ATLAS PLANNING

FRIAR STILE ROAD

RICHMOND

TW10 6NH

FLOOD RISK ASSESSMENT

AUGUST 2023

FW2352_FRA_001 V1.1

REVISION HISTORY

Revision	Reason for Issue	Author	Checker	Approved	Date
v1	First Issue.	JR	PU	DM	26.07.2023
v1.1	Appendix B development proposals have been updated as requested by Malins Group. Appendix I has been updated to suit the updated development proposals.	JR	PU	JD	17.08.2023

EXECUTIVE SUMMARY

1. The site is at NO quantifiable risk of flooding from tidal events.

2. The property is identified within the Environment Agency Flood Risk mapping as being at very low risk of flooding from Rivers and Seas.

3. The site is identified by the Environment Agency as having a very low risk of flooding from overland Surface Water.

4. The site is considered to be at a Low quantifiable risk of flooding from groundwater sources.

5. The site is identified by the Environment Agency as being at NO quantifiable risk of flooding from manmade lakes within the topographical catchment of the site.

6. The site is at a negligible risk of flooding from the existing sewerage network in the vicinity of the site.

7. The site is at a negligible risk of flooding from its own private drainage connections however this can be mitigated by regular maintenance to ensure the ongoing performance of the system.

8. We therefore conclude that the proposed residential units are above the modelled flood level of the local watercourses and sits within Flood Zone 1 as defined in the National Planning Policy Framework July 2021 Table 1.

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APPENDICES

TABLES

FIGURES

1.0 INTRODUCTION

1.1.1 Farrow Walsh Consulting has been engaged by the applicant Atlas Planning to produce a Flood Risk Assessment and drainage strategy to accompany the planning application for a proposed residential development to be situated at Friars Stile Road, Richmond, London.

1.1.2 The development proposals include the demolition of existing garages and construction of a new 3 Bedroom residential property. A site location plan is included within Appendix A and the development proposals can be found within Appendix B.

1.1.3 This report considers the flood risk associated with a development proposal of this type and considers mitigation measures to ensure user safety.

1.1.4 The Flood Risk Assessment (FRA) report has been informed by the guidance contained within The National Planning Framework (July 2021, Department for Communities and Local Government) (NPPF).

1.1.5 Reference has been made to basic flood maps contained within the Environment Agency website and the Environment Agency Standing Advice for Local Planning Authorities.

1.1.6 In consulting the Environment Agency website this report examines the following:

- Assessment of Flood risk and the likely sources of flooding
- Managing Residual Flood Risk
- Managing surface water
- Remedial Measures

1.1.7 This FRA examines the flood implications of the proposed development based on the following objectives, set out within the NPPF.

- Appraising risk
- Managing risk
- Reducing risk
- A partnership approach.

1.1.8 This report has been prepared using the following policy and guidance documentation:

- National Planning Policy Guidance (NPPG)
- Ciria C753 – The SUDs Manual
- Flood and Coastal Risk Projects, Schemes and Strategies: Climate Change Allowances (July 2020)
- West London Level 1 Strategic Flood Risk Assessment (Metis Consultants Ltd – 2018)
- OPDC Infrastructure Delivery Plan (June 2018)
- OPDC Integrated Water Management Strategy (June 2018)
- Non-Statutory Technical Standards 2015
- Written Ministerial Statement regarding Sustainable Drainage (HCWS161) 2014
- The Water Framework Directive (2000)
- Building Regulations Part H 2015

1.1.9 In consulting with key stakeholders and policies this report aims to assess the risk of flooding both to the site and the impact of any development on the downstream network.

1.1.10 The flood management strategy, including consideration of safe access / egress to and from the site and flood resilience measures, is based on relevant British Standards (BS8533), the standing advice provided by the Environment Agency and on best engineering judgement. The approach for the FRA is based on the requirements of the Environment Agency and London Borough of Richmond Upon Thames.

1.1.11 Any comments and opinions expressed in this report, including any conclusions are based on the information available to Farrow Walsh Consulting Ltd at the time of writing. The conclusions therefore could differ if the information is found to be inaccurate, incomplete or misleading. Farrow Walsh Consulting Ltd. accepts no liability should this be proven to be the case, or, if additional information is made available with respect to this site.

2.0 SITE DETAILS

2.1 SITE LOCATION

2.1.1 The proposed development site is located in the Richmond area of south west London.

2.1.2 The site location is bounded by the adopted highway Onslow Road to the east and Friars Stile Road to the south. The western and northern boundaries are formed of existing residential properties and gardens.

2.1.3 A site location plan can be found within Appendix A.

2.2 SITE DESCRIPTION

2.2.1 The application site is irregular in shape and covers a total area of 302m^2 or 0.03 hectares.

2.2.2 The site is currently classified as brownfield land with an industrial unit and hardstanding areas currently serving as parking for the units.

2.2.3 The site has existing access points already in place via Onslow Road.

2.3 TOPOGRAPHY

2.3.1 The ground levels on the site are recorded to OS datum as between 49.79 to 50.10mAOD and the site generally slopes in a southwest to northeast direction.

2.3.2 A copy of the topographical survey can be located within Appendix C.

2.4 HYDROLOGICAL CONTEXT

2.4.1 Online OS mapping indicates that there are no watercourses located within the boundaries of the site.

2.4.2 The River Thames is the nearest watercourse to the site and is located 490m to the west and is classified as a main river by the EA.

2.4.3 The site lies within the London management catchment of the Thames River Basin District.

2.5 GEOLOGICAL CONTEXT

2.5.1 The British Geological Society (BGS) online mapping indicates that the site geology comprises of London Clay Formation bedrock – clay, silt and sand, with no superficial deposits identified.

2.5.2 Nearby borehole data, taken from BGS, confirms that the site is underlain with London Clay. The borehole, TQ17SE163, located 314m west of the west of the site sunk at 45-67 Richmond Hill and indicates that below a metre of made ground is 24.384 metres of Clay, with water being struck at 19.660 metres O.D. The Borehole data can be found within Appendix D.

2.6 GROUNDWATER VULNERABILITY

2.6.1 Both the bedrock stratum and superficial deposits below the site are classified by the Environment Agency as being unproductive in terms of aquifer designation.

2.6.2 In terms of vulnerability, the ground is classified as unproductive by the Environment Agency.

2.6.3 The site does not lie within a Source Protection Zone.

2.7 EXISTING DRAINAGE

2.7.1 Thames Water are responsible for maintaining the public sewers within the area of Friars Stile Road, Richmond, London and the sewer records have been obtained and can be found within Appendix E.

2.7.2 The sewer records confirm a foul sewer to the northeast of the site, running from north to south, within Onslow Road, that connects into a sewer running from south to north along Friars Stile Road to the southeast of the site.

2.7.3 The records also indicate a surface water sewer running from south to north along Friars Stile Road.

2.7.4 The existing topographical survey identifies manhole's and below ground drainage within the site with a private combined drain running from south to north through the southern boundary of the site. It is expected that the current site surface and foul water drains via this drain into the public foul sewer within Onslow Road, to the east of the site.

2.7.5 The topographical survey can be found contained within Appendix C.

2.8 ARTIFICIAL WATER BODIES

2.8.1 The nearest reservoir to the site is Kempton Park East Reservoir located 7.4km to the south-west of the site.

2.8.2 There are several ponds situated within Richmond Park with the nearest, Bishop's Pond being located 530m southeast of the site.

3.0 ASSESSMENT OF FLOOD RISK

3.1 FLUVIAL

3.1.1 The site lies in the Thames River London catchment and falls under the administrative jurisdiction of the Environment Agency.

3.1.2 The Environment Agency have derived flood maps of England from which it is possible to initially identify whether a site is located within an area that is at risk of fluvial flooding. The maps, which are available on the Environment Agency's website, categorise land as being within Flood Zone 1, Flood Zone 2 or Flood Zone 3, with Flood Zone 1 being all land falling outside of the flood plain and Flood Zones 2 and 3 being all land within the floodplain. Flood Zone 3 is split into two further categories, namely Flood Zone 3a and Flood Zone 3b with Flood Zone 3b considered to be the functional floodplain.

3.1.3 The definitions of the Flood Zones extracted from the National Planning Policy Framework (NPPF) are described below:

- Flood Zone 1 – low probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).
- Flood Zone 2 – medium probability. This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (15 – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
- Flood Zone 3a – high probability. This zone comprises land assessed as having 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.
- Flood Zone 3b – the functional floodplain. This zone comprises land where water has to flow or be stored in times of flood. Typically, 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.

3.1.4 The extent of flooding on main rivers is indicated on the Environment Agency web site and an extract from the indicative flood maps can be seen in Figure 1. The areas of dark blue identify flooding probability of 1 percent (1 in 100 year) and the light blue areas are areas of extreme flood between the 1 percent and 0.1 percent (1 in 1000 year) probability.

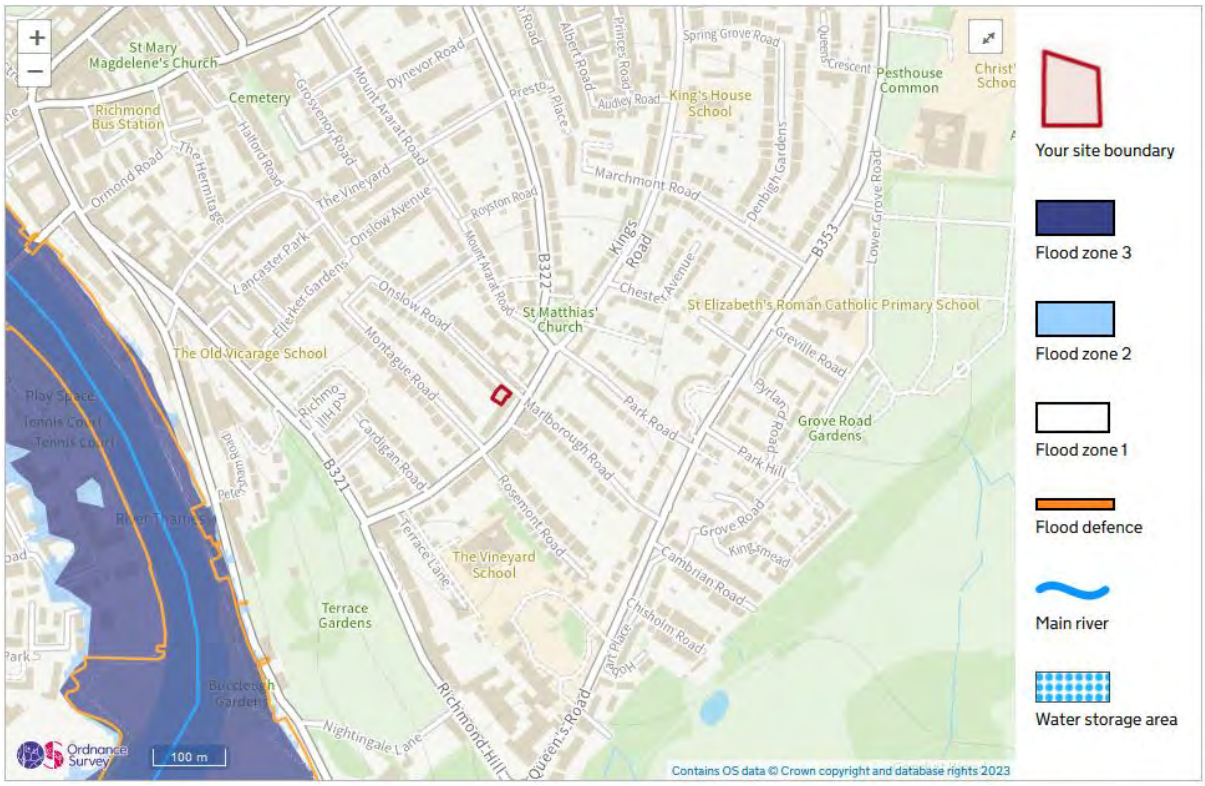


Figure 1 - Extract from EA Flood Map for Planning (July 2023)

3.1.5 It is identified on the EA indicative planning flood mapping the site lies within Flood Zone 1.

3.1.6 Based on Table 1 of the NPPF the site has a low probability of flooding due to main rivers within the extents outlined within Figure 1.

3.1.7 The SFRA indicates that no historic fluvial flood events have been recorded within the vicinity of the site.

3.2 TIDAL OR COASTAL

3.2.1 The site has an elevational range of 49.79 to 50.10 metres above sea level as shown within the topographical survey within Appendix C.

3.2.2 The site is geographically remote from any coastline. The site lies within the Thames River basin and the catchment of London.

3.2.3 The site is indicated by mapping as being remote from the areas at risk of tidal flooding with the existing coastal defences intact or removed.

3.2.4 The site is therefore considered comprehensively free from risk from tidal or coastal flooding effects, being horizontally and vertically remote from such influences at present, and after consideration of climate change effects.

3.3 GROUNDWATER FLOODING

3.3.1 Groundwater flooding occurs as a result of rising water from underlying aquifers or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at a shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although it is increasingly being associated with localised floodplain sand and gravels.

3.3.2 The SFRA classifies the site as having less than 25% risk of groundwater flooding as shown in Appendix F.

3.4 ARTIFICIAL WATER BODIES FLOODING

3.4.1 There are no reservoirs or manmade lakes within the immediate vicinity of the site.

3.4.2 The EA online mapping indicates that there are no areas within the vicinity of the site at risk of flooding from reservoirs.

3.4.3 The failure of the water mains running along the eastern and southern boundaries of the development site is considered statistically remote.

3.4.4 We conclude that the risk of failure of the water main is remote. It must however be noted that for a failure adjacent to the site the nature of the escape and probable pressurized column of water could itself cause some local flood damage, but this is beyond practical mitigation.

3.4.5 The SFRA indicates there have been no recorded historic incidents of flooding due to artificial sources.

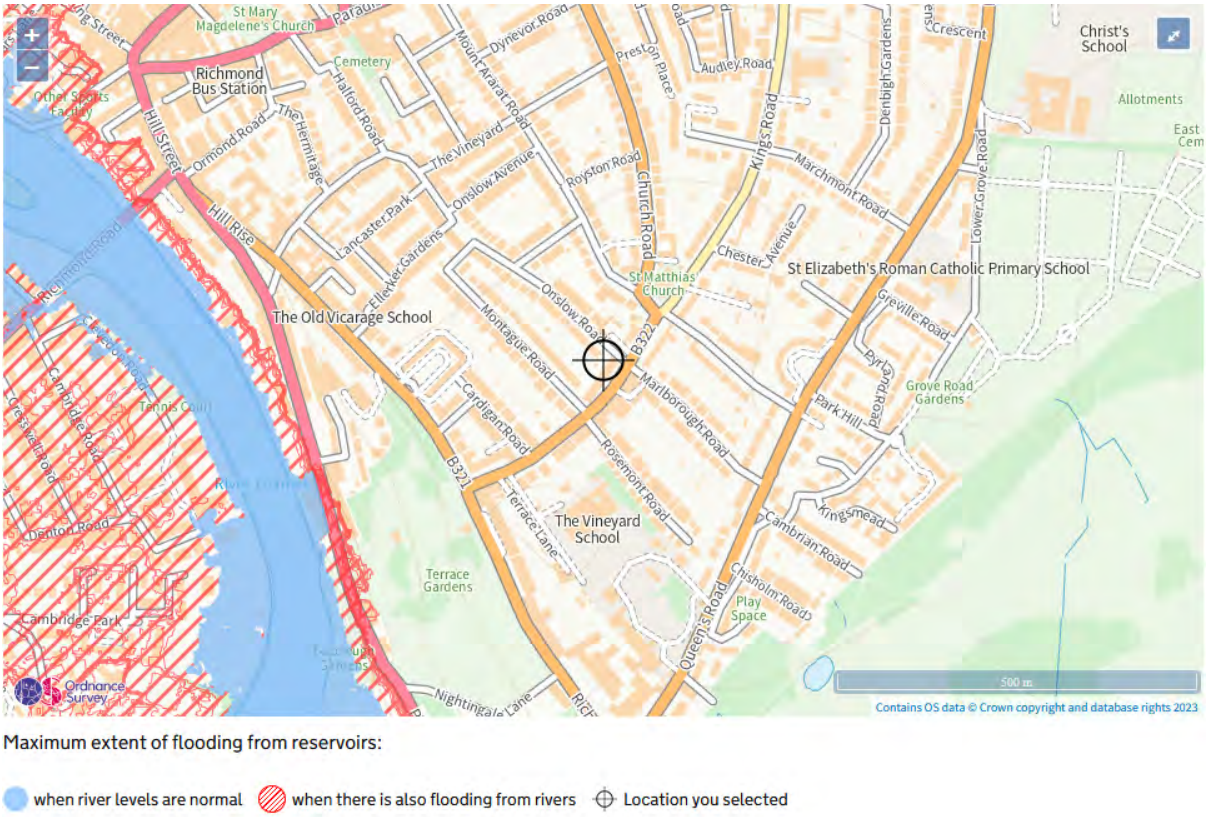


Figure 2 - Extract from EA Mapping Risk of Flooding from Reservoirs (July 2023)

3.5 SURFACE WATER FLOODING

3.5.1 Surface water flooding occurs when natural and engineered systems drainage network capacity is exceeded and thus cannot accommodate the volume of rainfall / runoff. Surface water flooding occurs often in urban areas during extreme, high intensity, low duration rainfall events which overwhelm the local surface water drainage systems. In rural areas this type of flooding can occur during medium intensity, long duration events where saturated ground conditions prevent natural infiltration into the subsoils below the surface. Flood water arising from such events is then conveyed above ground following the topography of the surrounding land.

3.5.2 The Environment Agency have modelled locations along critical flow paths and area situated in topographic depressions, which could flood following an extreme rainfall event when drainage capacity has been exceeded. Figure 3 indicates the predicted surface water flood risk map taken from the Environment Agency's website.

3.5.3 The site is considered to be at very low risk from overland flows by the EA.

3.5.4 The SFRA mapping indicates that the site is considered to be at low risk from the 1 in 1000-year, 1 in 100-year storm and 1 in 30-year events. The SFRA mapping can be found within Appendix F.

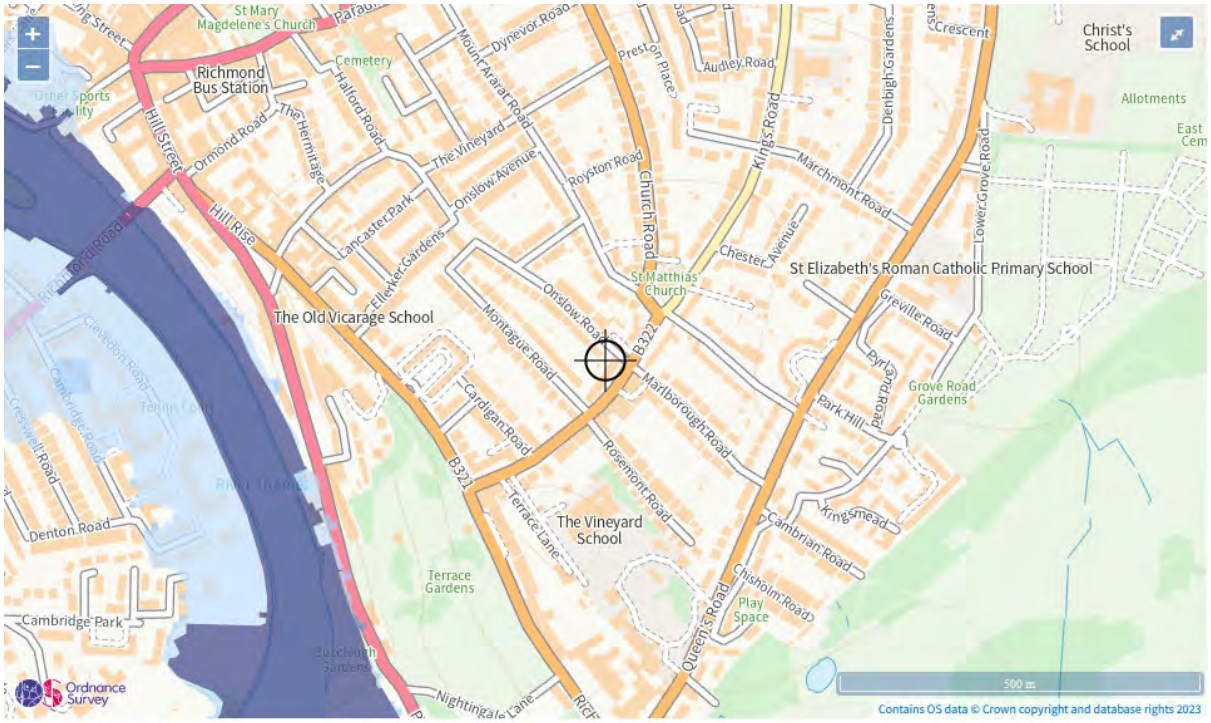


Figure 3 - Extract from EA Mapping Risk of Surface Water Flooding (July 2023)

3.6 EXISTING SEWER FLOODING

3.6.1 The sewer network surrounding the development is owned and maintained by Thames Water. A copy of the sewer records for the area can be found within Appendix E.

3.6.2 These records indicate a foul sewer, running from north to south along Onslow Road located along the eastern boundary of the site.

3.6.3 Generally, due to the site levels and those of the surrounding areas it is considered that any breach of the sewers within the highway would follow the natural topography of the highway within Onslow Road.

3.6.4 The site is also not recorded as a critical drainage area by the SFRA.

3.6.5 No historic flooding within the vicinity of the site was recorded in the SFRA. It should be noted that the sewerage systems are designed to accommodate the 1 in 30 year storm events and thus events above this probability, flooding from sewers will occur.

4.0 PROPOSED DEVELOPMENT

4.1 DEVELOPMENT PROPOSALS

4.1.1 The development proposal includes the demolition of the existing garages and the construction of a new 3 Bedroom residential property and a new stair well with bin and cycle storage. A site location plan is included within Appendix A and the development proposals can be found within Appendix B.

4.1.2 All access points for the unit shall be a minimum 150mm above the final ground levels to ensure that overland flows do not enter the property.

4.1.3 The current use of the application site is classed as brownfield use, with a hardstand area of 302m² (100%) which is currently believed to drain into the Thames Water Sewer via an underground drainage system.

4.1.4 In accordance with Table 2 of NPPG (2019), a building used for general industry has a flood vulnerability classification of 'less vulnerable'.

4.1.5 In accordance with Table 3 of NPPG (2019), the less vulnerable development within flood zone 1 is appropriate.

5.0 SURFACE WATER MANAGEMENT

5.1 FLOOD RISK FROM THE DEVELOPMENT

5.1.1 In accordance with NPPG site specific flood risk assessments should consider and assess how runoff from the development will be managed and whether it will increase flood risk elsewhere.

5.1.2 The primary flood risk generated by the new development is likely to be the risk posed by overland surface water flooding due to exceedance of the existing drainage network.

5.2 EXISTING SURFACE WATER DISCHARGE

5.2.1 The existing on site drainage network has been mapped and can be seen out falling into the Thames Water Sewer on the topographical survey contained within Appendix C. All existing Thames Water Sewers can be seen in Appendix E.

5.2.2 The existing site is classified as brownfield.

5.2.3 Existing brownfield runoff rates have been calculated for the existing impermeable area of 0.302ha using a 2-node system on Causeway Flow drainage design software, resulting in the below discharges:

Brownfield Runoff Rates	
Storm Event	Site 0.030ha (l/s)
$Q_{1,BR}$	4.0
$Q_{30,BR}$	9.8
$Q_{100,BR}$	12.7

Table 1 - Brownfield Runoff Rates

5.2.4 The full brownfield calculations can be found in Appendix G.

5.3 CLIMATE CHANGE

5.3.1 National Planning Policy Guidance requires that climate change be incorporated within the surface water drainage design in accordance with the Environment Agency's 'Flood and coastal risk projects, schemes and strategies: Climate change allowances' (July 2020) when assessing flood risk for a development.

5.3.2 The design life of the development is beyond 2070, therefore in accordance with the Environment Agency guidance the development should make allowances for an increase in extreme rainfall intensity of an additional 40% when compared to the 1961-1990 baseline.

5.4 PROPOSED SURFACE WATER DRAINAGE STRATEGY

5.4.1 Surface Water runoff from the proposed development should mimic, as far as possible, the surface flows from an undeveloped greenfield site.

5.4.2 Building Regulations 2010 Part H guidance for disposal of surface water is as follows:

- A soakaway or infiltration system, or where not reasonably practical;
- A surface water ditch or watercourse, or where not reasonably practical;
- A below ground sewer

5.4.3 While no current ground investigation has been made available nearby borehole data has confirmed the site to be underlain by London Clay, which does not support infiltration, therefore it can be concluded that infiltration would not be suitable for disposal of surface water on the site.

5.4.4 The nearest watercourse to the site is the River Thames, which lies 490m to the west of the site. Due to the distance from site a direct connection to the watercourse would not be feasible.

5.4.5 The Thames Water mapping indicates that the nearest appropriate sewer is the surface water sewer located in the Friars Stile Road/Onslow Road Junction.

5.4.6 The site currently drains into the sewer via a gravity system through a domestic combined sewer that runs within the southern boundary of the site and into the foul sewer located within Onslow Road.

5.4.7 Therefore, surface water disposal by the means of treatment and detention prior to controlled release into the Thames Water drainage network is deemed the most appropriate solution. Drainage strategy is included with Appendix I.

5.4.8 Existing greenfield runoff rates have been calculated for the development area and can be found within Appendix H and are also shown below.

Greenfield Runoff Rates	
Storm Event	Site 0.120ha (l/s)
$Q_{BAR,GR}$	0.15
$Q_{1,GR}$	0.13
$Q_{30,GR}$	0.35
$Q_{100,GR}$	0.48

Table 2 - Greenfield Runoff Rates

5.4.9 The development area of the site is 0.03 hectares, and it is proposed that 100% (0.03ha) of the development will be impermeable and require collecting and attenuating prior to discharge. The above areas are based on the current site layout available contained within Appendix B.

5.4.10 It is currently proposed that the drains within the site will remain under private ownership.

5.4.11 It is proposed that the surface water will be attenuated using a permeable paving before its controlled discharge using a flow control prior to discharge into the existing drainage within the site, and ultimately into the Thames Water sewer.

5.4.12 A copy of the Drainage Strategy can be found within Appendix I.

5.5 PROPOSED SURFACE WATER DISCHARGE

5.5.1 Surface water drainage will be provided in a new below ground gravity drains constructed around the unit and in the car park before joining onto the existing Thames Water surface water sewer. Attenuation is to be provided in the form of permeable paving. The proposed surface water runoff rates for the site will be limited to 2.0l/s for all storm events up to the 1 in 100year + 40% climate change storm event as agreed with Thames water (See Appendix E).

Proposed Runoff Rates	
Storm Event	Site – 0.030 ha (l/s)
$Q_{1,PR}$	0.15
$Q_{30,PR}$	2.0
$Q_{100,PR}$	2.0
$Q_{100+40\%cc,PR}$	2.0

Table 3 – Proposed Runoff Rates

5.5.2 This rate is subject to approval from the LLFA.

5.5.3 By controlling the discharge rate from the site for a 1in100 year + 40% storm event the site is offering a betterment to the downstream network by utilising on site flood storage at an earlier stage in the overall river catchment potentially reducing flooding downstream.

5.5.4 All sewers and drainage are to be constructed in accordance with all relevant industry standards, including but not limited to:

- Building Regulations Approved Document Part H 2010
- Sewer Sector Design Guidance

5.5.5 The drawings & schedules of the as-built site drainage system are to be made available to the building occupier to enable drainage maintenance and future works to be undertaken.

5.6 CONSIDERATION OF SUDS

5.6.1 With reference to CIRIA 753 and the surface water treatment process, the provision of permeable paving is to provide both storage and surface water treatment, allowing for the removal of silts from the drainage system and also providing ecological benefits for the site.

5.6.2 The Environment Agency require Sustainable Drainage (SuDS) techniques to be incorporated within new developments where possible, as highlighted in policy 5.13 on Sustainable drainage within their Integrated Water Management Strategy (June 2018).

5.6.3 Consideration should therefore be given to the use of the Sustainable Urban Drainage Systems. Table 2 below gives commentary in relation to the suitability of SuDS techniques for the proposed development.

SUDS Technique	Commentary	Suitability
Green Roof	Due to the small roof sizes and pitched nature of roofs within the development, the option of incorporating green roofs into the development is not suitable for this site.	No
Infiltration by Soakaway	No current ground investigation has been made available, it is however anticipated that the ground is made up of clay and therefore, soakaways are not suitable for this site.	No
Water Butt	Storage of roof runoff via the use of water butts has the potential to be utilised, however unlikely in an industrial setting.	Potential
Filter Strip	The is limited potential, due to the nature of the site area.	No
Infiltration Trench/Filter Trench	There is no suitable area within the site for infiltration trenches/filter trenches	No
Swale	There is limited potential, due to the nature of the site.	No
Bio-retention	There are limited areas for this to be sited, and concerns over maintenance by the owners.	No
Permeable Paving	Permeable paving has been used across the site to provide both treatment of hydrocarbons and storage.	Yes
Geocellular/modular system	Geocellular system is not practical as with the basement and the building occupying the majority of the site area there is no area to accommodate a tank within the site.	No
Infiltration Basin	Due to the size of the site, it is deemed as an unviable option.	No
Detention Basin	Due to the size of the site, it is deemed an unviable option.	No
Pond	Similar to detention basins, there is also no feasible position for such a feature	No
Stormwater Wetland	It is not viable or practical to accommodate stormwater wetland on site as there are no extensive large open soft landscaped area to accommodate this.	No

Table 4 - SuDS Consideration Table

5.6.4 The table above identifies that due to site constraints, the most feasible method for providing SuDS is to utilise a blue roof to reduce the discharge rate from the site with a green roof finish, to be designed by specialists. Further SuDS can be offered if required by means of water butts.

5.6.5 The permeable paving will provide both storage and water quality treatment for the impermeable areas of the site, while the remaining surface water will receive further treatment at the water treatment works as all surface water will drain via the Thames Water combined sewer due to the lack of public surface water sewers in the vicinity of the site.

5.7 ATTENUATION PROPOSALS

5.7.1 In accordance with current design guidelines the attenuation volume for a site should be calculated based on a 1 in 100 year + climate change allowance.

5.7.2 Permeable paved areas will be drained via catchpits and filter drains within the voided stone sub-base. This will allow the first 5mm of rainfall is proposed to be held within the proposed catch pits of the development along with wetting of materials from a dry state. The permeable paving filter drains will also

allow water to collect within the stone surround of the pipe to ensure the first 5mm is retained on site and lost through natural infiltration or evapotranspiration.

5.8 MAINTENANCE

5.8.1 At this stage it has been assumed that the residential unit owners will maintain the drainage elements as outlined within this report. Future maintenance schedules for the SuDS features have been provided within Appendix J.

5.8.2 The drawings and schedules of the as built drainage are to be made available to the building owner to enable drainage maintenance and future works to be undertaken.

5.8.3 At this stage, the maintenance company has not yet been appointed and as such the applicant will be responsible until such time as they are appointed. Once appointed the contact details will be provided to the LLFA for records.

5.9 EXCEEDANCE FLOWS

5.9.1 Exceedance flows are to be contained within the site. The intention is to direct flows away from the building's access points, with the accesses being a minimum of 150mm above the external surrounding levels.

5.10 CONSTRUCTION SEQUENCING

5.10.1 Temporary drainage is to be constructed at the start of the programme to ensure that runoff is controlled from the site throughout the duration of the works. This will minimise the impact of the developed at the start of the project potentially lessening the effects of flooding on downstream properties.

5.11 DRAINAGE SUMMARY

5.11.1 The proposed surface water drainage system can be summarised as follows:

- Surface water runoff from the site will be stored and treated within the permeable paving of the parking bays, before being discharged into the Thames Water surface water network at a controlled rate via a flow control chamber.
- Use of Flow control to control discharge rate into Thames Water Sewer.

6.0 FOUL WATER DRAINAGE STRATEGY

6.1 FOUL WATER DRAINAGE DESIGN

6.1.1 It is proposed that foul water drainage will be conveyed from the north to south of the site by below ground internal private gravity drains prior to connection into the existing Thames Water sewer located within Onslow Road.

6.1.2 Where available any existing connections into the sewer shall be utilised.

7.0 FLOOD MITIGATION STRATEGY

7.1 PRINCIPLES FOR MITIGATION STRATEGY

7.1.1 In accordance with Table 3 of NPPG (2019), a building used for general industry has a flood vulnerability classification of 'less vulnerable'.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	×	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	×	×	×	✓

Table 5 - Extract from NPPG 2019 (Table 3)

✓ Denotes Development is appropriate

× Development should not be permitted

7.1.2 The findings of the FRA indicate that the site is located within FZ1 and thus deemed appropriate for development in accordance with NPPG.

7.1.3 The findings of the FRA indicate that the site may be susceptible to surface water flooding when considering the impacts of climate change. As such, the following mitigation measures should be introduced to protect the parcel for its lifetime.

- Any air brick vents to the property are to be set a minimum 0.60m above FFL to prevent flood water ingress, with new telescoping underfloor vents provided where required.
- It is also proposed that all access points to the building comprise of sealed uPVC or composite doors with sealed gaskets to the perimeter.
- Raised electrical sockets and meters set a minimum of 600mm above the proposed FFL should be implemented along with the use of plastic or stainless-steel fixtures for longevity.

7.1.4 The drainage design should account for any residual risk of flooding from surface water as a result of exceedance events.

7.2 SEQUENTIAL APPROACH

7.2.1 The site is located within Flood Zone 1 with the building being positioned where possible outside of the proposed surface water flood extents to ensure a sequential approach is taken by trying to position buildings as far away from the source of flooding as practical.

7.3 FINISHED FLOOR LEVELS

7.3.1 Floor levels should be set such that they are a minimum of 150mm above the final surrounding ground levels. The proposed Floor level has also been raised 200mm from existing.

7.4 SAFE ACCESS

7.4.1 In accordance with current guidance and DEFRA FD2320 safe access is to be provided for users in the event of flooding. Where safe access cannot be provided measures are to be implemented to ensure the users' safety until the emergency services have been able to reach them.

7.4.2 The EA online mapping indicates that the site access lies within FZ1 have therefore has a low probability of flooding. The access points lie outside the mapped extents of flooding caused by rivers and seas but Park Royal Road is identified as a mixture of high and medium risk of flooding due to surface water overland flows. The mapping indicates that the access will encounter a flood depth of between 300mm and 900mm with flows less than 0.25m/s.

7.4.3 In accordance with DEFRA FD2320 Table 13.1 shown in Figure 4 a flood depth of between 300mm and 900mm with a velocity less than 0.25m/s as on Friars Stile Road would represent a danger to most, meaning the majority of users would be required to maintain a stay put approach. However, safe access and egress can be provided in all storm events to the west of the building, with no flooding highlighted there via the EA online mapping.

Table 13.1 Danger to people for different combinations of depth and velocity

Velocity (m/s)	Depth of flooding (m)											
	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.00												
0.10												
0.25												
0.50												
1.00												
1.50												
2.00												
2.50												
3.00												
3.50												
4.00												
4.50												
5.00												

Key:
- Danger for some
- Danger for most
- Danger for all

Figure 4 - Extract from DEFRA FD2320 showing Table 13.1

7.4.4 In extreme flood events above the 1 in 1000-year (0.1%) storm event the development would operate a 'stay put' approach in extreme flooding events for users. They would be advised to stay within the development and await assistance from emergency services.

7.5 FLOOD WARNING & EVACUATION

7.5.1 Whilst the site is considered to have a low probability of flooding from all sources, and a stay put approach can be adopted, access and egress from the site in storm events above the 1 in 100 year probability will impact on the ability of some users to be able to access / egress the site. Therefore it is important that all users of the development are made aware of the flood warning procedures.

7.5.2 By utilising the flood warning systems available it is anticipated that the users will be able to egress from the site in a safe manner in advance of an extreme (1.0 – 0.1 percent probability) storm event occurring.

7.5.3 Flood warnings are published by the Met Office can be found here:

https://flood-warning-information.service.gov.uk/warnings

7.5.4 The Met Office Flood Forecasting Centre in conjunction with the Environment Agency publishes Flood Guidance Statements containing:

- General overview of the flood risk
- Assessment of the flood risk
- Weather warnings and flood warnings
- Specific area of concern map

7.5.5 The Met Office uses a Flood Risk Matrix (see Figure 4) to assess the likelihood against the potential impact and assigns a risk colour and level.

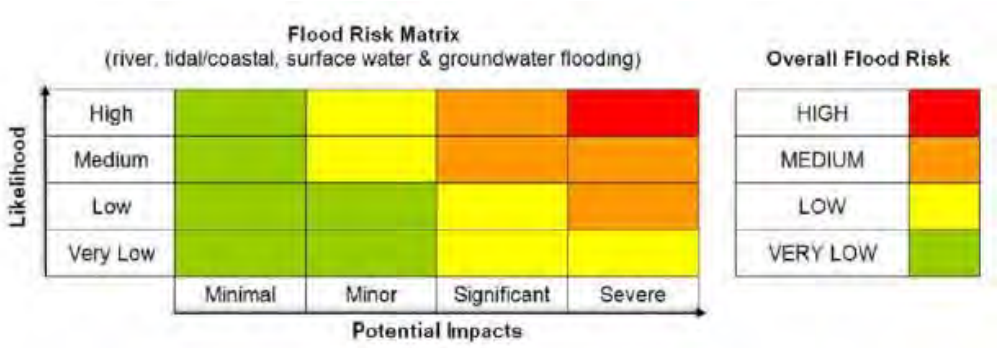


Figure 5 - Flood Risk Matrix

7.5.6 Typical examples of impacts from flooding aligned with the flood risk matrix are shown in Table 4.

Flood Impacts Table			
Minimal Impacts	Minor Impacts	Significant Impacts	Severe Impacts
Generally, no impact, however there may still be Isolated and minor flooding of low-lying land and roads Isolated instances of spray/wave overtopping on coastal promenades Little or no disruption to travel although wet road surfaces could lead to difficult driving conditions	Localised flooding of land and roads – risk of aquaplaning Localised flooding could affect individual properties Individual properties in coastal location affected by spray and/or wave overtopping Localised disruption to key sites identified in flood plans (e.g. Railways, utilities) Local disruption to travel – longer journey times	Flooding affecting properties and parts of communities Damage to buildings/structures is possible Possible danger to life due to fast flowing/deep water/wave overtopping/wave inundation Disruption to key sites identified in flood plains (e.g. railways, utilities, hospitals) Disruption to travel is expected. A number of roads are likely to be closed	Widespread flooding affecting significant numbers of properties and whole communities Collapse of buildings/structures is possible Danger to life due to fat flowing/deep water/wave overtopping/wave inundation Widespread disruption or loss of infrastructure identified in flood plans (e.g. railways, utilities, hospitals) Large scale evacuation of properties may be required Severe disruption to travel. Risk of motorists becoming stranded.

Table 6 - Flood Impact Table

7.5.7 The Environment Agency constantly monitors rainfall, river levels and sea conditions to forecast the possibility of flooding. If necessary, the Environment Agency can be contacted:

Incident hotline 0800 80 70 60 (24hrs)

Floodline 0345 988 1188

7.5.8 The Environment Agency Flood Warning Levels:

Warning type		Meaning	When it is used
	**Flood Alert**	Flooding is possible. Be prepared.	Two hours to two days in advance of flooding
	**Flood Warning**	Flooding is expected. Immediate action required	Half an hour to one day in advance of flooding
	**Severe Flood Warning**	Severe Flooding. Danger to life.	When flooding poses a significant threat to life.

Table 7 - Environment Agency Flood Warning Levels

8.0 SEQUENTIAL AND EXCEPTION TESTS

8.1 SEQUENTIAL TEST

8.1.1 For clarity the aim of the sequential test is to steer new development to areas with the lowest probability of flooding. Furthermore, approval of the Sequential Test lies with the Local Planning Authority.

8.1.2 The NPPF indicates that for a less vulnerable land use within Flood Zone 1, development is appropriate. Environment Agency mapping and the Strategic Flood Risk Assessment both indicate that the entirety of the site lies within Flood Zone 1.

8.1.3 The site is in an existing residential estate with prominent residential buildings within the vicinity of the site and a garage building already occupying the site.

8.1.4 In view of the facts as identified the applicant does not own other sites considered to be more suitable for use for a residential development in the immediate vicinity.

8.1.5 The above clearly demonstrates that the sequential test would be satisfied provided it can be demonstrated that flood water will not pose excessive risk to the development, safe ingress and egress can be created and the development will not increase risk of flooding elsewhere.

8.1.6 The NPPF defines what type of development is appropriate in an individual location and seeks to guide development generally away from areas of flood risk. It nevertheless accepts implicitly that some development in areas of higher potential risk may be appropriate or indeed essential, and seeks to classify zones of risk, types of development and development suitability.

8.2 EXCEPTION TEST

8.2.1 Table 3 within the NPPF indicates that the site is appropriate for use as a less vulnerable land use due to the site being within Flood Zone 1.

8.2.2 Wider sustainable benefits to the community include:

- Potential for reduced risk of flooding elsewhere by increasing flood storage volume within the site
- Reduction in surface water runoff when compared to the existing situation delaying discharge into the watercourse and potentially providing a betterment downstream

8.2.3 The FRA demonstrates safety and flooding sustainability by:

- Maintaining floor level proud of surrounding ground level to reduce opportunity for surface water flows to run towards building.
- Controlling runoff on site to delay the discharge into the sewer network.
- Safe ingress and egress routes for pedestrians being available from the properties to the surrounding highways.

8.2.4 There will be a significant reduction in the level of surface water runoff rate over the current land use.

8.2.5 In view of the above the exception test is deemed to have passed.

9.0 CONCLUSIONS

9.1 CONCLUSIONS

9.1.1 The site proposed for development is free of potential risk of flooding from tidal events.

9.1.2 The site is outside the extents of the mapped flood plain of main river systems while being classified as a very low risk area.

9.1.3 The site is at very low risk of flooding from overland flow routing from surface water and can be mitigated against by raising vent bricks and electrical sockets, as well as using sealed doors on all access points. The FFL for the development is to be a minimum of 150mm above the surrounding ground level further mitigating the flood risk.

9.1.4 The site is at a low susceptibility of flooding from groundwater sources.

9.1.5 The site is at no risk of flooding from manmade lakes.

9.1.6 The escape flow route from the strategic water mains has also been considered. In the unlikely event of failure of the mains the flows would not reach the properties.

9.1.7 The site is at no risk of flooding from existing sewerage systems for the same reason as the water mains issue.

9.1.8 The proposed surface water discharge rate offers a betterment to the existing brownfield runoff rates for all storm events with the use of SUDS to treat and delay runoff entering the watercourse network.

9.1.9 The site is at a negligible risk of flooding from its own private drainage systems; however, this can be mitigated against by regular maintenance in accordance with the maintenance strategy provided within this report and channelling of flows within the development away from the properties.

9.1.10 We therefore conclude the application site lies within Flood Zone as defined in the NPPF Table 1 and since the exception test for this has been passed less vulnerable development uses should be permitted.

APPENDICES

APPENDIX A – SITE LOCATION PLAN

Farrow Walsh Consulting Limited

SITE LOCATION PLAN

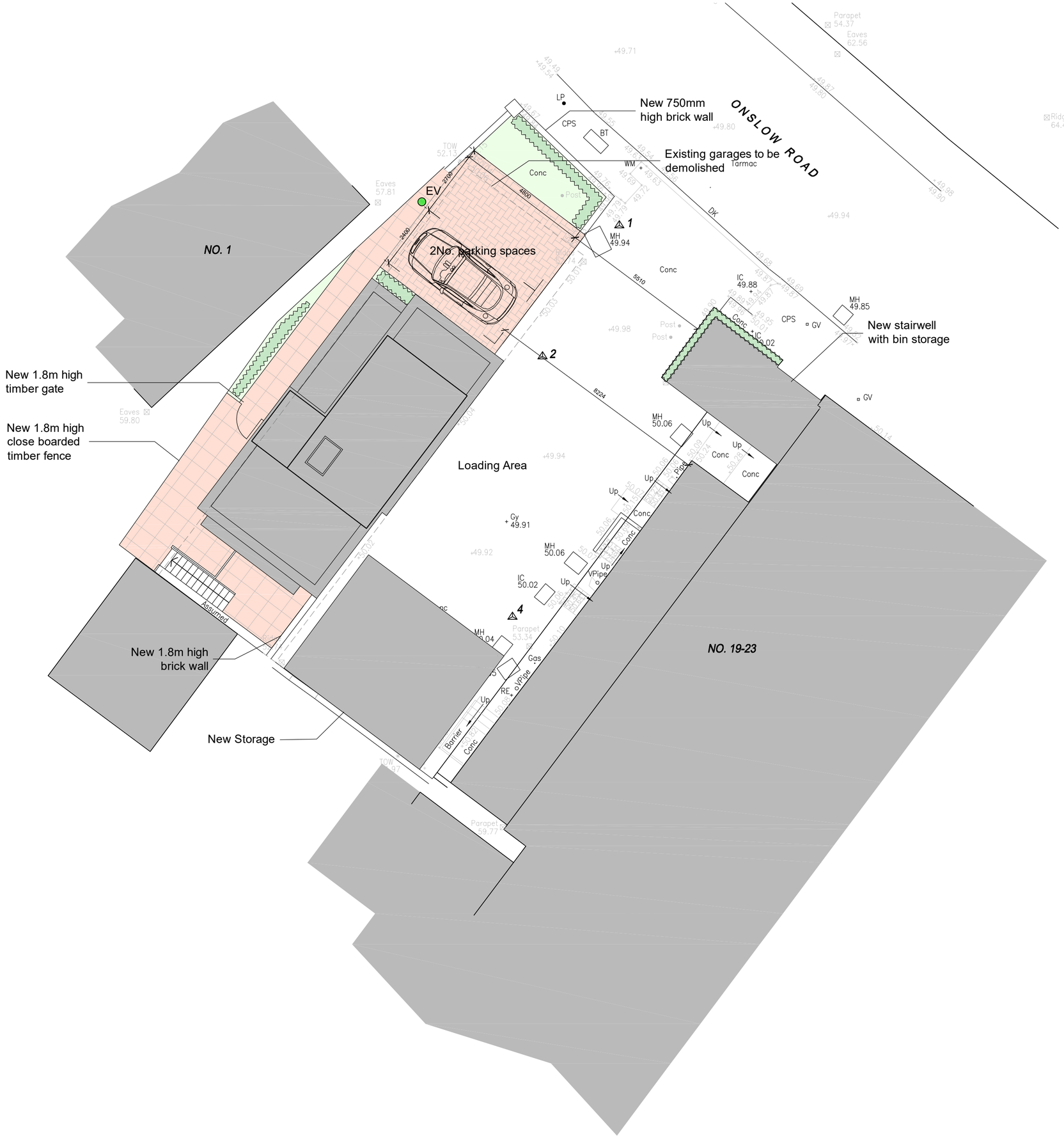
FW2352/Friars Stile Road, Richmond

X 518421 Y 174350

Site Location – Aerial Photograph

Site Location – Road Map

APPENDIX B – DEVELOPMENT PROPOSALS



NOTES

GENERAL NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE OTHER RELEVANT CONSULTANTS DRAWINGS.
2.ALL FINISHES ARE TO CONFORM TO THE CURRENT BUILDING REGULATIONS.
3. REFER TO A SEPARATE DOCUMENT FOR THE DESIGNERS RISK ASSESMENT.
4. ALL WORKS OR MATERIALS INDICATED ON THIS DRAWING ARE TO BE TO THE LATEST RELEVANT BRITISH STANDARDS AND CARRIED OUT IN ACCORDANCE WITH THE BRITISH STANDARDS CODES OF PRACTICE OR RECOGNIZED INSTITUTE OR TRADE ASSOCIATION RECOMMENDATIONS AND PUBLICATIONS.

Soft Landscaping

Indicates existing trees / shrubs.

Indicates new trees / shrubs to LA approval.

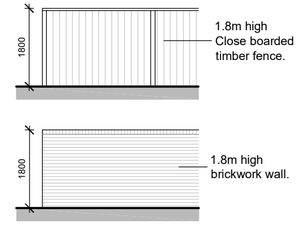
Hard Landscaping

Block Paving

Herringbone pavers to parking bays.

Electric Vehicle Charging Point

Boundary treatment details



1:100 scale

0 1m 2m 3m 4m 5m

Revision	Date	Description	Dwn	Chkd
P5	July 2023	Minor amendments	LW	
P4	July 2023	Added dimensions	HM	
P3	June 2023	Amendments based on pre-app comments	HM	
P2	Nov 2022	Amendments to suit client comments	LW	

PLC ARCHITECTS
Lansdowne House
25-26 Hampshire Terrace
Portsmouth PO1 2QF
Hampshire England
Tel: (023) 92 755 333
E-Mail: admin@plcarchitects.com
Web: www.plcarchitects.com

Client :

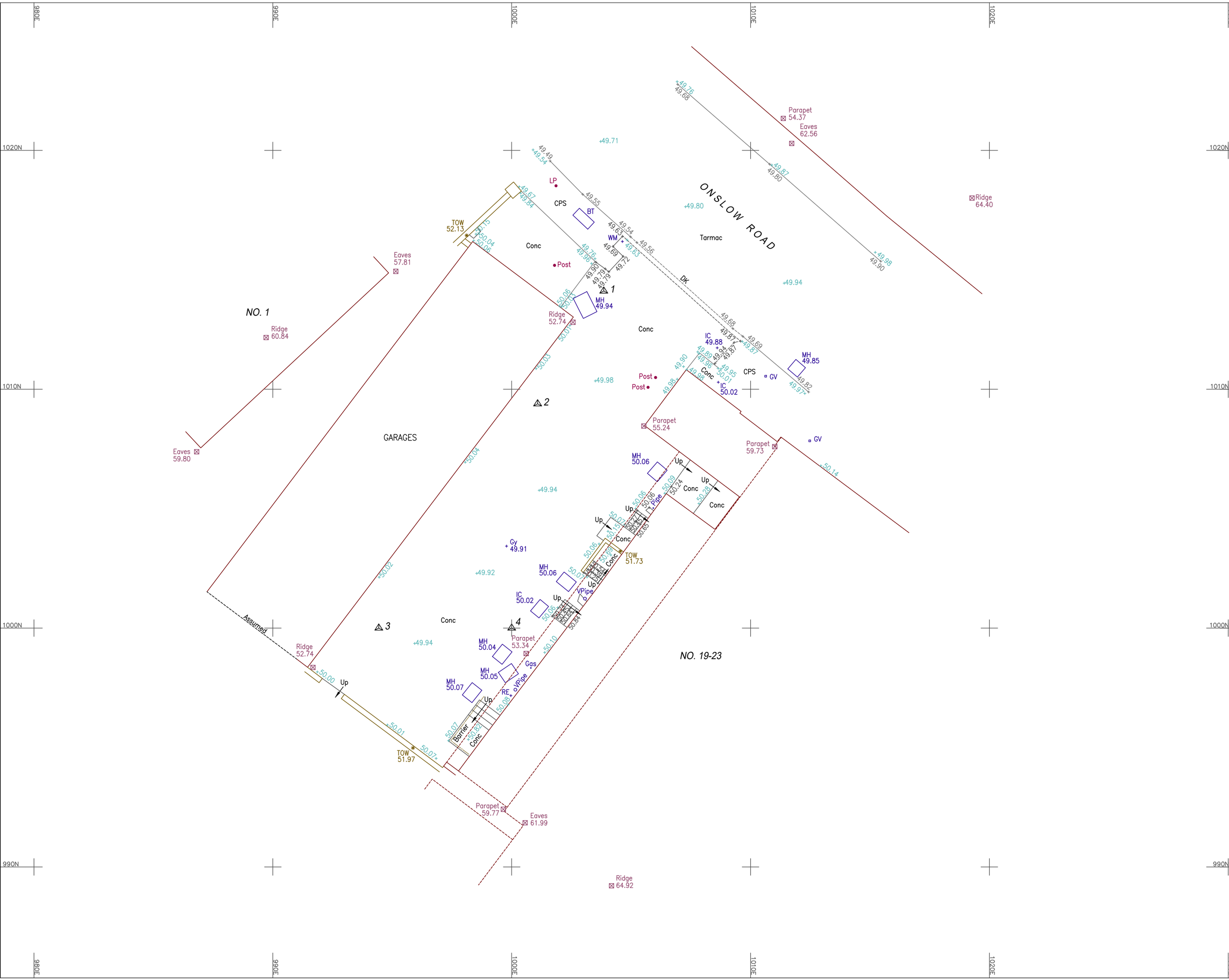
Project :
Land at rear of
19-23 Friars Stile Road
Richmond TW10 6NH

Drawing Title :
Proposed Site Plan

Drawn By	Date	Checked By	Date	Approved By	Date
LW	Oct '22				

Drawing No.	Revision:	Scale:
22.3349.102	P5	1:100 @ A2

APPENDIX C – TOPOGRAPHICAL SURVEY



Important Information:

All information contained in this drawing (including digital data) should be checked and verified prior to any fabrication or construction.

Survey Legend

FENCES

BARBED WIRE FENCE	B/W	
CORRUGATED IRON FENCE	C/I	
CLOSE BOARD FENCE	C/B	
CHESTNUT PALING FENCE	C/P	
IRON RAILING FENCE	I/R	
POST AND CHAIN FENCE	P/C	
POST AND RAIL FENCE	P/R	
POST AND WIRE FENCE	P/W	
CHAIN LINK FENCE	C/L	
LARCH LAP FENCE	L/L	
INTERWOVEN FENCE	I/W	
WIRE MESH FENCE	W/M	

Trees

Hedges (Width To Scale)

Walls — Wall 2.0m (Width to Scale)

Fences — C/B 1.8m

ABBREVIATIONS

BOLLARD	Bo	MARKER	Mk
BRITISH TELECOM IC	BT	NOTICE BOARD	NB
CONCRETE PAVING SLABS	CPS	PARKING METER	PM
COVER LEVEL	CL	ROAD NAME PLATE	RNP
DROP KERB	DK	ROAD SIGN	RS
ELECTRIC INSPECTION COVER	EC	RODDING EYE	RE
ELECTRICITY POLE	EP	RETAINING WALL	Rtw
FIRE HYDRANT	FH	RAINWATER PIPE	RWP
FLOWER BED	FB	STOP VALVE	SV
FOOTPATH	FP	TELEGRAPH POLE	TP
GAS VALVE	GV	TELEPHONE CALL BOX	TCB
GULLY	Gy	TRAFFIC LIGHT	TL
INSPECTION COVER	IC	UNABLE TO LIFT	UTL
PIPE INVERT LEVEL	IL	UNKNOWN	Unk
KERB OUTLET	KO	VENT PIPE	VP
MAN HOLE	MH	WATER METER	WM
THRESHOLD	Th	DIAMETER	Ø

North:

Grid: Local Grid

Levelling: Arbitrary Datum Based On Station 4. Value used 50.00m

Drawing Title: Topographical Survey

Site Address: Land Rear of No.19-23 Friars Stile Road TW10 6NH

Client: The Malins Group

Surveyor	JS	Drawn By	WB	Verified By	AF	Date	11.08.22

CM No: CM/22209/T

Rev:

Scale: 1:100m @ A2

Date: August 2022

Cadmap Ltd
Unit 131 Dunsfold Park
Cranleigh
Surrey, GU6 8TB
T: 01483 429385
E: info@cadmap.co.uk
W: www.cadmap.co.uk

APPENDIX D – BGS BOREHOLE DATA

1812 7431
TQ17SE 163

BOREHOLE NO. 2

Ground Level 86.5 O.D. +26.37m Diameter of Boring 8 inch

Water Struck Seepage at 76.5 O.D. 64.5 O.D. Method Shell and auger

Standing Water Level 77.0 O.D. (21/5/68) Start 13/5/68 Finish 14/5/68

REMARKS:

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
Made ground (Brown clay, gravel and brick fragments)	10'0"			J7240 2'6"	U7241 3'6"
				J7242 7'6"	U7243 8'6"
Firm brown clay	2'6"	10'0"	76.5		
		12'6"	74.0	J7244 12'6"	
Stiff grey clay, with 1 inch sand layer at 19ft	67'6"				U7245 13'6"
				J7246 17'6"	U7247 18'6"
				J7248 22'6"	
					U7249 25'0"
				J7250 27'6"	
					U7251 30'0"
				J7252 32'6"	
					U7253 35'0"
				J7254 37'6"	
					U7255 40'0"
				J7256 42'6"	
					U7257 43'6"
				J7258 47'6"	
					U7259 48'6"
TOTALS					

NOTES: Descriptions in accordance with C.P.2001 "Site Investigations"
J Jar Sample B Bulk Sample W Water Sample

TQ17SE 163

BOREHOLE NO. 2 (contd)

Ground Level..... Diameter of Boring.....

Water Struck..... Method .....

Standing Water Level..... Start..... Finish.....

REMARKS:

Description of Strata	Thickness	Depth	Reduced Level	Disturbed Samples	Undisturbed Samples and Insitu Tests
Stiff grey clay with linch sand layer at 19ft	67'6"			J7260 52'6" J7261 55'0" J7262 57'6" J7264 62'6" J7265 65'0" J7266 67'6" J7268 72'6" J7269 75'0" J7270 77'6"	U7263 58'6" U7267 68'6" U7271 78'6"
		80'0"	6.5		
Bottom of Borehole		24.38			
TOTALS	80'0"	80'0"			

NOTES: Descriptions in accordance with C.P.2001 "Site Investigations"
J Jar Sample B Bulk Sample W Water Sample

APPENDIX E – THAMES WATER SEWER RECORDS

Asset location search

Property Searches

Farrow Walsh Consulting Ltd
62 Highcross Street 62 Highcross Street

LEICESTER
LE1 4NN

Search address supplied 19
Friars Stile Road
Richmond
TW10 6NH

Your reference FW2352

Our reference ALS/ALS Standard/2023_4829680

Search date 18 May 2023

Notification of Price Changes

From 1st April 2023 Thames water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk

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

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

0800 009 4540

Asset location search

Property Searches

Search address supplied: 19, Friars Stile Road, Richmond, TW10 6NH

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 0800 009 4540, 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

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.

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

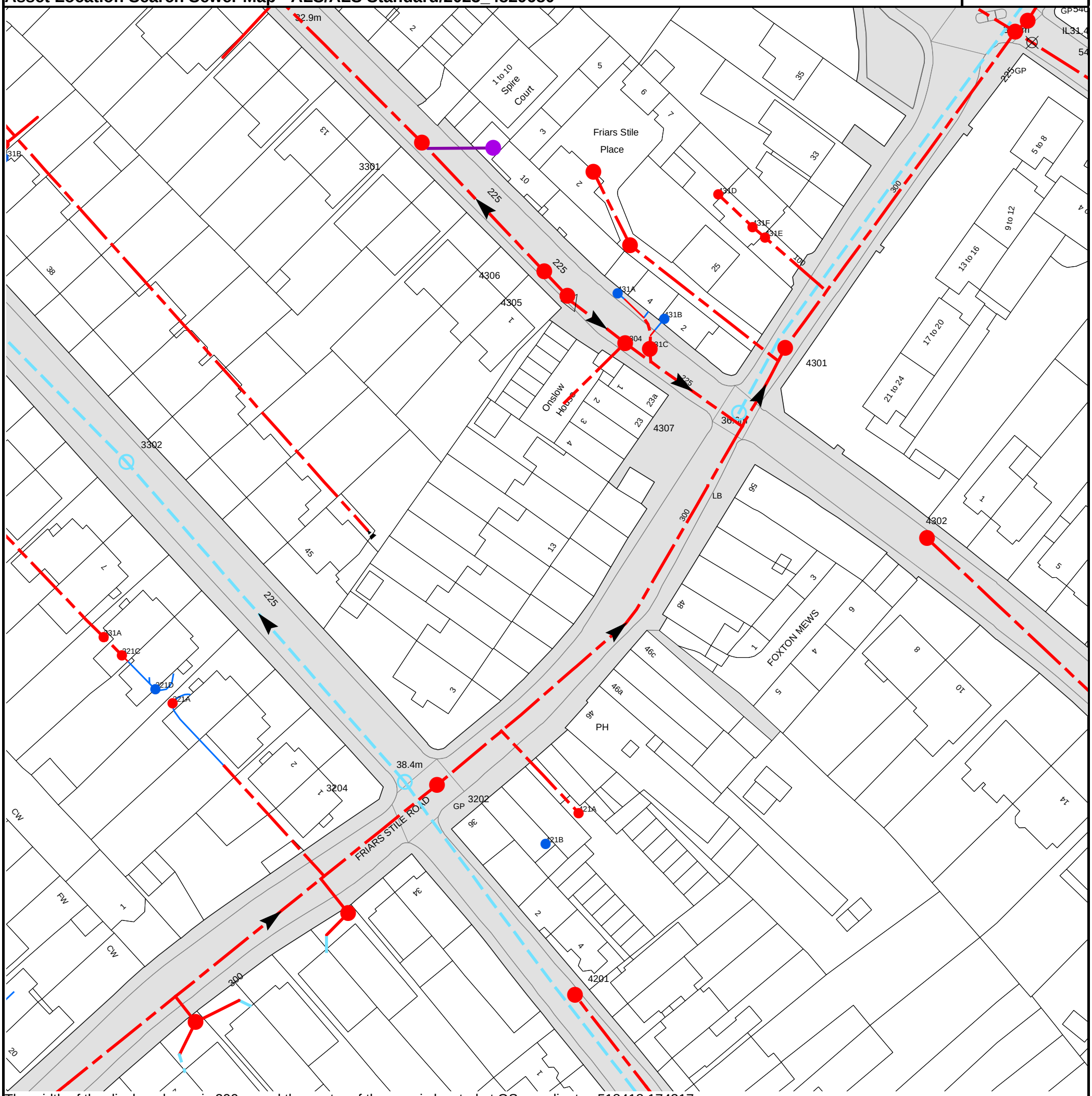
Clean Water queries

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/2023_4829680



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 518418,174317

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
4307	36.44	35.28
431C	n/a	n/a
4301	36.21	31.97
4304	35.93	32.96
431B	n/a	n/a
431A	n/a	n/a
4311	n/a	n/a
431E	n/a	n/a
431F	n/a	n/a
431D	n/a	n/a
4310	n/a	n/a
5402	35.21	31.17
5403	35.24	31.15
4302	36.14	33.68
331A	n/a	n/a
321C	n/a	n/a
3302	36.36	35.02
321D	n/a	n/a
321A	n/a	n/a
3204	38.47	36.98
3301	34.21	31.94
4312	n/a	n/a
4306	35.48	33.04
4305	n/a	n/a
32ZP	n/a	n/a
32YT	n/a	n/a
3202	38.53	34.46
421B	n/a	n/a
4201	38.96	36.98
421A	n/a	n/a
33YX	n/a	n/a

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 divects 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

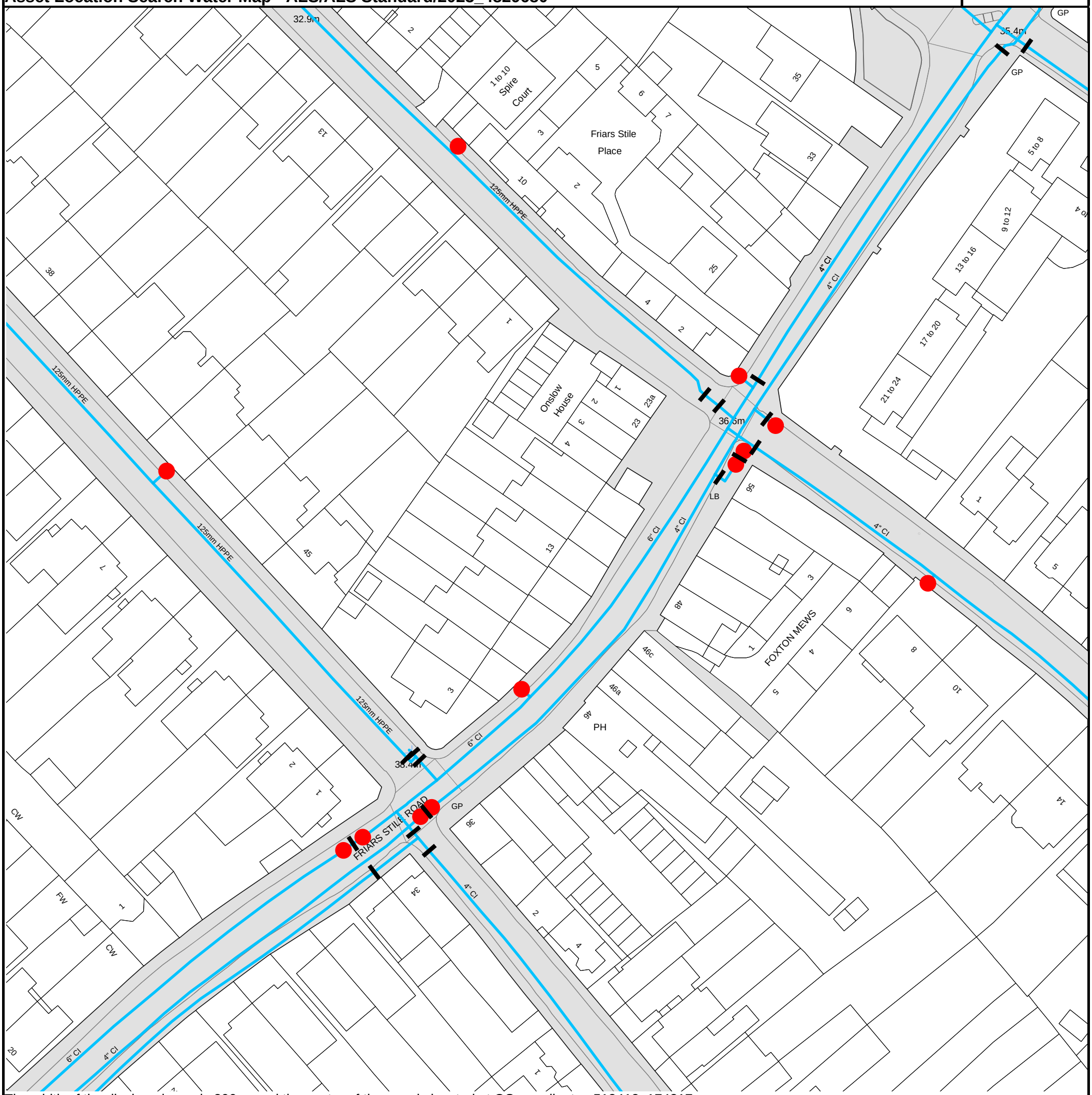
- Casement — Ducts may contain high voltage cables. Please check with Thames Water.
- Conduit Bridge
- Subway
- Tunnel

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.

Asset Location Search Water Map - ALS/ALS Standard/2023_4829680



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 518418, 174317.

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 - Water Key

Water Pipes (Operated & Maintained by Thames Water)

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

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.

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

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

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.

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')

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
- **Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

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: Indicates 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.

Payment 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 within 14 days of the 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. 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'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. 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 still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

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 0300 034 2222 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**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	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

Jamie Royle

From: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 20 July 2023 15:23
To: Jamie Royle
Cc: Jon Davey
Subject: RE: RE: FW: Courtesy DS6105039

Hi Jamie,

Thanks for your email.

The sewer is a foul sewer, the fact that surface water is connected into it doesnt make it a combined sewer. There is surface water sewer in the area, junction with Friars Stile Road. Please check in Onslow Road, there may be a surface water sewer there, just not marked on the map.

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable.
The disposal hierarchy being:
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 (5l/s/ha). Please note this is not a 5l/s, its is 5l/s/ha. So if your site is less than 1ha, the flowrate should be applied accordingly.

Conection into a foul water sewer is generally not acceptable.

Please let me know if you have any further questions.
Kind regards,

Natalya

Original Text

From: Jamie Royle <jamie@farrowwalsh.co.uk>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 14.07.23 11:26:20
Subject: RE: FW: Courtesy DS6105039

Morning Natalya,

I hope that you are well.

We've had a CCTV survey done to confirm what the current on-site drainage arrangement is. Please see the attached.

The survey would suggest that the sewer running along Onslow Road is actually a combined sewer and not a foul sewer as shown on the Thames asset plan.

Based on the CCTV survey findings would it be acceptable to discharge both storm and foul water into the combined sewer.

Look forward to hearing back from yourself.

Kind Regards,

Jamie Royle CAD Technician

Office Telephone 0330 100 0363

farrow walsh CONSULTING

Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

Company Number 06682625

From: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: Friday, June 23, 2023 2:45 PM
To: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: RE: FW: Courtesy DS6105039

HI Jamie,

I have replied to you on 26/05, please see an extract below. Let me know if you need any further information.

Thanks

Natalya

From:	"DEVELOPER.SERVICES@THAMESWATER.CO.U" <DEVELOPER.SERVICES@TH
To	jamie@farrowwalsh.co.uk
Cc	jon@farrowwalsh.co.uk
Bcc	
Date/Time:	26.05.2023 11:51:06 GMTUK
* Subject:	DS6105039:PDEV:TW10 6NH:FRIARS Stile Road, Richmond

Font Family Font Sizes

Hi Jamie,

Thanks for your email and application.

As this development is only for one property you do not require a capacity check. You do require a consent to make a conn
here https://www.thameswater.co.uk/help/home-improvements/how-to-connect-to-a-sewer

In regard to the surface water, it must be connected into a surface water system. I would suggest checking surrounding p
There is surface water sewer in Friars Stile Road so I would think there should be surface water nearby you could make a
You can use one application for all proposed connections.

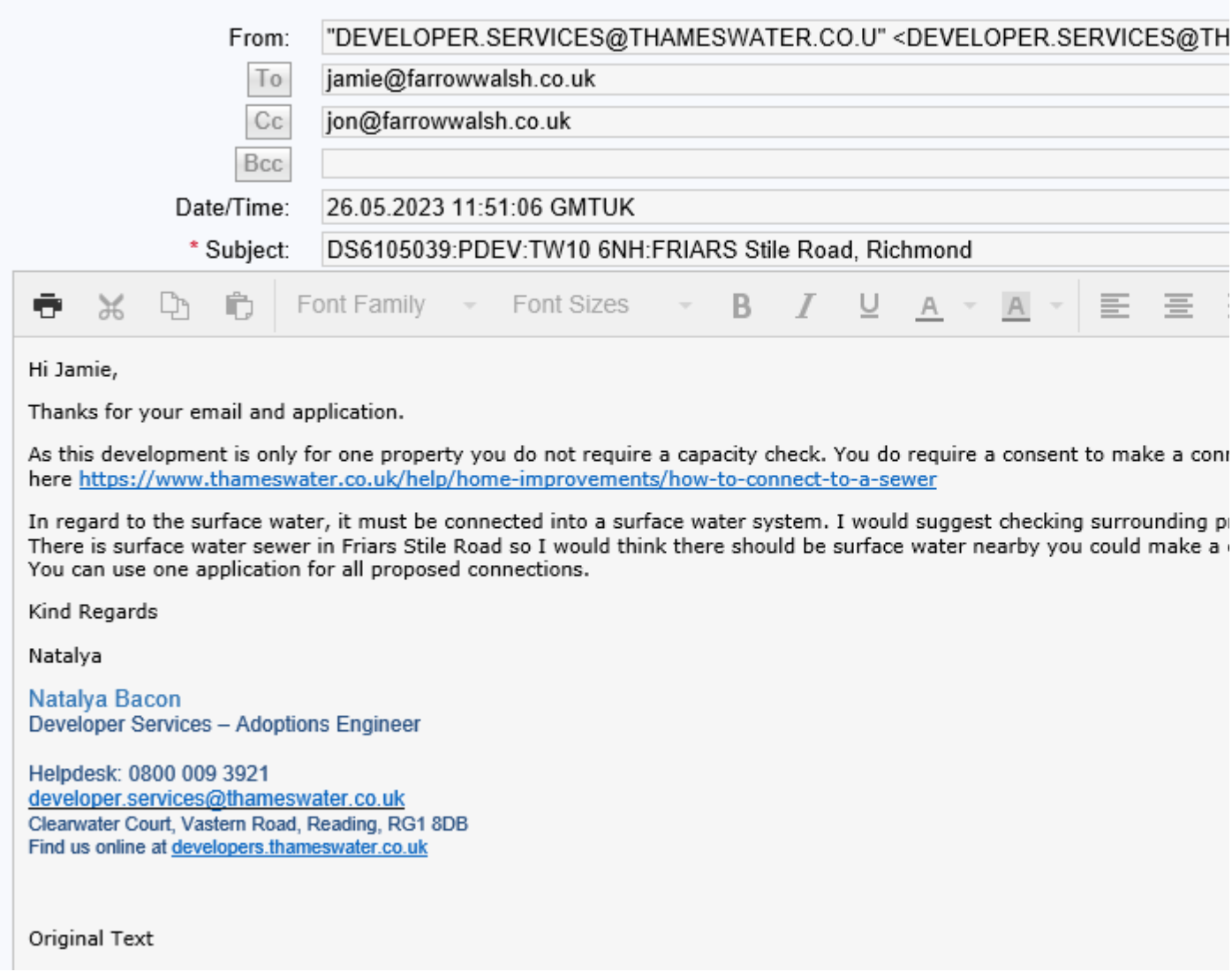
Kind Regards

Natalya

Natalya Bacon
Developer Services – Adoptions Engineer

Helpdesk: 0800 009 3921
developer.services@thameswater.co.uk
Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk

Original Text



From: "DEVELOPER.SERVICES@THAMESWATER.CO.U" <DEVELOPER.SERVICES@TH
To: jamie@farrowwalsh.co.uk
Cc: jon@farrowwalsh.co.uk
Bcc:
Date/Time: 26.05.2023 11:51:06 GMTUK
* Subject: DS6105039:PDEV:TW10 6NH:FRIARS Stile Road, Richmond

Font Family Font Sizes

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Kind Regards

Natalya

Natalya Bacon
Developer Services – Adoptions Engineer

Helpdesk: 0800 009 3921
developer.services@thameswater.co.uk
Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk

Original Text

Original Text

From: Jamie Royle <jamie@farrowwalsh.co.uk>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <developer.services@thameswater.co.uk>
CC:
Sent: 20.06.23 11:55:04
Subject: FW: Courtesy DS6105039

Good Morning,

I hope that you are well.

Could I get an update on this developer enquiry please?

Kind Regards,

Jamie Royle Civil Engineering Technician

Office Telephone 0330 100 0363

Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

Company Number 06682625

From: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: Monday, May 22, 2023 5:02 PM
To: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: Courtesy DS6105039

DS reference DS6105039

developer.services@thameswater.co.uk

0800 009 3921
Mon – Fri 8am – 5pm

thameswater.co.uk/developerservices

email about? | Acknowledgement of application
need to do next? | Note your reference number
| FRIARS STILE ROAD RICHMOND, TW10 6NH

your waste water pre-planning application at the above address. This has been passed to our technical team for assessmer
s your application within 21 days.

te of your reference number which is DS6105039. Should you need to contact us please quote this reference number.

uestions, please call us on 0800 009 3921 between 8am and 5pm, Monday to Friday, or email developer.services@thames

vices

king your sewer connection correctly at connectright.org.uk

g to this email, please note that we are unable to accept emails which are larger than our 15MB email size limit.
ble or large files, please use a compression software, such as WINZIP to group your files together prior to sendin
e in ZIP, RAR, 7Z, JPEG, PDF or PNG format. Thank you.'

its subsidiaries. If you aren't the intended recipient of this email, please don't copy, use, forward or disclose its contents to any other person – please destroy and delete the message and any attachments from your system.

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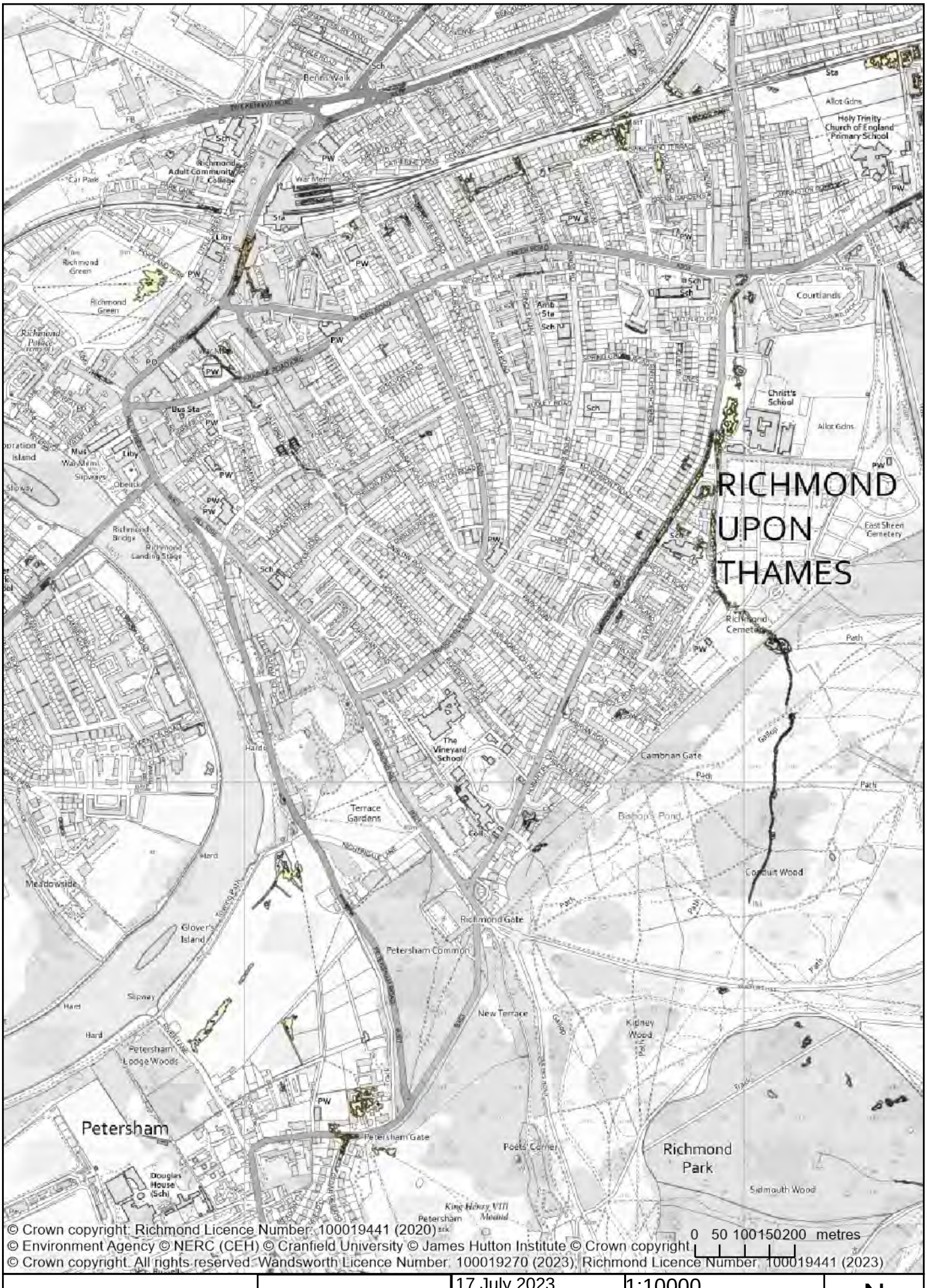
APPENDIX F – SFRA MAPPING [EXTRACTED JULY 2023]



0 50 100 150 200 metres

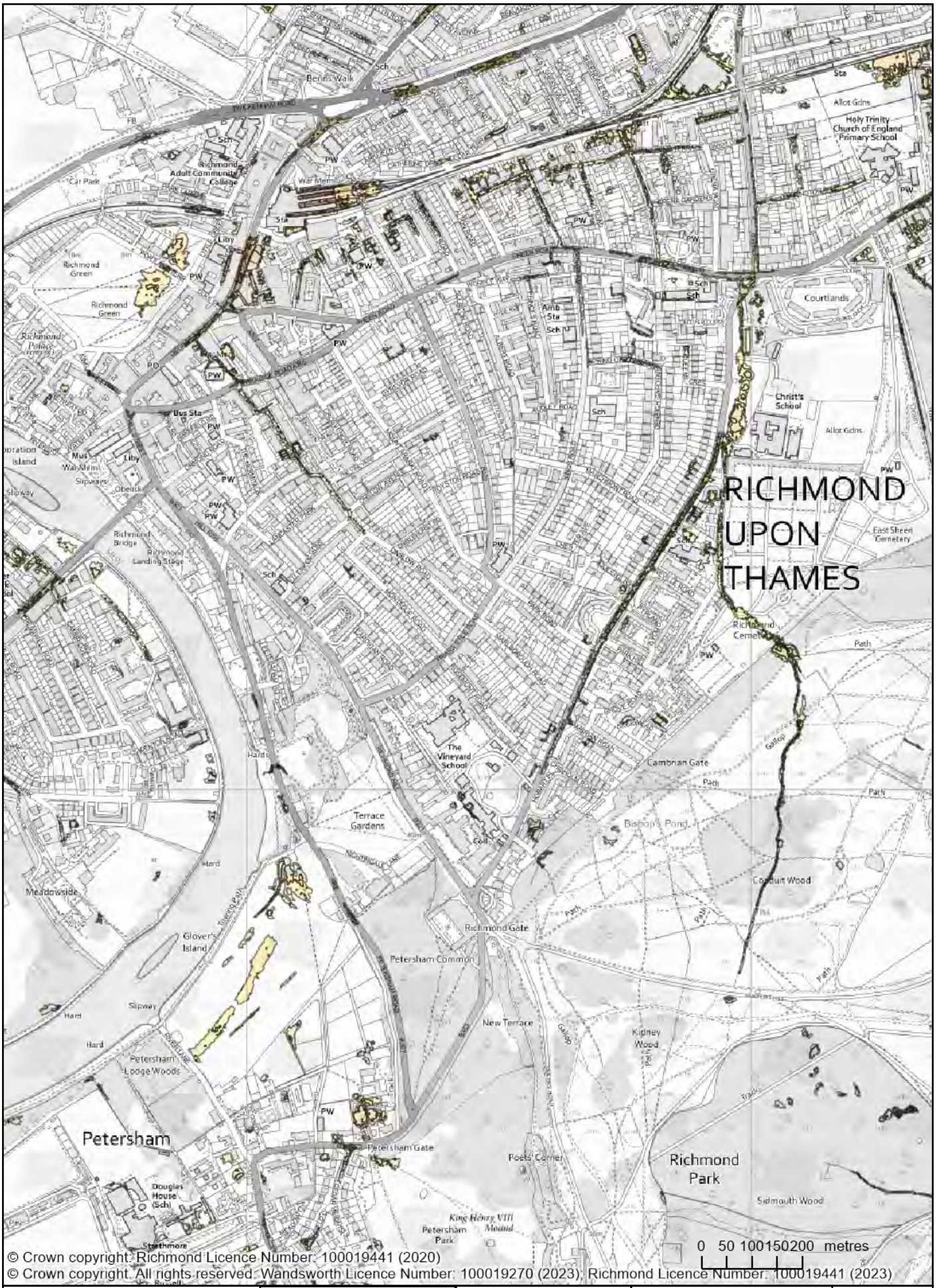
LONDON BOROUGH OF RICHMOND UPON THAMES

17 July 2023

1:10000

Printed from Richmond Web Page

N



LONDON BOROUGH OF RICHMOND UPON THAMES

17 July 2023

1:10000

Printed from Richmond Web Page

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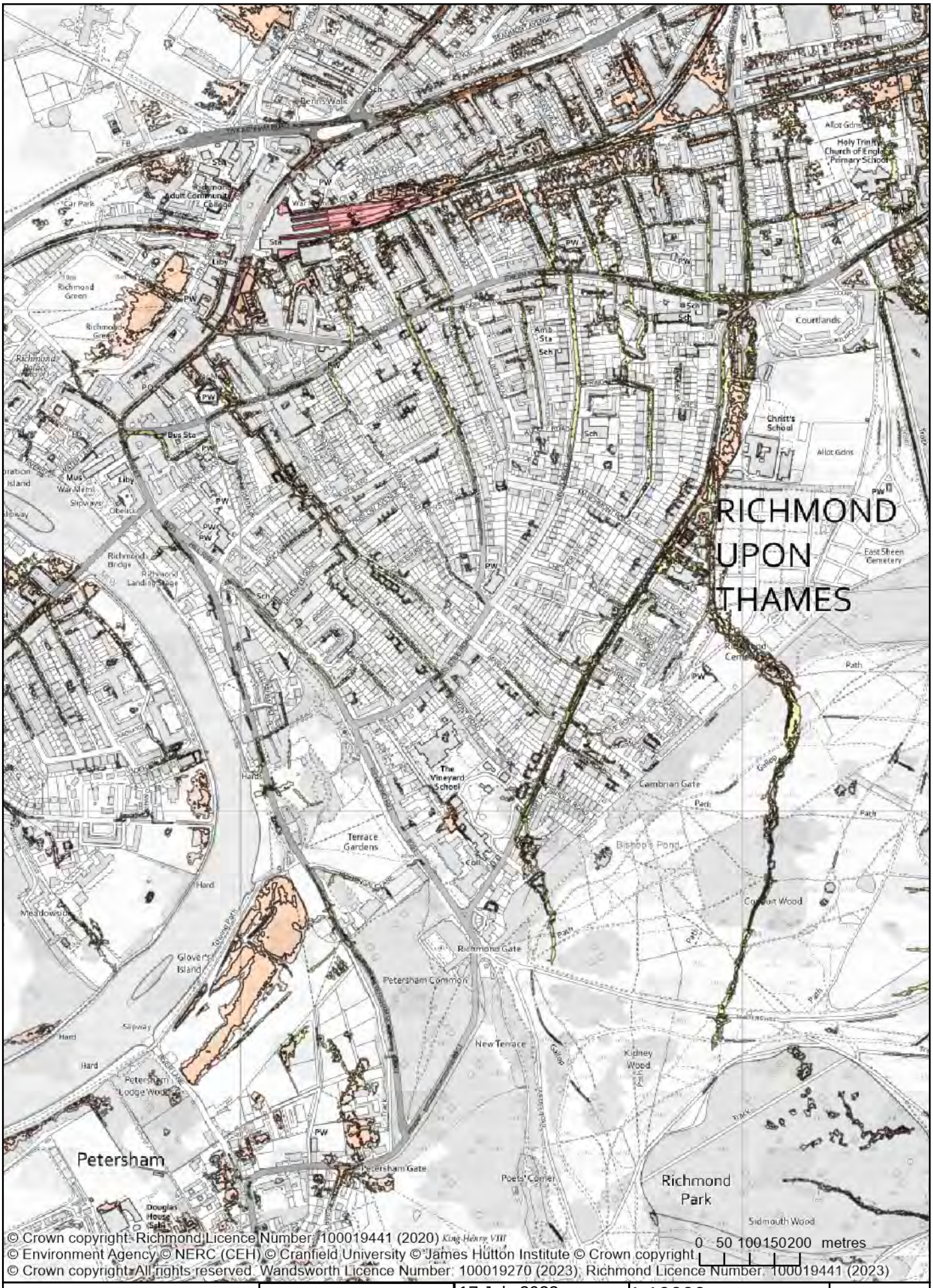

LONDON BOROUGH OF RICHMOND UPON THAMES

17 July 2023

1:10000

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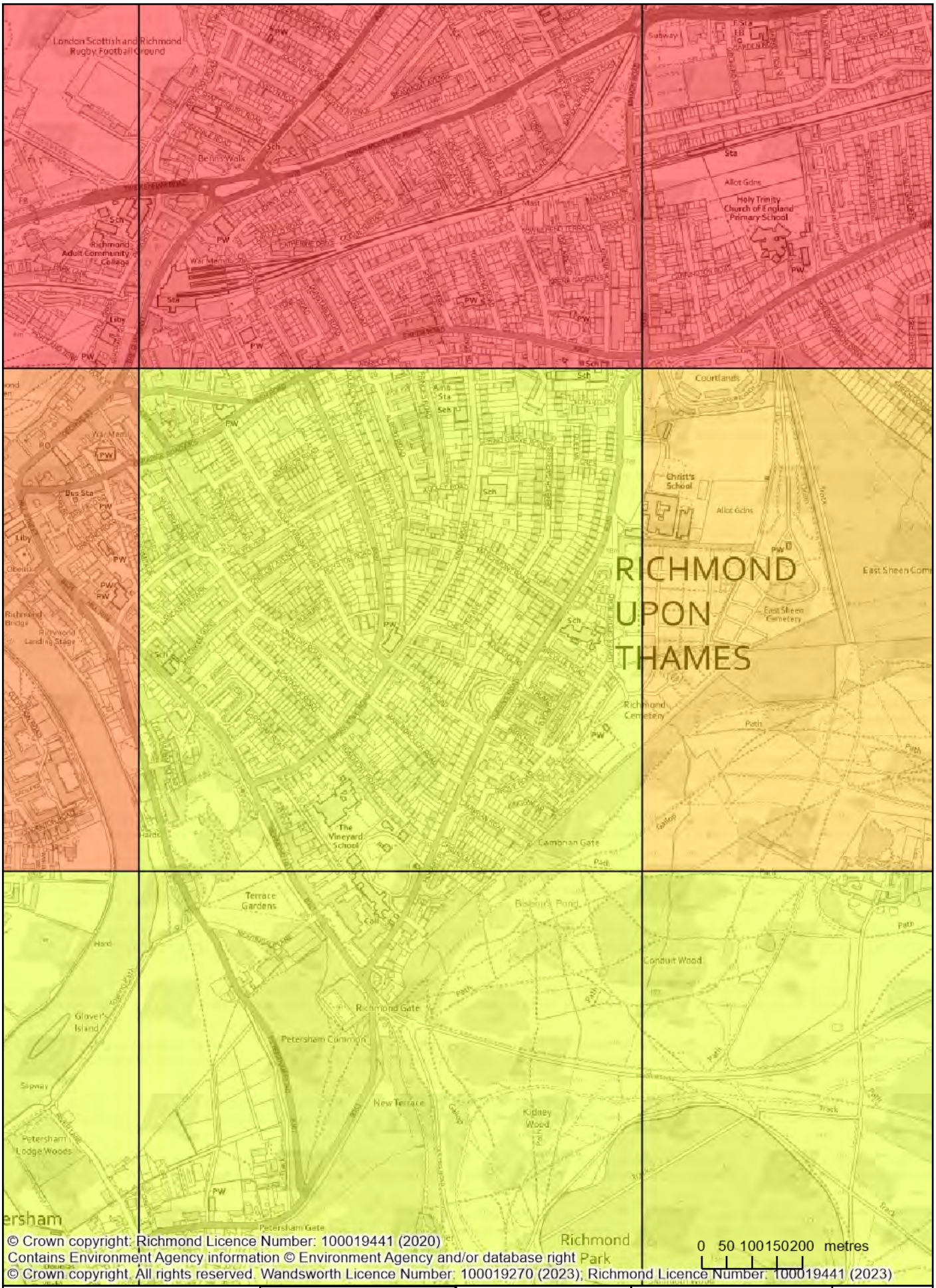

LONDON BOROUGH OF RICHMOND UPON THAMES

17 July 2023

1:10000

Printed from Richmond Web Page

N

APPENDIX G – BROWNFIELD RUNOFF RATE CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.410	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
ExMH 5	0.030	5.00	50.000	600	1.350
ExMH 6			50.000	600	1.372
ExMH 8			49.850	900	2.700

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	ExMH 5	ExMH 6	1.300	0.600	48.650	48.628	0.022	59.1	150	5.02	50.0
1.001	ExMH 6	ExMH 8	11.325	0.600	48.628	47.150	1.478	7.7	150	5.07	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.311	23.2	4.1	1.200	1.222	0.030	0.0	42	0.989
1.001	3.663	64.7	4.1	1.222	2.550	0.030	0.0	25	2.055

Pipeline Schedule

Link	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)
1.000	1.300	59.1	150	Circular	50.000	48.650	1.200	50.000	48.628	1.222
1.001	11.325	7.7	150	Circular	50.000	48.628	1.222	49.850	47.150	2.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	ExMH 5	600	Manhole	Adoptable	ExMH 6	600	Manhole	Adoptable
1.001	ExMH 6	600	Manhole	Adoptable	ExMH 8	900	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
ExMH 5	50.000	1.350	600	◯	0	1.000	48.650	150
ExMH 6	50.000	1.372	600		1	1.000	48.628	150
				◯	0	1.001	48.628	150

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
ExMH 8	49.850	2.700	900	1	1.001	47.150	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	19.000	Drain Down Time (mins)	240
Ratio-R	0.410	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ExMH 5	10	48.699	0.049	4.0	0.0139	0.0000	OK
15 minute winter	ExMH 6	10	48.654	0.026	4.0	0.0073	0.0000	OK
15 minute winter	ExMH 8	10	47.175	0.025	4.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ExMH 5	1.000	ExMH 6	4.0	1.156	0.172	0.0046	
15 minute winter	ExMH 6	1.001	ExMH 8	4.0	1.999	0.061	0.0224	1.9

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ExMH 5	10	48.707	0.057	5.2	0.0161	0.0000	OK
15 minute winter	ExMH 6	10	48.657	0.029	5.2	0.0083	0.0000	OK
15 minute winter	ExMH 8	10	47.179	0.029	5.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ExMH 5	1.000	ExMH 6	5.2	1.237	0.223	0.0055	
15 minute winter	ExMH 6	1.001	ExMH 8	5.1	2.156	0.079	0.0270	2.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ExMH 5	10	48.732	0.082	9.9	0.0231	0.0000	OK
15 minute winter	ExMH 6	10	48.669	0.041	9.8	0.0116	0.0000	OK
15 minute winter	ExMH 8	10	47.190	0.039	9.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ExMH 5	1.000	ExMH 6	9.8	1.454	0.425	0.0089	
15 minute winter	ExMH 6	1.001	ExMH 8	9.8	2.580	0.152	0.0431	4.6

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ExMH 5	10	48.745	0.095	12.8	0.0269	0.0000	OK
15 minute winter	ExMH 6	10	48.675	0.047	12.7	0.0134	0.0000	OK
15 minute winter	ExMH 8	10	47.195	0.045	12.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ExMH 5	1.000	ExMH 6	12.7	1.549	0.550	0.0107	
15 minute winter	ExMH 6	1.001	ExMH 8	12.7	2.766	0.196	0.0520	5.9

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	ExMH 5	10	48.768	0.118	18.0	0.0334	0.0000	OK
15 minute winter	ExMH 6	10	48.685	0.057	17.9	0.0161	0.0000	OK
15 minute winter	ExMH 8	10	47.204	0.054	17.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	ExMH 5	1.000	ExMH 6	17.9	1.679	0.773	0.0137	
15 minute winter	ExMH 6	1.001	ExMH 8	17.8	3.022	0.276	0.0669	8.3

APPENDIX H – GREENFIELD RUNOFF RATE CALCULATIONS

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	... ...
Site name:	FW2352
Site location:	Friar Stile Road, Richmond

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.45571° N
Longitude:	0.29698° W
Reference:	2395464134
Date:	Jul 14 2023 16:17

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
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 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

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

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates 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 consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is 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 would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	0.15	0.15
1 in 1 year (l/s):	0.13	0.13
1 in 30 years (l/s):	0.35	0.35
1 in 100 year (l/s):	0.48	0.48
1 in 200 years (l/s):	0.57	0.57

APPENDIX I – DRAINAGE STRATEGY

Site Details

302m² / 0.030ha : Development area

302m² / 0.030ha : Existing impermeable area

302m² / 0.030ha : Proposed impermeable area (not including 10% Urban Creep)

2.00 l/s : Existing Brownfield Qbar storm discharge rate

9.80 l/s : Existing Brownfield Q30 storm discharge rate

12.70 l/s : Existing Brownfield Q100 storm discharge rate

2.00 l/s : Proposed Q100+40% climate change (+10% urban creep) storm discharge rate to existing sewer to be agreed with LLFA / Thames Water

Development impermeable areas to be drained into the storm drain via permeable paving with minimum SUDs treatment to Ciria753, via gravity sewers.

All proposed surface water discharge rates are subject to Thames Water approval.

Contractor to validate existing drainage invert and cover levels prior to start of construction works and report result to Engineer

Existing services, those to be retained or relocated, to be located by Contractor and protected for the duration of the works

Drainage Layout subject to confirmation of RWP and SVP locations by Architect

All existing connections to the Thames Water sewer from the site that are to be reused, where feasible.

Existing drainage beneath proposed storage unit is to be built over and maintained

ONSLOW ROAD

FRIARS STILE ROAD

PLOT 1

NO. 1

NO. 19-23

NEW STAIRWELL WITH STORAGE

STORAGE UNIT

MH4304
CL 49.85
IL 47.15

MH4307
CL TBC
IL TBC

Existing 150Ø Thames Foul Sewer

Existing Surface Water Pipe

150Ø Combined Sewer

100Ø Combined Sewer

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

THE HAZARDS NOTED BELOW ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPES OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS

WORKING WITH LIVE SERVICES AND SEWER. WORKING WITHIN HIGHWAY.

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

General Notes

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings and details.
3. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site work prior to such approval being given it is entirely at their own risk.
5. Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions / contaminants, drainage, design and planning / density negotiations.
6. All dimensions are in millimetres unless otherwise stated.
7. The Farrow Walsh Consulting Designers Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site.

NOTES

1. Information shown is for PLANNING purposes only and is not to be used for construction.
2. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
3. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
4. The exact position, level, size and use of existing sewers to be confirmed on site. Any discrepancies to be reported to the engineer prior to commencement of works.
5. All uncovered and shallow pipework to be protected against construction traffic as part of the contractors temporary works requirements.
6. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
7. Exact location line and level of existing stubs to existing manholes in the road to be confirmed on site prior to construction.
8. Cover levels shown are approximate only, subject to the Architect's external works and landscaping scheme.
9. See Architect's details for all setting out dimensions to buildings and boundaries etc
10. All connections to road gullies and channels shall be 150mm nominal bore pipework. Connections to RWPs to be 100mm nominal bore pipework subject to confirmation of RWP sizes and/or design flow. No pipe work to be downsized in the direction of flow.
11. Connections to foul terminal fittings to be 100mm nominal bore pipework subject to confirmation of above ground pipe diameters and/or design flow. No pipe work to be downsized in the direction of flow.
12. All pipework to be U-PVC type in accordance with WIS 4-35-01 unless otherwise noted.
13. All pipes connecting to adopted manholes up to and including 300mm dia. to be Wavin Ultrarib or similar approved.
14. All pipes connecting to adopted manholes greater than 300mm dia. to be Concrete.
15. All pipes under buildings without suspended floors shall have Class S bedding.
16. All pipework entering and exiting manholes to be connected with pipe soffits level.
17. Pre-formed channels to be used at all manholes.
18. High strength concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the specification.

LEGEND

- Development Boundary
- Permeable paving with min 500mm thick Type 3 voided stone attenuation
- Linear Drain
- Existing Foul Drainage
- Existing Surface Water Drainage
- Existing Combined Drainage
- Proposed Surface Water Drainage
- Proposed Foul Drainage
- Proposed Foul Lateral Connection
- Proposed Surface Water Lateral Connection
- Perforated Pipe
  450mm dia. IC Max Depth 3.0m
  600mm Dia. Catch Pit (storm only)
  (with 400mm depth sump)
- 1200mm Dia. Inspection Chamber

1. **Proposed S106 Connection**
   New surface water connection into existing sewer subject to S106 application approval by Thames Water
2. **Mesh Screening**
   Mesh screen to be placed over the outlet pipe of chambers during site construction works and removed immediately prior to the first occupancy of the dwellings served by the sewers.
3. **Existing Sewer**
   Invert levels and location of the existing sewer to be validated prior to any construction works by the Contractor.
4. **Discharge Rate**
   Storm discharge from site restricted to 2.0 l/s for up to a 1 in 100 year +40% climate change (+10% urban creep) storm event, using a flow control chamber.
5. **Linear Drain**
   To stop exceedance flows running towards the highway
6. **Permeable Paving**
   Permeable paving is to be used as the first form of treatment for surface water run off in the main access drive and parking bays. The paving is to be used as a form of attenuation with 500mm of voided stone below.

Minimum pipe cover to soffits to be per the Sewer Sector Guidance Appendix C B5.1.7:
- 0.35m - domestic gardens and pathways without vehicle access
- 0.5m - domestic driveways, parking areas and yards for vehicles <7.5T gross weight
- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
- 0.9m - agricultural land and public open space
- 1.2m - highway and parking areas with unrestricted access for vehicles >7.5T gross weight

Any pipes with cover to soffit less than those stated above are to have a Class Z concrete pipe bed & surround.

Internal foul drain pipe minimum gradients:
- 1:80 from SVP & WC to IC
- 1:40 from Basin & Sink to IC

Refer to Architect's/M&E drawings for pipe sizes and setting-out information.

Maximum Drainage Chamber Depths:
- Ø315mm PPIC - 1.2m - Type 4 (BS EN 13598-2)
- Ø450mm PPIC - 3.0m - Type 3/4 (BS EN 13598-2)
- Ø600mm PPIC - 3.0m - Type 3 (BS EN 13598-2)
- Ø1200mm Concrete - 6.0m (with standard detail)

All drainage to be constructed in accordance with Sewer Sector Guidance and Building Regulations Part H.

A CCTV and level survey of the as-built drainage to OS Datum and Grid is to be undertaken by the Contractor and provided to the Engineer for final approval.

Sewer details shown have been taken from Thames Water sewer records and utility survey undertaken by Amber Utilities Ltd, dated June 2023. Contractor to validate drainage locations and levels prior to commencement of the works.

Construction Note:
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions along drainage route (such as unrecorded services). If the drainage is laid from the site out to the outfall, it can result in significant abortive works to relay and overcome such obstructions.

Rev	Description of updates	Drawn	Check'd	App'd	Date
A2	Updated to suit the latest site Layout received from Malin's Group 04/08/2023	JR	PU	JD	17/08/23
A1	Issued for Approval.	JR	PU	DM	26/07/23

Revision Schedule

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FOR APPROVAL

Client: Atlas Planning

Project: Friar Stile Road, Richmond

Title: Drainage Strategy

Drawn:	Checked:	Approved:	Date:	Scale:
JR	PU	DM	July 2023	1:100 @ A1

Drawing No. **FW2352-C-400**

Revision: **A2**

APPENDIX J – DRAINAGE MAINTENANCE SCHEDULE

Drainage Maintenance Schedule - Friars Stile Road, Richmond

Schedule	Feature	Location	Inspection Type	Inspection Frequency	Required Action	Maintenance Works	Maintenance Intervals	Comments
Occasional Maintenance	Foul & Surface Water Chambers	Entire site	Visual	6 Months	Remove silt and leaf build up from gullies, chambers, gutters etc.	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Road & Yard Gullies	Entire site	Visual	6 Months	Mechanical silt removal from sump	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Flow Control Chamber	C1	Visual	6 Months	Mechanical silt removal from sump	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Permeable Paving	Parking bays	Visual	6 Months	Manual removal of weeds	Weed removal *	6 Months (or as required)	Maintenance interval subject to Visual Inspection findings
	Catchpit Chambers	Entire Site	Visual	6 Months	Mechanical silt removal from sump	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings

Remedial Actions	Foul & Surface Water Drainage	Entire site	Visual	12 Months	Remove and dispose of oils or fuel (diesel & petrol) residues using safe standard practices.	Safe removal or contaminant residues	As required.	As required.
	Permeable Paving	Parking bays	Visual	12 Months	Infiltration surface rehabilitation	Replace broken or cracked pavious **	As required or following poor performance.	Maintenance interval subject to Visual Inspection findings
	Permeable Paving	Parking bays	Visual	12 Months	Infiltration surface rehabilitation	Relay any areas of settlement	As required or following poor performance.	Maintenance interval subject to Visual Inspection findings
Monitoring	Foul & Surface Water Drainage	Entire site	Visual	12 Months	Walk over inspection for condition (breaks, lifting & missing) of chamber covers and grates.	Replace broken or cracked inspection chamber covers	As required.	Maintenance interval subject to Visual Inspection findings
	Permeable Paving	Parking bays	Visual	Monthly for first 3 Months	Initial inspection to ensure performance	Top up grit between paviours	As required.	Maintenance interval subject to Visual Inspection findings

* If weeds are persitent, weed killer may be used to reduce the requirement for manual weed removal.

** Any block which is to be replaced should be bedded on anew layer of grit / sand.

*** If re-construction is necessary, the following procedure should be followed: 1. Lift surface layer and laying course, 2. Remove and geotextile filter layer, 3. inspect sub-base and wash/replace if required, 4. Renew any geotextile layer as required, 5. Renew laying course, jointing material and block paviours. Note: this is deemed unlikely to occur and thus unlikely to be implemented

Maintenance procedures to be undertaken in accordance with Ciria 753. This schedule should be read in conjunction with all engineering drawings

APPENDIX K– LONDON SUSTAINABLE DRAINAGE PROFORMA

LONDON BOROUGH OF RICHMOND UPON THAMES

GREATER**LONDON**AUTHORITY

LoDEG

1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	19-23 Friars Stile Road, Richmond
Address & post code	19-23 Friars Stile Road, Richmond, TW10 6NH
OS Grid ref. (Easting, Northing)	E 518422
	N 174351
LPA reference (if applicable)	
Brief description of proposed work	Demolition of the existing garages and construction of 1 3 bedroom residential dwelling
Total site Area	302 m^2
Total existing impervious area	302 m^2
Total proposed impervious area	302 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	
Existing drainage connection type and location	Surface water and foul connect into the combined sewer located in Onslow Road.
Designer Name	Jamie Royle
Designer Position	Civil Engineering Technician
Designer Company	Farrow Walsh Consulting

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	None	
Bedrock geology classification	London Clay	
Site infiltration rate	0	m/s
Depth to groundwater level	50	m below ground level
Is infiltration feasible?	No	

2b. Drainage Hierarchy

	Feasible (Y/N)	*Proposed (Y/N)*
1 store rainwater for later use	Y	Y
2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
3 attenuate rainwater in ponds or open water features for gradual release	N	N
4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
5 discharge rainwater direct to a watercourse	N	N
6 discharge rainwater to a surface water sewer/drain	N	N
7 discharge rainwater to the combined sewer.	Y	Y

2c. Proposed Discharge Details

Proposed discharge location	Public Combined Sewer in Onslow Road
Has the owner/regulator of the discharge location been consulted?	Yes

3. Drainage Strategy

3a. Discharge Rates & Required Storage

	Greenfield (GF) runoff rate (l/s)	*Existing discharge rate (l/s)*	*Required storage for GF rate (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.15			
1 in 1	0.13	4		2
1 in 30	0.35	9.8		2
1 in 100	0.48	12.7		2
1 in 100 + CC				2
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Flow Control Chamber		

3c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0		0
Green roofs	0	0	0
Blue roofs	0	0	0
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	35	35	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	0		0
Total	**35**	**35**	**0**

4. Supporting Information

4a. Discharge & Drainage Strategy	*Page/section of drainage report*
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Appendices D & E
Drainage hierarchy (2b)	Section 5
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Section 5
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Section 5
Proposed SuDS measures & specifications (3b)	Section 5
4b. Other Supporting Details	*Page/section of drainage report*
Detailed Development Layout	Appendix B
Detailed drainage design drawings, including exceedance flow routes	Appendix J
Detailed landscaping plans	
Maintenance strategy	Appendix L
Demonstration of how the proposed SuDS measures improve:	Section 5
a) water quality of the runoff?	Section 5
b) biodiversity?	Section 5
c) amenity?	Section 5