Dr Shanthi Thomas
124 St Pancras Way
London, NW1
Structural Planning Report

ENTUITIVE

Dr Shanthi Thomas

124 St Pancras Way
London, NW1

Structural Planning Report

April 2017

Issue No.	Date	Prepared By	Checked By
Issue 0	26th April 2017	J. Maguire BScEng CEng MIStructE	S. Bilic MEng
Issue 1	31st May 2018	J. Maguire BScEng CEng MIStructE	S. Bilic MEng

ENTUITIVE

143 Crownstone Road, London SW2 1NB
(t) +44 (0)20 7733 6837
(e) mail@entuitive.com

Project Number: 4369

Entuitive is a trading name of Tall Engineers Ltd Company No. 5393264
Registered address: 149A Southampton Way, London, SE5 7EW

1. CONTENTS

2. SCOPE AND GENERAL INFORMATION

Entuitive were asked to advise on the structural engineering part of the BIA associated with the proposed works at 124 St Pancras Way NW1 9NB.

This document describes the engineering assumptions made in the design of the new basement at 124 St Pancras Way. It also describes a possible construction sequence. It does not address the works above ground floor.

3. SITE AND DEVELOPMENT APPRAISAL

3.1. Existing building and location

St Pancras Way is a residential street located in the London Borough of Camden.

124 St Pancras Way is located on the northern end of St Pancras Way and lies on the eastern side of the street and shares party walls with residential properties, 122 and 126 St Pancras Way, to the north and south. It is also bounded to the east by residential development on Rochester Place. The building is located in Jeffrey's Street Conservation Area. Please refer to the relevant extracts which are provided in Appendix A.

Historic maps of this area indicate that the site was developed around the mid-1800s and prior to that comprised of open farmland. There is no record of bomb damage to the site. Please refer to the relevant extracts which are provided in Appendix A.

The Lost Rivers map indicates that the historical River Fleet may have passed some 300m east of the site. For the purposes of this report the front door of the house is assumed to face directly west onto St Pancras Way.

The house is a terraced building over four storeys, including a single below ground storey of reduced head height. There is also a small three storey rear addition to the back of the main house. At some point in the past a single-storey extension has been added to the rear.

The soil investigation was carried out in March 2017. The investigation included five trial pits and one borehole located at rear of the building. The results of the investigation are shown in the report No. CG/28111 prepared by Card Geotechnics Ltd.

It is assumed that the existing house has loadbearing masonry walls, suspended timber floors throughout with a ground bearing slab in the reduced height basement and loadbearing brick and masonry and timber internal walls. The roof is of timber construction with a slate finish.

3.2. Proposed Development

The proposed alterations involve the formation of a basement extension, within the rear garden, to the rear of the existing property. We propose that this work is undertaken via the formation of the reinforced concrete underpins constructed in a hit and miss sequence.

The scheme design for the proposed new substructure is illustrated in sketches in Appendix C.

3.3. Existing Ground Conditions

For the purpose of the planning application, a site investigation has been carried out and the results are given in the report No CG/28111 prepared by Card Geotechnics Ltd. This allowed us to develop the scheme with some certainty for this stage of the project.

For the purpose of this report, we have taken the site specific geotechnical investigation results which are shown in the mentioned report. The house is underlain by made ground of a depth of around 0.1m – 1.0m over possible Head Deposits of a depth of around 2.15m BGL over Weathered London Clay formation to a proved depth of around 8.45m bgl.

3.4. Site Hydrogeology

From the knowledge of the site and the local conditions, the following was encountered:

Groundwater was not encountered in the window sampler borehole or hand dug foundation inspections during the intrusive works.

The window sampler borehole was installed within a groundwater monitoring well, with a response zone over the granular Possible Head Deposits. Groundwater monitoring undertaken on 15th March 2017 recorded a groundwater level of 1.86m bgl, resting just above the base of the cohesive Possible Head Deposits. The water levels had risen to 1.21m bgl during a subsequent visit undertaken on 31 March 2017, resting within the cohesive Possible Head Deposits.

Only confined perched water has been identified beneath the site within Possible Head Deposits, which were noted to be of 0.25m thickness and have a slow infiltration rate. On this basis it is considered that these soils are not of great hydrological significance and it is therefore considered that the proposed development would not contribute further to any cumulative effects on groundwater

The site does not lie within the designated floodplain of the River Thames, nor is it located within a Groundwater Source Protection Zone as defined by the Environment Agency.

3.5. Slope Stability

The existing site is generally level and the new landscaping will not change the site slopes, as such no issues relating to slope stability need to be addressed.

3.6. Surface Flow and Flooding

The new basement will be built under the existing paved rear garden so the proportion of hard surface area will not increase. This means that no increase in surface water will be discharged to the drainage.

4. PERMANENT WORKS

4.1. Foundations in General

The underlying strata will provide a suitable bearing stratum for the support of the proposed new basement. The design of the basement will be driven by the stability of the Weathered London Clay Formation in conjunction with temporary supports to maintain the stability of existing walls, adjacent land and properties and any existing buried services.

4.2. Basement Construction

The new basement will be formed by extending downwards below the existing brick walls with approximately 2.5m deep reinforced concrete underpinning. The internal toe of the underpinning will form part of the new floor slab and will be cast into new reinforced concrete basement slab in the centre of the floor plan.

The reinforced concrete underpinning will be brought up to the undersides of the original brickwork wall foundations to ensure that the load has not increased on the existing walls of the building. In some cases the existing masonry wall will require removal as the original masonry would not be able to support the lateral forces from the retained earth.

The scheme for the basement and temporary works is illustrated in sketches in Appendix C. An indicative sequence of works is provided later in this report.

4.3. Impact on Adjacent Structures and Services

Both adjacent buildings affected by these works directly adjoin No124.

With good construction practice, actual settlements should be kept within the 'very slight' range in the Classification of damage visible in walls refer to Appendix B. If any damage develops in the structure of the adjacent buildings then normal Party Wall procedures provide a mechanism for completing any repairs.

In view of the depth to the fine grained Weathered London Clay Formation, soils are plastic and specific precautions are considered to be required with respect to protecting foundations from the effects of seasonal soil heave/ shrinkage induced by trees. This will need to be taken into account during the final design however there were no significant trees encountered within the property that could impact on the proposed works.

An analysis of the predicted vertical displacement in the existing footing has been undertaken by CGL in their BIA report and it is noted that there will not be any significant damage to adjacent properties as a result of the proposed works.

It is not anticipated that the work will have an impact on buried services passing across the site e.g. sewers, cables etc. Detailed searches into the locations of any mains services will be carried out in due course, but at this stage there are no known services in the vicinity of the basement excavation. In the course of the normal design development these will be considered and appropriate designs developed for rerouting or protection should it be required.

As the proposed works will directly affect the foundations to the adjoining properties the works will be notifiable under Sections 3 and 6 of the Party Wall etc Act 1996.

4.4. Basement Water tightness

It is expected that the basement will need to meet a minimum level of Grade 3 water-tightness in accordance with BS8007 and BS 8102. Grade 3 implies full water and vapour tightness within the useable space.

We recommend that the basement design will incorporate the use of a drained cavity construction for the perimeter walls and slab. This is a system of drainage blankets, slots and sumps used to control and discharge any below ground water leakage, via burst pipe, through the retaining structure.

For an additional level of security, water resisting concrete admixtures in addition to a drained cavity may be considered. Final design of the waterproofing should be carried out by the architect in due course.

5. TEMPORARY WORKS

5.1. Responsibilities

The following is a suggested construction sequence that would allow the proposals to be built safely. It must be recognised that the contractor will be responsible for determining the actual construction sequence, designing the necessary temporary works and correctly executing the works.

A detailed method statement will be required from the contractor even if the contractor chooses to follow this suggested construction sequence. Should the contractor follow this suggested construction sequence it in no way relieves them of the responsibility to ensure the stability of the building and neighbouring structures during construction stage.

5.2. Structural Monitoring Plan

To ensure the predicted movements in the adjacent buildings remain within acceptable limits, a structural monitoring plan has been devised to enable mitigation to be effectively implemented in the event of agreed trigger values for movement being exceeded.

5.2.1. Responsibilities for the Implementation pf the Monitoring Plan

The responsibility for the implementation of the monitoring plan shall rest with the appointed contractor, working in conjunction with the pointed structural engineer.

5.2.2. Location of Monitoring Positions

Monitoring positions are to be located along the front and rear elevations of numbers 122, 124 and 126 St Pancras Way.

5.2.3. Movement Monitoring Equipment

Precise survey equipment is to be used for monitoring movement. This equipment is to record all vertical and horizontal components of movement (in two perpendicular plan directions) to a minimum accuracy of 1mm.

5.2.4. Condition Survey

Conditions Surveys will be prepared for both 122 and 126 St Pancras Way before any monitoring commences and this will be undertaken as part of the Party Wall Awards between 124 St

Pancras and the adjoining properties. These surveys will record the present physical condition of each property.

5.2.5. Baseline Situation

Before any excavation or construction works commence, monitoring is to be undertaken in order to establish a baseline situation.

5.2.6. Frequency of Monitoring

During all underpinning works and the basement extension excavation works, monitoring is to be undertaken daily at the start and end of every work shift.

At other times monitoring is to be undertaken weekly to cover a period prior to commencement of any works and ceasing after completion of the works, by agreement of all interested parties.

5.2.7. Criteria for assessment of Monitoring data and Comparison with Predicted Movements

The cumulative movements in any directions of any monitoring point are to be compared with the predicted movements at any stage and using the following decision table:

MONITORING CRITERIA		
Total movement less than 2mm in any direction		Green
Total movement in excess of 2mm in any direction or additional movement of 2mm in any direction	Notify Structural Engineer	Amber
Total movement in excess of 5mm in any direction or additional movement of 5mm in any direction	Notify Structural Engineer and Party Wall Surveyor	Red`

5.2.8. Communication of the Monitoring Data to Interested Parties

The monitoring data are to be distributed to all interested parties on a weekly basis during Green and Amber conditions and daily during any Red conditions.

5.3. Groundwater Control

The Contractor will provide any necessary small temporary sump points to control water ingress during the excavation works. This could take the form of locating temporary sump points some 300mm below the basement extension formation level at the location to the proposed underpins. All of the perched water that drains into the sump should be pumped away to the foul sewer prior to the casting of the underpin.

A detailed method statement will be required from the contractor that must include a strategy for ground water control.

6. SUGGESTED CONSTRUCTION SEQUENCE

6.1. Installation of temporary steelwork structure

Dig down for the temporary works pad foundations as set out on drawing 4369 P-SK-04 to the rear ground floor plan. Install the temporary steelwork support structure with needle props above 1st floor level. Carefully demolish all the ground floor structure to the underside of the temporary works props and set aside the existing floor joists to be reused.

6.2. Commence the underpinning works and installation of the steel box frame

The perimeter of the basement should be constructed in an underpinning sequence as shown on sketches SK-PL-01 to 03. The excavations for each pin will generally be in the region of 2.5m high and approximately 1.0m wide. The base of the pin formed each time should be wide enough to support the vertical loads from above, refer to the sketches SK-PL-01 to 03.

Although this process will form a reinforced retaining wall, the portion of the base that projects beyond the assumed party wall line will be unreinforced so that it may be broken off with relative ease should future works below the neighbouring properties require this in the future.

Following the sequence outlined on drawings P-SK-01 carefully excavate all the pins numbered 1. With adequate temporary shoring in place cast the reinforced concrete base and wall underpins below the existing walls. Insert dry packing after 48 hours and after a further 24 hours form a trench across the site to join sequence 1 pins together. Ensure that adequate shoring and cross propping is installed.

The contractor should start with pins marked as pins 1. Each pin should be backfilled with well compacted arising soil following the installation of the dry packing between the top of the pin and the underside of the existing foundation. By backfilling, following the completion of underpins, the lateral stability of perimeter walls will be maintained as the construction progresses around the perimeter of the basement.

Steel reinforcing bars should be left protruding from the sides of each cast underpin section to lap with subsequent underpin wall slab pours. Prior to the casting of adjacent wall sections the contractor must ensure that there is hydrophilic strip, or similar approved, placed into all construction joints.

Following the installation of all the pins numbered 1- 6 the contractor should install the temporary horizontal steel beams as shown on the basement floor plan appended to the report, as shown in Appendix C. These beams will ensure that the lateral stability to the below ground walls will be maintained until the basement slab reaches sufficient design strength.

Cast the blinding for the box frame base. With the steel box frame on site lower it into position and connect it together. With the box frame held in position, chemically anchor dowel bars into the no.1 underpin sections. Install the mesh surround to the base steel beam and cast the concrete foundation around it ensuring that there is a minimum of 100mm of concrete to all side of the base steel. Cast some slab starter bars into the base section.

6.3. Cast basement slab

The basement should be excavated to formation level following the sequence outlined on drawing SK-PL-01 and the new basement slab cast with dowel bars fixed into the side of the underpin walls. Steel reinforcing bars should be left protruding from the end of the cast basement slab to lap with reinforcement in the subsequent basement slab pours. Prior to the casting of the basement slab the contractor must ensure that there is hydrophilic strip, or similar approved, placed into all construction joints.

6.4. Remove propping

Once the basement slab has reached its design strength, as verified by testing of concrete cubes, the temporary lateral propping may be removed.

7. ASSESSMENT OF KEY SAFETY ISSUES

The following issues will require further consideration in order to mitigate or eliminate inherent risks:

- Underground Services- A detailed survey of the existing services will have to be undertaken. All existing services will need to be terminated prior to any excavation.
- Intrusive Structural Survey– investigation will be needed to ensure that assumptions about the existing structure can be verified.
- Construction workers in direct contact with the made ground risk of ingestion and inhalation. With the level of contaminants present in the made ground the SI report highlights that this has a medium risk rating and the risk will be mitigated through the use of appropriate site practices and using full PPE.
- Bulk Deliveries- Delivery and handling of large or heavy structural elements (e.g. reinforcement bars and steel box frame sections) from the main road entrance. Reinforcement can be detailed to provide smaller bars at more regular centres, which will help reduce the weight of hand-lifted elements. However parking licences maybe required from the local council for the delivery trucks.
- Excavation in confined spaces - Normal protection measures to be taken whilst excavating in confined spaces.
- Detailed Temporary Works Design with Site Monitoring– the sequence of work needs to be developed in detail by an experienced professional engineer, and regular site visits and reports made to ensure that site operatives understand and follow the designed sequence.

8. CONCLUSIONS

Our judgment based upon the investigations carried out, the geological records and our experience of basement developments in similar conditions in London is as follows:

a) The development will maintain the structural stability of the existing building and neighbouring properties in the temporary and permanent stages. The engineering of basements of this kind is well understood and there are no difficult or peculiar issues that will arise in this case.

b) The development will have no adverse effects on drainage, run-off or hydrogeology. We do not consider that this site raises any unusual or adverse groundwater or drainage issues.

John Maguire

BSc Eng CEng MIStructE

Entuitive

29th May 2018

Image of 124 St Pancras Way from Google maps

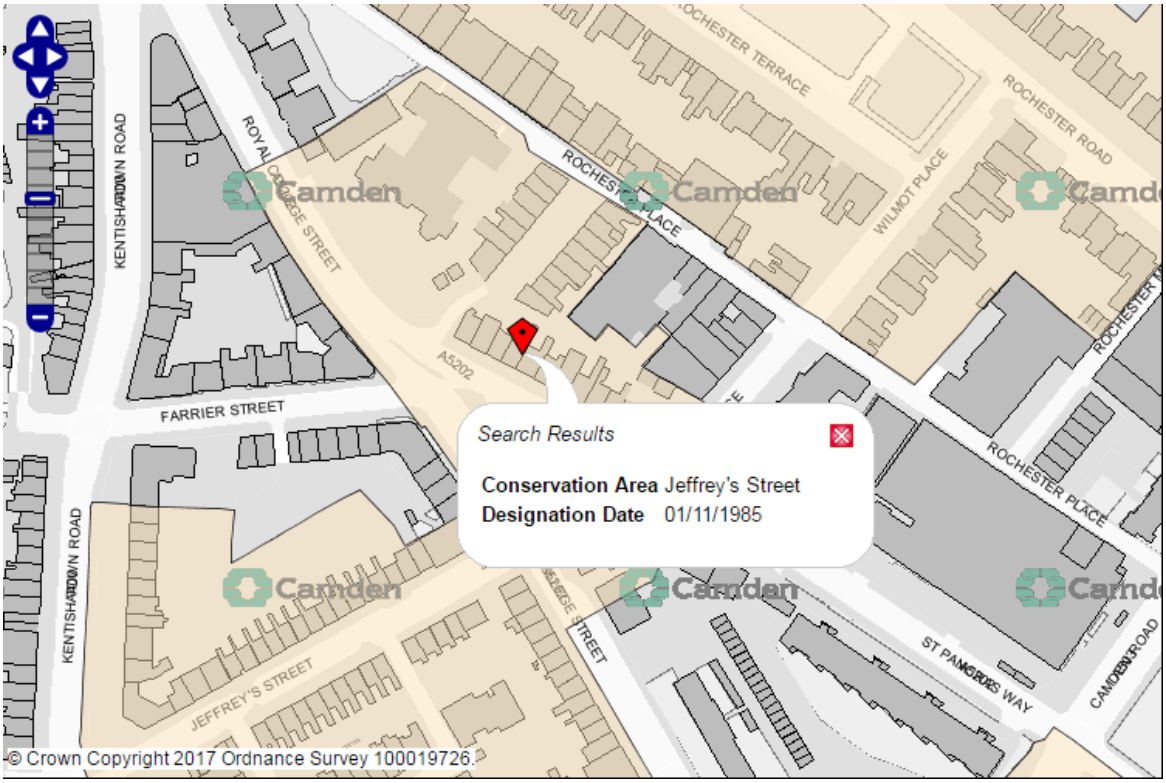
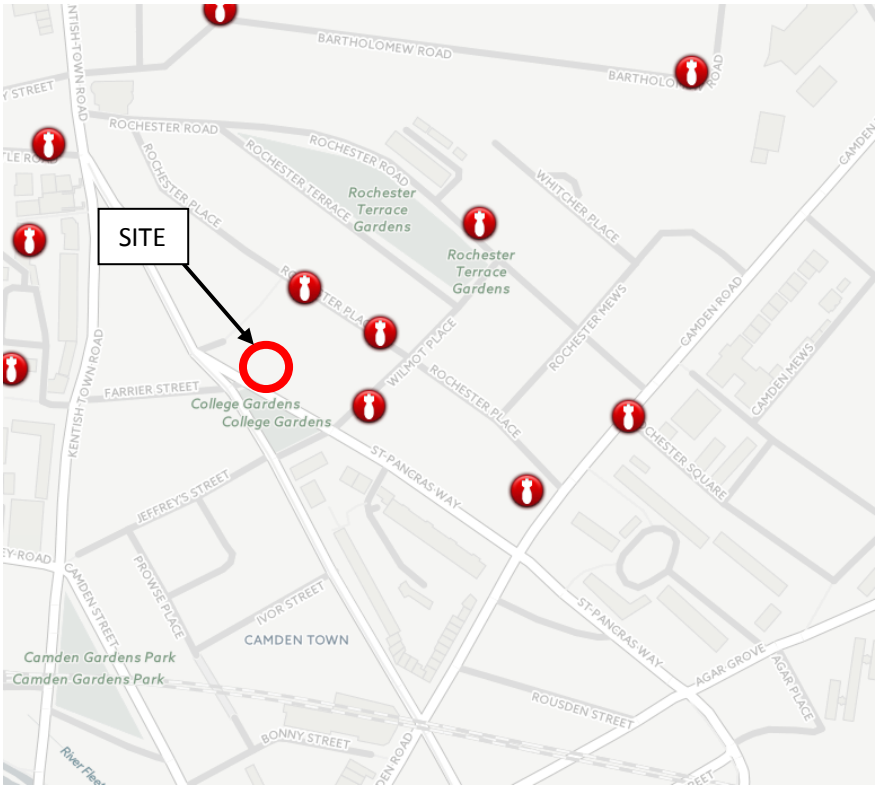
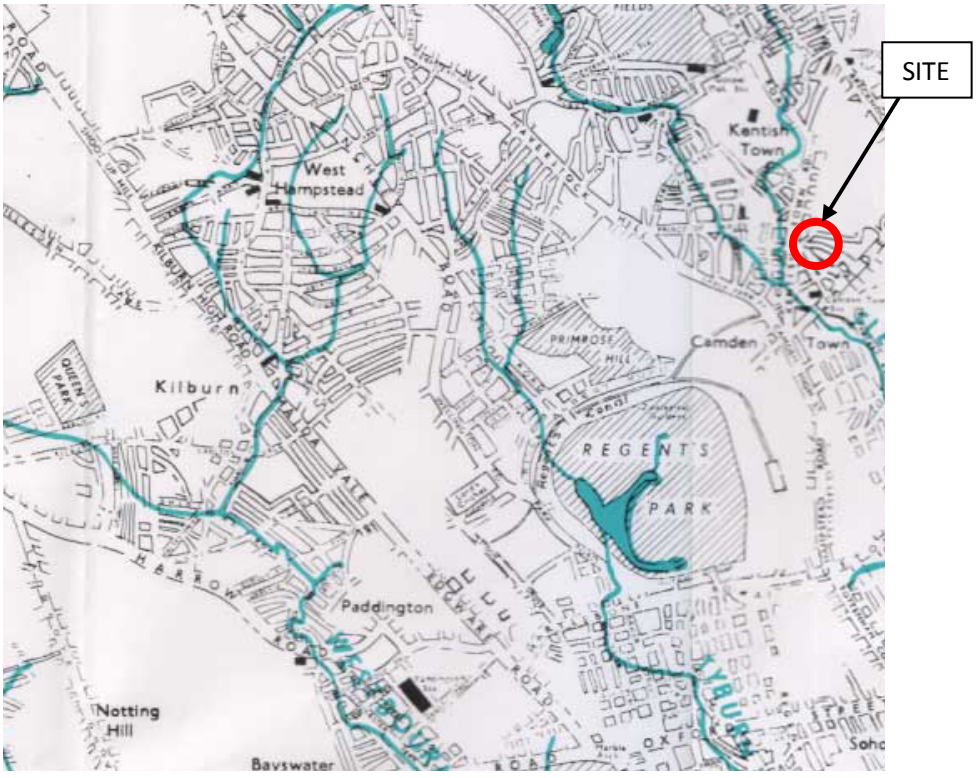


Image of 124 St Pancras Way within Jeffrey's Street Conservation Area



Bomb map of the local area



Lost rivers of London Map

John Maguire

From: LUL CED Infra Protection <lulcedip@tube.tfl.gov.uk>
Sent: 29 May 2018 15:28
To: John Maguire
Cc: LUL CED Infra Protection
Subject: FW: 4369 - 124 St Pancras Way, NW1 9NB
Attachments: Location & Block Plan.PDF

Dear Sir/Madam

With reference to your email and supporting details regarding your proposed works I now write to advise you that London Underground have no shallow railway structures within the area(s) outlined and therefore should not be affected by your proposal.

Please note as an additional precaution I have forwarded your enquiry onto our power supply division who may contact you directly regarding the prospect of any LUL powers cable/duct routes that may be affected.

Andrew Harrison
Infrastructure Protection | STREETWORKS

London Underground | 5 Endeavour Square, Stratford City, London E20 1JN.
Email: andrewharrison@tfl.gov.uk Telephone: 020 7918 2962

Find out more about Infrastructure Protection - https://youtu.be/0hGoJMTBOEg

Mitigating risk - while helping London develop.

Please consider the environment before printing this e-mail

From: John Maguire [mailto:john.maguire@entuitive.com]
Sent: 22 May 2018 14:04
To: LUL CED Infra Protection
Subject: 4369 - 124 St Pancras Way, NW1 9NB

Hi,

Please can you let me know if works at the below address will have an affect on the below ground tube and rail assets.

Address – 124 St Pancras Way, NW1 9NB

The proposed alterations involve the formation of a basement extension, within the rear garden, to the rear of the existing property. The house has an existing basement and the proposal is just to extend it laterally into the rear

garden. We propose that this work is undertaken via the formation of the reinforced concrete underpins constructed in a hit and miss sequence.

With this lateral basement extension, we will only be going no deeper than 1.0m below the existing foundations to the existing house.

I've attached a site plan for information.

Should you require any further information or have any queries please let me know.

Best regards
John

John Maguire BSc(Eng) Dip(Struct) CEng MIStructE
Senior Engineer
D. +44 (0)20 3519 9309

Entuitive | Canada + United Kingdom + United States

John Maguire

From: LULHVpowerassets@tfl.gov.uk
Sent: 30 May 2018 14:42
To: John Maguire
Subject: NRSWA Request Response - Your Reference 4369 - 124 St Pancras Way, NW1 9NB

Our Ref: LRPDJWNG
Your Ref:4369 - 124 St Pancras Way, NW1 9NB
Date:30 May 2018

Name: John Maguire
Company Name: Entuitive

Dear Sir/Madam

We acknowledge receipt of your Letter / New Roads & Street Works Act Enquiry dated 29/05/18 relating to the following enquiry:

124 St Pancras Way, NW1 9NB

We have no H.V. cables or cable duct routes in the immediate area in question. Please note that we only manage High Voltage, Pilot and Fibre Optic Cables for the London Underground distribution network.

Yours sincerely

On Behalf of the H.V. Cables Manager

Title: NRSWA co-ordinator

Email:LULHVpowerassets@tfl.gov.uk

London Underground
Power Distribution
Units 7 & 8,Station Road
Drawing Office
Tufnell Park
London
N19 5UW
Tel: 0203 054 8418

****

1

Transport for London
London Underground

London Underground
Infrastructure Protection

3rd Floor
Albany House
55 Broadway
London SW1H 0BD

www.tfl.gov.uk/tube

Your ref:
Our ref: 24211-SI-1-310518

John Maguire
Entuitive
john.maguire@entuitive.com

31 May 2018

Dear John,

124 St Pancras Way London NW1 9NB

Thank you for your communication of 29th May 2018.

I can confirm that London Underground assets will not be affected by basement works at the above location.

If I can be of further assistance, please contact me.

Yours sincerely

Shahina Inayathusein
Information Manager
Email: locationenquiries@tube.tfl.gov.uk
Direct line: 020 3054 1365

MAYOR OF LONDON

APPENDIX C – BRE DAMAGE CLASSIFICATION TABLE

BRE classification table of visible damage to walls with particular reference to ease of repair of plaster and brickwork or masonry

Category of damage	Degree of damage	Description of typical damage [ease of repair]	Approximate crack width [mm]
0	Negligible	Hairline cracks of less than about 0.1 mm width are classified as negligible	Up to 0.1 mm
1	Very slight	Fine cracks which can easily be treated during normal decoration. Perhaps isolated slight fracturing in building. Cracks rarely visible in external brickwork	Up to 1 mm
2	Slight	Cracks easily filled. Re-decoration probably required. Recurrent cracks can be masked by suitable linings. Cracks not necessarily visible externally; [some external repointing may be required to ensure weather tightness]. Doors and windows may stick slightly.	Up to 5 mm
3	Moderate	The cracks require some opening up and can be patched by a mason. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weather tightness often impaired.	5 to 15 mm [or a number of cracks up to 3]
4	Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows] Windows and door frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably. Some loss of bearing in beams. Service pipes disrupted.	15-25 mm but also depends on number of cracks
5	Very severe	This requires a major repair job involving partial or complete re-building. Beams lose bearing, walls lean badly and require shoring. Windows broken with distortion. Danger of instability	Usually greater than 25 mm but depends on number of cracks.

APPENDIX D – STRUCTURAL DRAWINGS AND TEMPORARY WORKS DRAWINGS