north of the River Thames. There is therefore no risk of flooding from fluvial flow.

6.01.03 Surface (Pluvial) - The levels for the site have been set to fall towards the Station road, and therefore any overland flow will fall away from the development, and not pose a risk to it. Exceedance flows will fall towards Station Road to the South of the site.

6.01.04 Sewers (Pluvial) – There are public sewers location in Station Road. In the event of exceedance, flows are directed away from the building as described above. There is therefore negligible risk of flooding from sewers.

6.01.05 Groundwater – Groundwater was detected at a depth of 3.65m on site. These levels are below the intended design levels. There is therefore no risk of flooding from groundwater, although consideration for localised dewatering may be needed during the construction of deeper foundations.

6.01.06 Artificial Sources – There are no major artificial water sources such as canal, reservoirs or water tanks within the vicinity of the site, and therefore there is no flood risk due to artificial sources.

Table 4 - Flood Risk Assessment Summary

Aspects of Flood Risk	**Assessment/Comment**
Area liable to flooding	The development site lies within Flood Zone 1 of the Environment Agency Flood Zone Map.
Probability of flooding occurring	Flooding from surface water at the site will be considered during the level and drainage design.
Standard of existing flood defences	N/A

and their effectiveness	
Likely depth of flooding	N/A
Rates of flow likely to be involved	N/A
Likelihood of impacts to other areas, properties and habitats	Any increase in the surface area, SUDS will be used for surface water management.
Effects of climate	The effects of climate change on flooding at the site are likely to be limited, due to the use of infiltration technique and the system will be designed for 1 in 100-year storm event plus climate change.

6.02 Sequential Test

6.02.01 The Sequential Test is intended to direct new development to area of lowest probability of flood risk, and ensure development is in the most appropriate flood zone.

6.02.02 As the development extents of the site are within Flood Zone 1 and is in the least vulnerable category, the development can be considered appropriate for the proposed use, and therefore passes the Sequential Test.

6.03 Exception Test

6.03.01 The Exception Test is not required as the site is located within Flood Zone 1.

7.00 SUSTAINABLE DRAINAGE PROPOSALS

7.01 Storm Water Management and SuDS

7.01.01 Sustainable Drainage Systems (SuDS) involve the management of storm water from developments effectively in order to reduce the impact of run-off both to the site in question and properties downstream, and not to exacerbate existing problems. This is achieved by not increasing peak flows that will otherwise result from the development. The philosophy of SuDS is to mimic as closely as possible, the natural drainage from a site before development, and to ensure that storm water runoff is treated so there is no detriment to water quality of the receiving watercourse.

Using SuDS may provide water quantity and quality control, as well as increased amenity value. Appropriately designed and maintained schemes may improve the sustainable water management at the site by:

- Reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream.
- Reducing the volume, rate of discharge, and the frequency of water flowing directly to watercourses or sewers from the developed sites.
- Improving water quality compared with conventional surface water sewers by removing pollutants.

7.01.02 The following section represents the considered views on suitable SuDS options appropriate to this site. CIRIA C753[6] The SuDS Manual was consulted to examine the use of SuDS on this site. Conclusions are based on the assessment of the site and the evaluation of the relevant design requirements and regulatory consultation.

7.02 Potential SuDS Techniques Considered for this Site

7.02.01 Green Roofs

Green roofs comprise a multi-layered system that covers the roof of a building or podium structure with vegetation cover, over a drainage layer. They are designed to intercept and

[6] CIRIA, 2016. The SuDS Manual C753

retain precipitation, reducing the volume of run-off and attenuating peak flows.

Cost to the structure can be considerable and poor maintenance will leave it looking unsightly. Space is also limited due to the need to provide for plant and photovoltaic cells on the building roof.

Not Recommended

7.02.02 Soakaways

Soakaways are square or circular excavations either filled with rubble or lined with brickwork, precast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. They can be grouped and linked together to drain large areas including highways. The supporting structure and backfill can be substituted by modular geocellular units. Soakaways provide storm water attenuation, storm water treatment and groundwater recharge.

Accurate infiltration rates for the site have yet to be determined. Based on the understanding of the ground water level, the site is currently considered as unsuitable for soakaways.

Not Recommended

7.02.03 Swales

Swales are linear vegetated drainage features in which surface water can be stored or conveyed. They can be designed to allow infiltration, where appropriate. They should promote low flow velocities to allow much of the suspended particulate load in the storm water runoff to settle out, thus providing effective pollutant removal. Roadside swales can replace conventional gullies and drainage pipes.

Swales should be considered during detailed design subject to a ground investigation report. Due to the limited space on site, the development is unsuitable for swales

Not Recommended

7.02.04 Tanked Pervious Pavements

Pervious pavements provide a pavement suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored between infiltration to the ground, reuse or discharge to a watercourse or other drainage system. Pavements with aggregate sub-bases can provide good water quality treatment.

The use of permeable paving for external car parking bays can be used as a stone sub-base not only stores and slows down the rate of discharge, but also raises the water quality.

Recommended

7.02.05 Geo-cellular/Modular Systems

Modular plastic geo-cellular systems with a high void ratio that can be used to create a below ground storage structure.

Modular tanks can be used for run off attenuation but requires silt trap protection and a suitable means of access for cleaning and inspection.

Recommended

7.02.06 Ponds/Infiltration Basin

Ponds can provide both storm water attenuation and treatment. They are designed to support emergent and submerged aquatic vegetation along their shoreline. Run off from each rain event is detained and treated in the pool. The retention time promotes removal through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations.

Not Recommended

7.03 Sustainable Drainage Maintenance

7.03.01 The various SuDS features will remain privately owned and be maintained by the landowner once handed over post construction. The exact details of this arrangement will be defined with the future tenants are confirmed.

7.03.02 The SuDS operation and maintenance strategy will be in accordance with CIRIA C753 best practice, as tabled below:

Table 5 – SuDS Operation and Maintenance Requirements

Routine maintenance	Inspect flow control chamber for evidence of poor operation	Monthly for 3 months then annually.
	Remove debris from catchment surface.	Monthly
	Remove sediment from catch-pits.	Annually, or as required by inspection
Remedial actions	Replace malfunctioning flow control parts.	As required
Monitoring	Inspect all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Inspect permeable paving joints and reapply grit filler as required to ensure block support.	Annually
	Survey inside of attenuation tank for sediment build up and remove if necessary.	Every 5 years or as required by inspection.

8.00 DRAINAGE STRATEGY – SURFACE WATER

8.01 Drainage Strategy

8.01.01 The Station Road, Hampton site consists of…

- Underground Attenuation storage facility 110m³
- Silt Trap Manhole
- Package Pumping Station discharging at 2 l/s (Subject to LLFA approval)
- Shallow sub-base permeable block paving
- Surface Water manholes
- Surface Water Sewers

8.02 Proposed Surface Water Runoff Rate

8.02.01 The site consists of a Proposed Care Home development which has an impermeable area 2280m^2.

8.02.02 Based on the Environment Agency Guidance for climate change published in February 2016[7], a climate change allowance of 40% should be considered.

8.02.03 In accordance with the LLFA requirements, this development should be restricted to Greenfield run-off rates.

8.02.04 The Greenfield run-off calculations using IH124 have been undertaken. A copy of the "Greenfield" calculations can be found in Appendices 6. The Greenfield Runoff formula is:

$$Q_{bar\ rural} = 0.00108 \times (0.01 \times .228)^{0.89} \times 598^{1.17} \times 0.3^{2.17}$$

This is based on the following characteristics:

- Soil type: 2
- SPR: 0.3
- SAAR: 598mm
- M5-60 Rainfall depth: 20mm
- 'r' Ratio M5-60/MS-2 day: 0.4
- Hydrological region:6

[7] Gov.uk, 19 February 2016, Guidance Flood Risk Assessments: Climate Change Allowances

Table 5 – Greenfield Runoff Rates

Return Period	1:1 Year	1:30 Year	1:100 Year	Qbar
Greenfield Runoff Rate (l/s)	0.37	1	1.38	0.43

8.02.05 A runoff value for the Greenfield section of the site has therefore been set at Qbar = 0.43 l/s. As recommended by Thames Water we propose to restrict the surface water discharge flow to 2 litres/second for all storm events up to and including 1 in 100 year + 40% CC. The flow will be restricted to 2 l/s and as a result the outlet vortex orifice will be less than 75mm. This will need to be agreed with LLFA.

8.03 Attenuation Volume

8.03.01 Using hydraulic modelling software, the total required attenuation for the detailed planning area is approximately 138m^3 in a 1 in 100 year + 40% climate change events.

8.03.02 The attenuation is provided via Modular Attenuation Storage Tanks (95% Void).

8.03.03 In accordance with best practice, a SuDS treatment train will be included into the proposed drainage strategy. This will consist of:

- Shallow Sub-base Permeable Block paving
- Silt Trap Manhole
- Silt Trap Gullies
- Landscape Areas

8.04 Drainage Strategy

CWA have prepared a surface water strategy drawing which can be found in Appendix 7.

9.00 DRAINAGE STRATEGY – FOUL SEWERAGE

9.01 The proposed foul drainage will provide infrastructure to support for 89 no. units

9.02 It is proposed to pumping rate of 4.09 l/s (4000l/day/unit) the future development to the public foul water sewer in Station Road.

9.03 A formal S106 application will be required.

9.04 Thames water have confirmed that the existing foul sewer network has sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

9.05 CWA have prepared a foul water strategy drawing, which can be found in Appendix 7.

10.0 CONCLUSIONS

10.01 The development proposes a Care home consisting of 89 units and 14 parking bays with access road running through to the to the north of the site.

10.02 Foul water with a pumping rate of 4.09l/s and will discharge into Station Road 175mm foul public sewers, subject to a formal S106 connection application.

10.03 Surface water will be designed to cater for storm events up to 1 in 100 plus 40% climate change. The site will drain at runoff rate of 2 l/s via a cellular attenuation tank and pumps.

10.04 The use of sustainable drainage systems (SuDS) has been considered and can be incorporated within the design. Surface water discharge will be attenuated on site via a cellular attenuation storage tank system with an attenuation volume of approximately 138m^3.

10.05 Infiltration values are to be confirmed further to testing. CWA therefore assume the site is not suitable for infiltration and the use of soakaways as the ground is classed as London Clay.

10.06 The development is classified as Less Vulnerable usage and the proposed development part of the site is in Flood Zone 1 and meets the Sequential Test. The Exception Test is not therefore required.

10.07 The site does not pose any increased flood risk to the site itself or adjacent developments and is not susceptible to flooding by other techniques.

10.08 This report has been prepared to meet the requirements of National Planning Policy Framework (NPPF) for a site not at risk from flooding.

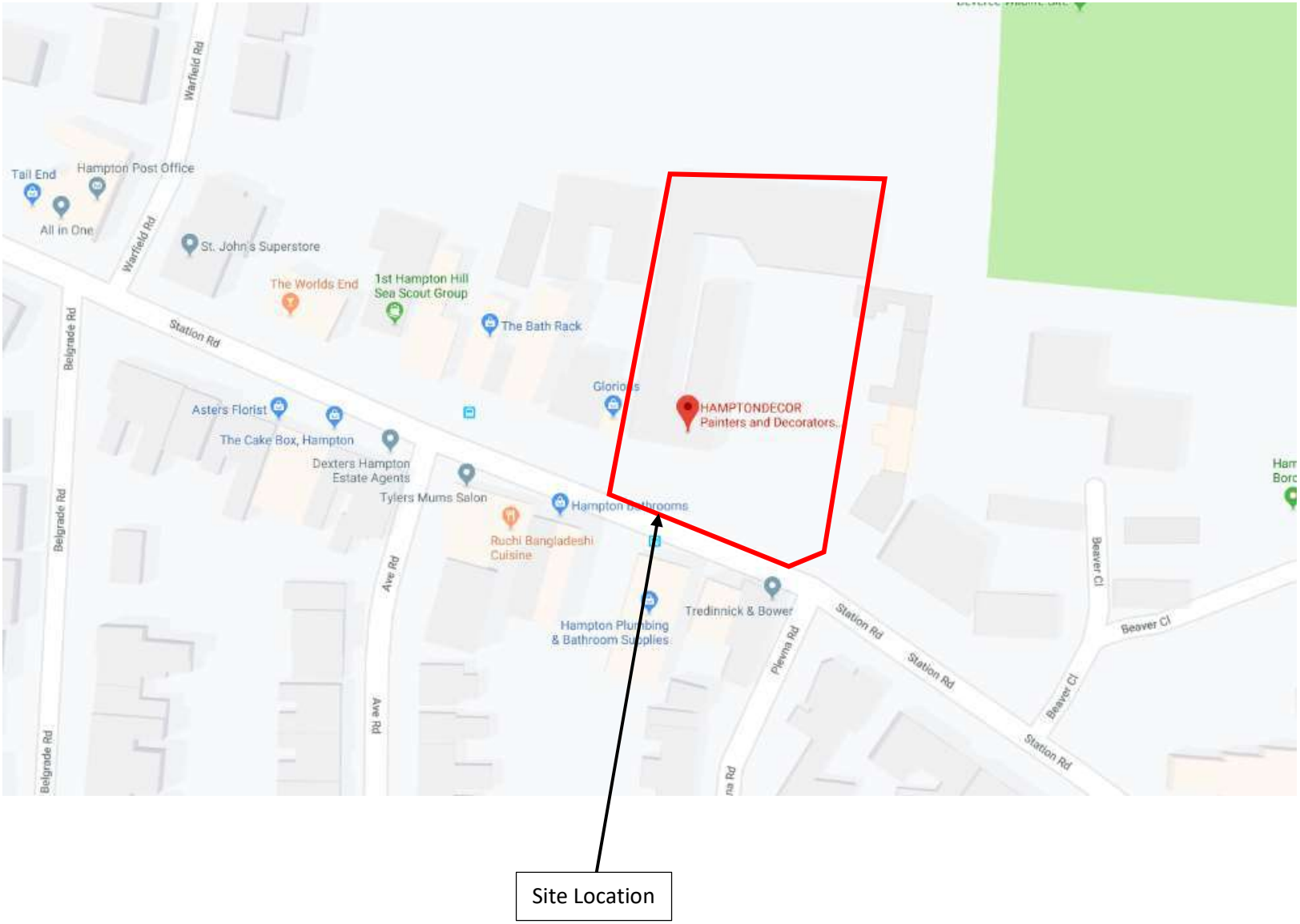
APPENDICES

APPENDIX 1

LOCATION PLAN AND AERIAL VIEW

Appendix 1A – Site Location Plan

Station Road, Hampton (TW12 2AX)



Appendix 1B – Aerial View Plan

Station Road, Hampton (TW12 2AX)

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APPENDIX 2

DEVELOPMENT PROPOSAL

Figured dimensions only are to be used. All dimensions to be checked onsite. Differences between drawings and between drawings and specification or bills of quantites to be reported to the PRC Group.

Revisions:		Drawn/Chkd:	Date:
P1	Preliminary Issue	MAS	22.05.2019
P2	General updates	AM	02.07.2019
P3	Building update	AM	10.07.2019
P4	General updates	AM	24.07.2019

North

Scale 1:200

0 10 20 m

Preliminary Issue

Client:
Cinnamon Care Collection

Project:
Proposed Care Development
Station Road, Hampton

Drawing Title:
Site Layout

24 Church St. West,
Woking, Surrey,
GU21 6HT

01483 494 350

info@prc-group.com
www.prc-group.com

Scale @ A1:	Checked by:	Date:
1 : 200	AM	16.05.2019

Job No:	Stage _ Drawing No:	Rev:
11045	FE_010	P4

Issue Status:

Construction ☐ Preliminary ■
Information ☐ Approval ☐
Tender ☐

Architecture
Planning
Master Planning
Urban Design
Interiors
Landscape

Offices
Woking
London
Milton Keynes
Warsaw

PRC Architecture & Planning

24/07/2019 15:34:59

Revisions:		Drawn / Chkd:	Date:
P1	Preliminary Issue	MAS	22.05.2019
P2	Minor amendments	MAS	04.06.1019

Accommodation Schedule

	Basement	Ground	First	Second	TOTAL
Assisted Care	0	3	3	16	22
Care Beds	17	17	32	0	66

Gross Internal Area (GIA) Schedule (m2)

	Basement	Ground	First	Second	
Assisted Care	430	208	204	1138	**1980m2** (*21,313 sq.ft*)
Care Beds	963	943	1198	0	**3104m2** (*33,411 sq.ft*)
					5084m2 (*54,724 sq.ft*)

North

Scale 1:100

0 5 10 m

Preliminary Issue

Client:
Cinnamon Care Collection

Project:
Proposed Care Development
Station Road, Hampton

Drawing Title:
Ground Floor layout

PRC

24 Church St. West,
Woking, Surrey,
GU21 6HT

01483 494 350

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Scale @ A1:	Checked by:	Date:
1 : 100	AM	05/16/19

Job No:	Stage _ Drawing No:	Rev:
11045	FE_012	P2

Issue Status:

Construction ☐ Preliminary ■
Information ☐ Approval ☐
Tender ☐

Architecture
Planning
Master Planning
Urban Design
Interiors
Landscape

Offices
Woking
London
Milton Keynes
Warsaw

PRC Architecture & Planning

04/06/2019 14:51:31

Revisions:		Drawn / Chkd:	Date:
P1	Preliminary Issue	MAS	22.05.2019
P2	Minor Amendments	MAS	04.06.2019
P3	Floor Plan updates	AM	01.07.2019
P4	Floor Plan updates	AM	10.07.2019
P5	General updates	AM	24.07.2019

North

Scale 1:100

0 5 10 m

Preliminary Issue

Client:
Cinnamon Care Collection

Project:
Proposed Care Development
Station Road, Hampton

Drawing Title:
Basement Floor Layout

Scale @ A1 : 1 : 100
Checked by : AM
Date : 16.05.2019
Job No : 11045
Stage _ Drawing No : FE_011
Rev : P5

Issue Status :
Construction ☐ Preliminary ■
Information ☐ Approval ☐
Tender ☐

PRC
24 Church St. West,
Woking, Surrey,
GU21 6HT
01483 494 350
info@prc-group.com
www.prc-group.com

Architecture
Planning
Master Planning
Urban Design
Interiors
Landscape

Offices
Woking
London
Milton Keynes
Warsaw

PRC Architecture & Planning

24/07/2019 12:19:33

CWA
Intelligent Engineering

APPENDIX 3

TOPOGRAPHICAL SURVEY

N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
S1	513723.345	169682.265	13.250
S2	513753.949	169679.959	12.859
GH1	513635.539	169729.688	14.518
GH2	513829.333	169634.284	12.182
GH3	513750.224	169696.867	13.229
GH4	513757.786	169729.601	13.230

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings *Surveyed Buildings*

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings, Wall, Kerb line, Line marking, Drop kerb, Centre line, Top of bank, Overhead Cable, Concrete edge, Tarmac edge, Grass verge, Canopy/Overhang, Verge, Bottom of bank

1 100.000 — Station and Name, Station Level

Tree / Bush / Sapling

Area of Undergrowth

Woodland

R: Ridge Level
E: Eaves Level
F: Flat Roof Level
Gate

Fence types:
I\W Interwoven
I\R Iron Railings
W\M Wire Mesh
P\R Post & Rail
P\W Post & Wire
C\L Chain Link
W\P Wooden Panels
C\B Close Boarded
S\P Steel Palisade

IC	Inspection chamber	Bo	Bollard
PInv	Pipe invert	IB	Illuminated bollard
Gy	Gully	Bin	Rubbish bin
Bg	Back gully	Vp	Vent pipe
Dp	Down pipe	Grl	Ground light
Pipe	Pipe above ground	Lbox	Letter box
MH	Manhole	Stmp	Tree Stump
WL	Water level	Sty	Stile
Fl	Flood light	IFL	Internal floor level
Lp	Lamp post	THL	Threshold level
Tp	Telegraph post	Sp	Sign post
Ep	Electricity post	TH	Trialhole
Tl	Traffic light	BH	Borehole
Bus	Bus stop	ELC	Electric
Sv	Stop valve	BT	British Telecom
St	Stop tap	C'box	Control box
Er	Earth rod	TT	Tactile
Wm	Water meter	BP	Brick paved
Gas	Gas valve	CPS	Concrete paving slabs
Av	Air valve	CVR	Cover
ICU	Unidentified inspection	R/wall	Retaining wall
Wo	Wash out	TWL	Top of Wall Level
Re	Rodding eye	TCL	Tree canopy level
BB	Belisha beacon	G:	Girth
CTV	Cable tv	MG	Multi girth
Mkr	Marker post	IC	Inspection chamber
Gmkr	Gas marker post	CL:	Cover level
So	Soffit	IL:	Invert level
Fh	Fire hydrant	UTL	Unable to lift

Rev	Date	Description	Drawn	Q. Ref

greenhatch group

Topographical Surveys · Site Engineering · Utility / CCTV Surveys · Measured Building Surveys · 3D Laser Scanning · Revit & BIM Models

Rowan House
Duffield Road
Little Eaton
Derby
DE21 5DR
Tel (01332) 830044 Fax (01332) 830055
admin@greenhatch-group.co.uk
www.greenhatch-group.co.uk

St Albans: Unit B, The Courtyard, Alban Park, St Albans, Hertfordshire, AL4 0LA. t. (01727) 854481

Newcastle: 24 Riverside Studios, Amethyst Road, Newcastle Bus. Park, Newcastle-U-Tyne, NE4 7YL. t. (01912) 736391

London: 27, Cornwall Terrace Mews, Regents Park, London, NW1 5LL. t. (02072) 241806

CLIENT
Meedhurst Project Management

PROJECT
Former Police Station 66 Station Road Hampton

TITLE
Topographical Survey

SCALE	DATE
A0@ 1: 200	04/07/2019
DRAWN	**QUALITY REF**
JOS	GH5444

Level datum	See note
Grid orientation	See note
Job number	34025

Drawing No.	Rev.
34025_T	0

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

CWA
Intelligent Engineering

APPENDIX 4

EA FLOOD ZONE MAPS

Flood map for planning

Your reference	Location (easting/northing)	Created
Appendix 4A	**513754/169693**	**17 Jul 2019 7:43**

Your selected location is in flood zone 1, an area with a low probability of flooding.

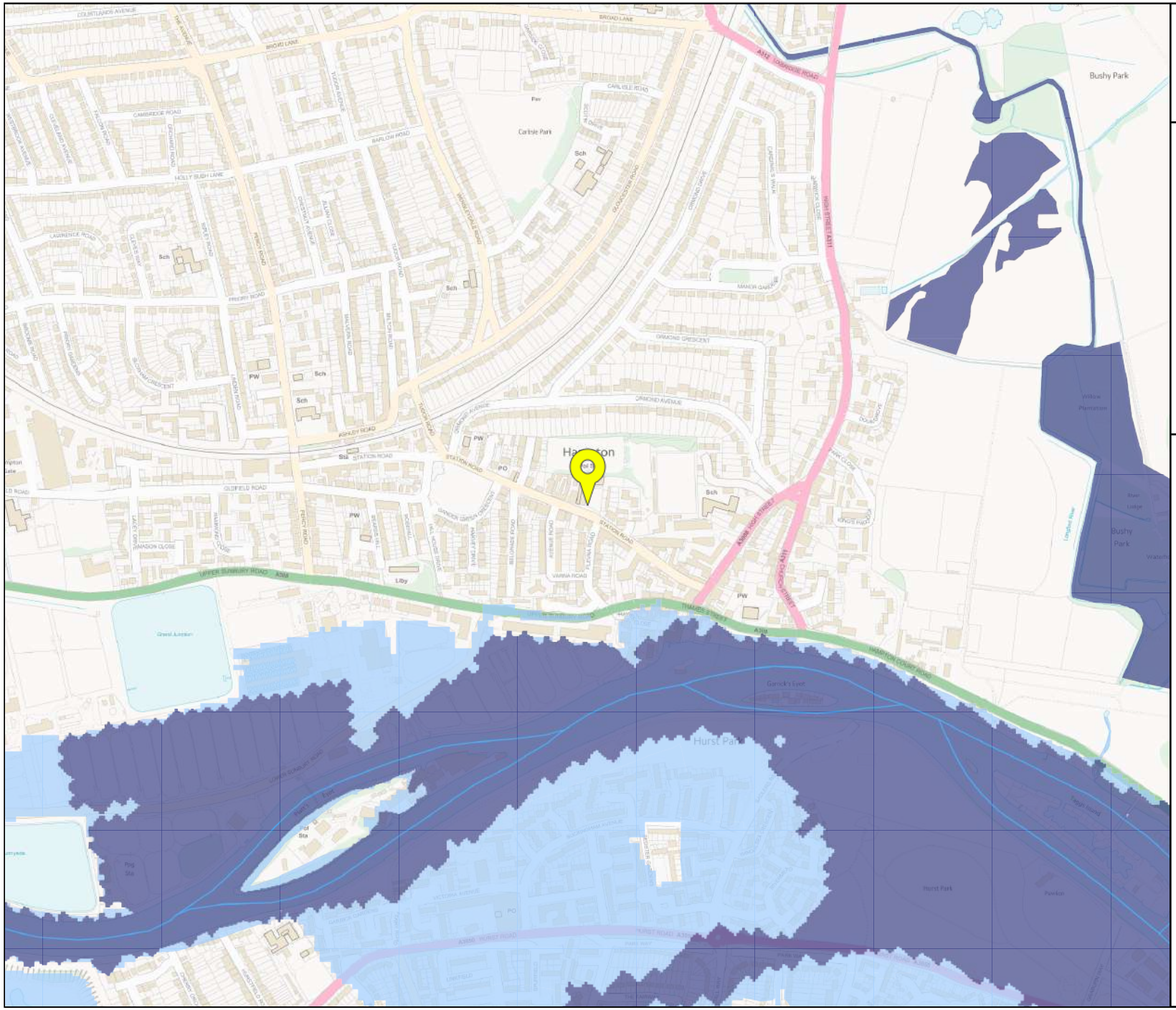
This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
Appendix 4A

Location (easting/northing)
513754/169693

Scale
1:10000

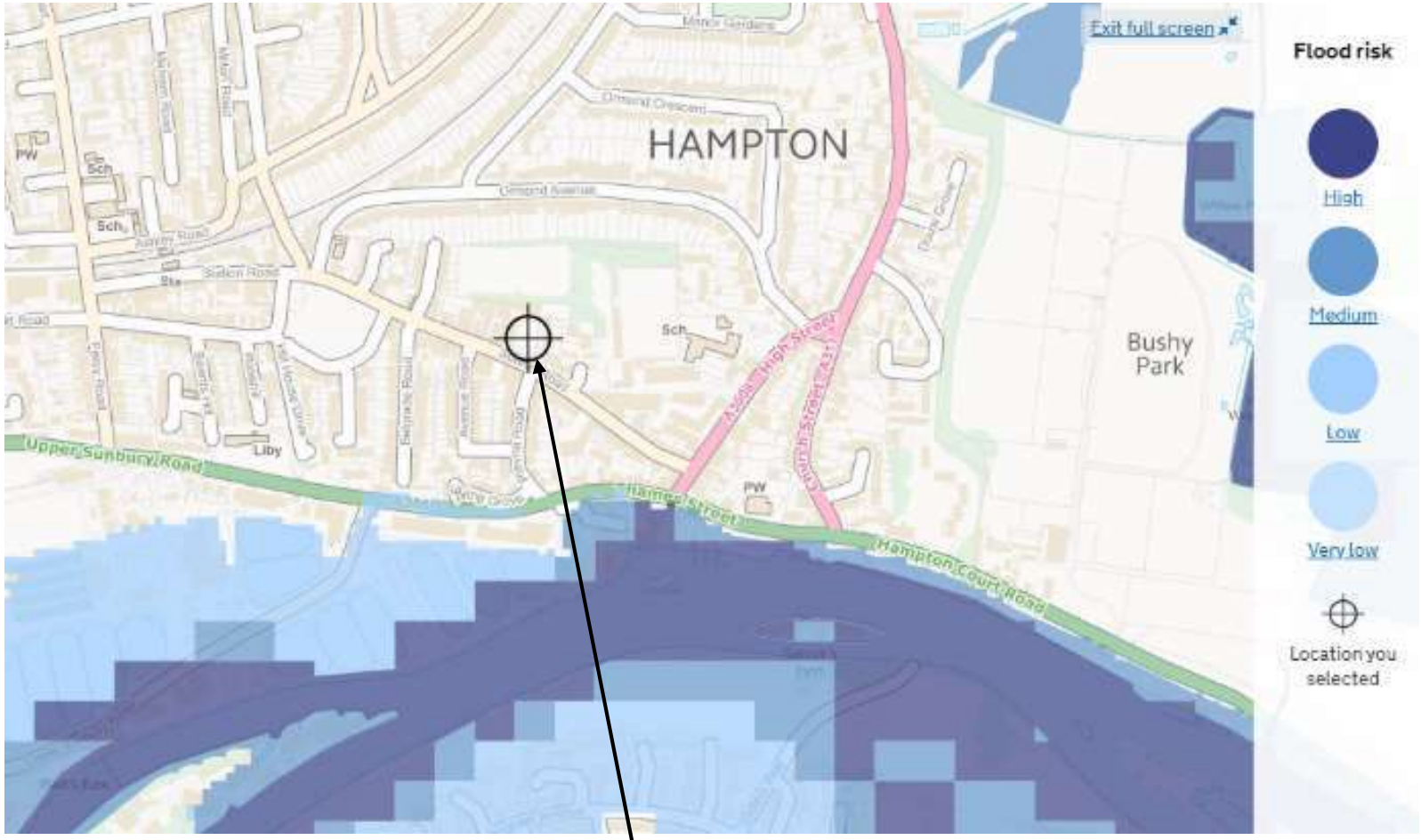
Created
17 Jul 2019 7:43

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 100 200 300m

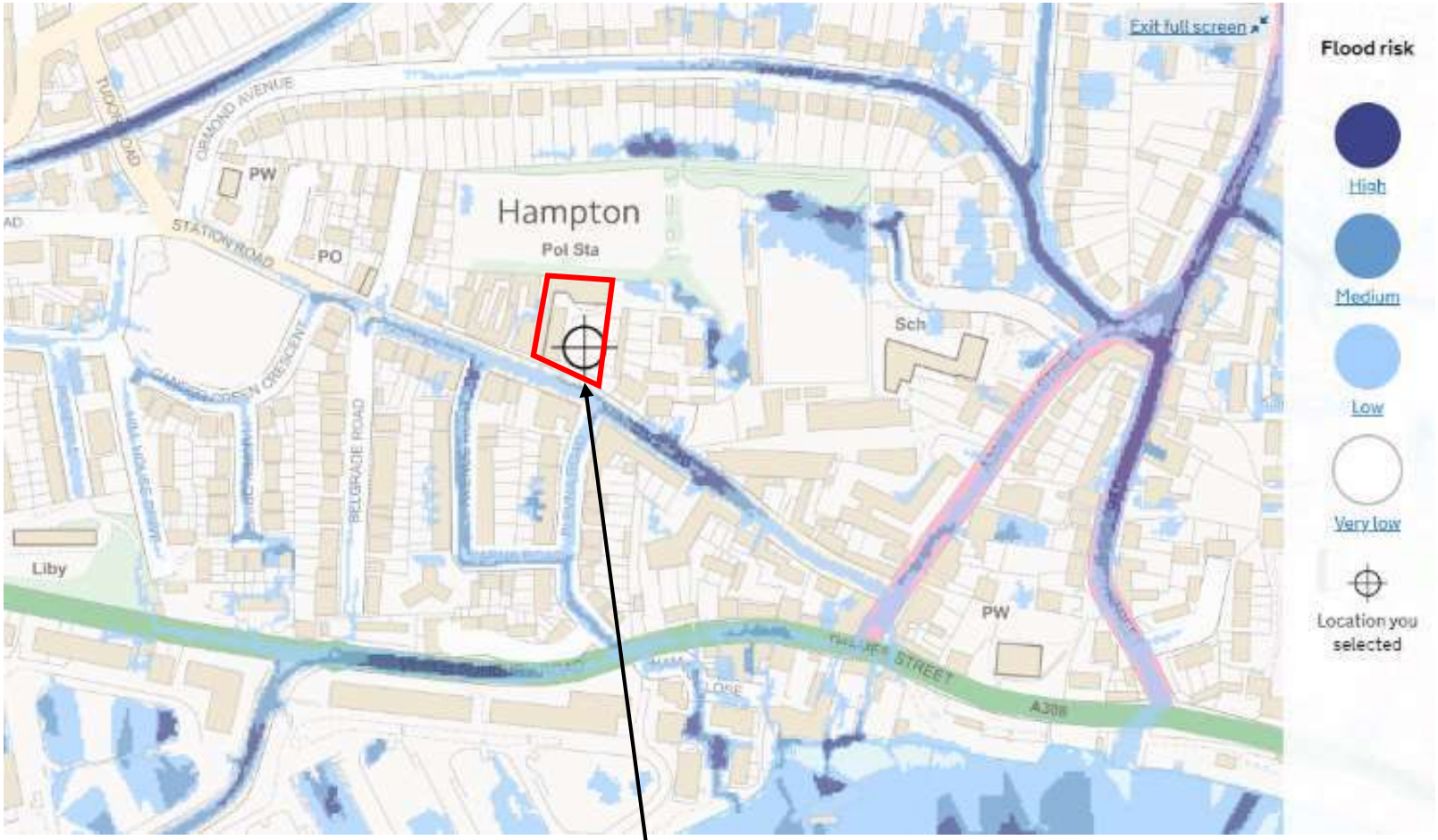
Appendix 4B – Flood Risk from rivers or the Sea

Station Road, Hampton (TW12 2AX)



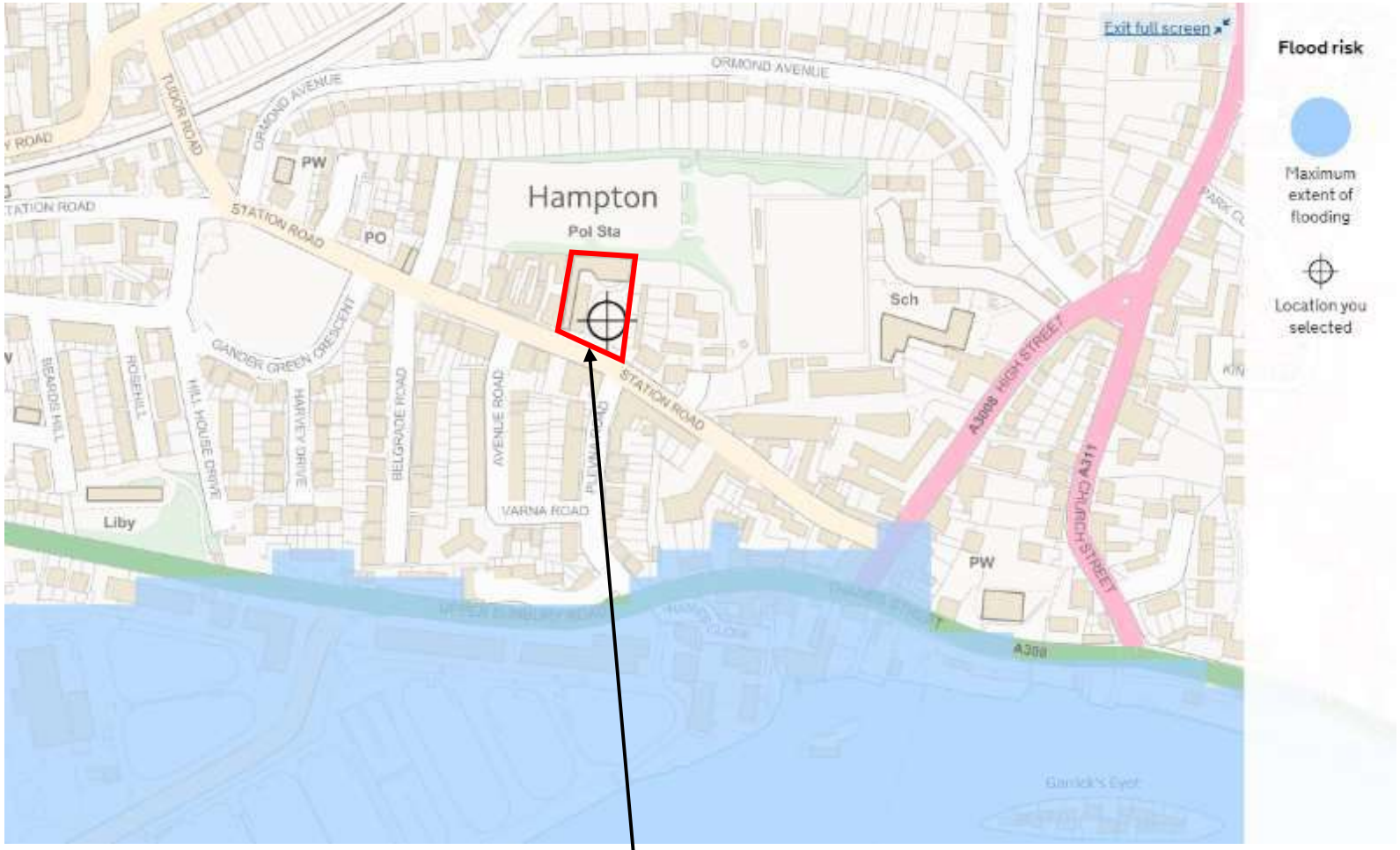
Appendix 4C – Flood Risk from Surface Water

Station Road, Hampton (TW12 2AX)



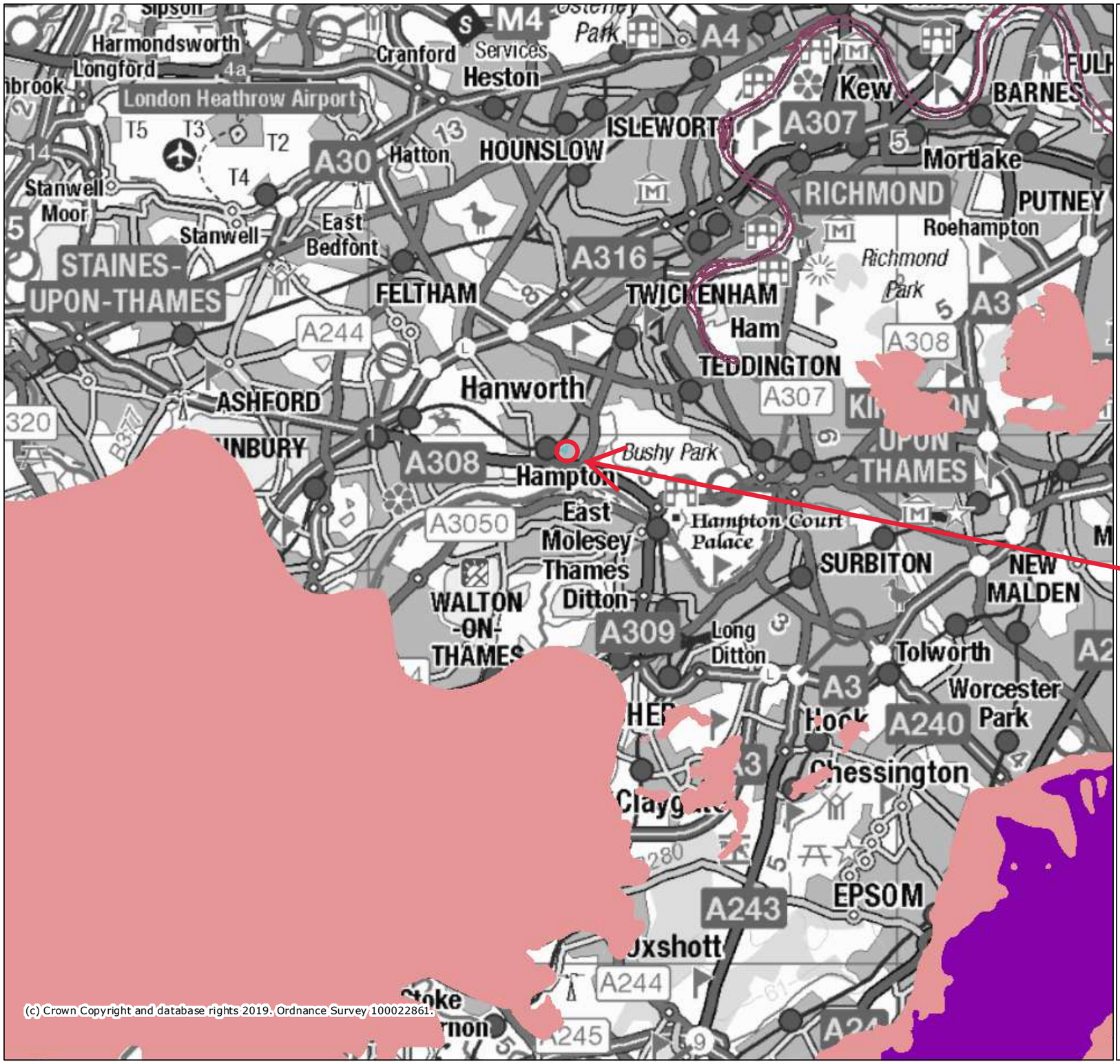
Appendix 4D – Flood Risk from Reservoirs

Station Road, Hampton (TW12 2AX)



MAGIC

Appendix 4E



Site
Location

Legend

Aquifer Designation Map (Bedrock) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unproductive

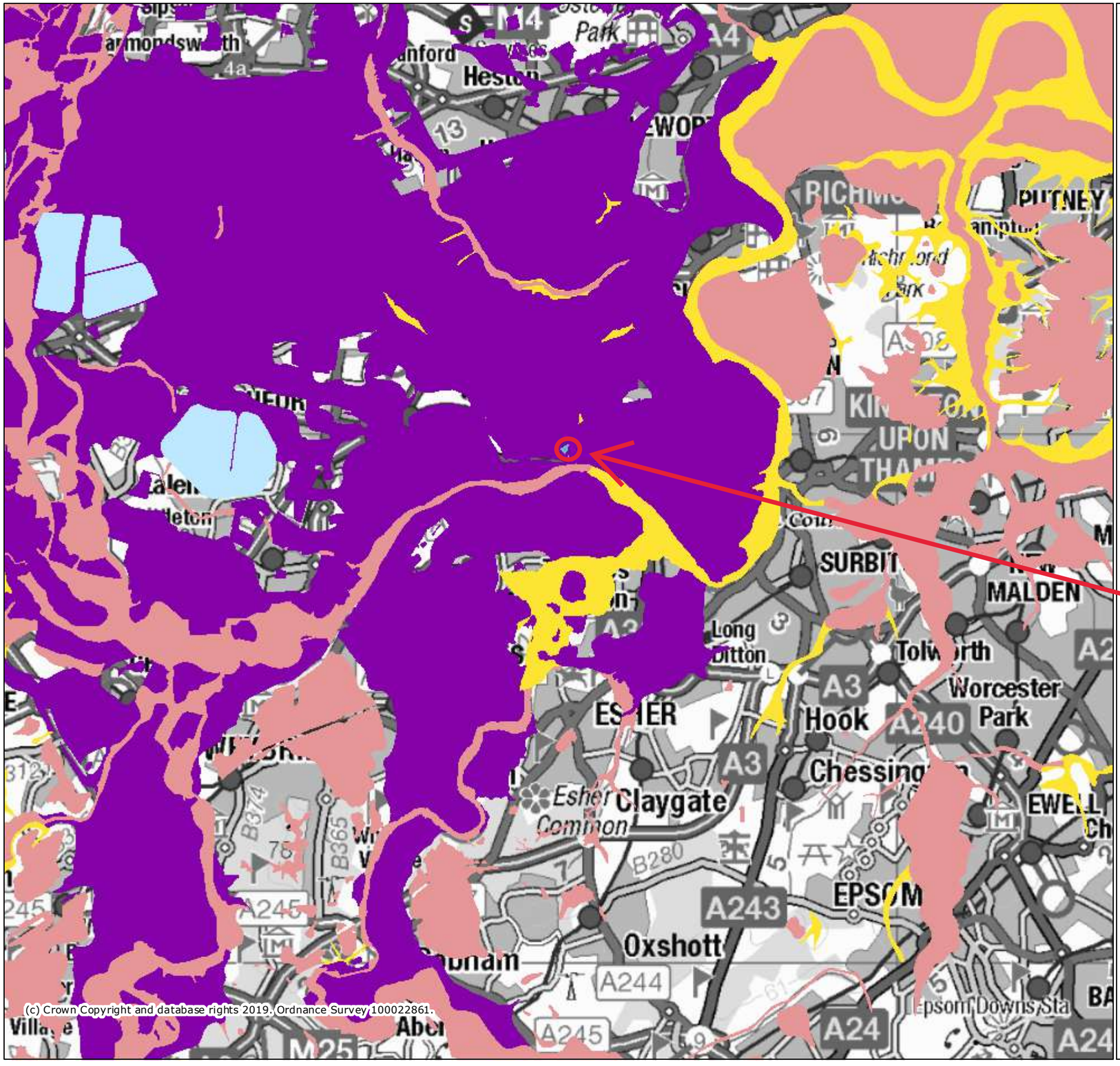
Projection = OSGB36
xmin = 493500
ymin = 158400
xmax = 533700
ymax = 177900

0 1.5 3
km

Map produced by MAGIC on 17 July, 2019.

MAGiC

Appendix 4F



Legend

Aquifer Designation Map (Superficial Drift) (England)

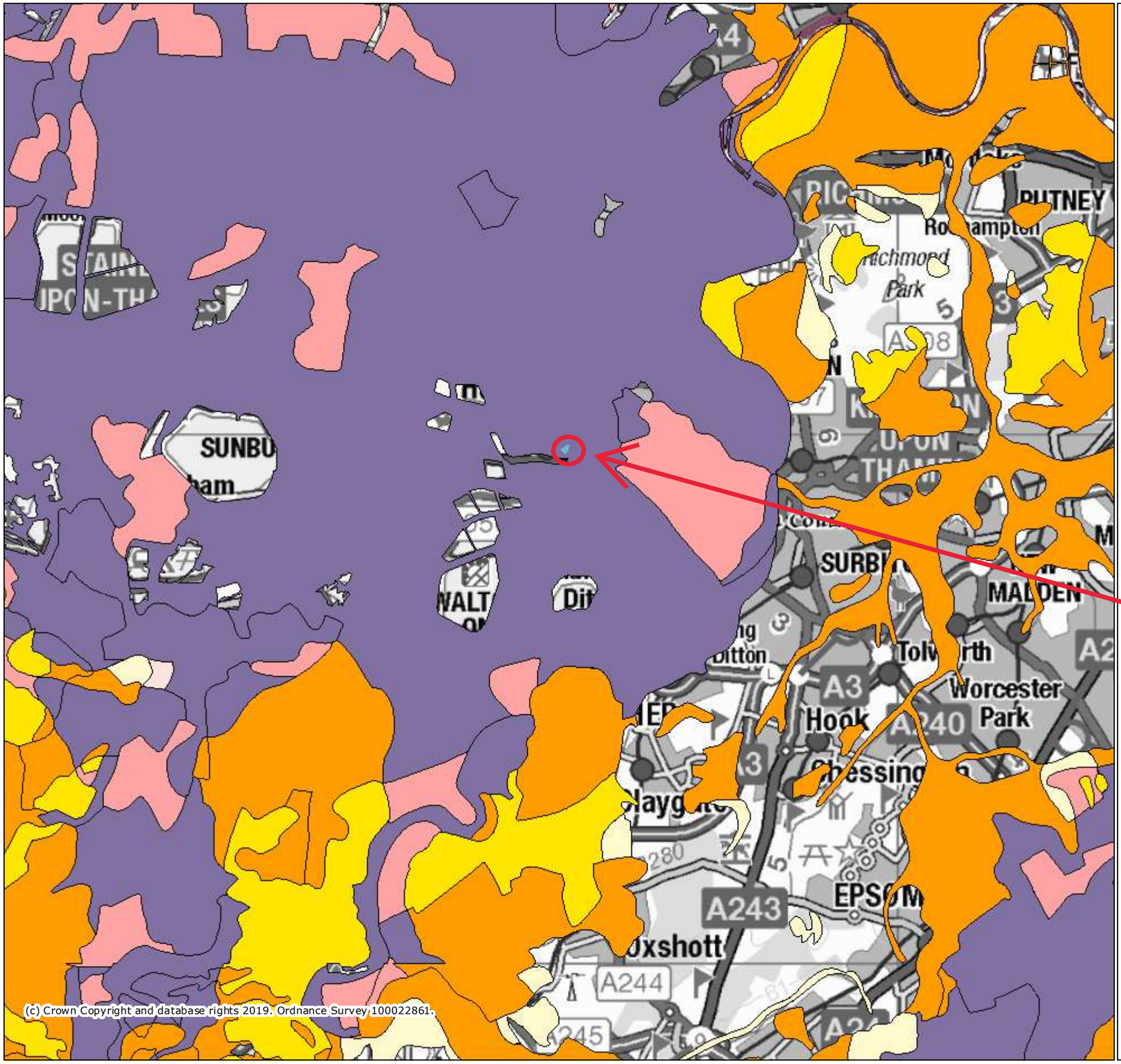
- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive

Projection = OSGB36
xmin = 493500
ymin = 158400
xmax = 533700
ymax = 177900

0 1.5 3
km

MAGiC

Appendix 4G



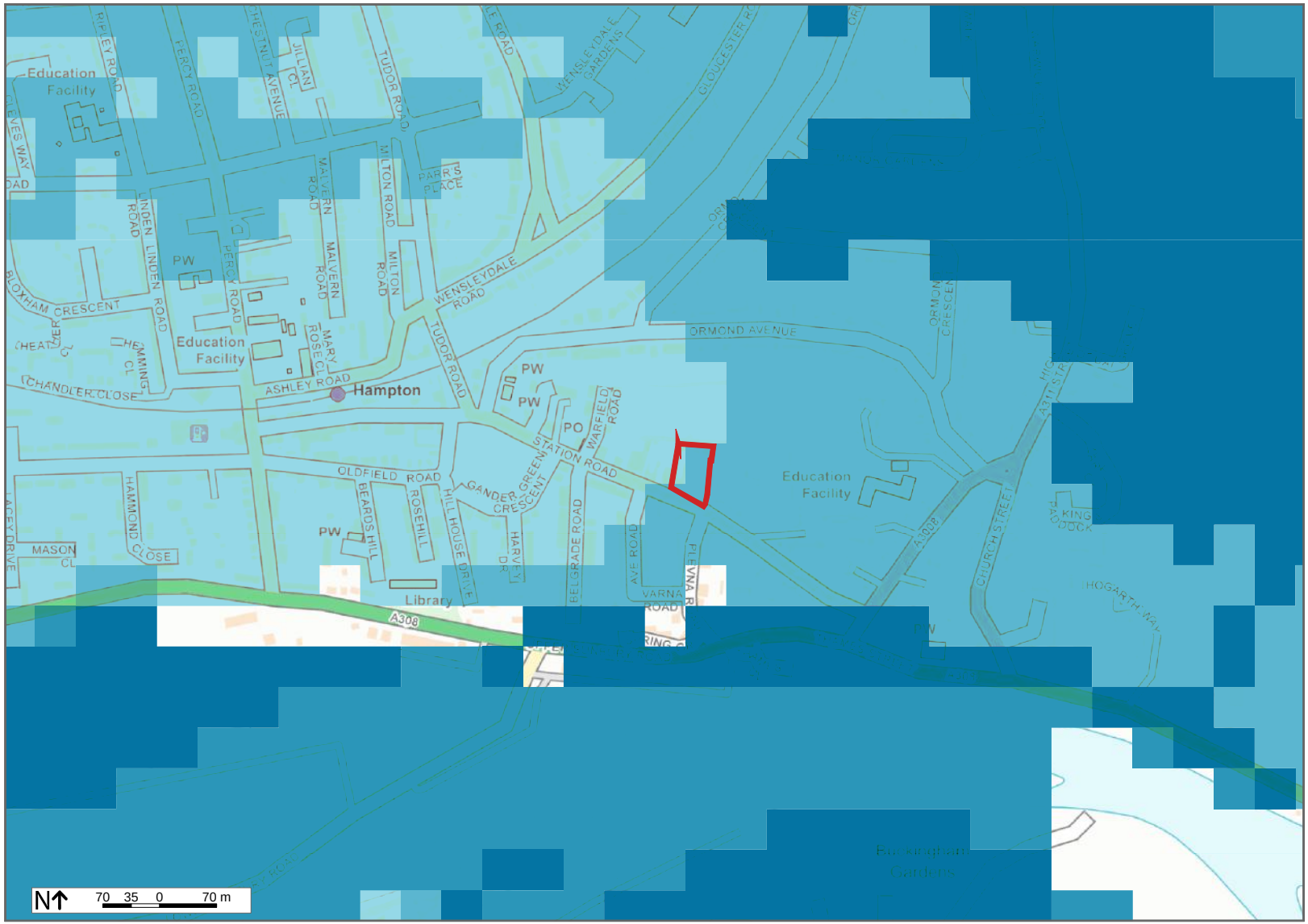
Legend

Groundwater Vulnerability Map (England)

- Major Aquifer High
- Major Aquifer Intermediate
- Major Aquifer Low
- Minor Aquifer High
- Minor Aquifer Intermediate
- Minor Aquifer Low

Projection = OSGB36
xmin = 493500
ymin = 158400
xmax = 533700
ymax = 177900

0 1.5 3
km



Appendix 4H - Risk of Flooding from Groundwater

Legend:

Susceptibility to flooding from groundwater:

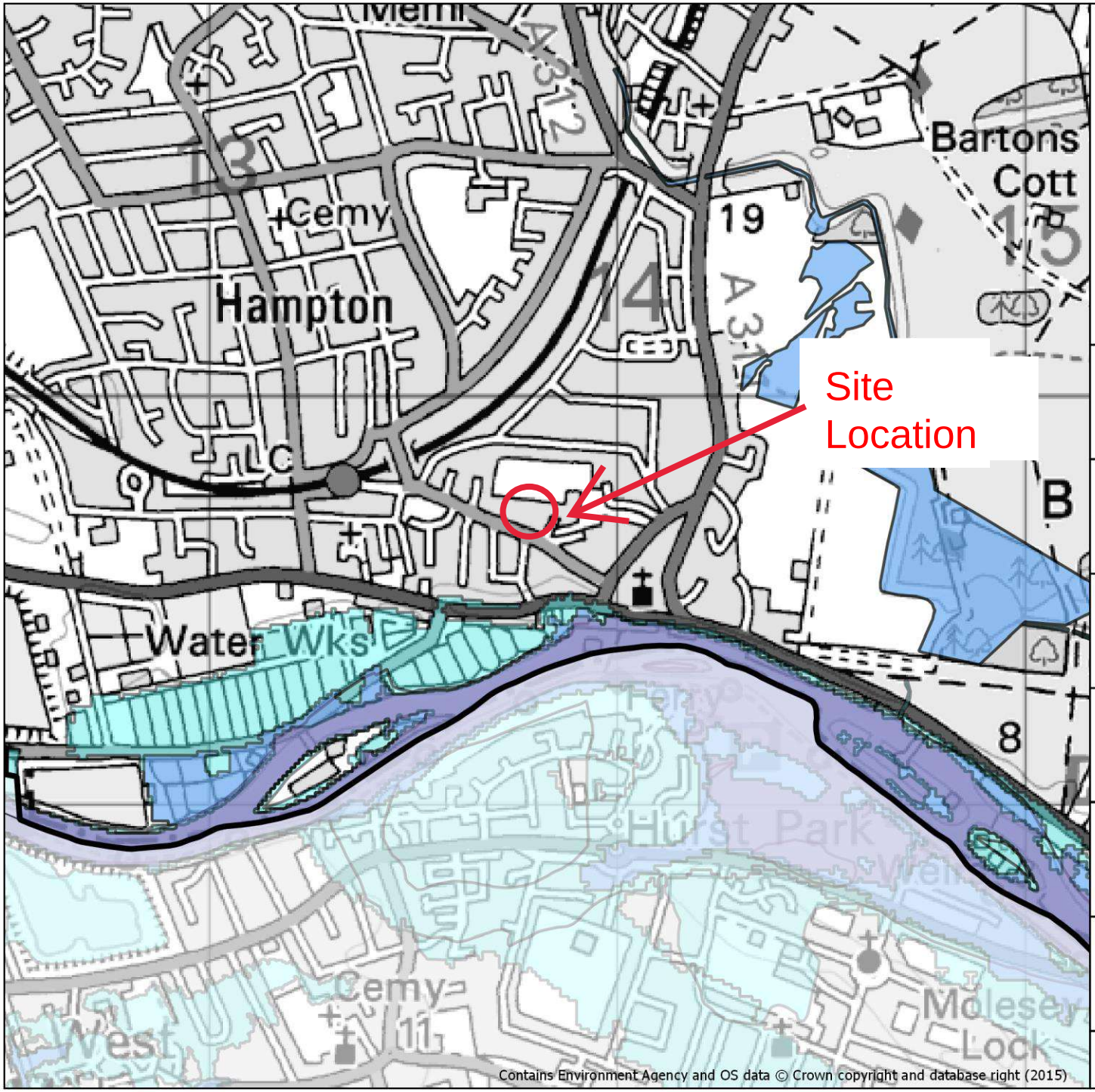
- Significant
- Moderate
- Low

Map Information

Scale	1:7500
Date:	17/07/19
Reference	Station Road Hampton
Order No:	2136230

Map data

FIND
PROFESSIONAL MAPPING INTELLIGENCE
Created at findmaps.co.uk



Legend

- Borough Boundary
- Localised Drainage Issues
- Flood Defences
- Flood Zone 3b
- Flood Zone 3a
- Flood Zone 2

in association with

Environment Agency

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

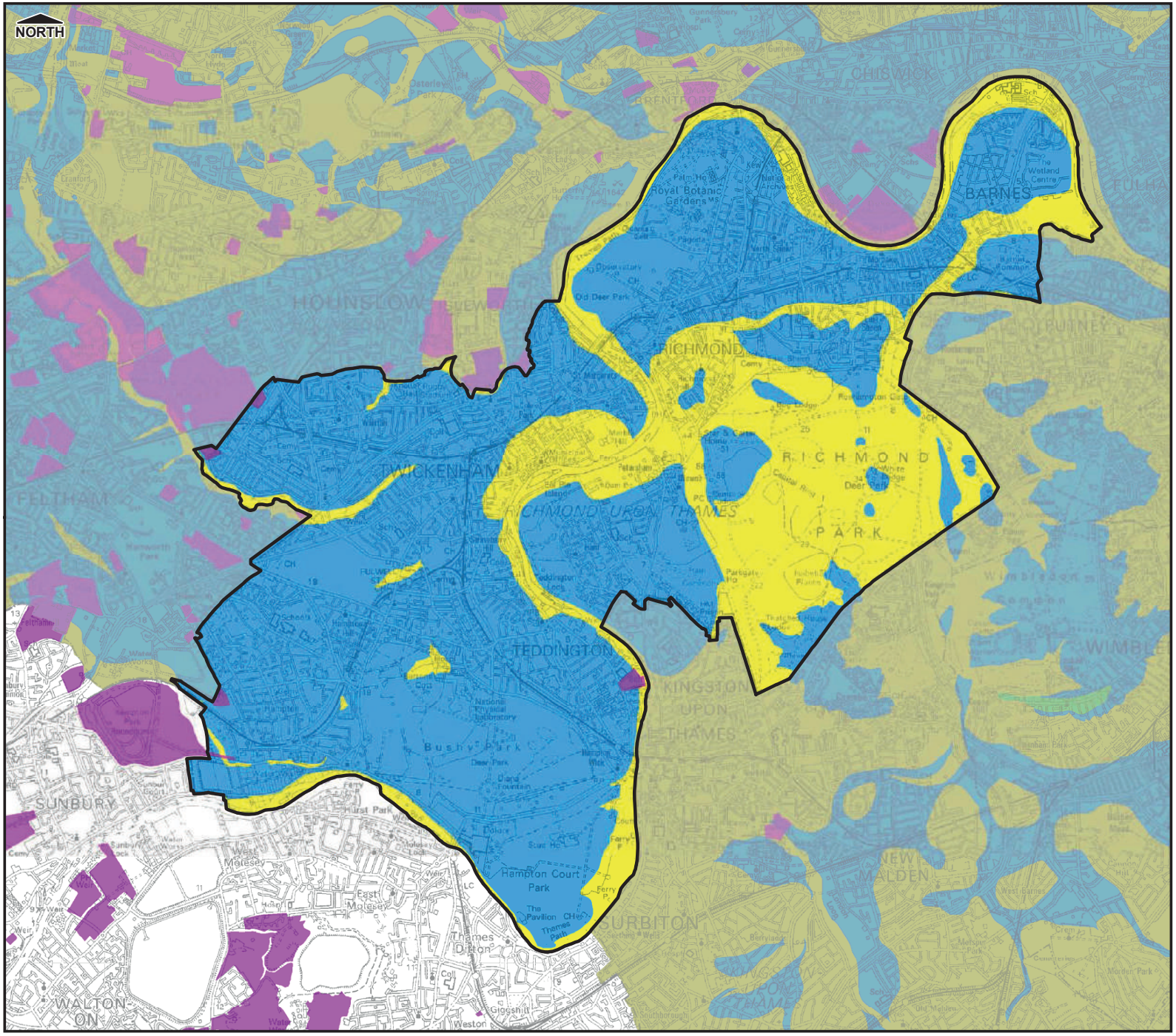
Drawing Title

Risk of fluvial and tidal flooding within character area R8 - Hampton, Taggs Island & Platt's Eyot

Drawing Number

FIGURE 8

1:14,000



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Richmond Borough Council

EA Groundwater Source Protection Zone

- Inner Zone
- Outer Zone
- Historic Landfill Site

Infiltration SUDS Suitability

- Infiltration SUDS potentially suitable
- Infiltration SUDS potentially unsuitable
- Infiltration SUDS Suitability Uncertain -Site investigation required

Notes

London Borough Richmond

LONDON BOROUGH OF RICHMOND UPON THAMES

Surface Water Management Plan

Scale at A3	Date	Drawn by	Approved by
1:50,000	22/03/2011	C.Woolhouse	S.Cox

Infiltration SUDS Suitability Map

Consultants

CAPITA SYMONDS Flood Risk Management

Scott Wilson

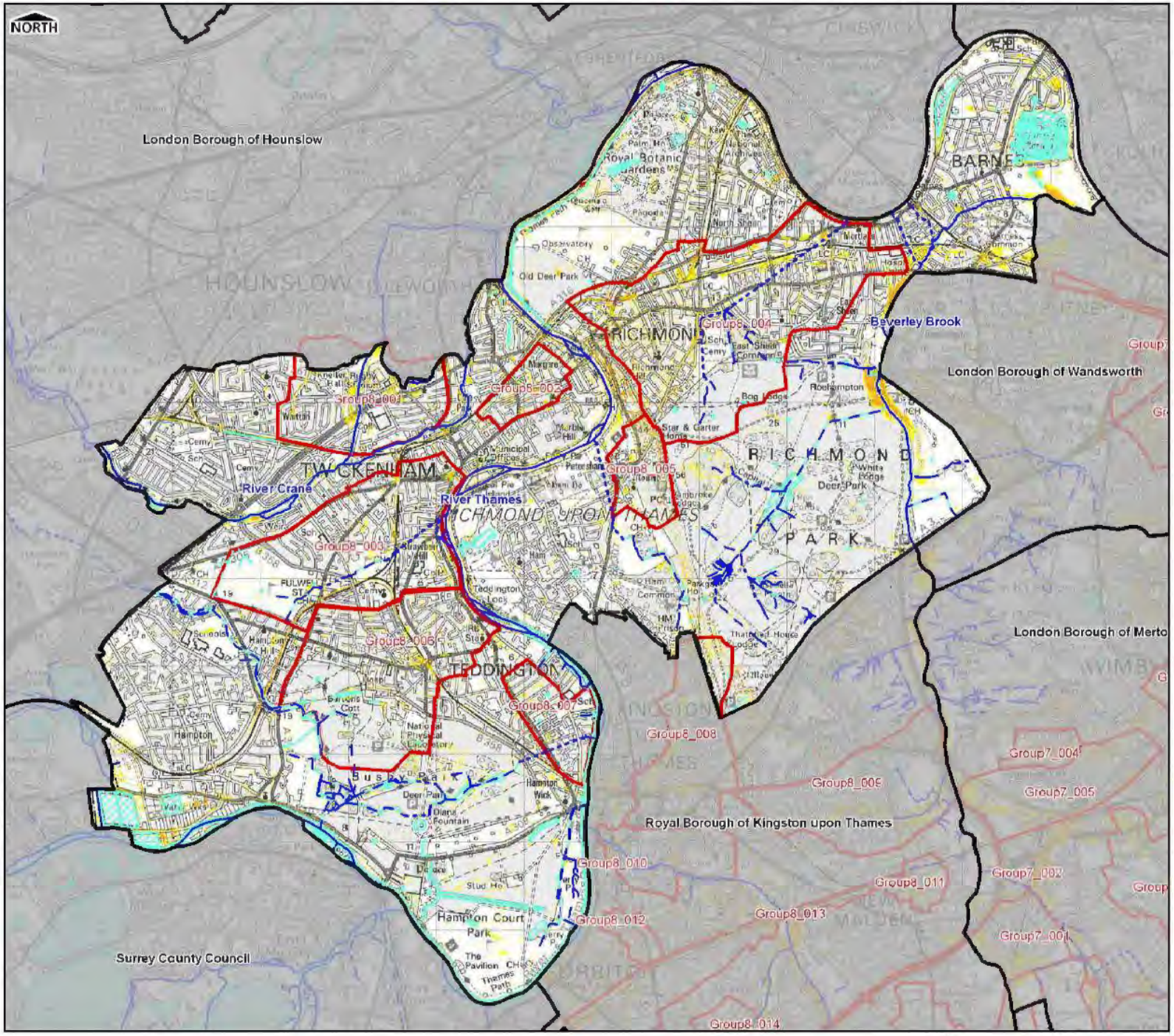
URS / Scott Wilson
6 - 8 Greencoat Place
London
SW1P 1PL

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATER LONDON AUTHORITY

FIGURE D-6

Filepath: D134786 Drain London_Tier 2_Group 8\700 Technical\711 GIS\01 Layout\Richmond\Infiltration SUDS Suitability Map.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

- Borough Administrative Boundary
- Critical Drainage Area
- Permanent Water Body
- Main River
- Ordinary Watercourse
- Culverted Watercourse

Flood Hazard

- <0.75 Caution (Very low hazard)
- 0.75 - 1.25 Moderate (Danger for some)
- 1.25 - 2.0 Significant (Danger for most)
- <2.0 Extreme (Danger for all)

Notes

1. Flood Hazard has been defined based upon the joint EA and Defra R&D Technical Report FD2320 (January 2006).
2. Degree of flood hazard can be interpreted as follows:
- Caution: Flood zone with shallow flowing water or deep standing water
- Moderate: Flood zone with deep or fast flowing water. Dangerous for children, the elderly and the infirm
- Significant: Flood zone with deep fast flowing water. Dangerous for most people.
- Extreme: Flood zone with deep fast flowing water. Dangerous for all (including emergency services)

London Borough of Richmond upon Thames

LONDON BOROUGH OF RICHMOND UPON THAMES

Surface Water Management Plan

Scale at A3	Date	Drawn by	Approved by
1:45,000	20/07/11	A.HARRIS	J.ROBINSON

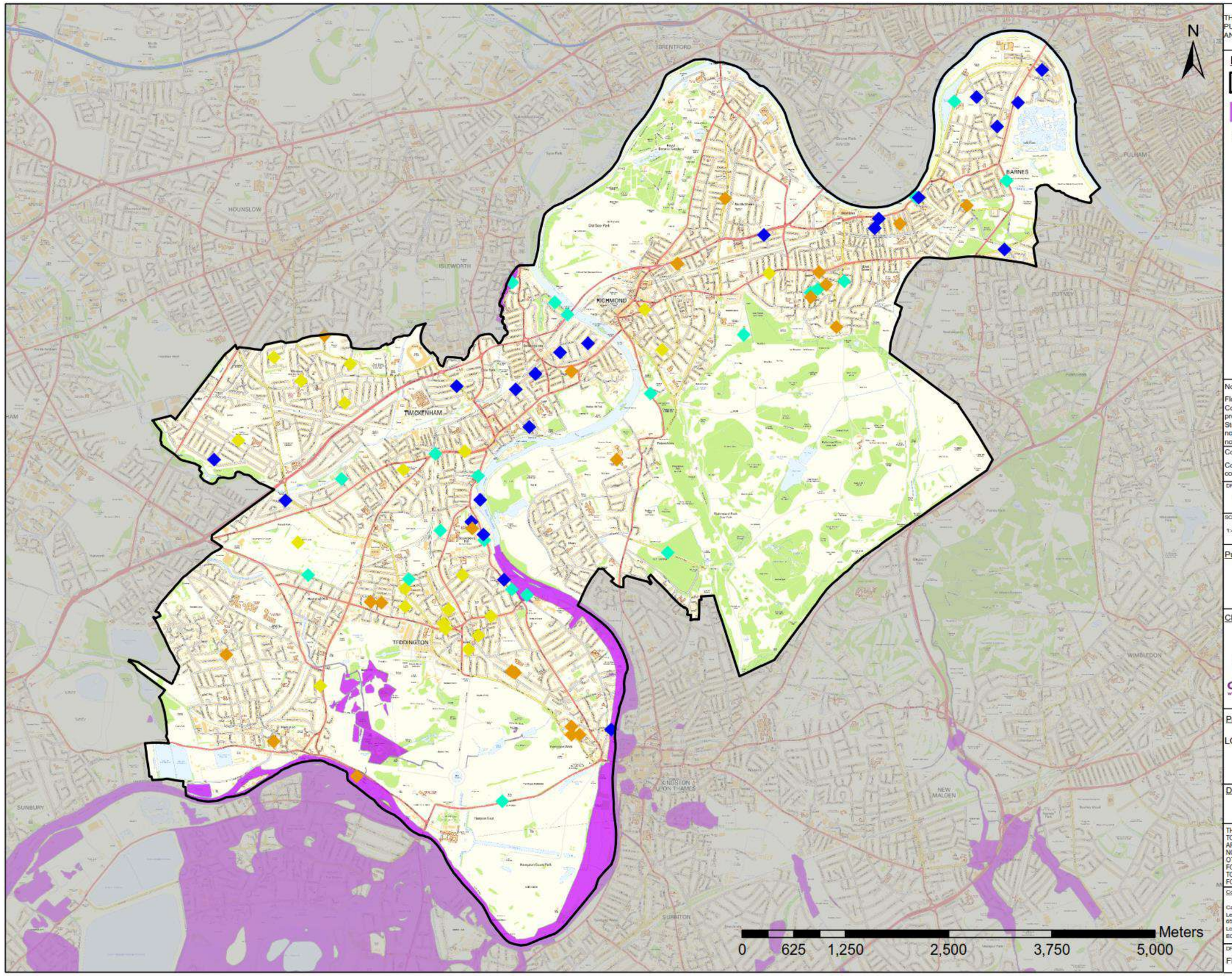
Surface Water Flood Hazard Rating 1 in 100 Chance of rainfall event occuring in any given year (1% AEP) plus Climate Change

Consultants
CAPITA SYMONDS
Flood Risk Management
Scott Wilson
URS / Scott Wilson
6 - 8 Greencoat Place
London
SW1P 1PL

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE D-14



THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

Legend

- Administrative Boundary
- Environment Agency Historic Flood Map

Reported Flooding Incidents

- River
- Multiple
- Surface Water
- Groundwater

Notes

Flooding incidents have been mapped based on Council records available at the time of the production of the Local Flood Risk Management Strategy.In many cases incidents of flooding may not been reported to the Council and will therefore not be shown on this map.

DRAWN BY	CHECKED BY	PASSED BY	DATE
GA	LT	PH	June 2014

SCALE @ A3: 1:42,000

ISSUING OFFICE: Gresham Street

Purpose of Issue

DRAFT REPORT FOR CONSULTATION

Client

Wandsworth, merton, London Borough of Richmond upon Thames, CROYDON www.croydon.gov.uk, Sutton, Royal Kingston

Project Title

LONDON BOROUGH OF RICHMOND LOCAL FLOOD RISK MANAGEMENT STRATEGY

Drawing Title

HISTORIC FLOODING

Consultant

Capita
Level 4,
65 Gresham Street
London
EC2V 7NQ

CAPITA | URS

DRAWING NUMBER	REV
FIGURE 1	A

APPENDIX 5

EXISTING SEWER RECORDS

Mr Nathan Robinson
CWA
3rd Floor, Lancaster House
67 Newhall Street
Birmingham
B3 1NQ

Wastewater pre-planning
Our ref DS6063845

30 July 2019

Pre-planning enquiry: Confirmation of sufficient capacity

Site Address: 74A Station Road, Hampton, Greater London - TW12 2AX

Dear Mr Robinson,

Thank you for providing information on your development for the proposed 88no. bed care home on previously Brownfield land.

Foul water discharge via gravity into 175mm foul water sewer on Station Road.
Surface water discharge via gravity into 225mm surface water sewer on Station road. Flows restricted to 5.0l/s discharging a total impermeable area of 1,890m².

Foul Water

From the information you have provided, we can confirm that the existing **foul sewer** network does have sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

This confirmation for capacity is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

Surface Water

When redeveloping an existing site, policy 5.13 of the London Plan and Policy 3.4 of the Supplementary Planning Guidance (Sustainable Design And Construction) states that every attempt should be made to use flow attenuation and SUDS/storage to reduce the surface water discharge from the site as much as possible.

Thames Water Planning team would expect the surface water drainage hierarchy to be applied to demonstrate that discharge to the public sewer is the most appropriate discharge route. If this is confirmed, then surface water runoff will need to be attenuated to a peak discharge rate of **2.0litres/second** for all storm events up to and including 1in100year+40%CC. Should the policy above be followed, we would envisage no capacity concerns with regards to surface water for this site.

If you've any further questions, please contact me on 0203 5778 102.

Yours sincerely

Rahim Khan

Development Engineer
Developer Services – Sewer Adoptions Team

Asset location search

Thames Water Property Searches

CWA Intelligent Engineering
67 Newhall Street 67 Newhall Street

BIRMINGHAM
B3 1NQ

Search address supplied	Station Road, Hampton NA NA 74A Station Road NA NA Hampton Greater London TW12 2AX
Your reference	CWA-19-207
Our reference	ALS/ALS Standard/2019_4043919
Search date	19 July 2019

Keeping you up-to-date

Notification of Price Changes

From 1 September 2018 Thames Water Property Searches will be increasing the price of its Asset Location Search in line with RPI at 3.23%.

For further details on the price increase please visit our website: www.thameswater-propertysearches.co.uk
Please note that any orders received with a higher payment prior to the 1 September 2018 will be non-refundable.

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

searchcode

Asset location search

Property Searches

Search address supplied: Station Road, Hampton, NA, NA, 74A, Station Road, NA, NA, Hampton, Greater London, TW12 2AX

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

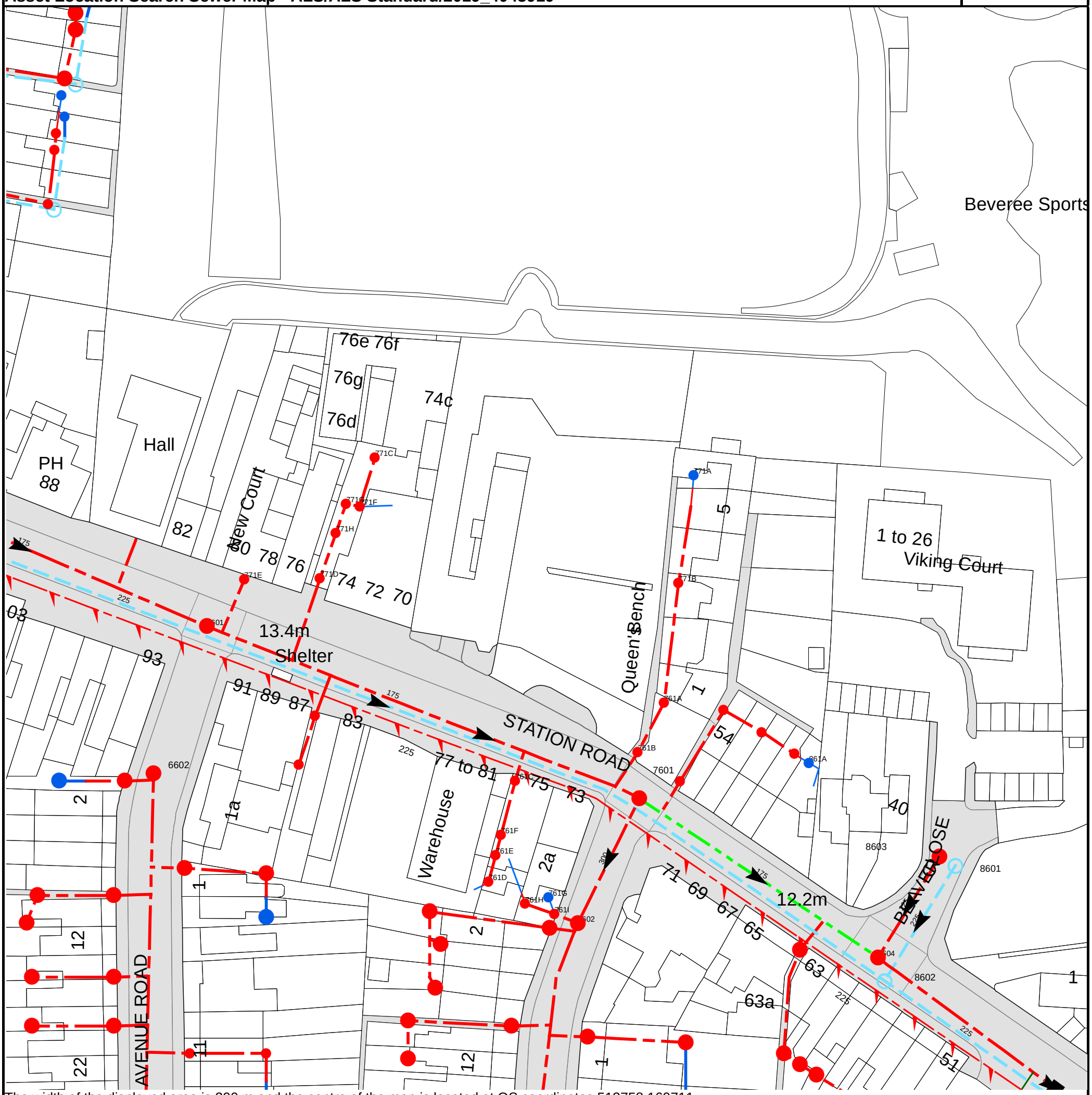
Clean Water queries

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

Asset Location Search Sewer Map - ALS/ALS Standard/2019_4043919



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 513758,169711

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.

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
76ZQ	n/a	n/a
761D	n/a	n/a
761E	n/a	n/a
761F	n/a	n/a
76WX	n/a	n/a
761C	n/a	n/a
761H	n/a	n/a
761G	n/a	n/a
76ZS	n/a	n/a
761I	n/a	n/a
7602	12.52	10.76
76YY	n/a	n/a
761B	n/a	n/a
7601	12.28	10.13
761A	n/a	n/a
771B	n/a	n/a
76XX	n/a	n/a
76YZ	n/a	n/a
76XY	n/a	n/a
76XZ	n/a	n/a
86ZT	n/a	n/a
86ZP	n/a	n/a
86ZV	n/a	n/a
86ZR	n/a	n/a
861A	n/a	n/a
86ZW	n/a	n/a
8604	12.35	10.31
8602	10.42	9.55
8603	12.58	11.02
8601	12.6	10.7
67ZS	n/a	n/a
67YY	n/a	n/a
67ZT	n/a	n/a
67ZV	n/a	n/a
67ZX	n/a	n/a
67YQ	n/a	n/a
67ZP	n/a	n/a
68ZQ	n/a	n/a
67XZ	n/a	n/a
68ZR	n/a	n/a
771D	n/a	n/a
771H	n/a	n/a
771G	n/a	n/a
771F	n/a	n/a
771C	n/a	n/a
771A	n/a	n/a
66YY	n/a	n/a
66YT	n/a	n/a
66ZP	n/a	n/a
66YQ	n/a	n/a
66XV	n/a	n/a
6602	13.39	11.82
66XR	n/a	n/a
66YX	n/a	n/a
6601	13.56	10.99
771E	n/a	n/a
76WS	n/a	n/a
76WV	n/a	n/a
76YR	n/a	n/a
76XT	n/a	n/a
76XS	n/a	n/a
76WZ	n/a	n/a
76WY	n/a	n/a
76ZT	n/a	n/a
76ZX	n/a	n/a
66ZR	n/a	n/a
66YR	n/a	n/a
66YV	n/a	n/a
66ZQ	n/a	n/a

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.

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

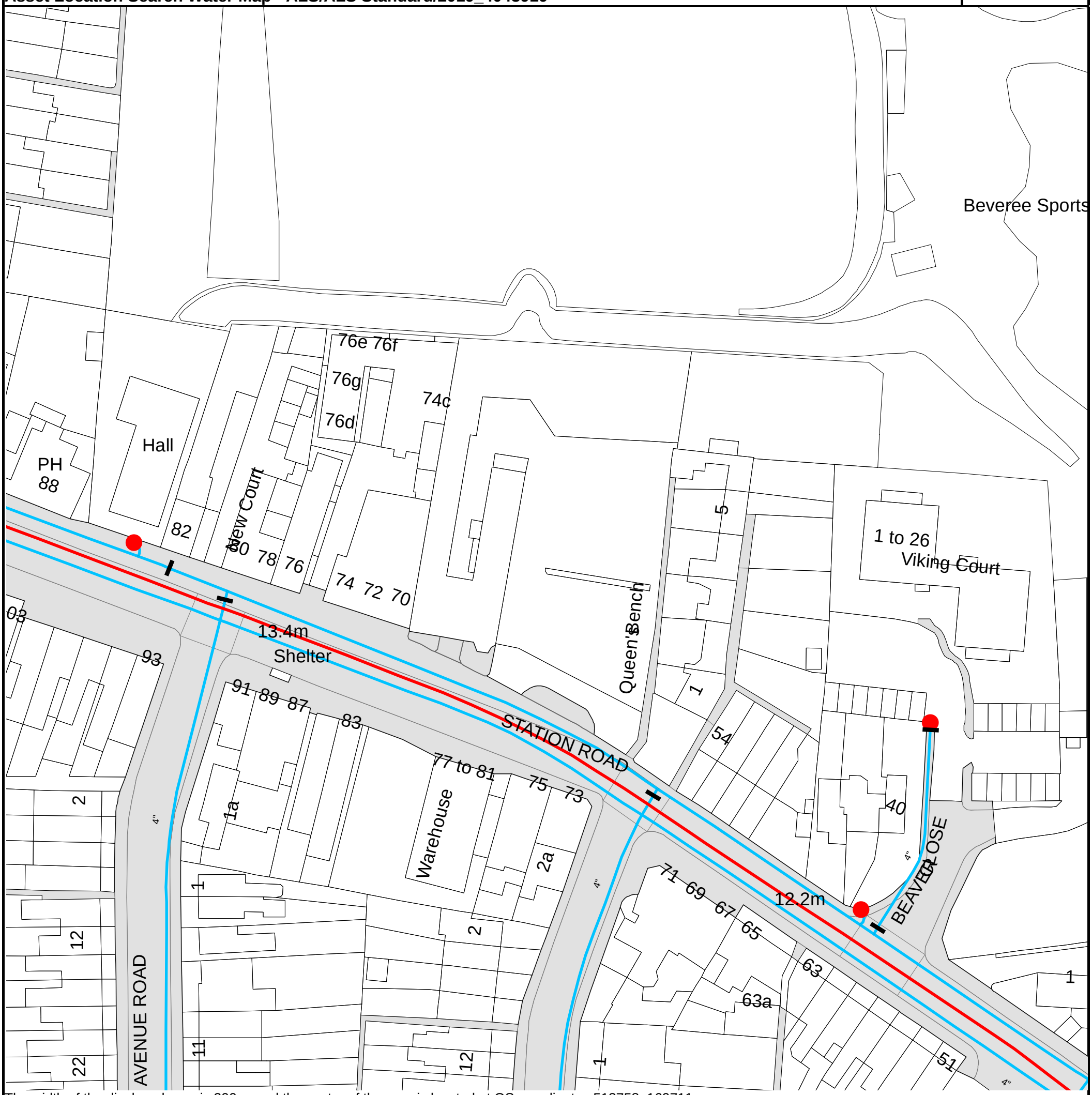
Proposed

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.

Asset Location Search Water Map - ALS/ALS Standard/2019_4043919



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 513758, 169711.

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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**

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if the Ombudsman finds that you have suffered actual loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Web site: www.tpos.co.uk
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

CWA
Intelligent Engineering

APPENDIX 6

SURFACE WATER CALCULATIONS & IMPERMEABLE AREA PLAN

INDICATIVE NORTH

NOTES

1. This drawing is to be read in conjunction with all relevant Architects, Engineers and other specialist details and specifications.
2. Do not scale from this drawing.
3. Drawing issued for planning discussions only, further to approval from Planning, Local Authority, Sewerage Undertaker, Environment Agency and any other governing parties. Following receipt of further information and comments the scheme may be revised.
4. Drawing based upon PRC Architects layout drawing ref: 11045 - FE_010 - Proposed Site Plan
5. The location and level of all existing services are to be identified prior to construction and the engineer advised of any clashes.
6. Locations and extent of drainage features, including SuDS facilities indicative only.
7. No hydraulic modeling, geotechnical and structural assessment of the proposal has been carried out at this stage.

Key

Site Area - 2858m^2

Permeable Area - 582m^2

Impermeable Area - 2276m^2

FOR PLANNING PURPOSES ONLY

Rev.	Amendments	Date	By	Chkd.

Drawing Status

CWA
Intelligent Engineering

Lancaster House, 67 Newhall Street, Birmingham, B3 1NQ
Tel: 0121 270 6962 Email: enquiries@cwa-eng.com

Station Road
Hampton
London

Proposed Impermeable Area Plan

Drawing Number			Revision
CWA-19-207-SK002			P1
Drawn by	NR	Checked by	JSP
Date	July 2019	Scale	1:200 @ A1

HR Wallingford
Working with water

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	
Site name:	Station Rd, Hampton
Site location:	

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	51.41536° N
Longitude:	0.36698° W

Reference:	
Date:	2019-07-17 10:14

Methodology	IH124

Site characteristics

Total site area (ha)	.286

Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	2	2
HOST class	---	---
SPR/SPRHOST	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm)	598	598
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

(1) Is Q_{BAR} < 2.0 l/s/ha?

Normally limiting discharge rates which are less than 2.0 l/s/ha are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite may be a requirement for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	0.43	0.43
1 in 1 year (l/s)	0.37	0.37
1 in 30 years (l/s)	1	1
1 in 100 years (l/s)	1.38	1.38

Drainage Design Report

Flow

v6.0

Network	Storm Network
Filename	Y:\Jobs CWA-19\CWA-19-207\06.Calculations\Storm attenuation cals.pfd
Username	John Panesar (jpanesar@cwa-eng.com)
Last analysed	31/07/2019 15:00:12
Report produced on	31/07/2019 15:01:13

Causeway Sales

Tel:	+44(0) 1628 552000
Fax:	+44(0) 1628 552001
Email:	marketing@causeway.com
Web:	www.causeway.com

Technical support web portal:

http://support.causeway.com

Rainfall Methodology	FSR
Return Period (years)	5
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.400
CV	0.750
Time of Entry (mins)	4.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Enforce best practice design rules	

	Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Notes
	S1	0.230			102.000	Manhole		1200				2.000	

	Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Con Offset (m)	Min DS IL (m)

	Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)	Notes

Link ID	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)	US Node ID	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node ID	Dia (mm)	Width (mm)	Node Type	MH Type

Node ID	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type		Link ID	IL (m)	Dia (mm)	Link Type
S1			102.000	2.000	1200		Manhole						

Rainfall Methodology	FSR		Return Period (years)	Climate Change (%)
FSR Region	England and Wales		100	40
M5-60 (mm)	20.000			
Ratio-R	0.400			
Summer CV	0.750			
Winter CV	0.840			
Analysis Speed	Normal			
Drain Down Time (mins)	240			
Additional Storage (m³/ha)	0.0			
Storm Durations (mins)	15			
	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
Check Discharge Rate(s)	x			
1 year (l/s)				
30 year (l/s)				
100 year (l/s)				
Check Discharge Volume	x			
100 year 360 minute (m³)				

Hydro-Brake®												
Node	Flap Valve	Online / Offline	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Objective	Sump Available	Product Number	Min Outlet Diameter (m)	Min Node Diameter (mm)
S1	x	Online			100.000	1.000	2.0	(HE) Minimise upstream storage			0.100	1200

Depth/Area/Inf Area

Node	Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Depth (m)	Area (m²)	Inf. Area (m²)
S1	0.00000	0.00000	2.0	0.95	100.000		0.000	145.0	0.0
							0.999	145.0	0.0
							1.000	0.0	0.0

Default Values			Overrides					
Entry Loss (manhole)	0.250		**Link**	**Entry Loss**	**Exit Loss**		**Node**	**Flood Risk (m)**
Exit Loss (manhole)	0.250							
Entry Loss (junction)	0.000							
Exit Loss (junction)	0.000							
Flood Risk (m)	0.300							

Node Size	
Node Losses	
Link Size	
Minimum Diameter (mm)	150
Link Length	
Maximum Length (m)	100.000
Coordinates	
Accuracy (m)	1.000
Crossings	
Cover Depth	
Minimum Cover Depth (m)	
Maximum Cover Depth (m)	3.000
Backdrops	
Minimum Backdrop Height (m)	
Maximum Backdrop Height (m)	1.500
Full Bore Velocity	
Minimum Full Bore Velocity (m/s)	
Maximum Full Bore Velocity (m/s)	3.000
Proportional Velocity	
Return Period (years)	
Minimum Proportional Velocity (m/s)	0.750
Maximum Proportional Velocity (m/s)	3.000
Surcharged Depth	
Return Period (years)	
Maximum Surcharged Depth (m)	0.100
Flooding	
Return Period (years)	30
Discharge Rates	
1 year (l/s)	
30 year (l/s)	
100 year (l/s)	
Discharge Volume	

100 year 360 minute (m³)	

Results for 100 year +40% Critical Storm Duration. Lowest mass balance: 100.00%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute winter	S1	352	100.974	0.973	19.8	135.1949	0.0000	OK			2.0				60.7