Thames Water Utilities Ltd
Developer Services
Asset Development
Second Floor West, Clearwater Court, Vastern Road, Reading RG1 8DB

Potable Water Capacity
Flow & Pressure Investigation

Location: Pears Building, Royal Free Hospital, Pond Street, London NW3 2QG

DATE	ISSUE	REFERENCE	AUTHOR	APPROVED
24/5/2016	1.0	DS4011432	N Lazarow	M Cieslak

CONTENTS

1. INTRODUCTION

As per your request received 29 April 2016, this report is to evaluate the results of the flow and pressure test and to ascertain the availability of capacity within the existing local mains network and its ability to supply the proposed new domestic peak demand profile for the Pears Building, a 7 storey building of office space, laboratories and patient hotel at the Royal Free Hospital, Pond Street, London NW3 2QG.

The investigation will also determine whether or not any enhancement to the existing network is necessary to supply your requirement, while maintaining existing flows and pressures to our present customers.

Should your development proposal change, this report would become invalid and a further test would be required. If other developments are completed within the Water Pressure Zone before your development and depending on their size and location, this may also necessitate the test to be retaken. The findings of this report are valid for 18 months.

2. EXISTING NETWORK

The local mains network is hydraulically dominated by the Hampstead Reservoir located north east of the site. Water demand to the zone is supplied by the Ashford Common Water Treatment Works west of London and transferred in 42" And 48" trunk mains pumping on from Cricklewood and Fortis Green Pumping Stations.

9" diameter strategic mains in East Heath Road and Heath Street to the north west are the principle inlets to the District Metered Area (DMA) with water flowing south under gravity. The distribution mains also support an adjacent DMA on the western side of Rosslyn Hill.

Drawing (90)MEP0001 C shows supplies connecting to the 6" main in Haverstock Hill at the junction with Rowland Hill Street.

3. EXISTING DEMAND TYPE

The local demand type is predominately residential and residential amenities, which have an overall peak morning water demand profile from the distribution mains network.

4. DOMESTIC DEMAND

The redevelopment of the site consists of office space, laboratories and patient hotel.

Based on empirical and historical data for this type of use, maximum daily consumption will be 18,500 litres. By applying diversity factors, this equates to a peak demand profile of 11.12 l/s.

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5. TEST LOCATION

It was essential to select a suitable washout to induce your flow requirements on our existing network. The following three criteria have determined the location of this washout:

a) must be located on the main proposed to supply your domestic demand;

b) must be closest to the point of entry of your connection; and

c) located in such a manner that when the calibrated flow gauge is operated to induce the required flow rates, the discharged water will not cause flooding of existing properties.

The washout selected was on the 6" diameter main at 250 Haverstock Hill, London NW3 2AE. Please refer to appendix for plan of the test location.

6. PRESSURE LOGGER LOCATIONS

Pressure Logger locations have been selected to comprehensively monitor the impact of the morning domestic peak demand profile on the existing mains network. Please refer to appendix for pressure logger location plans.

LOGGER 1. 4" MAIN 245, HAVERSTOCK HILL, LONDON, NW3 4PR
LOGGER 2. 100mm MAIN 64, ASPERN GROVE, LONDON, NW3 2BX
LOGGER 3. 4" MAIN 5, HAMPSTEAD HILL GARDENS, LONDON, NW3 2PH
LOGGER 4. 7" MAIN 27, ROSSLYN HILL, LONDON, NW3 5UJ
LOGGER 5. 9" MAIN 106, HEATH STREET, LONDON, NW3 1DR

See Appendix for the location of the site, test and pressure loggers.

7. INDUCED FLOWS

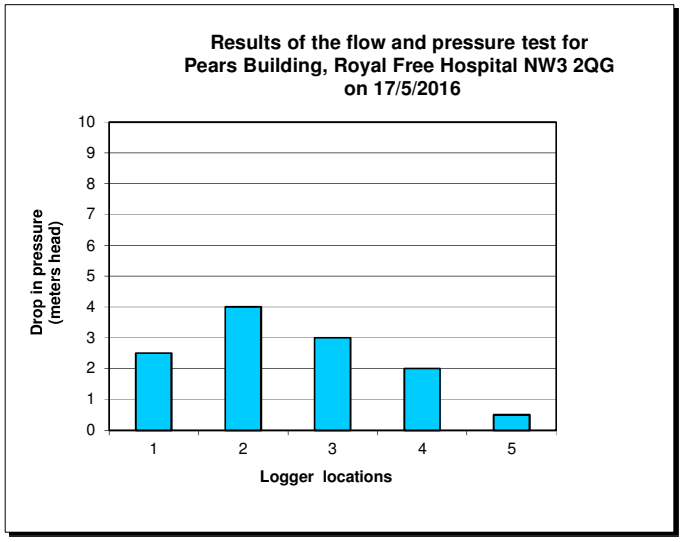
For the domestic demand, flow rates of 11.50 l/s were induced for 3 minute periods.

The flow rate was induced during the weekday peak morning demand period, Monday to Friday 07:00 - 08:30 inclusive. The pressure loggers monitoring the investigation will show a significant drop in pressure, if the network has insufficient spare capacity to supply the new peak demand.

8. INVESTIGATION RESULTS

The investigation was undertaken on 17/5/2016. All five pressure loggers provided the field data for the duration of the investigation. The drops in pressure recorded during the test are represented in the table and graph below.

Flow rates	11.50l/s
Logger location 1	2.5
Logger location 2	4
Logger location 3	3
Logger location 4	2
Logger location 5	0.5



These are within acceptable levels and show that the mains network is capable of supplying your proposed extension to the hospital facilities and no offsite main reinforcement is required to the network however should your proposal change, this report would become invalid and a further test would be required.

The result of the seven day pressure logger showed the minimum pressure available at the site was 49.50 meters head, (4.9 Bar). This occurs between 8.30 am. It is expected that on completion and occupation of the development, there would be a further reduction in pressure of approximately 2 meters head as shown in the flow test.

Please note that irrespective of the pressure which currently exists within the local mains network, Thames Water's minimum level of service is 10 metres head of pressure at the boundary stop valve.

See Appendix for the results graph of the 7 day pressure logger.

9. CONCLUSION

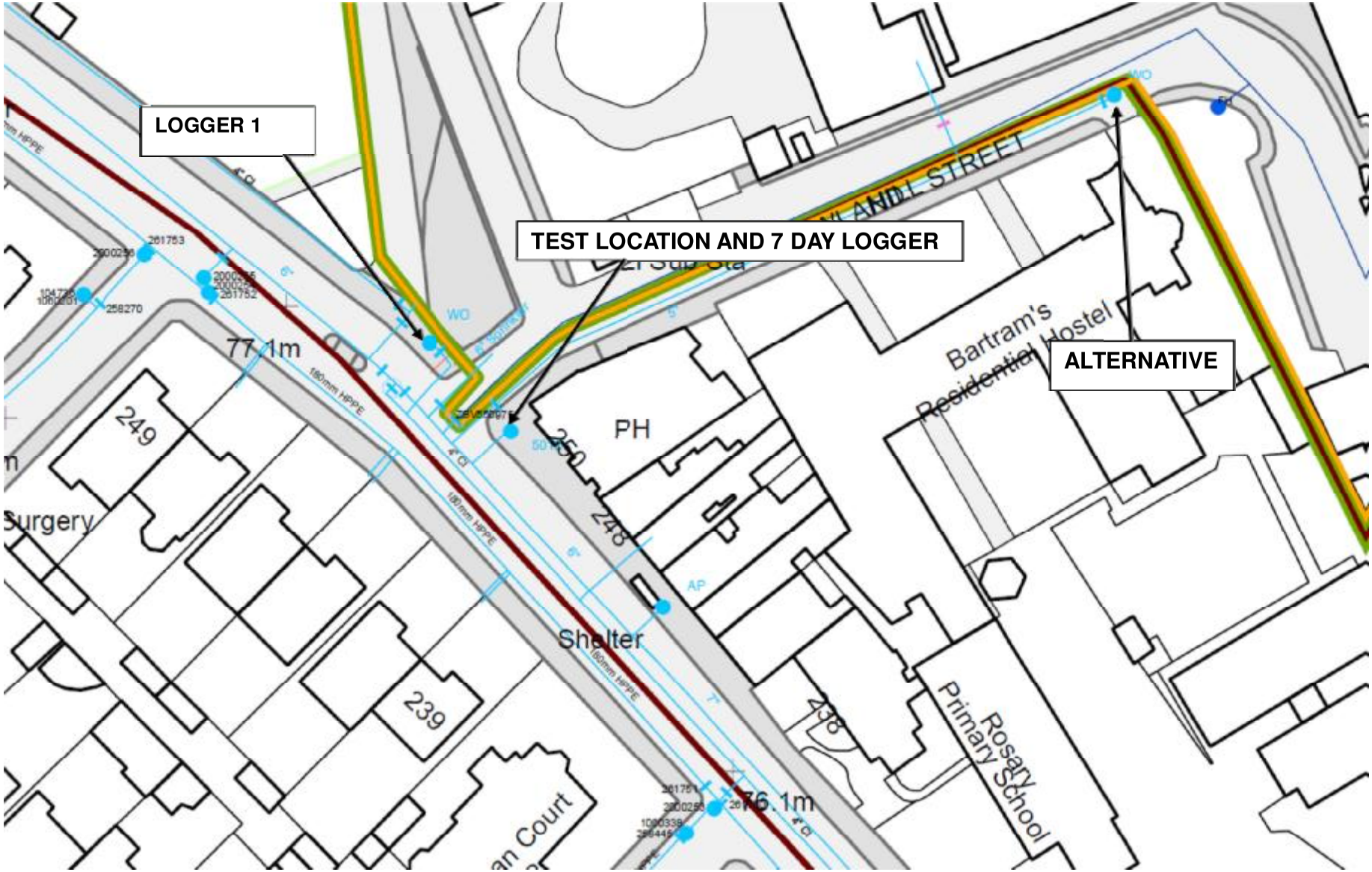
The result of the investigation has established the following: The network has sufficient spare capacity in the 6" distribution main in Haverstock Hill, London NW3 2AE to supply your domestic peak demand profile for the proposed development of office space, laboratories and patient hotel.

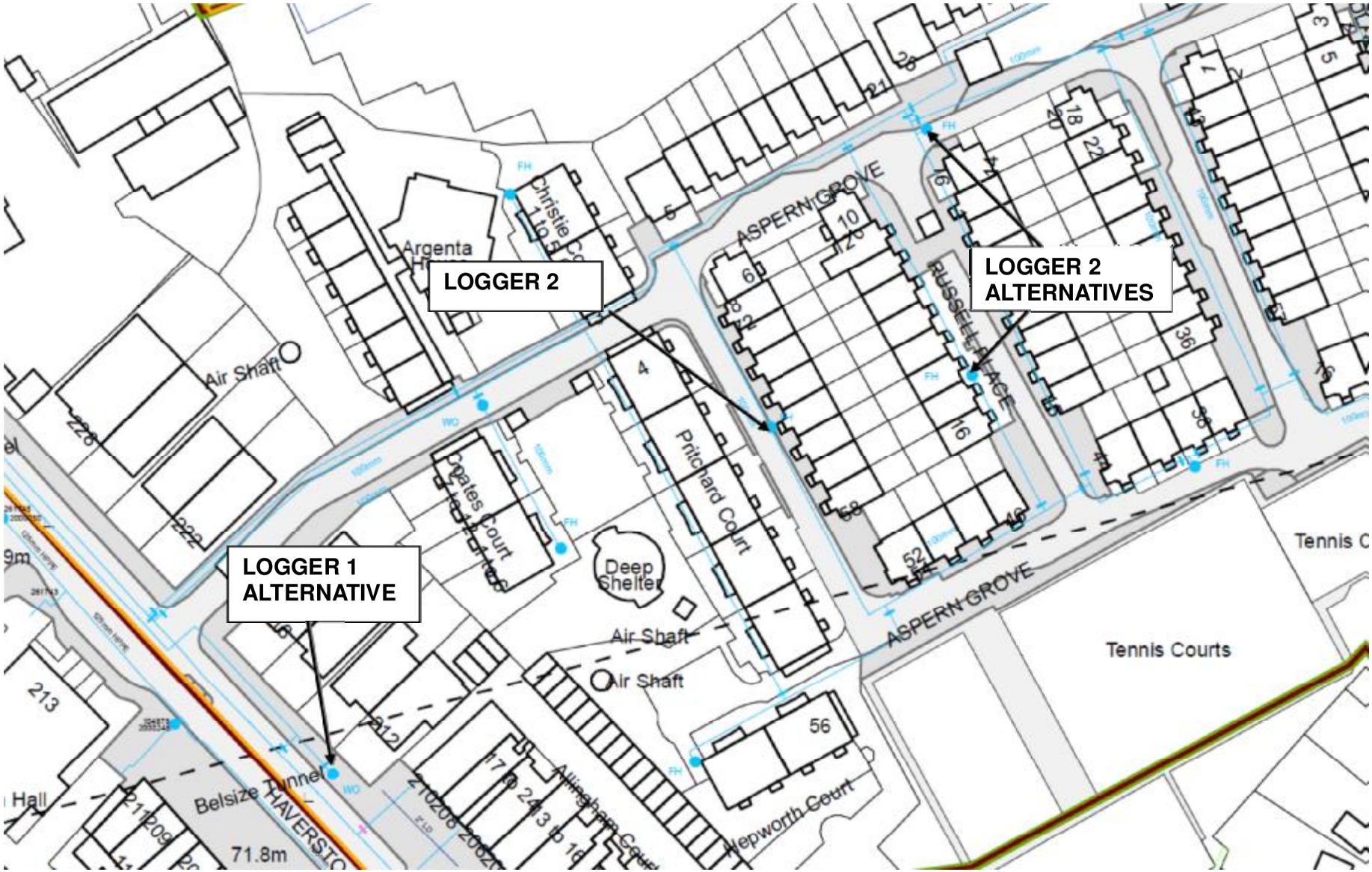
10. BUDGET COSTS FOR REINFORCEMENT

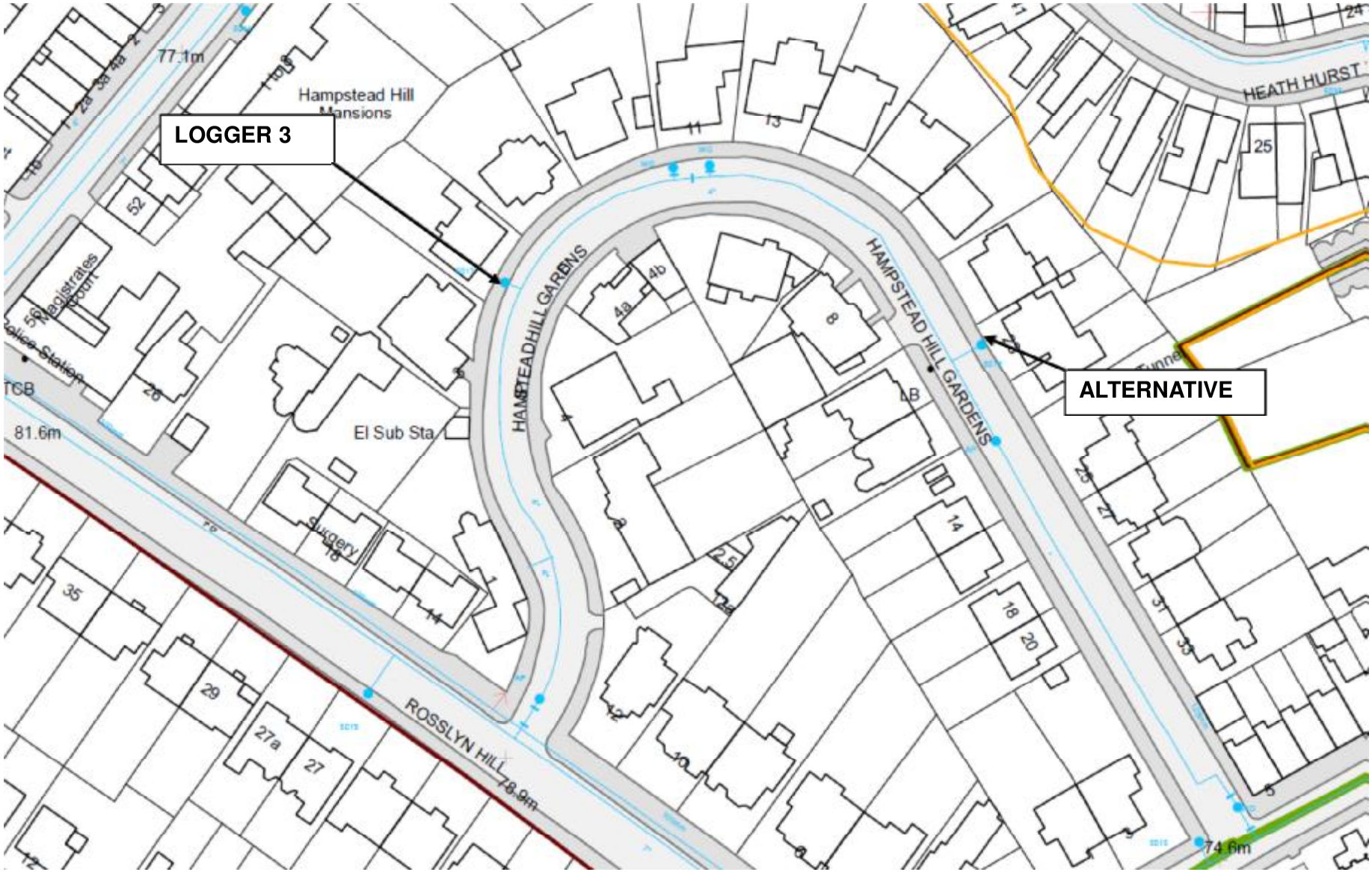
N/A

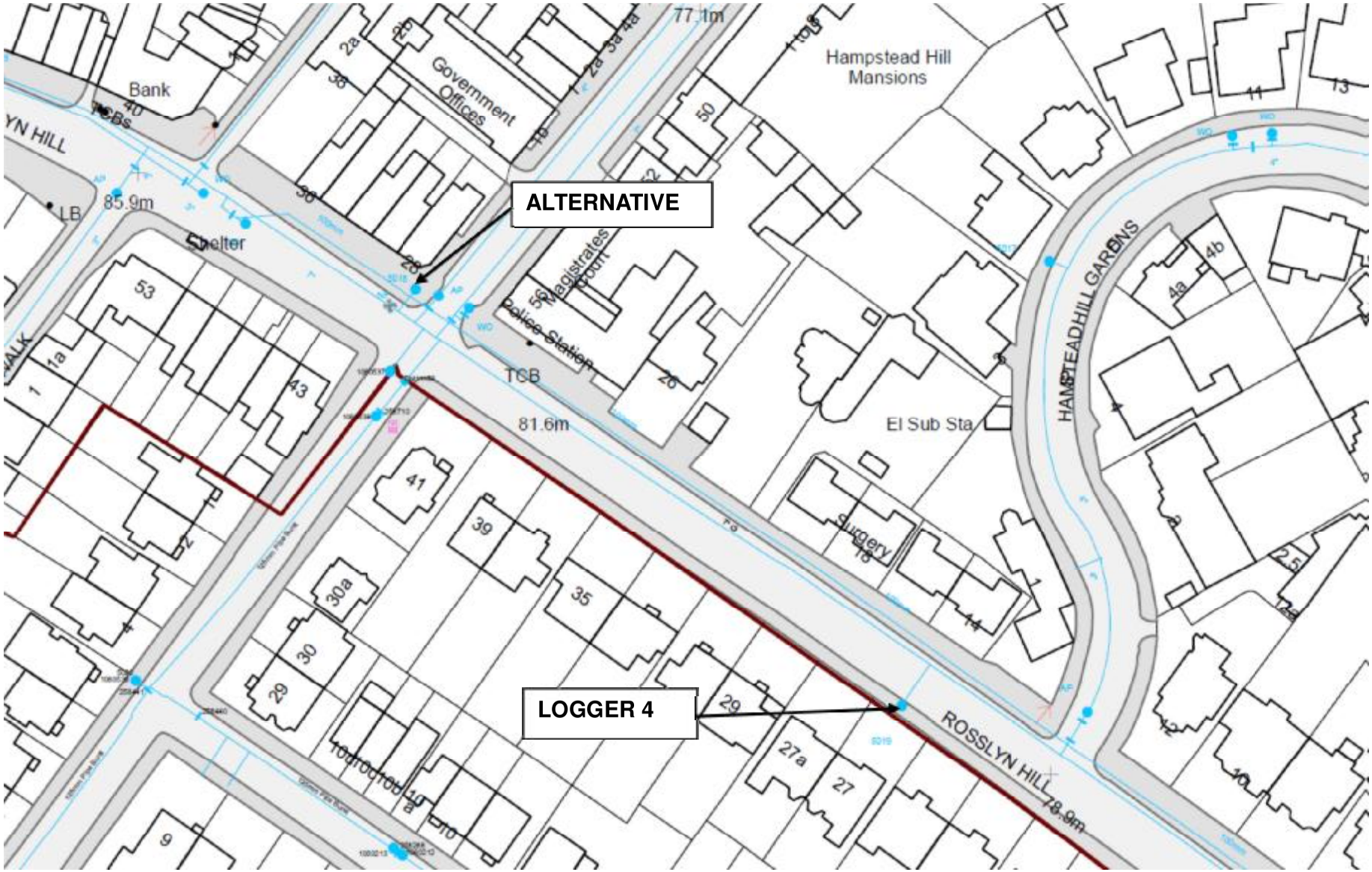
APPENDIX

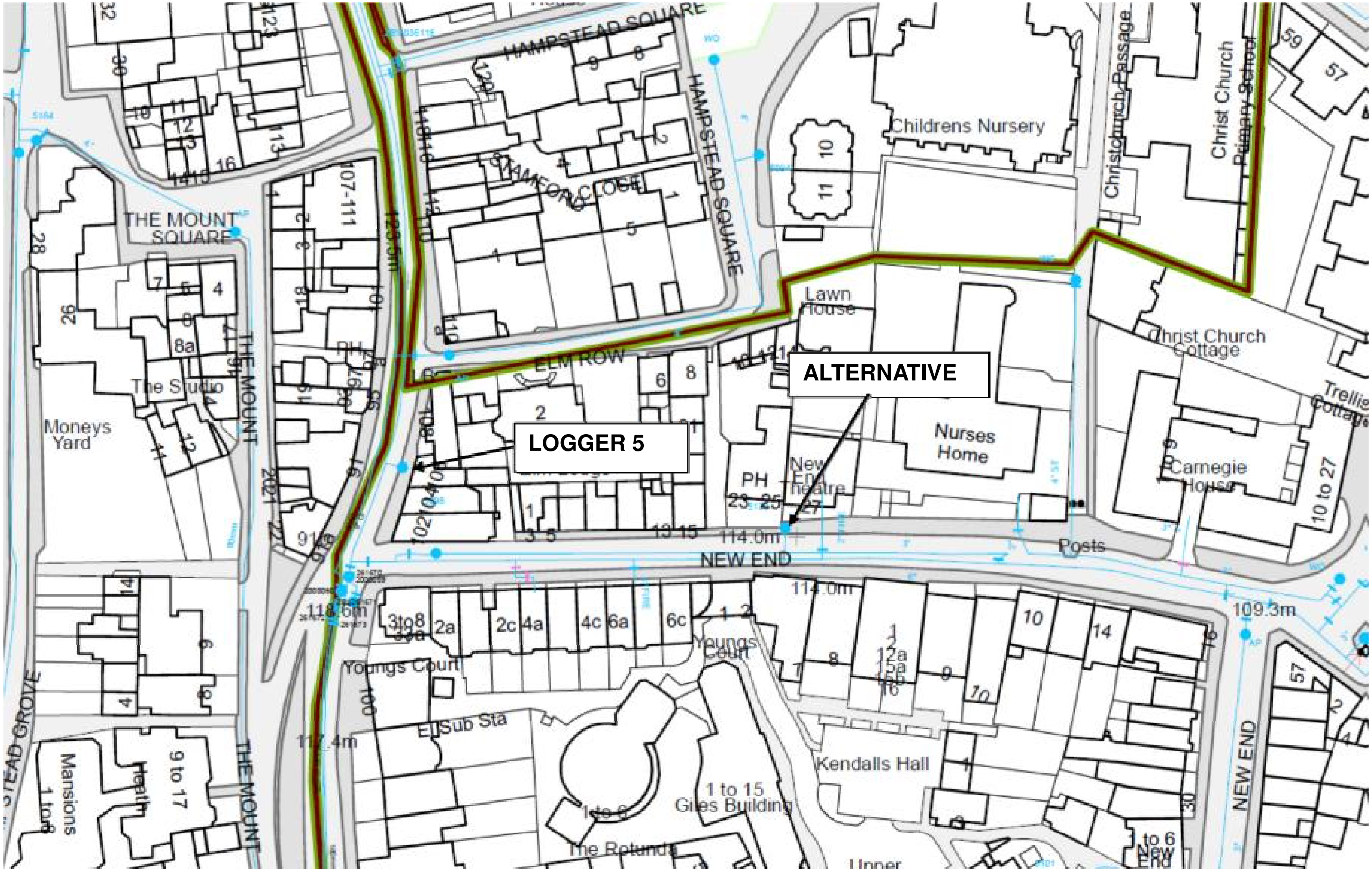
SITE LOCATION


LOGGER 1
TEST LOCATION AND 7 DAY LOGGER
ALTERNATIVE
77.1m
76.1m
PH
Shelter
Surgery
Bartram's Residential Hostel
Rosary Primary School
249
250
248
239
236
WO
AP


LOGGER 2
LOGGER 2 ALTERNATIVES
LOGGER 1 ALTERNATIVE
ASPERN GROVE
Russell Page
Pritchard Court
Coates Court
Deep Shelter
Air Shaft
Air Shaft
Air Shaft
Tennis Courts
Tennis C
Hepworth Court
Belsize Tunnel
71.8m
Argenta
Christie
Hall

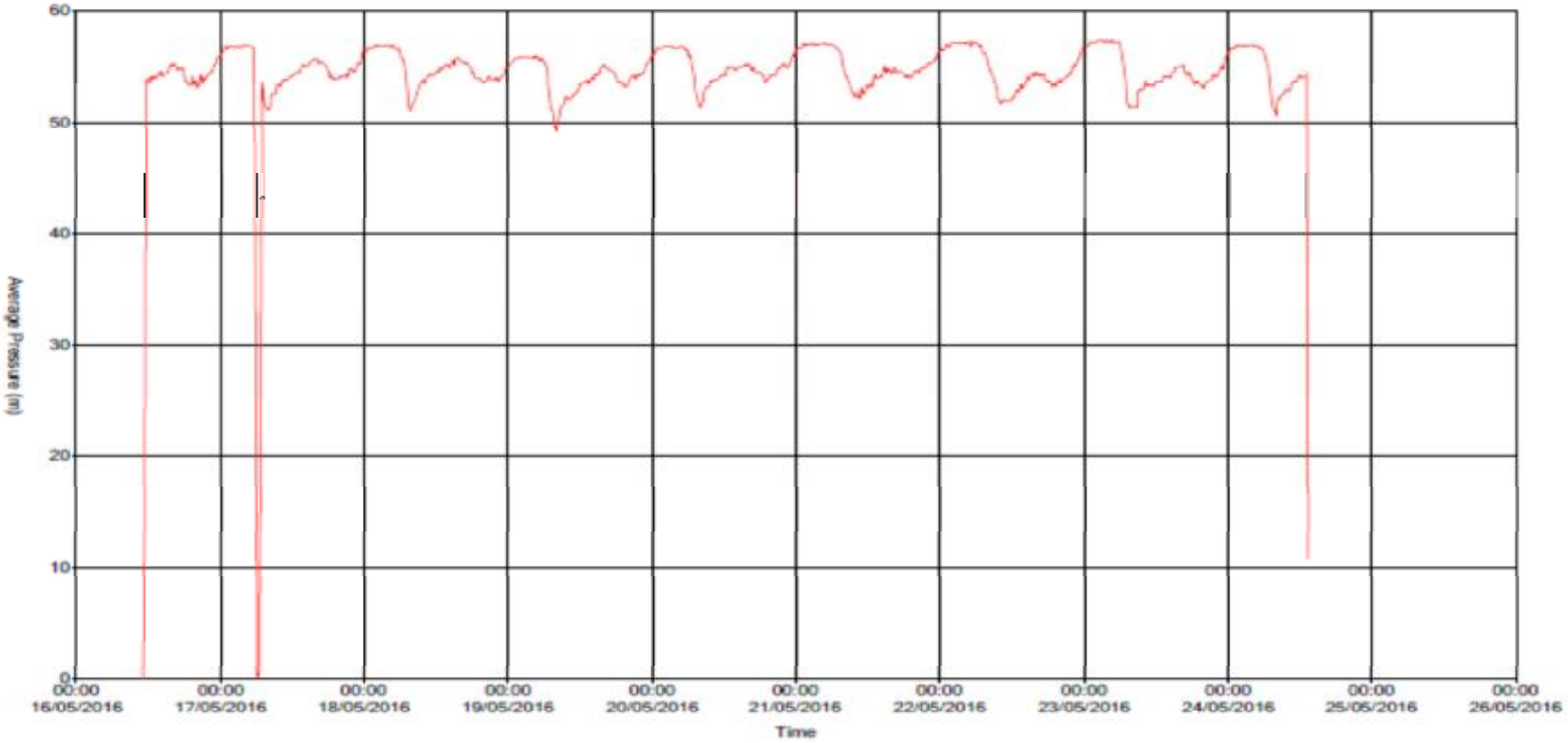

LOGGER 3
ALTERNATIVE
Hampstead Hill Mansions
HAMPSTEAD HILL GARDENS
HEATH HURST
ROSSLYN HILL
El Sub Sta
Surgery
Registrars Room
Police Station
TCB
77.1m
81.6m
78.9m
74.6m


ALTERNATIVE
LOGGER 4
Bank
Government Offices
Hampstead Hill Mansions
Magistrates Room
Police Station
Shelter
LB
85.9m
77.1m
81.6m
78.9m
TCB
El Sub Sta
Surgery
HAMPSTEAD HILL GARDENS
ROSSLYN HILL
YN HILL



LOGGER 5
ALTERNATIVE
NEW END
ELM ROW
HAMPSTEAD SQUARE
STAMFORD CLOSE
THE MOUNT
THE MOUNT SQUARE
Christchurch Passage
Childrens Nursery
Christ Church Primary School
Christ Church Cottage
Carnegie House
Nurses Home
Lawn House
New End Theatre
Moneys Yard
The Studio
Youngs Court
Kendalls Hall
1 to 15 Giles Building
The Rotunda
El Sub Sta
Posts
114.0m
109.3m
123.5m
118.6m

7 DAY PRESSURE TREND AT PEARS BUILDING, ROYAL FREE HOSPITAL
HAVERSTOCK HILL, LONDON NW3 2AE
MINIMUM PRESSURE 49.50 M HEAD MAXIMUM PRESSURE 57.40 M HEAD



PLEASE NOTE, THAMES WATER'S MINIMUM LEVEL OF SERVICE IS 10M HEAD AT THE PROPERTY BOUNDARY VALVE