Form

7 WARWICK COURT - LONDON, WC1R 5DJ

STRUCTURAL ENGINEER'S STRUCTURAL METHOD STATEMENT IN SUPPORT OF PLANNING APPLICATION

Job No: 152335

Date: 9th October 2015

Revision: P2

Residential

Commercial

Conservation

Retail

Education

Art

Hotels

Period

FORM Structural Design

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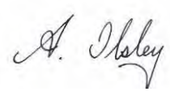
Andy Ilsley CEng MIStructE		09.10.15

Form

CONTENTS

PREAMBLE

This report has been prepared by Form Structural Design Ltd on the instructions of the project architects, Marek Wojciechowski Architects (MWA), acting on behalf of the client, GFZ Developments.

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ABOUT FORM SD

Form has over 10 years' experience in projects involving listed residential refurbishment/conservation, using numerous techniques and sequences of construction. This extensive design, site and local geology/hydrology experience has positioned the practice as one of London's leading refurbishment engineering design consultants.

Many of our projects are in the London Boroughs of RBKC, Westminster, Camden, Hammersmith & Fulham, Lambeth and Wandsworth, making us familiar with the most recent requirements for residential development.

TERMS OF REFERENCE

We were appointed in August 2015 by our client, GFZ Developments, to prepare a supporting Structural Methodology Statement in support of a Planning Submission for the refurbishment of 7 Warwick Court, London, WC1R 5DJ.

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1 INTRODUCTION

This report has been prepared as a supporting document to the planning application for the redevelopment of the site which is occupied by 7 Warwick Court; five storeys high including lower ground floor and mansard type roof.

The proposal involves the renovation and construction of a proposed extension. This report primarily presents an outline structural scheme for the construction of the new steel structure towards the rear that replaces an existing extension and the construction of a new roof. Consequently, the floor area is to be converted from office use to residential apartments.

Limitations

This report and the structural information produced to date are based on a review of the proposed architectural plans together with a visual inspection of the existing building, with limited intrusive investigation due to its listed status.

Should works proceed, then further intrusive survey work will be undertaken to investigate the existing structural elements it is proposed to retain. Furthermore all the remaining trial holes would be carried out to inform the detailed design and party wall process.

2 SITE INFORMATION

2.1 The Site and Existing Buildings

The property is terraced, located on the eastern side of Warwick Court and is estimated to date back to the late 17th century. As of 1951, the building is Grade II listed. The front façade consists of solid brickwork masonry and appears to be original; the paint work at ground floor is expected to be a covering for repairs to the masonry in the past. From Circa 1850 the building has been used for office use, however prior to that the property was considered as residential. Numerous extensions to the rear have been constructed, with the latest full height extension including a lift being constructed in1991.

A visual inspection of the property has been undertaken and the construction was observed to be typical of its age:

- Floors ground floor and above consist of timber joists spanning side to side, with intermittent timber support beams that span front to back. The floor boards appear to be modern and not original.
- The internal partitions are typically load bearing timber stud construction above ground floor level.
- The party and lower ground floors are of masonry construction and have been underpinned (to the rear) in the past. Further investigations are required to the front over the building.
- The roof is of timber construction and is of the same era as the rear extension, again of timber construction.

Bomb maps from World War II (see figure 4) show that the area of the site was heavily bombed, with a recorded hit from a V2 long range rocket centred at less than 25m from the site. Number 8 Warwick Court was described as ‘ruin’, however no further details are known of the damage occurred at Number 7.

With the original timber structure and front façade, it would appear that the building was not subject to substantial bomb damage from World War II.

Figure 1: *Photograph Taken From Warwick Court*

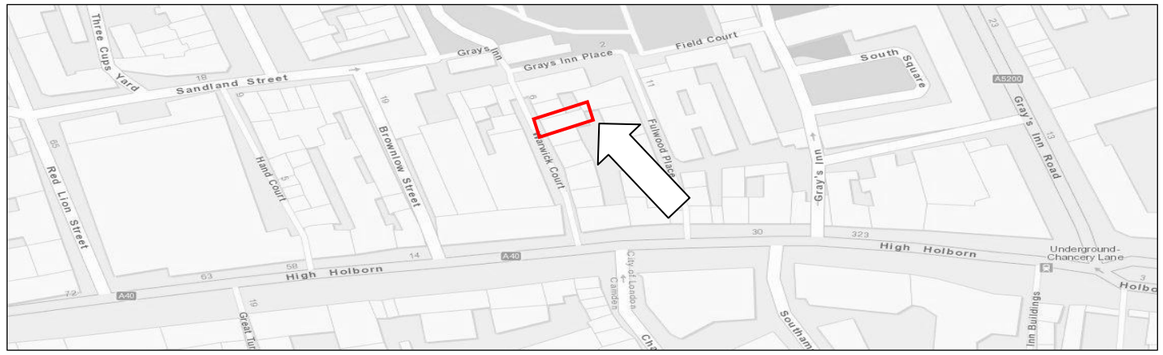

Figure 2*: Site Location Plan of 7 Warwick Court*

Figure 3: *Site Aerial View of 7 Warwick Court*

Figure 4: *WWII Bomb Map Indicating 7 Warwick Court*

2.2 Ground Conditions and Geology

A site specific investigation next door at No. 8Warwick Court has been carried out by Aviron to: confirm the ground conditions, ascertain the soil design parameters and to record the ground water levels for the substructure design.

The proposed works allow for the replacement of the existing ground bearing slab at lower ground level. The finished floor level is to remain and therefore the scope of works will not have a noticeable impact on the ground conditions.

No water table was encountered during the investigations.

Summary Of Borehole Log	
Description of Strata	**Depth**
Made Ground Pavers, over sub-base, over Firm and locally soft, brown and grey, sandy, gravelly clay and concrete cobbles	0.0m – 1.8m
Gravel/Sand Dense becoming very dense, brown, very sandy, fine to coarse, sub-angular to angular flint GRAVEL (Lynch Hill Gravel)	1.8m+
London Clay Firm to stiff becoming stiff (high strength) and very stiff fissured grey and dark grey CLAY of the London CLAY Formation.	Estimated 6m BGL

Slope Stability

The site is considered to be generally level and not cut into the side of hills or valleys therefore slope stability is not considered to be a problem.

2.3 Underground Drainage

Below Ground Drainage

The below ground drainage design will be developed further during detailed design should planning consent be granted. It is expected that surface water and foul will be drained by utilising the existing gravity fed system.

2.4 Existing Utilities

Water

A Thames Water Asset Location Search has been undertaken and search results have been appended to this report in Appendix E.

The search confirms that there are to be no water related services beneath the site.

Gas and Electrical

It is to be established whether any gas or electrical services run under the site. If so they will be diverted.

If required, services will be diverted and replaced to modern day standards where necessary as determined by the Mechanical and Electrical Engineer for the project. All services that are required to pass through new structure will be sleeved and articulated accordingly to allow for future movements and settlements of the surrounding structure.

2.5 Underground Structures

London Underground

It can be seen from Figure 5 below that the London Underground Central Line is approximately 50m to the south of the site. London Underground Ltd has also confirmed that no London Underground assets are located within 50m of the site (Ref. 20878-SI-C115) in Appendix F.

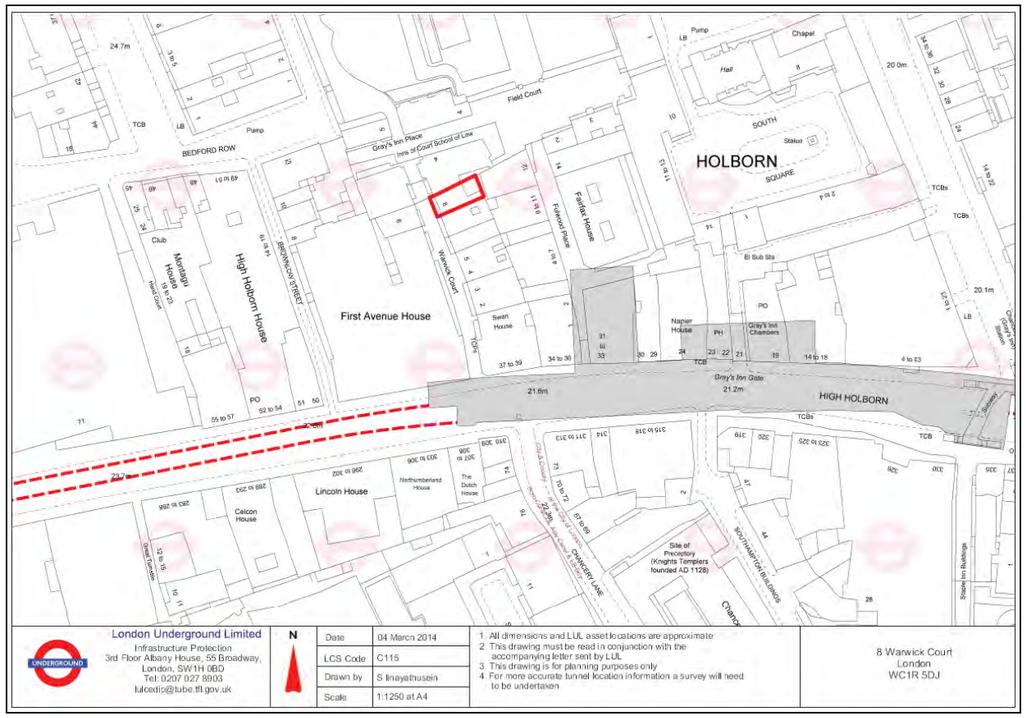

Figure 5: *London Underground Lines Map Indicating 7 Warwick Court*

3 SCOPE OF WORKS

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The proposed structural work associated with the refurbishment of the property can be split into key items referenced in Figures 6-11 and described below in order of structural significance.

1. **Removal and Replacement of Existing 1990s Rear Extension**
   This involves the complete removal of the existing load bearing masonry and timber floor structure; this includes the existing lift shaft and approximately a third of the original masonry rear façade. In its place will be a braced steel frame with timber floors that will form the new extension from lower ground to third floor. This will be inboard of the party walls that form the courtyard and should therefore pose no issue to the party wall process. The new foundations will be reinforced concrete footings and in board of the existing masonry party walls; again to not add additional load. The rear façade will be replaced by a steel box frame that spans again from lower ground to third floor. The box frame will provide both support to the existing and proposed floors, as well as lateral stability for the rear of the building, replacing the stability previously provided by the masonry wall. All load will be taken down on to the existing foundation ensuring the same load path as before.

2. **Removal of Internal Wall Adjacent to Stair at Lower Ground Floor**
   The internal masonry wall from lower ground to ground floor is to be removed. It is expected to support the timber joists above; the support will be replaced with steel beams that will also form the trimming arrangement to the new staircase down from ground floor. The wall is not expected to provide stability to be building and therefore a steel box frame is not required.

3. **Lowering of Existing Front Lightwell**
   At its current state, the concrete slab that forms base of the lightwell is located just below the window sill level at lower ground floor. The existing masonry retaining wall is to be replaced with a reinforced ‘L’ shaped retaining wall, cast in 1 metre sections, so that the structural slab level is the same as the lower ground floor. This will also involve underpinning the existing front façade in mass concrete, cast in a hit and miss sequence. Refer to Appendix B for Underpinning Specification. Allowances have been made for the rebuild and slight lowering of the existing ground floor slab to allow for new services and an increased head room. Visual inspections of trial pits (refer to Appendix A) show that both party walls have been underpinned in the past and therefore undermining of existing foundations need not to be considered.

4. **Repairing and Reinforcement of Existing Timber Structure.**
   As mentioned in Section 2.1, the existing structure is Grade II listed and consists of a timber structure internally. From an initial visual inspection, the timber appears to be in good condition and the proposals show that this structure is largely to be untouched with no additional load imposed on it, apart from where the new bathrooms are located. However, allowances are to be made for local repairing and reinforcing of the existing timber joists and supporting beams. This will be achieved with the doubling up of existing joists and the strengthening of the supporting beams with steel plates. At each floor further robustness will be achieved with the installation of an 18mm ply decking, in place of the existing modern floor boards. A full timber inspection will be required by a specialist to check for areas of rot.

5. **Removal of Existing Timber Roof Structure**
   As is stands, the existing timber roof is formed with a pitched roof to the front and a flat roof over the rear and extension. The entire roof is to be removed (front pitch to be retained if possible) and replaced with two pitched roofs, one front and one back and both with a vaulted ceiling. Steel ridge and eaves beams that span between party walls will be installed to omit any thrust forces onto the front and rear façade. There also been allowances made for the local trimming of rooflights/hatches, and additional steel support for plant.

6. **Reinforcing of Timber Balustrades**
   After visual inspection there are areas on each stair case where the centres between each balustrade are larger than expected. This has the potential to cause some instability and therefore this is to be addressed by replacing with a new timber balustrade.

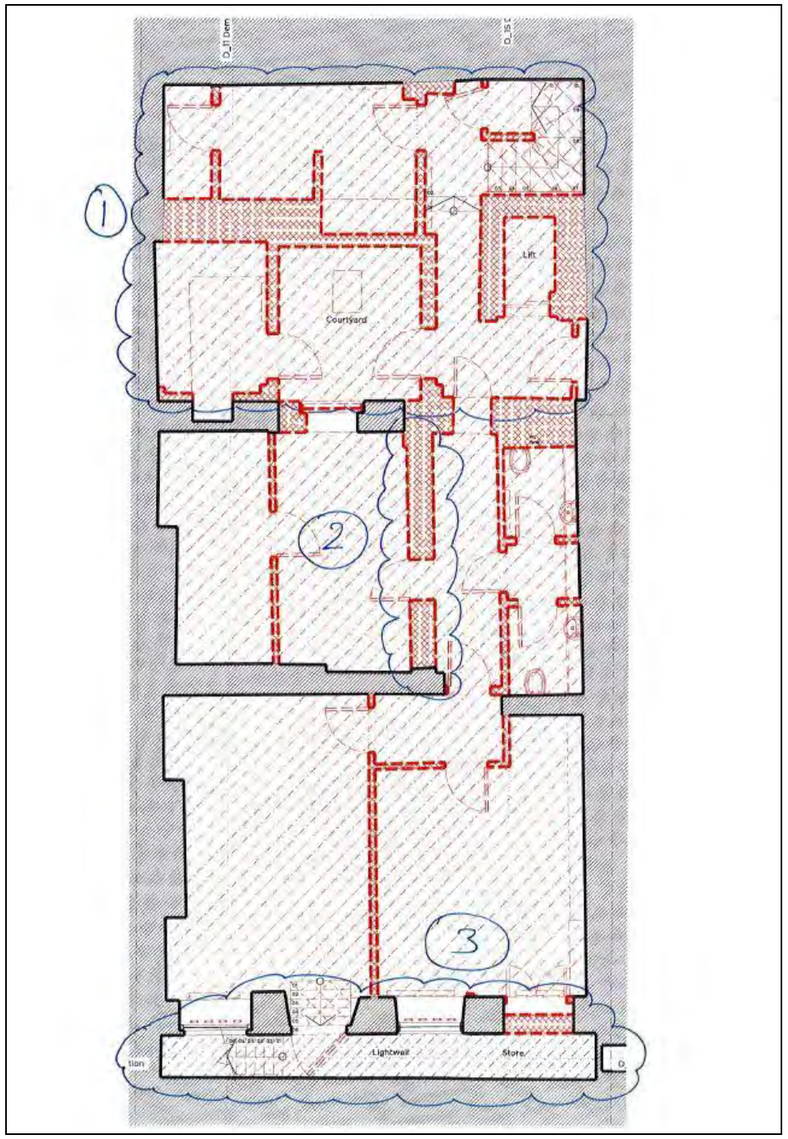


Figure 6: *Existing Lower Ground Floor Layout (demolition shown hatched red)*

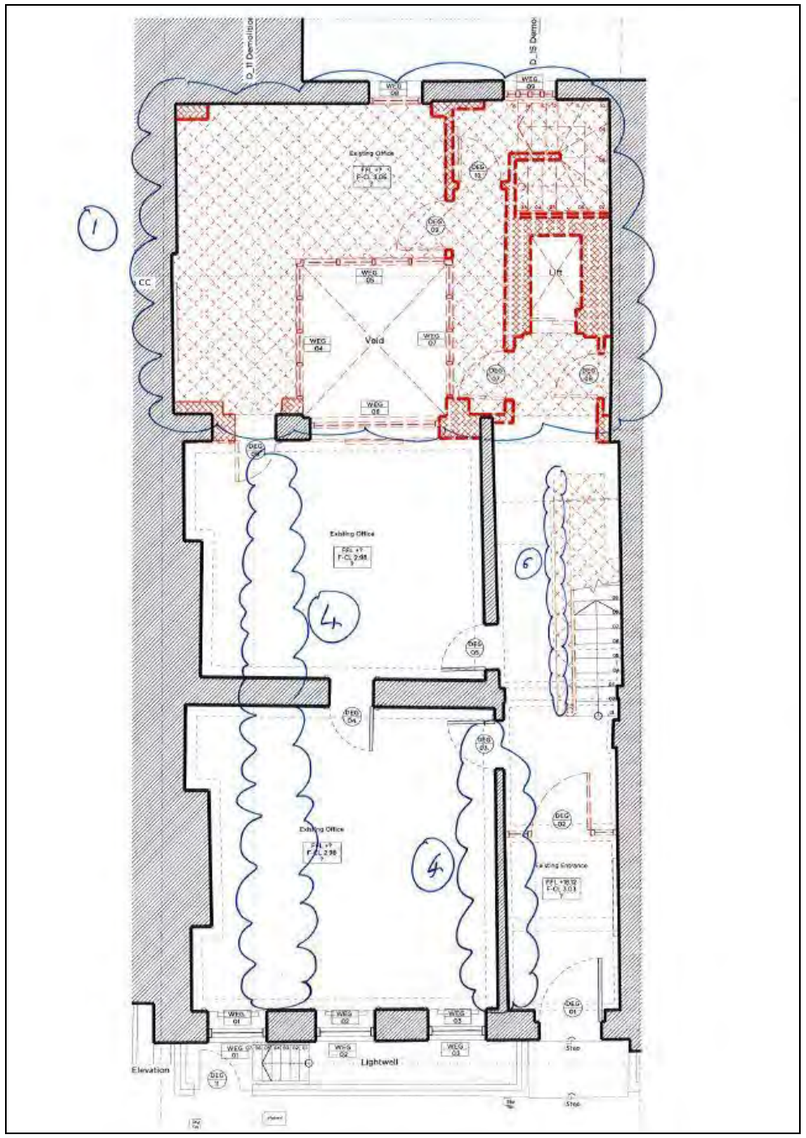


Figure 7: *Existing Ground Floor Layout (demolition shown hatched red)*

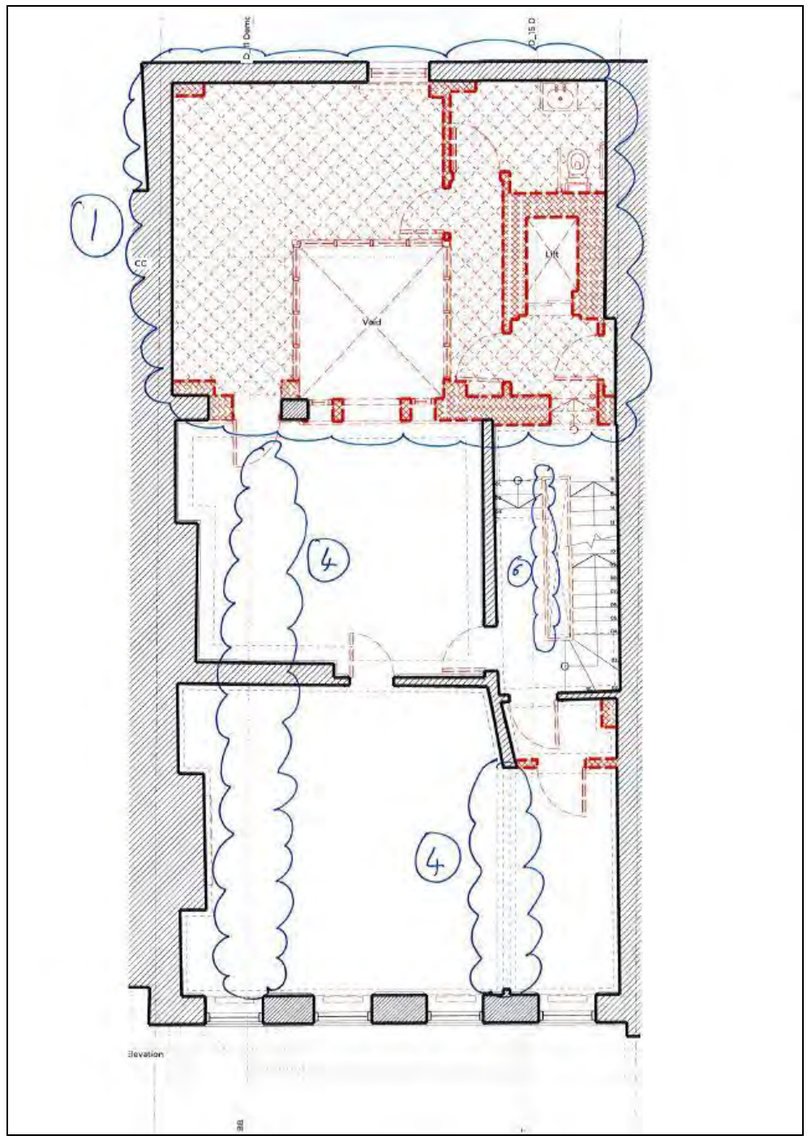


Figure 8: *Existing First Floor Layout (demolition shown hatched red)*

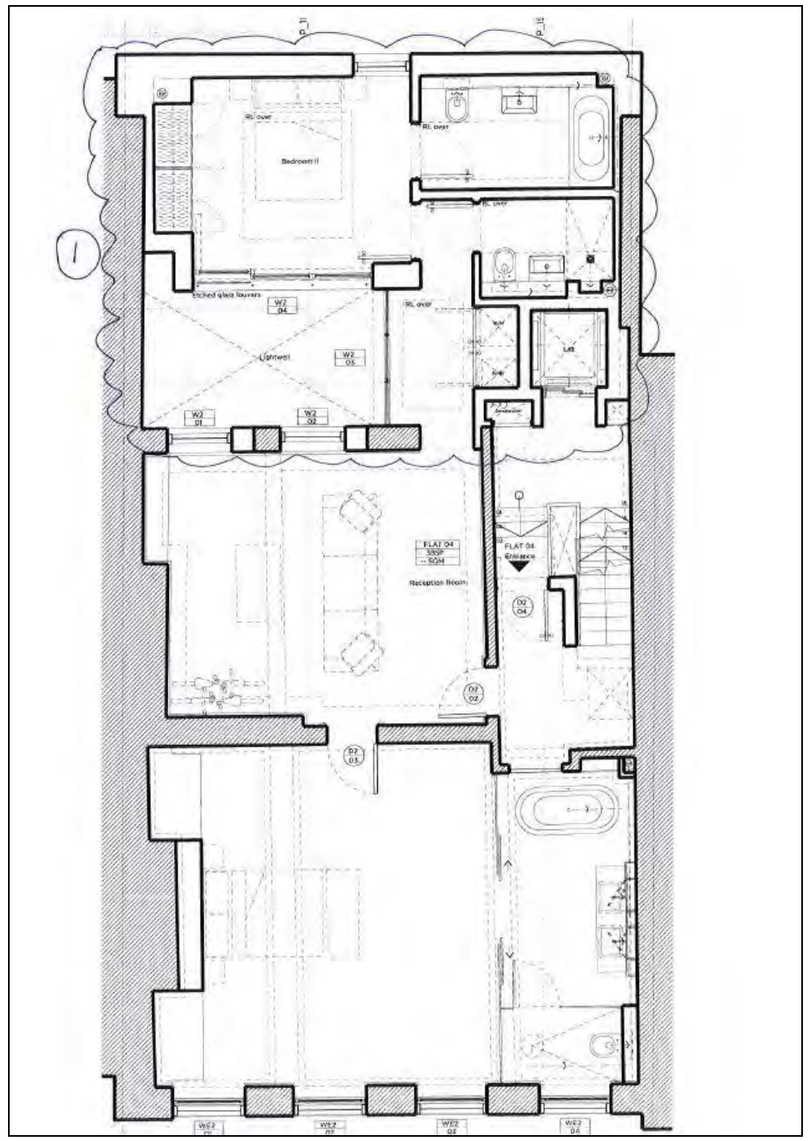


Figure 9: *Proposed Second Floor Layout showing extension*

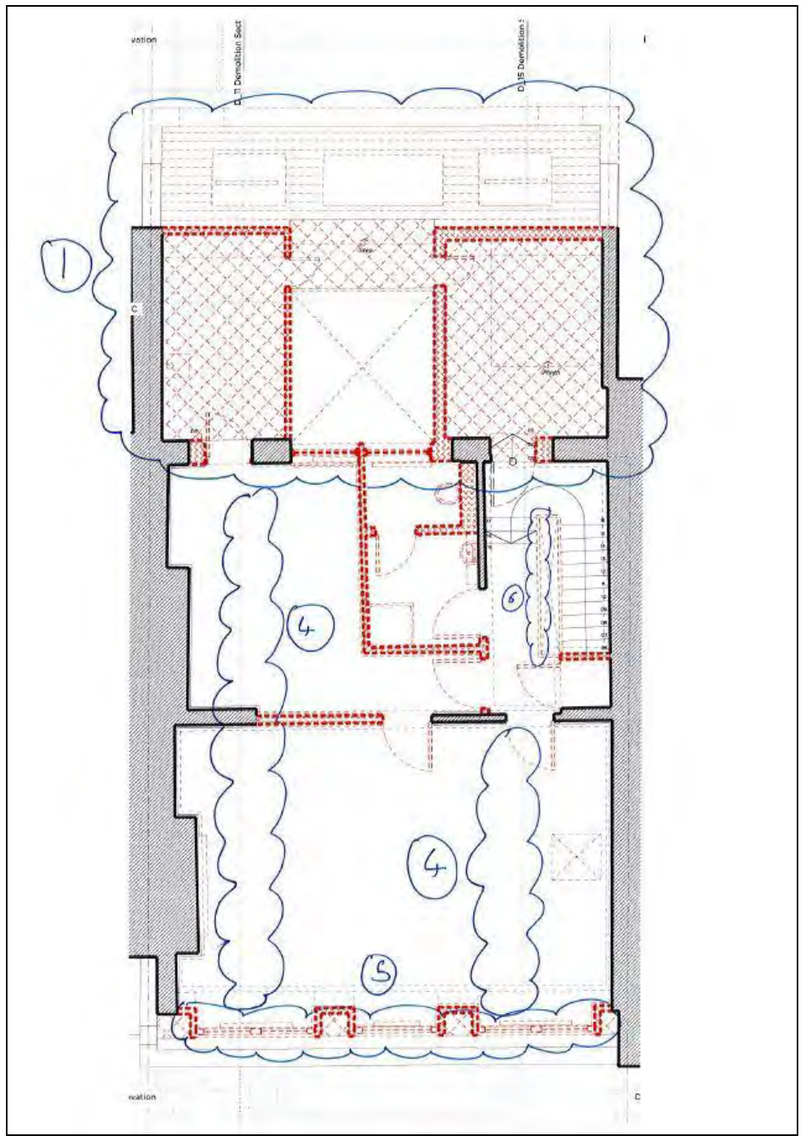


Figure 10: *Existing Third Floor Layout (Demolition shown in red)*

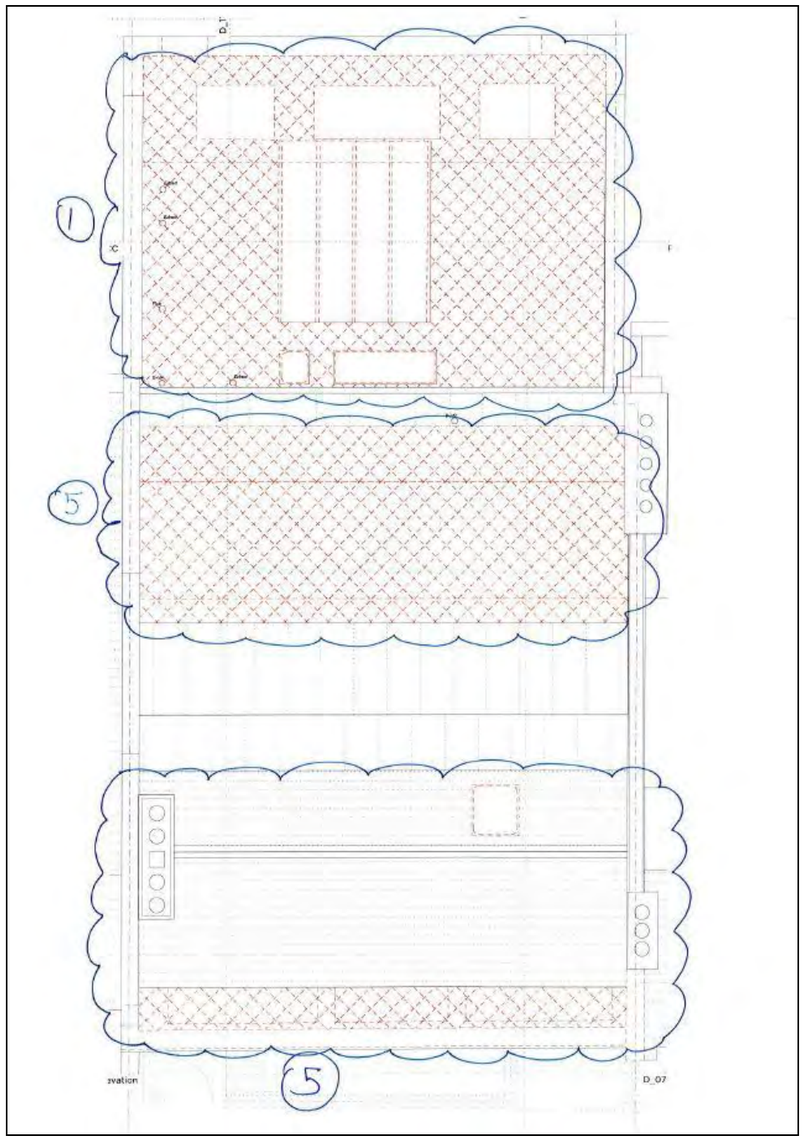


Figure 11: *Existing Roof Layout (Demolition shown in red)*

4 SITE MANAGEMENT

This section of the report has been produced at planning stage and before the main contractor has been fully appointed. It sets out the systems and procedures that the Contractor will utilise in controlling the construction operations on site, to ensure progress of the project in the most safe and efficient manner possible and to minimise impacts on the local environment and surrounding amenity.

In addition to any planning conditions Tendering Contractors will be made aware of the contents below.

Once planning permission is granted, the appointed contractor will be fully responsible for the management of the site and it may be deemed necessary to re-submit an updated Construction Traffic Management Plan prior to the commencement of site activities.

4.1 General Practice

Construction operations are likely to have impact on residential amenity on a day to day basis. The contractor will be expected to minimise the impact that the construction process could cause to the Local Environment and the neighbouring community. All care will be taken not to cause the primary environmental nuisances, noise and dust pollution. Below are actions that will be carried out to abate these problems.

Reduction in noise disruption will be achieved by:

- Coordinated delivery times to avoid peak traffic times.
- Ensuring all plant has sound reduction measures (mufflers, baffles or silencers)
- Strict adherence to the site working hours.

Reduction in dust pollution and other airborne debris will be achieved by:

- Ensuring that all materials transported to and from site are in enclosed containers or fully sheeted.
- During dry periods the works are to be damped down to control the generation of dust.
- Ensuring materials have a minimum of packaging.
- Ensuring all polystyrene and similar lightweight materials are weighted down
- Making sure all dust generating materials are adequately packaged.

In addition to the above provisions the following measures will be taken to reduce any further negative effects on the environment:

- Ensuring all contaminants kept on site are safely stored with the necessary procedures put in place for leaks and spillages etc.

- All temporary lighting, whether for the construction itself or for construction traffic, will be directional to ensure minimal light spillage across the site. The lighting will only be used as necessary during operational working hours.

Environmental issues are taken very seriously and the Contractor will be expected to employ good management practices to minimise the effects of noise and dust on the environment and local community.

4.2 Excavation of Soil

During the site set up the contractor will ensure that the main access route through the existing property is cleared, with particular care taken to protect the existing fabric of the existing listed structure.

The soil will be excavated with hand tools and bagged ready for immediate removal at the front the Number 7.

Prior to the commencement of the works the specialist ground works contractor will provide detailed method statements for all aspects of the construction for approval by the engineer. These statements will address:

- All the site specific procedures described in the previous sections to necessary to minimises any noise and vibration that may affect the neighbouring properties.

- Construction requirements for temporary propping, movement monitoring, and waste disposal.

4.3 Demolition, Rubbish Removal and Recycling

Demolition:

The demolition of the rear extension and timber roof is substantial. Proposals for any demolition sequences by the contractor should be submitted to the engineer to checking, prior to any works. Demolition works are to take place within the confines of the site at the rear of the property.

- All materials such as the existing stock-bricks, re-useable timbers, steel beams etc are to be recycled where possible.

- All brickwork and concrete demolition work is to be constantly watered to reduce any airborne dust.

- Demolished materials are to be removed to a skip placed in front of the site which will be emptied daily.

Building work which can be heard at the boundary of the site will not be carried out on Sundays and Bank Holidays and will be carried out within working hours as agreed with the council.

Rubbish Removal and Recycling:

An important part of the site management process involves site cleansing, rubbish removal and recycling.

To reduce and manage site waste:

- We will ensure that all material removed from site is taken to waste recycling stations and separated for recycling where possible. Records of the waste recycling will be provided by the recycling stations.

- Segregate waste types to facilitate recycling activities.

- Ensuring that all Duty of Care and other legal requirements are complied with during the disposal of waste.

- Consulting with suppliers to determine correct / appropriate disposal routes for waste products and containers.

- It will be the responsibility of each contractor to keep the site area under his control safe from build-up of rubbish.

5 OUTLINE CONSTRUCTION SEQUENCE

The following section describes our envisaged sequence for the construction of the works based on the construction and temporary works techniques described in the previous section. The contractor may put forward alternative solutions to suit his programme and method of working. Regardless no structural works will commence without a detailed temporary works design, drawing and calculation package in place including all necessary method statements. The works can be split into for main sections, in order of importance, shown below:

5.1 Main Works to Rear of Site

The main works incorporate the demolition of the existing rear extension, the partial removal of the existing rear façade and the construction of the rear extension (item 1). Temporary works will have to ensure that the lateral stability and support to the existing floorplates which are to remain are provided at all times. A sequence is suggested as follows:

a) Site is prepared in accordance with techniques shown in Section 4.
b) Internal strip out of extension is carried out to reveal the primary structure (likely to be timber flooring).
c) Sacrificial strips footings are to be installed (if required) for temporary works.
d) A continuous line of props are installed at set centres along the rear façade and the rear extension, as well propping for the incoming timber beams. Props are to be cross braced to form a frame so that stability for the adjoining walls is retained during the works.
e) The existing masonry structure that formed the rear extension is carefully deconstructed, including the existing lift.
f) The existing foundations (likely to be a concrete footing) are broken out and removed. Depending on the location, existing foundations can remain if they can be used as footings to the temporary props.
g) Repairs or reinforcing of existing garden walls to be carried out as necessary.
h) Carefully remove and reinstate masonry where necessary to reform rear façade.
i) The existing mass concrete strip footing is to be locally broken out to allow for the installation of the new concrete encase steel beam that forms the base of box frame BF-01.
j) Steel box frame BF-01 is installed from lower ground floor upwards. Support to the existing floors is now provided by the permanent structure.
k) Temporary propping along the line of the existing rear faced can now be removed.
l) New reinforced concrete footings are constructed throughout the rear of the building.
m) The new steel work that forms the rear extension can now be installed. The braced frame is to be tied back to the existing structure.
n) New timber floor and the concrete lower ground floor to be cast.

5.2 Works to the Front Lightwell

Refer to Section 3 (item 3) for proposals to lower the existing front lightwell. A sequence is suggested as follows:

a) Site is prepared in accordance with techniques shown in Section 4.
b) The existing front façade is to be underpinned in mass concrete from the inside in 1 metre sections and in a hit and miss sequence.
c) The existing lightwell is to be propped back to the existing building.
d) In 1 metre sections and again in a hit and miss sequence, the existing masonry wall that forms the light well is removed and replaced with an ‘L’ shaped retaining wall.
e) Render and finishes can now be installed as per Architect’s details.

5.3 Works to the Roof

Refer to Section 3 (item 5) for proposals to remove the timber roof in large parts to form two vaulted ceilings (refer to A(28)01 in Appendix A). A sequence is suggested as follows:

a) Site is prepared in accordance with techniques shown in Section 4.
b) Temporary roof scaffold structure to be installed above roof to ensure building is watertight prior to works.
c) Internal strip out of extension is carried out to reveal the primary structure. Structural Engineer to carry out inspection to ensure structure is as expected.
d) Temporary wailers and propping is to be designed by the contractor and installed underneath the roof structure to retain stability to the party walls and the two facades.
e) Existing finishes and timber structure to be carefully removed.
f) Repairs or reinforcing of existing chimney and party walls to be carried out as necessary.
g) Build up party walls in masonry as necessary to form gable ends.
h) Cast in mass concrete Padstones and install steel ridge and eave beams (steel arrangement and support indicated on L(23)06 in Appendix A).
i) Install steel and timber trimming beams to form openings.
j) Complete infill between main structural elements, finishes to Architect’s details.

5.4 Timber Floor Repair

Refer to Section 3 (item 4) that indicates the potential requirement for the existing timber structure to be repaired locally. This is be confirmed by a timber specialist prior to any works. In the event that repairs to the joists or beams are required, it is proposed that the structure is accessed and treated from the floor above to avoid damage; so that the existing Rococo plaster ceiling (dated approximately 1750) can remain. Any propping of the existing floor shall continue down to the lower ground floor slab.

APPENDIX A

PRELIMINARY FORM STRUCTURAL DRAWINGS

Document No.	Title	Revision
152335 L(23)01	Existing and Proposed Basement Plans	P3
152335 L(23)02	Existing and Proposed Ground Floor Plans	P3
152335 L(23)03	Existing and Proposed First Floor Plans	P3
152335 L(23)04	Existing and Proposed Second Floor Plans	P3
152335 L(23)05	Existing and Proposed Third Floor Plans	P3
152335 L(23)06	Existing and Proposed Roof Plans	P3
152335 A(28)01	Proposed Section B-B	P3
152335 A(28)02	Proposed Section F-F	P2
152235 L(23)00	Trial Hole Locations and Details	P1

Form

APPENDIX B
UNDERPINNING SPECIFICATION

To be read in conjunction with the Preliminaries and General Conditions.

WORKMANSHIP: The work shall be carried out in accordance with the Engineer's drawings and instructions and to the approval of the Architect and the Building Control Officer. This specification is intended to be used for concrete underpinning. The contractor carrying out the underpinning should be suitably experienced and also hold membership of The ASUC organisation, in addition to following ASUC *plus* guidance October 2013.

Any other sequence of operations or method of working proposed by the Contractor is to be submitted to the Architect and copied to the Engineer and agreed in writing a minimum of 14 days before work is to be commenced on site.

For 2 staged underpinning sections a staggered hit & miss sequence is to be adopted for the lower underpin sections. The contractor is to indicate clearly on a drawing the sequence of construction for the under and lower sections of underpinning. The base of the sections of the first stage are to be widened to ensure settlement in the temporary condition is limited to Category 0 to 1 at all times.

The category of movement expected with underpinning works is to be Category 0 or 1 according to CIRIA guide 580 (very slight cracking, max 1mm). If the contractor feels this is not achievable he should advise the design team and party wall surveyors well in advance of the works.

It is the contractor responsibility to provide a monitoring regime that will provide sufficient data to the engineer and adjoining owner's party wall surveyor. The contractor is to provide monitoring proposals for comment agreed in writing a minimum of 14 days before work is to be commenced on site.

The use of site mixed concrete for underpins may only be used following the written approval of the Structural Engineer. Batching and mixing equipment will need to comply with BS 1305 and BS 4251. Sufficient cubes with compressive tests at 7 and 28 days are to be carried to demonstrate design strength is achieved.

CONTRACTORS RESPONSIBILITIES: The Contractor shall be responsible for the safety of the underpinned structure and provide all necessary shoring, strutting and bracing to ensure its safety and stability at all times. A method statement and temporary works sequence prepared by the contractor/ temp works designer is required 7 days before works start. Calculations are to be provided to justify the proposals for temporary support.

SERVICES: The Contractor is also to carry out a survey of the property and adjacent area to establish the location of obstructions such as service runs or drains. Any obstruction found is to be brought to the attention of the Architect / Engineer. The Contractor is to allow for any temporary support to the services or obstructions during the underpinning.

SUGGESTED CONSTRUCTION SEQUENCE:

- The underpinning is to be undertaken in short sections not exceeding 1 metre in length and in a 'hit and miss' sequence as shown on the drawings. The sequence is to be clearly marked in spray paint on the wall above the underpinning so all of the operatives involved understand the work sequence. A full size cops of the drawings and method statement should be on site at all times accessible by all operatives.

- No adjacent pin is to be excavated until a minimum 48 hours after the adjacent pin has been cast and packed up.

EXCAVATION: shall be to the depth and width shown on the drawings and shall be into firm and stable ground by a minimum 150mm. Where tree roots are encountered, new underpins are to extend 600mm below the last trace of any root activity. The sides of the excavations shall be adequately shored and propped to prevent subsidence or slip of the soil. Soil faces behind the pin and at the formation level shall be undisturbed.

The sides of the completed pin are to be thoroughly cleaned and scabbled to the satisfaction of the Engineer. If dowel bars or shear keys are specified on the drawings the install as necessary. If no dowels specified then allow for minimum H20 Dowels x 800 long with 400mm embedment into adjacent pin sections, dowels spaced at max vertical 300mm centres up the pin.

All excavations are to be inspected by the Engineer and/or the Building Control Officer. Minimum notice of 24 hours is to be given when excavations are ready for inspection

The soffit of the existing footings is to be levelled off and cleaned of all loose or detrimental material. Inspect footing for loose material and take due care when excavating

Any soil faces behind the underpinning that require to be retained shall be by precast concrete poling boards, trench sheeting or suitable cement boards- any of which need to be agreed with the engineer and party wall surveyor beforehand. The poling boards are to be measured as left in.

No projecting parts of the existing footings are to be trimmed except as shown on the drawings or directed by the Engineer.

The concrete for the underpinning is to be poured continuously to 75mm below the soffit of the existing footing. The concrete is to be fully compacted using a mechanical vibrator.

The top 75mm of the pin is to be filled to the full depth and width of the void with a well rammed C35 concrete using 5mm – 10mm coarse aggregate and "Conbex 100" expanding admixture by Messrs Fosroc UK Limited in accordance with their instructions. The filling of this void is to be undertaken 24 hours after the concrete has been poured.

CONCRETE GRADE: On works where a full specification has not been provided, a FND2 mix should be used. This has characteristic 28 day strength of 35N/mm² and is suitable for Class 2 sulphate soils.

OVER-EXCAVATION: Except where noted otherwise on the drawings, areas of over-excavation are to be backfilled with a granular material and compacted in 225mm layers to provide a stable sub-base compatible with the final finishes.

SPOIL: The contractor will include in his prices for the removal of all spoil arising from the works which is not suitable for backfilling purposes.

RECORDS: A full record of each section underpinned is to be kept on site and readily available for inspection by the Engineer or Building Control Officer.

GUARANTEE: The Contractor is to provide a 10 year insurance backed guarantee for the underpinning works.

APPENDIX C

BUILDING DAMAGE CLASSIFICATION TABLE

During the later detailed design phases of the project a geotechnical specialist will undertake a ground movement analysis to confirm the foundation widths and limit movement to within the trigger values agreed under the Party Wall awards. Monitoring will be undertaken during the works to ensure these values are not exceeded.

Classification of visible damage to walls (after Burland et al, *1977, Boscardin and Cording, 1989; and Burland, 2001)*

Category of damage	Description of typical damage (ease of repair is underlined)	Approximate crack width (mm)	Limiting tensile strain ε_{lim} (per cent)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible.	< 0.1	0.0–0.05
1 Very slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection.	< 1	0.05–0.075
2 Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and some repointing may be required externally to ensure weathertightness. Doors and windows may stick slightly.	< 5	0.075–0.15
3 Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5–15 or a number of cracks > 3	0.15–0.3
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 but also depends on number of cracks	> 0.3
5 Very severe	This requires a major repair involving partial or complete rebuilding. Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	usually > 25 but depends on number of cracks.	

Notes

1. In assessing the degree of damage, account must be taken of its location in the building or structure.
2. Crack width is only one aspect of damage and should not be used on its own as a direct measure of it.

Form

APPENDIX D

AVIRON SITE INVESTIGATION REPORT

Site Investigation report as issued by Aviron in June 2014 for No. 8 Warwick Court. (Adjoining site in same ownership as No. 7)

Form

APPENDIX E

THAMES WATER ASSET SEARCH

Form

APPENDIX F

LONDON UNDERGROUND ASSET SEARCH

Asset Location Search

Thames Water Property Searches
12Vastern Road
READING
RG1 8DB

Search address supplied Warwick House Chambers
8
Warwick Court
London
WC1R 5DJ

Your reference 13089

Our reference ALS/ALS Standard/2014_2690642

Search date 18 February 2014

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: Warwick House Chambers, 8, Warwick Court, London, WC1R 5DJ

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

Asset Location Search

valve. If you would like to know the static pressure, please contact our Customer Centre on 0845 920 0800. 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

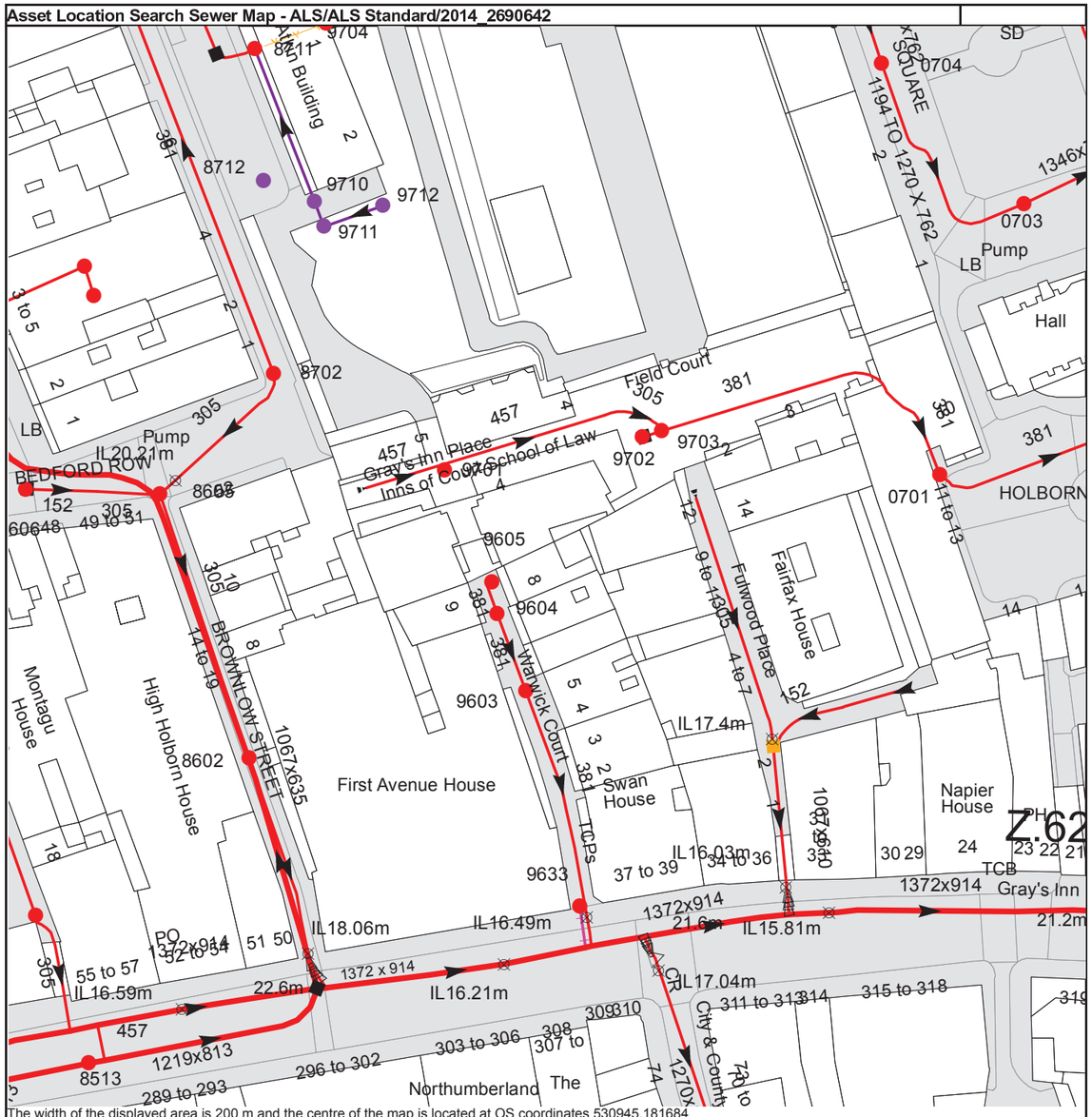
Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

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



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 530945,181684

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
0704	20.9	17.3
8605	23.87	19.98
8602	23.09	19.08
8712	n/a	n/a
8702	23.78	20.87
9710	n/a	n/a
9711	n/a	n/a
9712	n/a	n/a
9701	22.47	18.41
9605	n/a	n/a
9604	22.76	18.8
9603	22.96	18.33
9633	22.14	n/a
9702	n/a	n/a
9703	21.03	17.5
0701	19.48	16.56
0703	20.79	17.08
8711	n/a	n/a
8513	23.03	9.26
8601	23.79	19.34
8606	24.6	20.63
87BE	n/a	n/a
87BF	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

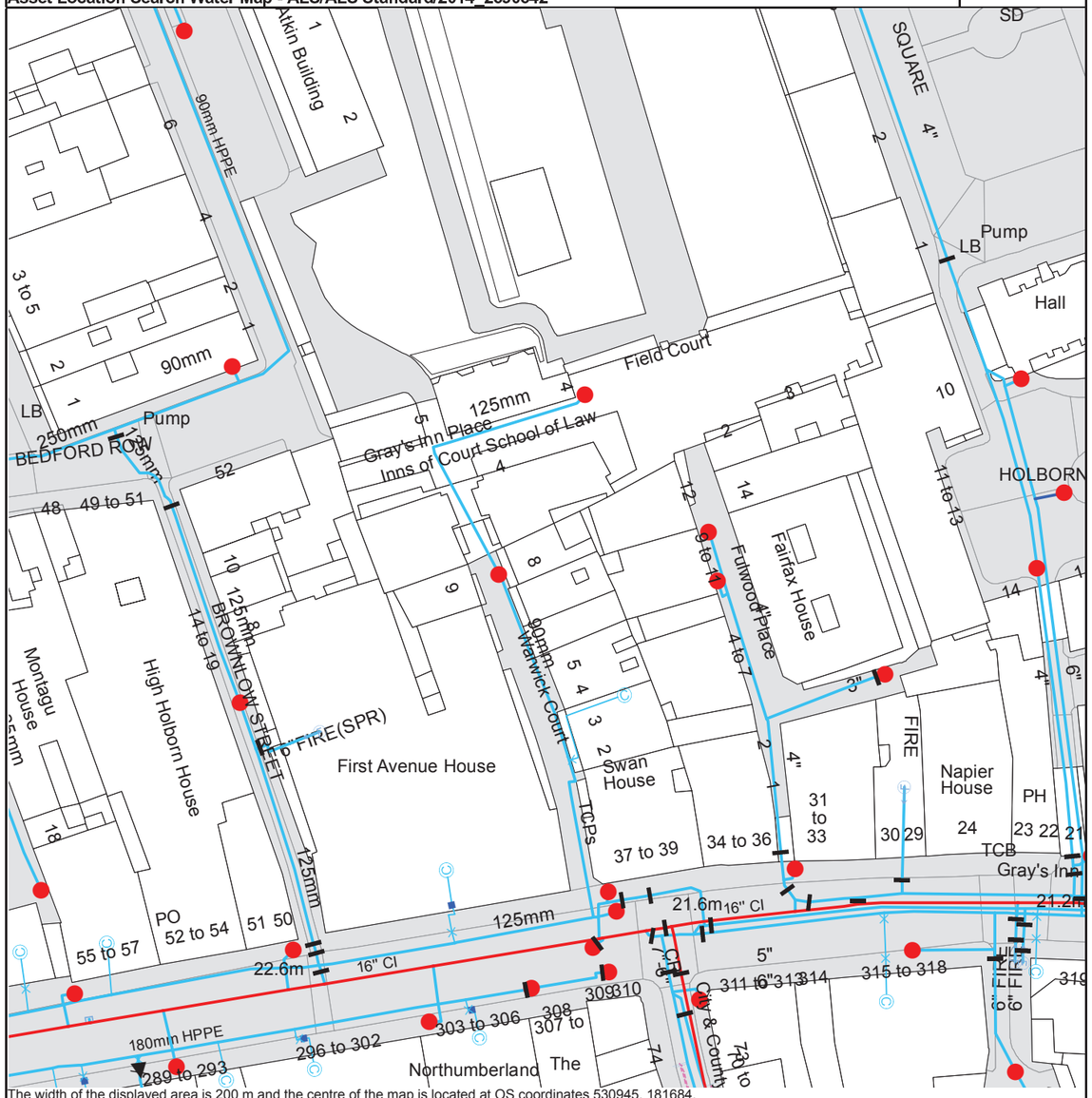
Other Sewer Types (Not Operated or Maintained by Thames Water)

- 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/2014_2690642



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 530945, 181684.

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.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

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

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

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

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

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

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

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

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

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

- Data Logger

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 0845 9200 800.

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**

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

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

The Search Code:

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

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

The Code's core principles
Firms which subscribe to the Search Code will:

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

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

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

TPOs Contact Details
The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
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

APPENDIX F

LONDON UNDERGROUND ASSET SEARCH

Date 04 March 2014

Our Ref 20878-SI-C115

Your Ref

To David Andrews
FORM Structural Design
DavidA@form-sd.com

London Underground Limited

Hello David,

8 Warwick Court London WC1R 5DJ

Thank you for your communication of 26th February 2014.

Attached is a 1:1,250 plan @A4 showing the location of Chancery Lane London Underground Station which is served by the Central line.

Please note:

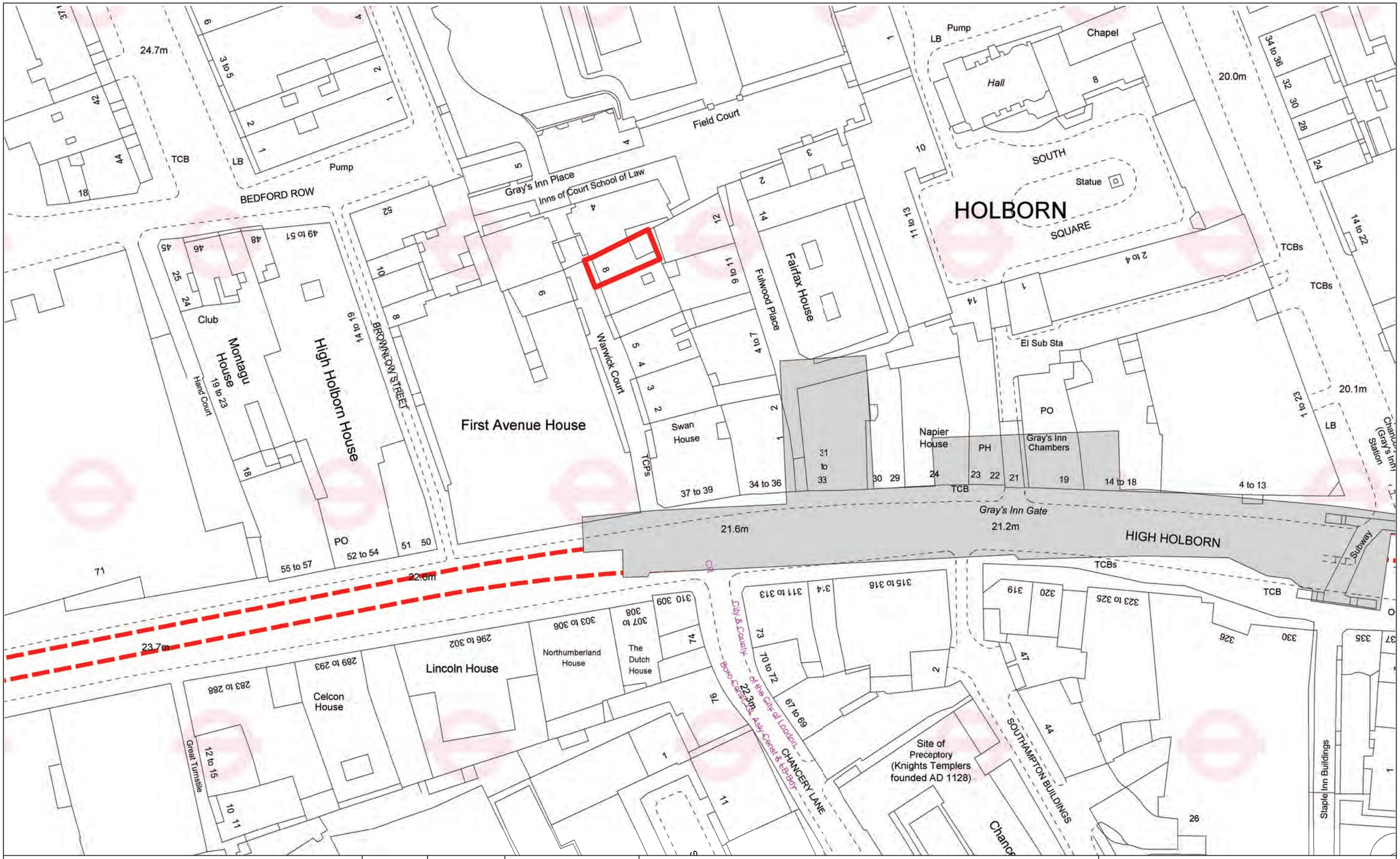
- shaded areas represent sub-surface structures which can be as shallow as 0.2 metres below surface level
- the positions of the tunnels on this plan are indicative only and must not be used for design purposes
- due to varying levels within underground stations it is not possible to show tunnel crown depths in the shaded area
- for more accurate tunnel location information a survey will need to be undertaken
- this letter must be distributed with the drawing which it refers to

If you or any other intends undertaking the following at the above location London Underground Infrastructure Protection must be provided with details of the proposals so that the safety of our railway can be assured:

- demolition
- structural works
- excavation
- boreholes or piling
- highway works above shaded areas

Should you have any further enquiries, please do not hesitate to contact me.

Shahina Inayathusein
Information Manager
LUL Infrastructure Protection
E-mail: locationenquiries@tube.tfl.gov.uk
Tel: 0207 918 0016



London Underground Limited Infrastructure Protection 3rd Floor Albany House, 55 Broadway, London, SW1H 0BD Tel: 0207 027 8903 lulcedip@tube.tfl.gov.uk	N

Date	04 March 2014
LCS Code	C115
Drawn by	S.linayathusein
Scale	1:1250 at A4

1. All dimensions and LUL asset locations are approximate
2. This drawing must be read in conjunction with the accompanying letter sent by LUL
3. This drawing is for planning purposes only
4. For more accurate tunnel location information a survey will need to be undertaken.

8 Warwick Court
London
WC1R 5DJ