Camden Mixed Developments Limited

GRAND UNION HOUSE

FLOOD RISK ASSESSMENT AND OUTLINE DRAINAGE STRATEGY

RP-FRA-001
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1 INTRODUCTION

1.1 APPOINTMENT AND BRIEF

1.1.1 WSP has been commissioned by Camden Mixed Developments Limited to carry out a Flood Risk Assessment (FRA) to support a proposed planning application, and a BREEAM assessment for the new build at Grand Union House, 16-20 Kentish Town Road, London, NW1 8NH.

1.1.2 Under an Appointment dated 2020 between WSP and Camden Mixed Developments Limited, WSP was employed as Consultant to provide this FRA and in doing so has exercised reasonable skill and care. This Report relates solely to the FRA for the above mentioned development.

1.1.3 This Report is intended for the sole benefit of the parties named above and shall not be capable of assignment. WSP shall not be liable for any use of the report for any reasons other than that for which the report was originally prepared and provided.

1.2 OBJECTIVE OF THE STUDY

1.2.1 This FRA investigates flood risk within the area and establishes the mitigation measures proposed to ensure the sustainability and safety of the scheme over its lifetime.

1.2.2 An outline surface water drainage and foul water drainage strategy has been provided to ensure associated flood risks are taken into consideration for the production of this FRA.

1.2.3 The FRA has been produced in line with the requirements of the National Planning Policy Framework (NPPF) and the Environment Agency (EA) Standing Advice as well as through consultation with the EA, Thames Water (TW) and the London Borough of Camden (LBC) [the Lead Local Flood Authority (LLFA)] and the proposed re-development and has been produced to inform the BREEAM UK New Construction 2014 assessments from a flood risk and drainage perspective (Pol 03 credits).

1.3 STUDY METHODOLOGY

1.3.1 The appraisal process comprised of a desktop study, data research and in accordance with regulatory bodies and third party standing advice.

1.3.2 The following documents, policies and resources have been used to produce this FRA:

- LBC Local Flood Risk Management Strategy [LFRMS] (2013)
- LBC Strategic Flood Risk Assessment [SFRA] (2014);
- LBC Surface Water Management Plan [SWMP] (2011);
- LBC Preliminary Flood Risk Assessment [PFRA] (2011);
- LBC Water and Flooding Planning Guidance (March 2019) and
- LBC Local Plan (2017).

1.3.3 This Report is informed by the London Plan (March 2016), the draft new London Plan (Intend to Publish, December 2020) and associated Sustainable Design and Construction Supplementary Planning Guidance (SPG) (April 2014).

1.3.4 This FRA makes partial use of third party information and contains Environment Agency information © Environment Agency.

1.3.5 Although this Report was prepared using the degree of skill and care ordinarily exercised by Engineers practicing under similar circumstances, please note that WSP cannot take responsibility for errors in the information provided by third parties.

EXISTING SITE

1.4 SITE LOCATION

1.4.1 Grand Union House is located on Kentish Town Road, within the London Borough of Camden.

1.4.2 The site is situated approximately 25 metres to the south of Regent's Canal at OS Grid Reference: 528953, 184033.

1.4.3 The site is located in an urban setting in a predominantly mixed use (retail/commercial) urbanised area. The site is bounded at the north and east by Sainsbury's supermarket and office buildings, at the west by Kentish Town Road, and a commercial property just south of the site.

1.4.4 An indicative site location plan can be seen below in Figure 1.

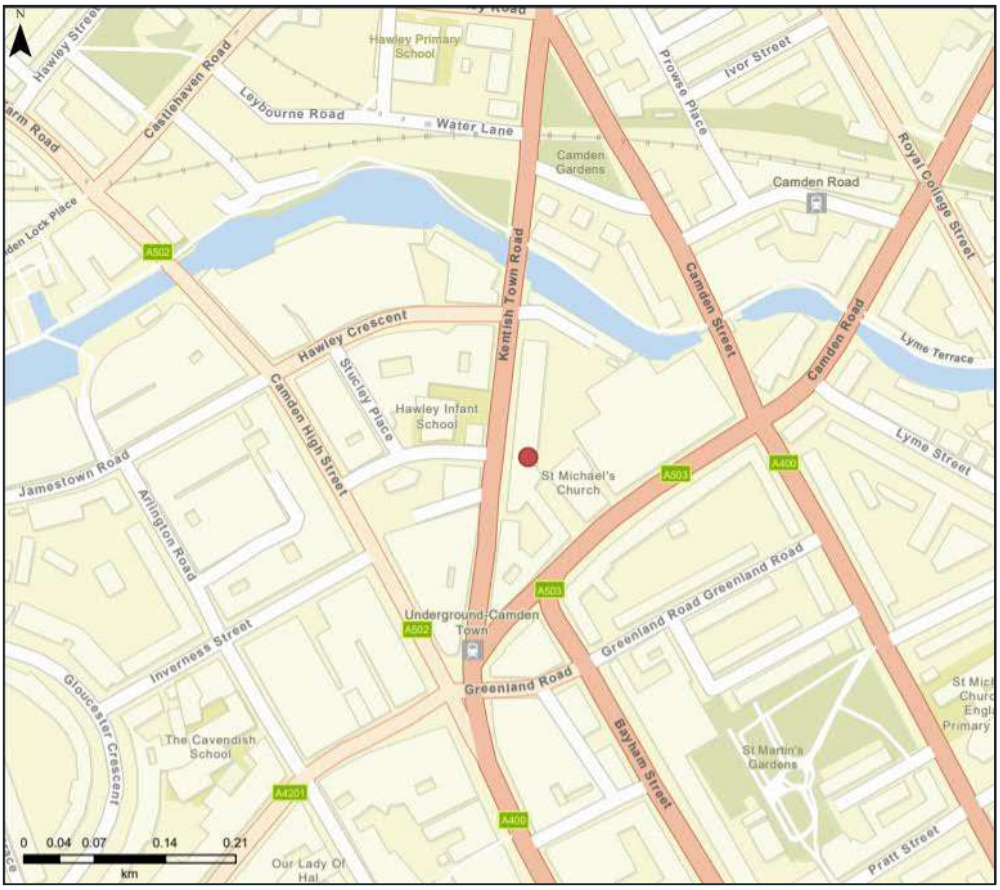


Figure 1 - Site Location Plan

1.4.5 Refer to Appendix A for a Site Location Plan.

1.5 EXISTING SITE DESCRIPTION

1.5.1 The site covers an area of 0.3ha hectares (ha) and comprises a one level basement car park, ground level/mezzanine car park, 2 floors of offices and roof plant areas. The existing retail units and main office entrance are on the Kentish Town Road frontage.

1.6 SITE TOPOGRAPHY

1.6.1 Based on topographical survey data undertaken by Plowman Craven in May 2015, see Appendix B, the Site is relatively flat. The north-west point of the Site has a level of circa 25.94m AOD and at the south west of the Site the level is circa 26.14m AOD.

1.7 GEOLOGY AND HYDRO-GEOLOGY

1.7.1 This section of the report has been informed by mapping from the British Geological Survey (BGS) Geology of Britain viewer 1:50 000 scale mapping and magic maps data.

1.7.2 Geology underlying the site is:

- Superficial Geology - None Recorded
- Bedrock Geology - Thames Group - Clay, Silt, Sand and Gravel. Sedimentary Bedrock formed approximately 34 to 56 million years ago in the Palaeogene Period. Local environment previously dominated by shallow seas.
- There are no source protection zones (SPZs) under the site with the closest SPZ (SPZ 3) located approximately 1.17km west of the site. SPZs show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied to a groundwater source.

1.7.3 The Site is not located in an aquifer designation area.

1.8 EXISTING WATERCOURSES, FLOOD DEFENCES AND OTHER STRUCTURES

1.8.1 The River Thames is located approximately 3.80km south-east of the site and flows from west to east.

1.9 EXISTING SEWERS/ DRAINAGE

1.9.1 Based on the TW Asset Records (Appendix B), there is a 1372x787mm combined water sewer, increasing to 1422x762mm, running in a southern direction beneath the carriageway of Kentish Town Road. A 1422x762mm combined sewer crosses the southern part of the site in an easterly direction and additionally, a 1372x787mm combined sewer is also shown to run north east beneath Camden Road.

1.10 ARTIFICIAL WATERCOURSES

1.10.1 Regent's Canal, maintained by the Canal and River Trust is located approximately 20m north of the Site and runs from east to west.

1.10.2 The Serpentine, a 16 hectare lake in Hyde Park is located approximately 1.40km south-west of the Site.

2 PROPOSED DEVELOPMENT

2.1 DEVELOPMENT PROPOSALS

2.1.1 The Proposed Development comprises of:

"Part-demolition, re-build and upward extension to provide additional Class E office and commercial floorspace, six residential units (Class C3), new areas of landscaping and public realm."

2.2 VULNERABILITY CLASSIFICATION

2.2.1 In accordance with the NPPF (2018) and associated flood risk and coastal planning practice guidance (2014) (Table 2: Flood risk vulnerability classification) the proposed development usage (offices, residential and retail) is classified as a more vulnerable development.

2.3 SEQUENTIAL TEST AND EXCEPTION TESTS

2.3.1 As stated in the NPPF, a sequential risk-based approach to determine the suitability of land for development in flood risk areas should be applied at all stages of the planning process giving precedence to low flood risk areas wherever possible.

2.3.2 Based on the Flood Map for Planning, see Figure 2, the site is located in Flood Zone 1.

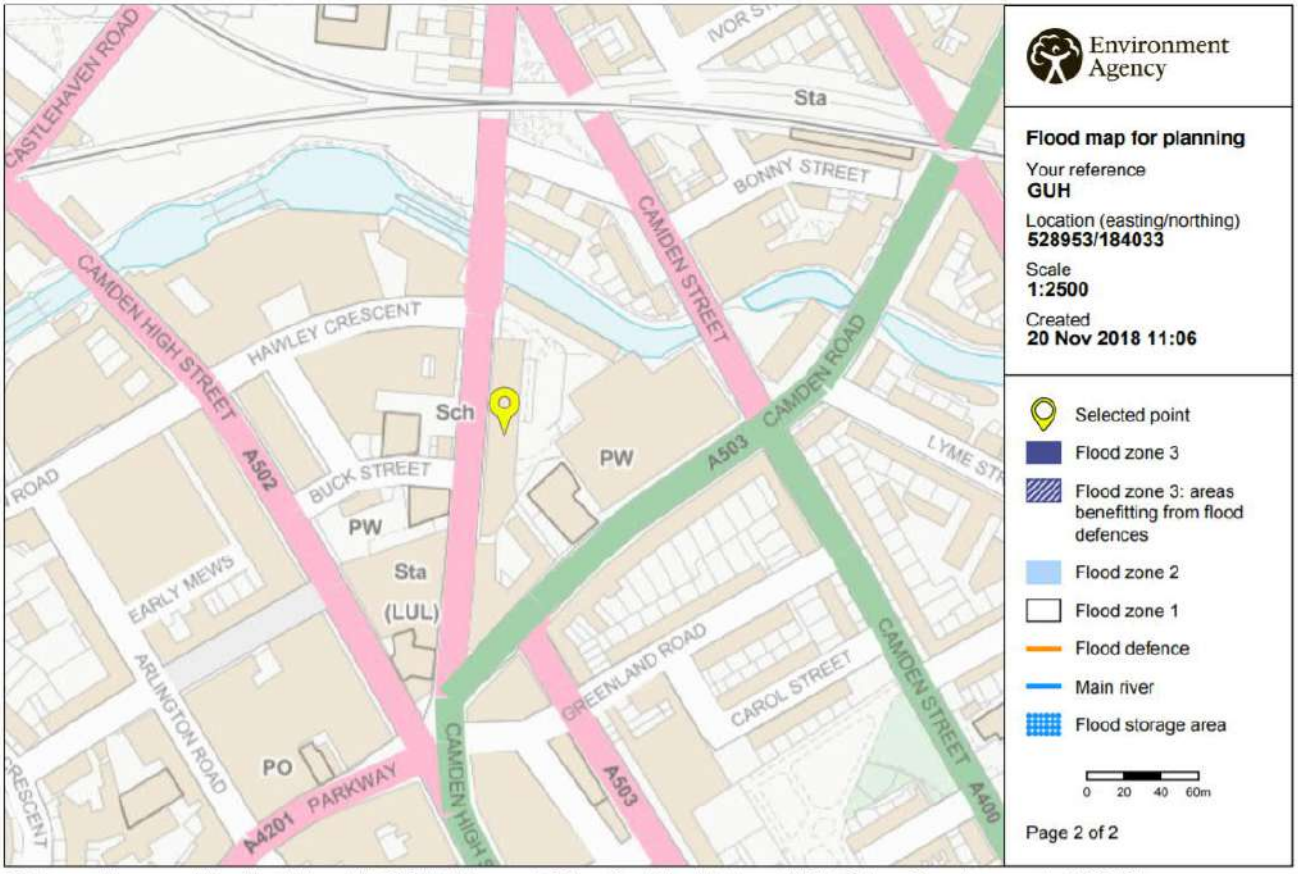


Figure 2 - Flood Map for Planning

2.3.3 Based on the flood risk and coastal planning practice guidance (2014) (Table 3: Flood risk vulnerability and flood zone 'compatibility') as the site is located within Flood Zone 1 and classified as a more vulnerable development, development is appropriate, and the site can be considered as sequentially acceptable. The exception test does not need to be applied as the site is sequentially acceptable.

3 DEFINITION OF THE FLOOD HAZARD

3.1.1 Reference to the both LBC SFRA, LFRMS is made, where appropriate, in the following sections and relevant maps are attached in **Appendix D**.

3.1.2 Reference to consultation with EA, TW, and LBC is made in the following sections and correspondence is attached in **Appendix F**.

3.2 FLUVIAL AND TIDAL FLOODING

3.2.1 Based on the flood map for planning the site is located in Flood Zone 1, as confirmed through correspondence with the EA, which is classified as land having a less than 0.1% annual probability of river (fluvial) or sea (tidal) flooding (1 in 1000 year return period event). In consistency with the above, the site is classified as having a 'very low' probability of flooding from fluvial or tidal sources on the 'long term flood risk information', see extract in Figure 3.

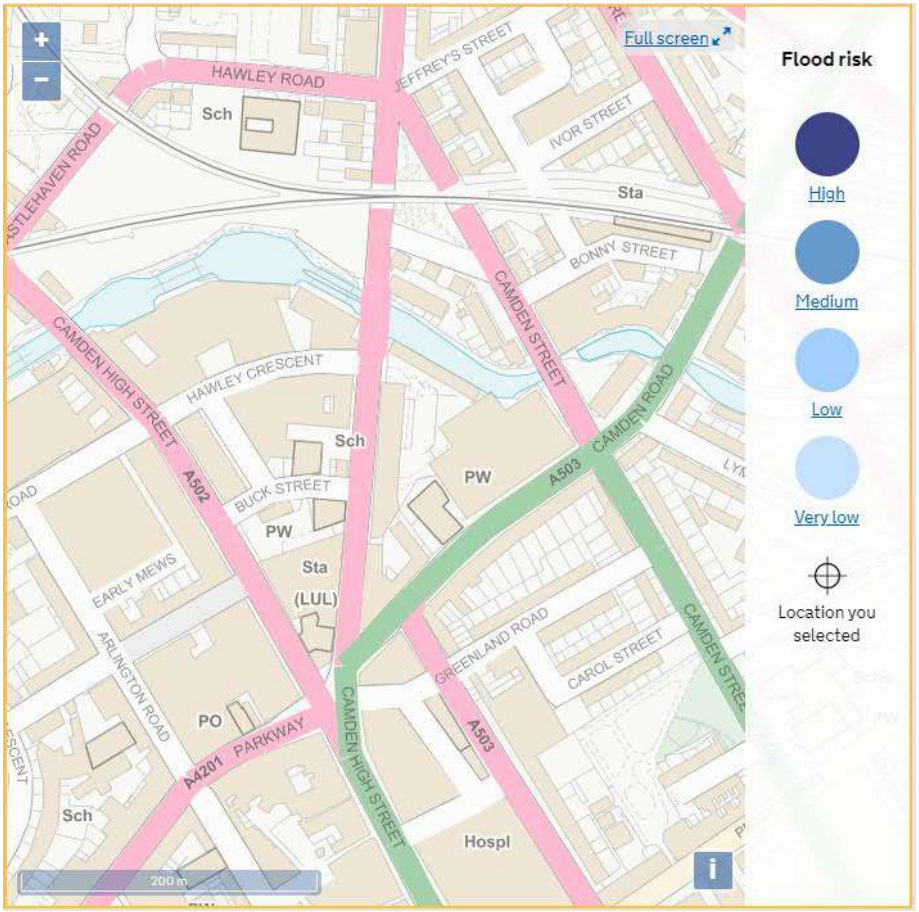


Figure 3 - Extract from gov.uk 'long term flood risk information' Extent of flooding (rivers and sea)

3.2.2 It is stated in the LBC Strategic Flood Risk Assessment (2014) that *"all main rivers located in the LBC are now culverted and incorporated into the Thames Water Sewer Network and therefore there is no fluvial flood risk in LBC."*

3.2.3 The closest fluvial or tidal source is the River Thames.

3.2.4 Based on the above, the probability of tidal/fluvial flooding to the Site is considered low to negligible.

3.3 GROUNDWATER FLOODING

3.3.1 The appended mapping (Figure 4e) in the LBC Strategic Flood Risk Assessment shows that the Site is not located within an area of increased susceptibility in elevated groundwater.

3.3.2 The Site is also not located in an area that has experienced either an EA groundwater flood incident or a recorded LBC historic groundwater flood incident.

3.3.3 Based on the above, the probability of groundwater flooding to the Site is considered to be low.

3.4 SURFACE WATER FLOODING

3.4.1 Based on the 'Long Term Flood Risk information' [online.gov.uk] mapping, see extract in Figure 4, there are areas at risk of surface water flooding present adjacent to the site.

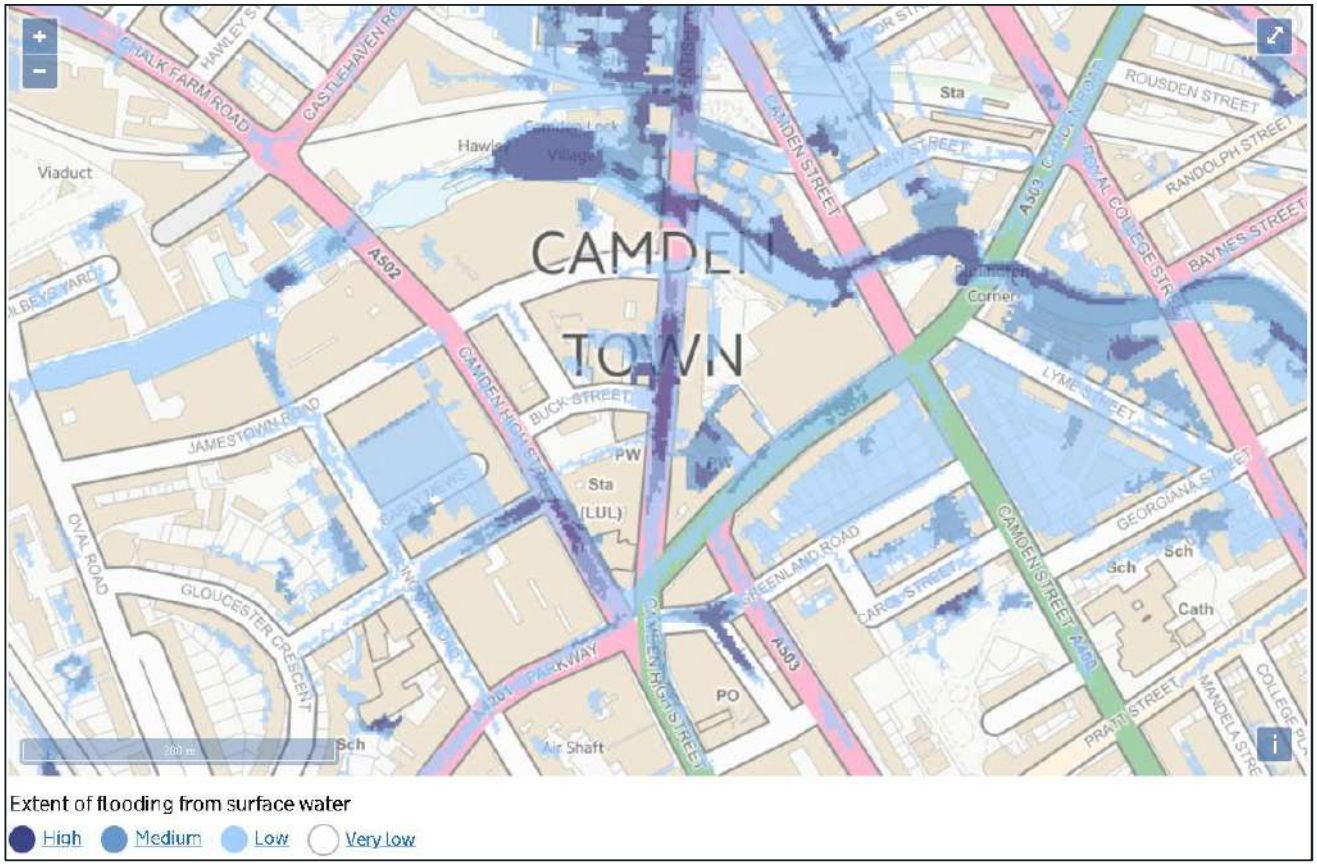


Figure 4 - Extract from gov.uk 'Long Term Flood Risk information'
Extent of flooding (surface water)

3.4.2 The immediate vicinity, i.e. the Kentish Road carriageway, Sainsbury's rear adjoining basement car park ramp, and the adjacent Barnes House/St Michael's churchyard, comprise of areas classified as 'Low' to 'High' risk of surface water flooding where:

- 'Low' risk are areas classified with an annual probability of flooding of between 1% and 0.1% with flood depths up to 300mm; and
- 'Medium' risk are areas classified with an annual probability of flooding of between 1% and 3.3% with flood depths between 300-900mm.; and
- 'High' risk means that the area has an annual probability of flooding of over 3.3% with flood depths over 900mm.

3.4.3 The area located to the rear of the Site i.e. the Sainsbury's rear adjoining basement car park ramp is predicted to have a 'High' risk of surface water flooding. However, the surface water mapping is for strategic purposes and does not consider the opening into the basement level car park, as well as the on-site internal basement level car park drainage system.

3.4.4 The SFRA identifies the Site to lie within a Critical Drainage Area (CDA) [Group003_03] i.e.

"A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure".

3.4.5 A further review of the CDA mapping, Figure 6 of the SFRA, demonstrates that the Site is not within the Local Flood Risk Zone (LFRZ) of the CDA. Therefore, the Site is not primarily affected by the wider sources of flood risk comparative to the local area.

3.4.6 In addition, Figure 3ii of the SFRA is consistent with the online mapping information identified above, whereby surface water flooding is predicted within the external areas surrounding the Site. However, Figure 3ii shows no record of the Site flooding from off-site sources. The nearest recorded surface water flooding incident to a property has been identified to be located approximately 500m north of the Site at Kelly Street, Maitland Park, Kentish Town.

3.4.7 Based on the above, the probability of surface water flooding is considered to be medium to low, however surface water flooding cannot be discounted from off-site sources from the adjacent carriageway, rear Sainsbury's car park ramp and St Michael's churchyard area. The mitigation measures to address the predicted surface water flooding from off-site are detailed in Section 5 and 6 of this report.

3.5 SEWER FLOODING

3.5.1 Within the SFRA, an extract of the Thames Water DG5 Flood Register is provided which indicates within the last 10 years (prior to 2014) the number of properties affected by internal and external sewer flooding within each 4 digit postcode area of the LBC. From this it is identified that the 4 digit postcode area that the Site is located in has not had any properties effected by external flooding, however there has been 1 property effected by internal sewer flooding.

3.5.2 Through consultation with Thames Water it has been determined that:

"the flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers."

3.5.3 Based on the above, the probability of sewer flooding at the Site has been assessed as low.

3.6 RESERVOIR AND ARTIFICIAL SOURCES OF FLOODING

3.6.1 Based on the 'Long Term Flood Risk information' [online.gov.uk] mapping, see extract in Figure 5, the site does not lie within an area susceptible to reservoir flooding. Areas which lie within the maximum extent of flooding are considered to be areas which peoples' lives could be threatened by an uncontrolled release of water from a reservoir.

Figure 5 - Extract from gov.uk 'long term flood risk information' Extent of flooding (reservoirs)

3.6.2 It should be noted that flooding from reservoirs is extremely unlikely. EA guidance states that:

"All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, we ensure that reservoirs are inspected regularly and essential safety work is carried out"

3.6.3 It is stated in the SFRA that “the Canal and River Trust have confirmed that no flooding incidents associated with Regent’s Canal have been recorded in LBC.”

4 CLIMATE CHANGE

4.1 BACKGROUND INFORMATION

4.1.1 As explained in the Climate Change Adaptation Sub-Committee Progress Report 2014, increased flood risk is the greatest threat to the UK from climate change. Models of the climate system suggest floods of the type experienced in England and Wales in autumn 2000, and between December 2013 and February 2014, have become more likely as a consequence of increased concentrations of greenhouse gases in the atmosphere.

4.1.2 More frequent short-duration, high intensity rainfall and more frequent periods of long-duration rainfall could be expected. Sea levels are also expected to continue to rise.

4.1.3 New EA guidance "Flood risk assessments: climate change allowances" issued on the 19th February 2016 (and subsequent minor updates) provides up to date information on expected changes in rainfall, river flows and sea level rise as a consequence of climate change.

4.1.4 A key change from the previous guidance is that the climate change allowances for peak river flows now are shown as variable on a regional basis; allowances are also now based on percentiles, whereby a percentile is a measure used in statistics to describe the proportion of possible scenarios that fall below an allowance level (e.g. a 50% percentile means that the allowance has 50% chances of not being exceeded).

4.1.5 Sea levels allowances reflect the previous guidance and vary on a regional basis and for each epoch as shown in Table 3 of the EA guidance.

4.1.6 The EA has provided guidance to assess the impact of climate change on fluvial flooding. Technical assessment of climate change impacts on fluvial flooding appropriate for new developments depending on their scale and location (see following section).

4.1.7 For peak rainfall the EA Guidance provides an upper end and central allowance depending on epoch; the guidance recommends assessing both the central and upper end allowances to understand the range of possible impacts. These allowances are detailed in Table 2 (Peak rainfall intensity allowance in small and urban catchments) of the EA guidance.

4.2 DEVELOPMENT LIFESPAN

4.2.1 A typical lifespan for a residential development is 100 years.

4.2.2 Based on this, the contingency peak rainfall allowances for climate change that are potentially applicable to this Site are as set out in Table 2 of the EA's "Flood risk assessments: climate change allowances" advice are:

- Upper End – 40% increase in peak rainfall by 2115;
- Central – 20% increase in peak rainfall by 2115.

4.2.3 When undertaking the outline drainage strategy, the surface water attenuation calculations will be determined using the central and upper end estimates to prevent potential exceedance flows off site.

4.2.4 The contingency peak river flow allowances, that are potentially applicable to the site to account for the impact of climate change, are as set out in Table 1 of the EA's "Flood risk assessments: climate change allowances" advice as follows:

- Higher Central – 35% increase in peak river flow by 2115 within Thames catchment;
- Central – 25% increase in peak river flow by 2115 within Thames catchment.

4.3 IMPACT OF CLIMATE CHANGE ON THE DEVELOPMENT

4.3.1 Given the location of the site in Flood Zone 1, away from the floodplain, it is deemed that the site being affected by fluvial and tidal flooding, within a climate change scenario, is highly unlikely.

4.3.2 The probability of surface water flooding is expected to increase over time as a consequence of climate change, as rainfall intensity in extreme events is expected to increase. However, the potential impact of flooding is mitigated by the commercial "less vulnerable" usage, as well as the mitigation of levels falling away from the site entrances/openings.

5 FLOOD RISK MITIGATION MEASURES

5.1.1 As discussed in the previous pages, no significant sources of flood risk within the site have been identified, although surface water flooding from off-site sources may be the only potential source of flooding identified which may impact the Site. Therefore, any future potential risk is further reduced through the proposed design measures as discussed below.

5.2 OUTLINE SURFACE WATER DRAINAGE STRATEGY

5.2.1 An Outline Drainage Strategy is essential for any new development to ensure that surface water is managed effectively to limit the risk off site as well as on site and compliance with local policy. The following sections details principles of the existing and proposed surface water drainage systems.

EXISTING DISCHARGE

5.2.2 The current site area is approximately 3003m^2 (~0.3ha) and is entirely impermeable. In order to calculate the existing surface water discharge rate for a variety of storm events, Wallingford Procedure's Rational Method as shown below, has been used:

Q = 2.78 x Rainfall Intensity (mm/hr) x Area (ha)

5.2.3 Given the small nature of the site and close proximity to the public sewer network, it is assumed it will take approximately 15 minutes for the site to drain into the TW public sewer system. Rainfall Intensity has been sourced from the Flood Estimation Handbook (FEH) data, in accordance to latest guidance.

Table 1 - Existing Brownfield Runoff Rate

Return Period	Rainfall Intensity (mm/hr)	Flow Rate (l/s)
1 in 2 Year	37	30.9
1 in 30 Year	97	80.9
1 in 100 Year	130	108.4

PROPOSED DISCHARGE

SuDS Option Appraisal

5.2.4 Policy SI 13 Sustainable Drainage of the London Plan, indicates developers should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible should utilise SuDS for new developments, in line with the following drainage hierarchy:

- store rainwater for later use;
- use infiltration techniques, such as porous surfaces in non-clay areas;
- attenuate rainwater in ponds or open water features for gradual release;
- attenuate rainwater by storing in tanks or sealed water features for gradual release;
- discharge rainwater direct to a watercourse;
- discharge rainwater to a surface water sewer/drain;
- discharge rainwater to the combined sewer.

Offices Building (Existing Structure)

5.2.5 The proposed scheme utilises the existing concrete structure from the foundations to level one. This is due to Sainsbury's supermarket store having an operational customer car park at basement level below Grand Union House which needs to remain in operation both during construction stage and in the future. Accordingly, and in order to maximise the building envelope in response to comments from planning officers a structural analysis was undertaken to investigate how many new storeys can be added above this to provide the maximum floorspace on the Site.

5.2.6 This analysis showed that adding green roof/blue roof attenuation system would not be possible as it would require strengthening works to be undertaken to the internal columns between basement and ground level. These works would be disruptive and would render the scheme undeliverable due to the impact on the basement operation.

5.2.7 There is no scope within the existing structure to incorporate any surface water attenuation, and due to lease restrictions regarding access under the ground as set out above.

5.2.8 Therefore, it is proposed that the development will mimic existing discharge rates with no formal attenuation proposed.

5.2.9 However, SuDS in the form of rain gardens are proposed as part of proposed landscape architectural plans and will therefore provide some benefit in decreasing existing volumetric and rate of runoff. Please refer to Landscape Architectural drawings and report for reference and indication of Urban Green factor details.

Residential Building (New Build)

5.2.10 The residential building will collect surface water at roof level and attenuate in the form of a blue roof attenuation system.

5.2.11 Due to the above, the use of attenuated rainwater from typical blue roof systems for recycled use is considered unfeasible There is limited use within the building envelope for residential users e.g. no external areas for residents to use for irrigation potentially.

5.2.12 Based on the geology of the site, it is anticipated that infiltration will not be feasible to drain the surface water due to the anticipated low infiltration rates associated with the underlying geology (London Clay). As such, it is considered that infiltration would not be a feasible method to discharge surface water from the Proposed Development and has been excluded within the outline drainage strategy based on the available information at this stage. The development footprint also prevents safely placing soakaways near foundations, as space is limited, with the general requirement needing 5m clear of structures/permanent features.

5.2.13 Although Regent's Canal is located 20m north of the site it would not be feasible to discharge into this watercourse as the location of houses along the canal would make a connection unfeasible.

5.2.14 As rainwater is attenuated above ground within the roof system, there are no other areas of the residential building to include an open water feature e.g. pond.

5.2.15 The restricted runoff from the blue roof attenuation system will therefore be discharged into the public combined sewer network, as there is no separate surface water sewer.

Proposed Blue Roof Attenuation

5.2.16 In favour of sustainability, a combined PV panel, green/blue roof attenuation system is proposed within the residential building. An indicative available area for attenuation has been measured as 156m2. Based on a depth of 150mm, a total attenuation volume of approximately 23m^3 will be provided above ground.

5.2.17 Due to the nature of the small roof area, a maximum discharge of up to 2.0l/s is proposed for up to the 1:100 year return period event, in accordance with best practice. A limiting discharge rate of 2.0l/s has been allocated. Good practice and guidance states that a minimum discharge rate of 5.0l/s should be applied for low flow rates, due to the risk of blockages associated with low velocity sedimental flow. Further discussion with relevant surface water drainage manufacturers indicate a minimum flow of 2l/s can be achieved, and as such informs the preliminary design of the residential building.

5.2.18 The new proposed surface water discharge from the Site will provide a reduction when compared to the pre-development scenario. A TW pre-development enquiry (submitted February 2021) has been made to confirm the capacity of the public sewerage network to cater to the new site discharge from the Site, and a response is awaited. In the event of inadequate capacity, a suitably worded pre-occupation planning condition, recommended by TW, shall be secured to ensure adequate capacity for the Proposed Development, prior to occupation. This will ensure that any necessary remedial upgrade works will be delivered in accordance to an agreed TW infrastructure phasing plan.

Summary

5.2.19 Based on the principles outlined for the Proposed Development, an indicative outline surface water drainage layout plan detailing the proposed drainage connections from the Site (both office and residential building) is shown on WSP Drawing 70009120-D-001.

5.2.20 A London Sustainable Drainage Proforma for the Camden London Borough Council summarises the Outline Surface Water Drainage Strategy and can be found within Appendix E.

5.3 SURFACE WATER DRAINAGE MAINTENANCE AND MANAGEMENT STRATEGY

Table 2 - Drainage Maintenance Requirements

Drainage Feature	Regular Maintenance	Occasional Maintenance	Monitoring
Drainage Channels	Inspections will be frequent and regular, depending on local conditions, but at least annually by Site management. Inspections will include gratings; covers including their locking bolts; sumps and sump buckets; exposed concrete surround and adjacent paving. Channels will be flushed with water or high pressure jetting (no boiling water or cleaning agent will be used). All silt buckets and sumps will be cleaned out replaced back into the units ensuring they are correctly fitted.	All channel surfaces and joints will be checked and repaired as necessary.	Inspected every 6 months or after large storm.
Manholes / Inspection Chambers	Inspection chambers will be checked every 6 months for the accumulation of debris and silt and cleaned as necessary.		Inspect every 6 months or after large storm.
Blue Roof/Green Roof	Check for accumulation of debris and silt and cleaned as necessary. Covers and frames to be checked for damage. Check condition of inlet and outlet pipes, flow controls, baffles and isolation structures	Clean as necessary. All manhole and inspection chamber covers and frames to be replaced as necessary. Repair exposed concrete and surfacing as necessary. Repair/rehabilitation of inlets, outlet, overflows and vents, as required.	Inspect every 6 months or after large storm.

5.4 FOUL WATER STRATEGY

5.4.1 Foul water runoff from the development will be collected at a high level and conveyed to the boundaries of each building block, before connecting to demarcation manhole(s) via downpipes. All demarcation manholes will subsequently discharge to the combined sewers located around the Site.

5.4.2 Confirmation of the demarcation arrangement/location will be confirmed at the detailed design stage.

5.4.3 Foul water shall discharge via gravity, if possible. Where foul water appliances are located too low to allow for a gravity discharge, the foul water runoff shall convey towards a pumped drainage system. Subsequently, the pumped system will be conveyed towards to a higher level demarcation manhole, before gravity discharging into the public combined sewer.

5.4.4 Where there are areas whereby pollution may occur, e.g. car park areas or loading bays, petrol inceptors shall be incorporated, if deemed necessary.

5.4.5 To prevent any internal flooding as a result of overloaded public sewers, non-return valves will be utilised to prevent sewer flooding entering the Site.

5.4.6 The proposed foul water discharge has been included as part of a TW pre-development enquiry (submitted February 2021) to confirm the capacity of the public sewerage network. In the event of inadequate capacity, a suitably worded pre-occupation planning condition, recommended by TW, shall be secured to ensure adequate capacity for the Proposed Development, prior to occupation. This will ensure that any necessary remedial upgrade works will be delivered in accordance to an agreed TW infrastructure phasing plan.

6 RESIDUAL RISKS

6.1.1 Since the site is located within Flood Zone 1, away from any floodplain, residual fluvial / tidal flood risk is considered to be negligible.

6.1.2 In accordance with best practice it is also recommended to design the development with slightly raised thresholds above the surrounding land and in such a way that levels fall away from the buildings; this will help in mitigating against any residual surface water flood risk.

7 CONCLUSIONS

7.1.1 Flood risk within the area has been assessed and mitigated where appropriate; and this FRA informs the BREEAM NC 2018 assessment from a flood risk and drainage perspective (Pol 03 criteria).

7.1.2 The site is shown in the EA Flood Maps as being located within Flood Zone 1, which based on the NPPF, is classified as having a 'low' probability of tidal and fluvial flooding. Other potential sources of flooding have been investigated however no significant sources of flooding have been identified.

7.1.3 The proposed outline surface water management strategy, which includes an allowance for climate change in line with current guidance, considers the appropriate mitigation to manage surface water runoff.

7.1.4 The BREEAM credits expected to be achievable are summarised below; final assessment and confirmation on the credits achieved is the responsibility of the BREEAM assessor.

Table 3 – BREEAM Pol 03 Credit Summary

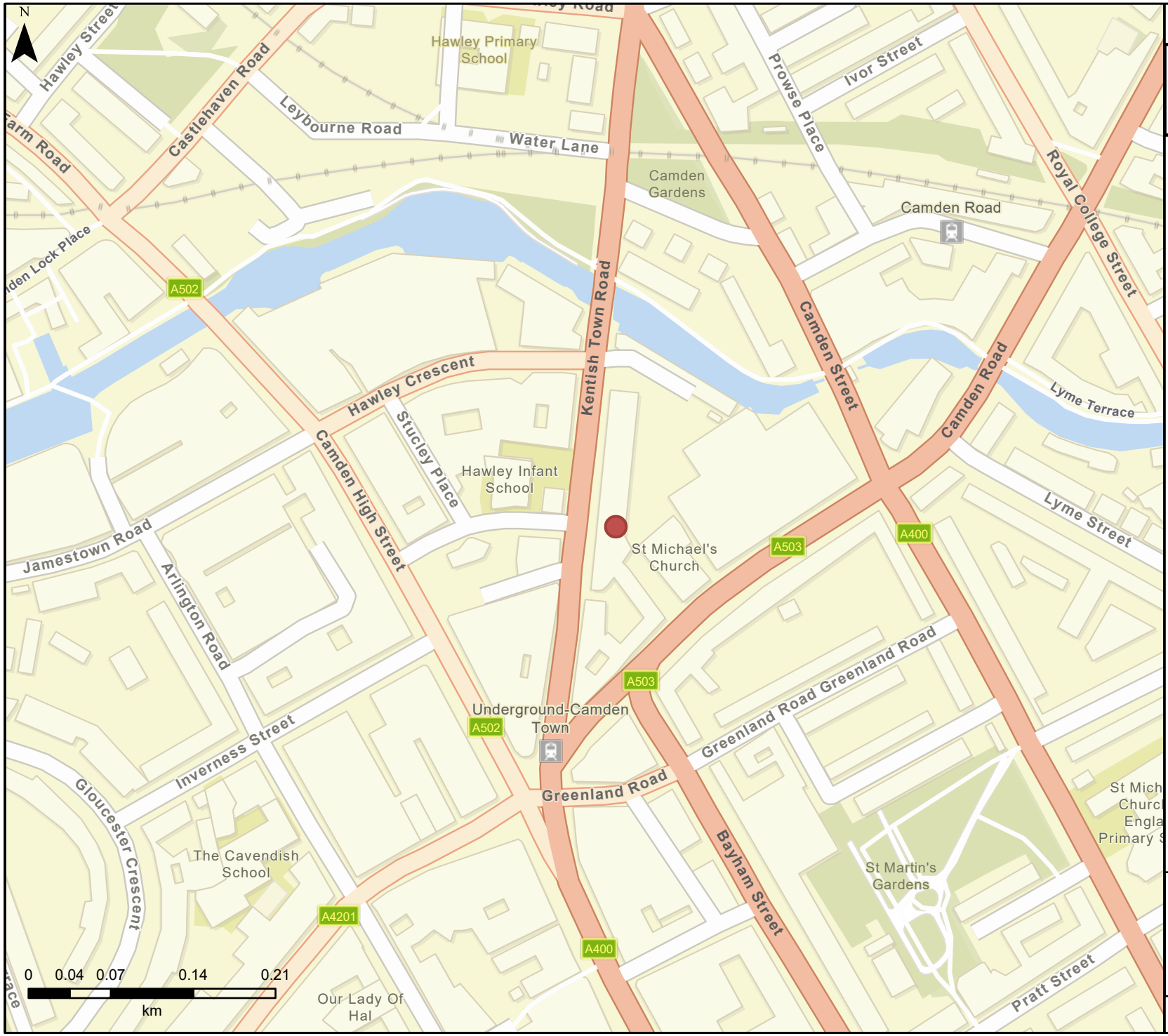
Pol 03 Credit	Relevant Criteria (summary)	Comments
Flood Resilience	**Pre-requisite:** An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria. **Two credits available (flood resilience):** 1) Where a site-specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration	**Expected to achieve two credits for flood resilience:** This FRA has identified that the development site is located within Flood Zone 1 and the development is at low risk of flooding from all sources when taking into account the effects of climate change.
Surface Water Run-off	**Pre-requisite:** Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site. **One credit available (surface water management):** 1. Drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the pre-developed site. This should comply at the 1-year and 100-year return period events. 2. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. 3. Calculations for surface water runoff need to include an allowance for climate change, in accordance to best practice planning guidance.	**Pre-requisite expected to be achieved**: See Outline Drainage Strategy in Appendix G. **Expected not to achieve one credit for surface water management**: Due to the constraints associated with the structural capacity of the structure, the drainage strategy does not incorporate any attenuation and therefore does not provide any improvement in run-off rates. **Potential to achieve one credit for surface water resilience**:

	One credit available (surface water resilience): 1. Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND EITHER 2. Drainage design measures are specified to ensure that the post development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change. 3. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques. OR (only where criteria 2 and 3 for this credit cannot be achieved): 4. Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options. 5. Drainage design measures are specified so that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: a. The pre-development 1-year peak flow rate; OR b. The mean annual flow rate Qbar; OR c. 2L/s/ha. Note that for the 1-year peak flow rate the 1-year return period event criterion applies (as described in the peak run-off criteria above). 6. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. 7. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	
Minimising Watercourse pollution	**Pre-requisite:** An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria. **One credit available for minimising watercourse pollution:** 8. There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant). 9. In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques. 10. Where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance notes for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems. 11. Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure). 12. All water pollution prevention systems have been designed and installed in accordance with the recommendations of	**Expected not to achieve one credit for minimising watercourse pollution**: Due to the pre-development and post development site being having no option to infiltrate which eliminates the opportunity of ensuring 'no discharge from the developed site for rainfall up to 5mm'.

	documents such as the SuDS manual and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site. 13. A comprehensive and up to date drainage plan of the site will be made available for the building/site occupiers. 14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place. 15. Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance.	

Appendix A

SITE LOCATION



DO NOT SCALE

Information Classification:

INTERNAL

Information that is only intended for internal distribution among WSP employees, independent consultants, contractors, sub-contractors, clients and authorised third parties.

Legend :

Title : Grand Union House - Indicative Site

Author : ArcGIS Web AppBuilder

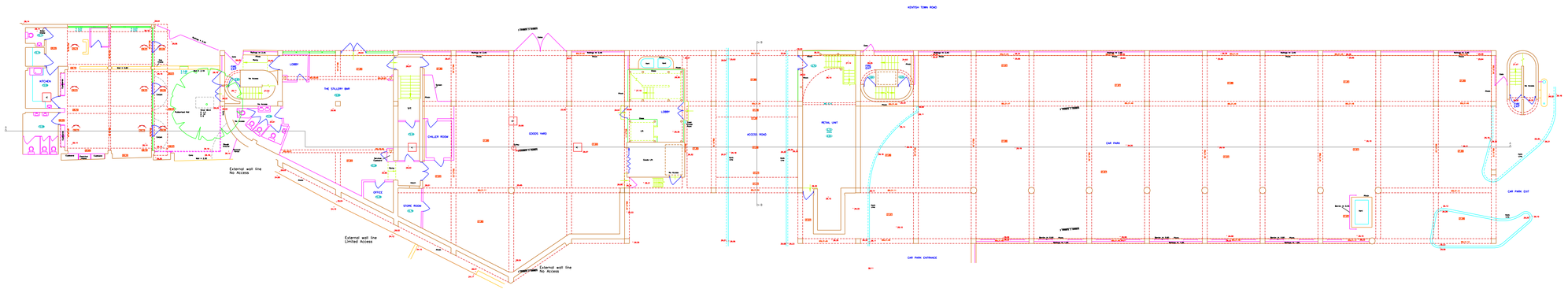
Scale : 1:4,514

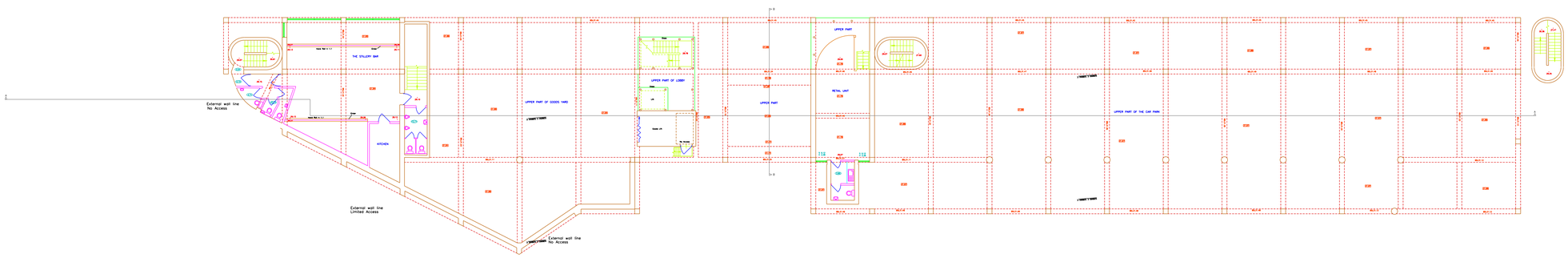
Layout : WSP A4 Landscape

Current Time : 22/02/2021 13:32

Appendix B

SURVEY INFORMATION

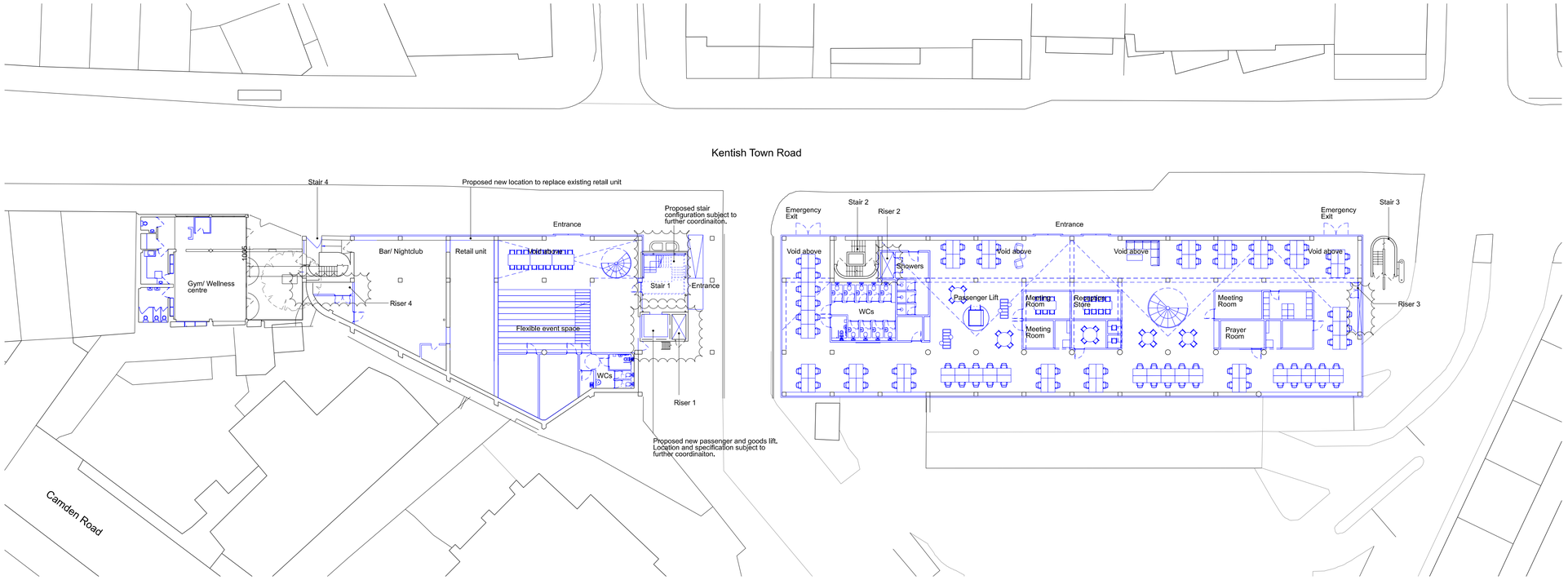

KENTISH TOWN ROAD
THE STILLERY BAR
LOBBY
KITCHEN
CHILLER ROOM
OFFICE
STORE ROOM
GOODS YARD
ACCESS ROAD
RETAIL UNIT
LOBBY
CAR PARK
CAR PARK EXIT
CAR PARK ENTRANCE
External wall line
No Access
External wall line
Limited Access
External wall line
No Access


External wall line
No Access
THE STILLERY BAR
KITCHEN
External wall line
Limited Access
UPPER PART OF GOODS YARD
UPPER PART OF LOBBY
UPPER PART
RETAIL UNIT
UPPER PART
UPPER PART OF THE CAR PARK
External wall line
No Access

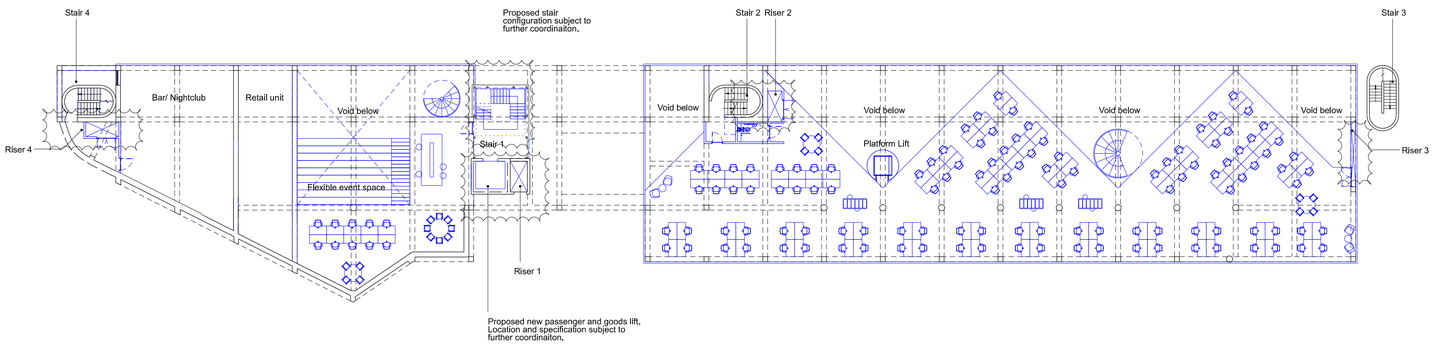
1:200 at A1

Appendix C

DEVELOPMENT PROPOSALS



1 / 1100 PROPOSED GROUND FLOOR
SCALE 1:500@A3



2 / 1105 PROPOSED FIRST FLOOR
SCALE 1:500@A3

KEYS:

Existing

Proposed

Notes:

1. Furniture layout and desk numbers require further coordinaiton. Exact desk capacity TBC.
2. MEP require further coordinaiton.
3. Ventilation ducts/ riser locations not included. Subject to further coordinaiton.
4. Dry risers not included. Subject to further coordinaiton.

N

DRAFT

Rev	Date	Description
-	17.01.20	Issued for informaiton & coordinaiton
		(Previouesly issued as 531_S1105-2)

6a Architects
Rapier House
40 Lambs Conduit Street
London WC1N 3LJ
t +44(0)20 7242 5422
f +44(0)20 7242 3646

post@6a.co.uk
www.6a.co.uk

PROJECT: **GRAND UNION HOUSE**

JOB: **531**

TITLE: **PROPOSED GROUND & FIRST FLOOR PLANS**

STATUS: **STAGE 2**

DATE: **17.01.20**

SCALE: **1:250(A1) 1:500(A3)**

REV: **-**

NUMBER: 1100

DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE TO BE CHECKED ON SITE. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL CONSULTANTS INFORMATION

DRAWN: **AB**

INSPECTED: **MK**

Appendix D

WATER COMPANY DATA AND CORRESPONDENCE

Sewer Flooding
History Enquiry

Property Searches

WSP UK Ltd
London London
Chancery Lane

Search address supplied	Grand Union House Grand Union House Kentish Town Road London NW1 9LQ
Your reference	Grand Union House
Our reference	SFH/SFH Standard/2018_3912946
Received date	**21 November 2018**
Search date	**21 November 2018**

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

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

0845 070 9148

Sewer Flooding
History Enquiry

Thames Water Property Searches

Search address supplied: Grand Union House,Grand Union House,Kentish Town Road,London,NW1 9LQ

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

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

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

0845 070 9148

Sewer Flooding
History Enquiry

Thames Water Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

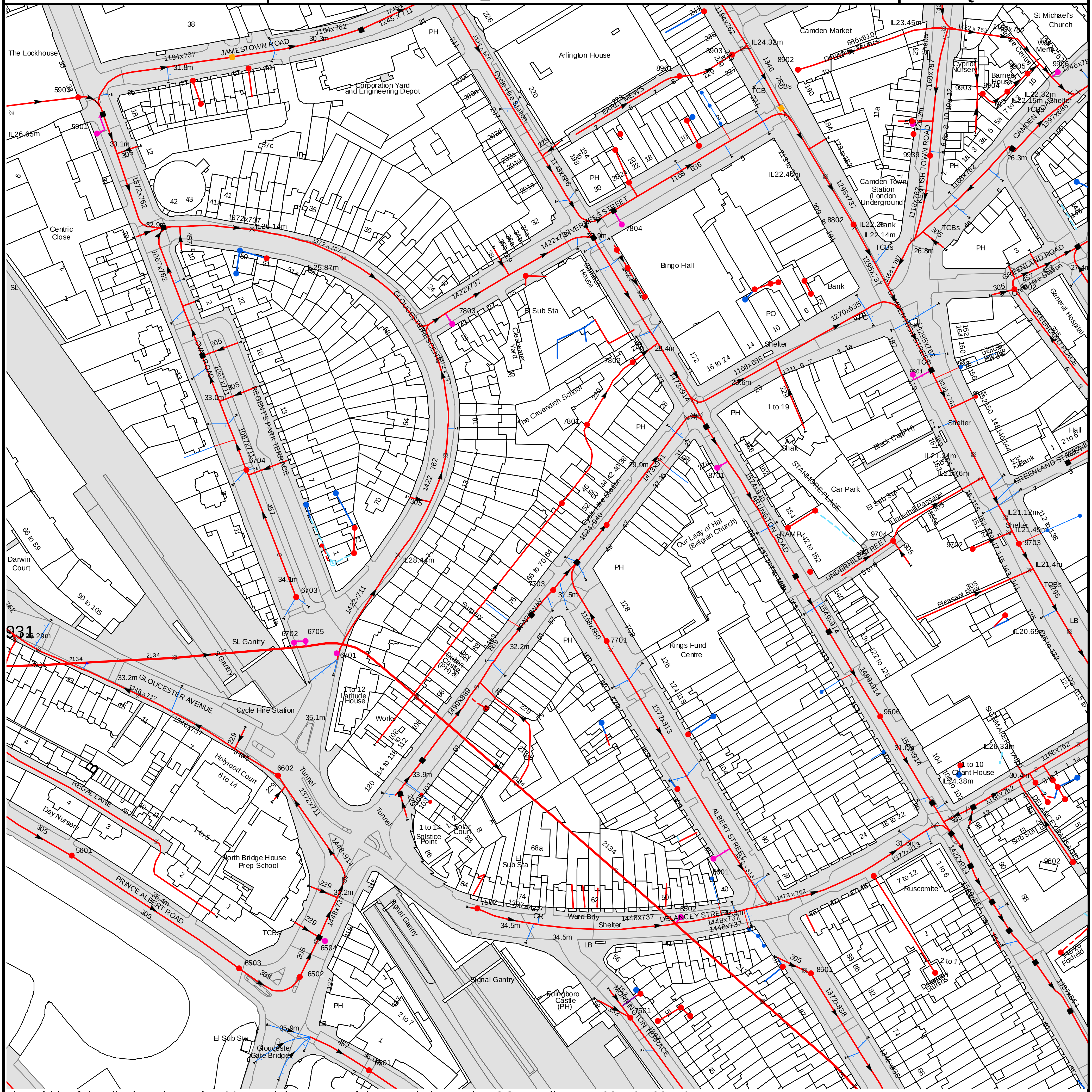
Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

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

0845 070 9148

Asset Location Search Sewer Map - ALS/ALS Standard/2017_3571474

TQ2883NE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528750,183750

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
6501	35.91	32.46
9633	29.89	29.03
95AB	n/a	n/a
96EH	n/a	n/a
9602	29.41	n/a
9903	26.24	23.61
9904	23.85	23.31
9905	23.84	23.13
9906	n/a	n/a
99AB	n/a	n/a
971A	n/a	n/a
981A	n/a	n/a
9802	26.55	23.53
9702	n/a	25.67
97DA	n/a	n/a
9703	n/a	n/a
9634	29.96	28.46
971B	n/a	n/a
9632	29.82	28.19
96EI	n/a	n/a
96EG	n/a	n/a
7802	28.5	26.37
781C	n/a	n/a
8701	n/a	n/a
88EH	n/a	n/a
88EF	n/a	n/a
88EG	n/a	n/a
88EE	n/a	n/a
87CA	n/a	n/a
88DI	n/a	n/a
87CB	n/a	n/a
88DJ	n/a	n/a
87BJ	n/a	n/a
8802	n/a	n/a
9704	30.25	27.43
9801	n/a	n/a
981B	n/a	n/a
79DG	n/a	n/a
9939	26.15	22.47
79DF	n/a	n/a
89FC	n/a	n/a
79DC	n/a	n/a
9940	n/a	n/a
9942	n/a	n/a
891A	n/a	n/a
9941	n/a	n/a
89FB	n/a	n/a
89FA	n/a	n/a
891B	n/a	n/a
891C	n/a	n/a
8901	26.78	25.74
8902	27.29	24.65
8903	n/a	n/a
89DJ	n/a	n/a
6504	35.51	31.84
661A	n/a	n/a
661B	n/a	n/a
7502	34.45	30.8
7615	n/a	n/a
76BJ	n/a	n/a
7501	33.89	29.52
75EH	n/a	n/a
75EI	n/a	n/a
75EE	n/a	n/a
86CG	n/a	n/a
85HE	n/a	n/a
8502	33.38	14.44
86DB	n/a	n/a
85HD	n/a	n/a
851A	n/a	n/a
86DC	n/a	n/a
8601	n/a	n/a
851D	n/a	n/a
851C	n/a	n/a
851B	n/a	n/a
85DD	n/a	n/a
8501	32.52	27.91
861A	n/a	n/a
95EB	n/a	n/a
9606	31.16	23.96
961A	n/a	n/a
95EA	n/a	n/a
96DG	n/a	n/a
96DH	n/a	n/a
6701	34.24	29.74
7701	31.79	28.32
7703	31.3	28.11
67EJ	n/a	n/a
67EF	n/a	n/a
671A	n/a	n/a
67EE	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
771A	n/a	n/a
771B	n/a	n/a
67ED	n/a	n/a
7801	n/a	n/a
7803	n/a	n/a
78ED	n/a	n/a
781B	n/a	n/a
781A	n/a	n/a
7804	n/a	n/a
6502	35.83	32.06
6503	35.67	32.12
5601	35.36	32.33
6602	34.69	30.66
6702	34.32	n/a
6705	34.4	14.54
6703	n/a	31.39
67EH	n/a	n/a
6704	33.43	28.77
68BJ	n/a	n/a
68CB	n/a	n/a
68CA	n/a	n/a
5901	n/a	n/a
59AF	n/a	n/a
5903	n/a	n/a
59BI	n/a	n/a
69CI	n/a	n/a

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

Asset Location Search Sewer Map - ALS/ALS Standard/2017_3571474	TQ2984SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 529250,184250

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
40DA	n/a	n/a
40BI	n/a	n/a
40DF	n/a	n/a
40BJ	n/a	n/a
41CB	n/a	n/a
41BE	n/a	n/a
41BJ	n/a	n/a
41BI	n/a	n/a
42DH	n/a	n/a
42DF	n/a	n/a
42DG	n/a	n/a
42DE	n/a	n/a
42DD	n/a	n/a
42DC	n/a	n/a
40EB	n/a	n/a
40DC	n/a	n/a
40FC	n/a	n/a
40FA	n/a	n/a
40DB	n/a	n/a
44CC	n/a	n/a
44BJ	n/a	n/a
4302B	31.33	28.64
44CB	n/a	n/a
44BD	n/a	n/a
44CG	n/a	n/a
4316	n/a	n/a
4317	n/a	n/a
4403B	34.35	30.87
4401A	n/a	n/a
4204A	30.14	28.61
4301B	31.53	27.68
3302	30.54	29.9
3217	27.88	23.77
3019	26.44	n/a
40GA	n/a	n/a
4101B	26.49	22.99
4010	26.7	20.12
40GB	n/a	n/a
4001A	26.29	13.44
4102A	27.1	n/a
40FG	n/a	n/a
4226	28.97	n/a
40FI	n/a	n/a
40FH	n/a	n/a
40FJ	n/a	n/a
40GC	n/a	n/a
4011	27.8	23.74
40GD	n/a	n/a
4002A	27.8	21.85
40FD	n/a	n/a
40DJ	n/a	n/a
40FE	n/a	n/a
40EC	n/a	n/a
40BF	n/a	n/a
40EJ	n/a	n/a
40BG	n/a	n/a
40AE	n/a	n/a
4012	28.3	24.2
4003B	28.3	21.97
1201	n/a	23.55
2234	28.42	12.52
2206	n/a	23.47
221E	n/a	n/a
221D	n/a	n/a
2236	29.06	n/a
2242	n/a	n/a
22FA	n/a	n/a
2235	29.44	n/a
3202	29.5	25.41
321A	n/a	n/a
3301	29.84	25.66
2301B	29.74	25.28
231C	n/a	n/a
231B	n/a	n/a
231A	n/a	n/a
241A	n/a	n/a
041A	n/a	n/a
0406	n/a	n/a
1303	28.82	25.11
1401	n/a	n/a
1403	30.57	27.93
2403	31.45	26.3
2303	31.05	26.45
34AC	n/a	n/a
34AE	n/a	n/a
34AI	n/a	n/a
3401	31.13	n/a
3407	31.45	13.58
0207	n/a	n/a
02FJ	n/a	n/a
02FI	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
02FH	n/a	n/a
02FG	n/a	n/a
02FF	n/a	n/a
03FI	n/a	n/a
03FH	n/a	n/a
1301	28.75	23.09
0301	n/a	n/a
03DH	n/a	n/a
03CI	n/a	n/a
03CE	n/a	n/a
0302	28.5	25.91
03DF	n/a	n/a
0325	n/a	n/a
0324	n/a	n/a
03FF	n/a	n/a
03FD	n/a	n/a
03FE	n/a	n/a
04ED	n/a	n/a
04EC	n/a	n/a
04EB	n/a	n/a
04CH	n/a	n/a
04EE	n/a	n/a
04AI	n/a	n/a
0404	n/a	n/a
3105	n/a	n/a
2107	n/a	n/a
1104	n/a	n/a
2108	27.88	n/a
21CG	n/a	n/a
221F	n/a	n/a
22FD	n/a	n/a
2201	n/a	n/a
2241	n/a	n/a
2240	n/a	n/a
2239	n/a	n/a
221A	n/a	n/a
221B	n/a	n/a
221C	n/a	n/a
2202	n/a	25.51
3001	25.29	12.67
201A	n/a	n/a
201B	n/a	n/a
2002	26.34	22.4
10DJ	n/a	n/a
10DI	n/a	n/a
2003	n/a	n/a
11DG	n/a	n/a
11DB	n/a	n/a
11DA	n/a	n/a
11CJ	n/a	n/a
2101	n/a	n/a
2124	n/a	n/a
2102	n/a	n/a
11CI	n/a	n/a
11CH	n/a	n/a
2103	27.58	23.31
211B	n/a	n/a
2125	n/a	n/a
211A	n/a	n/a
00AD	n/a	n/a
00CD	n/a	n/a
001A	n/a	n/a
1023	26.68	n/a
1003	n/a	n/a
1024	26.67	18.53
10CH	n/a	n/a
0201	26.39	22.77
02AF	n/a	n/a
0206	25.63	23.93
0202	25.6	23.49
02EF	n/a	n/a
0141	26.94	22.6
0102	n/a	n/a
0204	n/a	n/a
02DB	n/a	n/a
02DC	n/a	n/a
11ED	n/a	n/a
11EE	n/a	n/a
1102	24.61	21.79
121A	n/a	n/a
1101	27.58	22.24
1103	27.7	n/a
11DE	n/a	n/a
11DD	n/a	n/a

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Asset Location Search Sewer Map - ALS/ALS Standard/2017_3571474

TQ2884SE

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528750,184250

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528750,184250

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
9227	26.01	n/a
9207	n/a	n/a
93EA	n/a	n/a
93ED	n/a	n/a
93DC	n/a	n/a
9317	26.26	n/a
93DD	n/a	n/a
94DI	n/a	n/a
94EA	n/a	n/a
94CD	n/a	n/a
94EB	n/a	n/a
94EC	n/a	n/a
94ED	n/a	n/a
9401	n/a	n/a
93EG	n/a	n/a
93EH	n/a	n/a
94AH	n/a	n/a
94AG	n/a	n/a
94AF	n/a	n/a
84CC	n/a	n/a
84CE	n/a	n/a
84CB	n/a	n/a
84CA	n/a	n/a
84BJ	n/a	n/a
84BB	n/a	n/a
84AH	n/a	n/a
84BA	n/a	n/a
84AG	n/a	n/a
84AI	n/a	n/a
84AJ	n/a	n/a
94AD	n/a	n/a
94BF	n/a	n/a
94BE	n/a	n/a
94AD	n/a	n/a
94BC	n/a	n/a
93CC	n/a	n/a
94AC	n/a	n/a
94AB	n/a	n/a
9402	27.64	23.6
94AJ	n/a	n/a
94AI	n/a	n/a
94AF	n/a	n/a
94BA	n/a	n/a
94DJ	n/a	n/a
94BH	n/a	n/a
94BG	n/a	n/a
8401	27.32	23.36
64CJ	n/a	n/a
631A	n/a	n/a
64BB	n/a	n/a
6401	n/a	n/a
6403	28.31	26.18
64FC	n/a	n/a
64FE	n/a	n/a
7402	27.19	24.19
74AB	n/a	n/a
74AG	n/a	n/a
74AE	n/a	n/a
74AC	n/a	n/a
74AF	n/a	n/a
74AD	n/a	n/a
74BB	n/a	n/a
74AI	n/a	n/a
74AJ	n/a	n/a
74BA	n/a	n/a
7411	n/a	n/a
7412	27.53	23.18
831A	n/a	n/a
84BE	n/a	n/a
84BD	n/a	n/a
84CD	n/a	n/a
83AG	n/a	n/a
84BF	n/a	n/a
84BC	n/a	n/a
84BG	n/a	n/a
64EE	n/a	n/a
64AF	n/a	n/a
64BJ	n/a	n/a
64BH	n/a	n/a
54CA	n/a	n/a
54AJ	n/a	n/a
54CB	n/a	n/a
64EA	n/a	n/a
54BH	n/a	n/a
54BI	n/a	n/a
64EB	n/a	n/a
54BJ	n/a	n/a
54AE	n/a	n/a
54BE	n/a	n/a
54BG	n/a	n/a
54BF	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
64EC	n/a	n/a
64ED	n/a	n/a
64DJ	n/a	n/a
64EH	n/a	n/a
541B	n/a	n/a
541A	n/a	n/a
54BC	n/a	n/a
54BD	n/a	n/a
54BB	n/a	n/a
54DE	n/a	n/a
5403	28.07	25.52
54DI	n/a	n/a
64FA	n/a	n/a
90AB	n/a	n/a
9206	25.9	19.9
9203	25.87	23.75
9102	26.21	23.16
9202	25.74	23.29
9201	n/a	n/a
9228	26.05	19.35
92AG	n/a	n/a
911B	n/a	n/a
911A	n/a	n/a
9229	26.38	19.17
92AF	n/a	n/a
92AB	n/a	n/a
8001	27.43	24.26
9002	n/a	n/a
80BI	n/a	n/a
801B	n/a	n/a
901A	n/a	n/a
801A	n/a	n/a
7001	n/a	n/a
7016	n/a	n/a
8002	25.41	24.87
8003	26.19	24.36
9001	n/a	n/a
8004	27.03	25.41
71BE	n/a	n/a
7201	26.91	23.72
8201	26.24	24.17
6204	27.89	23.85
72AE	n/a	n/a
72AF	n/a	n/a
7202	n/a	n/a
92DE	n/a	n/a
92EB	n/a	n/a
92DI	n/a	n/a
7205	n/a	n/a
6301	n/a	n/a
93CB	n/a	n/a
73AC	n/a	n/a
93CA	n/a	n/a
93CF	n/a	n/a
93CE	n/a	n/a
83AD	n/a	n/a
83AI	n/a	n/a
73AD	n/a	n/a
83AH	n/a	n/a
93BJ	n/a	n/a
93CD	n/a	n/a
93BI	n/a	n/a
93BE	n/a	n/a
511B	n/a	n/a
511A	n/a	n/a
6101	30.18	27.3
611A	n/a	n/a
611B	n/a	n/a
611C	n/a	n/a
6202	n/a	n/a
621A	n/a	n/a
5201	n/a	n/a
5203	28.17	24.3
5301	27.93	24.41
5302	n/a	n/a
531A	n/a	n/a
531B	n/a	n/a
5303	n/a	n/a
6303	n/a	n/a
5304	n/a	n/a
6304	n/a	n/a
63BF	n/a	n/a
63BG	n/a	n/a
641A	n/a	n/a
5402	n/a	n/a
641B	n/a	n/a
64DA	n/a	n/a
64CH	n/a	n/a
64CA	n/a	n/a
64EG	n/a	n/a
64CG	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level

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Asset Location Search Sewer Map - ALS/ALS Standard/2017_3571474	TQ2983NW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 529250,183750

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
49DG	n/a	n/a
49AJ	n/a	n/a
49CD	n/a	n/a
49CC	n/a	n/a
49CB	n/a	n/a
49DI	n/a	n/a
49DF	n/a	n/a
4614	n/a	n/a
4602	n/a	n/a
4701	23.71	13.66
4721	23.86	n/a
471A	n/a	n/a
3814	23.94	n/a
4802	21.26	17.29
4901B	21.24	19.17
491A	n/a	n/a
4902A	n/a	n/a
0503	n/a	n/a
05FD	n/a	n/a
05FE	n/a	n/a
25CB	n/a	n/a
25CI	n/a	n/a
25DD	n/a	n/a
25CA	n/a	n/a
35CB	n/a	n/a
25CH	n/a	n/a
25DC	n/a	n/a
25BJ	n/a	n/a
25BI	n/a	n/a
25CG	n/a	n/a
2901	n/a	n/a
2930	24.89	18.08
2903	n/a	n/a
2929	25.02	22.03
2928	25.09	20.58
3901	25.29	18.49
2902	n/a	n/a
25AJ	n/a	n/a
25BH	n/a	n/a
25CF	n/a	n/a
3501	22.84	8.17
25CJ	n/a	n/a
25BE	n/a	n/a
1536	n/a	n/a
25BF	n/a	n/a
2506	24	19.2
2504	n/a	n/a
15GH	n/a	n/a
15GI	n/a	n/a
2505	23.98	14.23
35BG	n/a	n/a
36EB	n/a	n/a
16BC	n/a	n/a
36DJ	n/a	n/a
2601	23.84	20.37
16BD	n/a	n/a
36DI	n/a	n/a
3633	n/a	n/a
16BJ	n/a	n/a
3601	n/a	n/a
3701	24.89	21.41
2701	25.41	9.46
2703	25.97	22.3
3702	24.74	19.9
37JE	n/a	n/a
371A	n/a	n/a
37JH	n/a	n/a
1704	27.73	23.22
1703	27.45	22.73
3703	n/a	n/a
37AH	n/a	n/a
38CI	n/a	n/a
1802	26.8	21.57
38CA	n/a	n/a
38EI	n/a	n/a
181B	n/a	n/a
38DF	n/a	n/a
181A	n/a	n/a
38FD	n/a	n/a
38FE	n/a	n/a
38DI	n/a	n/a
1805	26.63	n/a
181C	n/a	n/a
3802	n/a	n/a
38GA	n/a	n/a
2803	n/a	n/a
1808	26.21	22.82
1810	26.13	n/a
1811	26.09	21.32
1901	25.96	10.77
1902	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
051B	n/a	n/a
051D	n/a	n/a
051A	n/a	n/a
051C	n/a	n/a
05CJ	n/a	n/a
05CI	n/a	n/a
06EC	n/a	n/a
06EB	n/a	n/a
0504	n/a	22.1
05CD	n/a	n/a
05DA	n/a	n/a
05CA	n/a	n/a
15FF	n/a	n/a
15FE	n/a	n/a
15FC	n/a	n/a
16BI	n/a	n/a
05FJ	n/a	n/a
15EA	n/a	n/a
05FB	n/a	n/a
0501	n/a	23.16
05FF	n/a	n/a
15DJ	n/a	n/a
15DI	n/a	n/a
15EE	n/a	n/a
15EB	n/a	n/a
15EC	n/a	n/a
0502	24.67	20.08
1501	n/a	n/a
15ED	n/a	n/a
05FA	n/a	n/a
2503	24.03	18.91
05GA	n/a	n/a
25DB	n/a	n/a
05EJ	n/a	n/a
05EB	n/a	n/a
05EA	n/a	n/a
05EI	n/a	n/a
25DA	n/a	n/a
05EE	n/a	n/a
05EF	n/a	n/a
05FI	n/a	n/a
05EG	n/a	n/a
0601	n/a	n/a
05EH	n/a	n/a
06FA	n/a	n/a
0602	n/a	n/a
061B	n/a	n/a
051F	n/a	n/a
051E	n/a	n/a
09DB	n/a	n/a
1904	n/a	n/a
19IA	n/a	n/a
19GE	n/a	n/a
19II	n/a	n/a
19GF	n/a	n/a
19FC	n/a	n/a
19IH	n/a	n/a
19FE	n/a	n/a
19EH	n/a	n/a
19EI	n/a	n/a
19FA	n/a	n/a
19ED	n/a	n/a
19BG	n/a	n/a
19BC	n/a	n/a
0702	27.97	23.66
071D	n/a	n/a
071E	n/a	n/a
071C	n/a	n/a
071B	n/a	n/a
071A	n/a	n/a
0703	27.59	23.06
0801	n/a	n/a
1804	27.28	22.18
0804	27.71	25.24
0805	26.34	24.87
1806	26.3	21.78
08EH	n/a	n/a
08EI	n/a	n/a
08GF	n/a	n/a
08GE	n/a	n/a
08GH	n/a	n/a
08EJ	n/a	n/a
18CI	n/a	n/a
08GI	n/a	n/a
18CJ	n/a	n/a
08GJ	n/a	n/a
18DA	n/a	n/a
0901	n/a	n/a
0605	n/a	n/a
07BE	n/a	n/a
06HA	n/a	n/a
07AF	n/a	n/a
0603	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
07CB	n/a	n/a
07CC	n/a	n/a
061A	n/a	n/a
07CD	n/a	n/a
07BH	n/a	n/a
06FF	n/a	n/a
07BI	n/a	n/a
16DB	n/a	n/a
1701	27.65	23.85
1602	n/a	22.3
16DC	n/a	n/a
171A	n/a	n/a
1603	n/a	n/a
16CB	n/a	n/a
171B	n/a	n/a
16CD	n/a	n/a

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

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

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

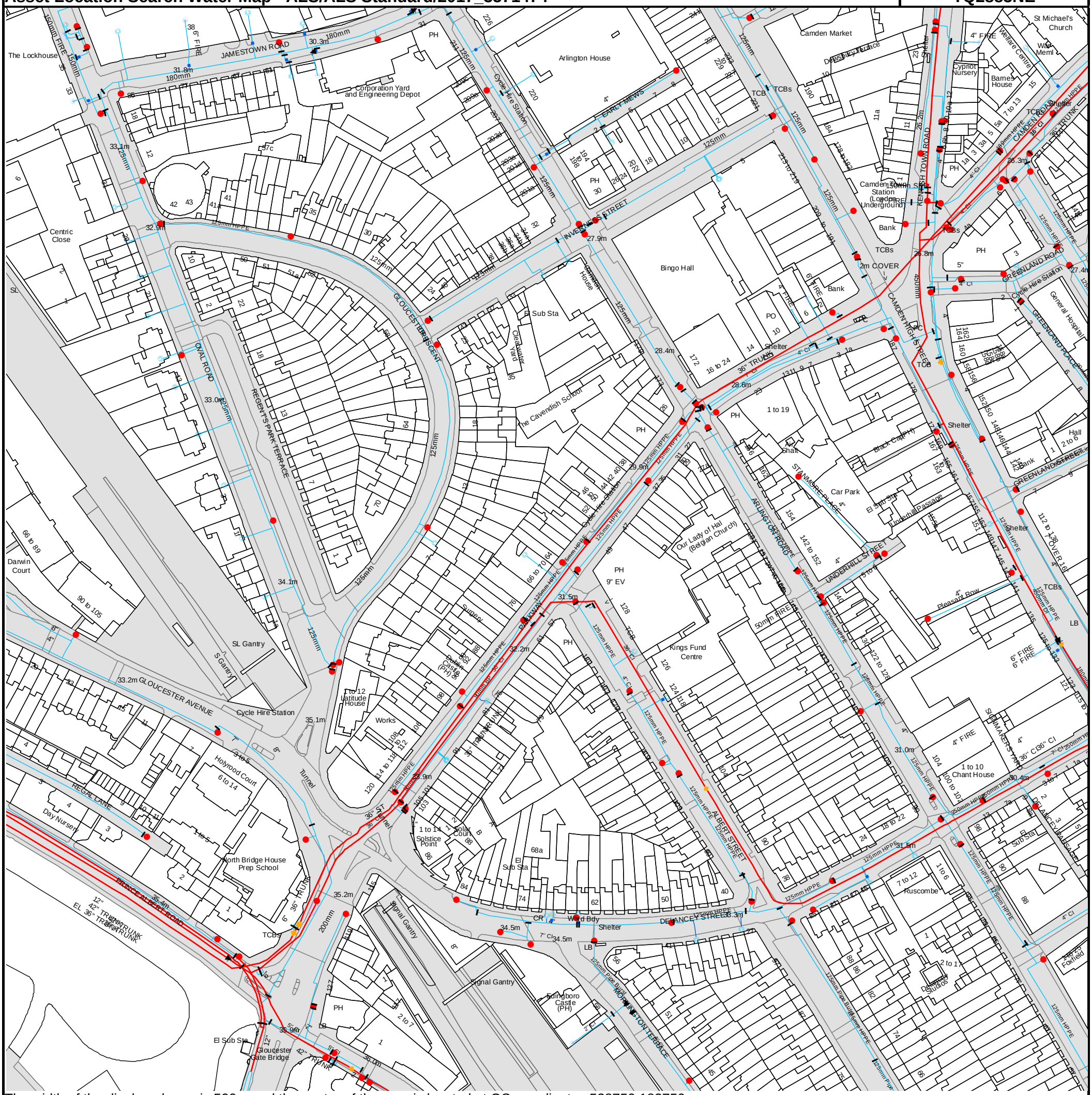
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2017_3571474

TQ2883NE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528750,183750

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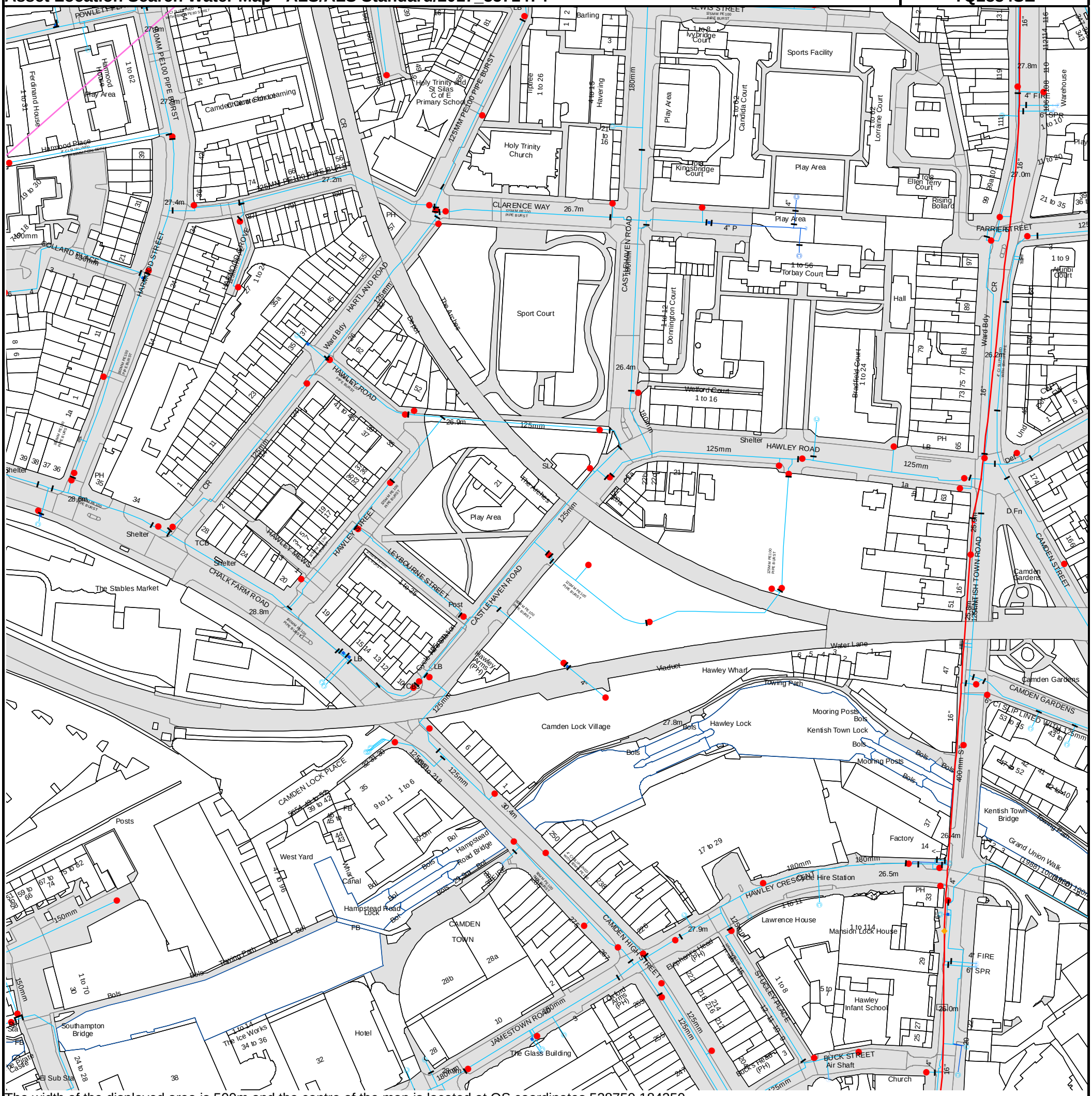
Asset Location Search Water Map - ALS/ALS Standard/2017_3571474	TQ2984SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 529250,184250

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 Map - ALS/ALS Standard/2017_3571474

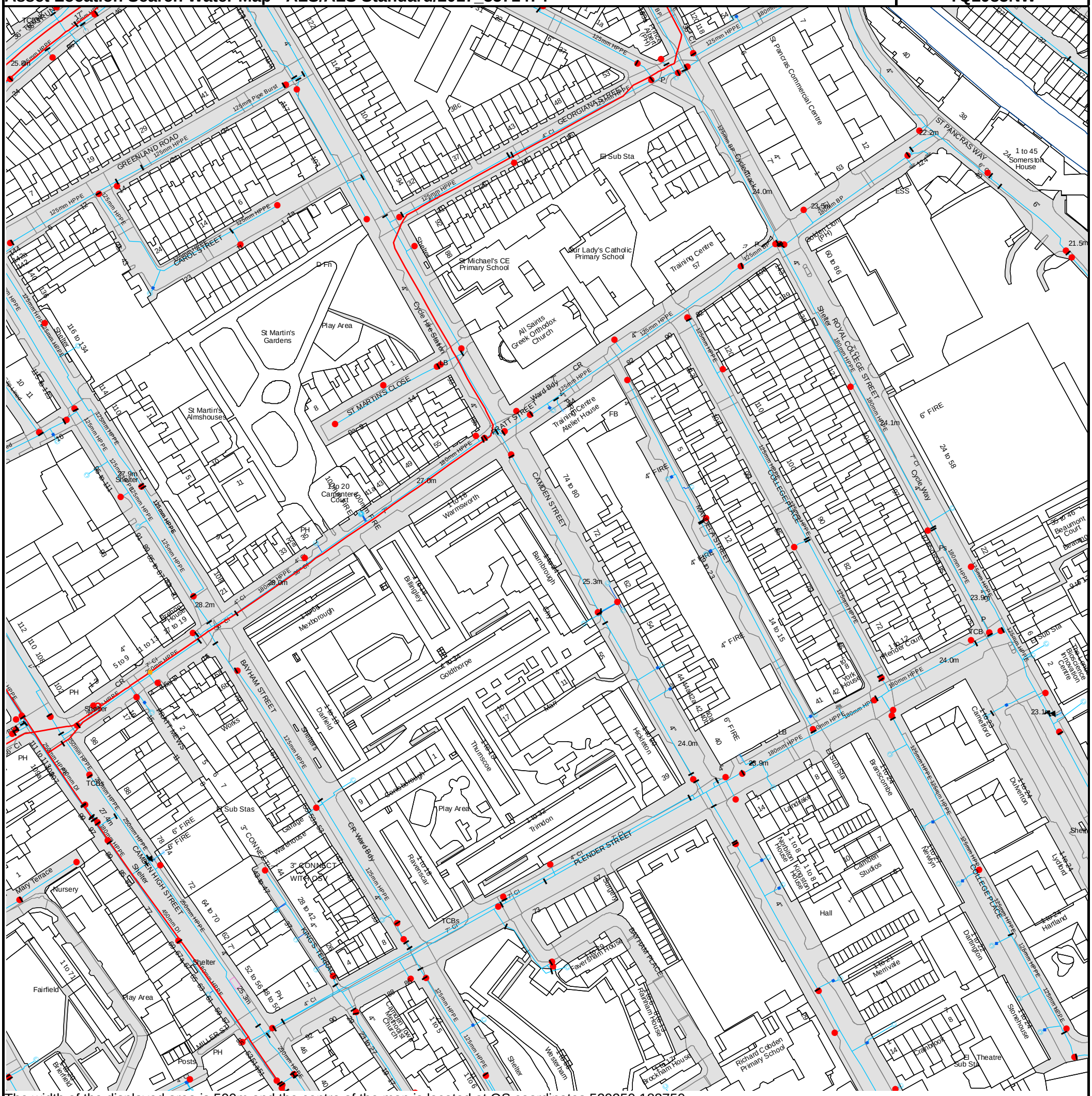
TQ2884SE



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 528750,184250

Asset Location Search Water Map - ALS/ALS Standard/2017_3571474

TQ2983NW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 529250,183750

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Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

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

16"

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

3" SUPPLY

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

3" FIRE

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

3" METERED

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

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

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

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

- Data Logger

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

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

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

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

Appendix E

LEAD LOCAL FLOOD AUTHORITY DATA AND CORRESPONDENCE

Ko, William

From:	Hannah Bryant <HBryant@geraldeve.com>
Sent:	24 January 2019 08:59
To:	'seonaid.carr@camden.gov.uk'
Cc:	Nia Fraser; Jake Geczy
Subject:	GUH: Flood Risk and Drainage Comments

Hi Seonaid

Please see our responses to the queries on flood risk and drainage set out below:

LFFA Comment and Action of Applicant:

The applicant to confirm the height of the kerbs adjacent to the proposed development and demonstrate how the proposed threshold drains can reduce surface water flood risk to the development in the event the existing adjacent kerb becomes overwhelmed.

Response:

We do not currently hold any topographical survey information to advise on the exact depth of the kerb. However from site visits the kerb height seems to be the standard 125mm. Threshold drains will be incorporated where possible, the exact location and design will need to be determined at the detailed design stage. As the existing basement sits below some extent of the ground floor, the logistics of incorporating threshold drains along all entrances may not be viable. Where drainage channels/threshold drains are incorporated, they will be designed to convey the 1:100 year + 40% climate change event. They will be sized to accommodate this flow based on manufactures (ACO/GATIC) design criteria and associated catchment area. This would aid in reducing the risk of surface water flooding to retail units if an event of extreme flooding did occur on Kentish Town Road.

It should be noted that the existing ground floor structure is to be retained and is a reinforced concrete slab and thus provides good flood resilience which reduces the residual risk. Where possible, there may be an option to raise internal levels (at ground floor) slightly above external levels, to allow for falls away from ground floor entrances. This will passively aid in reducing the risk of surface water flooding. Within the scope of re-paving along Kentish Town road, drainage channels will be incorporated within newly formed low spots on the footway. However the exact nature (depth and flow) of the surface water flooding will need to be determined following more complex surface water modelling. The available EA's online surface water modelling is relatively crude and cannot be used to accurately inform design at this stage. Therefore, the extent of any surface water mitigation works will need to be determined at the next detailed design stage.

LLFA Comment and Action of Applicant:

- ***Review opportunities for SuDS within the Public realm area of the site and provide plans of where these could be located.***
- ***Identify any betterment in runoff rates which may be achieved through proposed SuDS.***

- ***A drainage layout plan with details of the proposed connection to the existing sewer (including invert levels/pipe sizes.***

Response:

Due to the site constraints we do not consider the provision of SuDS within the public realm area to be feasible. Whilst we would be happy to propose permeable paving to the public footpath along Kentish Town Road, this is public land and we do not believe that permeable paving is normally an adoptable solution. However, we would be happy to discuss further if Highways are amenable.

In respect of the private land, to the rear of Grand Union House, this sits above the existing Sainsbury's basement car park and therefore falls outside of Camden Mixed Developments Limited ownership. Whilst we could retrofit a 'blue roof' to retain water on top of the existing basement slab, the cost/benefit for doing so is considered to be minimal and would need to be reviewed in light of the viability of the scheme as a whole. It would also likely require new waterproofing to the basement slab, which would require Sainsbury's approval prior to undertaking. We have also assessed the option of introducing a water storage tank above Sainsbury's basement, however due to the loading restrictions of the existing foundations, which we will be retaining, we cannot implement.

The proposals try to maximise the permeable soft areas as far as is practically possible with a green roof to the bin store and new planting area to the back (along the boundary with the church).

LLFA Comment and Action for applicant:

The drainage strategy proposes to incorporate threshold drains as flood mitigation measures. However, it is not clear the volume of surface runoff the proposed mitigation measure can accommodate and if this would be sufficient to prevent the commercial ground floor from flooding. Furthermore, there is no mention of safe access to and from the development.

Applicant to demonstrate how the commercial ground floor will be resilient to surface water flooding.

Response:

Please refer to the response above with regards to flood mitigation measures.

Safe access from these units seems to be an excessive requirement. If surface water flooding occurred it would be a gradual build-up of water and as such the commercial units fronting Kentish Town Road will have visibility of this and can close and evacuate as needed, to the rear of the development, which is unaffected by surface water flooding.

If you have any queries regarding the above, please let me know.

Many thanks

Hannah

Hannah Bryant
Associate

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HBryant@geraldeve.com

Gerald Eve LLP
72 Welbeck Street London W1G 0AY
www.geraldeve.com

Camden GREATERLONDONAUTHORITY LoDEG

1. Project & Site Details

Project / Site Name (including sub-catchment / stage / phase where appropriate)	Grand Union House
Address & post code	Grand Union House, 16-20 Kentish Town Road, London, NW1 8NH
OS Grid ref. (Easting, Northing)	E 528957
	N 184029
LPA reference (if applicable)	
Brief description of proposed work	"Part-demolition, re-build and upward extension to provide additional Class E office and commercial floorspace, six residential units (Class C3), new areas of landscaping and public realm."
Total site Area	3003 m^2
Total existing impervious area	3003 m^2
Total proposed impervious area	1233 m^2
Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	Yes, CDA 003. Not identified to lie within LFRZ.
Existing drainage connection type and location	Combined sewerage connection into sewer located on Old Kentish Road.
Designer Name	William Ko
Designer Position	Senior Engineer
Designer Company	WSP

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	0.9			
1 in 1	0.9	30.9	16	0.4
1 in 30	1.6	80.9	16	0.6
1 in 100	1.8	108.4	16	0.9
1 in 100 + CC			16	2
Climate change allowance used		40%		

3b. Principal Method of Flow Control	Blue Roof (16m3) on new build. Green roof throughout development.

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	1594	15.94
Blue roofs	0	156	15.6
Filter strips	0	0	0
Filter drains	0	0	0
Bioretention / tree pits	0	0	0
Pervious pavements	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Attenuation tanks	0		0
Total	**0**	**1750**	**31.54**

2. Proposed Discharge Arrangements

2a. Infiltration Feasibility

Superficial geology classification	No Superficial Deposits
Bedrock geology classification	Thames Group - Clay, Silt, Sand and Gravel
Site infiltration rate	0 m/s
Depth to groundwater level	-40 m below ground level
Is infiltration feasible?	No

2b. Drainage Hierarchy

	Feasible (Y/N)	Proposed (Y/N)
1 store rainwater for later use	N	N
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	Combined Sewer located on Kentish Town Road
Has the owner/regulator of the discharge location been consulted?	Yes, TW Pre-planning Enquiry

4. Supporting Information

4a. Discharge & Drainage Strategy	Page/section of drainage report
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	Page 4 of FRA/DS
Drainage hierarchy (2b)	Page 14 of FRA/DS
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	Appendix G
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	Appendix G
Proposed SuDS measures & specifications (3b)	Appendix G
4b. Other Supporting Details	Page/section of drainage report
Detailed Development Layout	Appendix G
Detailed drainage design drawings, including exceedance flow routes	Appendix G
Detailed landscaping plans	Refer to Planning Submission
Maintenance strategy	Page 17 of FRA/DS
Demonstration of how the proposed SuDS measures improve:	Page 4 of FRA/DS
a) water quality of the runoff?	Page 15 - use of rain gardens
b) biodiversity?	Page 16 - use of PV/Green Roof
c) amenity?	ge 15 - use of rain gardens/green ro

Pro-forma for any schemes in flood risk areas & all major development - Camden LLFA

All yellow boxes **must** be completed on this and all relevant tabs
Complete peach cells with source document and section/page references, required to support/justify responses
Do not edit grey cells
Please note guidelines / notes in column M
Complete all relevant tabs

Introduction: This Proforma is intended to help you understand the Sustainable Drainage and Flood Risk considerations that the Lead Local Flood Authority (LLFA) and Local Planning Authority (LPA) will take into account when considering an application in Camden, as well as helping us to consider the application. This does not replace the need also to provide where required a Drainage Statement, Flood Risk Assessment, and GLA-Camden SuDS Pro-forma, and observe the detailed guidance in ' Camden Planning Guidance (CPG) Water & Flooding'. Any information provided should be referenced to the relevant section of submitted supporting documents. This summary page will help provide key details on the application. Note that certain cells on this and other tabs will be populated automatically from previous answers given.

A. Application details

Planning reference (if known)				
Scheme name	Grand Union House			
Scheme address	Grand Union House, 16-20 Kentish Town Road, London, NW1 8NH			
Postcode	NW1 8NH			
Scale of development as registered	Major			
Scale - policy subcategory	Major - largescale	Residential parts	Major - largesc	Non-residential parts
Type(s) of development	Mixed	new/re-build and refurb/change of		
Site area, hectares	0.3003	*100%*		
Of which total permeable area, to nearest 0.0001 ha	0.177	59%		
Of which total impermeable area, to nearest 0.0001 ha	0.1233	41%		

	Existing	Proposed				
	TOTAL pre-development	For demolition	New-build incl. infills, re-build, extensions	Retained (refurbished or change of use)	TOTAL post-development	Net UPLIFT post-development
Total floor area of development (GIA)	3188		523	6726	7249	4061
of which residential	0		523		523	523
of which non- residential	3188			6726	6726	3538
Number of residential units	0		6			
List all use class(es)	Class E and Class C3					

Drainage Statement document details	WSP Flood Risk Assessment and Outline Drainage Strategy (Feb 2021)
Flood Risk Assessment document details	WSP Flood Risk Assessment and Outline Drainage Strategy (Feb 2021)

B. Flood Risk and SuDS - Policy & Documents Filter

Recommendation (Council to complete)			
	Site area 1 hectare or greater?	*No*	
	Major application?	*CHECK SITE DETAILS*	
	In Critical Drainage Area?	Yes	
	In or bordering (<50m) Local Flood Risk Zone(s)?	No	
	Name of LFRZ(s):		
	On Historically Flooded Street 1975 or 2002?	Yes	
	Name of HFS(s):	Kentish Town Road	
	Area at risk of flooding (surface water)?	*Yes*	
	Elevated groundwater susceptibility or <50m of GW ind	No	
	In area with recorded sewer flooding incident?	No	
	In street with historical underground watercourse?	No	
	Area at risk of flooding (other relevant types)?	*No*	
	Basement proposed - new, enlarged or change of use	No	
	IF YES, list proposed basement uses (all spaces):		
Approve/Condition/Refuse	*IF YES, are habitable or vulnerable use(s) included?*	Yes / No	
Approve/Condition/Refuse	*IF NO, is other (non-basement) vulnerable developme*	No	
	Vulnerable development in flood-prone area?	*CHECK SITE DETAILS*	
	Site-specific Flood Risk Assessment (FRA) required?	*CHECK SITE DETAILS*	
Approve/Condition/Refuse	Site-specific FRA submitted?	Yes	**If Yes, go to Flood Risk Proposals tab**
	Drainage Statement (DS) required?	*No*	
Approve/Condition/Refuse	DS submitted?	Yes	**If Yes, go to Flood Risk Proposals tab**
	Sustainable drainage (SuDS) proposals required?	*Yes*	
Approve/Condition/Refuse	SuDS proposals submitted?	Yes	**If Yes, go to SuDS Proposals tab**
	FRA/DS/SuDS supporting evidence required?	*Yes*	
Approve/Condition/Refuse	Supporting evidence submitted?	Yes	**If Yes, go to Flood Risk Proposals &/or SuDS Proposals ta**

	Name of HFS(s):	Kentish Town Road	
	Area at risk of flooding (surface water)?	*Yes*	
	Elevated groundwater susceptibility or <50m of GW in	No	
	In area with recorded sewer flooding incident?	No	
	In street with historical underground watercourse?	No	
	Area at risk of flooding (other relevant types)?	*No*	
	Basement proposed - new, enlarged or change of use	No	
	IF YES, list proposed basement uses (all spaces):		
Approve/Condition/Refuse	*IF YES, are habitable or vulnerable use(s) included?*	Yes / No	
Approve/Condition/Refuse	*IF NO, is other (non-basement) vulnerable developme*	No	
	Vulnerable development in flood-prone area?	*CHECK SITE DETAILS*	
	Site-specific Flood Risk Assessment (FRA) required?	*CHECK SITE DETAILS*	
Approve/Condition/Refuse	Site-specific FRA submitted?	Yes	**If Yes, go to Flood Risk Proposals tab**
	Drainage Statement (DS) required?	*No*	
Approve/Condition/Refuse	DS submitted?	Yes	**If Yes, go to Flood Risk Proposals tab**
	Sustainable drainage (SuDS) proposals required?	*Yes*	
Approve/Condition/Refuse	SuDS proposals submitted?	Yes	**If Yes, go to SuDS Proposals tab**
	FRA/DS/SuDS supporting evidence required?	*Yes*	
Approve/Condition/Refuse	Supporting evidence submitted?	Yes	**If Yes, go to Flood Risk Proposals &/or SuDS Proposals ta**

Flood Risk Assessment, Proposals & Evidence

Recommendation (Council to complete)	**Assessments**	Required?	Document submitted?	Document title	Page/ section reference	**Guidelines / notes**
	Site-specific Flood Risk Assessment	*CHECK SITE DETAILS*	*Yes*	WSP FRA & ODS (FEB 2021)	PAGE	Policy CC3 c. consider the impact of development in areas at risk of flooding (including drainage) & d. incorporate flood resilient measures in areas prone to flooding; Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable.
	Drainage Statement	*No*	*Yes*			Policy CC3 c. consider the impact of development in areas at risk of flooding (including drainage);
	SuDS Proposals tab completed	*No*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 14	
	SuDS Proposals	*Yes*	*Yes*	WSP FRA & ODS (FEB 2021)	PAGE 15	Policy CC3 b. avoid harm to the water environment and improve water quality & e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible
	SuDS Proposals tab completed	*Yes*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 15 and Appendix G	
Recommendation (Council to complete)	**Policy compliance**	Required?	Requirement met?	Document title	Page/ section reference	
	Assessments address local, regional & national policies	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 7	*including Local Plan CC3, CPG, new London Plan, National Planning Policy Framework*
	include suitable research & quantification of site flood risks	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 7-11	*including Strategic Flood Risk Assessment, Update LFRZ Map & EA Mapping*
	address cumulative impact of developments	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 7-11	Policy CC3 c. consider the impact of development in areas at risk of flooding
	propose suitable flood ingress internal coping measures	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 18	Policy CC3 d. incorporate flood resilient measures in areas prone to flooding;
	propose suitable flood risk mitigation measures	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 19	Policy CC3 d. incorporate flood resilient measures in areas prone to flooding;
	Internal water consumption target 105 l/p/d (residential)	*Yes*	Yes / No / Non-residential			Policy CC3 a. incorporate water efficiency measures
	External water consumption target 5 l/p/d (residential)	*Yes*	Yes / No / Non-residential			Policy CC3 a. incorporate water efficiency measures
	BREEAM Excellent water consumption target (non-resi >500m2)	*Yes*	Yes / No / Residential			Policy CC3 a. incorporate water efficiency measures
	Will not locate vulnerable development in flood-prone area	*Yes*	*No*	WSP FRA & ODS (FEB 2021)	Appendix C - Proposed Plan	Policy CC3 f. not locate vulnerable development in flood-prone areas.
	Scheme does not increase flood risk on & off site	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 14	Policy CC3 The Council will seek to ensure that development does not increase flood risk
	Scheme reduces on&off-site flood risk where possible	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	PAGE 14	Policy CC3 The Council will seek to ensure that development...reduces the risk of flooding where possible
Recommendation (Council to complete)	**Evidence supporting Assessments & Proposals**	Required?	Evidence submitted?	Document title	Page/ section reference	
	Drawings showing site-specific flood risk up to 100yr+40%	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	Appendix G - Blue Roof	*allowing 300mm freeboard to potential water ingress points*
	Drawings showing proposed internal coping measures	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	Appendix G - Blue Roof	
	Drawings showing proposed flood mitigation measures	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	Appendix G - Blue Roof	
	Drawings showing proposed basement/ground floor uses	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	n/a - Refer to Architect	
	Building flood risk emergency evacuation plan		No	WSP FRA & ODS (FEB 2021)	n/a	
	Drawings showing on&off-site overland exceedance flows	*CHECK SITE DETAILS*	Yes	WSP FRA & ODS (FEB 2021)	Appendix G	
	Internal water calculations & proposals (resi)	*Yes*	Yes / No / Non-residential			Policy CC3 a. incorporate water efficiency measures
	External water calculations & proposals (resi)	*Yes*	Yes / No / Non-residential			Policy CC3 a. incorporate water efficiency measures
	BREEAM water calculations & proposals (non-resi >500m2)	*Yes*	Yes / No / Residential			Policy CC3 a. incorporate water efficiency measures

Sustainable Drainage (SuDS) Assessment, Evidence and Proposals

Recommendation (Council to complete)	**Assessments**	Document submitted?	Document title	Page/ section reference	**Guidelines / notes**
	Drainage Statement (DS)	*Yes*	WSP FRA & ODS (FEB 2021)	PAGE 14	Policy CC3 c. consider the impact of development in areas at risk of flooding (including drainage);
	GLA-Camden SuDS Pro-forma (fully completed)	Yes	WSP FRA & ODS (FEB 2021)	Appendix E	Download from www.london.gov.uk/what-we-do/environment/climate-change/surface-

Recommendation (Council to complete)	**Policy compliance**	Requirement met?	Document title	Page/ section reference	
	DS must include identification of flood risk	Yes	WSP FRA & ODS (FEB 2021)	Appendix E	
	DS must include assessment of existing, greenfield & proposed runoff rates	Yes	WSP FRA & ODS (FEB 2021)	Appendix G	Policy CC3 e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible & Policy CC3 supporting text §8.67
	DS must include identification of measures, in line with the drainage hierarchy, to reduce runoff rates	Yes	WSP FRA & ODS (FEB 2021)	Page 14	
	Achieve greenfield runoff rates wherever feasible, or as close as possible	Yes	WSP FRA & ODS (FEB 2021)	Page 16	Policy CC3 e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible & Policy CC3 supporting text §8.66
	Constrain runoff volumes to greenfield for 100yr 6hr event where feasible	Yes	WSP FRA & ODS (FEB 2021)	n/a - Volumetric criteria met with permeable area increase	
	Backstop target for unaltered buildings: >50% reduction in existing run-off	Yes	WSP FRA & ODS (FEB 2021)	Page 15	
	Developments must include SuDS unless inappropriate	Yes	WSP FRA & ODS (FEB 2021)	Page 15-16	Policy CC3 e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible & Policy CC3 supporting text §8.68
	Development should follow the detailed London Plan drainage hierarchy	Yes	WSP FRA & ODS (FEB 2021)	Page 14-16	
	EA climate change factor applied: 2080s upper rainfall intensity allowance (40%)	Yes	WSP FRA & ODS (FEB 2021)	Page 14-16	

Recommendation (Council to complete)	**Evidence supporting Assessments & Proposals**	Evidence submitted?	Document title	Page/ section reference
	Drawings detailing SuDS extent & position (incl. outfalls, control points, levels)	Yes	WSP FRA & ODS (FEB 2021)	Appendix G
	Blue-green roof details with area & minimum 150mm substrate for storage	Yes	WSP FRA & ODS (FEB 2021)	Appendix G
	Results of cross-site infiltration rate or similar tests to show soil (in)compatibility	No		
	Professional run-off calculations supporting rates & volumes reported in DS	Yes	WSP FRA & ODS (FEB 2021)	Appendix G
	Drawings showing on&off-site overland exceedance flows	Yes	WSP FRA & ODS (FEB 2021)	Appendix G
	Evidence of site surveys and investigations relating to drainage	Yes	WSP FRA & ODS (FEB 2021)	Appendix B
	Lifetime maintenance and adoption arrangements (and maintenance owner)	Yes	WSP FRA & ODS (FEB 2021)	Page 17
	Management of health & safety risks related to SuDS design	Yes	WSP FRA & ODS (FEB 2021)	Page 17
	Confirmation of discharge capacity (or correspondence) from relevant body eg TW	Yes	WSP FRA & ODS (FEB 2021)	Appendix D

Appendix F

ENVIRONMENT AGENCY DATA AND CORRESPONDENCE

Carroll, Daniel

From:	NET Enquiries <HNLenquiries@environment-agency.gov.uk>
Sent:	06 September 2018 12:19
To:	Tribe, Phoebe
Subject:	RE: HNL98606NR - Grand Union House - EA Consultation
Attachments:	Grand Union House Existing Site Plan.pdf; HNL98606NR Groundwater Contours mAOD.pdf; HNL98606NR DRN.pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

Dear Phoebe

Thank you for your request dated 21/08/2018 to use Environment Agency data.

The information on Flood Zones in the area relating to Grand Union House, Kentish Town Road, Camden Town, London NW1 9NX is as follows:

The property is in an area located within Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named site is in and is not specific to the property/proposed development itself.

Because this site does not fall within an area at risk of flooding from rivers or the sea, we do not hold any detailed flood modelling data. As such we are unable to provide a flood risk product.

We do not hold records of historic flood events from rivers and/or the sea affecting the area local to this site. However, please be aware that this does not necessarily mean that flooding has not occurred here in the past, as our records are not comprehensive.

Since this site is classed as being “very low risk” from fluvial or tidal flooding we have no plans to carry out any works which would reduce flood risk.

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

You can view and download flood risk maps from our website at:
http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap#x=357683&y=355134&scale=2

This address is within 20m of an area at high risk of surface water flooding.
Following the Flood and Water Management Act 2010, Lead Local Flood Authorities are responsible for the management of groundwater and surface water flooding. They also maintain a register of property flooding incidents. You may want to seek further advice from the the London Borough of Camden.

You can also view and print surface water flood maps online at:

http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

This information is provided subject to the Open Government Licence, which you should read.

- The site is located within defended Flood Zone 1?

See above

- Please provide Product 4 data, including relevant Breach scenario's and surface water flooding maps, if applicable for the site.

See above

- We would also welcome any information that the EA may hold on any flooding issues locally in the area, or any other information that would aim in the production of the FRA?;

See above. For more information you can also visit this link
https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk

- Could you please (if available) supply a map showing historical rivers which are now lost in the area, if available? Is the EA aware of any culverted watercourses/main rivers in the area?

The subterranean or underground rivers of London are tributaries of the River Thames and River Lee that were built over during the development of London. These rivers now flow through underground culverts.
Thames Water owns these rivers and we suggest you contact them for further information.
Please find attached the detailed river network map. There are no main rivers in your area.
You can have a look at this website: https://www.gov.uk/guidance/owning-a-watercourse

- Are there any water quality issues/requirements for the watercourses / groundwater on site or downstream that we need to take into account?

For Water Framework Directive waterbody classifications, you can have a look at our Catchment Data Explorer at http://environment.data.gov.uk/catchment-planning/

- We would be interested in any information in your possession on groundwater (e.g. groundwater level) and the potential for groundwater flooding within the area. This includes if the site is located within a source protection zone and whether infiltration would be an appropriate means of disposing of surface water.

The site is not in a source protection zone.

We monitor groundwater levels in Principal Aquifers, which have water resource significance. In your area, the Principal Aquifer is the Chalk. Measured levels are dependent on a variety of factors, including aquifer properties, local geological and terrain conditions, time of measurement, seasonal variations, as well as abstraction/discharge activities nearby.

The chalk groundwater contour map shows indicative groundwater elevation during high groundwater conditions, and is not based on real-time data. It is recorded as metres above ordnance datum (mAOD), and is intended as a guidance only.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

I hope that we have correctly interpreted your request. If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

Kind regards,

Naoimh Richardson
Customers and Engagement Officer

☎ 0203 0257507 HNLenquiries@environment-agency.gov.uk
✉ **Environment Agency, Hertfordshire and North London**
Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE

Working days: Monday to Friday 7am – 3pm

Creating a better place for people and wildlife

From: Enquiries, Unit
Sent: 23 August 2018 14:53
To: 'phoebe.tribe@wsp.com' <phoebe.tribe@wsp.com>
Subject: Received on 21/08, Due on 19/09 | FW: Grand Union House - EA Consultation

Dear Phoebe

I have passed your e-mail to the local customer team who will deal with your request.

The Freedom of Information Act and Environmental Information Regulations state that a public authority must respond to requests for information within 20 working days, but we aim to respond to all enquiries as quickly as we can.

You can find more information about our service commitment by clicking on the link below:

https://www.gov.uk/government/publications/environment-agency-customer-service-commitment

You can contact our customer team directly on the contact details below, or call the National Customer Contact Centre on 03708 506506 who will transfer you to the area team.

Please quote your enquiry reference 180823/ER15 in any correspondence with us regarding this matter.

Customers and Engagement
Environment Agency
Hertfordshire and North London Area
Alchemy
Bessemer Road
Welwyn Garden City
Hertfordshire
AL7 1HE

Kind regards

Eileen Roffe
Customer Service Advisor
National Customer Contact Centre - (Part of National Operations)

Mail to: enquiries@environment-agency.gov.uk
Tel: 03708 506 506
Fax 01709 312820
Website: www.gov.uk/environment-agency

So how did we do...?

Our National Customer Contact Centre relies on customer feedback, so we really value your thoughts on how we are doing. We will always make changes where we can to improve our service. This will only take three minutes to complete:

http://www.smartsurvey.co.uk/s/NCCCcustomer/

From: Tribe, Phoebe [mailto:phoebe.tribe@wsp.com]
Sent: 21 August 2018 14:58
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Cc: Bansal, Gurdeep <Gurdeep.Bansal@wsp.com>
Subject: Grand Union House - EA Consultation

Dear Sir/Madam

Grand Union House, Kentish Town Rd, Camden Town, London NW1 9NX - Flood Risk Consultation

We are in the process of undertaking a Flood Risk Assessment (FRA) and Drainage Strategy for the site in question in order to support a planning application .

The site is located on within Flood Zone 1 according to the Environment Agency online Flood Maps, and has an area of 0.159 ha however the site is located within Camden Critical Drainage Area ref: CDA3_003, with risk of flooding from surface water. We will therefore be undertaking an FRA on the management of surface water for this site and liaise with London Borough of Camden (LBC) and Thames Water (TW).

We would however seek EA confirmation of the following:

- The site is located within defended Flood Zone 1?
- Please provide Product 4 data, including relevant Breach scenario's and surface water flooding maps, if applicable for the site.
- We would also welcome any information that the EA may hold on any flooding issues locally in the area, or any other information that would aim in the production of the FRA?;
- Could you please (if available) supply a map showing historical rivers which are now lost in the area, if available? Is the EA aware of any culverted watercourses/main rivers in the area?
- Are there any water quality issues/requirements for the watercourses / groundwater on site or downstream that we need to take into account?
- We would be interested in any information in your possession on groundwater (e.g. groundwater level) and the potential for groundwater flooding within the area. This includes if the site is located within a source protection zone and whether infiltration would be an appropriate means of disposing of surface water.

We understand the docks are under ownership of C&RT and that any ordinary watercourses are owned by the local authority, we will contact them to discuss any local ordinary watercourses as well as surface water flooding, however are you aware of any other responsible authorities, and if so please could you supply and relevant contact details.

In addition, could you please let us know the names and contact details of the EA's Development Control Officer and Planning Liaison Officer who are responsible for the area?

We would welcome your comments on any additional issues you may have involving this site. We would appreciate an early response, therefore if you require any further information regarding the site to assist with our queries, please do not hesitate to contact me.

Kind regards,
Phoebe

Phoebe Tribe
Graduate Engineer

T +44 (0) 207 3145117

WSP House, 70 Chancery Lane
London, WC2A 1AF

wsp.com

Flood map for planning

Your reference	Location (easting/northing)	Created
GUH	**528953/184033**	**20 Nov 2018 11:06**

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

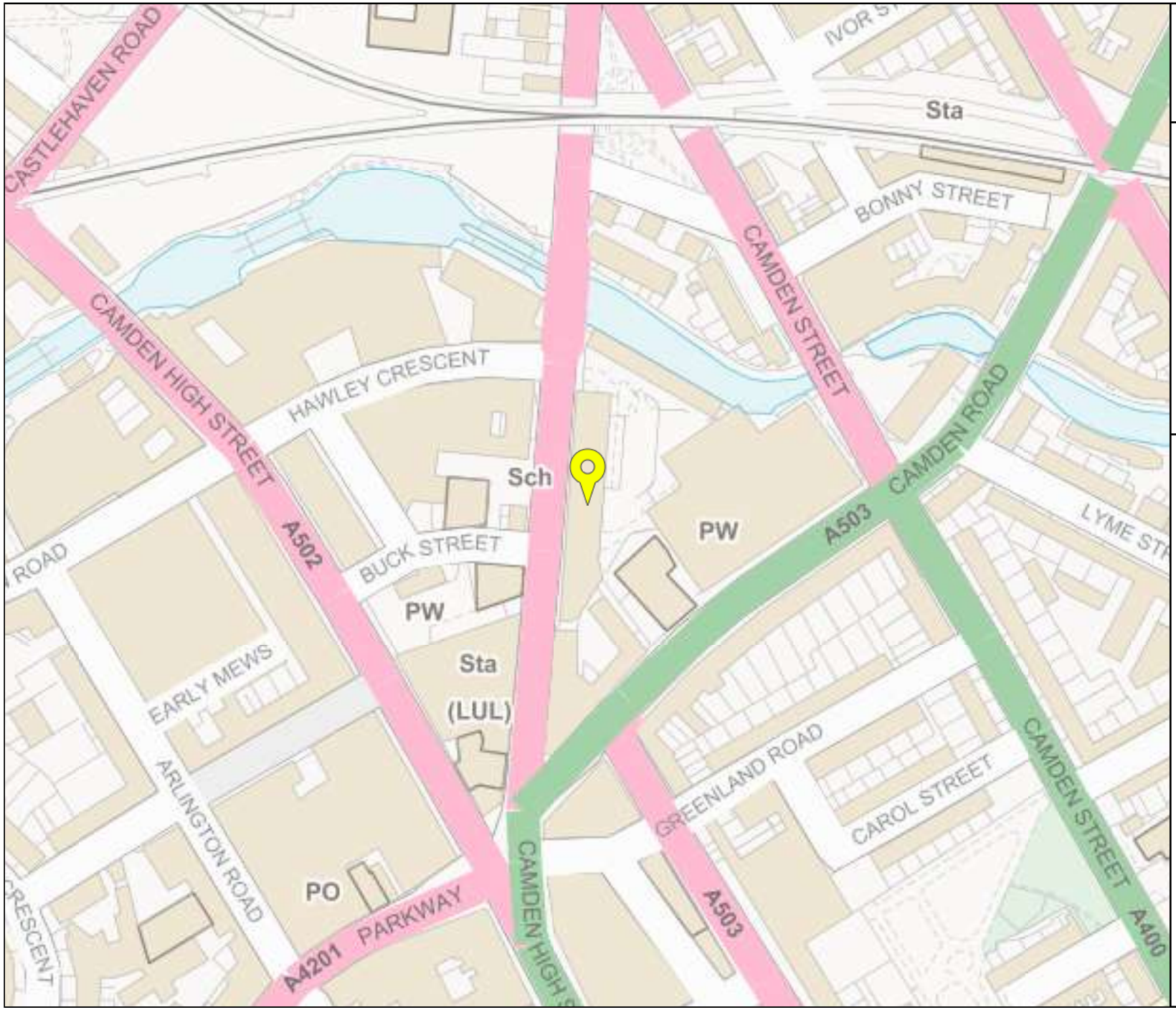
This means:

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

Notes

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

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



Environment Agency

Flood map for planning

Your reference
GUH

Location (easting/northing)
528953/184033

Scale
1:2500

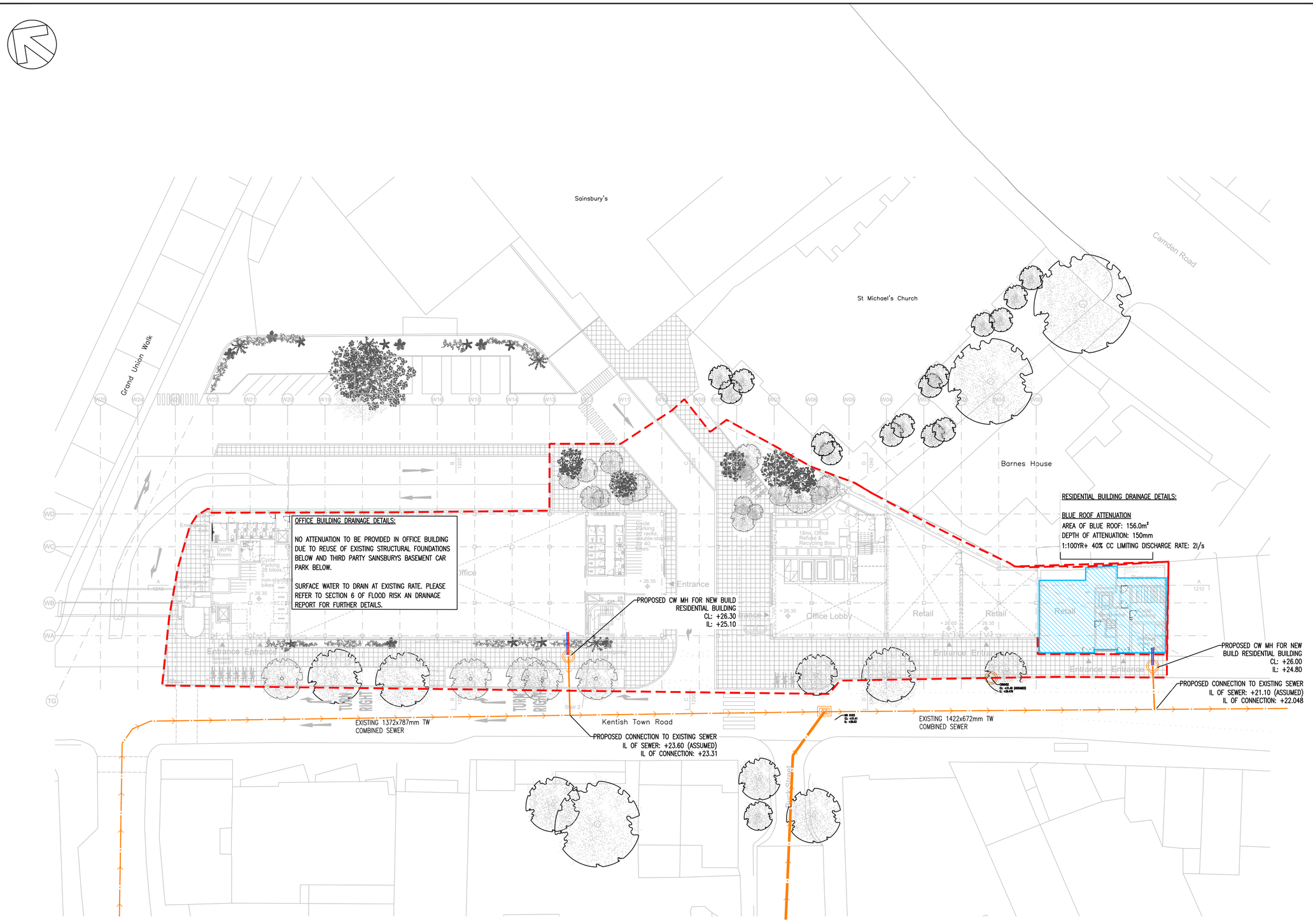
Created
20 Nov 2018 11:06

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

0 20 40 60m

Appendix G

OUTLINE DRAINAGE STRATEGY



DO NOT SCALE

NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SERVICES AND ENGINEERS DRAWINGS TOGETHER WITH RELEVANT SPECIFICATIONS.
2. DIMENSIONS ARE NOT TO BE SCALED FROM THIS DRAWING.
3. UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT LOCAL AUTHORITIES OR STATUTORY BODIES, IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ARE ISSUED AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR AND / OR EMPLOYER COMMENCE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
5. LEVELS ARE IN METRES AOD UNLESS STATED OTHERWISE
6. ALL DRAINAGE WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH BUILDING REGULATIONS PART H, SEWER FOR ADOPTION AND CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY (LAST REVISIONS) WHERE APPROPRIATE
7. ALL CAST IRON PIPES TO BE IN ACCORDANCE WITH BS 437:2008 OR BS EN 877:1999
8. ALL COVERS AND FRAMES TO BE MINIMUM CLASS C250
9. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT PROJECT DOCUMENTATION AND DRAWINGS
10. DRAINAGE LAYOUT SUBJECT TO APPROVAL FROM RELEVANT APPROVING BODIES
11. ALL PIPES SHALL HAVE FLEXIBLE JOINTS IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS
12. THE POSITION OF EXISTING SERVICES SHOULD BE VERIFIED PRIOR TO COMMENCEMENT OF WORKS ON-SITE.
13. PIPE BEDDING CLASSIFICATIONS ARE DERIVED FROM T.R.R.L DOCUMENT 'SIMPLIFIED TABLED OF EXTERNAL LOADS ON BURIED PIPELINES'.
5. THIS DRAWING IS INTENDED FOR PLANNING PURPOSES ONLY AND DOES NOT CONSTITUTE A FULLY DETAILED DESIGN, AND MUST BE TREATED AS SUCH

KEY

- SITE BOUNDARY
- COMBINED WATER SEWER AND MANHOLE
- PROPOSED FOUL WATER PIPE
- PROPOSED SURFACE WATER PIPE
- PROPOSED BLUE ROOF ATTENUATION

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	28/02/21	DC	FIRST ISSUE	WK	WK

DRAWING STATUS: S2 - FOR INFORMATION

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wsp.com

CLIENT: CAMDEN MIXED DEVELOPMENTS LTD

ARCHITECT: 6a ARCHITECTS

SITE/PROJECT: GRAND UNION HOUSE
16-20 KENTISH TOWN ROAD, LONDON, NW1 8NH

TITLE: OUTLINE DRAINAGE STRATEGY
GENERAL ARRANGEMENT

SCALE @ A1:	CHECKED:	APPROVED:	
1:100	WK	WK	
PROJECT NO: 70072757	DESIGNED: DC	DRAWN: DC	DATE: February 21

DRAWING No: 70009120-D-001 REV: P01

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

Half Drain Time : 98 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	-0.057	0.043	0.0	0.6	0.6	6.4	Flood Risk
30 min Summer	-0.047	0.053	0.0	0.9	0.9	7.9	Flood Risk
60 min Summer	-0.040	0.060	0.0	1.0	1.0	8.9	Flood Risk
120 min Summer	-0.033	0.067	0.0	1.2	1.2	10.0	Flood Risk
180 min Summer	-0.030	0.070	0.0	1.3	1.3	10.4	Flood Risk
240 min Summer	-0.029	0.071	0.0	1.3	1.3	10.5	Flood Risk
360 min Summer	-0.031	0.069	0.0	1.3	1.3	10.3	Flood Risk
480 min Summer	-0.034	0.066	0.0	1.2	1.2	9.8	Flood Risk
600 min Summer	-0.037	0.063	0.0	1.1	1.1	9.4	Flood Risk
720 min Summer	-0.039	0.061	0.0	1.1	1.1	9.0	Flood Risk
960 min Summer	-0.044	0.056	0.0	0.9	0.9	8.2	Flood Risk
1440 min Summer	-0.052	0.048	0.0	0.7	0.7	7.1	Flood Risk
2160 min Summer	-0.060	0.040	0.0	0.6	0.6	6.0	Flood Risk
2880 min Summer	-0.064	0.036	0.0	0.5	0.5	5.3	Flood Risk
4320 min Summer	-0.069	0.031	0.0	0.3	0.3	4.6	Flood Risk
5760 min Summer	-0.072	0.028	0.0	0.3	0.3	4.1	Flood Risk
7200 min Summer	-0.075	0.025	0.0	0.2	0.2	3.7	Flood Risk
8640 min Summer	-0.077	0.023	0.0	0.2	0.2	3.5	Flood Risk
10080 min Summer	-0.078	0.022	0.0	0.2	0.2	3.3	Flood Risk
15 min Winter	-0.057	0.043	0.0	0.6	0.6	6.4	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	181.537	0.0	6.2	24
30 min Summer	116.544	0.0	8.1	36
60 min Summer	71.025	0.0	10.3	60
120 min Summer	45.659	0.0	13.4	90
180 min Summer	34.597	0.0	15.2	124
240 min Summer	28.129	0.0	16.5	158
360 min Summer	20.668	0.0	18.3	224
480 min Summer	16.401	0.0	19.3	290
600 min Summer	13.626	0.0	20.1	354
720 min Summer	11.672	0.0	20.6	416
960 min Summer	9.092	0.0	21.4	540
1440 min Summer	6.340	0.0	22.3	790
2160 min Summer	4.397	0.0	23.5	1152
2880 min Summer	3.393	0.0	24.2	1508
4320 min Summer	2.365	0.0	25.1	2248
5760 min Summer	1.839	0.0	26.4	3000
7200 min Summer	1.523	0.0	27.3	3744
8640 min Summer	1.311	0.0	28.1	4424
10080 min Summer	1.160	0.0	28.9	5144
15 min Winter	181.537	0.0	6.2	24

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XP Solutions | Source Control 2017.1.2

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	-0.047	0.053	0.0	0.9	0.9	7.9	Flood Risk
60 min Winter	-0.040	0.060	0.0	1.1	1.1	8.9	Flood Risk
120 min Winter	-0.033	0.067	0.0	1.2	1.2	10.0	Flood Risk
180 min Winter	-0.031	0.069	0.0	1.3	1.3	10.2	Flood Risk
240 min Winter	-0.031	0.069	0.0	1.3	1.3	10.2	Flood Risk
360 min Winter	-0.035	0.065	0.0	1.2	1.2	9.7	Flood Risk
480 min Winter	-0.038	0.062	0.0	1.1	1.1	9.1	Flood Risk
600 min Winter	-0.042	0.058	0.0	1.0	1.0	8.6	Flood Risk
720 min Winter	-0.045	0.055	0.0	0.9	0.9	8.1	Flood Risk
960 min Winter	-0.051	0.049	0.0	0.8	0.8	7.3	Flood Risk
1440 min Winter	-0.059	0.041	0.0	0.6	0.6	6.1	Flood Risk
2160 min Winter	-0.066	0.034	0.0	0.4	0.4	5.0	Flood Risk
2880 min Winter	-0.069	0.031	0.0	0.3	0.3	4.5	Flood Risk
4320 min Winter	-0.074	0.026	0.0	0.2	0.2	3.8	Flood Risk
5760 min Winter	-0.077	0.023	0.0	0.2	0.2	3.4	Flood Risk
7200 min Winter	-0.079	0.021	0.0	0.2	0.2	3.0	Flood Risk
8640 min Winter	-0.081	0.019	0.0	0.1	0.1	2.8	Flood Risk
10080 min Winter	-0.082	0.018	0.0	0.1	0.1	2.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	116.544	0.0	8.1	36
60 min Winter	71.025	0.0	10.3	60
120 min Winter	45.659	0.0	13.4	96
180 min Winter	34.597	0.0	15.2	132
240 min Winter	28.129	0.0	16.5	168
360 min Winter	20.668	0.0	18.3	238
480 min Winter	16.401	0.0	19.3	306
600 min Winter	13.626	0.0	20.1	372
720 min Winter	11.672	0.0	20.6	436
960 min Winter	9.092	0.0	21.4	566
1440 min Winter	6.340	0.0	22.3	812
2160 min Winter	4.397	0.0	23.5	1168
2880 min Winter	3.393	0.0	24.2	1528
4320 min Winter	2.365	0.0	25.1	2332
5760 min Winter	1.839	0.0	26.4	3008
7200 min Winter	1.523	0.0	27.3	3744
8640 min Winter	1.311	0.0	28.1	4496
10080 min Winter	1.160	0.0	28.9	5240

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 528951 184038	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.015

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.005	4	8	0.005	8	12	0.005

Model Details

Storage is Online Cover Level (m) 0.000

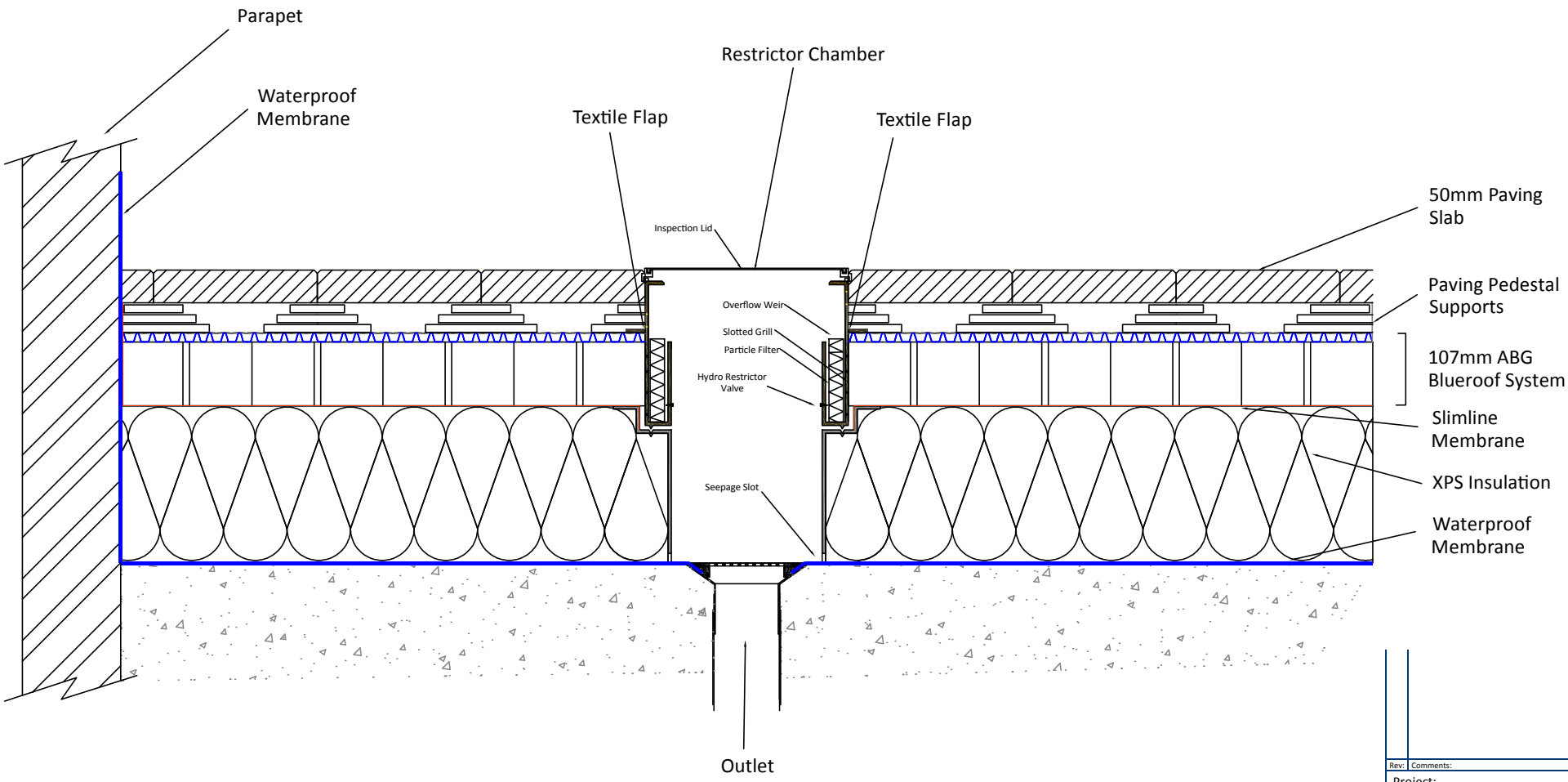
Cellular Storage Structure

Invert Level (m) -0.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	156.0	0.0	0.100	156.0	0.0

Orifice Outflow Control

Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) -0.100



Rev:	Comments:	By:	Date:

Project:
BLUE ROOF

Title:
Restrictor Chamber and Paving Detail

Drawn by:	Date:	
GJB	30/03/16	
Scale: NTS	Drawing Ref: XXXXXXXXX	Rev: XX

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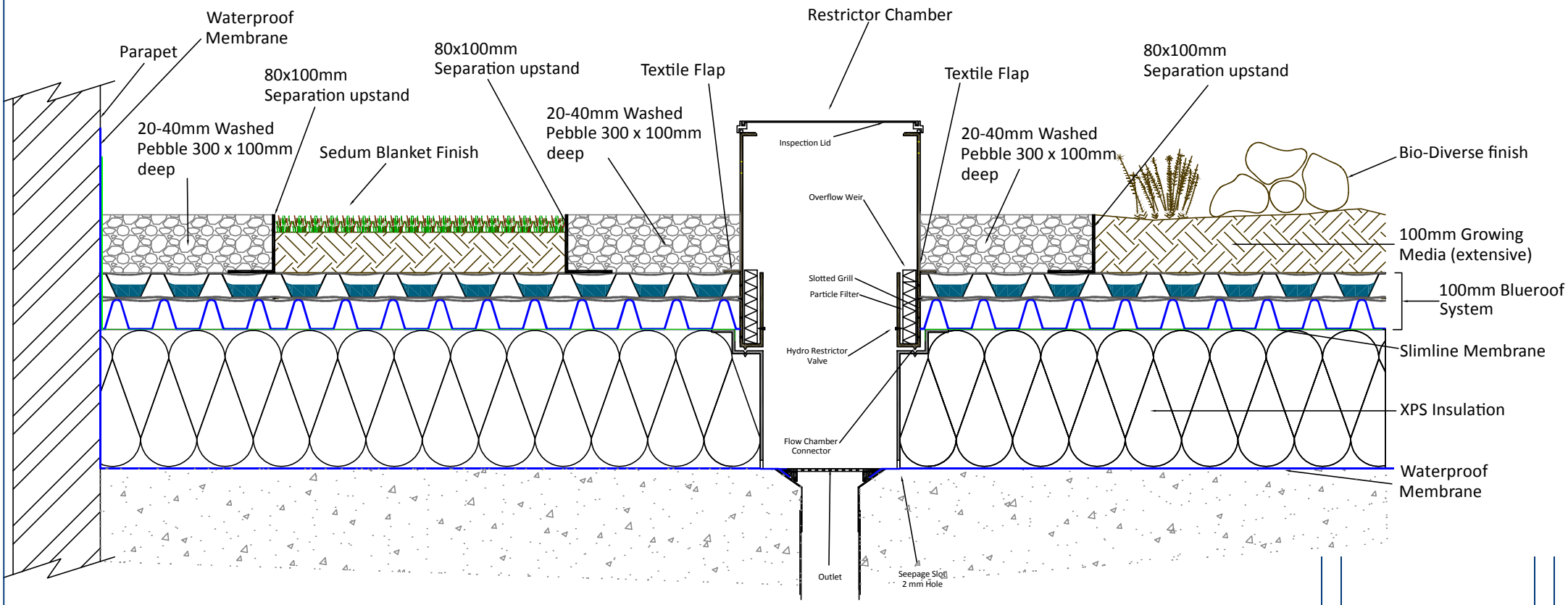

Rev:	Comments:	By:	Date:

Project: BLUE ROOF		
Title: BR01		
Drawn by: GJB	Date: 29/10/15	
Scale: NTS	Drawing Ref: 01	Rev: XX

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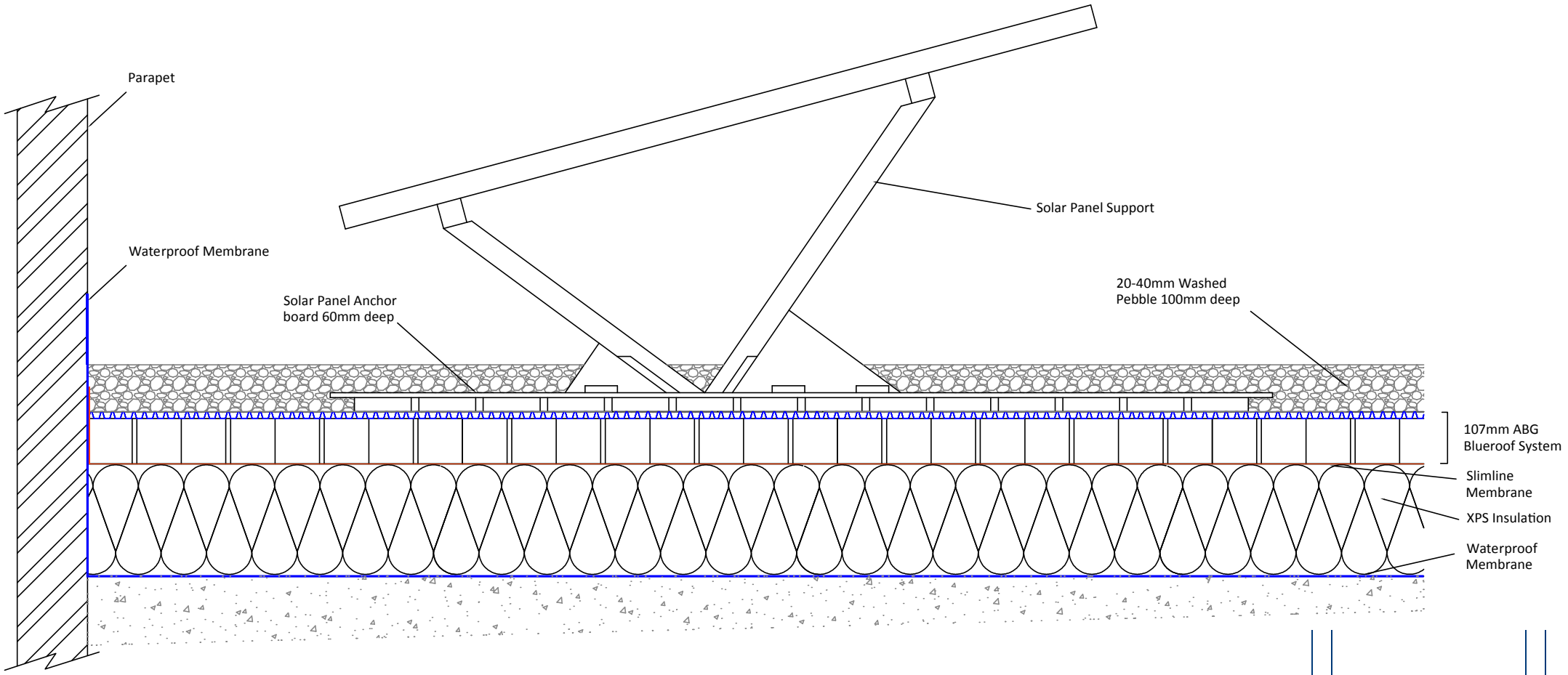

Rev:	Comments:	By:	Date:

Project:
BLUE ROOF

Title:
Solar Panel Detail

Drawn by:	Date:	
GJB	30/023/16	
Scale: NTS	Drawing Ref: XXXXXXXXX	Rev: XX

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blueroof

Green Biodiverse, Moreland Primary School, Islington, UK

creative geosynthetic engineering

Case Study

Project Description

Moreland Primary School, in the London Borough of Islington, is a new purpose-built school, nursery and children's centre. The £12.4m development, carried out by Morgan Sindall, also included demolition of the existing school which would remain in operation throughout construction.

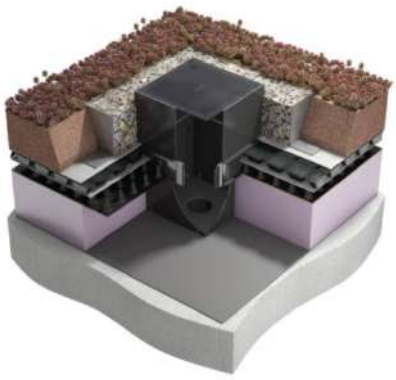
Phased construction was carried out over a 12 month period before the school's opening in autumn 2016. The project maximised all usable outside space. For example, the school roofs were designed for play, education (science lessons and children's allotments), general staff and pupil enjoyment.

The Challenge

The Inner London development had very limited construction space due to its location and phased construction programme. The original design included below ground attenuation tanks to provide temporary storage and controlled discharge of storm water. This presented a problem at the outset as it would significantly reduce site storage space and limit access to other sub-contract trades, subsequently delaying the programme of works. The challenge was to develop a new method of storage/discharge which would not adversely impact upon the rest of the project. Any solution would have to be sensitive to Islington's Biodiversity Action Plan which looked to protect existing site ecology and enhance biodiversity through a range of measures including a biodiverse roof system.

Project Information

Client	Islington Borough Council
Contractor	Morgan Sindall / Geogreen Solutions
Consultant	Haverstock Architects / Conisbee
Products	ABG blueroof & Biodiverse Roof Systems
Quantity	1500m^2
Benefits	• Versatile ABG **blueroof** system to allow for a range of finishes • Eliminated the need for attenuation tanks at ground level. • ABG biodiverse roof system contributed to BREEAM 'Excellent' rating • Complete ABG service: design through to installation.



ABG blueroof system

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blueroof

Green Biodiverse, Moreland Primary School, Islington, UK

abg creative geosynthetic engineering

Case Study

The Solution

Due to the technical expertise and experience of similar working conditions, **ABG** designed a versatile blue roof system which would eliminate the need for attenuation tanks at ground level whilst still allowing for the range of roof finishes required. **ABG's** knowledge and experience also meant that the work could be completed under strict and phased timeframes creating valuable storage space for other trades materials at roof level.
The incorporation of **ABG's** biodiverse roof system helped to maximise BREEAM credits and meet the criteria laid out in Islington's Biodiversity Action Plan.

Biodiverse roof area during construction. Incorporated to enhance site ecology, contributing to the project achieving a BREEAM 'Excellent' Rating

The ABG Service

ABG provide a full technical solution from design to manufacture, supply and install of the blue and biodiverse roof systems.

Pathways installed to make the roof accessible to all

ABG's versatile blueroof system adapted to suit a range of roof finishes

Contact ABG today to discuss your project specific requirements and discover how ABG past experience and innovative products can help on your project.

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