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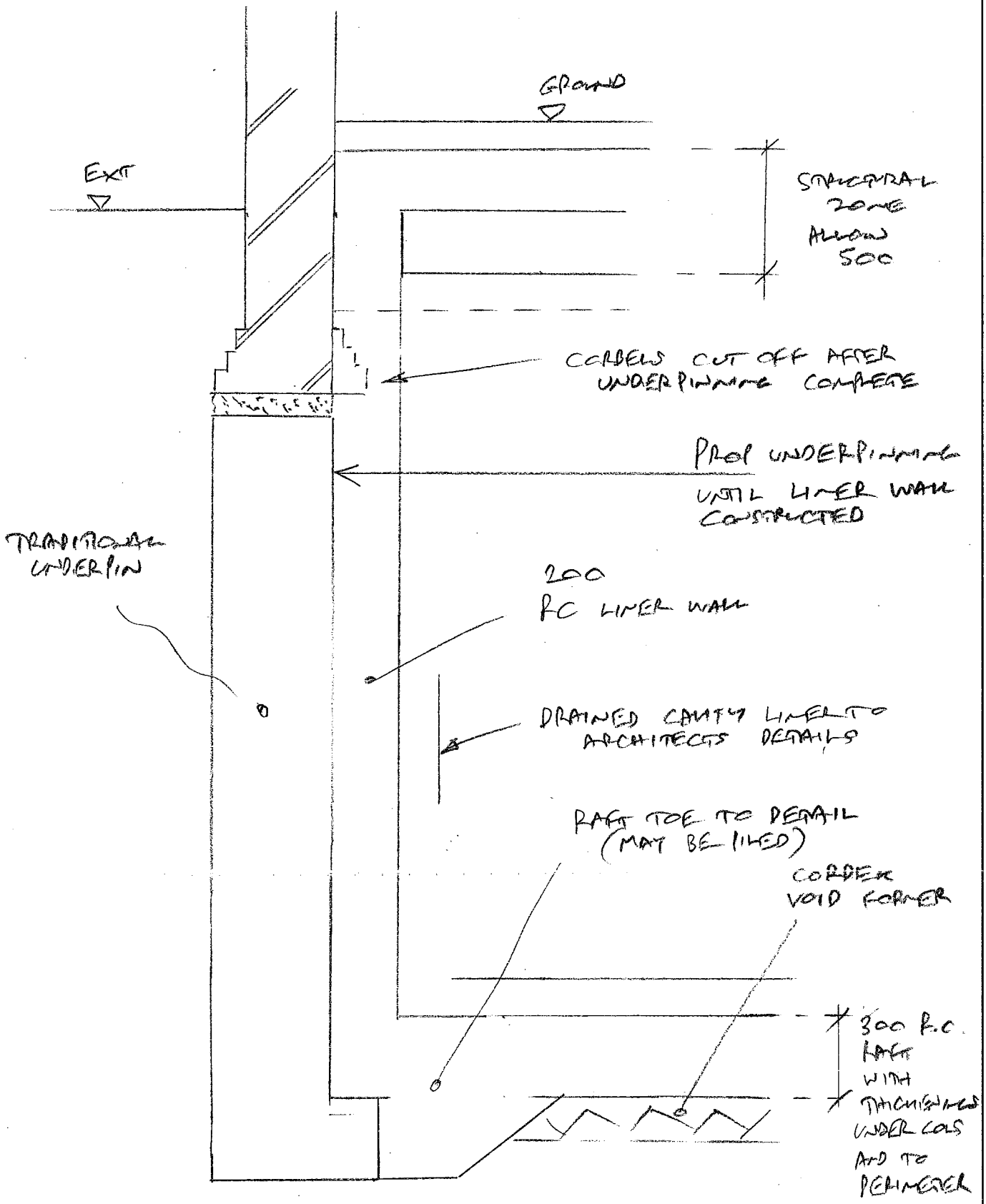
project
44 FERNCROFT AVE

title
TYPICAL UNDERPIN
FLANK WALL SECTION

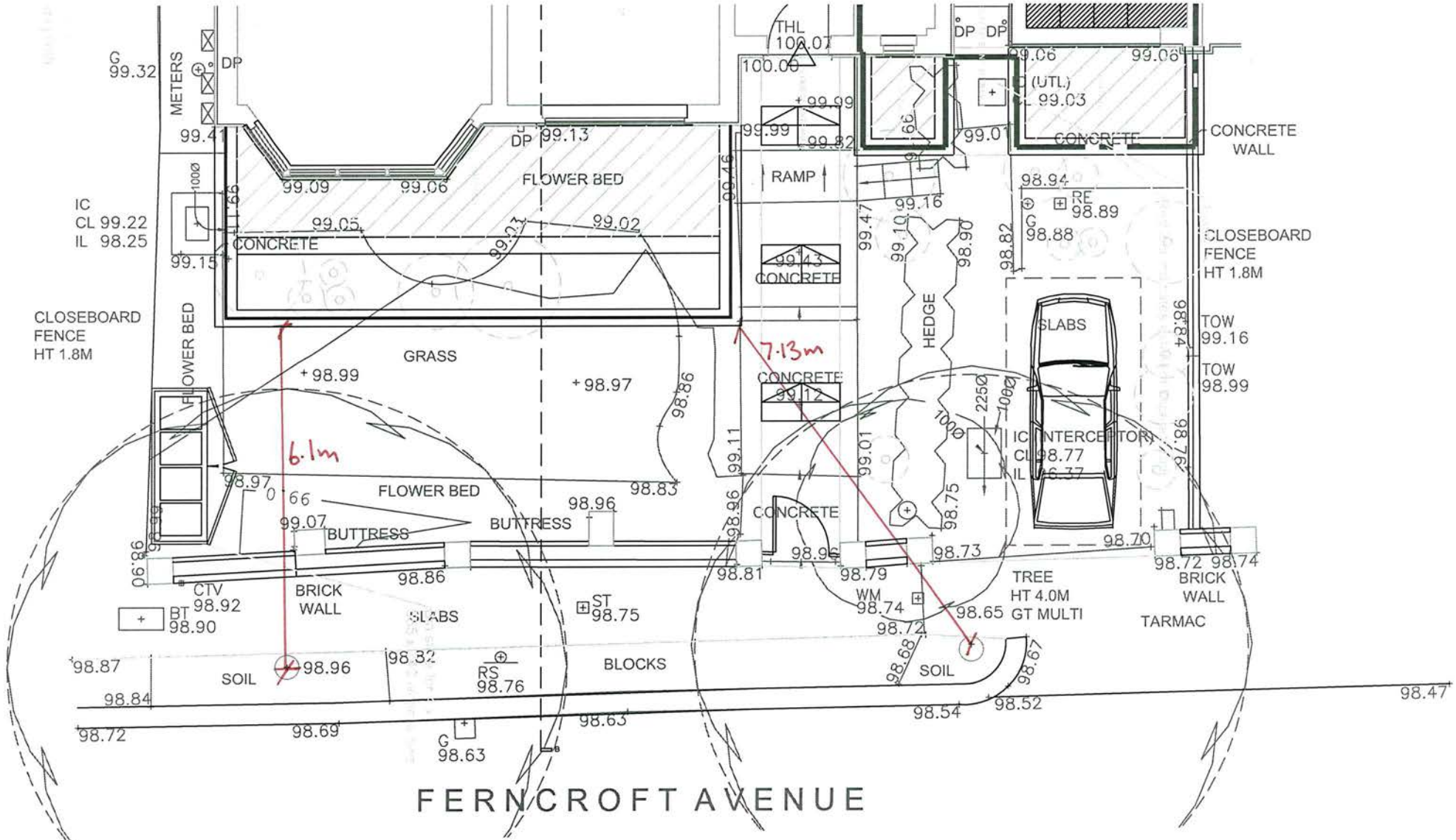
job no. 110610
drg. no. SSK004
scale 1:20
date 19.9.12
drawn TDA
checked

rev.	date	



APPENDIX C

Tree Locations in Proximity to Excavations



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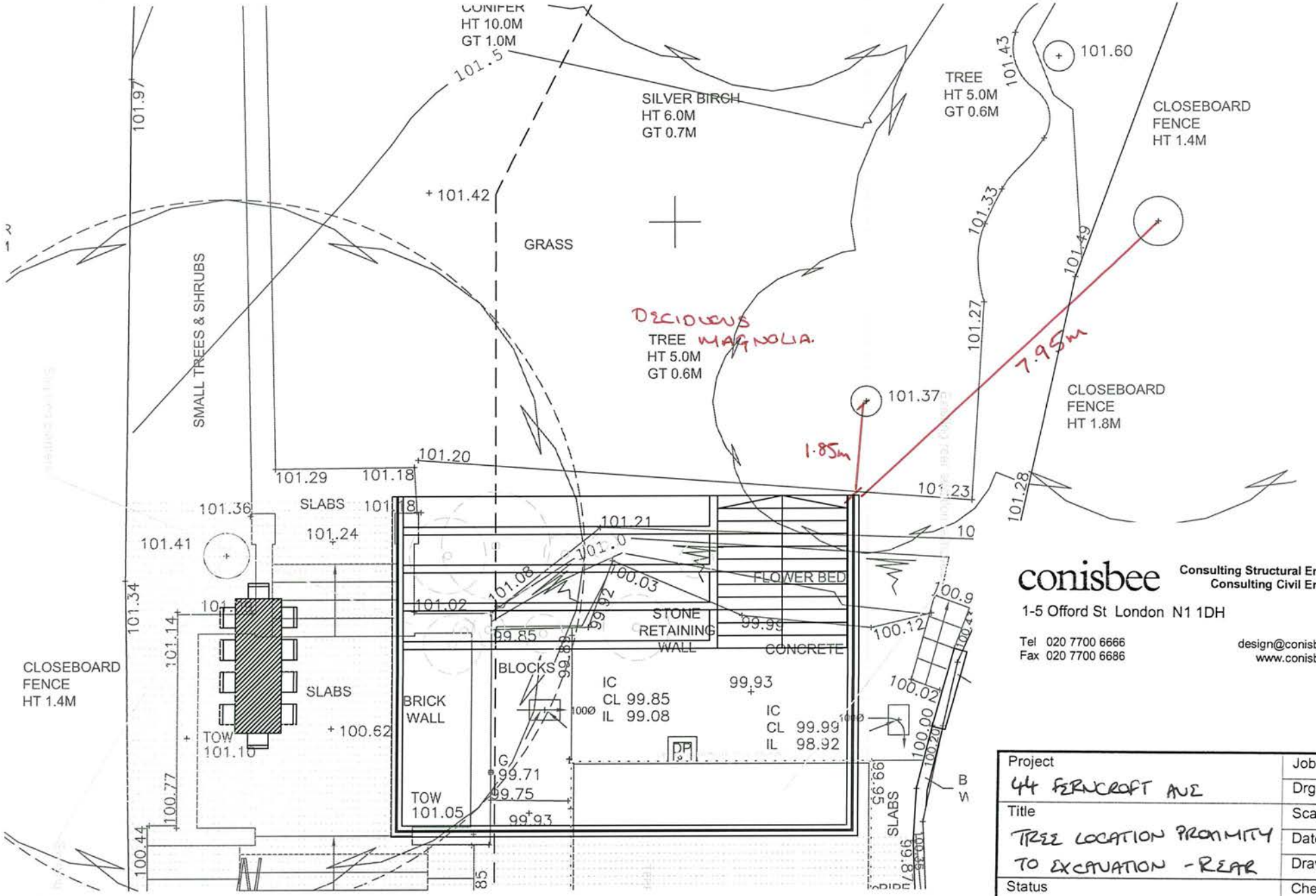
Project 44 FERNCROFT AVE	Job No. 11060 1
	Drg. No.
Title TREE LOCATION PROXIMITY TO EXCAVATION – FRONT	Scale
	Date
	Drawn
Status	Checked



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Project: 44 FERNCROFT AVE	Job No. 110601
	Drg. No.
Title: TREE LOCATION PROXIMITY TO EXCAVATION - REAR	Scale
	Date
	Drawn
Status	Checked

APPENDIX D

FLOODS IN CAMDEN – REPORT OF THE FLOODS SCRUTINY PANEL

Floods in Camden

Report
of the
Floods
Scrutiny Panel

London Borough of Camden

June 2003

Contents

CHAIR'S FOREWORD

I have pleasure in presenting the report of the Scrutiny Panel on the August 2002 floods in Camden.

The floods caused much damage for those unfortunate enough to have the flood water and sewage enter their properties and also caused a great deal of distress to those affected. Many people had to vacate their homes and, such was the magnitude of the impact, some have been unable yet to return home some nine months later. In addition to the flooding of residential properties, considerable damage was inflicted upon public services and facilities and private businesses.

The panel took extensive evidence from local residents and organisations, and from council officers, the emergency services, Camden Primary Care Trust, neighbouring boroughs, other stakeholders and of course Thames Water Utilities. I would like to thank them all for their help.

We were fortunate to be able to co-opt Jane May, a local resident from West Hampstead who herself suffered from the flooding, to contribute her detailed local knowledge to the panel's work. We were also greatly assisted in our task by Professor Edmund Penning-Rowsell, an academic from Middlesex University Flood Hazard Research Centre, who provided the panel with invaluable and independent expertise. I should also like to acknowledge the work of Tim Young and Graham Magee (Scrutiny Team) and Vicky Wemyss-Cooke (Committee Services), whose commitment to the panel's work enabled us to produce an evidence-based report with constructive recommendations.

I would particularly like to thank all the residents and local organisations that contributed to the panel's work. Many of them attended our panel meetings on a regular basis. The evidence that they provided helped us build up a picture of the extent of the flooding and how greatly it impacted on people's lives. The panel sympathised greatly with all those affected. This was key to our determination not simply to understand what had happened but to try to produce recommendations to tackle problems in the future.

However, we would not want to raise residents' hopes and expectations unduly. Our report shows unfortunately that floods will always occur that are beyond the capacity for cost-effective sewers to deal with. Nor will extra gully cleaning capacity - although desirable and indeed endorsed by the panel - solve the problem.

Nevertheless, we are very pleased that Thames Water has agreed to work with Camden Council to explore what preventative actions it might be able to take and what mitigation measures it might put in place to deal with flooding problems. A joint working party of Thames Water and the Council has already met, and we have recommended that the working party's progress should be monitored and reported to the Overview and Scrutiny Commission.

Other courses of action lie within the Council's responsibilities, and we have therefore made recommendations to the Council's Executive that steps should be swiftly taken. We have, for example, recommended that the Council's emergency

planning procedures should be upgraded, including improvements to the capacity and responsiveness of the ‘out of hours’ service at times of emergency; improved communication between departments to facilitate cooperative, improved responses; and that our planning policies should be reviewed to see if we can restrict particular types of basement conversions in areas known to be at risk of flooding.

I am confident that the outcome of the panel’s work will be some amelioration in the worst affected locations and an improved, more coordinated Council response should such another event regrettably occur.

I commend our report, through the Overview and Scrutiny Commission, to the Executive of Camden Council and to Thames Water and trust they will act upon it.

Councillor Janet Guthrie

EXECUTIVE SUMMARY

1. The Floods in Camden Scrutiny Panel was set up by the Overview and Scrutiny Commission to look at the causes and impact of the widespread flooding that took place in Camden on 7 August 2002 and to make recommendations for action.

2. During the evening rush hour period on 7 August 2002, a series of thunderstorms unleashed torrential rainfall on Camden. The resultant flooding inflicted considerable damage on Camden residents and their homes, public services and facilities, and private businesses. Nearly all the flooding occurred north of the Euston Road, and primarily in West and South Hampstead (NW2 and NW6 postcode areas), although there was also flooding in parts of the NW3 postcode area, in Kentish Town (NW1 and NW5), and in a few other roads elsewhere.

3. Many residents were affected, and those who were unfortunate enough to have the flood water and sewage enter their properties suffered both damage to their homes and a great deal of distress. A number of people had to vacate their homes and, such was the magnitude of the impact, some have been unable yet to return home some eight months later.

4. Public services affected included local schools, West Hampstead Fire Station, Fortune Green Playcentre, and some Council offices. Public transport services were also severely affected, causing problems for residents and commuters alike.

5. Extensive costs were incurred as a result of the flooding. Not all costs could be or have been quantified, but *at a minimum* the identified costs run to approaching £1 million pounds. If the costs to individual residents were to be added in, the total would be very much higher.

6. Historical research showed that the topography of Hampstead and the nature of summer thunderstorms make high rainfall levels and flooding events a recurring feature in Camden. These phenomena have a long history and have not been recently created by global warming. Comparisons are drawn in the report between the 1975 floods in Camden and those in 2002, showing marked similarities.

7. The report focuses on exploring the contributory factors involved in the 2002 flooding, including past and current maintenance. It finds that a common explanation put forward for the flooding, that the highway gullies were blocked, leading to a build-up of water and flooding, is not a satisfactory explanation, for two reasons.

8. The first reason is that owing to the excessive rainfall the main sewer system became completely full and under what is technically known as ‘surcharge pressure’, forcing the water to find whatever outlet it could – not only back onto the streets through manholes and gully gratings but also unfortunately into residents’ homes directly, at basement and ground floor level. Even were the gullies to have been blocked, this would have made no difference: the flood water

could not drain to the trunk sewer. Secondly, Thames Water's evidence confirmed that the flooding was caused by its sewer system reaching maximum capacity very quickly so that the roads could not be drained at the rate the rain fell.

9. The scrutiny panel questioned Thames Water senior managers at length, and the report concludes on the basis of full answers to this questioning that Thames Water's inspection and maintenance of its sewers in Camden appears to have been adequate in 2002, and there is no evidence that maintenance deficiencies contributed to the flood extent and severity.

10. It further concludes that owing to the intensity, duration and direction of the rainstorm, the Thames Water sewer system serving the area became full and under surcharge pressure, to the point where it could not cope with any more rainfall, leading to the flooding. Any blocked or otherwise deficient Camden Council highway gullies could not have caused flooding on this scale.

11. The report notes that while the weight of evidence points clearly to blocked highway gullies not being the cause of the flooding, that is not to say that Camden does not have any blocked or deficient gullies. The panel's examination of Camden Council's gully cleaning service leads it to conclude that residents have a point when they query whether the service is sufficiently resourced and whether some simple steps could not be taken to improve the service's efficiency and minimise the number of blocked and deficient gullies.

12. The report therefore welcomes the Council's acknowledgement that the gully cleaning contract needs reviewing (including its record-keeping and performance monitoring arrangements) and retendering, and the assurance that this process had already been set in motion. Had this not been put in train by officers, the panel would have recommended that it be pursued. To reinforce this work, the report makes further recommendations to improve the service and ensure examination of the contract specification by the Overview & Scrutiny Commission before it is retendered.

13. The report also looks at how key agencies deal with flooding and what emergency plans exist for this contingency. Although it briefly considers the role and performance of the emergency services (police, fire and ambulance), it focuses on the role and performance of both the Council and Thames Water.

14. The report notes that the only statutory responsibility regarding flooding per se that Camden Council has is as a highways authority responsible for highway drainage, where it has a *duty* to ensure that gullies are maintained and serve their purpose. However, in respect of flooding generally the Council has directly relevant powers and duties in its capacities as a local housing authority and as a landlord, as well as other incidental powers.

15. The panel explored what planning powers the Council could bring to bear as a local planning authority on the problem of flooding. The report notes that the Council has strictly limited powers to control the conversion and occupation of basements through the planning and building control system, even when these

basements may be at risk of flooding. Recommendations are made, though, to see whether the review of the Unitary Development Plan could broaden two of its policies to cover issues relating to risk of flooding in vulnerable areas; and whether there is scope for restricting cellar conversions and basement excavations for residential purposes in areas of known flood risk.

16. The panel also took extensive evidence from relevant Council departments about what they did to deal with the flooding and its aftermath. While much valuable work was done, there were clearly deficiencies in the Council's response, as the report details. The report notes that the panel called for officers to begin drafting an Action Plan to address this situation, as an interim measure.

17. The report therefore makes a number of recommendations designed to improve the Council's response in future. It recommends that the Council improve its departmental and corporate capacity to respond effectively to flooding in particular and emergencies in general by building on the draft Action Plan instigated by the Panel. An important element in this is that the Council should increase the capacity and responsiveness at times of emergency of the 'out of hours' service, and the report suggests a variety of ways by which this might be achieved.

18. The report further recommends that the Council's Emergency Planning Officer should inform promptly the Chief Executive, the Corporate Management Team and appropriate Members (including relevant ward councillors) of local or borough-wide emergencies, according to agreed criteria and mechanisms in the Council's emergency planning procedures.

19. A key part of the panel's work was to take evidence from Thames Water senior managers about the company's role and performance. The report notes that Thames Water acknowledged that its handling of the aftermath of the flood could have been better and explained that it is currently examining its approach to flood events in order to respond to the criticisms made, with a view to being more proactive and improving its responsiveness.

20. The report details the current position regarding Thames Water's programme for dealing with sewer flooding, which is dependent on the amount of money that the Office of Water Services (Ofwat) allows it to invest and is prioritised according to the severity and frequency of the flooding experienced. There are properties on Thames Water's Sewer Flooding database in the Camden area, but at present the severity and frequency of flooding that they have experienced are not high enough to place them all in Thames Water's prioritisation programme for the period 2000 to 2005.

21. The panel welcomed Thames Water's expressed willingness to work with the Council on addressing flooding issues, and urged that an expert 'task group' should be established between the Council and Thames Water with terms of reference addressing the key problems identified in the course of the panel's investigations. The report notes that this idea has been speedily pursued and that the first meeting of the 'task group' has already taken place, with progress already being made on the key issues. Recommendations are made urging the

Council to press both Thames Water and Ofwat for further reductions in sewer flooding in Camden and make representations to WaterVoice Thames for support for such investment. The report also calls for a report back from the joint Task Force on progress within four months to the Executive Member for the Environment and the Overview & Scrutiny Commission.

22. Finally, in recognition that solutions to many of the major problems identified lie outside the Council's control, a recommendation is made that the Council should communicate the panel's report and its findings to Camden's MPs and to the all-parliamentary Floods Group of MPs; the Association of London Government and the Local Government Association; the GLA member covering Camden and the Greater London Authority; and the Government minister with responsibility for flooding.

FLOODS IN CAMDEN SCRUTINY PANEL

Panel Membership

Councillor Janet Guthrie (Chair)
Councillor Harriet Garland
Councillor Theo Blackwell (resigned)
Councillor Jonny Bucknell
Councillor Flick Rea
Jane May (co-opted member)

Policy & research support

Professor Edmund Penning-Rowsell, Flood Hazards Research Centre, Middlesex University (expert adviser)
Tim Young, Scrutiny Manager, Corporate Policy & Projects, LB Camden
Graham Magee, Scrutiny Officer, Corporate Policy & Projects, LB Camden

Committee support

Vicky Wemyss-Cooke, Committee Services, LB Camden

Contributions of evidence

The Panel would like to thank Camden residents and community organisations, Thames Water, the emergency services, NHS colleagues, transport operators, local businesses, Camden Council Members and officers, and a range of other organisations who gave evidence and whose contributions are detailed in Appendices 2 and 3 of this report.

The Panel would also like to thank the large number of residents whose homes were flooded for their regular attendance at panel meetings and for their invaluable contributions.

The Panel would also like to thank Stephen Berryman for the photographs in this report taken of the flood in Lymington Road NW6 on 7 August 2002.

1. Introduction

1.1. The Floods in Camden Scrutiny Panel was set up by the Overview and Scrutiny Commission to look at the causes and impact of the widespread flooding that took place in Camden on 7 August 2002 and to make recommendations for action.

1.2. The flood caused a great deal of damage for those unfortunate enough to have the flood water and sewage enter their properties and also caused a great deal of distress to those affected. Many people had to vacate their homes and, such was the magnitude of the impact, some have been unable yet to return home some nine months later. In addition to flooding residential properties, considerable damage was inflicted upon public services and facilities and private businesses.

1.3. The panel held five meetings and took written evidence from a large number of residents and local organisations, as well as from council officers, the emergency services, Camden Primary Care Trust, neighbouring boroughs and other stakeholders.

Membership

1.4. The Panel is an independent lay scrutiny body set up by the Overview and Scrutiny Commission to carry out the specific task of looking at the floods in Camden. It was originally set up with five non-executive councillors. No member of a scrutiny panel can be a member of the Council's Executive, since they make most of the Council's decisions within the policy and budget framework set by the Council. Therefore when one panel member, Cllr Theo Blackwell, was elected to the Executive soon after the Floods panel was set up, he had to stand down from the panel and was not replaced. However, the panel also co-opted Jane May, a local West Hampstead resident active in a local community association and with direct experience of the flooding; and appointed an expert adviser, Professor Edmund Penning-Rowsell, an independent academic expert from Middlesex University Floods Hazards Research Centre, to assist the panel in its work.

1.5. The number of councillors on each scrutiny panel is usually set at eight, with seats allocated in proportion to the representation of the different political parties on the Council. However, for this panel the three political parties agreed to experiment with a smaller panel membership of only five councillors – three Labour, one Conservative and one Liberal Democrat. The panel members were: Cllr Janet Guthrie (Labour - Chair), Cllr Harriet Garland (Labour), Cllr Theo Blackwell (Labour - resigned), Cllr Jonny Bucknell (Conservative), and Cllr Flick Rea (Liberal Democrat).

Terms of Reference

1.6. The Panel's terms of reference, agreed by the Overview and Scrutiny Commission at its meeting on 15 October 2002, were as follows:

a) To examine the extent and impact of the flooding in Camden on 7 August 2002.

b) To assess what contributory factors were involved in the flooding, including past and current maintenance.

c) To look at how key agencies deal with flooding and what emergency plans exist for this contingency.

d) To estimate where possible the costs incurred by the Council and other relevant agencies in dealing with it.

e) To make recommendations for appropriate action by the Council and other agencies.

Mode of working

1.7. The Floods Panel was the sixth one to be set up by the Overview and Scrutiny Commission in its 2002-2003 programme. Rather than hold an intensive series of panel meetings on a fortnightly basis for nine months, the Commission agreed to set this panel to work in an experimental fashion, meeting monthly to enable it to digest a large number of key documents and producing a report in a shorter timescale than most panels.

Evidence

1.8. Given this overall brief and its specific terms of reference, the Panel agreed at the outset that it wished to gather written evidence from as many residents as possible who were directly affected by the floods, from local organisations and from other stakeholders whose views and experiences were also relevant. We therefore publicised the panel in local newspapers, through residents' associations and by writing to a wide range of stakeholders. During the scrutiny we considered written evidence from a large number of local residents and local organisations, as well as from public and private agencies including the emergency services, Camden PCT, transport operators, Ofwat, WaterVoice Thames, neighbouring local authorities, and the Association of British Insurers. A full list of those who gave written evidence to the panel is attached at Appendix 2.

1.9. The Panel also agreed to focus the limited number of sessions it had available to take oral evidence on questioning in detail key council officers and in particular Thames Water (full details to be found in Appendix 3). We were pleased that Thames Water recognised the

importance of the panel's work by both supplying us with written evidence and providing three key senior managers to attend a panel meeting and answer our questions. This meeting was almost entirely dedicated to exploring Thames Water's responses to the flooding event and what the company might do to tackle the problem in future.

1.10. We would like to thank all of those who gave their views to the panel, whether in person or in writing. Their contributions were invaluable. We also wish to thank the considerable number of residents with first-hand experience of the floods who attended the panel meetings and contributed information and views to the panel's proceedings. We have drawn on the evidence supplied by residents to illustrate in particular the extent and impact of the flooding in Camden.

1.11. Some of the subject matter in this report is inevitably technical or deals with agencies that may be unfamiliar, so a glossary of terms can be found in Appendix 5 towards the end of the report.

1.12. In the remainder of this report, we have taken an overview in section 2 of the extent and impact of the flooding in Camden, including the costs incurred by the Council, other relevant agencies and local residents in dealing with the flooding. Section 3 focuses on exploring the contributory factors involved in the flooding, including past and current maintenance. In section 4 we have looked at how key agencies deal with flooding and what emergency plans exist for this contingency. Our recommendations are to be found at appropriate places throughout these sections but are also gathered together in Appendix 1. Finally, in recognition that solutions to many of the major problems identified lie outside the Council's control, section 5 offers some routes for taking forward action at a regional and national level.

2. The extent and impact of the flooding in Camden on 7 August 2002

The extent of the 2002 flooding

2.1. During the evening rush hour period on 7 August 2002 a series of thunderstorms unleashed torrential rain on Camden. According to the Meteorological Office, Hampstead Heath received 60mm (2”) of rain in just under an hour on 7 August.

2.2. Evidence taken by the panel showed that the flooding on 7 August 2002 inflicted considerable damage on public services and facilities, on private businesses, and on Camden residents and their homes. With the property information provided to us by residents, businesses and other bodies, we mapped the extent of the flooding in Camden. South of the Euston Road we received no reports of flooding, apart from the basements of Camden Town Hall and the Housing Department’s central offices in Bidborough House; all other flooding occurred north of the Euston Road, and primarily in West and South Hampstead (NW2 and NW6 postcode areas), although there was also flooding in parts of the NW3 postcode area, in Kentish Town (NW1 and NW5), and in a few other roads elsewhere. This was broadly confirmed by evidence from both the Metropolitan Police and the London Fire Brigade: the police, for example, received 127 calls regarding flooded premises in the NW3 and NW6 areas, while the Fire Brigade took 93 calls from the Belsize area, 89 calls from West Hampstead and 44 calls from Kentish Town.

2.3. There may have been some flooding in other roads in the borough of which we were unaware, but with the limited time at our disposal we have captured the 2002 picture to the best of our knowledge. Later in the report in section 4 we make recommendations about how the fullest possible mapping of the extent of the 2002 flooding should be obtained, and how that information should be put to use.

2.4. Our researches also unearthed detailed information on the severe floods that hit Camden in 1975, nearly three decades earlier. Figure 1 on the next page, overlays the 1975 data on the 2002 data to show which roads and areas were flooded on both occasions, and which suffered only once, either in 1975 or 2002, while Appendix 4 lists the roads in two columns, 1975 and 2002, for easy comparison. The 1975 floods appear to have been more widespread, although we recognise that this is of little comfort to those residents who were so badly affected last year. We will return to these historical comparisons later in this section.

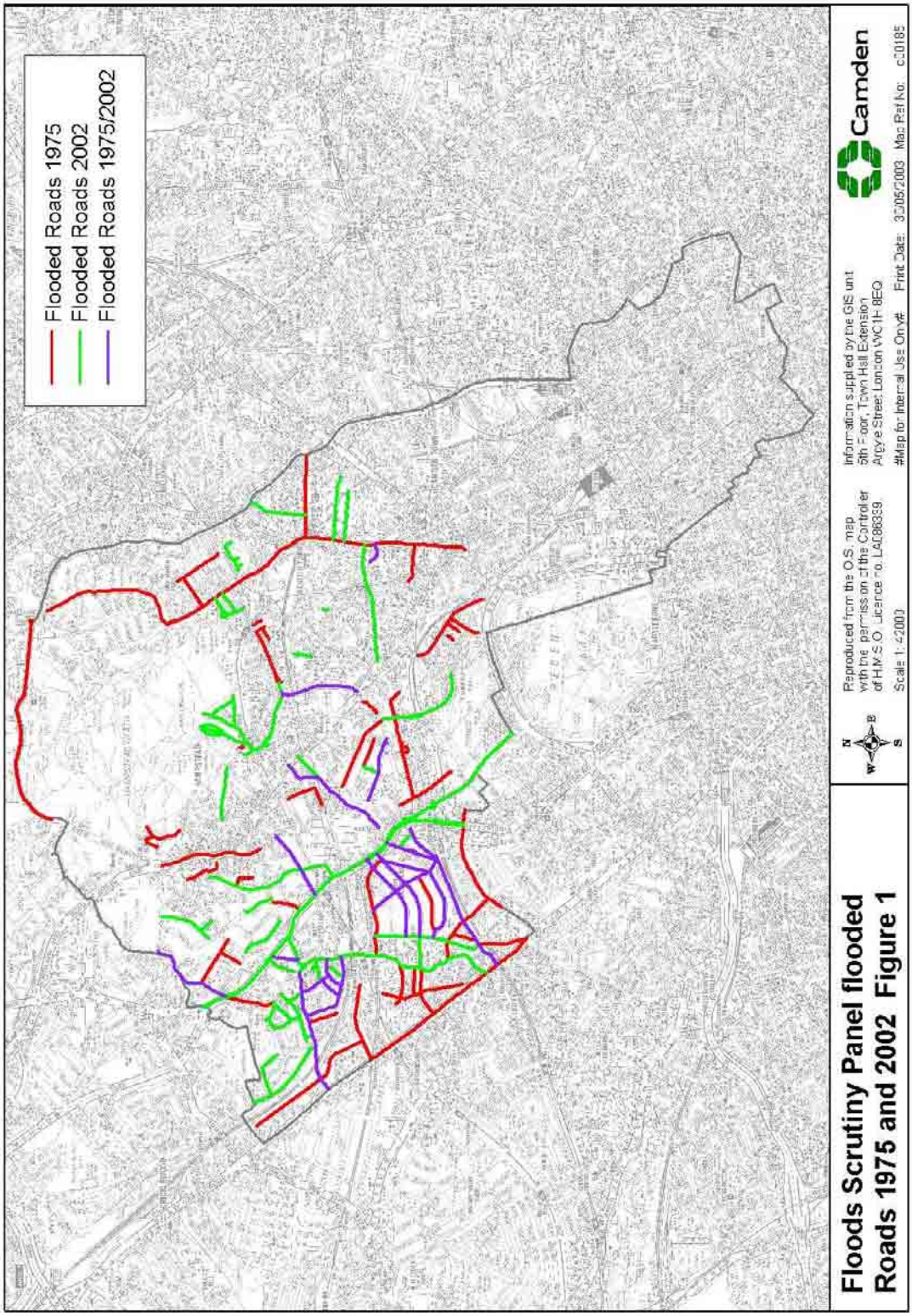

Figure 1 Map showing flooded roads and properties in 1975 and 2002

The impact of the 2002 flooding

2.5. The impact of the flooding was undoubtedly severe. In this brief report a few selected examples will have to stand for the depth of evidence that came to us, from our own researches and from accounts that were supplied to us in response to our invitation to submit experiences and testimonies. We shall look in turn at public services and facilities, private businesses, and Camden residents and their homes, but reserve most space for the residents' story. Their experiences were the most widespread and most stressful. As the Camden Primary Care Trust identified in its evidence to us:

> *Flooding affects people psychologically – they often feel powerlessness and helplessness during a flood, and find making repairs, cleaning up, and dealing with insurance claims after flooding stressful. The psychological effects of flooding can continue months or even years after the event, and are often more pronounced than the physical health effects.*

2.6. Public services affected included local schools, West Hampstead Fire Station, Fortune Green Playcentre, and some Council offices. Of these, the impact on Hampstead School was particularly severe:

Damage to Hampstead Secondary School, Westbere Road, NW2

Flood water running off the open area at the rear of the site, which is University College Sports Ground, built up against the school's rear brick boundary wall until the pressure from the build up resulted in a collapse of approximately 50 metres (140') of wall and fencing. The water that had built up was then free to carry on into the school, resulting in the damage to the building areas noted below.

Damage occurred to 6 areas: the rear boundary wall; the main hall which required a complete new raised timber floor; the drama block which also required a new floor; the IT Room which was flooded to a depth of 1.5 metres (5'), damaging internal finishes, computer benching, computers and electrics; the plant room which needed new heating equipment; and the surface of the tennis courts.

2.7. Transport was also severely affected, causing problems for residents and commuters alike. Traffic on roads encountered flood waters a foot deep or more in places – one resident described seeing "*cars attempting to drive down the road with their tyres entirely obscured by the water level."* The photograph on the following page shows a van travelling along Lymington Road NW6.

2.8. Public transport services were widely disrupted. Kings Cross underground station, for example, was closed at the height of the rush hour, and overground train services out of Euston experienced cancellations and delays, as an earlier train incident was compounded by the heavy rain, which itself created major track and signalling problems.

Silverlink train services – extracts from incident log

- Overhead lines down at Camden on 07/08 at junction of main line and North London Line at 12.00. Shuttle services in operation - all freight cancelled. 2 Units trapped and passengers de-trained. Large amount of work as much damage; work hampered by severe thunderstorms, lightning and heavy rain.

- Also, same evening Euston flooded due [to] large downpours of rain, all lines blocked. Primrose Hill tunnel also flooded.

- At same time retaining wall also collapsed on up Euston to Watford route but fell across all lines. First services on Euston to Watford route ran to Kilburn but due to damage to signal by debris services terminated at Willesden.

- Although water subsided for next day it had caused failure to 2 track circuits on the Euston to Watford line. Full service began at 10.00 on 08/08.The flooding then continued later in the day and on the 09/08 with Primrose Hill having a problem of flooding, caused by failure of pumps not being able to cope with amounts of rain. On morning of 09/08 this also trapped units for the North London Line and Clapham Junction services.

2.9. Private businesses were also affected by the flooding. On the eastern side of Camden, for example, shops in Kentish Town Road between Hawley Road and Farrier Street were flooded and began clearing out their premises on the morning after the flood. On the western side of the borough, commercial premises in Mill Lane were also flooded. The Boulevard Restaurant in West End Lane was so badly affected that it had to close for refurbishment and has only just reopened for business.

2.10. It is, however, Camden residents who have suffered most from the flooding. The event of 7 August 2002 caused a great deal of damage for those unfortunate enough to have the flood water enter their properties. The flood also caused considerable distress to those affected, as the testimonies below show.

> The flood water came up through the basement toilet and if it hadn't been for the efforts of my son who blocked the toilet with clothing and a mop, the amount of sewage in the flat would have been much more. The whole basement was flooded to about two foot of water and my son is still traumatised by the experience. We removed all the carpet that evening, to start the drying out process. This took over three weeks and involved a de-humidifier on full 24 hours, for over two weeks.
> ***Resident, Mill Lane, NW6***
>
> Our ground floor flat was flooded. The drain was simply unable to cope with the amount of water at the back of the house, and burst up through the drain outlet into our bathroom shower. Although we baled out the shower-base frantically -- with the additional assistance of kind neighbours -- we could not contain it. The none-too-fragrant water cascaded out of our bathroom, into our hallway and across our dining room.
> After all this time, we are still getting our home back to normal... The bathroom, hall and dining room [walls which had to be hacked out and replastered, with a new damp proof course injected], are now at long last being redecorated as I write. We are currently waiting for a date when the wood flooring will be replaced. The hall carpet will be laid in January. So we have been living more or less on a building site/furniture-warehouse state since August.
> ***Resident, Chesterford Gardens, NW3***
>
> Family x of xxx has 3 children … and they are all traumatised by this flood. y lost 2 years of GCSE coursework and all her lifetime's artwork and feels she's lost part of herself. They are all frightened whenever it rains and on bad nights all pile into their mother's bedroom. z says it was hot water that was gushing out of the exploding manhole covers. They now have more problems to do with plumbing and have put into Paddington Churches for a transfer. Paddington Churches have made an effort and redecorated all their bedrooms but with all bedrooms at basement

level everyone is still very nervous.
Resident, Goldhurst Terrace, NW6

The basements of my neighbour's and my house are converted and comprise the kitchen, dining and study/living area, and bathroom. Water flooded up from the drains at the back of the two houses, through the bath, the toilet, and the back patio doors, flooding every inch of our basements. The height of my neighbour's flood was four feet and mine eight inches, in both cases causing irreparable damage to electrical equipment, furniture and fittings, and irreplaceable personal possessions.
Resident, NW1

2.11. Many people affected by the flood had to vacate their properties and, such was the magnitude of the damage sustained, at least eight households have been unable yet to return to these properties some nine months later.

We were flooded out of our home… on 7th August 2002, and are currently living in the Swiss Cottage Hotel… without any idea when we will be able to return. The drying out process is still continuing. The floors, walls, fitted cupboards throughout, bed and furniture were badly affected; most of it is beyond redemption and will need to be replaced.

One of us was indoors at the time of the flood; the situation was frightening and quite beyond the control of the individual who could do nothing to prevent the water flooding through the flat to around three feet in depth.
Resident, Goldhurst Terrace, NW6

The flood waters penetrated the lower sash of the windows in the bedroom and living room, and through the French windows in the kitchen. Flood water also penetrated the flat through the air bricks. The drains backed up through the toilet and bath. Flood waters came down the steps from Cannon Hill, through the door next to the lockers, and thence through the inner door to the kitchen. The whole flat was flooded, the kitchen being flooded to a depth of 1100mm (3'). The resident had to move out and the flat is still unoccupiable.
Estate Manager, private flats, NW6

xx Parkhill Road, NW3 **–** Extensive flooding occurred. Repairs are ongoing and anticipated cost is in excess of £30,000. The tenants have been decanted to privately rented accommodation at a further cost.
Gospel Oak District Housing Office Manager, Camden Council

2.12. The panel was also informed about the tragic death of an elderly Camden resident, who was flooded out, hospitalised, discharged into

the local authority's care, taken ill and returned to hospital, and unfortunately died nearly three weeks after the flood hit her home. While we were grateful to have received evidence about this resident's circumstances and experiences, her post-flood treatment and care were outside the panel's remit. The panel therefore endorsed the Chair's action of forwarding the case details to the appropriate bodies for their consideration and appropriate action. At the time of writing the Social Services Department had just completed their investigation into the details of the testimony (which was being treated as an informal complaint to the Department). The NHS bodies involved will be approached informally by the Social Services Department on concluding their report but may well want to be asked formally to investigate by the representatives involved before they do so.

The costs of the August 2002 flooding

2.13. When gathering evidence about the extent and impact of the flooding, the panel asked those supplying information to provide an estimate of the costs they had incurred in dealing with the flood, on the day and making good afterwards. Evidence came from a variety of sources – Council departments, housing associations, local residents, transport operators etc – and showed that extensive costs were incurred as a result of the flooding. Not all costs had been quantified at the time we gathered our evidence – only a few residents out of the large numbers affected provided estimates of the damage incurred to their homes and possessions. Nor could a figure be put on costs such as rectifying the problems of the Primrose Hill tunnel being blocked, the wall collapsing across the track near Euston and the delays and cancellations in train services identified in Silverlink's evidence.

2.14. However, *at a minimum* the identified costs incurred in the event run to approaching million pounds. If the costs to individual residents were to be added in, this total would be very much higher. Although some of the costs are covered by insurance, all told this represents a considerable amount of resources that could have been otherwise productively used.

Historical evidence and comparisons

2.15. The panel also carried out research into how the flood of 7 August 2002 compared with other flood events that have occurred in the area. The archive material held at Holborn Library and the former Borough Engineer's maps held in the basement of Camden Town Hall were used to gather information on flooding in Camden over the last 125 years.

High rainfall and flooding

2.16. The historical sources showed that the topography of Hampstead and the nature of summer thunderstorms make high rainfall levels and flooding events (see box below) a recurring feature in Camden. These

phenomena have a long history and have not been recently created by global warming.

2.17. The historical data on such summer storms and the experiences of flooding has raised the question of the risk of flooding and how this is stated. A high level of rainfall/flood expected once in 100 years (otherwise known as a return period of 100 years) translates back to a flood risk of 1% in any year. The problem is that after such an event people assume it will not be repeated in their lifetime. However, the *probability* of it occurring is exactly the same for any year, including the next one.

1878 Flood Summary
A downpour on 10th and 11h April lasting 19 hours ending at midday, produced exceptional fall of 11.73cm (4.62") at Haverstock Hill. Widespread flooding occurred, causing much damage. Another followed this great storm two months later. G.J Symons measured 8.31cm (3.27") in one and a half hours in Camden Square on 23 June.

1922 – 1931 Summary
In 1923 a terrific thunderstorm lasted all night on 9-10 July with the most vivid lightening of the twentieth century. Several thousand flashes were counted and the rainfall total of 6.53cm (2.57") recorded for the observatory at Hampstead was not broken until 1975. London suffered widespread flooding.

1924 had one of the wettest summers on record and the total for the year was 97.64cm (38.44"), only exceeded by 1927. Rainfall in July 1924 was 19.3cm (7.60"), the highest total for any month, a record that still stands.

In 1927 the exceptional total of 97.97cm (38.57") fell, the highest annual fall recorded. This is the only occasion when over 254cm (100") has fallen in three consecutive years.

1975 Flood Summary
'Severe storm between 5.30pm and 8.00pm on 14 August 1975 – caused flooding in lower lying areas of Hampstead. Heaviest and most concentrated since records began for this part of Borough, over six inches of rain [15cm] fell - likely to be once every 100 years. The drainage capacity of household drains, road gullies and sewers was far exceeded and was unable to cope with the volume of water involved.'
London Borough of Camden Works Department

Water courses

2.18. The research also uncovered evidence on the many small streams, rivulets ponds and wells that existed or underlie the Hampstead area, which have never been channelled or culverted.

2.19. The relevance of this was to discover which of these numerous old water courses are still running, with what sort of flow and whether this has any impact on the hydraulic incapacity of the sewer system. The research showed that such courses existed but further study and analysis would be required to draw any firm conclusions about whether such underground streams have any impact on flooding. Nevertheless, the information obtained from the records to date is available for use by Thames Water, and we would expect the Council to be proactive in enabling Thames Water to have access to any maps and data as required.

3. Contributory factors involved in the flooding, including past and current maintenance

Sewerage and drainage responsibilities

3.1. Before the panel could properly examine and assess the contributory factors involved in the August 2002 flooding, we first had to clarify which authorities were responsible for the different parts of the sewerage and drainage systems in Camden: public sewers; highway drainage systems; and private sewers and drains.

Public sewers

3.2. Thames Water Utilities Ltd are responsible for public sewers. Under the Water Industry Act 1991 Section 94 Thames Water have a general duty to "*provide, improve and extend the public sewer system to ensure that their areas are, and continue to be, effectually drained*". The water industry regulator Ofwat makes sure that water companies can carry out their responsibilities under the Water Industry Act 1991[1].

Highway drainage systems

3.3. Highway drainage systems are generally the responsibility of the London Boroughs. These generally comprise road gullies, which drain both highways and pavements, connected by small diameter pipes to the public sewer system. For each road gully, below the cast iron grating visible on the highway, there is a gully chamber (which effectively stores silt between cleans). This leads into a small diameter pipe connected to the main public sewer, which can be typically 10 metres (30 feet) below the road surface. Figure 2 on the following page illustrates this arrangement.

[1] Ofwat describes its role as: 'We are the economic regulator of the water industry in England and Wales. This means that we:

- limit the amount companies can charge customers;
- make sure that companies can carry out their responsibilities under the Water Industry Act 1991;
- protect the standard of service you receive;
- encourage companies to be more efficient; and
- work to encourage competition where appropriate.'

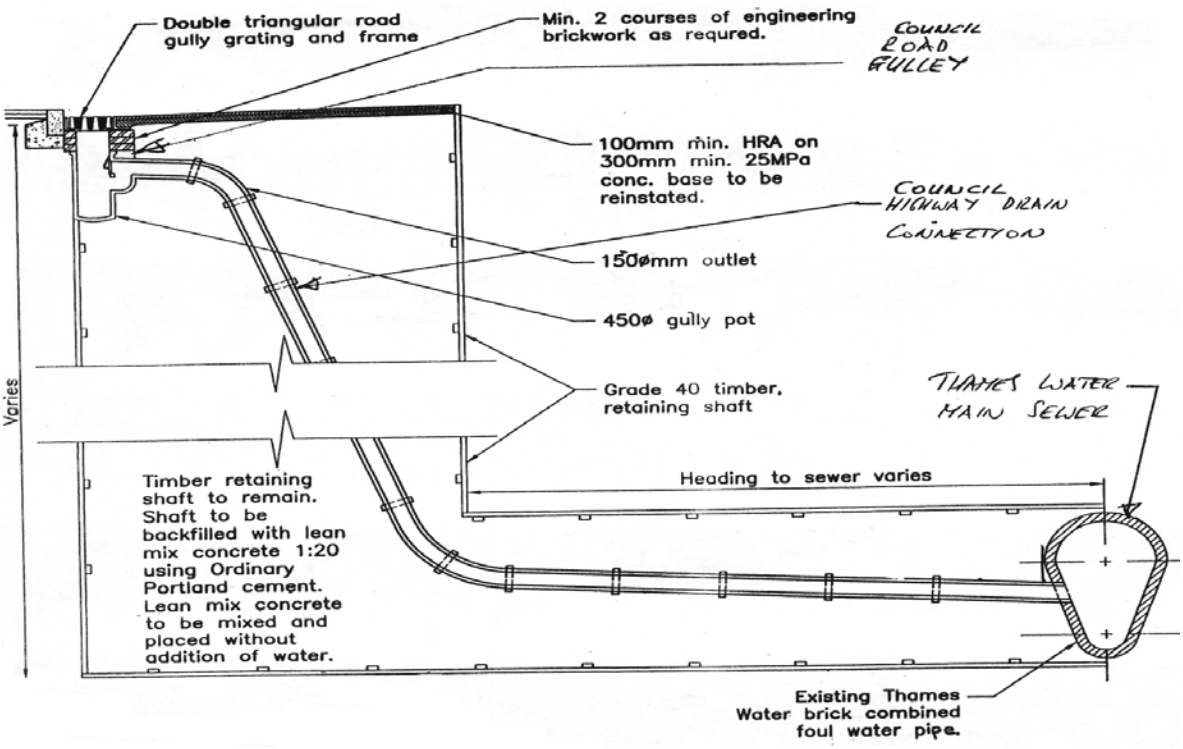

Figure 2 Highway Drainage Systems

Private Sewers and Drains

3.4. In addition, there are extensive lengths of sewers and drains which are in private ownership (or in some cases owned by London Boroughs, for example in their capacity as a housing authority). Most highway and private sewers and drains flow into the Thames Water combined public sewer system. In that sense both highway and private drainage are dependent on the Thames Water system to provide an effective outlet (although individuals may to choose to connect foul water to a cess pit/septic tank and surface water can be connected to a soakaway).

Explanatory factors in the flooding

3.5. Before the panel was set up, a common explanation being put forward for the flooding was that gullies, which are Camden Council's responsibility, were blocked which led to a build-up of water and flooding. However, in the course of taking evidence it became clear to the panel that this was simply not a satisfactory explanation, for two reasons.

3.6. Firstly, we read in a large number of residents' accounts of the flooding that manhole covers had been blowing off, that the drains on their property could not take the rainwater away, and that sewage water was coming into homes through toilets, sinks and baths. This indicated, as our independent expert adviser confirmed, that the main sewer system was completely full and under what is technically known as 'surcharge pressure', created by water flows from areas further upstream in the public sewer system. This pressure was forcing the water to find

whatever outlet it could – not only back onto the streets through manholes and gully gratings but also unfortunately into residents' homes directly, at basement and ground floor level. Even were the gullies to have been blocked, this would have made no difference: the flood water could not drain to the trunk sewer.

3.7. The second reason was that Thames Water's written evidence of December 2002 confirmed that the flooding was caused by its sewer system being unable to cope. The volume, intensity and direction of the rainstorm on 7 August led to not only its main sewers but also its North West Storm Relief sewer[2], which relieves the main sewers, becoming full:

> *… the August event moved through Camden in a North to South direction, the same as that of the Storm Relief sewer. This resulted in the sewer reaching maximum capacity very quickly and remaining under pressure throughout its total length. The highway drainage system could not drain the roads at the rate the rain fell; this resulted in heavy overland flows running down the hills in Belsize Rd, Priory Terrace, Goldhurst Terrace, Pandora Rd and Sumatra Rd to the low points where, unable to access the sewers, it created very deep water levels at these locations. When the storm relief sewer reached its capacity, no additional rainfall could get into the sewer. With high volumes of water still pressurising the sewer, all flow above capacity discharged into Belsize Road at the junction with Priory Rd.*

3.8. In contrast, Thames Water explained that a storm the following month moved in from the West and was much less geographically concentrated. This had the effect of spreading the load over more trunk sewers, so that the Storm Relief sewer was able to maintain a downstream capacity to allow waterflows to be kept underground.

3.9. Many residents made the point in their evidence to us that the North West Storm Relief sewer was built precisely to save the West Hampstead and South Hampstead areas from flooding, yet less than a decade after its completion the area had suffered its worst flood since 1975. A key issue therefore was why Thames Water's Storm Relief sewer had not coped with the rain on 7 August. When Thames Water senior managers attended a panel meeting in March 2003 we specifically asked them this question.

3.10. The minutes of that meeting confirm Thames Water's written evidence that the reason homes in that area were flooded was that the Storm

[2] The North West Storm Relief Sewer was designed for a 1 in 10 year storm period and completed in 1994 at a cost of £5.1m. See Figure 3 which shows where the Storm Relief Sewer runs through Camden.

Relief Sewer was inundated and could not cope with the volume of rainfall that was outside the parameters to which it was built. The storm relief sewer ran beneath these roads and this was where most of the surface flooding occurred. Thames' managers agreed that logic would indicate that the relief sewer had mitigated the flooding on 7 August, but only through modelling the flood event could this be said for certain. Worryingly for all concerned, Thames acknowledged that if a storm of similar intensity was to occur again it was very likely that these homes would be flooded again.

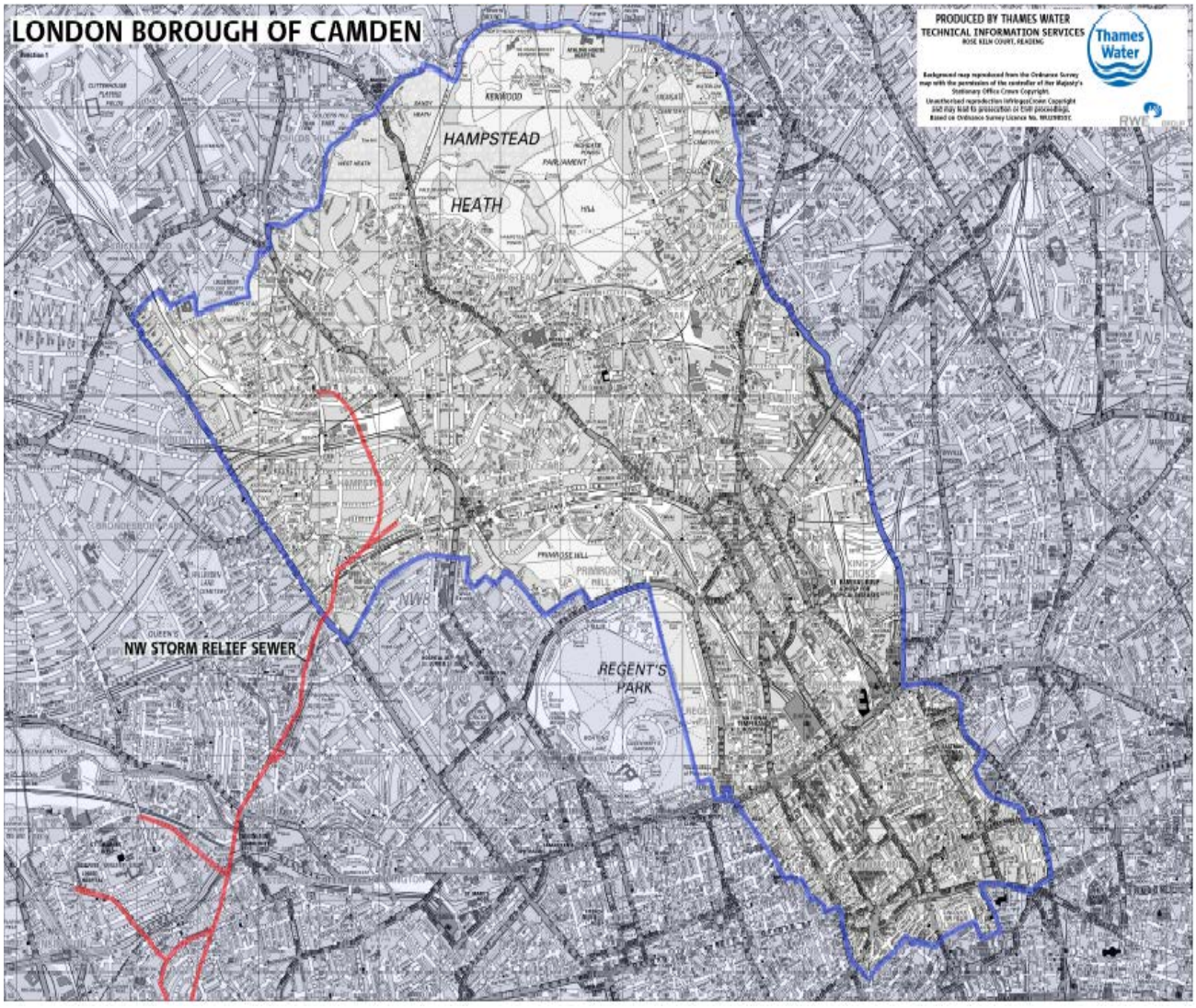

Figure 3 Map of North West Storm Relief Sewer in Camden

3.11. We further checked with Thames Water managers at this panel meeting about their inspection and maintenance arrangements, to see if there were any deficiencies in them. Thames explained that maintenance of the smaller local sewers is largely reactive - when Thames receives information that there is a problem with a local sewer a team is sent out to inspect and clean it as appropriate. The large trunk sewers are maintained by way of 'danger point rounds' - areas of the network that have a history of blockage or maintenance issues are

inspected on a regular basis. These sewers drain by gravity and are largely self-cleaning.

3.12. The North West Storm Relief Sewer itself is inspected quarterly and after significant storm events. Prior to the 7 August 2002 storm it had last been inspected in June 2002, with no problems logged. The panel was assured that more frequent inspections would serve no purpose since on a day-to-day basis it would be empty. It was inspected after the 7 August 2002 flood and one weir board in the NW6 area had become dislodged, which meant that the combined sewer network would have 'spilled over' into the storm relief sewer earlier in the storm event than would normally be the case. This would have had no material effect during a rainfall event of that size.

3.13. On the basis of these full answers to our questioning, we conclude that the inspection and maintenance undertaken on Thames Water's sewers in the north west of Camden appears to have been adequate in 2002, and there is no evidence that maintenance deficiencies contributed to the flood extent and severity.

3.14. We further conclude that owing to the volume, intensity and direction of the rainstorm, the Thames Water sewer system serving the area became full and under surcharge pressure, to the point where it could not cope with any more rainfall, leading to the flooding. Any blocked or otherwise deficient Camden Council highway gullies could not have caused flooding on this scale. The problem on 7 August was that both highway and private drains were no longer able to discharge into Thames Water's sewers while these were under surcharge pressure as a result of being completely full with the excessive rainfall.

Improving gully cleaning

3.15. As gully cleaning is the responsibility of Camden Council, we considered it in some detail, and our conclusions are set out here.

3.16. While the weight of evidence points clearly to blocked highway gullies not being the cause of the flooding, that is not to say that Camden does not have any blocked or deficient gullies. We took evidence from the Acting Head of the Engineering & Traffic Service at our first panel meeting and followed that up with further questioning at the subsequent meeting. We ascertained that Camden Council maintains approximately 12,000 road gullies, of which it is estimated that no more than 500 are blocked at any one time to the extent that they no longer rapidly clear water from the adjacent highway.[3]

[3] Gullies include as part of their construction both a "trap" (which provides a waterseal from the main sewer) and a "pot" or chamber which collects silt and prevents this being washed into the highway drain connection and into the main sewer. Gullies which from the road surface appear to contain water are therefore generally working satisfactorily as designed. The gully cleansing operation involves

3.17. Gullies become blocked for a number of reasons: building waste and ready-mixed concrete being fly tipped into them; gully covers/ gratings being blocked by leaves, rubbish and general debris generally as a result of storm conditions or rapid leaf fall; and restaurant waste, in particular large volumes of fat which congeal. Gullies can also become blocked over time through a failure in the connection to the main sewer, caused by deterioration due to age, tree root growth or damage by statutory undertakers' work.

3.18. The Council's performance target for cleaning each gully is twice per year, which is increased for "critical gullies" such as those in low lying areas to up to four times per year, but we noted that there are a number of factors that affect output by the gully crew of the Council's single gully cleansing machine. Heavy parking in some areas requires suspension of parking bays to access gullies, but this is currently very staff intensive and only a proportion of roads can be dealt with in this way. Parking in many streets often requires a second or third visit to achieve satisfactory access, which has a knock-on effect in maintaining the overall cleaning programme. Similarly the number of gullies that can be cleared per day on an "emergency" as distinct from "programmed" basis depends on location and time taken to travel from job to job, together with how difficult each job is. The panel observed a gully cleansing machine in operation and witnessed the amount of time needed to remove not just concrete and rubble, but also knives and used drug syringes from the gully.

3.19. However, our examination of Camden Council's gully cleaning service leads us to conclude that residents have a point when they query whether the service is sufficiently resourced and whether some simple steps could not be taken to improve the service's efficiency and minimise the number of blocked and deficient gullies. We noted, for example, that the Council used to have three machines on the road in the 1980s, when car parking in Camden was much less intensive. Fly-tipping and disposal of drug debris into gullies have only added to the task.

3.20. We welcomed therefore the Acting Head of Engineering & Traffic Services's acknowledgement that the gully cleaning contract needed reviewing (including its record-keeping and performance monitoring arrangements) and retendering, and the assurance that this process had already been set in motion, although we noted that it could take from 9 to 12 months in order to comply with European competition legal requirements. The pre-retendering review process will look at options for increased resources and systems which focus attention on critical gullies in areas which are prone to flooding.

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removing silt, grit and detritus from the trap/chamber. This can amount to a considerable quantity but does not indicate that a gully is blocked or not functioning.

3.21. Had this not been put in train by officers, we would have recommended that it be pursued. To reinforce this work, though, we have further recommendations to make. In their evidence to the panel, individual residents and residents' organisations made a number of very helpful suggestions on how to improve the gully cleaning process and how they might assist the Council. We have therefore incorporated those ideas into a composite recommendation, with a further supporting recommendation.

Recommendations

1. **That the Council's Environment Department should improve its gully cleaning performance by:**
   a) **focusing its priorities on the areas of known flood problems (especially in the spring and early summer cleaning schedules);**
   b) **devising a more rigorous and effective monitoring regime, including an updated system for gully identification ;**
   c) **enlisting the help and co-operation of local residents by publicising in advance (for example, via the Camden website, local organisations' newsletters and door-to-door deliveries) when gully cleaning is to take place in an area;**
   d) **enabling members of the public to report activities such as fly tipping into gullies; and**
   e) **exploring the possibility within the Council's waste management contract of street sweepers clearing leaves out of gullies where appropriate.**

2. **That, because of the importance to the panel of this issue, the contract specification for gully cleaning be submitted to the Overview and Scrutiny Commission at the appropriate time for consideration.**

3.22. In the course of taking evidence the panel did hear of a small number of instances of very localised flooding where minor highways works, such as raising kerbs, redesigning some traffic calming measures, installing extra storm gullies and correcting damage done to council engineering work by other contractors might mitigate the effects of heavy rainfall. All these cases have been passed to Engineering and Consultancy Services in the Environment Department to deal with.

Recommendation

3. **That the Council's Environment Department investigate these cases of very localised flooding, carry out surveys and undertake a programme of minor highways works to deal with them.**

3.23. In the next section we turn to the role key agencies have regarding the problem of flooding; what emergency plans exist for this contingency;

and how agencies acquitted themselves during the flood on 7 August 2002 and immediately afterwards.

4. Dealing with flooding in Camden

4.1. Although we will briefly look at the role of the emergency services, our focus in this section of the report is on Camden Council and Thames Water.

The role and performance of the emergency services

4.2. The role of the three emergency services – police, fire and ambulance services – are different but complementary with regard to flooding. The function of the police is the same in any emergency. Their role is to secure the area once an incident has happened and act as facilitators for other emergency services. The police co-ordinate activities at the scene of the emergency and try to avoid duplication. As with other services, the police are responsible for the preservation of life and property, but the skilled rescue service is the London Fire Brigade while the London Ambulance Service's role is to triage, treat and transport casualties.

4.3. A large number of residents contacted the Metropolitan Police on 7 August. The police received 127 calls on regarding flooded premises in the NW3 and NW6 areas, for example. However, most of the callers were either referred to the London Fire Brigade or the police themselves passed the information to the LFB. Officers were only required to attend a single call, which took about 30 minutes.

4.4. In total, the London Fire Brigade (LFB) dealt with 245 calls about flooding in Camden in the period from 1731hrs 7 August to 0020hrs on 8th August, using their 'Batch Mobilising' procedure which allows it to prioritise life threatening calls and deal with less urgent calls in turn. Much of the work on the ground consisted of small-scale pumping out of premises, damage control and general assistance to householders. The LFB explained that it always tries to work with other agencies in such circumstances when necessary. It has generic brigade contingency plans for such events, including the use of fire engines from adjacent areas to help deal with the high number of calls, if necessary. One LFB crew attending Camden on 7 August came from Kensington fire station.

4.5. It was this LFB crew that particularly assisted residents in the Fairhazel Gardens/Goldhurst Terrace area. Attending a call after the rain had stopped, the crew lifted a manhole cover on the pavement outside 15 Fairhazel Gardens and used a ceiling hook to clear a blockage, which made the flood water fall rapidly.

4.6. The London Ambulance Service (LAS) also attended a number of calls in Camden on 7 August but was unable in its evidence to provide precise details of calls where the service attended residents or businesses affected by the floods. However, we were informed that the impact on the LAS as a result of the flooding was judged to be terms

minimal and neither of the LAS sectors involved reported any special or particular problems or difficulties as a result.

The role and performance of the London Borough of Camden

The Council's role

4.7. There is a widespread impression about local councils that they are in some way responsible for everything that happens in the public arena within their boundaries, but this is not the case. The panel took legal advice to be clear about the exact position.

4.8. The only statutory responsibility regarding flooding per se that Camden Council has is as a highways authority responsible for highway drainage, where it has a *duty* to ensure that gullies are maintained and serve their purpose. However, in respect of flooding generally the Council has directly relevant powers and duties in its capacities as a local housing authority and as a landlord.

4.9. The Council has various duties to its tenants as a local housing authority, which include maintaining its properties in a habitable condition. The Council is also landlord to a significant number of long leaseholders, a position which carries with it a number of obligations.[4]

4.10. The Council has other duties and powers to allow them to assist after the flood (for example, the Council has a *duty* to collect household waste, and the *power* to make arrangements to collect specific items of waste such as bulky items too large for disposal through standard household waste collections). Other powers or duties might arise in connection with or as a result of social services functions.

4.11. Some residents have queried whether the Council was obliged to do anything about the rats and mice that they felt were prevalent after the flood. Under the Prevention of Damage by Pests Act 1949, the Council has a *duty* to keep its own land free from rats and mice by carrying out inspections, destroying rats and mice, but only has *powers to* keep privately owned land free from such vermin.

[4] The respective obligations of the landlord and tenant will be set out in detail in the terms of the lease for each property. However, if the property was sold under the right to buy, then statute requires the Council as landlord to keep in repair the structure and exterior of the property and of the building which it is in (including drains), and to make good any defect. This would normally be subject to recovery of the cost through the service charge. There is also a statutory requirement for the landlord to rebuild or reinstate the property (subject to service charge) if it is damaged by flood (among other causes). Some of the damage caused by the flooding may fall within this obligation.

Controlling basement conversions

4.12. In response to points made in evidence by a number of residents asking for the Council to exercise greater control over basement conversions in West and South Hampstead, the panel researched planning records between January 1984 and December 2002 and found 556 applications for basement residential conversions. The six streets in the borough where there had been the highest numbers of such planning applications (43 in total) were all flooded in August 2002: Bracknell Gardens NW6, Nassington Road NW3, Hillfield Road NW6, Inglewood Road NW6, Canfield Gardens NW6, and Fairhazel Gardens NW6.

4.13. We also explored in some depth what planning powers the Council could bring to bear as a local planning authority on the problem of flooding. We found that the Council has strictly limited powers to control the conversion and occupation of basements through the planning and building control system, even when these basements may be at risk of flooding. As the Assistant Director (Environment Department) explained in her evidence:

> *Excavating a cellar or basement area to make it liveable constitutes development. This would require planning permission in the case of flats and commercial premises. However in the case of single-family dwellings, if this is within the allowable volume increases, it will be "permitted development". This means that the Council as local planning authority has no control over the works or the future use of the basement provided it stays part of the single-family dwelling.*
>
> *The adopted UDP [Unitary Development Plan] has a policy of discouraging developments in basements where townscape issues are a consideration[5]. The issue is normally whether basements are a characteristic feature of the area. This policy operates across the borough and not just in conservation areas. The Council needs to be able to show demonstrable harm as a result of the development and to be confident that the decision can be upheld at appeal. Vulnerability to flooding is not an issue that is considered in this policy.*

[5] Policy EN27 in the Unitary Development plan states: *The Council will oppose development within basement areas, whether by infilling or excavation, where this would detract from the original design of the building or the established character of the street.*

4.14. We welcome the Environment Department's indication that it could look again in the review of the UDP at the wording of policy EN27 on basements and policy EN9[6] on water quality to see if the criteria for assessment of basements could be widened to cover issues relating to risk of flooding in vulnerable areas. This would have to be a risk-based and sequential approach as outlined in central government's Planning Policy Guidance Note (PPG) 25, 'Development and Flood Risk'. The assessment of risk would need to be discussed jointly with Thames Water.

4.15. We noted that any new policy would not affect excavating new basements or converting cellars for residential purposes in single-family dwellings. Rather than continue to remain virtually powerless to stop such conversions in areas known to be susceptible to flooding, we believe the Council should ascertain whether it could restrict such conversions, by withdrawing permitted development rights through Article 4 directions; or by using the general power of well-being; or by seeking appropriate powers from central government under the 'freedom and flexibilities' scheme, available to Camden as an 'Excellent' authority under the Audit Commission's Comprehensive Performance Assessment process.

Recommendations

4. That the Council look again in the review of the UDP at the wording of policy EN27 on basements and policy EN9 on water quality to see if the criteria for assessment of basements could be widened to cover issues relating to risk of flooding in vulnerable areas.

5. That the Council ascertain whether it could restrict the excavation of new basements or conversion of cellars for residential purposes in areas known to be at risk of flooding, by withdrawing permitted development rights through Article 4 directions, or by using the general power of well-being, or by seeking appropriate powers from central government under the Comprehensive Performance Assessment's 'freedom and flexibilities' scheme for excellent authorities.

Controlling surface water run-off

4.16. We also explored the potential of Sustainable Urban Drainage Systems (SUDS) for dealing with the contribution made by surface water to flooding. The principle of SUDS is to control surface water runoff as

[6] Policy EN9 states: *The Council will seek to ensure that all development is sited and designed to avoid adversely affecting the water environment, to prevent or mitigate flooding, to protect the quality of underground and surface water, and to conserve water resources.*

close to its origin as possible. The Mayor's draft London Plan states that SUDS should become the norm[7].

4.17. The Council's Environment Department expressed its willingness to explore the possibility of and the best way to implement the Mayor's draft policy proposal, with a view to strengthening the Council's planning policy in this area. However, we noted that the department's assessment that given the amount of roofs and non-permeable surfaces in the borough, this would only have a marginal effect on water runoff in the short to medium term and would certainly not compensate for any failings in the drainage infrastructure.

The Council's Emergency Planning duties and powers

4.18. Completing our enquiries into Camden Council's role in respect of flooding, we also looked in depth at the Council's emergency planning duties and powers.

4.19. The 1993 General Local Authority Function Regulations give a responsibility to local authorities to plan for emergencies under the principles of Integrated Emergency Management for peacetime disasters and war. Camden Council's Emergency Planning Officer produces a manual under the regulations. The 2001 Emergency Procedure manual which was current at the time of the August 2002 floods covered major accidents, natural disasters and other major emergencies. It noted that the aim of the Emergency Procedure is '*to provide the basis for the orderly control and co-ordination of Council services to support the emergency services to minimise hazard to life and property in the borough and alleviate suffering in the event of an emergency*. *All Chief Officers should prepare and maintain departmental contingency plans and call-out lists to ensure a rapid response by staff in their respective departments to a request from the police or the Chief Executive (or designated officer).'*

4.20. The 2001 Emergency Procedure manual makes a distinction between an 'emergency' - defined as '*a situation where Council services are required in excess of those which are provided under normal day or night-time conditions and therefore a special mobilisation is required*' – and a 'major incident' which is:

[7] Policy BR7states: '*The Mayor will and boroughs should seek to ensure that surface run off is managed on site wherever practicable. The use of sustainable urban drainage systems should be the norm unless there are practical reasons for not doing so. Such reasons may include the local ground conditions or density of development. In such cases the developer should seek to manage as much run off on site and explore sustainable methods of managing the remainder as close as possible to the site*.'

'*any emergency that requires the implementation of special arrangements by one or all of the emergency services for: -*

- *The rescue and transport of a large number of casualties.*
- *The involvement either directly or indirectly of large numbers of people.*
- *The handling of a large number of enquiries likely to be generated both from the public and the news media usually to the police.*
- *Any incident that requires the large scale combined resources of the three emergency services.*
- *The mobilisation and organisation of the emergency services and supporting organisations, e.g., Local Authority, to cater for the threat of death, serious injury or homelessness to a large number of people.*'

4.21. The manual notes that '*the term* "major disaster/incident" *must not be used by Council Officers without the approval and authority of the senior police officer in charge of the incident*', although the latest London Emergency Service Liaison Panel Manual (6th edition) does permit a local authority to declare a "major incident" in the event of a flood.

4.22. Having established what powers and duties Camden Council has with regard to flooding, we can now turn to the issue of the Council's performance at the time of the August 2002 flooding.

The Council's performance

4.23. We took extensive written and oral evidence from the Environment and Housing Departments, the Emergency Planning Officer and the 'Out of Hours' telephone service (administered at the time by the Housing Department but since transferred to the Chief Executive's Department) about what they did to deal with the flooding and its aftermath.

4.24. The gully cleansing crew and their vehicle worked through the night to free up gullies and sewers blocked by the debris deposited by the floods. We noted the Housing Department had also responded speedily to a large number of problems in the two most affected housing districts, Gospel Oak and Hampstead - repairs officers at Hampstead District Housing Office issued 75 instructions to contractors in the period 7 - 14 August 2002 for remedial works to be undertaken. We also noted that although there was an initial delay of some hours in granting free bulk rubbish removal, once the widespread nature of the problem was appreciated by the Environment Department, free collections were arranged, at an approximate cost of £10,000 to the Council.

4.25. However, while much valuable work was done, there were clearly deficiencies in the Council's response. Residents could not get through to the Council or could only leave a message on an answering machine

because the Council's Emergency Telephone Service (ETS) was inundated with telephone calls[8]. Although we recognise that the ETS has no emergency resources under its direct control for 'out of hours' Camden Council work, this did mean that a number of residents were unable to access advice or a route to possible assistance from the Council.

4.26. One reason why the ETS was overstretched was that the Housing Department's Careline Service[9] was then running ETS in addition to its own 24-hour remit. The panel welcomes the transfer of ETS to Camden E-services in Cressy Road which was already programmed to take place on 1st April 2003, since this may create more capacity to deal with emergency calls. However, we appreciate that it would not be helpful to raise people's expectations about what the Council can do for them in an emergency - the aim should be not to advertise a helpline for services that we cannot effectively deliver, but to be equipped to pass on useful information and channel callers to services that we can provide.

4.27. We therefore welcome the steps being taken in response to the Panel's identification of these problems by the manager of the Council telephone switchboard and Contact Centre. These steps include co-ordinating work with departments to provide the switchboard/Contact Centre with full information and training, with the aim of securing an effective response to flood emergencies. This would be part of a more general Service Level Agreement between departments and the 'out of hours' emergency service. We recommend that additional ways of increasing capacity at times of emergency should also be found.

Recommendation

6. That the Council should increase the capacity and responsiveness at times of emergency of the 'out of hours' service by, for example, arranging a bank of staff who could be called upon to answer telephones in an emergency situation; providing key information through a menu system; and providing callers with waiting time estimates if all phone lines are busy.

4.28. Some residents and councillors also complained about a perceived lack of awareness across the Council about the scale and severity of the flooding. While this was not the case in the District Housing Offices most affected by the flooding, evidence about other parts of the Council

[8] The ETS's telephone statistics indicate that during the period 1800 -2400hrs on Wednesday 7August, ETS dealt with a total of 138 calls; this compares with 78 on the preceding evening at the same time and 85 on the following day. Additionally 450 other callers hung up after waiting more than 90 seconds in the queue.

[9] Careline is a 24-hour telephone-based community alarm service for older, disabled and otherwise frail people. It is run by the Needs and Access Division in Camden Council's Housing Department.

clearly made it a concern for the panel. We therefore welcomed the Press Office's production of a draft communications strategy, with the key objectives of ensuring that all key front line staff are fully briefed about flooding and are sympathetic to concerns of residents; ensuring all staff are aware of flooding situation; and keeping all councillors informed, in particular councillors in those wards affected by floods.

4.29. Both the lack of capacity in the Council's 'out of hours' telephone service during the flood event and the lack of a Council-wide briefing of key staff about the flooding in our view are part of the wider problem that departmental and corporate coordination in the aftermath of the 2002 floods was not as good as is desirable. We also heard that housing officers had not been in contact with the Environment Department in the immediate aftermath of the flooding as they had been fully occupied trying to deal with the situation, although they are now in contact on strategic issues. We were also puzzled to hear that the Council's Emergency Planning Officer (EPO) was not called in by Environment or Housing departments or the emergency services, so that the Council's corporate centre did not therefore appreciate at the time the extent and significance of the 7 August 2002 flood.

4.30. When we questioned the Emergency Planning Officer about this, he explained that the decision to mobilise the EP service or not for non-major emergencies has to be made by senior officers of the emergency services or Council at the scene, and that he could only assume that officers who dealt with the August floods felt that they had enough resources available to deal with the situation.

4.31. However, in their evidence to us housing officers acknowledged that there would have been benefits from co-ordination with other departments, especially Environment, and that what was needed was a plan to deal with situations that did not constitute a major civil emergency but could be classed as an emergency at a local level.

4.32. The panel therefore made an interim recommendation that officers should convene a cross-departmental working group and produce an action plan for the Panel to comment on. We were pleased to receive a prompt response to this suggestion at our next meeting in the form of a draft action plan, with commitments to undertake tasks (such as producing a draft communications strategy and compiling a list of staff, plant, materials, and equipment that can be used in times of flooding) that officers have been fulfilling.

4.33. Since then this has been taken a step higher, and the panel welcomes the acting Chief Executive's decision to instruct departments to carry out an urgent review of existing departmental contingency plans and identify any gaps in arrangements. In particular, the panel notes the strong central co-ordination that characterised the Council's response to the 1975 floods, and welcomes the Corporate Management Team's

proposal for a 'lead Department' to undertake coordination responsibilities during and after particular types of local emergencies.

4.34. The panel further welcomes the setting up of an Emergency Planning corporate working group co-ordinated by the Emergency Planning Officer to look at the new London-wide and local emergency planning arrangements, and notes that the borough Emergency Procedure manual will be updated as necessary.

Recommendations

7. That the Council improves its departmental and corporate capacity to respond effectively to flooding in particular and emergencies in general by building on the draft Action Plan instigated by the Panel.

8. That the Council's Emergency Planning Officer should inform promptly the Chief Executive, the Corporate Management Team and appropriate Members (including relevant ward councillors) of local or borough-wide emergencies, according to agreed criteria and mechanisms in the Council's emergency planning procedures.

The role and performance of Thames Water

4.35. Under the Water Industry Act 1991 Section 94 Thames Water has a general duty to '*provide, extend and improve the public sewer system to ensure that their areas are, and continue to be, effectually drained*'. Thames Water is also a statutory water company which, by virtue of the Water Industries Act 1991 Section 2, has wide powers to do anything calculated to facilitate or conducive to or incidental to the carrying out of its functions.

4.36. On August 7th/8th Thames Water (TW) sent a limited number of operatives to Camden to deal with the flooding. There were five blockage engineers covering the area during this period, with starting times of 7.00am to 4.30pm and 12.00noon to 9.30pm, but due to the work load these teams were still working at midnight. There were flooding problems elsewhere in the TW network and this put a significant strain on TW's workforce, but its senior managers acknowledged when giving evidence to us that the number of staff attending in Camden was not sufficient.

4.37. Thames Water also acknowledged that its handling of the aftermath of the flood could have been better too. Residents had reported to the panel the problem of getting a meaningful response from engaging in correspondence or telephoning the organisation's Customer Services

point. TW's stated policy of offering free courtesy 'clean-ups'[10] to residents who have suffered from sewerage flooding does not seem to have been generally conveyed to residents either. After 7/8th August, TW provided only five internal and four external clean-ups in Camden.

4.38. In its oral evidence Thames Water explained that it is currently examining its approach to flood events in order to respond to the criticisms made, with a view to being more proactive and improving its responsiveness. In its view, a lot of lessons had been learned from the recent flooding. It recognised that the issue of the accuracy of weather forecasts and the ability to anticipate flood events needed to be addressed, but there were no actual barriers to TW improving its current processes for predicting and reacting to incidents of flooding. TW hoped that this review would be complete within the next three months, and it would be exploring the opportunities to work more closely with local authorities and other agencies.

4.39. We welcome this positive and constructive outcome to Thames Water's engagement with our scrutiny panel and will summarise our recommendations with regard to working jointly with TW at the end of this section, after we have dealt with the crucial issue of how and when TW might invest more money in tackling flooding problems in Camden.

Thames Water and investing in Camden

4.40. Thames Water's role in providing, extending and improving the public sewer system in Camden and the Thames region is regulated by Ofwat. This affects the crucial business questions of how much TW can charge for its services and how much it can invest to improve those services.

4.41. To put the issue in the wider context, Thames Water has over half the properties at risk of sewer flooding in England and Wales. TW said in its earliest response to panel requests for information that '*[we] believe that it is unacceptable in this modern world for properties and their owners to have to suffer the horrible consequences of sewer flooding*.'

4.42. In the late 1990s Thames requested permission from Ofwat to spend more money on sewer flooding in the Thames region. Ofwat's funding decision was made in 1999 for the spending period 2000 to 2005 (technically known as AMP3). Ofwat allowed funding for 1500 properties to be relieved from internal flooding, although Thames had asked for funding to relieve 3000 properties.

4.43. Thames continued to press for additional funding for sewer flooding after this funding decision by Ofwat. Recognising stakeholder pressure, including that from the consumer representatives' organisation,

[10] The basic clean-up service, which is at TW's discretion, includes removing solids left after flooding; washing down the affected areas; disinfecting; and pumping out of basements.

WaterVoice Thames (WVT), to do more to relieve flooding, and the fact that TW had brought forward the delivery of its programme, Ofwat agreed at the end of 2002 to allow Thames Water to invest an additional £27m to relieve sewer flooding for an additional 500 properties[11]. TW's 2000 to 2005 plan now includes 1750 properties for internal flooding relief and 250 for severe external flooding relief. In addition TW will be examining all other properties on its Sewer Flooding History database [12] to see if mitigation measures can give any relief.

4.44. There are properties on the Sewer Flooding database in the Camden area, but at present the severity and frequency of flooding that they have experienced are not high enough to place them all in Thames Water's prioritisation programme for the period 2000 to 2005.

4.45. In the panel's view, the system for prioritising sewerage investment does not currently record adequately the extent of flood problems in Camden because it does not yet include all the properties flooded in 2002. Thames Water has acknowledged that this information needs to be gathered, in order to see whether inclusion of all flooded properties in the Camden area would increase both their position (if they have been flooded before) and Camden's position generally on the Severity and Frequency Index[13] and whether their relative position in TW's prioritisation programme would change.

4.46. In response to panel questioning, Thames Water also said that it has funding for flood prevention works up to 2005 which has not yet been allocated. Investigations would be carried out and then recommendations would go to various internal panels at TW before money is allocated to specific schemes. The progress of the prioritisation process is monitored by WaterVoice Thames. There was

[11] The total of 500 properties is made up of 250 internal flooded properties and 250 external flooded properties. They all require high capital cost solutions.

[12] This is a database of properties that have been flooded in the whole Thames Water Region (i.e. the River Thames catchment area including London). In considering funding, Ofwat look at Category A and B properties: Category A have been flooded internally 2 or more times in the last 10 years from hydraulic causes (i.e. sewers that cannot cope and overflow). Category B have been flooded internally only once in the last 10 years from hydraulic causes. There are approximately 1000 A and 7000 B properties on the database, of which around 40% are in the Metropolitan London Area.

[13] In order to direct the limited funding to the worst cases of flooding, Ofwat have agreed a priority system based on severity and frequency – the Severity Frequency Index (SFI). Points are allocated to the degree of severity (for example a school or hospital scores more than a residential property) and to the number of times flooded; the higher the score, the greater the priority given. Most flooding occurs in an area, so properties are grouped together and an average SFI is calculated for a scheme. The system keeps in view the score of the highest scoring property, to prevent a very high scoring property being 'lost' amongst a scheme with a low average SFI.

also some funding available to look at mitigation measures (such as non-return valves, humps, flood guards and small scale local landscaping) for properties suffering from hydraulic flooding, but these mitigation works would also need to be prioritised.

4.47. In addition to any implications for planning such investment from the process of updating the SFI, Thames Water is also currently investigating the causes of persistent flooding in the Sumatra and Pandora Roads area, which the panel believes may be caused by 'pinch points' in the sewer system. If it were decided that FLIP devices (non-return valves and pumps) are the answer for properties in these streets, then TW have said that installation work could begin at the end of 2003, but if major infrastructure work were required then it could be later.

Tackling the problem: a joint 'Task Force'

4.48. The panel welcomed Thames Water's expressed willingness to work with the Council on addressing flooding issues. This included a willingness to explore the panel's suggestions of some form of a warning system if flooding is threatened that would be accessible to most people, such as a telephone warning system., which we also welcomed. The panel urged that a expert 'task group' should be established between the Council and Thames Water with terms of reference addressing the key problems that we identified in the course of our investigations:

- *the extent of flooding problems and the relative priority of flood alleviation investment and works in Camden;*
- *the known problems (such as flooding in Sumatra/Pandora Roads) and potential sources of problems (such as illegal connections and groundwater infiltration) in the Thames Water system in the North West of Camden;*
- *the need for mitigating or short term measures for the Thames Water main and adjoining sewer system and for households in particular areas at risk (e.g. the Goldhurst Terrace/ Belsize Rd area) such as mini pumping facilities and storm overflows, non-return valves etc;*
- *Thames Water's emergency response procedures for dealing with flooding events, including preventative advice, handling the post-event clean up, contacting customers, monitoring the effects and updating the risk register;*
- *the scope for more coordinated action amongst relevant agencies regarding Emergency Planning procedures for flooding incidents;*
- *information for householders and businesses on the range of possible flood mitigation and prevention measures which they could take to protect their property, and information on local emergency contacts and response arrangements.*

4.49. We are pleased that this idea has been speedily pursued and that the first meeting of the 'task group' has already taken place. At our final panel meeting we heard that progress is already being made on addressing the key problems identified.

4.50. For example, one of the Task Group's key aims is to explore whether Camden can be given higher priority for flood expenditure. This will require collecting information on all properties, including schools and businesses, affected by the August 2002 flood event. The panel had agreed to kick-start this information-gathering process by passing over to Thames Water all the addresses of those residents who had sent evidence of their flooding to the panel, subject to their agreement, while recognising that a household survey would be required. This would need to be conducted in both a thorough and customer-friendly fashion if the problem of under-reporting of flooding incidents is to be overcome.

4.51. At the Task Force's first meeting it was agreed that the Council would conduct the survey and that Thames Water would process the results, so that TW's database of flooded properties would more accurately reflect the extent of flooding problems in Camden. This in turn should help to increase Camden's prioritisation for flood relief/mitigation works.

4.52. Thames Water also agreed at the first meeting to a number of very positive steps, including the reopening of its investigation into the flooding problems in the Sumatra/Pandora Road area; checking for possible infiltration of groundwater and unauthorised connections to the sewer system; and contributing to a joint leaflet or booklet for householders with emergency contact numbers and information about possible flood mitigation and prevention measures which could be taken to protect properties.

4.53. We also believe that the Council should capitalise on the Task Force's potential for laying the foundations for improved working relationships between the Council and Thames Water in the future.

Recommendations

9. That the Council does everything in its power to press Thames Water for further reductions in sewer flooding in Camden and that to this end the joint Thames Water/Camden Council Task Force should continue its work addressing the key problems that the panel has identified.

10. That there should be a report back from the joint Task Force on progress within four months to the Executive Member for the Environment and the Overview & Scrutiny Commission.

11. That the Council should use the experience of the joint Task Force to improve working relationships and sustain them through regular meetings in the future.

5. Further action by the Council and other agencies

5.1 The panel recognises that there are no easy solutions to the problem of flooding from sewers in the Thames region, since it requires large-scale investment in Thames Water's sewer system. We are encouraged by the fact that in March 2002 Ofwat consulted on its approach to the problem of flooding from sewers, and concluded in its consultation paper on setting price limits for the 2005-2010 investment period that '*we believe that avoiding sewer flooding is a high priority for customers and that further investment is warranted to reduce the problem for those most affected*'. However, we also note Ofwat's caveat that '*we must also consider the reasonableness of the whole investment programme, the value for money of future investment and the effect of other influences on customers' bills.'*

5.2 Nevertheless, to address the problem of tackling sewer flooding in 2005-10 Ofwat has said that water companies should consider investment to solve or reduce sewer flooding problems for customers who have already suffered internal flooding and are believed to be at risk of repeat flooding at least once in ten years. It has further said that where companies wish to tackle less severe problems, Ofwat will consider the proposals put to it, taking account of the costs and benefits and the views of customers. Ofwat has also stated that it expects companies to develop prioritised lists of schemes to deal with known problems, based on criteria agreed with their local WaterVoice committee.

5.3 We are also encouraged by WaterVoice Thames's response to Ofwat's consultation on sewer flooding which said that the avoidance of sewer flooding should be accorded the highest priority over the next five years, and that the provision of the resources needed to fund comprehensive and effective remedial programmes should take precedence over less urgent improvements.

5.4 The panel believes that the Council should talk to both Ofwat and WaterVoice Thames so that each can gain a clear understanding of the flooding problems that residents, public services and private businesses have experienced, the costs that these have imposed, and the need for action.

Recommendations

12. That the Council should make strenuous representations to Ofwat for more funding for Thames Water to carry out flood relief/mitigation works in respect of sewer flooding in Camden.

13. That the Council also makes urgent representations to WaterVoice Thames for its support for such investment.

5.5 Finally, we believe that our investigation has raised some serious issues that need to be brought to the attention of Camden's Members of Parliament and other MPs; London and national local government associations; and regional and central government.

Recommendation

14. That the Council communicate the panel's report and its findings to Camden's MPs and GLA representative; the Greater London Authority, Association of London Government and the Local Government Association; the all-party parliamentary Flood Prevention group of MPs; and the Government minister with responsibility for flooding.

APPENDIX 1: PANEL RECOMMENDATIONS

1. **That the Council's Environment Department should improve its gully cleaning performance by:**
   a) **focusing its priorities on the areas of known flood problems (especially in the spring and early summer cleaning schedules);**
   b) **devising a more rigorous and effective monitoring regime, including an updated system for gully identification;**
   c) **enlisting the help and co-operation of local residents by publicising in advance (for example, via the Camden website, local organisations' newsletters and door-to-door deliveries) when gully cleaning is to take place in an area;**
   d) **enabling members of the public to report activities such as fly tipping into gullies; and**
   e) **exploring the possibility within the Council's waste management contract of street sweepers clearing leaves out of gullies where appropriate.**

2. **That, because of the importance to the panel of this issue, the contract specification for gully cleaning be submitted to the Overview and Scrutiny Commission at the appropriate time for consideration.**

3. **That the Council's Environment Department investigate cases of very localised flooding, carry out surveys and undertake a programme of minor highways works to deal with them.**

4. **That the Council look again in the review of the UDP at the wording of policy EN27 on basements and policy EN9 on water quality to see if the criteria for assessment of basements could be widened to cover issues relating to risk of flooding in vulnerable areas.**

5. **That the Council ascertain whether it could restrict the excavation of new basements or conversion of cellars for residential purposes in areas known to be at risk of flooding, by withdrawing permitted development rights through Article 4 directions, or by using the general power of well-being, or by seeking appropriate powers from central government under the Comprehensive Performance Assessment's 'freedom and flexibilities' scheme for excellent authorities.**

6. **That the Council should increase the capacity and responsiveness at times of emergency of the 'out of hours' service by, for example, arranging a bank of staff who could be called upon to answer telephones in an emergency situation; providing key information through a menu system; and providing callers with waiting time estimates if all phone lines are busy.**

7. That the Council improves its departmental and corporate capacity to respond effectively to flooding in particular and emergencies in general by building on the draft Action Plan instigated by the Panel.

8. That the Council's Emergency Planning Officer should inform promptly the Chief Executive, the Corporate Management Team and appropriate Members (including relevant ward councillors) of local or borough-wide emergencies, according to agreed criteria and mechanisms in the Council's emergency planning procedures.

9. That the Council does everything in its power to press Thames Water for further reductions in sewer flooding in Camden and that to this end the joint Thames Water/Camden Council Task Force should continue its work addressing the key problems that the panel has identified.

10. That there should be a report back from the joint Task Force on progress within four months to the Executive Member for the Environment and the Overview & Scrutiny Commission.

11. That the Council should use the experience of the joint Task Force to improve working relationships and sustain them through regular meetings in the future.

12. That the Council should make strenuous representations to Ofwat for more funding for Thames Water to carry out flood relief/mitigation works in respect of sewer flooding in Camden.

13. That the Council also makes urgent representations to WaterVoice Thames for its support for such investment.

14. That the Council communicate the panel's report and its findings to Camden's MPs and GLA representative; the Greater London Authority, Association of London Government and the Local Government Association; the all-party parliamentary Flood Prevention group of MPs; and the Government minister with responsibility for flooding.

APPENDIX 2: LIST OF WRITTEN EVIDENCE

Item	Date	Author	Title
1	Dec 2002	Ursula Taylor, Head of Commercial Law, London Borough of Camden	Preliminary Legal Advice
2	Nov 2002	Flooding Investigative Committee, Greater London Authority	Flooding in London: A London Assembly Scrutiny Report
3	Nov/Dec 2002	a) Rosemary Letwin, NW1 b) Noelle and Christopher Peake, NW3 c) Tony Wingate, NW3 d) Mr Goring, NW3 e) Composite: i) Sandra and David Montague ii) Councillor Andrew Marshall iii) Keith Ollier, Engineering and Traffic Services f) Re Miss Ilse Keller, NW6 g) West Hampstead Amenity & Transport,(WHat) h) West Hampstead Labour Party i) BAM Estate, NW3 and NW6 j) Dr Barnett S Bergman	Evidence received from residents and local organisations, covering NW1, NW3, NW6 and NW8 areas.
4	Nov/Dec 2002	District Housing Offices	Evidence from London Borough of Camden's District Housing Offices
5	Dec 2002	Keith Ollier, Acting Head of Engineering & Traffic Services, London Borough of Camden	Flooding in Camden-Comments of Engineering & Traffic Services, L.B. of Camden
6	Sep & Dec 2002	Mike Tempest, Waste Water Operations Manager, and Peter Taylor	Evidence from Thames Water Utilities
7	Nov 2002	Colin Murray, CAD Liaison, Metropolitan Police	Evidence from the Metropolitan Police
8	Nov 2002	Max Hood, Operational Planning, London Fire Brigade	Evidence from London Fire Brigade

Item	Date	Author	Title
9	Nov 2002	London Ambulance Service	London Ambulance Service spreadsheets of calls over 3 week period 31Jul-14 August 2002
10	July 2002	John Rodgers, Emergency Planning Officer, London Borough of Camden	Evidence from Emergency Planning Officer Including Appendix 1: Major Incidents Emergency Procedure Manual 2001Appendix 1: Major Incidents Emergency Procedure Manual (draft 2002)
11	Dec 2002	Maria Duggan, Acting Head of Inequalities, Camden Primary Care Trust	Flooding in Camden: Health Implications
12	Jan 2003	Peter Taylor, Flooding Programme Manager, Thames Water Utilities	Thames Water: supplementary submission
14	Jan 2003	Keith Ollier, Acting Head of Engineering and Traffic Services, Environment Department, London Borough of Camden	Evidence of Engineering and Traffic Services (Environment Department).
15	Jan 2003	Anne Doherty, Assistant Director, Environment Department, London Borough of Camden	Evidence of Anne Doherty, Assistant Director, Environment Department re Council planning policies re flooding and Sustainable Urban Drainage Systems.
16	Jan 2003	Ursula Taylor, Head of Commercial Law, London Borough of Camden	Briefing note on Marcic v Thames Water Utilities EWCA Civ 64
17	Jan 2003	Gerri Scott, Assistant Director, London Borough of Camden	Follow up Submission by Housing Department on Emergency Procedures and Emergency Planning

Item	Date	Author	Title
18	Dec 2002 Jan 2003	a) Jane May b) Combined Residents Associations of South Hampstead (CRASH) c) xx Menelik Road, NW2 d) 34a Holmdale Road NW6 e) xx Hillfield Road NW6 f) 64 Hillfield Road NW6 g) xx Aldred Road, NW6 h) xx Mill Lane NW6 i) xx Ajax Road NW6 j) xx Fairhazel Gardens NW6 k) xx Belsize Road NW6 l) xx Goldhurst Terrace NW6 m) xx Goldhurst Terrace n) GF, 92 Goldhurst Terrace o) xx Platt's Lane NW3 p) xx Belsize Lane, NW3 q) 9a Lancaster Drive NW3 r) xx Lancaster Drive NW3 s)xx Lancaster Grove NW3 t) xx Chesterford Gardens NW3 u) xx Lyncroft Gardens NW3 v) xx Parkhill Road NW3 w)xx Willow Lane/Pilgrims Lane NW3 x) The Hampstead Lawn Billiard and Skittle Club y) xx Wendling NW5	Evidence received from residents and local organisations, covering NW1, NW3, NW6 and NW8 areas.
19	Jan 2003	Brian Cole, Careline Manager, London Borough of Camden	Housing Department's Careline Service
20	Jan 2003	John Rodgers, Emergency Planning Officer, London Borough of Camden	Evidence including: Appendix 1: Major Incidents Emergency Procedure Manual (draft 2003)
21	Jan 2003	Various	Schools, council commercial properties and council operational buildings affected by the flooding
22	Jan 2003	Various	Housing Associations' evidence

Item	Date	Author	Title
23	Jan 2003	London Borough of Brent, Corporation of London, London Borough of Islington	Other local authorities
24	Jan 2003	Richard Fearn, Director, Midlands, Railtrack	Railtrack evidence
25	Jan 2003	Association of British Insurers	Renewing the partnership – how the insurance industry will work with others to improve protection against floods
26	Jan 2003	Anthony Rowe, Senior Emergency Planning Manager, London Ambulance Service	London Ambulance Service: a) response addressing the panel's terms of reference b) spreadsheets of calls over 3 week period 31Jul-14 August 2002
27	Feb 2003	John Rodgers, Emergency Planning Officer, London Borough of Camden	Evidence from London Borough of Camden's Emergency Planning Officer
28	July 2002	WaterVoice	Water Voice – representing water customers Annual Report 2001/02
29	Aug 2002	Office of Water Services Ofwat	Levels of service for the water industry in England and Wales 2001 – 2002 Report
30	Sept 2002	Office of Water Services Ofwat	Flooding from SewersResponse to consultation
31	Feb 2003	Office of Water Services Ofwat	Periodic Review 2004 (PR04)
32	Feb 2003	Graham Magee, Scrutiny Officer and Malcolm Holmes, Borough Archivist, London Borough of Camden	Historical Maps from Borough Engineer Records

Item	Date	Author	Title
33	Feb 2003	Victoria J Philpott BSC Undergraduate research project University of Southampton 1979	A Study of the occurrence, distribution and causes of flooding in the London Borough of Hampstead.
34	1982	Robert Tyssen-Gee	Hampstead Weather 1860 – 1981 A Camden History Society Publication
35	Feb 2003	Graham Magee, Scrutiny Team and Lorna Small, GIS, London Borough of Camden	Flooded Roads 1975 and 2002 Map
36	Feb 2003	a) Goldhurst Terrace Residents b) xx Hillfield Road,NW6 c) Mark Stonebanks, xx Hillfield Road, NW6 d) Jeffreys Street Residents Association e) xx Marlborough Mansions, NW6 f) xx Ornan Road NW3	Evidence received from residents and local organisations, covering NW1, NW3, NW6 and NW8 areas.
37	Feb 2003	Various council departments	Cross Departmental Officer Working Group Action Plan
38	Feb 2003	Andrew Kennard Public Affairs Executive London Underground	Flooding in the Underground
39	Feb 2003	Bill O'Connor, Siverlink	Silverlink Report Incident 679 148
40	Feb 2003	Max Hood, Operational Planning, London Fire Brigade	Supplementary Evidence from London Fire Brigade
41	Feb 2003	Office of the Deputy Prime Minister	Planning Policy Guidance Note 25 PPG25
42	Feb 2003	Paschal O' Neill & Archie Onslow Environment Department,	Response to Mark Stonebanks, xx Hillfield Road, NW6

Item	Date	Author	Title
		London Borough of Camden	
43	Feb 2003	Gerri Scott, Assistant Director Housing Department, London Borough of Camden	Update on Leaseholders repairs and preventative work
44	Feb 2003	Tom McMahon, Head of Street and Environment Services Environment Department, London Borough of Camden	Street Environment Services response to flooding issues
45	Jan 2003	Peter Taylor, Flooding Programme Manager, Thames Water Utilities	Thames Water: supplementary submission
46	Oct 2002	Office of Water Services Ofwat	Periodic Review 2004 (PRO4) Setting price limits for 2005-10: Framework and approach A consultation paper
47	Feb 2003	Chris Berlingieri, Woodchurch Road	Evidence received from resident
48	Feb 2003	Angela Spooner, Hampstead DHO Manager Housing Department, London Borough of Camden	Supplementary evidence from the Housing Department on Costs due to Flooding: Hampstead District
49	Feb 2003	Gerri Scott, Assistant Director Housing Department, London Borough of Camden	Update on Leaseholder repairs and preventative work
50	Mar 2003	Tim Young, Scrutiny Manager, London Borough of Camden and Edmund Penning-Rowsell, Head of the Flood Hazard Research Centre, Middlesex University and Floods Scrutiny Panel expert advisor.	Outline draft report with initial reflections on the evidence heard.
51	Mar 2003	Graham Magee, Scrutiny Officer, London Borough of Camden	Information on storms in Hampstead 1878 - 2002
52	Mar 2003	Ursula Taylor, Head of Commercial Law, London Borough of Camden	Duties, Powers and responsibilities of Camden Council and Thames Water relating to the flood of 7 August 2002

Item	Date	Author	Title
53	6 Feb 2003	Ursula Taylor, Head of Commercial Law, London Borough of Camden	Briefing note on Marcic v Thames Water Utilities EWCA Civ 64
54	Feb/Mar 2003	a)xx Agamemnon Road, NW6 b)Dr Barnett S Bergman, NW6 b) xx Primrose Hill Road, NW3 c) Mark Stonebanks, Hillfield Road, NW6	Evidence from residents and local organisations
55	Mar 2003	Paschal O'Neill, Building Control and Archie Onslow, Forward Planning and Projects Environment Department, London Borough of Camden	Response to Mark Stonebanks, Hillfield Road, NW6
56	Mar 2003	Graham Magee, Scrutiny Officer and Malcolm Holmes, Borough Archivist, London Borough of Camden	Research on ponds and wells in the West End area
57	May 2003	Tim Young, Scrutiny Manager, London Borough of Camden	Final draft of Floods in Camden Scrutiny Report
58	June 2002	WaterVoice Thames response to the Ofwat consultation "Flooding from Sewers" June 2002	Report on consultation with emphasis to deal with sewer flooding in next five years hinges on: • More robust data collection • Sound system for determining priorities • Additional funding PRO4 • Greater coordination.

APPENDIX 3: LIST OF ORAL EVIDENCE

The panel has received oral evidence from the people listed below. This evidence is documented in the minutes of the Scrutiny Panel meeting on the date listed.

- Gerri Scott, Assistant Director of Housing, London Borough of Camden, 7th February 2003.

- Angela Spooner, Hampstead District Housing Office Manager, London Borough of Camden, 7th February 2003.

- Pat O'Neil, Hampstead District Housing Office, London Borough of Camden, 7th February 2003.

- Jon Judah, Assistant Director of Environment (Street Management), London Borough of Camden, 7th February 2003.

- Anne Doherty, Assistant Director of Environment (Planning), London Borough of Camden, 7th February 2003.

- Keith Ollier, Acting Head Engineering and Traffic Services, London Borough of Camden, 7th February 2003.

- Martin Reading, Engineering and Traffic Services, London Borough of Camden, 7th February 2003.

- Tony Denton, Local Government and Community Affairs Manager, Thames Water, 10th March 2003.

- Tom Kelly, Operations Manager (East London), Thames Water, 10th March 2003.

- Peter Taylor, Sewer Flooding Programme Manager, Thames Water, 10th March 2003.

- John Rodgers, Emergency Planning Officer, London Borough of Camden, 10th March 2003.

APPENDIX 4: FLOODED ROADS IN CAMDEN, 1975 and 2002

1975	2002
Abbey Road NW6	
Aberdare Gardens NW6	
	Achilles Road NW6
	Adamson Road NW3
	Agamemnon Road NW6
	Ajax Road NW6
	Aldred Road NW6
Arkwright Road NW3	Arkwight Road NW3
	Avenue Road NW6/NW8
Belsize Lane NW3	Belsize Lane NW3
Belsize Park Gardens NW3	
Belsize Road NW6	Belsize Road NW6
Boundary Road NW8	
Broadhurst Gardens NW6	
Broomsleigh Street NW6	
Bullbarrow, Abbey Road Estate NW6	
Canfield Gardens NW6	Canfield Gardens NW6
Cannon Hill NW6	Cannon Hill NW6
	Caversham Road NW5
Chalcot Gardens NW3	
	Chesterford Gardens NW3
Cotleigh Road NW6	
Dennington Park Road NW6	Dennington Park Road NW6
Edis Street NW1	
Egbert Street NW1	
	Fairfax Road NW6
Fairhazel Gardens NW6	Fairhazel Gardens NW6
Fellows Road NW3	
Ferncroft Avenue NW3	
	Finchley Road NW3
	Fleet Road NW3
Fordwych Road NW2	
Frognal Gardens NW3	
	Gaisford Street NW5
	Glenhurst Avenue NW5
Gloucester Avenue NW1	
Goldhurst Terrace NW6	Goldhurst Terrace NW6
Gospel Oak Estate NW5	
Greencroft Gardens NW6	Greencroft Gardens NW6
Hampstead Lane N6/NW3	
	Harben Road NW6
Harley Road NW3	
	Wendling, Haverstock Road NW5
Hawley Road NW1	
Heath Street NW3	

1975	2002
Hemstal Road NW6	
Highgate Road NW5	
Hillfield Road NW6	Hillfield Road NW6
Holmdale Road NW6	Holmdale Road NW6
	Ingestre Road NW5
	Inglewood Road NW6
	Jeffreys Street NW1
Kelly Street NW1	Kelly Street NW1
Kentish Town Road NW1 / NW5	
Kidderpore Gardens NW3	
Kilburn High Road NW6	
Kilburn Priory NW6	
	Kingdon Road NW6
Kingsgate Road NW6	
	Lady Margaret Road NW5
Lambolle Road NW3	
	Lancaster Drive NW3
Lancaster Grove NW3	Lancaster Grove NW3
Langland Gardens NW3	
Lowfield Road NW6	
	Lyncroft Gardens NW6
Lyndurst Gardens NW3	
Mansfield Road NW3	
Maygrove Road NW6	
	Menelik Road NW2
Messina Avenue NW6	
Mill Lane NW6	Mill Lane NW6
	Nassington Road NW3
Oak Village NW5	
	Ornan Road NW3
Pandora Road NW6	Pandora Road NW6
Park End NW3	
Parkhill Road NW3	Parkhill Road NW3
	Parliament Hill NW3
Platt's Lane NW3	Platt's Lane NW3
Primrose Hill Road NW3	Primrose Hill Road NW3
	Prince of Wales Road NW5
Princess Road NW1	
	Priory Road NW6
Priory Terrace NW6	
	South End Road NW3
	South Hill Park NW3
	South Hill Park Gardens NW3
Sumatra Road NW6	Sumatra Road NW6
Swains Lane N6	
	Tanza Road NW3
	Templewood Avenue NW3

1975	2002
	Templewood Gardens NW3
	West End Lane NW6
	Westbere Road NW2 – including Hampstead School
Willow Road NW3	Willow Road NW3
Winchester Road NW3	
Windmill Hill NW3	
	Woodchurch Road NW6
Woodsome Road NW5	
York Rise NW5	

APPENDIX 5: GLOSSARY

Duty – A task or action that an organisation or person is bound to perform for legal reasons. (compare with **Power**)

Environment Department – London Borough of Camden Council department with responsibility for services which deal with the external environment of the borough - its buildings, roads and open spaces - and the health and welfare of the public who live and work in Camden.

External flooding – Water inside the property boundary, from a surface water, foul or combined sewer.

Housing Department – London Borough of Camden Council department with responsibility for housing managing 30,000 council homes, finding homes for 2,000 families each year as well as developing policies and supporting initiatives to meet housing need in other sectors.

Hydraulic Incapacity – The inability of a sewer or drain to carry any more water.

Internal flooding – Water entering a house or basement (including an integral garage). It can be water from a surface water, foul or combined sewer.

Major Incidents Emergency Procedure Manual – This manual covers major accidents, natural disasters and other major emergencies. It is produced by Camden Council under the 1993 General Local Authority Function Regulations, which gives local authorities a responsibility to plan for emergencies.

Mitigation – Measures that can be taken to reduce the impact of internal or external flooding, but do not remove the cause. They include non-return valves, flood guards to fit over doors and airbricks and construction of small landscaping features to divert flows.

Non Return Valves – Valves which can be fitted to drainage system which when closed prevent waste water or sewage from returning into properties.

North West Storm Relief Sewer – A new sewer constructed in Camden in 1994 by Thames Water at cost of £5.1 million. It is designed to relieve the main sewer system of excess water at times of storm and heavy rainfall.

Power – The ability or capacity to do something, but which is not required to be done for legal reasons. (compare with **Duty**)

Severe external flooding – When external flooding causes difficulties in access to the property.

Severity Frequency Index – A measure of the seriousness of flooding to a group or properties. To direct the funding for flooding, Ofwat has agreed a priority system based on severity and frequency. Points are allocated to the degrees of severity and to the number of times flood. The higher the score the greater priority.

Sewer Flooding History database – A database of properties that have been flooded in the whole Thames Water Region – the River Thames catchment area including London. Category A has been flooded internally 2 or more times in the last 10 years from hydraulic causes. Category B have been flooded internally only once in the last 10 years from hydraulic causes.

Surcharge pressure – An overloaded main sewer will come under pressure created by water flows from areas further upstream in the sewer system, causing the effect of water backing up out of manholes and gully gratings onto the streets, and also out of toilets, sinks and baths directly into residents' homes.

Sustainable Urban Drainage Systems (SUDS) – The principle of SUDS is to control surface runoff water as close to its origin as possible. Examples include porous surfaces e.g. in car parks, soakaways, reed beds, balancing ponds, gravel swales, rainwater harvesting, green roofs and water butts.

WaterVoice – Operates through nine regional committees in England representing the interests of customers in respect of price, service and value for money; they also investigate complaints from customers about their water company.

WaterVoice Thames – Represents customers of Thames, Three Valleys and Sutton& East Surrey water. Regional priorities for the committee are future water and sewage prices, dealing with sewer flooding, leakage and poor water pressure.

Other terms related to the report

ALG – Association of London Government – An organisation representing London local authorities. It is part think tank and part lobbying organisation it aims to secure more resources for London and get the best possible deal for London's 33 councils from Government.

CRASH – Combined Residents of South Hampstead - An organisation of 300 members covering the South Hampstead area.

DHO – District Housing Office – One of five local Camden Council offices across the borough delivering a range of Council housing services to council tenants and leaseholders.

EPO – Emergency Planning Officer – Council officer responsible for coordinating emergencies if required by the Police or Council Departments. Also responsible for producing the Major Incidents Emergency Manual.

GLA – Greater London Authority – The strategic citywide government for London. It is made up of a directly elected Mayor, the Mayor of London, and a separately elected Assembly, the London Assembly.

LAS – London Ambulance Service NHS Trust– World's largest free ambulance service conveying 700,000 Accident and Emergency patients to hospital each year and answering 3,000 calls per day. Also provides Patient Transport Service to hospitals.

LFB – London Fire Brigade – Run by the London Fire and Emergency Planning Authority (LFEPA) under the umbrella of the GLA. It is the third largest fire-fighting organisation in the world protecting people and property against fire in the 1587 square kilometres of Greater London.

LGA – Local Government Association – Represents local authorities of England and Wales and promotes better local government through modernisation agenda.

MP – Metropolitan Police - Founded in 1829, now employs 25,550 officers across 620 square miles ensuring provision of police and safer communities through Borough operational command units.

Ofwat – Office of Water Services – The economic regulator for the water and sewerage industry in England and Wales.

PCT – Primary Care Trust - As part of the modernisation of the National Health Service, Primary Care Trusts were developed to bring commissioning of health services and service delivery into one organisation and closer to local communities. Camden PCT performs this role in Camden.

UDP – Unitary Development Plan – A document that sets out the Council's policies and proposals for the use and development of land and buildings in Camden.

WHat – West Hampstead Amenity and Transport- A long established membership-based amenity group covering the West Hampstead area.

APPENDIX 6: USEFUL CONTACTS

For 'out of hours' emergency contact:
Camden Council
Phone: 020 7974 4444 or 020 7278 4444

For information on all Environment Department services between 9am-5pm Monday-Friday contact:
Environment Department
5th Floor
Camden Town Hall Extension
Argyle Street
London WC1H 8EQ
Phone: 020 7974 5611
Fax: 020 7974 5713
Email: info@camden.gov.uk

For information on all Housing Department services between 9am- 5pm Monday- Friday contact:
Housing Department
Bidborough House
20 Mabledon Place
London WC1H 9BF
Phone: 020 7278 4444
Fax: 020 7974 5946
Email: housing.piu@camden.gov.uk

Dial 999 for police, fire or ambulance in emergencies

London Fire Brigade non urgent calls

Borough Commander Camden
Paddington Fire Station
156 Harrow Road
London W2 6NL

020 7587 2302
bccamden@london-fire.gov.uk

Station Commander Euston
Euston Fire Station
172 Euston Road
London NW1 2DH

020 7388 1816 (direct line)
020 7587 4746 (station)
sceuston@london-fire.gov.uk

Station Commander Belsize
Belsize Fire Station
36 Lancaster Grove
London NW3 4PB

020 7587 4579 (direct line)
020 7587 4749 (station)
scbelsize@london–fire.gov.uk

Station Commander West Hampstead
West Hampstead Fire Station
325 West End Lane
London NW6 1RR

020 7794 3101 (direct line)
020 7587 4751 (station)
scwesthampstead@london-fire.gov.uk

Station Commander Kentish Town
Kentish Town Fire Station
20 Highgate Road
London NW5 1NS

020 7428 0579 (direct line)
020 7587 4750 (station)
sckentishtown@london-fire.gov.uk

Station Commander Fire Safety
Paddington Fire Station
156 Harrow Road
London W2 6NL

020 7587 2310 (direct line)
020 7587 2300 (reception)
scfscamden@london-fire.gov.uk

Police non urgent calls

Police Stations

Albany Street 020 8733 6226
Hampstead 020 8733 6625
Holborn 020 8733 6556/8
Kentish Town 020 8733 6025
West Hampstead 020 8733 6825

General Police number

Borough Control Room 020 7404 1212

Thames Water

Emergencies and non billing enquiries 0845 9200 800
Minicom service for deaf or hard of hearing 0845 7200 898

Thames Water Utilities
PO Box 436
Swindon
SN38 1TU

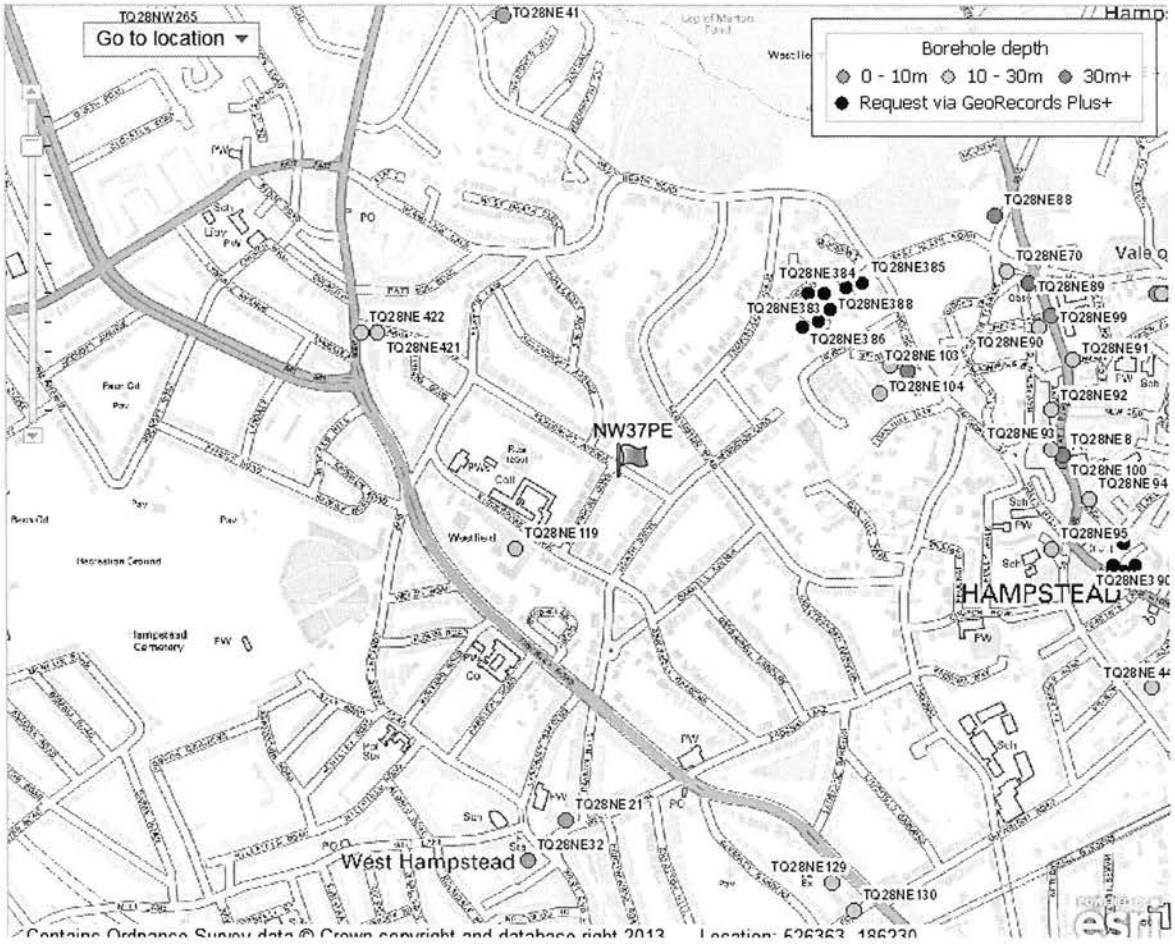
APPENDIX E

GEOLOGICAL SOCIETY BOREHOLE RECORDS

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Borehole record viewer

Search or **pan** and **zoom** to an area of interest.
Click on a **borehole** to open record.

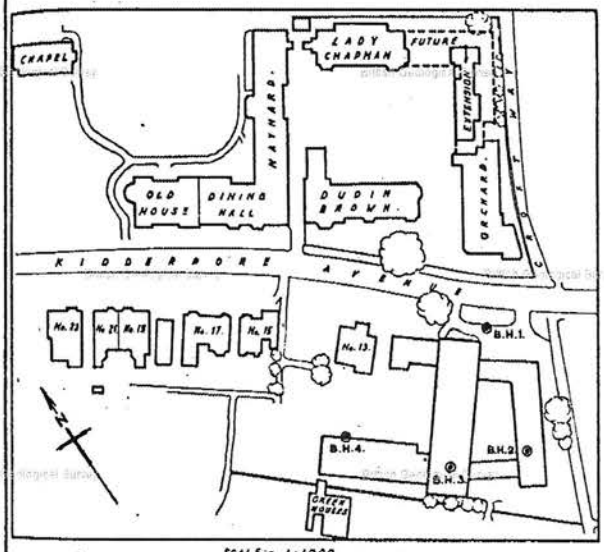


BGS ID: 590707 : BGS Reference: TQ28NE119
British National Grid (27700) : 525370,185750
Report an issue with this borehole

TQ/28NE/119

1" : 256

Fig. 6.



SCALE:- 1:1000

BOREHOLE	DEPTH Ft.	GROUND LEVEL Ft.	LONDON CLAY Ft.	WATER LEVEL Ft.	TRIAXIAL TEST RESULTS: SAMPLE DEPTH Ft.	SHEAR STRENGTH OR COHESION (C) Tons/sq. ft.	ANGLE OF SHEARING RESISTANCE (φ°)
1	50·5	71·7	52·7	51·3	8	(1) 2330	
					18	(2) 2580	0
					21	(3) 2080	
					41	(4) 2598	0
2	35·0	82·0	48·0	57·5	-	-	-
3	50·0	82·3	47·3	55·6	7	(1) 750	
					16	(2) 1082	0
					26 ·	(3) 1680	0
4	35·0	89·1	51·1	82·9	18	(1) 1730	
					30	2230	0

NOTE: ALL LEVELS REFERRED TO CLIENT'S DATUM WHICH IS 326·64 ft. ABOVE O.D.

LOC. 3117. WESTFIELD COLLEGE.
HAMPSTEAD N.W.3.
PLAN SHOWING BOREHOLES POSITIONS ON SITE OF NEW SCIENCE BUILDING.

SOIL MECHANICS LTD.
63, OLD CHURCH STREET, LONDON, S.W.3

3119

BGS ID: 590707 : BGS Reference: TQ28NE119
British National Grid (27700) : 525370,185750
Report an issue with this borehole

<< < Prev Page 2 of 5 Next > >>

TQ28NE/119
2587.8575

Fig. 1

BOREHOLE LOG

LOCATION NO. 3117 Westfield College, Hampstead, N.W.3.
CARRIED OUT FOR Council of Westfield College.
BOREHOLE NO. 1 DIAMETER : 8 Inch
GROUND LEVEL : 71.7 above Client's arbitrary datum DATE : 14th to 16th March, 1959

Description	Reduced Level	Legend	Sample	Depth	Thickness	M/c %
	+71.7			0'0"		
Rubble, clinker and gravel MADE GROUND	+69.9		1 2	1'9"	1'9"	26
Firm mottled grey and brown sandy clayey SILT becoming brown and more sandy below 7 ft. (CLAYGATE BEDS)			3 4 5 6		12'9"	24 25 24 25
	+57.2		7	14'6"		24
Firm becoming stiff light grey-brown sandy clayey SILT, more clayey below 17 ft. (Probably Claygate Beds)	+52.7		8 9	19'0"	4'6"	30 26
Stiff dark grey silty CLAY fairly slightly fissured and very stiff below 40 ft. Fine gypsum throughout. (LONDON CLAY)			10 11 12 13 14 15 16 17 18 19 20 22 21		31'6"	29 25 29 27 26 25 25 24 25 25 25 29
	+21.2			50'6"		

END OF BOREHOLE

Water Level Observations

Date	Time	Depth of Borehole	Depth of Casing	Depth to water
14.3.59	0130	14'6"	14'6"	1'4"
17.3.59	0730	50'6"	-	20'6"

Scale: 1 in. = 5 ft. • Disturbed Sample ▮ Core Sample △ Water Sample

SOIL MECHANICS LTD., 65 OLD CHURCH ST., S.W.3

BGS ID: 590707 : BGS Reference: TQ28NE119
British National Grid (27700) : 525370,185750
Report an issue with this borehole

TQ28NE/119
2587. 8575

Fig. 2

BOREHOLE LOG

LOCATION NO. 3117 Westfield College, Hampstead
CARRIED OUT FOR Council of Westfield College.
BOREHOLE NO. 2 DIAMETER: 8 inches
GROUND LEVEL: 62.0 ft. above Olients arbitrary datum DATE: 19th March, 1959

DESCRIPTION	REDUCED LEVEL	LEGEND	SAMPLE	DEPTH	THICKNESS	M/C %
TOPSOIL with turf	+62.0 +61.5		1 2	0'10" 0'6"	0'6"	
Soft becoming firm to stiff brown and grey mottled sandy clayey SILT, more sandy below 10 ft. (CLAYGATE BEDS)			3 4 5 6 7		13'6"	25
Coarse gypsum crystals	+48'0		8 9	14'10"		30
Firm becoming stiff at 15 ft. and very stiff at 28 ft. grey slightly fissured silty CLAY containing fine gypsum (LONDON CLAY)			10 11 12 13 14 15 17△ 16		21'10"	27
	+27.0			35'10"		27

END OF BOREHOLE

Water Level Observations

Date	Time	Depth of Borehole	Depth of Casing	Depth to Water
20-3-59	0730	36'0"	—	24'6"

Scale 1 in. = 5 ft. ● Disturbed Sample ▮ Core Sample △ Water Sample

SOIL MECHANICS LTD., 65, OLD CHURCH ST., S.W.3.

3119
31

BGS ID: 590707 : BGS Reference: TQ28NE119
British National Grid (27700) : 525370,185750
Report an issue with this borehole

TQ/28NE/119
2537.8575

Fig. 3

BOREHOLE LOG

LOCATION NO. 3117 Westfield College

CARRIED OUT FOR Council of Westfield College

BOREHOLE NO. 3 DIAMETER : 8 inches

GROUND LEVEL : 62.3 ft. above clients arbitrary datum DATE : 20th and 21st March, 1959

Description	Reduced Level	Legend	Sample	Depth	Thickness	%
SOIL with turf	+62.3		1	0'0"	1'0"	
	+61.3		2	1'0"		
				0' 3"		
Firm becoming stiff brown and grey mottled sandy silty CLAY. Very sandy at 3 ft. 6 in. (BLACKHEATH BEDS)			3			
			4		14'0"	28
			5			
			6			
	+47.3		7	15'0"		29
				Δ 67		
			8			
			9			
			10			
Stiff grey slightly fissured silty CLAY with fine gypsum (LONDON CLAY)			11			20
			12			
			13		35'0"	
			14			
			15			
Rich find gypsum 39 ft. and 1 large septarian nodule.			16			29
			17			
			18			
			19			
			20			
	+12.3		21	50'0"		
				15 24		
END OF BOREHOLE						

Water Level Observations

Date	Time	Depth of Borehole	Depth of Casing	Depth to Water
21-3-59	0730	41'0"	26'0"	6'6"

Scale: 1 in. = 5 ft. • Disturbed Sample ▮ Core Sample Δ Water Sample

SOIL MECHANICS LTD., 65 OLD CHURCH ST., S.W.3.

BGS ID: 590707 : BGS Reference: TQ28NE119
British National Grid (27700) : 525370,185750

Report an issue with this borehole

<< < Prev Page 5 of 5 Next > >>

TQ/28NE/119
2537-8575

Fig. 4

BOREHOLE LOG

LOCATION NO. 3117 Westfield College, Hampstead
CARRIED OUT FOR Council of Westfield College.
BOREHOLE NO. 4 DIAMETER: 6 inches
GROUND LEVEL: 69.1 ft. above clients arbitrary datum DATE: 17th and 18th March, 1959

	DESCRIPTION	REDUCED LEVEL	SAMPLE	DEPTH	THICKNESS	M/c %
Soil	TOPSOIL with turf.	+69.1 +68.6	• 1 • 2	0'0" 0'6"	0'6"	
CLGB	Soft becoming firm (below 5 ft.) grey and brown mottled sandy silty CLAY (CLAYGATE BEDS) More sandy	+54.1	• 3 ▌4 • 5 • 6 • 7 ▌8	15'0"	14'6"	30 28
	Firm brown and grey mottled sandy clayey SILT (Probably Claygate Beds) very silty	+51.1	• 9	18'0"	3'0"	
LC.	Firm to stiff grey sandy silty CLAY with shell fragments and fine gypsum. (LONDON CLAY)	+39.1	▌10 • 11 • 12 Δ 13 • 14 ▌15	30'0"	12'0"	26 24
	Stiff grey slightly fissured silty CLAY with fine silt laminations and shell fragments (LONDON CLAY)	+34.1	• 16 ▌17	35'0"	5'0"	26

END OF BOREHOLE

Water Level Observations

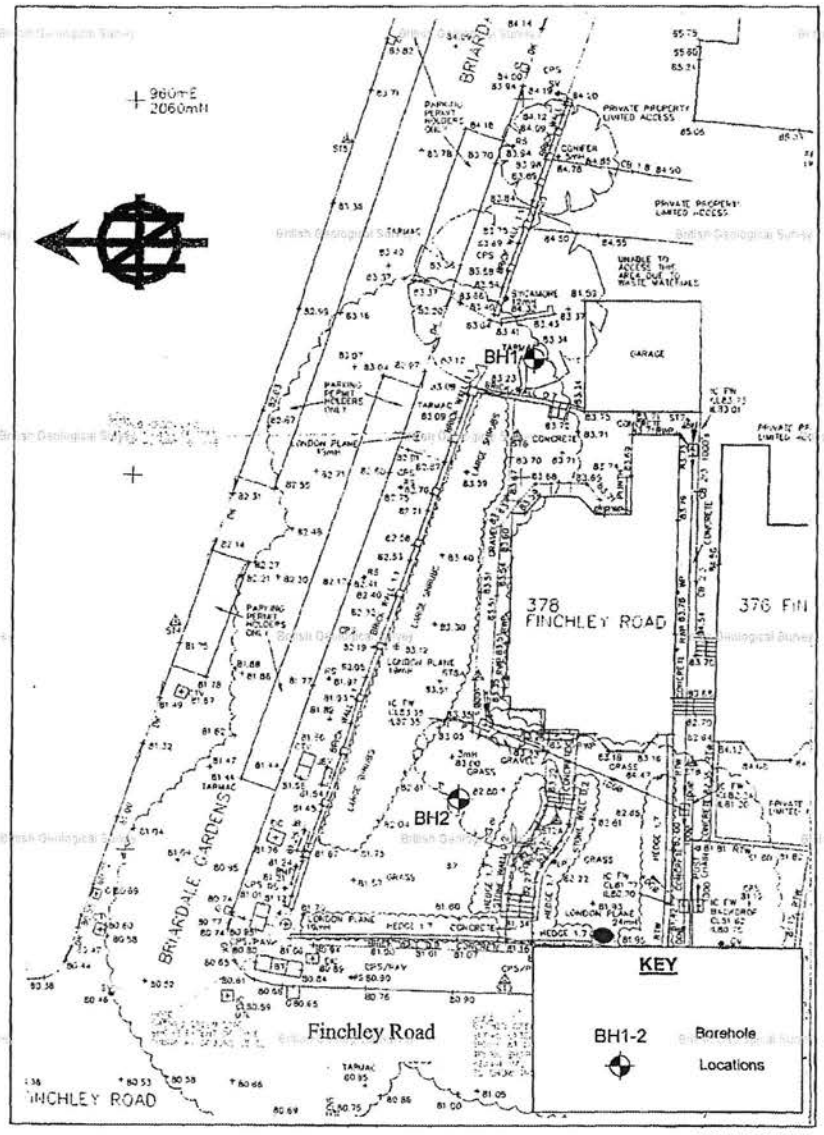
Date	Time	Depth of Borehole	Depth of Casing	Depth to Water
18-3-59	0730	35' 0"	–	6' 1"

Scale 1 in. = 5 ft. • Disturbed Sample ▌ Core Sample Δ Water Sample

SOIL MECHANICS LTD., 65, OLD CHURCH ST., S.W.3.

3119
3120

Borehole Location Plan



Project : 378 Finchley Road, NW3 **Client : Mr Manoj Shah**	**GROUND ENGINEERING** Peterborough Tel : 01733 566566	**Project No.** **C10575**

GROUND ENGINEERING

Geo-Environmental Specialists
01733 568566

Site: 378 FINCHLEY ROAD, LONDON NW3

BOREHOLE BH1

Date: 06/06/06

Hole Size: 150mm dia to 20.00m

Ground Level: 83.34m. O.D.

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.20-0.70	B1				MADE GROUND - CONCRETE		0.20	83.14
					MADE GROUND - Firm, friable, dark brown/brown/grey mottled slightly gravelly, sandy CLAY with occasional brick, concrete, coal and ash fragments			
1.00-1.50	B2						1.10	82.24
1.15-1.45	S	N12	0.90		Stiff brown/orange brown/light grey mottled CLAY with occasional selenite crystals. Becoming fissured below 2.50m			
1.75	D1							
2.00-2.40	U1	38	1.20 ▼s					
2.03	W1							
2.45	D2				(WEATHERED LONDON CLAY)			
2.75	D3							
3.00-3.40	U2	48	1.20					
3.45	D4							
3.75	D5						3.60	79.74
4.00-4.40	U3	55	1.20		Very stiff, closely fissured to stiff, brown/orange brown CLAY with occasional selenite crystals			
4.45	D6				(WEATHERED LONDON CLAY)			
4.75	D7							
5.00-5.40	U4	55	1.20					
5.45	D8						5.50	77.84
6.00	D9				Stiff, becoming very stiff below 7.00m, closely fissured, dark grey CLAY with occasional silt and fine sand seams			
6.50-6.90	U5	60	1.20		(LONDON CLAY)			
6.95	D10							
7.50	D11							
8.00-8.40	U6	62	1.20					
8.45	D12							
9.00	D13							
9.50-9.90	U7	70	1.20					
9.95	D14						10.00	73.34

REMARKS
1. Breaking out concrete from 0.00m to 0.20m for 0.50 hours
2. Excavating a pit from 0.20m to 1.00m for 1 hour
3. Borehole cased to 1.20m depth
4. Fibrous live roots observed to 1.75m depth
5. Standpipe installed to 4.00m depth

Project No 10575

Scale 1:50

Page 1/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▼ Water Strike
▼ Water Rise
N - SPT Blows for 0.3m
* - Blows for quoted penetration
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Struck	Rose to	Depth m Rate	Cased	Sealed

Groundwater Observations

Date	Depth m Hole	Casing	Water
06/06/06	20.00	1.20	dry
06/06/06	20.00	0.00	dry
20/07/06	4.00	0.00	2.03

GROUND ENGINEERING

Geo-Environmental Specialists
01733 568566

Site: 378 FINCHLEY ROAD, LONDON NW3

BOREHOLE BH1

Date: 06/06/06

Hole Size: 150mm dia to 20.00m

Ground Level: 83.34m. O.D.

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
					Very stiff, closely fissured to stiff, dark brown/ dark grey CLAY with occasional light brown silt and fine sand seams up to 6mm thick. Rare bivalve shell fragments at 15.00m		10.00	73.34
10.50	D15							
11.00-11.40	U8	78	1.20					
11.45	D16							
12.00	D17							
12.50-12.90	U9	85	1.20					
12.95	D18							
13.50	D19							
14.00-14.40	U10	90	1.20					
14.45	D20							
15.00	D21				(LONDON CLAY)			
15.50-15.90	U11	90	1.20					
15.95	D22							
16.50	D23							
17.00-17.40	U12	95	1.20					
17.45	D24							
18.00	D25							
18.50-18.90	U13	100	1.20					
18.95	D26							
19.55-19.95	U14	100	1.20					
20.00	D27						20.00	63.34

REMARKS: Borehole completed at 20.00m depth

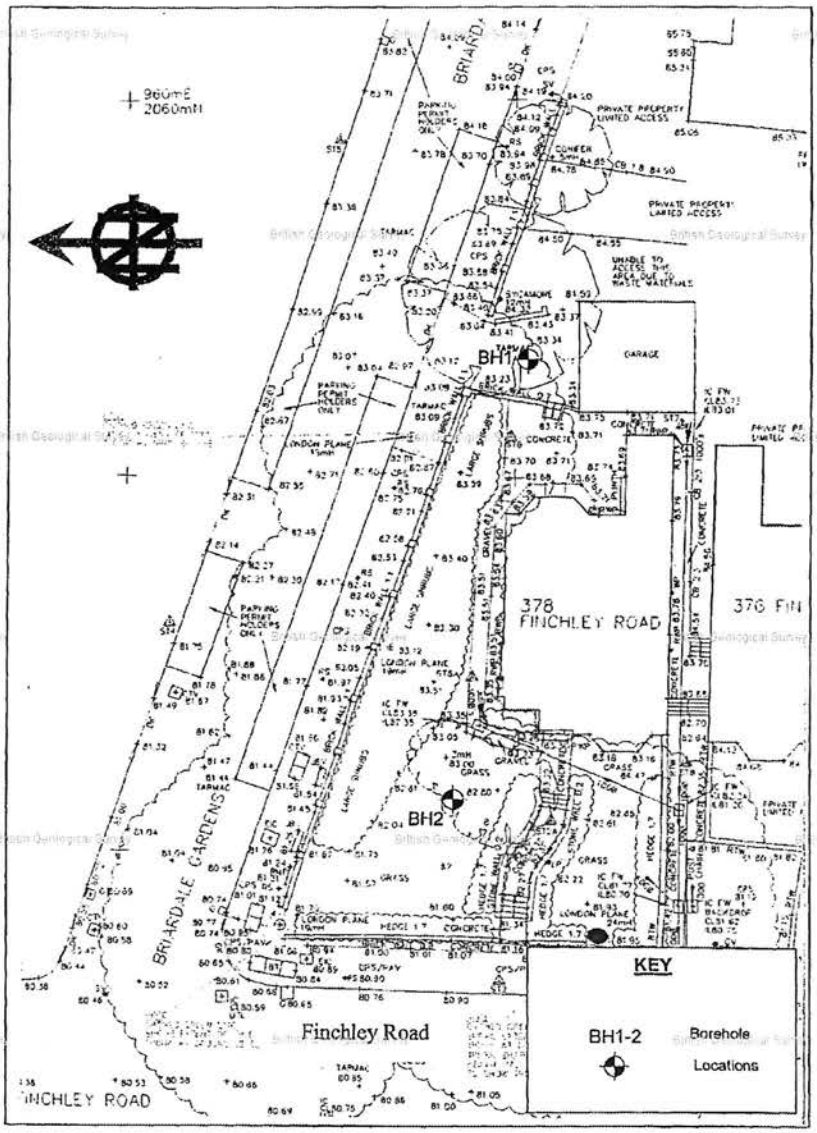
Project No 10575

Scale 1:50 | Page 2/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N - SPT Blows for 0.3m
* - Blows for quoted penetration
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
		Depth m					Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water

Borehole Location Plan



NOT TO SCALE

Project : 378 Finchley Road, NW3 Client : Mr Manoj Shah	GROUND ENGINEERING Peterborough Tel : 01733 566566	Project No. C10575

GROUND ENGINEERING

Geo-Environmental Specialists
01733 586566

Site: 378 FINCHLEY ROAD, LONDON NW3

BOREHOLE BH2

Date: 05/06/06 Hole Size: 150mm dia to 15.00m

Ground Level: 82.80m. O.D.

Samples and in-situ Tests			(Date) Casing	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows					
0.00-0.50	B1			MADE GROUND - Firm, friable, dark brown/black/grey mottled sandy, gravelly CLAY with occasional brick, ash, concrete and coal fragments			
0.50-1.00	B2						
1.00-1.50	B3						
1.15-1.45	S	N15	0.90			1.40	81.40
1.75	D1			Firm, becoming stiff and fissured below 3.50m, brown/orange brown/grey mottled CLAY. Occasional selenite below 3.00m			
2.00-2.30	U1	35	1.50				
2.35	D2			(WEATHERED LONDON CLAY)			
2.75	D3						
3.00-3.40	U2	38	1.50				
3.45	D4						
3.75	D5						
4.00-4.40	U3	42	1.50			4.00	78.80
4.45	D6			Stiff, fissured brown/orange brown CLAY with occasional selenite crystals and orange brown stained fissures			
4.75	D7						
5.00-5.40	U4	46	1.50	(WEATHERED LONDON CLAY)			
5.45	D8						
6.00	D9						
6.50-6.90	U5	50	1.50				
6.95	D10						
7.50	D11					7.50	75.30
8.00-8.40	U6	50	1.50	Stiff, closley fissured to firm, dark grey CLAY with occasional light brown fine sand and silt partings			
8.45	D12			(LONDON CLAY)			
9.00	D13						
9.50-9.90	U7	60	1.50				
9.95	D14					10.00	72.80

REMARKS
1. Excavating a pit from 0.00m to 1.00m for 1 hour
2. Borehole cased to 1.50m depth
3. Fibrous live roots observed to 3.45m depth

Project No 10575

Scale 1:50 Page 1/2

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Core
▼ Water Strike
▼ Water Rise
N - SPT Blows for 0.3m
• - Blows for quoted penetration
V - Vane Shear Test Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						05/06/06	15.00	1.50	dry
						05/06/06	15.00	0.00	dry

GROUND ENGINEERING

Geo-Environmental Specialists
01733 566566

Site: 378 FINCHLEY ROAD, LONDON NW3

BOREHOLE BH2

Date: 05/06/06

Hole Size: 150mm dia to 15.00m

Ground Level: 82.80m. O.D.

Samples and in-situ Tests			(Date) Casing	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows					
				Very stiff, fissured to stiff, dark grey/dark brown CLAY with occasional brown fine sand and silt partings up to 5mm thick. Occasional bivalve shell fragments at 13.00m. Locally slightly sandy		10.00	72.80
10.50	D15						
11.00-11.40	U8	66	1.50				
11.45	D16						
12.00	D17			(LONDON CLAY)			
12.50-12.90	U9	75	1.50				
12.95	D18						
13.50-13.90	U10	80	1.50				
13.95	D19						
14.50-14.90	U11	82	1.50				
15.00	D20					15.00	67.80
				Borehole completed at 15.00m depth			

REMARKS

Project No 10575

Scale 1:50 | Page 2/2

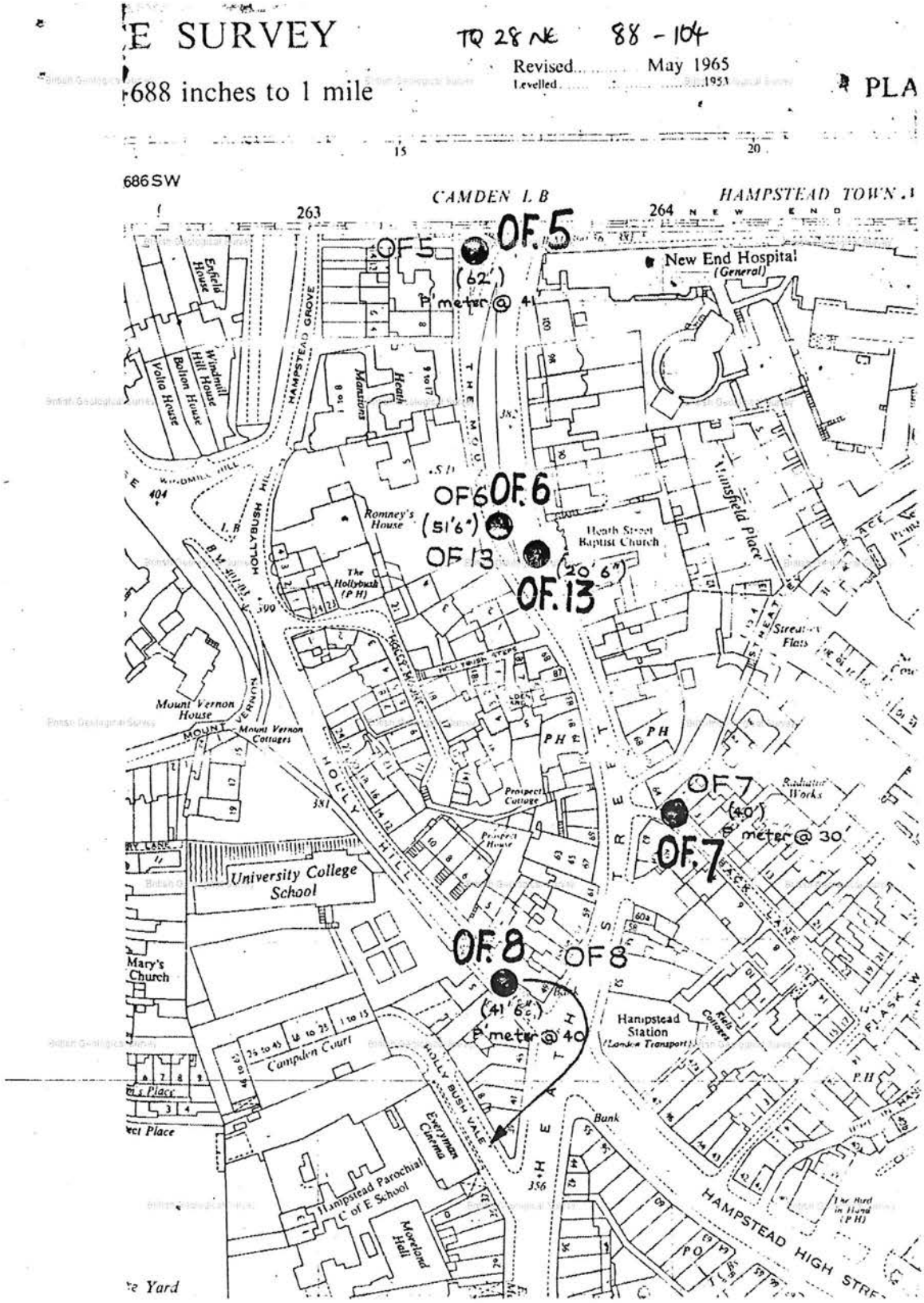
KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N - SPT Blows for 0.3m
" - Blows for quoted penetration
V - Vane Shear Test Cohesion ( ) kPa
▽c Level on completion
c▽w Level casing withdrawn
▽s Standpipe Level

Groundwater Strikes						Groundwater Observations			
			Depth m				Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 590692 : BGS Reference: TQ28NE104
British National Grid (27700) : 526030,186030
Report an issue with this borehole

<< < Prev Page 2 of 3 Next > >>



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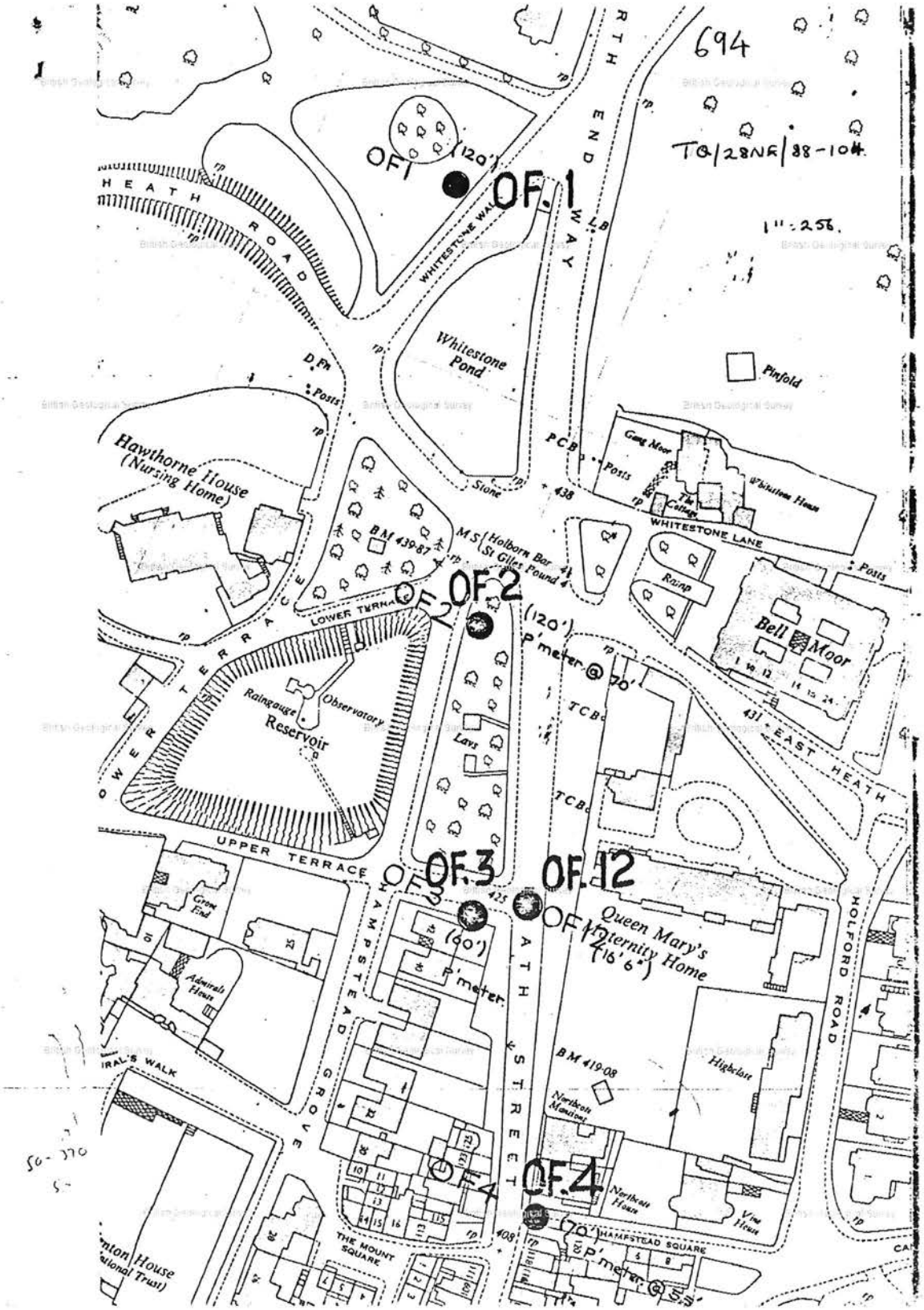
<< < Prev Page 1 of 3 Next > >>



BGS ID: 590692 : BGS Reference: TQ28NE104
British National Grid (27700) : 526030,186030
Report an issue with this borehole

B/1 (1965)
Height 405.08 O.D.

TQ/28NE/103
2608. 8603.

	Thickness (ft)	Depth (ft)
Top Soil	¼	
Brown sand with stones	4½	¼
Brown sandy mottled clay	4¼	4½
Firm brown clay with layers of sand	32	9
Very sandy brown clay	8½	41
Silt with layers of silty clay	11	49½
Soft brown mottled silty clay	2½	60½
Silt with layers of silty clay	8	63
Firm silty blue clay	11	71
Hard blue clay with layers of sand	37½	82
	119½	

B/HL (1968)

TQ/28NE/104 c. 370'+OD
2603. 8603.

	Thickness (ft)	Depth (ft)
Dirty sand	4	
Silty clayey sand	38	4
Silty grey clay	2	42
Silty sand	6	44
Grey silt (liquid)	10	50
Grey clay	10	60
	70	

KEY PLAN AT BACK OF REPORT.