elliottwood

33 Belsize Avenue

London, NW3 4BL

Structural Engineering Report and Subterranean Construction Method Statement

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Non-Technical Summary

If the above measures and sequence of works are taken into account in the eventual design and construction of the proposed works and are properly undertaken by suitability qualified contractor, these works should pose no significant threat to the structural stability of the adjoining properties or surrounding grounds.

Based on current knowledge of the building and the ground movement assessment completed by Fairhurst, if the works are carried out in this manner, then the likelihood of damage to the adjacent properties is expected to be Damage Category 0 (negligible) as set out in CIRIA Report C580.

The attached report and Basement Impact Assessment (BIA) state that the proposed basement will have no significant adverse effect on the local hydrogeology. They also state that both ground water and surface water will not be affected or cause significant adverse effects to the surrounding properties.

A Construction Traffic Management Plan (CTMP) will be completed to give advice on the likely programme, vehicular access and site set up.

EW will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter.

1.0 Introduction

1.1 Elliott Wood (EW) is a firm of consulting structural engineers approximately 120 strong operating from their head office in South West London. Residential developments of all scales have been central to the workload of the practice with many in the Greater London area. In particular EW have been producing designs for basements to both existing and new buildings. To date this numbers approximately 500 sites many of which have been in the Borough of Camden. Our general understanding of the development of London, its geology and unique features together with direct experience on many sites puts us in a strong position to advise clients on works to their buildings and in particular the design and construction of their basement.

1.2 EW were appointed by the building's owner to advise on the structural implications of the proposed refurbishment works to the five storey dwelling on the site of 33 Belsize Avenue. The following report has been prepared to ensure that the property and neighbouring properties are safeguarded during the works. This report follows the guidance given in the Camden Planning Guidance on Basements and Lightwells CPG4. This assessment has been prepared in accordance with the guidance given in CPG4, DP23 and DP27. A Basement Impact Assessment has been carried out by Site Analytical Services (SAS).

1.3 The Contractor will provide a detailed method statement including all temporary works before the works can commence on site. The Contractor is to accept full responsibility for the stability and structural integrity of the works during the contract and provide temporary support as necessary. The Contractor shall also prevent overloading of any completed or partially completed elements.

1.4 This statement focuses on the proposed subterranean works as opposed to the superstructure works and should be read in conjunction with all relevant Architects and Specialists supporting documents.

2.0 Description of Existing Building and Site Conditions

2.1 The existing building at 33 Belsize Avenue is a detached five-storey house with a lower ground floor below street level. The existing building appears to be of traditional construction with timber floors and roofs, and with load-bearing masonry walls. The rear light well was extended in the past creating a terraced area at lower ground floor level. The terraced area consisted of a ground bearing slab and contiguous piled wall on the perimeter retaining the rear garden at upper ground floor level (planning application: 2008/5337/P).

2.2 The existing building and neighbouring properties are not registered on the Camden Borough Listed building register but they are situated in the Belsize Park conservation area.

2.3 A site investigation was carried out at the property by SAS. The investigation comprised of two boreholes of 15m depth with sampling and in-situ testing to the ground conditions encountered in the boreholes. Disturbed and undisturbed samples were collected for laboratory testing.

2.4 The site investigation indicated that the underlying ground is London Clay overlaid by up to 1.5-1.9m of made ground. This is in line with geological records for this area. Water was encountered in one of the boreholes (Borehole 2) at a depth of 1.81m after a period of approximately five weeks. This was noted by SAS as likely due to surface water entering into the pipe but then unable to filter out into the impermeable clay. It was also noted that isolated pockets of perched water may be present in less permeable material at shallower depths on other parts of the site especially within the made ground layer. Sample testing indicated the underlying clay to be of firm becoming very stiff silty clay with occasional pockets and partings of silty fine sand and scattered gypsum crystals. Refer to SAS's report for details.

2.5 There are a number of mature and young trees both in the garden of No. 33 and neighbouring gardens. Refer to the Arboricultural Impact Assessment Report for existing tree root constraints to the lower ground floor and proposals.

2.6 The Belsize Tunnel (Network Rail asset no.SPC/T/30) runs under the road at the Belsize Ln and Ornan Road intersection. It has been confirmed by Network Rail that the proposed plans are over 28m away from their

assets and therefore will have no impact on their assets. Network Rail have requested that excavation drawings and method statements be submitted nearer to construction for information.

2.7 The adjacent properties 31 Belsize Road, 35 Belsize Road and 19 Belsize Lane do not have any basement work proposed for planning. It is assumed that the existing lower ground floor levels at 31 and 35 Belsize Road are of similar construction, size and level to No. 33.

2.8 The historical Tyburn river is located south east of the site, approximately 45m away. The site is not located within the flood plain or within a Groundwater Source Protection Zone and has a low risk of surface water flooding as defined by the Environment Agency Flood Maps.

2.9 Belsize Avenue is located within the Critical Drainage Area number GROUP3-005 as identified in Camden SWMP.

2.10 The results of our desk study can be summarised as follows;

The historic Tyburn river was found south east of the site, approximately 45m away (reference Lost Rivers of London, Nicholas Barton – refer to Appendix C).
The site is located in flood zone 1 and is not within a Groundwater Source Protection Zone as shown on the latest Environment Agency Flood Maps (reference; www.environment-agency.gov.uk).

- Network Rail Asset Protection agree that the proposed plans do not impact their assets (refer to Appendix B for Asset Information).
- There is no record of historical blast bomb damage to the property (reference, The LCC London Bomb Damage Maps 1939-1945, LTS, map 37).

3.0 Proposed Alterations

3.1 The proposed works involve alterations to the existing lower ground floor lightwell to reduce the floor level and construct a new floor at ground level, with a new lightwell and skylights. Additionally there is a single storey rear extension at the upper ground floor level with new facades and a full length opening across its rear elevation. Refer to Appendix A for proposed structural drawings and sections.

3.2 The existing contiguous piled wall enclosing the lightwell will be retained and a reinforced concrete liner wall constructed to support the new ground floor above.

3.3 The new lower ground floor slab will be a suspended reinforced concrete slab supported on edge thickenings and will provide a permanent prop to the existing piled wall. The slab will be suspended over a compressible void former to mitigate clay heave following the release of overburden pressure. The suspended slab will be designed to resist any hydrostatic pressure that may occur below the slab.

3.4 The overall stability of the main building will be maintained through the cellular layout of the walls and rigid diaphragm action of the floors at each level. A new stability frame is proposed at ground floor rear elevation to provide stability to the rear elevation.

3.5 If groundwater is experienced during excavation, suitable control of any inflows would be achieved using sump pumping. A detailed method statement for this process will need to be prepared by the contractor for comment by all relevant parties including party wall surveyors and their engineers. Water levels in the standpipes will be periodically measured prior to start on site. Trial pits will be dug when the contractor first starts on site to confirm the stability of the soil and to further investigate the presence of any groundwater inflows.

4.0 Proposed Below Ground Drainage

4.1 The proposed below ground drainage will be separated into foul and surface water wherever possible before connecting to the Thames Water combined sewer network in Belsize Avenue. The existing connection to the public sewer will be retained and reused if possible to minimise disruption outside of the site boundary. Refer to Appendix D for Thames Asset search.

4.2 It is assumed that foul drainage from lower ground floor and above will continue to drain via gravity.

4.3 The surface water drainage strategy will incorporate SuDS where feasible to reduce the impact of surface water runoff to the wider locality. Refer to the separate SuDS strategy report for further information.

5.0 Party Wall Matters

5.1 The proposed works development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be dealt with in full by the Employer's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, method statements and other relevant information covering the works that are notable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

5.2 The structural design for 33 Belsize Avenue will be developed so as not to preclude or inhibit similar, or indeed any, works on the adjoining properties. This will be verified by the Surveyors as part of the process under the Act.

6.0 Basement Impact Assessment Summary

6.1 The Land Stability, Groundwater and Surface Flow assessments have been carried out by SAS. The assessments conclude that the proposed development is unlikely to result in any specific land/slope stability issues or surface flooding issues. The assessment concluded the proposed development is unlikely to affect the groundwater regime beneath, or adjacent to the site.

6.3 A ground movement analysis has been carried out by Fairhurst. Based on current knowledge of the building and the ground movement assessment, if the works are carried out in this manner, then the likelihood of damage to the adjacent properties are expected to be in the CIRIA C580 Damage Category 0 (Negligible).

7.0 Hydrogeological Statement Summary

7.1 Groundwater was not encountered during the boring operations carried out by SAS in September 2017. Subsequent groundwater monitoring has shown that out of three boreholes, water was encountered in one borehole at a depth of 1.81m bgl. It was suggested that this was likely due to perched water within the made ground.

7.2 The structural slab level of the lower ground floor slab is approximately 3.0m bgl. It is therefore possible that perched water may be encountered during the construction of the basement, although based on the monitoring completed this is unlikely. Localised pumping will be implemented to deal with the perched water during the construction of the basement. As the ground has a low permeability it was advised that this would be a suitable method of controlling the water. The relevant filters will be installed on the pumps to ensure that the migration of fines is limited.

8.0 Conclusions

8.1 It is intended that the above measures and sequence of works are adopted for the eventual design and construction of the proposed works.

8.2 Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including party wall surveyors and their engineers. Elliott Wood Partnership will ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages. A specification and indication of monitoring requirements is given in section 9.0.

9.0 Monitoring during Excavation and Construction

9.1 The Contractor shall provide monitoring to all structures and infrastructure adjacent to the basement excavation at the time of excavation and construction.

9.2 Monitoring shall be completed as follows:

1) One month prior to any works being started to provide a base reading.
2) At the start and end of every shift during the excavation and until the basement slab and lining wall has been cast.
3) On a monthly basis thereafter for a 6 month period following completion of the notifiable works.

9.3 Cumulative movement of survey points must not exceed:

a. *Settlement and Lateral displacement*

Code amber trigger values: +/-4mm

Code red trigger values: +/-8mm

9.4 Movement approaching critical values:

Code Amber trigger value:

All interested parties, including the Adjoining Owner's Surveyor and his Engineer should be informed and further actions immediately agreed between two of the three Surveyors and implemented by the Building Owner. Notwithstanding the Party Wall requirements, the Contractor is to appoint, and to have permanently on site, a suitably qualified Structural Engineer who will be responsible for the reviewing of the movement monitoring results at the start and end of each day and provide immediate advice, remedial works and design as necessary in the event of movement being noted. The Contractor is to ensure that he has 24 hour / 7 days a week access to emergency support provision including but not limited to additional temporary props, needles, waling beams and concrete supply at the start of the excavation and prior to any likelihood of this trigger value being reached. If this value is reached the Contractor, and his Engineer, must without delay provide all interested parties with his plan to implement any emergency remedial and supporting works deemed necessary. The Contractor must be ready to carry out these works without delay if the movement continues and approaches the trigger value below.

Code Red trigger value:

All interested parties including Adjoining Owner's Surveyor and Engineer will be informed immediately. Works will stop and be made safe using methods and equipment agreed at the above stage. The Contractor is to ensure that the movement has stopped as a result of the implemented remedial works designed and installed at this stage. The requirements of the Party Wall Act will also ensure that, two of the three Surveyors and their advising Engineers shall then enter into an addendum Award, setting out whether or not the Building Owner's works can re-commence and when, and if so agree additional precautions or modifications to the proposals prior to re-commencement.

10.0 Subterranean Construction Method Statement

10.1 Construction generally

It is assumed that the above measures and assumed sequence of works are taken into account in the eventual design and construction of the proposed works.

Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including Party Wall Surveyors and their Engineers. The Contractor will need to ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages.

EW will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site report is provided to the design team, Contractor and Party Wall Surveyor.

Access onto the site will be from Belsize Avenue and must be coordinated in a sensible manner to minimise disruption to the adjoining residents; and provide a safe working environment.

Refer to drawings 2170409 S.301 – S.308 in the appendix for more information on the proposed sequence of construction.

10.2 Assumed Sequence of Construction

Stage 1: Site set-up

- Erect a fully enclosed painted plywood site hoarding along the front boundary wall, this should not impede on the neighbouring properties.
- The services within the site should be identified and isolated as necessary. All below ground obstructions should also be removed to allow the works to progress.
- The principles for the removal of spoil shall be agreed. Detailed information for this can be found in the CTMP.
- Tree Protection methods to be agreed and installed to all retained trees.
- Monitoring points should be installed to all neighbouring structures and infrastructure and a base reading should be taken prior to any construction works starting on the site.

Stage 2: Install temporary works and temporary piles

- Install temporary piles using existing steps to form ramp for access.
- Break down existing liner brick wall to lower ground floor level.
- Install temporary horizontal steel waling beam around the perimeter of piled wall.
- Install low level and high-level temporary horizontal props and waling beams. These will provide temporary restraint to any lateral forces until the new slabs have been cast and cured.
- Suitable temporary sumps should be excavated at all stages within the excavation to allow groundwater to be collected and pumped out if required. Filters should be installed to ensure that the migration of fines is limited.

Stage 3: Reduce level dig to lower ground floor formation level, Cast new RC slab

- Following installation of temporary works, carefully break-out existing lower ground floor slab in lightwell.
- Excavate to formation level
- Install drainage
- Install compressible void former under RC slab
- Cast RC base slab and thickenings (including kickers for RC liner walls).

Stage 4: Construct basement liner walls

- Once the base slab has cured it will provide a permanent low-level prop to the existing contiguous piled wall. Therefore low level props and waling beams can be removed.
- Cast RC walls to the underside of the high-level propping.
- Once RC liner walls have cured, install additional high level propping against new RC liner wall whilst maintaining previous high level props (propping existing contiguous piled wall).

Stage 5: Install high level props against new RC liner wall

- Once new high-level props onto new RC liner wall have been installed, removed previous high level props.
- Cast remaining RC liner walls.

Stage 6: Install ground floor structure

- Install ground floor steels and metal deck. Prop underside of deck as necessary.
- Once the ground floor structure has been installed, it will provide a permanent prop to the top of the contiguous piled wall and therefore the remaining temporary horizontal props can be removed.

11.0 Noise, Vibration and Dust

Below we have described the mitigation measures that are proposed to keep noise, dust and vibration to acceptable levels during construction.

11.1 Mitigation Measures for Demolition of Existing Structures

The breaking out of existing structures shall be carried out by diamond saw cutting and hydraulic bursting where possible to minimise noise and vibration to the adjacent properties. All demolition and excavation work will be undertaken in a carefully controlled sequence, taking into account the requirement to minimise vibration and noise. The contractor will need to utilise non-percussive breaking techniques where practicable.

As the property is detached there is less of an issue with noise and vibration transference via connections to the neighbouring building. However, the contractor should ensure that where any slab is adjacent to the boundary the concrete slab should be diamond saw cut first along the boundary to isolate the slab from any adjoining structures.

Dust suppression equipment should be used during the demolition process to ensure that any airborne dust is kept to a minimum.

11.2 Mitigation Measures for Excavation

Due to the size of the basement it is likely that mechanical plant will be required to complete the excavation for lowering the lower ground floor. The contractor should ensure that any mechanical plant is switched off when not in use and is subject to regular maintenance checks and servicing. An electrically powered conveyor will be used as detailed above.

11.3 Mitigation Measures for the Construction of the concrete shell

The contractor should ensure that any concrete pours are completed within the permitted hours for noise generating works. The contractor should allow for a contingency period to ensure that concrete pours can be completed within these hours regardless of unforeseen circumstances such as batching plant delays and traffic congestion.

The fabrication and cutting of steelwork for the reinforced concrete walls and underpins shall take place off site. If any rebar needs to be trimmed on site this should be completed using hydraulic or pneumatic tools instead of angle grinders.

11.4 Dust Control

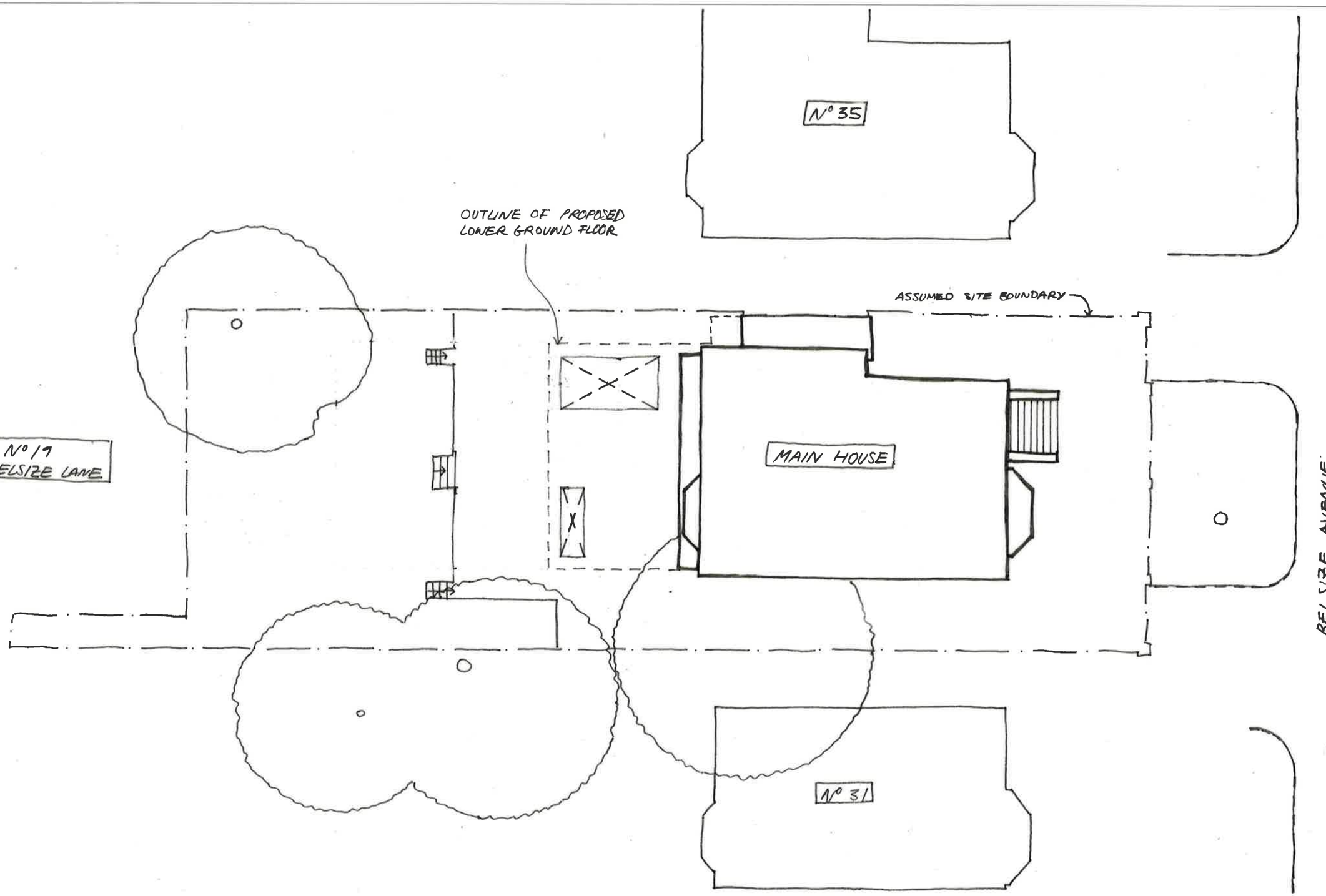
In order to reduce the amount of dust generated from the site, the contractor should ensure that any cutting, grinding and sawing should be completed off site where practicable. Any equipment used on site should be fitted with dust suppression or a dust collection facility.

The contractor will be responsible for ensuring good practice with regards to dust and should adopt regular sweeping, cleaning and washing down of the hoardings and scaffolding to ensure that the site is kept within good order. The contractor selected will be a member of the Considerate Contractors Scheme. Contact details of the contractor who will be responsible for containing dust and emissions within the site will be displayed on the site boundary so that the local residents can contact the contractor to raise any concerns regarding noise and dust.

The building will be enclosed within suitable scaffold sheeting and any stockpiles of sand or dust-generating materials will be covered. Cement, fine aggregates, sand and other fine powders should be sealed after use.

APPENDICES

A Proposed Structural Layouts and Sections



This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

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rev	date	by	chk	description
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P1	01.11.17	JTa	SSt	

drawing title
PROPOSED SITE PLAN

scale(s) 1:200@A3 | date OCT'17 | drawn JTa

drawing status
PRELIMINARY

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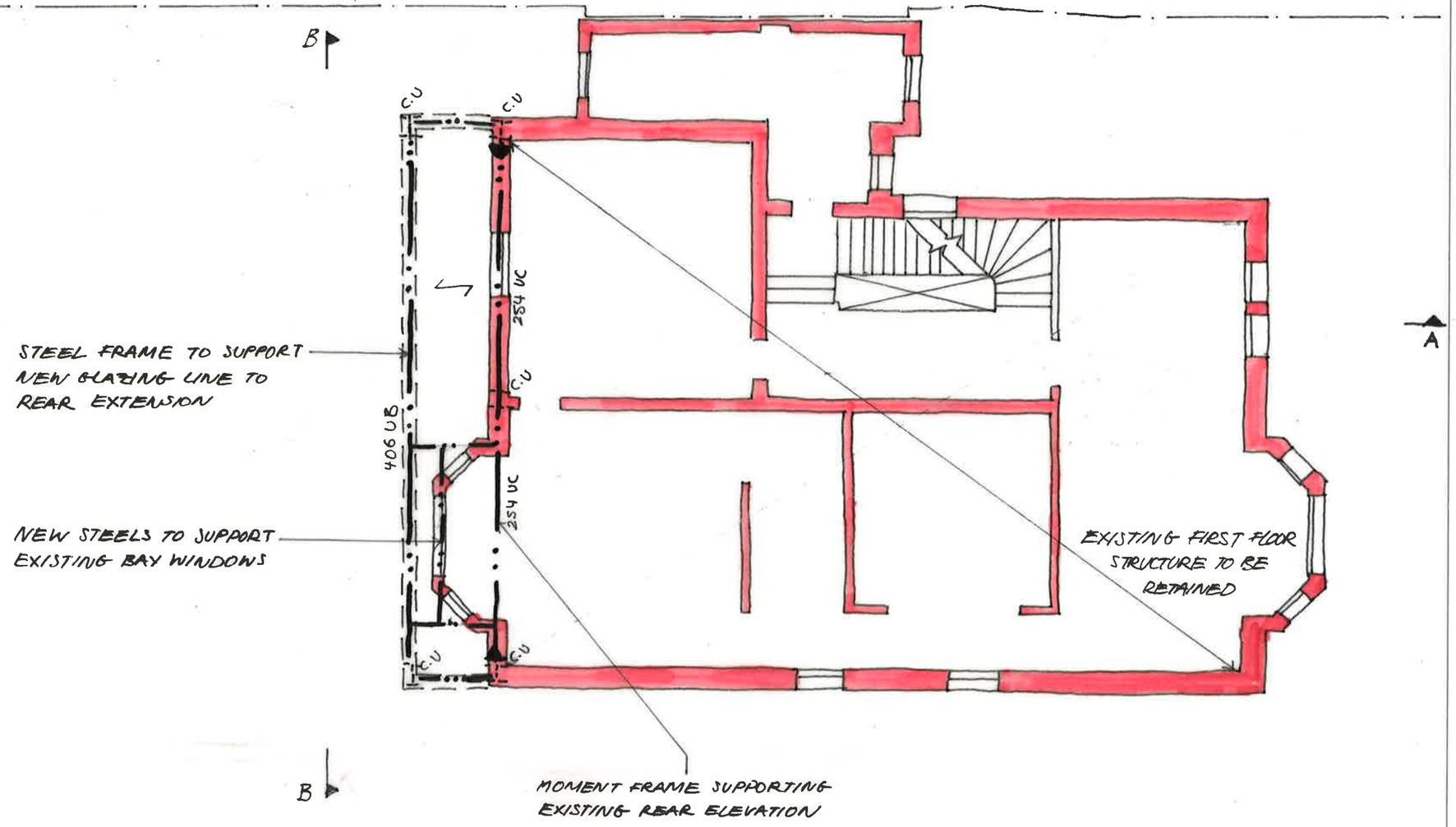
job no	drawing no	revision
2170409	S-1100	P2

Nº. 35



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P1	01.11.17	JTa	SSt	

drawing title
PROPOSED FIRST FLOOR PLAN

scale(s) 1:100@A3 | date OCT'17 | drawn JTa

drawing status
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job title
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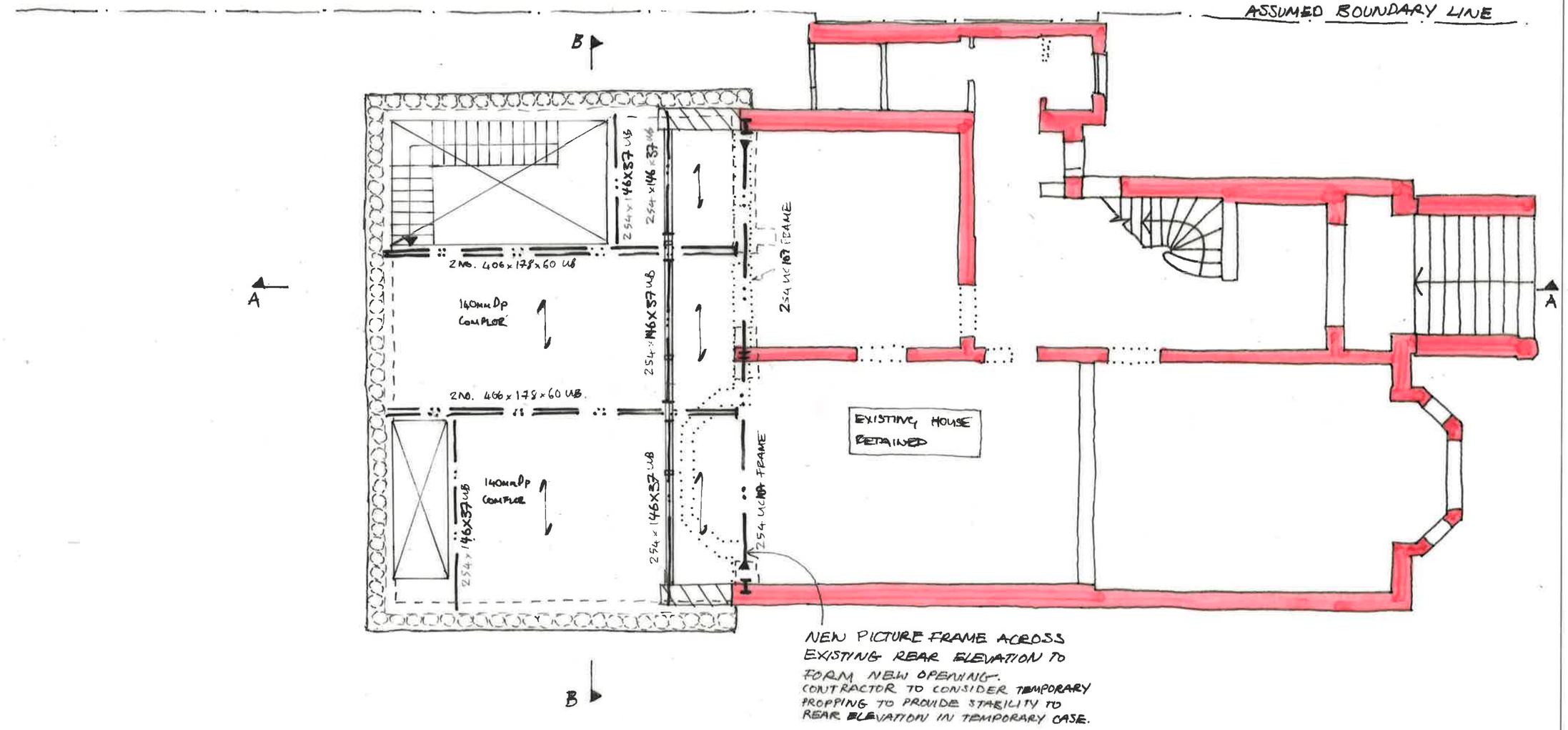
job no	drawing no	revision
2170409	S.110	P2

N° 35

ASSUMED BOUNDARY LINE



ASSUMED BOUNDARY LINE

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P1	01.11.17	JTa	SSt	

drawing title: GROUND FLOOR PLAN

scale(s): 1:100 @A3 | date: JAN'18 | drawn: JTa

drawing status: PRELIMINARY

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job no	drawing no	revision
2170409	S.100	P2

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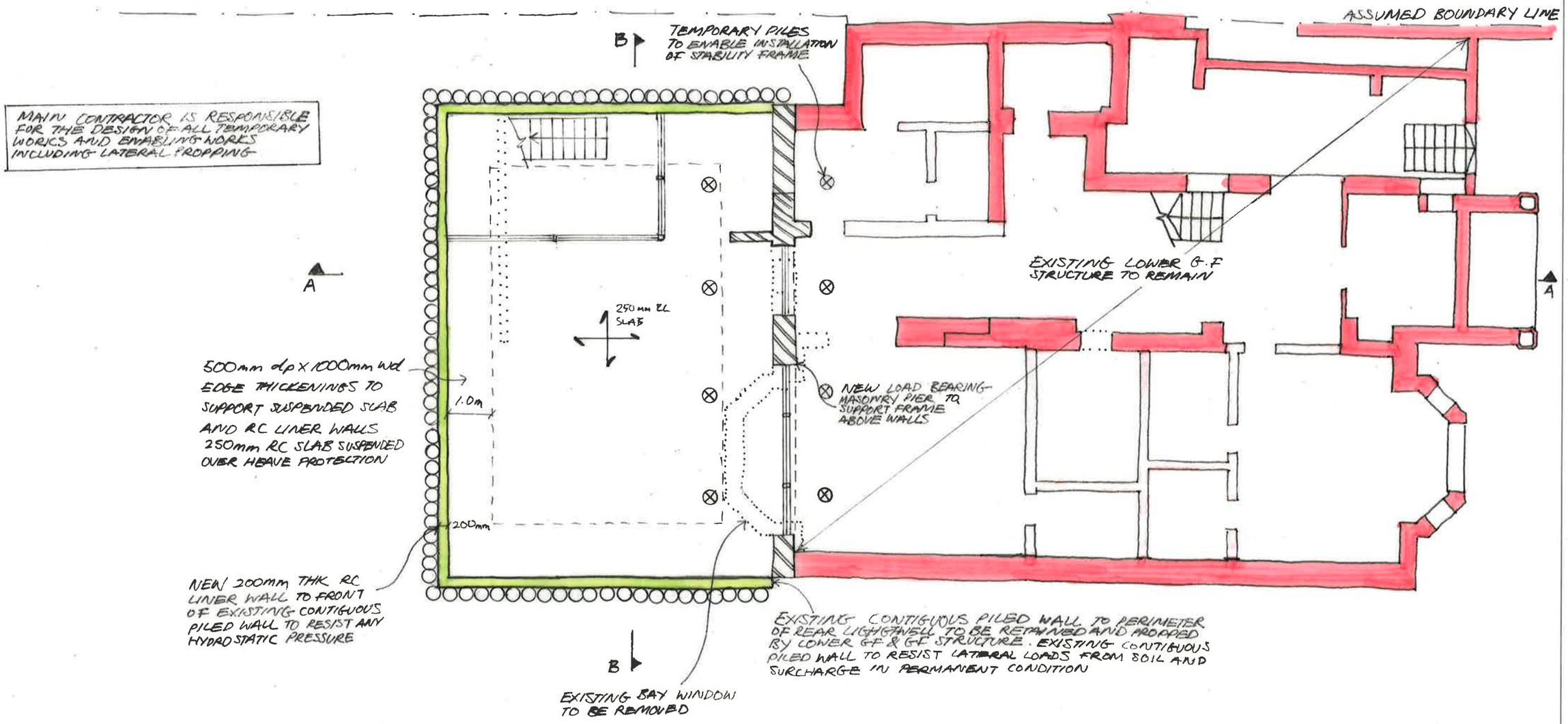

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P1	01.11.17	JTa	SSt	

drawing title: LOWER GROUND FLOOR

scale(s): 1:100@A3 | date: JAN'18 | drawn: JTa

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job no	drawing no	revision
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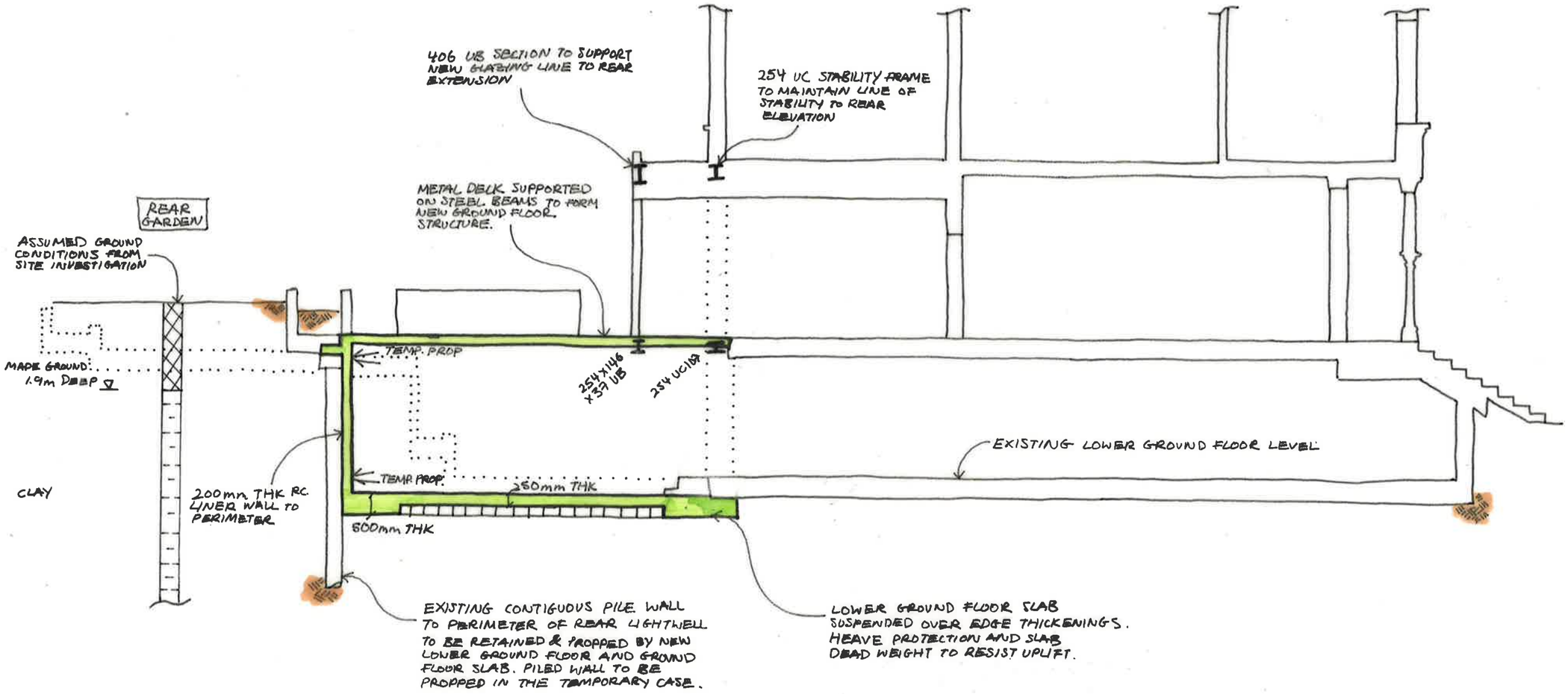

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P1	01.11.17	JTa	SSt	

drawing title: PROPOSE SECTION A-A

scale(s): 1:100 @A3 | date: JAN'18 | drawn: JTa

drawing status: PRELIMINARY

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job title: 33 BELSIZE AVENUE NW3 4BL

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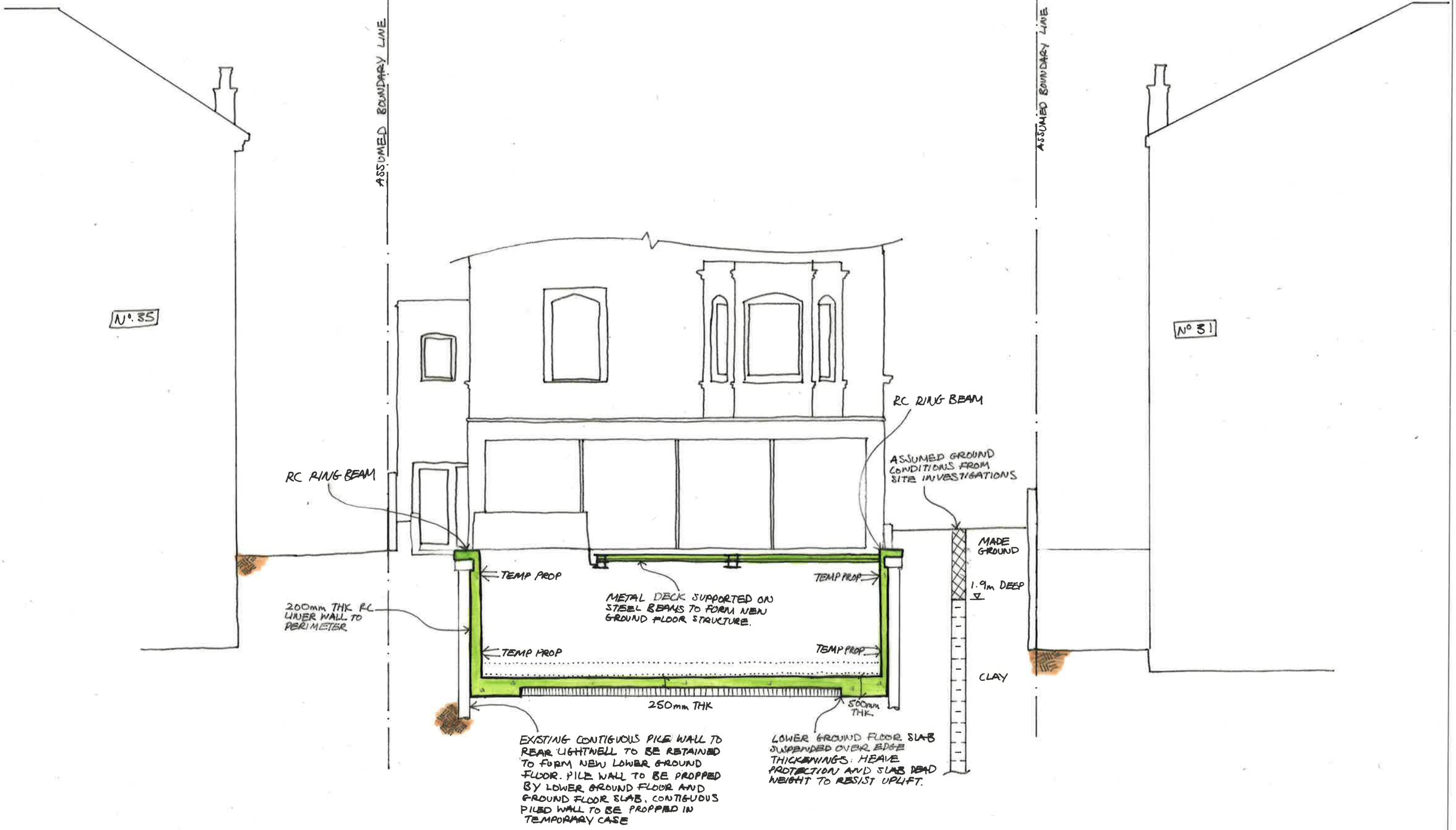
2170409	S. 21	P2



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P1	01.11.17	JTa	SSt	

drawing title
SECTION B-B

scale(s) 1:100 @A3 | date JAN'18 | drawn JTa

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33 BELSIZE AVENUE
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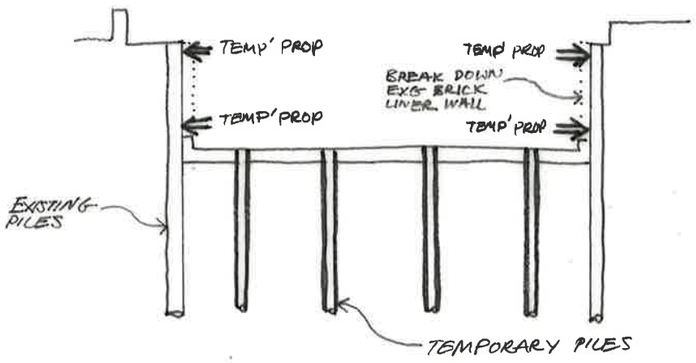
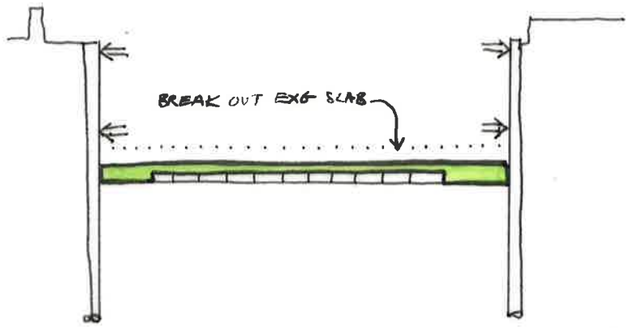
job no	drawing no	revision
217040	S. 20	P2

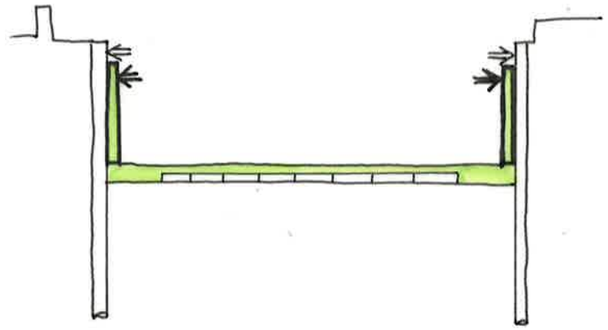
STAGE 1 – SITE SET-UP. ERECT SITE HOARDING AND INSTALL MONITORING POINTS AS NOTED IN THE SUBTERRANEAN CONSTRUCTION METHOD STATEMENT.



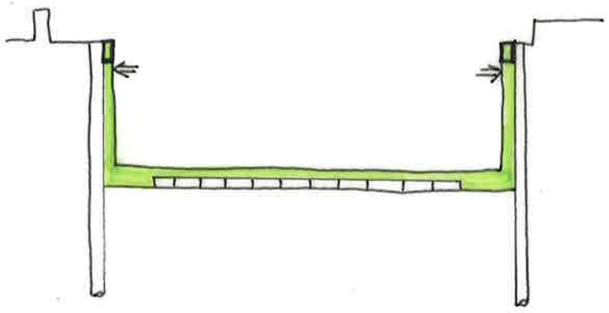
STAGE 2 – INSTALL TEMPORARY PILES AND TEMPORARY PROPPING AT HIGH AND LOW LEVEL. BREAK DOWN EXISTING LINER WALL AS NECESSARY TO ENABLE EXISTING PILES TO BE PROPPED.



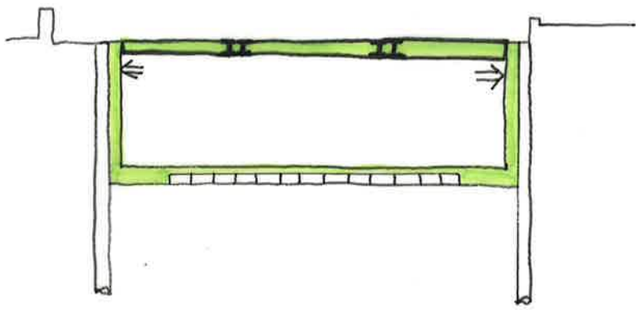
STAGE 3 – BREAK OUT EXISTING SLAB, REDUCE LEVEL DIG TAKING CARE AROUND TEMPORARY PILES. CAST NEW SLAB AND THICKENINGS OVER CORDEX HEAVE PROTECTION AS PER THE PERMANENT WORKS DESIGN.



STAGE 4 – ONCE BASE SLAB HAS CURED, REMOVE LOWER LEVEL PROPPING AND CAST RC LINER WALLS UP TO UNDERSIDE OF HIGH LEVEL PROPPING. ONCE RC LINER WALL HAS CURED, INSTALL HIGH LEVEL PROPPING AGAINST NEW RC LINER WALL, WHILST MAINTAINING PROPPING AT HIGH LEVEL.



STAGE 5 – REMOVE HIGH LEVEL PROPPING AND CAST REMAINING RC LINER WALLS.



STAGE 6 – INSTALL GROUND FLOOR STEELS AND METAL DECK. ONCE GROUND FLOOR STRUCTURE HAS BEEN INSTALLED, REMOVE PROPPING AND FINISH STRUCTURE ABOVE.

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

rev	date	by	chk	description
P1	01/02/18	JTa	SSt	

elliottwood

Elliott Wood Partnership Ltd
Wimbledon • Central London • Nottingham
Consulting Structural and Civil Engineers
tel: (020) 7499 5888 www.elliottwood.co.uk

job title
33 BELSIZE AVENUE NW3 4BL

drawing title
ASSUMED SEQUENCE OF WORKS

scale(s)	date	drawn
N.T.S	JAN'18	JTa

drawing status
PRELIMINARY

job no	drawing no	revision
2170409	T. 01	P1

B Network Rail Asset Information

Samuel Stacey

From: Keegan Benedicta <Benedicta.Keegan@networkrail.co.uk> on behalf of Asset Protection LNE EM <AssetProtectionLNEEM@networkrail.co.uk>
Sent: 04 September 2017 14:32
To: Samuel Stacey
Subject: RE: EN15277 - London 33 Belsize Avenue - Site Investigation

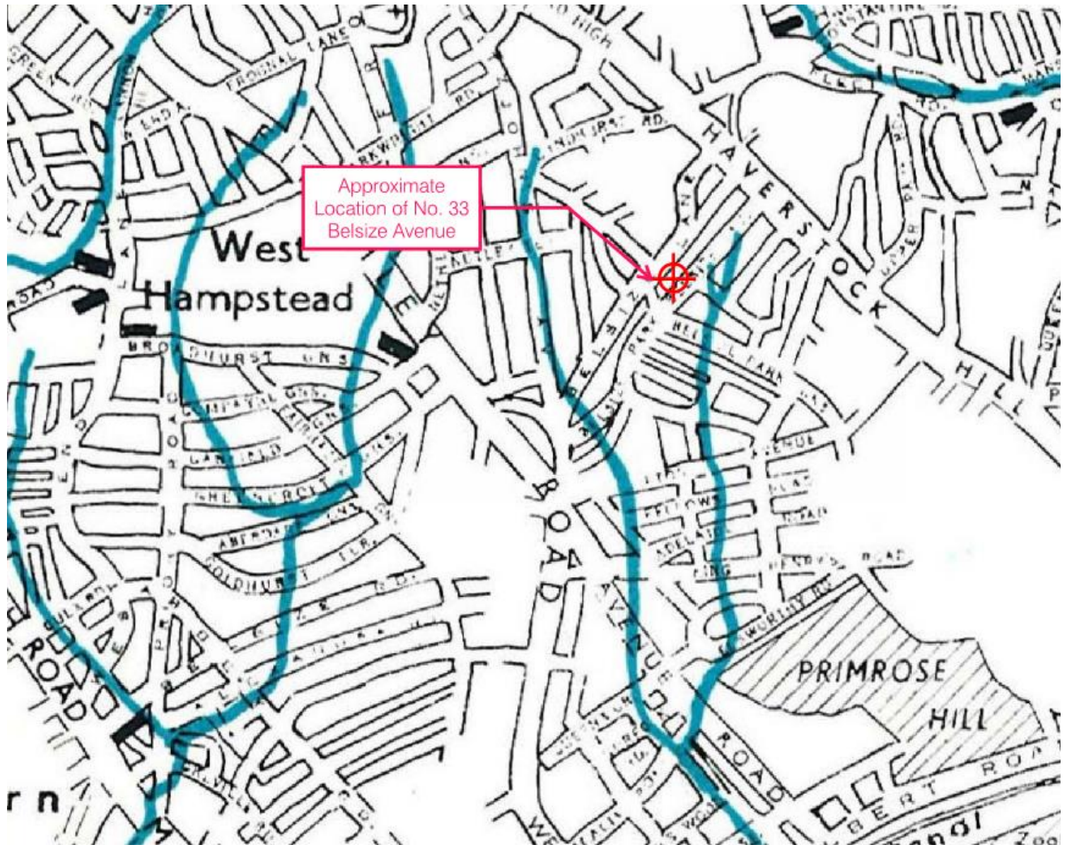
Hello Samuel
Thank you for contacting Asset Protection LNE EM. Your Network Rail enquiry reference is EN15277. Please use this for all future correspondence.
I have added a plan of where I believe you are discussing. It looks as if you are at least 28m from the tunnel. Network Rail's Asset Protection have no objection to you proceed at this distance but please would you send excavation drawings and details nearer the time for our engineers to look at.

Many thanks

Ben

Ben Keegan
Project Management Assistant
Asset Protection LNE EM
Network Rail
01904 389782 / 085 33782

C Lost Rivers of London



33 Belsize Avenue located near to the historic Tyburn and Westbourne rivers.

Ref: A portion of the map showing the course of the Lost Rivers Tyburn and Westbourne taken from Lost Rivers of London

D Thames Asset Search

Asset location search

Property Searches

Elliott Wood Partnership LLP
241The Broadway
LONDON
SW19 1SD

Search address supplied 33
Belsize Avenue
London
NW3 4BL

Your reference 2170409

Our reference ALS/ALS Standard/2017_3630974

Search date 11 August 2017

Keeping you up-to-date

Knowledge of features below the surface is essential in every development. The benefits of this not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility for any commercial or residential project.

An asset location search provides information on the location of known Thames Water clean and/or wastewater assets, including details of pipe sizes, direction of flow and depth. Please note that information on cover and invert levels will only be provided where the data is available.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

searchcode

Asset location search

Search address supplied: 33, Belsize Avenue, London, NW3 4BL

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Asset location search

Property Searches

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

Asset location search

Property Searches

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Asset location search

Property Searches

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

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

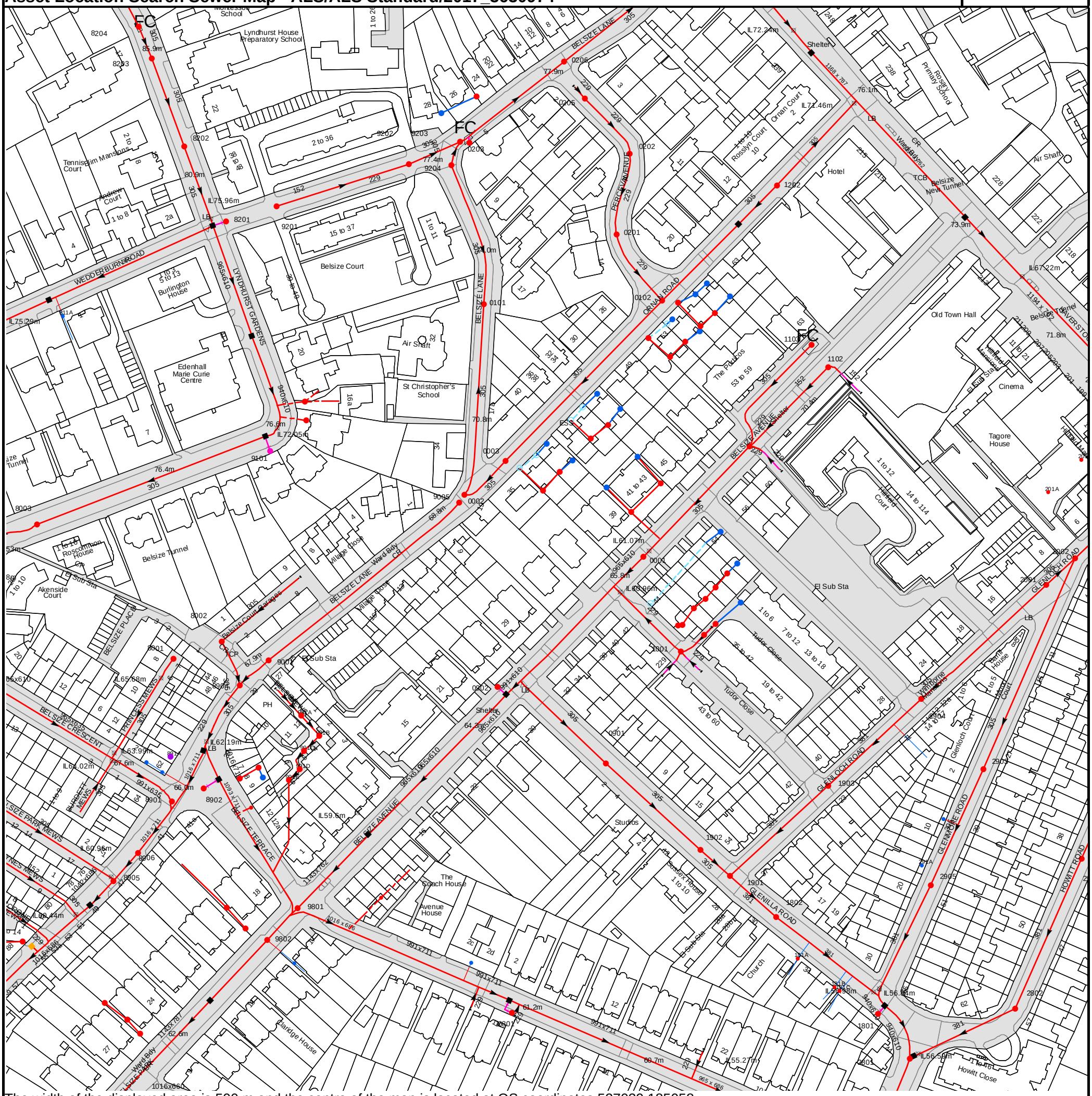
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

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

Asset Location Search Sewer Map - ALS/ALS Standard/2017_3630974



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 527039,185058

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2902	66.47	62.08
2801	61.76	56.43
1801	n/a	n/a
2802	64.04	58.75
181C	n/a	n/a
181B	n/a	n/a
181A	n/a	n/a
1802	61.84	57.63
2905	64.04	59.84
1901	61.97	57.88
291A	n/a	n/a
1902	62.11	58.09
291B	n/a	n/a
1903	64.43	60.02
00AG	n/a	n/a
00CB	n/a	n/a
0102	73.42	69.81
01BB	n/a	n/a
01AH	n/a	n/a
01BA	n/a	n/a
00AF	n/a	n/a
01BC	n/a	n/a
1001	64.47	61.74
00BA	n/a	n/a
11BI	n/a	n/a
10BC	n/a	n/a
11CE	n/a	n/a
11BH	n/a	n/a
11CC	n/a	n/a
10AD	n/a	n/a
10BD	n/a	n/a
11CD	n/a	n/a
11CB	n/a	n/a
10BE	n/a	n/a
10AB	n/a	n/a
10BI	n/a	n/a
10BF	n/a	n/a
11CA	n/a	n/a
10BG	n/a	n/a
10AC	n/a	n/a
1101	68.22	63.83
1202	75.7	72.49
1103	72.57	68.58
1102	70.97	68.32
2904	67.6	62.19
2903	67.27	62.74
2001	70.38	65.3
201A	n/a	n/a
2002	70.35	65.04
201B	n/a	n/a
8204	87.76	83.66
8203	86.62	82.05
8202	82.8	77.55
9202	78.11	74.48
92AH	n/a	n/a
9203	77.65	74.21
0203	77.65	74.21
02AC	n/a	n/a
0206	n/a	n/a
0205	77.44	74.61
0202	76.15	73
8003	75.89	71.06
811A	n/a	n/a
8001	69.28	n/a
8002	68.53	64.49
8201	n/a	n/a
8904	67.5	63.1
9001	n/a	n/a
9101	n/a	n/a
9201	79.26	76.91
9105	n/a	n/a
9106	n/a	n/a
991B	n/a	n/a
9204	n/a	n/a
9005	n/a	n/a
0002	69.2	65.64
0101	n/a	n/a
0902	n/a	n/a
0003	69.82	66.47
00DD	n/a	n/a
01CF	n/a	n/a
00DC	n/a	n/a
01CC	n/a	n/a
00DB	n/a	n/a
01BJ	n/a	n/a
00DA	n/a	n/a
01CE	n/a	n/a
01BI	n/a	n/a
01CD	n/a	n/a
0901	62.91	58.78
00CD	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
01BH	n/a	n/a
0201	74.64	71.3
01BG	n/a	n/a
00CC	n/a	n/a
00CF	n/a	n/a
0001	65.67	60.94
01AI	n/a	n/a
8902	n/a	n/a
991E	n/a	n/a
89FC	n/a	n/a
99DG	n/a	n/a
891C	n/a	n/a
991D	n/a	n/a
99DF	n/a	n/a
891B	n/a	n/a
891D	n/a	n/a
891A	n/a	n/a
991C	n/a	n/a
991A	n/a	n/a
78BI	n/a	n/a
88CE	n/a	n/a
8905	n/a	n/a
88CF	n/a	n/a
8906	64.86	n/a
88CG	n/a	n/a
8901	65.86	61.75
88BF	n/a	n/a
88BG	n/a	n/a
991F	n/a	n/a
9802	n/a	n/a
981B	n/a	n/a
9801	63.04	58.88
981A	n/a	n/a
081A	n/a	n/a
0801	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

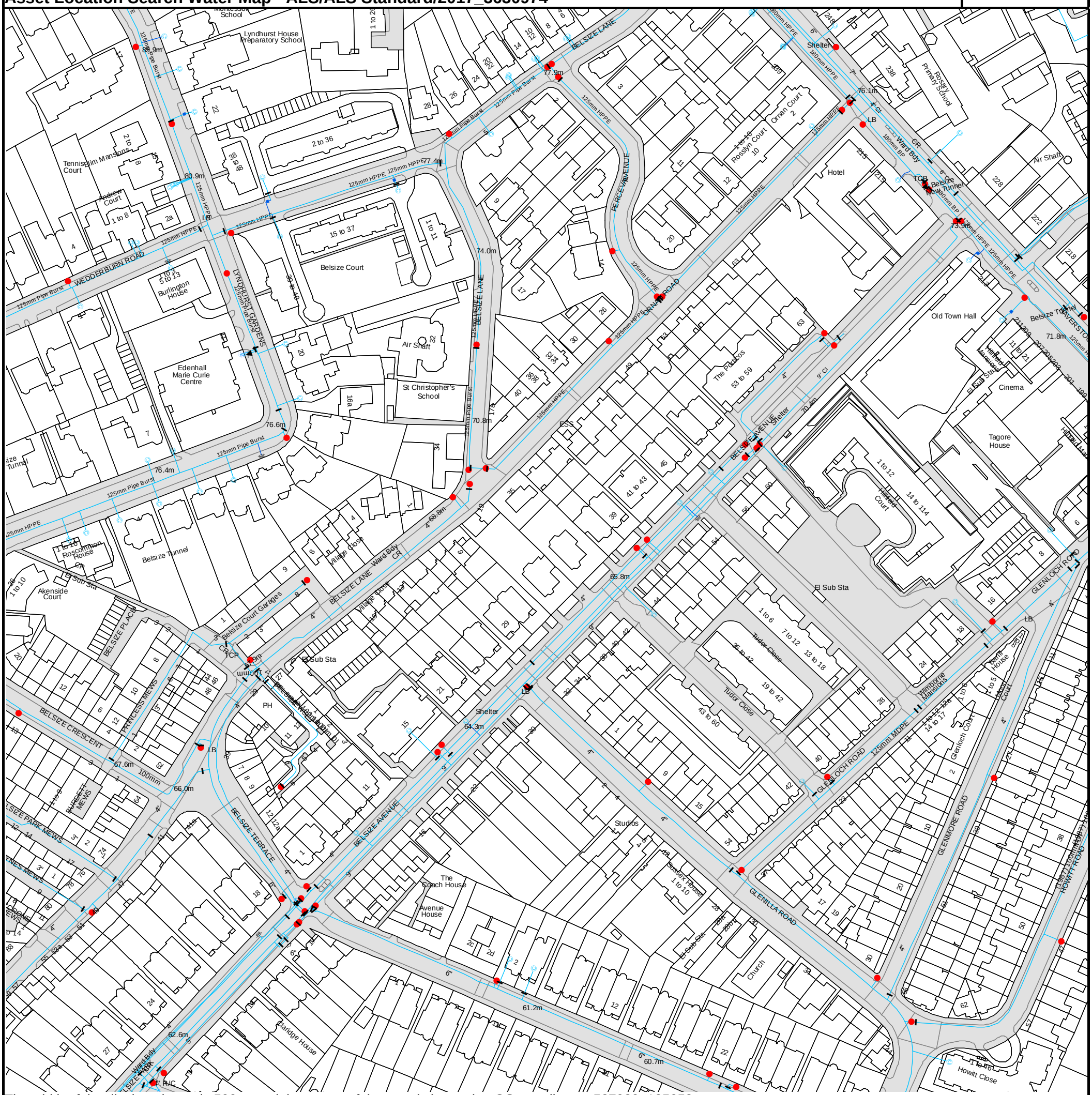
Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2017_3630974



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 527039, 185058.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

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

16"

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

3" SUPPLY

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

3" FIRE

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

3" METERED

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

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

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

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

- Data Logger

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

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

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

The Search Code:

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

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

The Code's core principles

Firms which subscribe to the Search Code will:

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

Complaints

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

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

TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

Sewer Flooding
History Enquiry

Property Searches

Elliott Wood Partnership LLP

The Broadway

Search address supplied	33 Belsize Avenue London NW3 4BL
Your reference	2170409
Our reference	SFH/SFH Standard/2017_3630975
Received date	**11 August 2017**
Search date	**11 August 2017**

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Sewer Flooding
History Enquiry

Property Searches

Search address supplied: 33,Belsize Avenue,London,NW3 4BL

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Sewer Flooding
History Enquiry

Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

Thames Water Utilities Ltd
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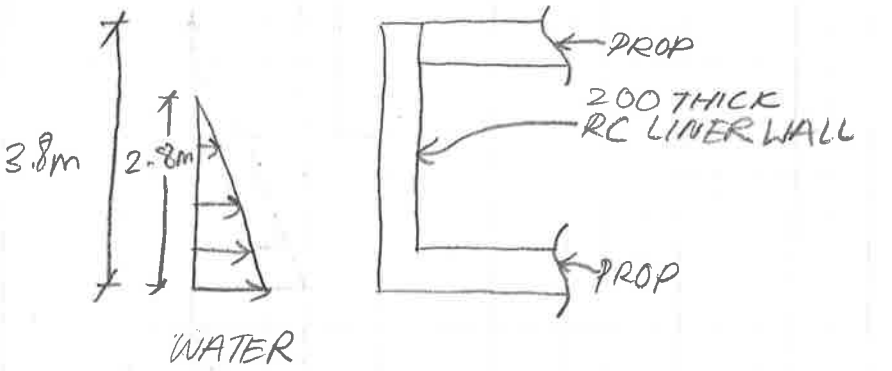
E Structural Calculations

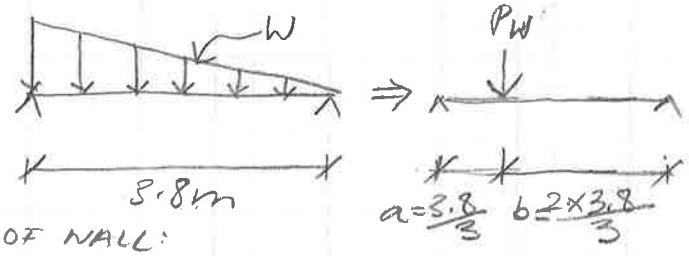
NEW LIGHTWELL RC LINER WALL

RC LINER IS PROPPED AT TOP AND BOTTOM. EXISTING CONTIGUOUS PILED WALL WILL CONTINUE TO RETAIN EARTH AND SURCHARGE LOADS. CHECK RC LINER CAN RESIST HYDROSTATIC PRESSURES:



$\gamma_{WATER} \approx 10 kN/m^3$

EQUIVALENT BEAM:



TAKING 1m SECTION OF WALL:

$P_W = \frac{1}{2} \times 2.8^2 m \times 1.0m \times 10 kN/m^3 = 39.2 kN$

FLEXURAL CHECK OF RC WALL

ASSUME C28/30 CONCRETE
ASSUME 50mm COVER, ASSUME H16 MAIN REINFORCEMENT
200mm THICK WALL

$d = 200 - 50 - 16/2 = 142mm$

$M_{ed} = \frac{P \times a \times b}{L} = \frac{39.2 \times 1.27 \times 2.53}{3.8} = 33.1 kN.m$

$K = \frac{M}{bd^2 f_{ck}} = \frac{33.1 \times 10^6}{1000 \times 142^2 \times 28} = 0.06$

TAKE $K' = 0.168$

$K < K'$ ∴ NO COMPRESSION REINFORCEMENT NEEDED.

TAKE $z = 0.95d = 0.95 \times 142 = 135mm$

$$A_{s,REQ} = \frac{M}{f_{yd} z} = \frac{33.1 \times 10^6}{435 \times 135} = 563.6\ mm^2$$

USE H16's @ 200 c/c ($A_s = 1005 mm^2$)

$$A_{s,min} = \frac{0.26 f_{ctm} b_t d}{f_{yk}} = \frac{0.26 \times 2.8 \times 1000 \times 142}{500} = 206 mm^2$$

$f_{ctm} = 2.8$ for $f_{ck} = 28$

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