Job Number: 181209

CROFT STRUCTURAL ENGINEERS

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Flood Risk Assessment

Property:

Brad Briggs
108a Goldhurst Terrace
London
NW6 3HR

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Revision	Date	Comment
-	13.09.2019	First Issue
1	22.11.2019	Mitigation measures expanded

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Executive Summary

This flood risk assessment for the basement development at 108a Goldhurst Terrace has explored the potential sources of flooding and compared existing and proposed conditions. The assessment has included a detailed study of the site and the surrounding area. The assessment concludes that the proposals will not increase the risk of flooding to nearby properties. The risk of flooding to 108a Goldhurst Terrace can be suitably mitigated by adopting appropriate construction methods.

1. Introduction

A new basement is proposed below an existing property at 108a Goldhurst Terrace. This report comprises a FRA (flood risk assessment) to support the planning application.

The objectives of the FRA is to establish:

- Whether the basement is likely to be affected by current or future flooding from any source
- Whether the basement will increase flood risk elsewhere
- Whether mitigation measures to deal with these effects and risks are feasible and appropriate

This flood risk assessment includes proposed design measures to reduce any risks associated with flooding and mitigate the impacts for the operation of the building, the users, the surrounding properties and the occupants of nearby properties.

Planning Context

While nowhere in the borough is identified by the Environment Agency as being flood prone from rivers or the sea, there are still parts that are identified as being subject to localised flooding from surface water. This is caused during times of heavy rainfall when the local combined sewer system is unable to deal with the volume and rate of flow.

All applications for a basement extension within flood risk areas identified in the LB Camden Flood Risk Management Strategy or in any future updated Strategic Flood Risk Assessment will be expected to include a Flood Risk Assessment

This report is based on information from a desk study, a site visit and relevant parts of the following documents:

- Basements CPG - March 2018
- Water and flooding CPG - March 2019

The scope of the FRA to be commensurate with the scale, nature and location of the development. This proposal described in this assessment is for a multi-occupancy dwelling. The level of analytical detail is limited accordingly.

2. Existing Site Conditions & Proposed Development

The existing property comprises a traditionally built Victorian end-of-terrace building. The structure is three storeys high and is surrounded by a garden. The garden comprises paved lightwells immediately to the front of the building; beyond this there is soft landscaping. From borehole investigations done in 2018, the building is understood to be founded on clay. Flat A, occupies the whole of the Lower Ground Floor and is the subject of this assessment. The site is less than 1 hectare and the site is on a street that was flooded in 1975 and 2002.

The proposal is to form a new single-storey basement below the footprint of the existing property. This will also extend into the garden in line with the proposed rear extension at lower ground floor level.

3. Flood Hazards and Mitigation Measures

The potential hazards related to flooding are as follows:

Tidal and Fluvial Flooding

Given that the site is above 40m AOD, and lies in Flood Risk Zone 1 (defined by the Environment Agency as having low risk of flooding from rivers and seas), the risk of flooding from fluvial and tidal sources is not significant.

Surface Water and Pluvial Flooding

The area surrounding the site has a gentle slope from north to south.

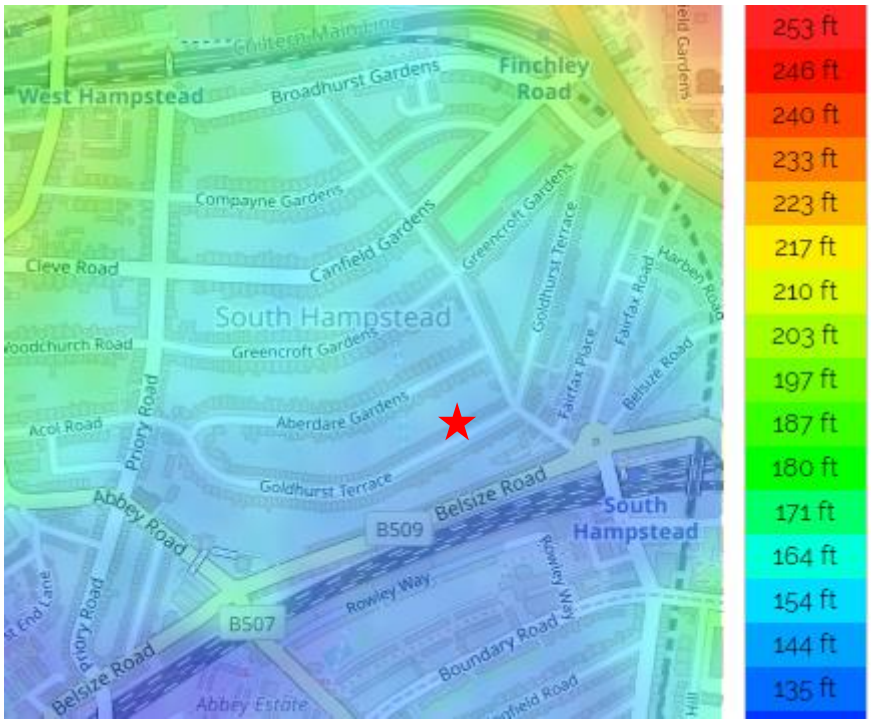


Figure 1: Extract from Lidar map showing surface topography

The property is on the north side of the road. Rainwater accumulating on the road will flow in directions of the slope of the surrounding area, from north to south, away from the property. Water entering the boundary of the property, in the event of intense rainfall, is more likely to be from wind-blown ingress than from surface flow due to gravity.

The site is adequately drained, as are the surrounding roads (which are drained by gullies maintained by Thames Water). 108a Goldhurst Terrace and the surrounding roads flooded in 1975 & 2002 due to a failure of a storm drain located just on the road just outside the property in question.

The new basement will not involve a significant removal of permeable surfaces (the walk-on roof-light will occupy less than 1m^2). Rainwater will be able to infiltrate into the ground as before and will not migrate to alternative locations above ground level.

Groundwater Flooding

Bore hole records (GWPR2929/GIR/September 2019) show that the new basement will be founded on, and be surrounded by clay. Clay has a very low level of permeability. The inclusion of a basement in this strata will therefore have very little effect on the conveyance of groundwater. The increase in risk of flooding from groundwater is therefore negligible.

During construction perched water may be present in made ground or in pockets of gravel within the clay. This can be discharged with active dewatering on site. it is advisable that the contractor monitors the groundwater prior to the start of works and make suitable arrangements for dewatering as necessary.

Infrastructure Flooding

There are no reservoirs nearby which could cause flooding in the event of failure. Furthermore these items are assumed to have a high level of maintenance thus the risk of flooding from these is considered very low.

There are no known cases of significant flooding from sewers in the local area other than in 1975-2002, as mentioned previously. This has since been rectified by Thames Water. In the 1990s, a 2.5m relief sewer was constructed in the local area, see Appendix A for letter from Thames water confirming works. The Appended document explains how Thames Water undertook significant works to increase the capacity of their storm drains in local to Goldhurst Terrace.

There is always a risk that incoming water mains may break, causing significant flood risk to the occupants of the basement. This risk is inherent with all basement structures. Mitigation measures are proposed in the following section.

Mitigation Measures

During times of high rainfall there will be an increased risk of surface water flooding from the impermeable surfaces of the street and pavement in front of the property. There are however a series of passive defences that help prevent rising surface water levels entering the boundary of 108a Goldhurst Terrace. The kerb line outside the property raises the pavement 65mm from the surface of the road. There is then another step up of 75mm from the pavement to the front garden on 108a Goldhurst terrace, as shown below.

Figure 2: Passive Defences at 108a Goldhurst Terrace

Further, there is a proposed 250mm masonry upstand around the front lightwell. This in total allows for 390mm of raised defence.

In addition to the passive defences outside the property, the existing hardstanding to the front of the lightwell is to be replaced with soft landscaping allowing for a greater percentage of rainwater to discharge into the ground.

In the unlikely event that water will enter the front lightwell, the sill height of the windows places another 650mm defence above the base of the lightwells.

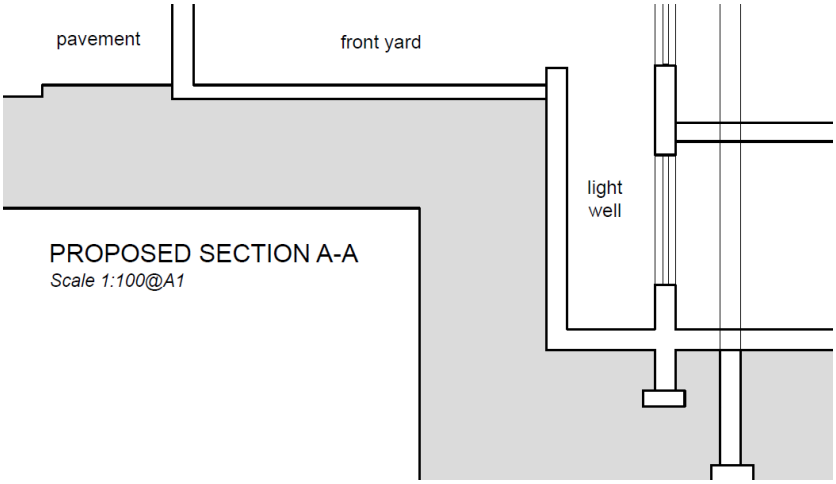


Figure 3: Partial section through front of property showing proposed lightwell upstand

There is a low risk of incoming water mains bursting resulting in localised flooding. This would occur at the front of the property and the passive defences stated above would mitigate the risk of flooding into the basement.

To mitigate the risks associated with flooding from groundwater, Croft would recommend that suitable waterproofing measures be proposed in conjunction with the structural design. A common and anticipated detailed design stage approach is to use internal dimpled membranes (Delta or similar). These will be integral to the waterproofing of the basement.

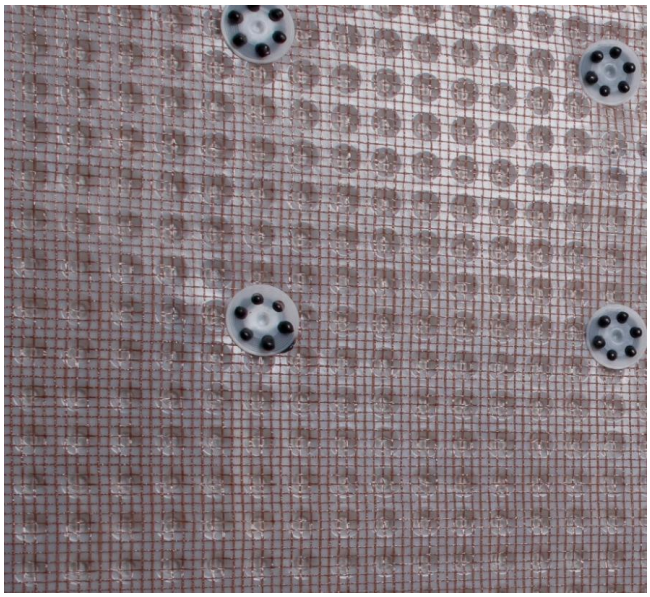


Figure 4: Example of dimpled membrane used for waterproofing basements

Any water from this will enter a drainage channel below the slab. This will be pumped and discharged into the exiting sewer system.

It is recommended that a waterproofing specialist is employed to ensure all the water proofing requirements are met. The waterproofing specialist must name their structural waterproofer. The structural waterproofer must inspect the structural details and confirm that he is happy with the robustness.

Due to the segmental construction nature of the basement, it is not possible to waterproof the joints. All waterproofing must be made by the waterproofing specialist. He should review the structural engineer's design stage details and advise if water bars and stops are necessary.

The waterproofing designer must not assume that the structure is watertight. To help reduce water flow through the joints in the segmental pins, the following measures should be applied:

- All faces should be cleaned of all debris and detritus
- Faces between pins should be needle hammered to improve key for bonding
- All pipe work and other penetrations should have puddle flanges or hydrophilic strips

The design of the services could include the following:

- A pumping system should be installed for the proposed basement. There is a likelihood that this may fail and allow excess water to accumulate. If this were to occur, the build-up of water would be gradual and noticeable before it becomes a significant life-threatening hazard.

- The pumping system should be a dual mechanism to maintain operation in the event of a failure. This should include a battery backup and a suitable alarm system for warning purposes.

Figure 5: Example of sump pump used commonly used for basement drainage

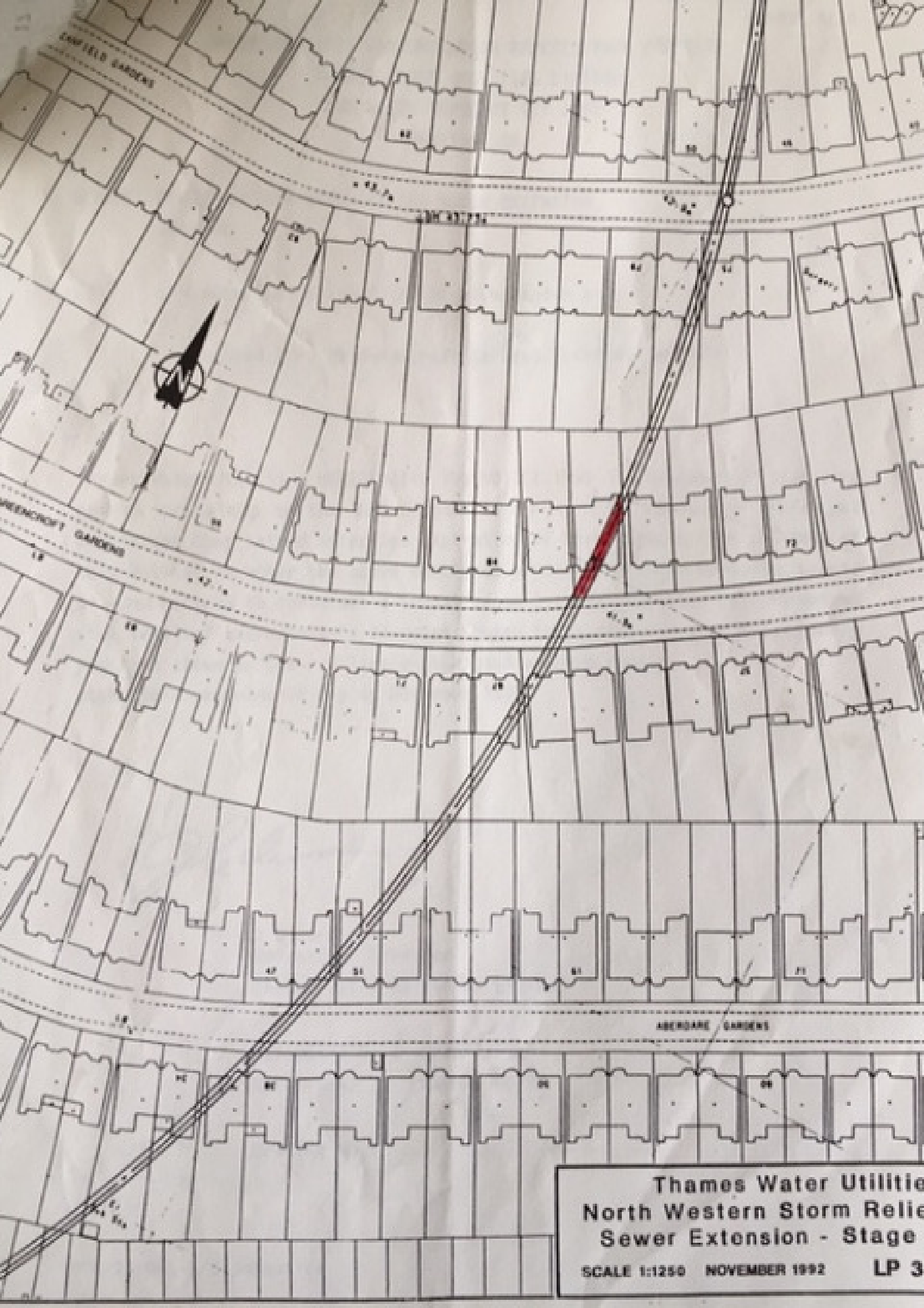
- Non-return valve to avoid the risk of backflow
- Install all electrical wiring at high level

SUDS Considerations

There is plentiful soft landscaping in the rear garden which allow and will continue to allow rainwater to discharge into the ground. This mechanism will be maintained: there are no proposals to change the landscaping in the rear garden. The use of artificial mechanisms such as attenuation tanks is therefore not considered necessary in this development. SUDS will be achieved by the continued use of soft-landscaped areas for infiltration.

4. Appendix A

Thames Water Correspondence


Thames Water Utilitie
North Western Storm Relie
Sewer Extension - Stage
SCALE 1:1250 NOVEMBER 1992
LP 3

NWSRSE/A134

IMPORTANT THIS COMMUNICATION AFFECTS YOUR PROPERTY

THAMES WATER UTILITIES LIMITED

THE WATER INDUSTRY ACT 1991

SECTION 159

SCHEME: NORTH WESTERN STORM RELIEF SEWER EXTENSION
STAGE 2

TO: the owner/occupier of the premises known as

Grnd Flr, 80 Greencroft Gardens, London, NW6 3JQ

Thames Water Utilities HEREBY GIVE YOU NOTICE that in pursuance of statutory powers contained in the Water Industry Act 1991 and other relevant provisions they intend after the expiration of three months from the date of this Notice, to enter the above mentioned premises by their servants agents or contractors to construct a tunnel of an internal diameter of 2.59 metres at a level of approximately 13 metres below the surface in the approximate position shown by the red line on the plan annexed hereto.
Dated this sixth day of October 1992.

J G Hurcom
Operations Director
Thames Water Utilities Limited

Telephone No.: 0734 237465
Reference: LWRM/1988/H3
LP3
Drawing No.: .....