125 Shaftesbury Avenue

Drainage Strategy

SEPTEMBER 2016

125 Shaftesbury Avenue, London

Drainage Strategy

September 2016

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This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2008, BS EN ISO 14001: 2004 and BS OHSAS 18001:2007)

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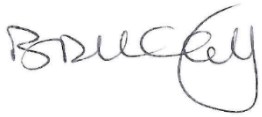
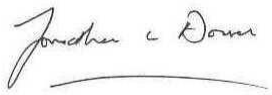
Third	05.09.16	Donal O'Donovan	Chris Hann	Brendan McCarthy Technical Director  Jonathan Dosser Technical Director 

Comments

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Executive Summary

Waterman was commissioned by Almacantar Shaftesbury S.á.r.l to produce a Drainage Strategy for the proposed refurbishment and extension of 125 Shaftesbury Avenue (the 'Site'), located in the London Borough of Camden. This report provides an outline drainage strategy for the Site.

The Development comprises remodelling, refurbishing and extending the existing building to provide flexible retail at the ground floor level, with improved and additional office space on upper levels. The Development would also provide improvements to the public realm, highways, servicing and landscaping.

The London Plan requires surface water runoff for new developments to be restricted to 50% of the existing rate. The existing surface water runoff rate from the Site has been calculated to be 100.8ℓ/s, which would need to be restricted to 50.4ℓ/s as part of the refurbishment and extension of the existing building at the Site. This requires a total storage volume of approximately 81m^3, allowing for the impacts of climate change over the lifetime of the Development.

Appropriate treatment would be incorporated into the drainage system to ensure that the quality of water discharged is acceptable. The final proposed Sustainable Drainage Systems scheme is to be confirmed at the detailed design stage.

The on-Site drainage networks and Sustainable Drainage Systems would be privately managed and maintained for the lifetime of the Development, ensuring they remain fit for purpose and function appropriately.

The proposed foul discharge rate has been calculated by AKTII to be 15.0ℓ/s, AKTII have indicated that this is likley to be comparable with existing rates.

A Pre-Development Enquiry has been submitted to Thames Water by AKTII to confirm that the existing public sewer network has the capacity to accommodate the proposed foul and surface water flows.

The foul and surface water connections would be made to the public sewer system within the Section 106 Agreement and in accordance with Thames Water under the Water Industry Act 1991.

The proposed outline drainage strategy (including the use of Sustainable Drainage Systems) complies with the National Planning Policy Framework, the London Plan and relevant local planning policy.

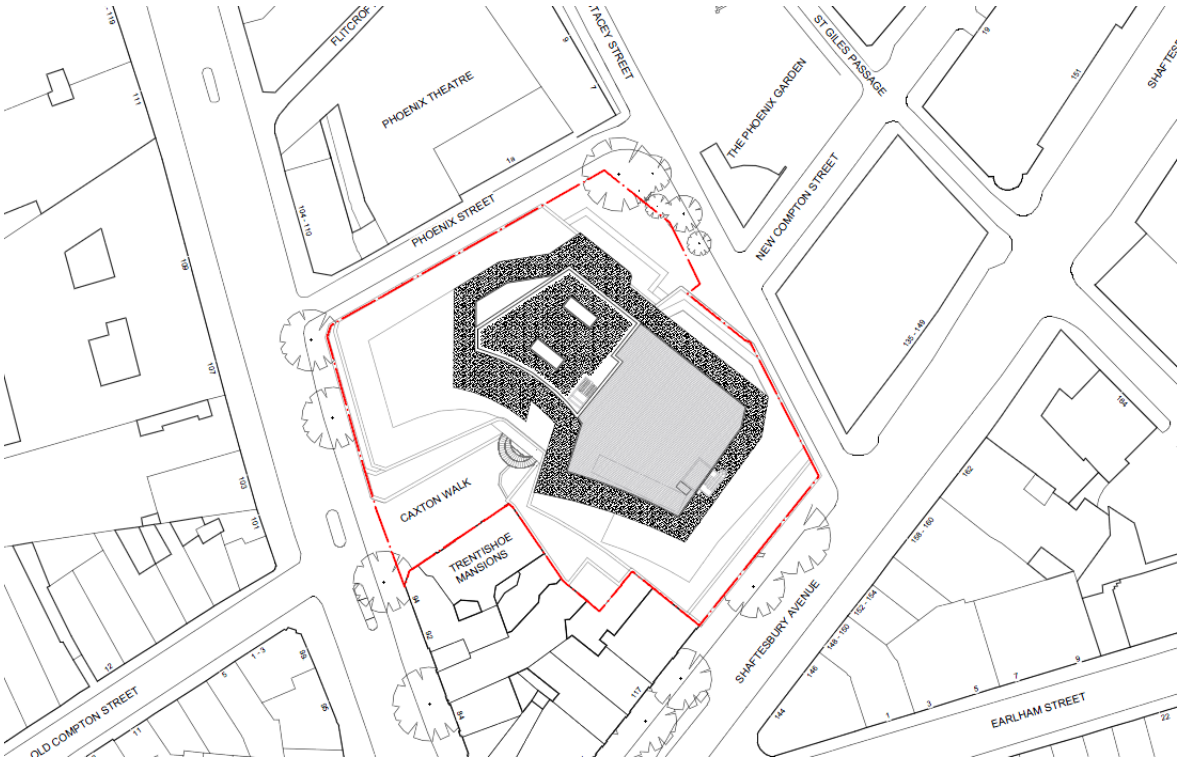
1. Introduction

1.1. Waterman was commissioned by Almacantar Shaftesbury S.á.r.l to produce a Drainage Strategy for the proposed refurbishment and extension of the existing building (the 'Development') at 125 Shaftesbury Avenue (the 'Site'), located in the London Borough of Camden (LBC). This report provides an outline drainage strategy for the Site.

Site Description

1.2. The existing Site is 0.354ha in area and is occupied by a building. It is bound by Phoenix Street to the north, Stacey Street to the north-east, Shaftesbury Avenue to the south-east, and Charing Cross Road to the west. The Site is centred at National Grid Reference 529930, 181120 as shown in Figure 1.

Figure 1: Site Location



The Development

1.3. The Development (Appendix A) comprises remodelling, refurbishing and extending the existing building to provide flexible retail at the ground floor level, with improved and additional office space on upper levels. The Development would also provide improvements to the public realm, highways, servicing and landscaping.

2. Planning Policy and Guidance

National Planning Policy Framework and Planning Practice Guidance

2.1. The National Planning Policy Framework[i] (NPPF) was published by the Department of Communities and Local Government in March 2012 and is the current national policy on flood risk and drainage. In relation to drainage it states that local planning authorities (LPAs) should only consider development when priority is given to the use of Sustainable Drainage Systems (SuDS).

2.2. The associated Planning Practice Guidance (PPG)[ii] provides additional guidance to the NPPF. The PPG requires drainage systems for new development to treat surface water at source using SuDS where practicable, to mimic natural conditions.

2.3. The PPG sets out that SuDS should be considered on a site-specific basis and should be provided unless it is demonstrated that they would be inappropriate. It goes on to set out that the LPA should be satisfied that the proposed minimum standards of operation are appropriate and that arrangements for ongoing maintenance are clear. This should be commensurate with the nature and scale of the proposed development.

Non-statutory Technical Standards for Sustainable Drainage Systems

2.4. The Non-statutory Technical Standards for Sustainable Drainage Systems[iii] was published in March 2015 and is the current guidance on the design, maintenance and operation of SuDS.

2.5. The standards set out that the peak runoff rates should be as close as is reasonably practicable to the greenfield runoff rate, but should never exceed the pre-development runoff rate.

2.6. The standards also set out that the drainage system should be designed so that flooding does not occur on any part of a site for a 1 in 30 year rainfall event, and that no flooding of a building (including any basement) would occur during a 1 in 100 year rainfall event.

2.7. It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.

London Plan and London Plan Supplementary Planning Guidance

2.8. The London Plan[iv] published in 2015 represents the Mayor's policies for development in London. It states that the frequency and consequences of fluvial, surface water and sewer flooding are likely to increase as a result of climate change and identifies SuDS as one of the key ways of ensuring that long-term flood risk is managed. Policy 5.13 promotes the use of SuDS to reduce the contribution of climate change to flooding, and seeks to ensure that surface water runoff is managed as close to its source as possible. Policy 5.11 specifically promotes the inclusion of roof, wall and site planting, where feasible.

2.9. The London Plan Supplementary Planning Guidance[v] (SPG) entitled 'Sustainable Design and Construction', published in April 2014, provides further information on how to achieve the objectives of the London Plan. Regarding the control of surface water runoff, the SPG states:

- Developers should aim to achieve 100% attenuation of the site's undeveloped surface water runoff rate i.e. achieve greenfield runoff rates; and

- Where greenfield rates cannot be achieved, a minimum of 50% attenuation of the undeveloped sites surface water runoff is expected.

2.10. The SPG also states the SuDS should be utilised for all developments, wherever practical, and should aim to provide additional benefits to a scheme as well as reduce flood risk.

Water Industry Act

2.11. Thames Water is the local Sewerage Undertaker and provides sewerage services under the guidance of the Water Industry Act 1991.

2.12. Under Section 106 of the Water Industry Act, the developer currently maintains the automatic right to 'communicate' with the public foul sewer system.

3. Existing Drainage

3.1. Thames Water sewer records (Appendix B) indicate that a number of sewers are present in the vicinity of the Site, as indicated below in Table 1.

Table 1: Thames Water Sewers

Location	Sewer
Phoenix Street	1,219mm x 813mm Combined Sewer
Stacey Street	1,143mm x 762mm Combined Sewer
Beneath Site	1,321mm x 787mm Combined Sewer
Shaftesbury Avenue	1,210mm x 813mm Combined Sewer
Charing Cross Road	1,219mm x 813mm Combined Sewer

3.2. The Thames Water records (Appendix B) indicate the invert levels of the existing sewers in the vicinity. These would need to be confirmed by a CCTV survey that would be undertaken post planning determination to confirm the condition and levels of the existing sewers / connections.

3.3. The surrounding invert levels for the 1,321mm x 787mm combined sewer that crosses the Site indicate that it would clash with the existing basement that was built circa 1980. It is therefore assumed that this sewer has since been abandoned. This will be confirmed by the CCTV survey.

4. Surface Water Drainage

4.1. The proposed surface water drainage system would be designed to convey surface water only, with foul water being discharged separately. The design would be in accordance with BS EN 752 – 'Drain and Sewer Systems Outside Buildings'[vi], BS EN 12056 – Gravity Drainage Systems Inside Buildings[vii], and Approved Document H of Building Regulations[viii].

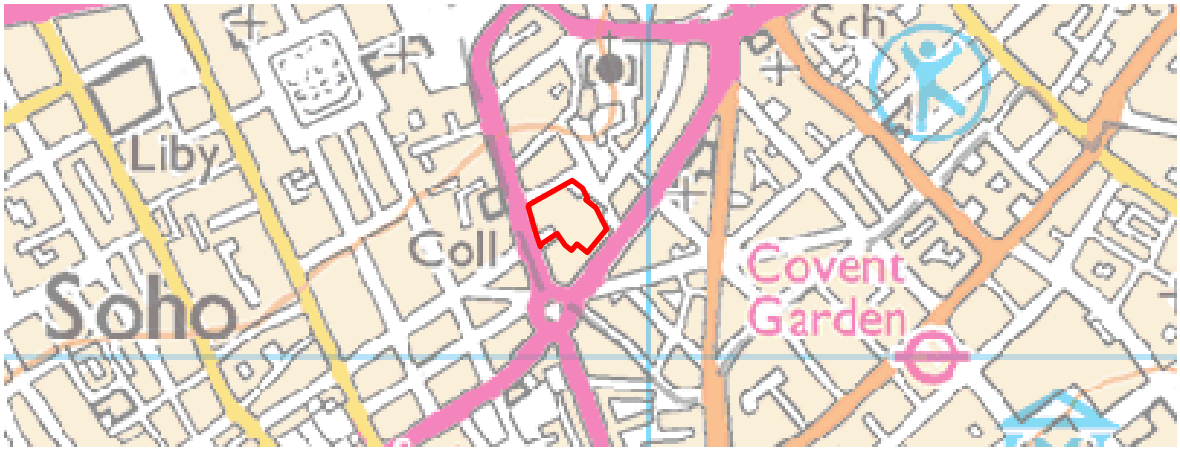
4.2. In line with Building Regulations and the PPG, the following hierarchy of surface water disposal should be adhered to, in decreasing order of preference:

1) Discharge to ground;
2) Discharge to a surface water body;
3) Discharge to a surface water sewer; and
4) Discharge to a combined sewer.

Discharge to Ground

4.3. The Site is not located within a groundwater Source Protection Zone (Figure 2), which indicates that surface water may be able to discharge to ground without causing a risk of pollution to the potable water supply. However, owing to the extent of the proposed basement, soakaways could not be incorporated spatially whilst maintaining the required 5m offset to the building (as per Building Regulations).

Figure 2: Environment Agency Source Protection Zone



Key

Site Location

Inner Source Protection Zone

Outer Source Protection Zone

Total Catchment

Special Interest

Source: http://watermaps.environment-agency.gov.uk

Discharge to a Surface Water Body

4.4. The nearest waterbody to the Site is the River Thames, located approximately 850m to the south-east. Given the distance from the Site and the requirement to cross third party land, discharging surface water directly to the Thames would not be feasible.

Discharge to a Sewer

4.5. Thames Water sewer records (Appendix B) indicate that a number of sewers are present in the vicinity of the Site (see Table 1), with surface water runoff from the Site expected to discharge into one or more of these sewers. It is therefore proposed that surface water runoff from the Development continues to discharge to these sewers.

Sustainable Drainage Systems

4.6. The most sustainable way to drain surface water runoff is through the use of SuDS, which need to be considered in relation to Site-specific constraints.

4.7. SuDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of water discharged, and hence reduce the risk of flooding. In addition to reducing flood risk, SuDS features can improve water quality, and provide biodiversity and amenity benefits.

4.8. A variety of SuDS are available to reduce or temporarily hold back the discharge of surface water runoff. Table 2 outlines the constraints and opportunities for each of the SuDS devices.

Table 2: Sustainable Drainage Techniques

Device	Description	Constraints / Comments	✓/✗
Living roofs (source control)	Provide soft landscaping at roof level which captures and reduces surface water runoff.	Daylight / sunlight constraints to building height preclude the incorporation of living roofs.	✗
Infiltration devices and Soakaways (source control)	Store runoff and allow water to percolate into the ground via natural infiltration.	The proposed building / basement which covers the majority of the Site, and the anticipated geology, precludes the potential for infiltration.	✗
Pervious surfaces (source control)	Storm water is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate and / or slowly release to sewers.	The proposed building / basement which covers the majority of the Site, precludes the potential for permeable paving.	✗
Rainwater harvesting (source control)	Reduces the annual average rate of runoff from the site by reusing water for non-potable uses e.g. toilet flushing.	There are no constraints to the incorporation of rainwater harvesting. However, the reduction of surface water runoff cannot be quantified with certainty as this would be dependent on the demand for harvested rainwater.	✓

Device	Description	Constraints / Comments	✓/×
Swales (permeable conveyance)	Broad shallow channels that convey / store runoff, and allow infiltration (ground conditions permitting).	The proposed building / basement which covers the majority of the Site, and the anticipated geology, precludes the potential for swales.	×
Filter drains and perforated pipes (permeable conveyance)	Trenches filled with granular materials (which are designed to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration.	The proposed building / basement which covers the majority of the Site, and the anticipated geology, precludes the potential for filter drains / perforated pipes.	×
Filter Strips (permeable conveyance)	Wide gently sloping areas of grass or dense vegetation that remove pollutants from runoff from adjacent areas.	The proposed building which covers the majority of the Site precludes the potential for filter strips.	×
Infiltration basins (end of pipe treatment)	Depressions in the surface designed to store runoff and allow infiltration.	The proposed building which covers the majority of the Site precludes the potential for basins.	×
Wet ponds and constructed wetlands (end of pipe treatment)	Provide water quality treatment & temporary storage above the permanent water level.	The proposed building which covers the majority of the Site precludes the potential for ponds.	×
Attenuation Underground (end of pipe treatment)	Oversized pipes, or geo-cellular / GRP tanks designed to store water below ground level.	Used only when the SuDS listed above cannot be installed with sufficient volumes to restrict runoff to the required rate.	✓

Roof Top Planting

4.9. Owing to daylight / sunlight constraints to the building, the inclusion of living roofs would not be feasible. However, the planting on the terraces would provide a bio-diverse habitat, in addition to capturing rainwater and naturally slowing the rate of runoff.

Rainwater Harvesting

4.10. The inclusion of rainwater harvesting would decrease the demand on potable water, and could be used for irrigation of the proposed landscaping, washdown / external cleaning, and toilet flushing. However, it cannot be guaranteed that there would always be sufficient demand for recycled water to ensure an empty tank is available prior to a high intensity rainfall event, when the storage is most required. Therefore, rainwater harvesting has not been taken into account in the surface water runoff calculations presented later in this drainage strategy. The potential for rainwater harvesting would be considered at the detailed design stage.

Underground Attenuation

4.11. Owing to the constrained urban nature of the Site, the only feasible option to restrict surface water runoff sufficiently would be through the use of a tank. However, there are no external areas with

sufficient space to site a tank. It would therefore be necessary to locate the tank within the proposed basement.

Proposed Surface Water Drainage Strategy

4.12. The London Plan ideally requires developments to restrict surface water runoff to the greenfield rate. However, where this volume cannot be incorporated within a site, it is acceptable to restrict runoff to 50% of the existing rate.

4.13. As set out above and shown in the Development proposals, there is limited space outside of the building / basement footprint. In order to achieve a gravity outfall to the public sewer network, attenuation needs to be located within the basement. This limits the size of the tank that can be accommodated, and therefore the volume of storage that can be provided. It is therefore proposed that runoff is restricted to 50% of the existing rate.

4.14. The existing runoff rate for the 15 minute, 1 in 100 year rainfall event has been calculated to be 100.8ℓ/s (Appendix C) using the Modified Rational Method. Runoff would therefore be restricted to 50.4ℓ/s to account for the impacts of climate change for the lifetime of the Development (30% increase in rainfall intensity).

4.15. Based on a restriction to 50.4ℓl/s, the attenuation tank would need to be approximately 81m^3. This was calculated using a WinDes Quick Storage Estimate, which includes for all storm durations (Appendix C). The proposed location of the required 81m^3 attenuation tank is shown on the outline drainage strategy drawing (Appendix D).

4.16. Appropriate treatment would be incorporated into the drainage system to ensure that the quality of water discharged is acceptable. The final proposed SuDS scheme would be confirmed at the detailed design stage.

4.17. The surface water connections would be made to the public sewer system through a Section 106 Agreement with Thames Water, under the Water Industry Act 1991.

Sustainable Drainage Systems Maintenance Plan

4.18. The PPG sets out the requirement for developers to consider the operation, management and maintenance of all SuDS.

4.19. Post construction, the on-Site management company would be responsible for the SuDS included in the scheme. Tables 3 and 4 outline what maintenance is anticipated for the proposed SuDS features.

Table 3: Maintenance Plan for Rainwater Harvesting

Rainwater Harvesting	
Task	**Frequency**
Inspect system for debris / blockages	Annually or as required

Table 4: Maintenance Plan for Underground Attenuation

Underground Attenuation	
Task	**Frequency**
Inspection of silt traps, manholes and pipework, and remove any sediment / debris	Quarterly or as required
Jetting of main structure to remove any sediment build up	Annually or as required

5. Foul Drainage

5.1. The proposed foul drainage would be designed in accordance with BS EN 752 – 'Drain and Sewer Systems Outside Buildings', BS EN 12056 – 'Gravity Drainage Systems Inside Buildings', and Approved Document H of Building Regulations.

5.2. It is anticipated that foul flows from the Site currently discharge one or more of the combined sewers surrounding the Site. It is therefore proposed to re-use the existing connection if possible post development. A CCTV survey would be undertaken post planning to confirm this. Indicative connections are shown on the drainage layout drawing (Appendix D).

5.3. The proposed foul discharge rate has been calculated by AKTII to be 15.0ℓ/s (Appendix C), AKTII have indicated that this is likley to be comparable with existing rates.

5.4. A Pre-Development Enquiry has been submitted to Thames Water by AKTII to confirm that the existing public sewer network has the capacity to accommodate the proposed foul flows.

5.5. If new connections are required, these would be made to the public sewer system through the S106 Agreement in accordance with Thames Water, under the Water Industry Act 1991.

6. Conclusions

6.1. The London Plan requires surface water runoff for new developments to be restricted to 50% of the existing rate. The existing surface water runoff rate from the Site has been calculated to be 100.8ℓ/s, which would be restricted to 50.4ℓ/s as part of the Development. This requires a total storage volume of approximately 81m^3, allowing for the impacts of climate change for the lifetime of the Development. The required 81m^3 attenuation tank has been included within the proposed basement arrangements.

6.2. Appropriate treatment would be incorporated into the drainage system to ensure that the quality of water discharged is acceptable. The final proposed SuDS scheme would be confirmed at the detailed design stage.

6.3. The on-Site drainage networks and Sustainable Drainage Systems would be privately managed and maintained for the lifetime of the Development, ensuring they remain fit for purpose and function appropriately.

6.4. The proposed foul discharge rate has been calculated by AKTII to be 15.0ℓ/s, AKTII have indicated that this is likley to be comparable with existing rates.

6.5. A Pre-Development Enquiry has been submitted to Thames Water by AKTII to confirm that the existing public sewer network has the capacity to accommodate the proposed foul and surface water flows.

6.6. The foul and surface water connections would be made to the public sewer system through the Section 106 Agreement in accordance with Thames Water under the Water Industry Act 1991.

6.7. The proposed outline drainage strategy (including the use of SuDS) complies with the NPPF, London Plan and relevant local planning policy.

7. References

[i] Department for Communities and Local Government, March 2012. *National Planning Policy Framework*

[ii] Department for Communities and Local Government, March 2014. *Planning Practice Guidance [Accessed: August 2015]*

[iii] Department for Environment, Food and Rural Affairs, March 2015. *Non-statutory technical standards for sustainable drainage systems*

[iv] Greater London Authority, March 2015. *The London Plan: Spatial Development Strategy for Greater London consolidated with Alterations since 2011*

[vv] Mayor of London, April 2014. *Supplementary Planning Guidance: Sustainable Design and Construction*

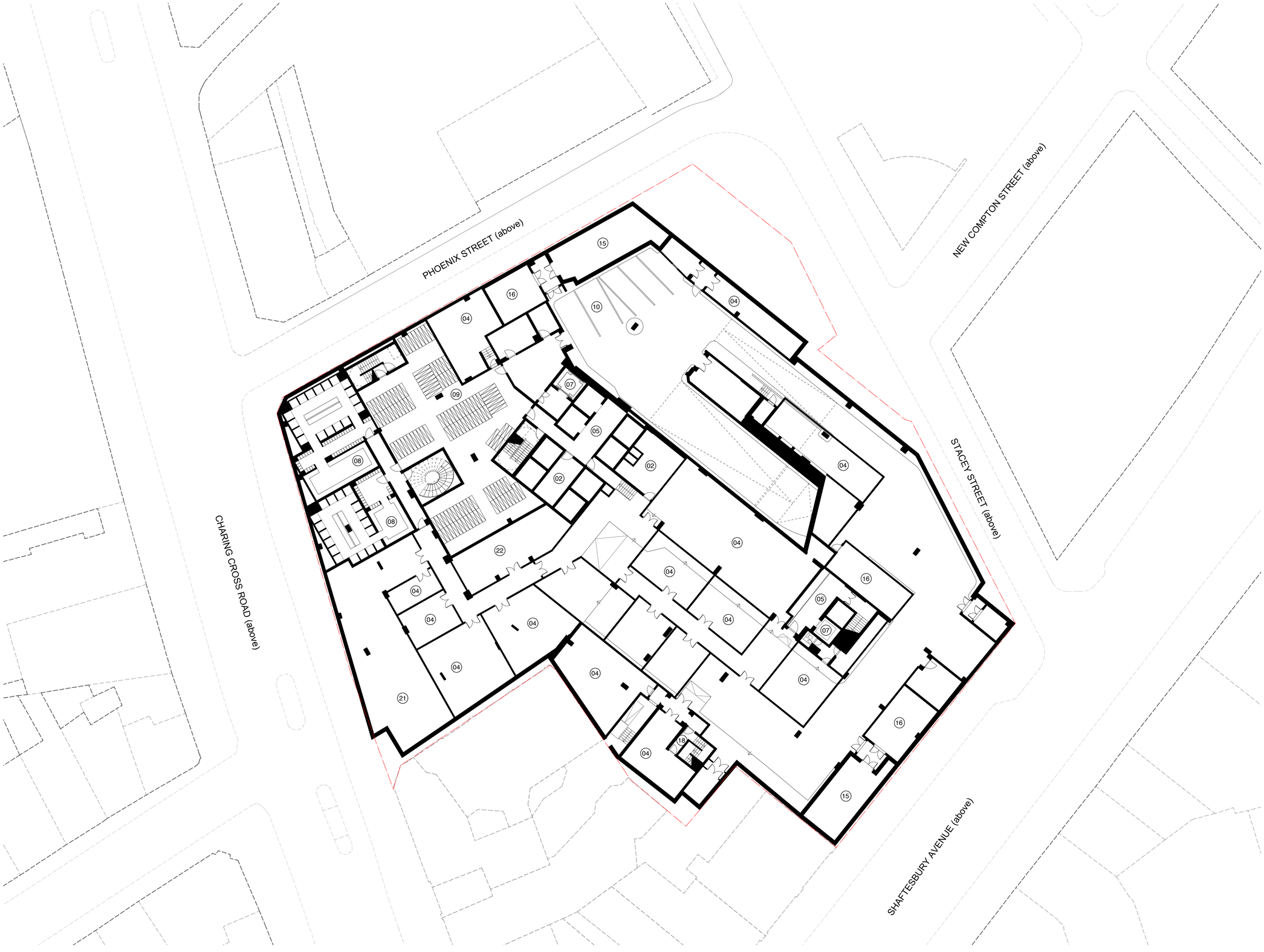
[vi] British Standards Institution, April 2008. *BS EN 752:2008 – Drain and Sewer Systems Outside Buildings*

[vii] British Standards Institution, September 2000. *BS EN 12056-2:2000 – Gravity Drainage Systems Inside Buildings*

[viii] HM Government, 2010. *The Building Regulations 2010: H, Drainage and Waste Disposal*

APPENDICES

A. The Development



1 Proposed Basement Plan
1:200 @ A1

notes

General Note:

The internal layouts within office floor space and ancillary areas of buildings may be subject to design development.

The precise location of walls, internal doors, columns, risers and the detailed layout of offce areas may be the subject of non-material changes and may vary from the internal layouts set out in these plans.

These minor alterations should not affect the position and arrangements of external doors and windows nor should they affect the relative relationship between habitable rooms and windows.

Landscape indicative only.

Plant indicative only.

All materials shown or highlighted are indicative only and may be subject to changes made during detailed design development.

Key:

01. Office: Office Space
02. Office: Building Management
03. Ancillary: WC / Washroom
04. Ancillary: Plant
05. Ancillary: Lift Lobby
06. Ancillary: Service Bay / Loading Bay
07. Ancillary: Goods In
08. Ancillary: Changing Rooms / Showers / Lockers
09. Cycle Parking
10. Lease Car Parking
11. Proposed Vehicle Gate
12. Proposed Pedestrian Gate
13. Rooftop Plant
14. BMU Store
15. UKPN Substation
16. Switch Room
17. Building Maintenance Unit Track / Planting
18. Existing Escape Stair
19. Existing Emergency Exit
20. Service Gallery
21. Sprinkler Tank
22. Attenuation Tank

INFORMATION

rev	date	check	comments

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drawing title

Proposed Basement Plan

drawn	size	date	scale
RB	A1	22.07.16	1:200

drawing number	revision
231_P20.100	-

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1 Proposed Ground Floor Plan
1:200 @ A1

notes

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INFORMATION

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project

125 Shaftesbury Avenue
London, WC2H

drawing title

Proposed Ground Floor Plan

drawn	size	date	scale
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drawing number	revision
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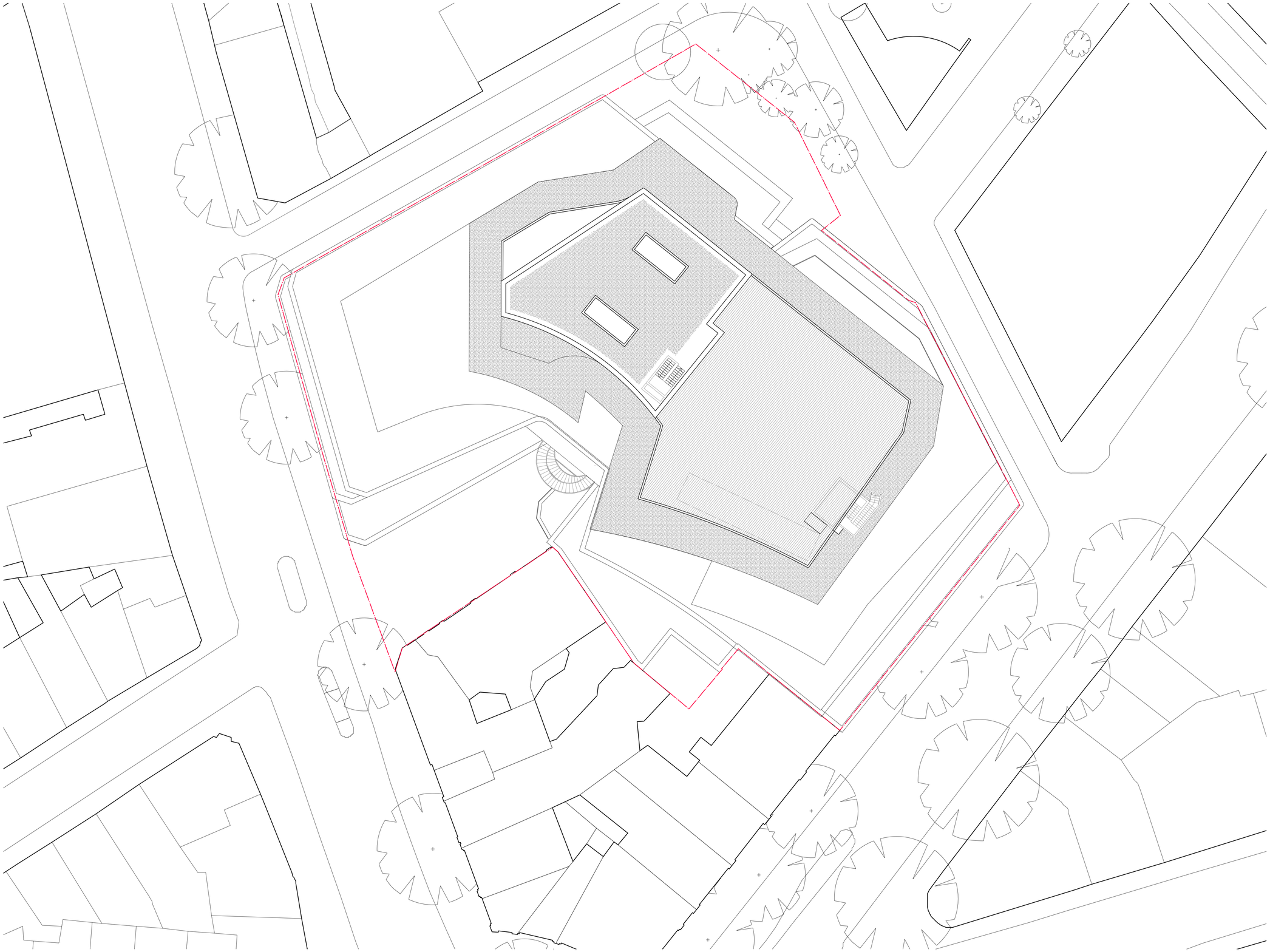

1 Proposed Roof Plan
1:200 @ A1

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N

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INFORMATION

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project

125 Shaftesbury Avenue
London, WC2H

drawing title

Proposed Roof Plan

drawn	size	date	scale
RB	A1	22.07.16	1:200

drawing number	revision
231_P20.115	-

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B. Thames Water Asset Plans

Asset Location Search

Waterman Infrastructure & Environment
Pickfords Wharf Pickfords Wharf

LONDON
SE1 9DG

Search address supplied	125, Shaftsbury Avenue 125 Shaftsbury Avenue London WC2H 8BS
Your reference	WIE10216
Our reference	ALS/ALS Standard/2015_3151321
Search date	23 September 2015

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk

Asset Location Search

Search address supplied: 125, Shaftsbury Avenue, 125, Shaftsbury Avenue, London, WC2H 8BS

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

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

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

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

Asset Location Search

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer

Asset Location Search

Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Asset Location Search

Further contacts:

Waste Water queries

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

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

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

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

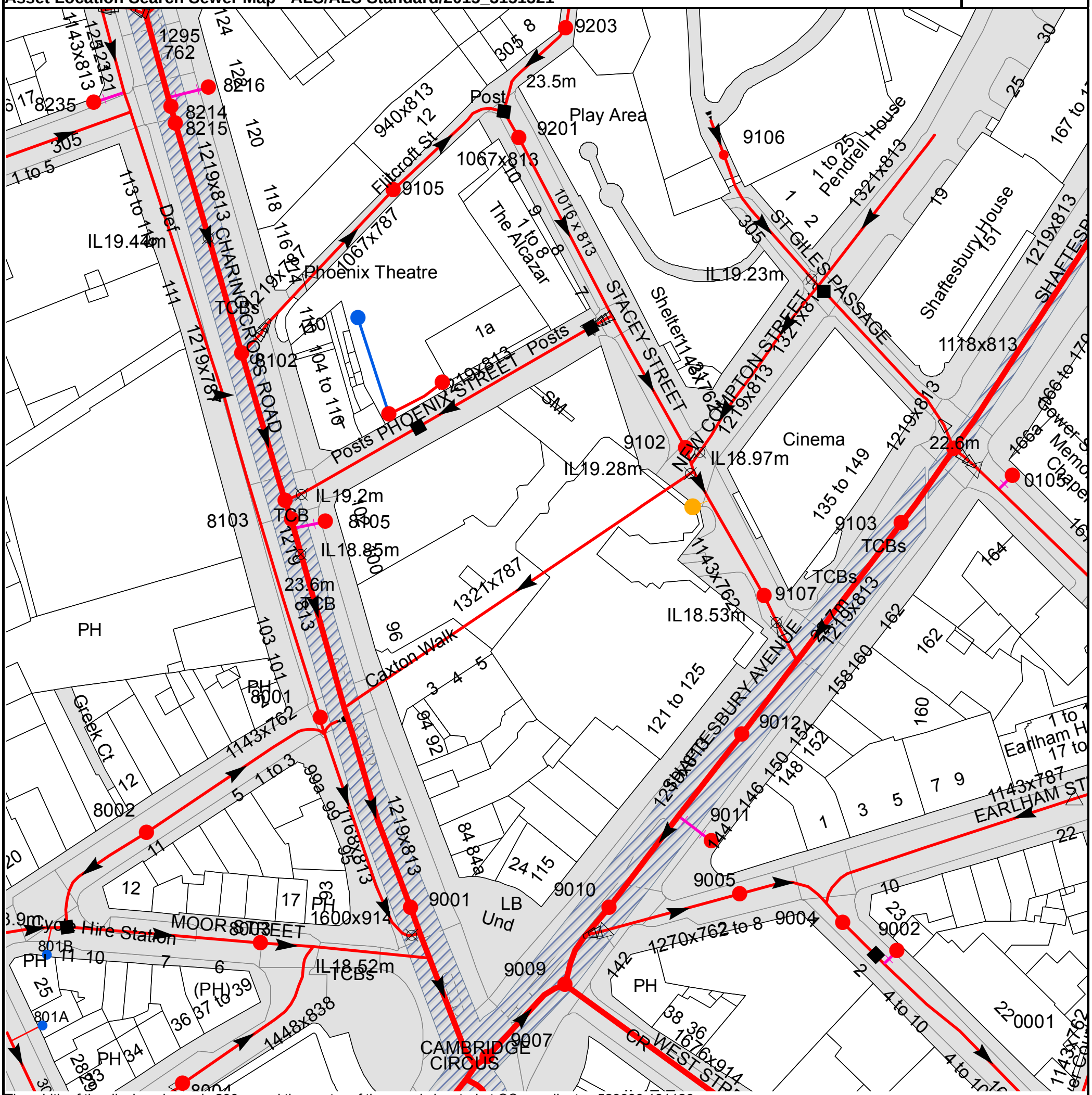
Clean Water queries

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

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

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2015_3151321



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529930,181126

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

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8105	n/a	n/a
81AD	n/a	n/a
81AC	n/a	n/a
9105	23.84	19.67
91BI	n/a	n/a
9201	23.54	19.41
9203	23.81	19.67
9102	23.34	18.98
9106	24.64	23.3
9107	n/a	n/a
9103	22.76	n/a
AUTO	n/a	n/a
0105	n/a	n/a
8004	23.74	17.45
9007	n/a	18.36
801A	n/a	n/a
9009	23.22	18.1
801B	n/a	n/a
9002	n/a	n/a
8003	23.47	18.58
9004	23.18	18.33
9001	n/a	18.58
9010	23.09	18.14
9005	23.1	18.52
9011	n/a	n/a
8002	23.72	19.43
9012	22.85	18.2
8001	23.65	18.79
8235	n/a	n/a
8214	n/a	19.48
8215	n/a	n/a
8216	n/a	n/a
8102	n/a	n/a
8103	n/a	18.89
8104	n/a	n/a

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

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

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

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

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

2) All measurements on the plans are metric.

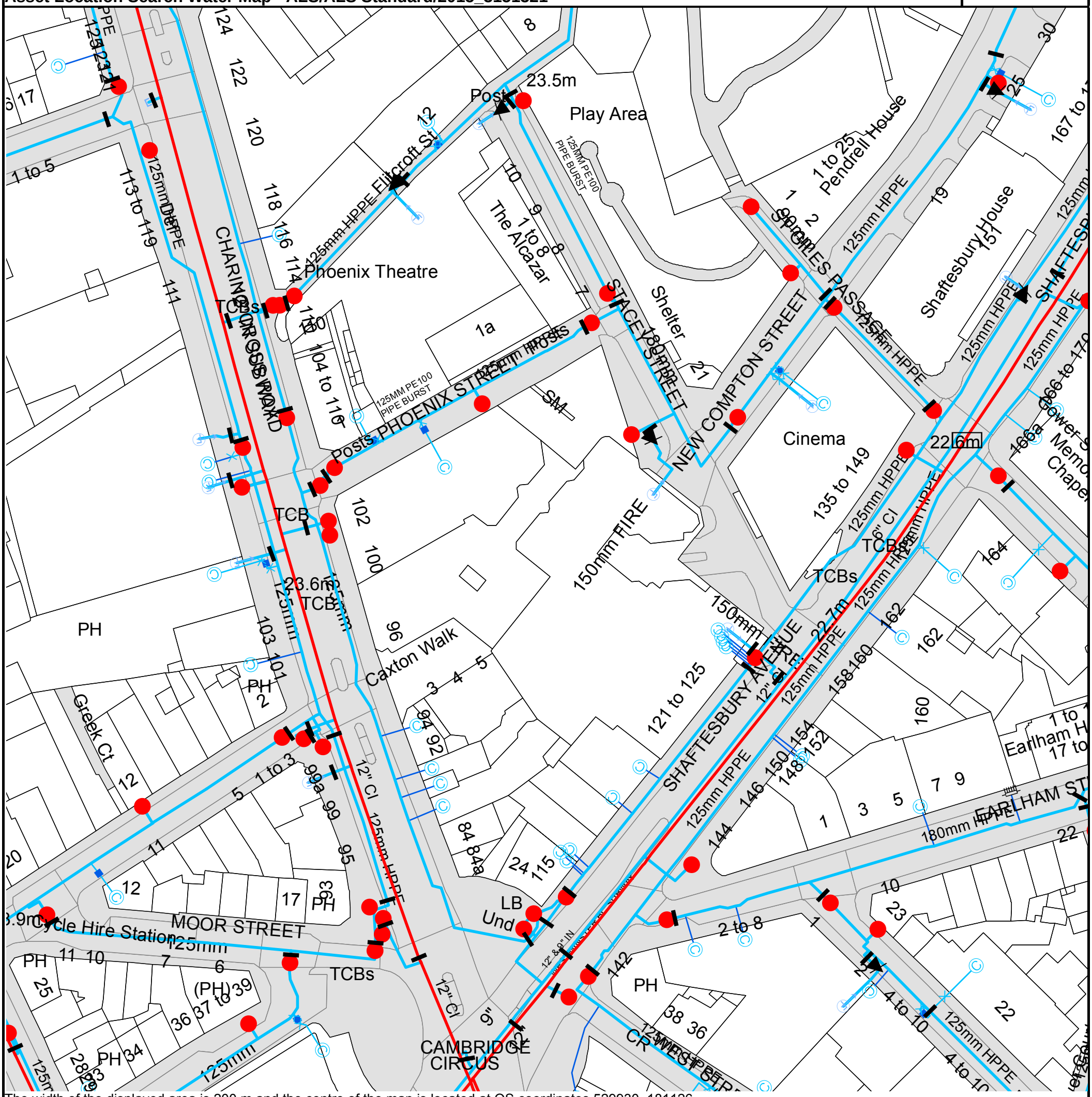
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

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

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

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

Asset Location Search Water Map - ALS/ALS Standard/2015_3151321



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 529930, 181126.

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.

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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

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

16"

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

3" SUPPLY

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

3" FIRE

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

3" METERED

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

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

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

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

- Data Logger

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

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

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

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

Terms and Conditions

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

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

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

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

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

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

Ways to pay your bill

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

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

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The Search Code:

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

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

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- monitor their compliance with the Code

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

TPOs Contact Details

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

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

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

C. AKTII's Drainage Calculations

7 Surface water drainage

7.1 Existing scheme

The available Thames Water record plans indicate that the site is bounded by the following network:

- A 1219 × 813 mm combined water sewer running along western side on Charing Cross Road;
- A 1219 × 813 mm combined water sewer running along the southern side on Shaftesbury Avenue;
- A 1143 × 762 mm combined water sewer running along the eastern side on Stacey Street south of New Compton Street;
- A 1016 × 813 mm combined water sewer running along the eastern side on Stacey Street north of New Compton Street;
- A1216 × 813 mm combined water sewer running along the southern side on Phoenix Street.

An extract from the record plans is shown in Figure 6.3 for reference.

It is believed that all surface water from the site currently discharges directly to one or more of these public sewers without any form of attenuation. However, it is not clear which one / s and it is therefore recommended that a CCTV survey of the existing site drainage network is undertaken to confirm the location, size and condition of all existing connections from the site and also to inform whether or not existing connections can be reused in the new scheme.

The total site area is approximately 3,550 m² and is all hardstanding. An existing split level basement covers the majority of site area. In accordance with the Modified Rational Method, the peak existing run-off from the site is calculated from the formula:

$Q = 3.61 \times C_v \times A \times i$

where C_v is the volumetric runoff coefficient, A is the catchment area in hectares and i is the peak rainfall intensity in mm / hr.

For the peak 1 in 1 year return period storm event this gives an existing discharge rate from the site of:

Q_1 = 3.61 × 0.75 × 0.355× 32.9 = 31.7 litres / sec

and for the peak 1 in 100 year return period storm event this gives an existing discharge rate from the site of:

Q_{100} = 3.61 × 0.75 × 0.355 × 104.8 = 100.8 litres / sec

7.2 Proposed scheme

The proposed scheme will retain 100% impermeable area on the site and therefore the proposed (unattenuated) peak run-off from the site for the 1 in 1 year return period storm would be:

Q_1 = 3.61 × 0.75 × 0.355× 32.9 = 31.7 litres / sec

and for the peak 1 in 100 year return period storm event:

Q_{100} = 3.61 × 0.75 × 0.355 × 104.8 = 100.8 litres / sec

Making an allowance for climate change of 30 % this would give an unattenuated design discharge of:

$Q_{1\,(+30\%)}$ = 41.2 litres / sec and **$Q_{100\,(+30\%)}$ = 137.0 litres / sec**

In accordance with the Environment Agency's guidelines, the Building Regulations and the Water Authority's advice, the preferred means of surface water drainage for any new development is into a suitable soakaway or infiltration drainage system. Sustainable Urban Drainage Systems (SUDS) can reduce the impact of urbanisation on watercourse flows, ensure the protection and enhancement of water quality and encourage recharging of groundwater in a manner which mimics nature.

In addition to this, the National Planning Policy Framework requires that surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic surface water flows arising from the site prior to the proposed development, whilst reducing flood risk to the site itself and elsewhere, taking climate change into account.

Therefore, as an absolute minimum, the proposed site discharge under the 1 in 100 year storm plus climate change should be no greater than the existing 1 in 100 year storm discharge (i.e. mitigate the impact of climate change). In this case, this would mean that, rather than discharging 137.0 litres / sec, the maximum permissible discharge from the site would be 100.8 litres / sec.

Further to the above, the London Plan – The Spatial development strategy for London Consolidated with Alterations Since 2011, issued in March 2016, states that Development should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates. In accordance with the method outlined in the Institute of Hydrology Report 124, the Greenfield runoff for the site is calculated from the formula:

$Q_{BAR} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

where AREA is the site area in km² (pro rata of 50 ha if the site is less than 50 ha), SAAR is the Standard Average Annual Rainfall in mm and SOIL is the Soil Index both read from The Wallingford Procedure maps. This gives a greenfield runoff for the site of:

Q_{BAR} = (0.00108 × $0.5^{0.89}$ × $600^{1.17}$ × $0.40^{2.17}$) / 50= 2.84 litres/sec (for 50 ha)

Scaling this for the actual site area gives:

Q_{BAR} = 2.84×0.355 = 1.01 litres / sec

Using the Hydrological Growth Curve for south east England, the growth factor from Q_{BAR} to Q_{100} is 3.146 which gives a value for **Q_{100} = 3.17 litres / sec.**

Small sites would require impractically small controls to achieve the greenfield flow rates which may cause risk of blockage. Therefore where the calculated values are less than 5 l / s the Environment Agency set a minimum flow of 5 litres per second.

The London Plan Supplementary Planning Guidance – Sustainable Design and Construction states that on previously developed sites, runoff rates should not be more than three times the calculated greenfield rate.

7.3 Disposal methods

SuDS management train

A useful concept used in the development of sustainable drainage systems is the SuDS management train (sometimes referred to as the treatment train). Just as in a natural catchment, drainage techniques can be used in series to change flow and quality characteristics of the runoff in stages. There are a variety of measures that can be implemented to achieve these goals:

Site management / Prevention

Site management procedures are used to limit or prevent runoff and pollution and include:

- Minimising the hardened areas within the site
- Frequent maintenance of impermeable surfaces
- Minimising the use of de-icing products

Source control

Source control techniques will be used where possible as they control runoff at source in smaller catchments. They can also provide effective pollution control and treatment, thereby improving the quality of the effluent discharged to the receiving waters.

Site control

Where source control techniques do not provide adequate protection to the receiving watercourses in terms of flood protection and pollution control, site control may be required.

Regional control

Where large areas of public space are available regional control can be incorporated to provide additional 'communal' storage and treatment to runoff from a number of sites. However, in this case, all storage and treatment will be implemented on-site.

Drainage hierarchy

Based on the above, the following drainage hierarchy will therefore need to be considered when preparing the surface water disposal strategy:

1. Store water for later use
2. Use infiltration techniques such as porous surfaces in non-clay area
3. Attenuate rainwater in ponds or open water features for gradual release to a watercourse
4. Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse
5. Discharge rainwater direct to a watercourse
6. Discharge rainwater to a surface water drain
7. Discharge rainwater to a combined sewer

A rainwater harvesting system is currently proposed to collect water and re-use it to flush toilets or irrigate areas of soft landscaping. This system will be implemented as part of the above ground drainage and therefore the public health engineers should confirm will be developing the details for this scheme.

It is anticipated that the site is underlain with impermeable London Clay which would prevent the use of infiltration. Also, the extent of the existing basement also prevents the use of infiltration devices. However, it will be possible to provide areas of permeable surfacing which allow storm water to percolate through the surface into the sub-base which can then be used as a means of conveyance to the site-wide drainage system. This percolation helps remove contaminants from the runoff thus improving the quality of the discharged water. These areas would need to be located over the basement roof and so would require careful co-ordination with the basement waterproofing and the finished levels / landscape build ups over the basement.

There are no adjacent rivers or ponds and so discharge to a watercourse will not be a viable disposal method either.

It is believed that the most feasible disposal option for the site is to connect to the existing public sewer either with a new connection or, preferably, by re-using one of the existing connections. As previously mentioned, at this stage it is not clear whether there will be a requirement to attenuate the flow but, in the event of it being required, the table below presents the approximate tank volumes required for a range of discharge rates under the 1 in 100 year (plus 30% climate change) storm event:

Discharge condition	Discharge rate	Storage volume required
Mitigate climate change only (Absolute minimum)	100.8 litres / sec	45 m³
50% of the existing run-off rate	50.4 litres / sec	81 m³
Pre-development 1-year peak flow rate	31.7 litres / sec	101 m³
Three times greenfield run-off	9.5 litres / sec	154 m³

The attenuation tank should be located at a high enough level so as to allow a connection to be made to the public sewer by gravity - in this case, it is assumed that this would be at relatively high level within the basement. Locating the tank below the basement slab would result in a pumped surface water system which is both unsustainable and uneconomic.

The use of green roofs has been considered but are not practical for implementation on this scheme due to restrictions on the building height.

Once the CCTV and level survey of the existing network has been undertaken the location and layout of the outfall(s) can be determined but due to the depth of the existing public combined sewers it is recommended that, if possible, the existing drainage connection(s) should be re-used to prevent the need for constructing a new, deep connection. This would minimise both the cost of the work and the disruption to the surrounding roads which are busy thoroughfares and consequently require significant traffic management to be provided during the work.

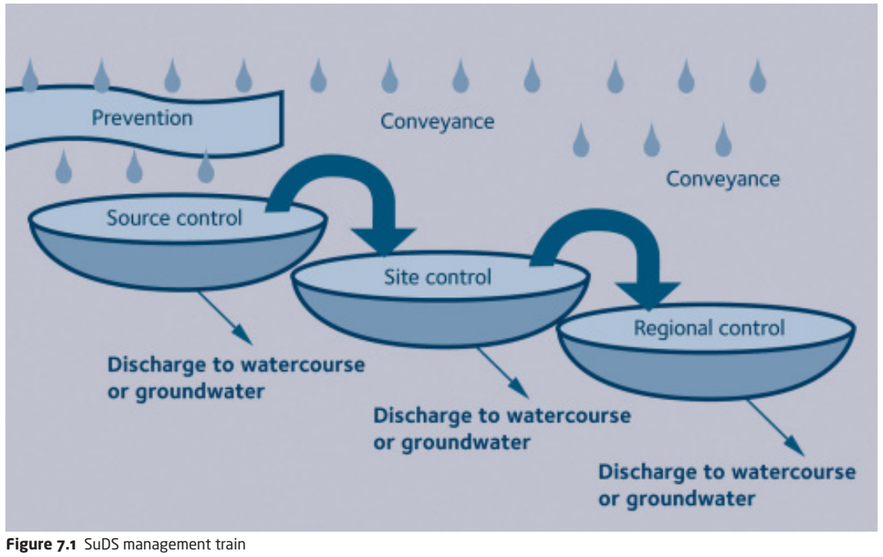


Figure 7.1 SuDS management train

Element	Management stage	Water quantity	Water quality	Amenity & biodiversity
Soft landscaping	Prevention	✓	✓	✓
Swales	Source Control	✓	✓	✓
Bio-retention	Source Control	✓	✓	✓
Green / Brown Roof	Source Control	✓	✓	✓
Permeable paving	Source Control	✓	✓	×
Geocellular tank	Site Control	✓	×	×
Flow control device	Site Control	✓	×	×

Fig. 7.2: Summary of proposed SuDS devices

7.4 Proposed scheme

The architectural layouts have been used to estimate the number of foul appliances in the proposed residential units. Using the guidelines for commercial developments given in BS EN 12056-2:2000 - "Gravity Drainage Systems Inside Buildings - Part 2: Sanitary Pipework, layout and calculation", the proposed foul flow is calculated from the formula:

$Q = K \times \sqrt{DU}$

For 'intermittent use' (representing offices, etc.), K has a value of 0.5 giving:

Appliance	No.	Discharge units per appliance	Total number of discharge units
Wash hand basin	178	0.6	106.8
Shower	36	0.6	21.6
Sinks	10	1.3	13.0
WC	175	2.5	437.5
Floor drains	10	2.0	20.0
		Total discharge units for site =	**639.7**
		Therefore, total flow from site =	**12.65 litres / sec**

At this early design stage it is suggested that an allowance for the higher figure of **15 litres / sec** is made to accommodate any design development until more accurate figures are available from the MEP engineer.

Although it has not been possible to make an assessment of the existing foul water flow, it is believed that it will be comparable to the proposed rates given the similarity in use. However, any increase will need to be agreed with Thames Water and their written approval of this will be required once a more detailed assessment can be made of the existing and proposed situations.

It is assumed that any foul water drainage from ground floor level and above will be drained by gravity in order to minimise the amount of pumping required. The basement levels will need to be pumped given the anticipated levels of the public sewers. At present no public health drawings are available and therefore it is not possible to assess the extent of the new drainage required.

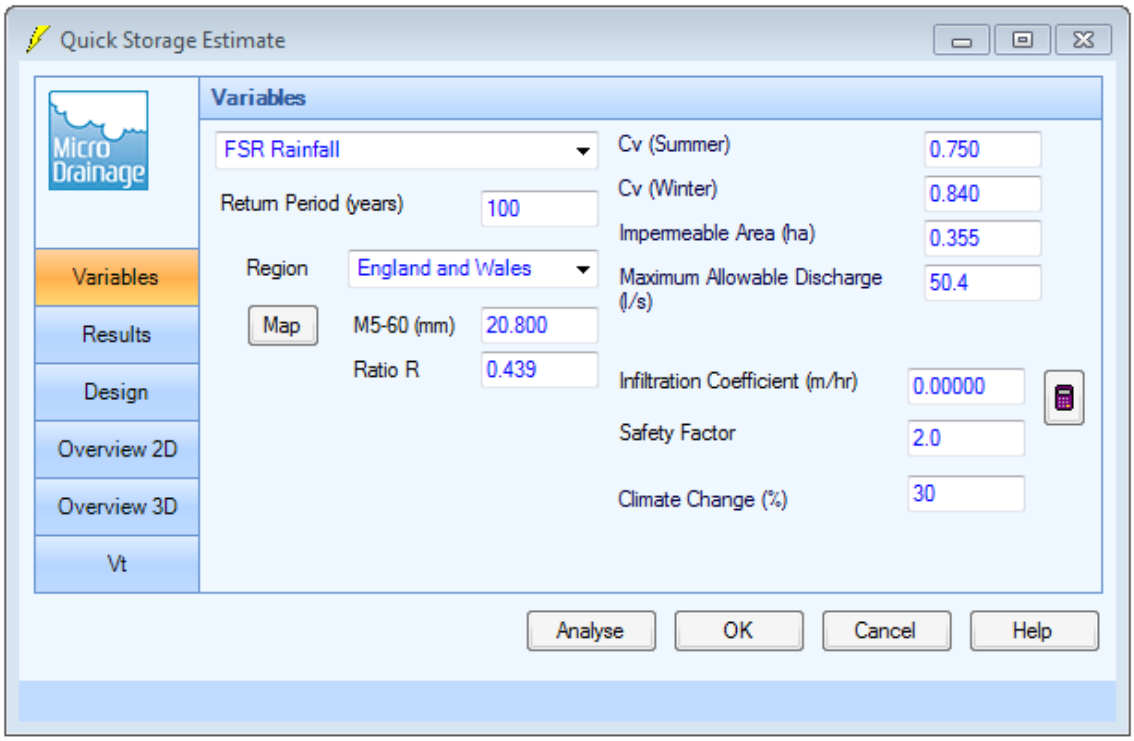
As with the surface water drainage, due to the depth of the public sewers it is recommended that, if possible, the existing drainage connection(s) should be re-used. Depending upon the findings of the CCTV survey it may also be possible to re-use some of the internal drainage at basement level and any existing pumping stations in order to minimise the need to break out the existing slab. Consideration should also be given to the installation of above ground pumped systems as opposite to new below ground pump stations.

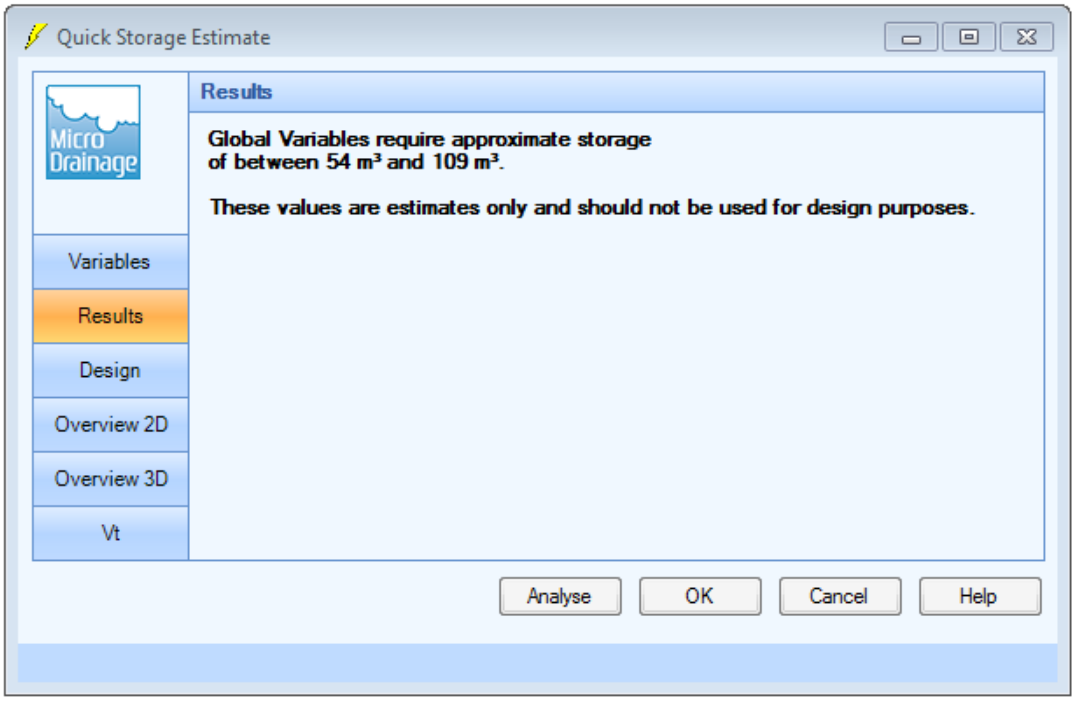
PROJECT NAME: 125 SHAFTESBURY AVENUE

AKT-II PROJECT NUMBER: 3540

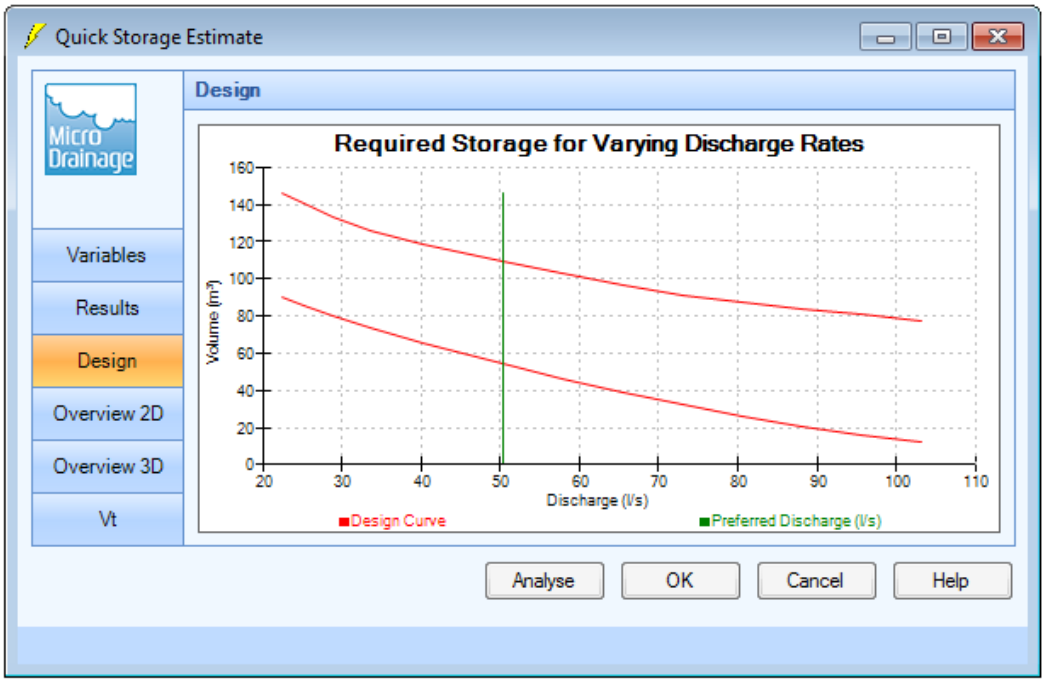
PRELIMINARY SURFACE WATER CALCULATIONS

MICRODRAINAGE QUICK STORAGE ESTIMATE

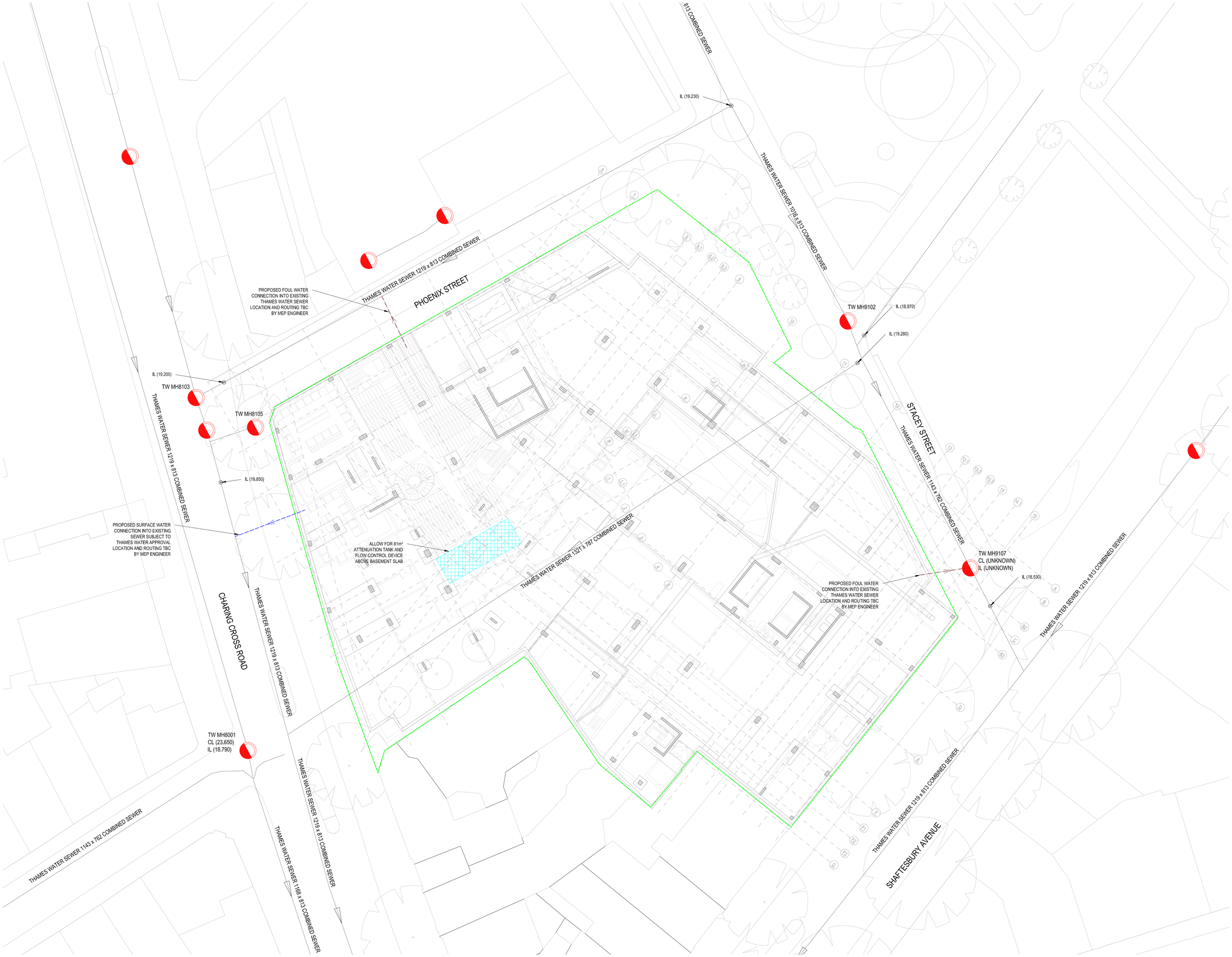




Taking the mean of these storage values, the required storage for an impermeable area of 0.355 hectares = 81m³



D. AKTII's Outline Drainage Strategy Drawing



NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METERS ABOVE ORDNANCE DATUM UNLESS NOTED OTHERWISE.
3. THIS DRAWING SHOULD NOT BE SCALED.
4. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER DRAWINGS AND SPECIFICATIONS.
5. THE LOCATION, LEVEL AND CONDITION OF THE EXISTING SEWER IS CURENTLY UNCONFIRMED.
6. THIS DRAWING IS BASED ON THE AVAILABLE THAMES WATER RECORD MAP. A CCTV SURVEY IS REQUIRED TO DETERMINE THE EXTENT OF THE EXISTING NETWORK ACROSS THE SITE AND TO ALLOW THE DRAINAGE DESIGN TO PROCEED.
7. THE PROPOSED MEP DRAINAGE LAYOUT IS STILL UNDER DESIGN DEVELOPMENT AND THEREFORE THE LOCATION OF OUTFALLS ARE INDICATIVE ONLY.
8. PERMISSION WILL BE REQUIRED FROM THE WATER AUTHORITY TO DISCHARGE SURFACE AND FOUL WATER TO THE EXISTING PUBLIC SEWER AND AN AGREEMENT REACHED AS TO AN ACCEPTABLE DISCHARGE RATE FROM THE SITE.
9. THIS DRAWING IS BASED ON PRELIMINARY INFORMATION ON EXISTING DRAINAGE. THE LAYOUT IS SUBJECT TO DESIGN DEVELOPMENT.

LEGEND

- SITE BOUNDARY
- EXISTING THAMES WATER COMBINED SEWER
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- EXISTING THAMES WATER COMBINED MANHOLE
- PROPOSED ATTENUATION TANK ABOVE BASEMENT SLAB

REV	DATE	DESCRIPTION	BY	CHECKED
P1	20.07.2016	PRELIMINARY ISSUE	LK	COB

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CLIENT

125 SHAFTESBURY AVENUE

PROJECT

PROPOSED BELOW GROUND DRAINAGE LAYOUT

TITLE

DRAWN	SCALE @ A1	CAD FILENAME
LK	1:200	3540-C-SK001

DATE	CHECKED	STATUS
JULY 2016	COB	PRELIMINARY

PROJECT No.	DRAWING No.	REVISION
3540	C-SK001	P1

PLOT DATE $DATE$ BY $USERNAME$

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