LMB Geosolutions Ltd

Ground Investigation
Land Contamination
Hydrogeology
Engineering Geology

23/05/2017

Tessa Craig
Planning Officer
Planning Solutions Team
Planning & Regeneration
London Borough of Camden
2nd Floor, 5 Pancras Square
London, N1C 4AG

CC: Elizabeth Brown (Campbell Reith), James Little (Space Basements), Manfred Orth (Client)

RE: Proposed Development, 41b Kingswear Road, London NW5 1EU

Dear Tessa:

This document has been compiled in response to the recent queries presented within the Campbell Reith Audit report (ref. 12466-60, April 2017). A summary of the queries as presented in **Appendix 2** of the Audit report is reproduced in the table below:

Query No.	Subject	Query	Status/Response
1	BIA	Ground investigation report and geotechnical evaluation not provided	Open – to be provided and conceptual site model updated
2	Hydrogeology	Groundwater – no groundwater monitoring	Open – monitoring data to be provided or temporary and permanent works to be designed on appropriately conservative assumptions
3	Land Stability	No information concerning nearby utilities provided with exception of railway infrastructure	Open – to be provided
4	Land Stability	Structural Stability calculations	Open – Structural stability in temporary and permanent case to be demonstrated with all assumptions clearly stated.

In addition, a representative of LMB Geosoltuions Ltd held informal discussions with a representative of Campbell Reith on 17th May 2017 to clarify the requirements of the responses to the queries raised via the audit. Responses to specific queries are provided in the sections below.

Groundwater

We would refer you to P11 of the BIA report (ref. LMB.17.02.22_REPPIL_BIA_KingswearRd_v1.0, February 2017) which contains the following text in relation to groundwater:

The exploratory hole was left open for 30 minutes to monitor any groundwater ingress. No groundwater was observed.

Notwithstanding this, recording of groundwater in monitoring installations constructed within the London Clay is not uncommon. However, rather than being representative of a permanent and laterally continuous aquifer unit, the groundwater is present as discrete units within (for example) micro fissures and local mudstone horizons and the recorded groundwater level will most likely be reflective of the pore water pressure in these discrete features.

Notwithstanding the above we can also confirm that the following measures will be employed to mitigate potential risks in relation to surface water / groundwater ingress:

- The basement design includes waterproofing to safeguard against water ingress following completion of the basement;
- Significant dewatering is not anticipated during the construction works, but some groundwater seepages and/or surface water infiltration into the excavation should be anticipated. It is anticipated that any seepages or rates of inflow of groundwater would be slow and it is recommended that seepages be dealt with by pumping from sumps; and
- The Contractor will excavate a trial pit prior to commencement of the main excavation works to observe any groundwater ingress and based on these observations amend groundwater control measures, as appropriate.

Further details are provided within the Basement Method Statement appended to this document.

Ground Investigation & Geotechnical Evaluation

The ground investigation works comprised completion of a single window sampler borehole in the front garden to a depth of 3.80m bgl (see Appended location plan).

As summarised on P11 of the BIA report (ref. LMB.17.02.22_REPPIL_BIA_KingswearRd_v1.0, February 2017), the borehole log details <1m of Made Ground soils overlying firm becoming stiff London Clay. The description of firm to stiff clays is considered to be consistent with the allowable bearing pressure of 100kN/m2 presented within the Basement Method Statement.

Based on the information from the borehole completed, the conceptual site model assumes that the basement foundations will be formed on stiff clays and that the basement retaining walls will primarily be formed against firm to stiff clays.

Land Stability

Utilities

A utility search of the area around the site has been undertaken and is appended to this document. We can confirm the following:

- Gas – low pressure main within Kingswear Road.
- Foul – no sewer directly adjacent to property within Kingswear Road.
- Mains water – 4" distribution line within Kingswear Road
- There are no *linesearch* asset holders in the vicinity of the site.

In addition, the review of the Envirocheck report for the site confirms that there are no below ground (culverted) water features within 500m of the site.

Based on the information reviewed it has been concluded that the basement excavation is unlikely to impact nearby utilities / buried services.

Structural Stability

A Basement Method Statement, structural drawings and structural calculations are appended to this document. As outlined on P17 of the BIA report (ref. LMB.17.02.22_REPPIL_BIA_KingswearRd_v1.0, February 2017), based on the information in these documents and discussions with the structural engineers for the project (Design Build) it has been concluded that the basement support will be of high stiffness in both the temporary and permanent state.

I trust the above is of use. However, if you require any further information then please feel free to contact me at your convenience.

Sincerely,

Philip Lewis
Director
LMB Geosolutions Ltd

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Build Design

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01242 693047
07771867679
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Basement Method Statement

41 Kingswear Road Highgate London

Property Details:
Flat B 41 Kingswear Road Highgate London

Client Information:
Mr & Mrs Orth

1.1. This method statement provides an approach that will allow the basement design to be correctly considered during construction. The statement also contains proposals for the temporary support to be provided during the works. The Contractor is responsible for the works on site and the final temporary works methodology and design on this site and any adjacent sites.
1.2. Contact Party Wall Surveyors to inform them of any changes to this method statement.
1.3. On this development, the approach is: construct the underpin segments that will support the permanent steel work insert the new steelwork remove load from above and place it onto new supporting steelwork cast the remainder of the retaining walls that will form the perimeter of the basement.
1.4. On this project, the cantilever pins are designed to be inherently stable without lateral support to the top of the wall. However, temporary props will be provided near the head and will provide support until the concrete has gained sufficient strength. The base benefits from propping. This is provided in the final condition by the ground slab. In the temporary condition, the edge of the slab is buttressed against the soil in the middle of the property. Also the skin friction between the concrete base and the soil provides further resistance. The central soil mass is to be removed in 1/3 portions and cross propping subsequently added as the central soil ass is removed
1.5. The bearing pressures have been limited to 100kN/m2. This is standard loading for the local ground conditions and acceptable to Building Control and their approvals

1.6. The structural water proofer must comment on the proposed design and ensure that he is satisfied that the proposals will provide adequate waterproofing.
1.7. Provide engineers with concrete mix, supplier, delivery and placement methods two weeks prior to the first pour. Site mixing of concrete should not be employed apart from in small sections (less than 1m3). The contractor must provide a method on how to achieve site mixing to the correct specification. The contractor must undertake toolbox talks with staff to ensure site quality is maintained.

2. Enabling Works

2.1. The site is to be hoarded with ply board sheets, at least 2.2m high, to prevent unauthorised public access.
2.2. Licences for skips and conveyors should be posted on the hoarding.
2.3. Provide protection to public where conveyor extends over footpath. Depending on the requirements of the local authority, construct a plywood bulkhead over the pavement. Hoarding to have a plywood roof covering over the footpath, night-lights and safety notices.
2.4. Dewater:
2.4.1.Place a bore hole to the front of the property down to a depth of 6m
2.4.2.Pump water away from site.
2.5. On commencement of construction, the contractor will determine the foundation type, width and depth. Any discrepancies will be reported to the structural engineer in order that the detailed design may be modified as necessary.

3. Basement Sequencing

3.1. Begin by placing cantilevered walls noted on plans. (Cantilevered walls to be placed in accordance with drawing.)
3.2. Needle and prop the walls over.
3.3.2.Dry pack to steelwork. Ensure a minimum of 24 hours from casting cantilevered walls to dry packing.Grout column bases
3.4. Excavate lightwell to front of property down to 3500mm below external ground level.
3.5. Excavate first front corner of lightwell. (drawing P01 refers)
3.6. Excavate second front corner of lightwell. (drawing P01 refers)
3.7. Continue excavating section pins to form front lightwell. (drawing P01 refers)
3.8. Place cantilevered retaining wall to the left side of front opening. After 48 hours place cantilevered retaining wall to the right side of front opening.
3.9. Needle and prop bay wall. Insert support
3.10. Excavate out first 1.2m around front opening, prop floor and
erect conveyor.
3.11. Continue cantilevered wall formation around perimeter of basement following the numbering sequence on the drawings P01
3.11.1. Excavation for the next numbered sequential sections of underpinning shall not commence until at least 8 hours after dry packing of previous works. Excavation of adjacent pin to not commence until 48 hours after dry packing. (24hours possible due to inclusion of Conbextra 100 cement accelerator to dry pack mix). No more than
3.11.2. Floor over to be propped as excavation progresses. Props to support floor to be inserted as works progress. (drawing P01 refers)

3.12. Cast base to internal wall. Construct wall to provide support to floor and steels as works progress.
3.13. Excavate and cast floor slab
3.13.1. Excavate 1/3 of the middle section of basement floor. As excavation proceeds, place props at a maximum of 2.5m. Locate props at a third of the height of the wall Excavate a 1/3 of the middle section of basement floor. As excavation proceeds place
3.13.2. Continue excavating the next 1/3 and prop then repeat for the final 1/3.
3.13.3. Place below-slab drainage. Recommend that all drainage is encased in concrete below the slab and cast monolithically with the slab. Placing drainage on pea shingle below the slab allows greater penetration for water ingress.
3.13.4. Place reinforcement for basement slab.
3.13.5. Building Control Officer and Engineer are to be informed 48 hours before reinforcement is ready and invited for inspection.
3.13.6. Once inspected, pour concrete.
3.14. Provide structure to ground floor and water proofing to retaining walls as required. It is recommended to leave 3-4 weeks between completion of the basement and installing drained cavity. This period should be used to locate and fill any localised leakage of the basement

4. Underpinning and Cantilevered Walls

4.1. Prior to installation of new structural beams in the superstructure, the contractor may undertake the local exploration of specific areas in the superstructure. This will confirm the exact form and location of the temporary works that are required. The permanent structural work can then be undertaken whilst ensuring that the full integrity of the structure above is maintained.
4.2. Provide propping to floor where necessary.
4.3. Excavate first section of retaining wall (no more than 1000mm wide). Where excavation is greater than 1.0m deep, provide temporary propping to sides of excavation to prevent earth collapse
(Health and Safety). A 1000mm width wall has a lower risk of collapse to the heel face.
4.4. Excavation of pins involves working in confined spaces and the following measures should be applied:
o Operatives must wear a harness and there must be a winch above the excavation.
o An attendant must be present at all times, at ground level, while excavation is occupied.
o A rescue plan must be produced prior to the works as well as a task-specific risk and method statement.
o Working in the confined space should require a permit to work.
4.5. Backpropping of rear face: Rear face to be propped in the temporary conditions with a minimum of 2 trench sheets. Trench sheets are to extend over entire height of excavation. Trench sheets can be placed in short sections as the excavation progresses.
4.5.1.If the ground is stable, trench sheets can be removed as the wall reinforcement is placed and the shuttering is constructed.
4.5.2.Where trench sheets are left in a slight over spill may occur past the neighbour's boundary wall line. Where this slight over spill is not allowed by the Party Wall Surveyors then cement particle board should be used as noted below.

4.5.3.Where soft spots are encountered, leave in trench sheets or alternatively back prop with precast lintels or sacrificial boards. If the soil support to the ends of the lintels is insufficient, then brace the ends of the PC lintels with 150x150 C24 timbers and prop with Acrows diagonally back to the ground.
4.5.4. Where voids are present behind the lintels or trench sheeting, grout voids behind sacrificial propping. Grout to be 3:1 sand/cement packed into voids.
4.5.5.Prior to casting, place layer of DPM between trench sheeting (or PC lintels) and new concrete. The lintels are to be cut into the soil by 150mm either side of the pin. A site stock of a minimum of 10 lintels should be present to prevent delays due to ordering.
4.6. If cut face is not straight, or sacrificial boards noted previously have been used, place a 15mm cement particle board between sacrificial sheets or against the soil prior to casting. Cement particle board is to line up with the adjacent owner's face of wall. The method adopted, to prevent localized collapse of the soil, is to install these progressively, one at a time. Cement particle board must be used in any condition where overspill onto the adjacent owner's land is possible.
4.7. Underpins can be completed in segmental lifts (e.g. top section of wall followed by bottom section of wall).
4.7.1.Place reinforcement for retaining wall segmental lift
4.7.1.1. At lift sections, reinforcement needs to be driven in. This is to be completed by predrilling holes and inserting the reinforcement into the predrilled hole.
4.7.1.2. Underside of the wall to be cast with chamfer to allow concrete for lower lift to be cast and no packing to be required.
4.8. Excavate base. Mass concrete heels to be excavated. If soil over is unstable, prop top with PC lintel and sacrificial prop.
4.9. Visually inspect the footings and provide propping to local brickwork. If necessary install sacrificial Acrow, or pit props, and cast into the retaining wall.
4.10. Clear underside of existing footing.
4.11. Local Authority inspection to be carried out for approval of excavation base.
4.12. Place reinforcement for retaining wall base and stem. Drive H16 Bars U-bars into soil along centre line of stem to act as shear ties to adjacent wall underpin.
4.13. Site supervisor to inspect and sign off works before proceeding to next stage.
4.13.1. For pins 1, 3 and 5, inform the engineer five days before the reinforcement is ready, to allow for inspection of the reinforcement prior to casting.
4.14. Cast base. On short stems it is possible to cast base and wall at the same time. It is essential that pokers/vibrators are used to compact concrete.
4.15. Concrete Testing:
4.15.1. For first 3 pins take 4 cubes and test at 7 days
then at 14 days and inform engineer of results. Test last cube at 28 days. If cube test results are low then action into concrete specification and placement method must be considered.
4.15.2. If results are good from first three pins, then from the 4th pin onwards take 2 cubes of concrete from every third pin and store for testing. Test one at 28 days. If result is low, test second cube. Provide results to client and design team on request or if values are below those required.
4.15.3. A record of dates for the concrete pouring of each pin must be kept on site.
4.15.4. The location of where cubes were taken and their reference number must be

recorded.
4.16. Horizontal temporary prop to base of wall to be inserted. Alternatively cast base against soil.
4.17. Place shuttering and pour concrete for retaining wall. Stop a minimum of 75mm from the underside of existing footing. It is essential that pokers/vibrators are used, hitting shutters is **not** considered adequate.
4.18. 24 hours after pouring the concrete pin, the gap shall be filled using a dry-pack mortar. Ram in dry-pack between the top of the retaining wall and existing masonry.
4.18.1. If gap is greater than 120mm, place a line of engineering bricks to the top of the wall. Dry pack from the engineering bricks to existing masonry.
4.19. After 24 hours, the temporary wall shutters can be removed.
4.20. Trim back existing masonry corbel and concrete on internal face.
4.21. Site supervisor to inspect and sign off for proceeding to the next stage. A record will be kept of the sequence of construction, which will be in strict accordance with recognised industry procedures.

Extending Party Wall down and reinforced concrete underpinning

4.22 Excavate a central trench giving sufficient headroom below existing floor for working and batter back the sides as indicated on accompanying drawing.
4.22. Excavate. concrete base. If soil over unstable prop top with PC lintel and sacrificial prop.
4.23. Visually inspect the footings and provide propping to local brickwork. If necessary, Acrow or pit
props to be sacrificial and cast into the retaining wall.
4.24. Clear underside of existing footing.
4.25. Local authority inspection to be carried for approval of excavation base.
4.26. Cast reinforced concrete base
4.27. After 24hours put DPM over top of mass concrete base. It is essential that pokers/vibrators are used to compact concrete.
4.28. Place reinforcement for retaining wall. Drive H16 U-Bars into
soil along centre line of stem to act as shear ties to adjacent wall. Bottom bars of wall to be bent flush with shutter and fixed with mould release oil.
4.29. Site supervisor to inspect and sign off works for proceeding to next stage.
4.29.1. For pins 1, 3 and 5 inform the engineer 48 hours before the reinforcement is ready, to allow for inspection of the reinforcement prior to casting.
4.30. Place shuttering and pour concrete for retaining wall. Stop a minimum of 75mm from the underside of existing footing. It is essential that pokers/vibrators are used, hitting shutters is not considered adequate.
4.31. Concrete Testing:
4.31.1. For first 3 pins take 4 cubes and test at 7 days, 14 days and inform engineer of results. Test last cube at 28 days. If cube test results are low then action into concrete specification and placement method must be considered
4.31.2. If results are good from first three pins, then from the 4th pin onwards, take 2 cubes of concrete and store for testing from every third pin. Test one at 28 days, if result is low, test second cube. Provide results to client and design team on request or if values are below those required.

4.31.3. A record of pin poured dates must be kept on site.
4.31.4. The location of where cubes were taken and their reference number must be recorded.
4.32. racking temporary prop to base of wall to be inserted.
4.33. 24 hours after pouring the concrete pin, the gap shall be filled using a dry-pack mortar. Ram in dry-pack between retaining wall and existing masonry.
4.33.1. If gap is greater than 120mm, place a line of engineering bricks to the top of the wall. Dry pack from the engineering bricks to underside of the existing foundation.
4.34. After 24 hours the temporary wall shutters are removed.
4.35. Trim back existing masonry corbel and concrete on internal face.
4.36. Site supervisor to inspect and sign off for proceeding to the next stage. A record will be kept of the sequence of construction, which will be in strict accordance with recognised industry procedures.

5. Floor Support

Timber Floor

5.1. The timber floor will remain in situ and be supported by a series of props, to provide open areas in the basement.
5.2. Position 100 x 100mm temporary timber beams, lightly packed, to underside of joists either side of existing sleeper wall and support with vertical Acrow props @ 900 centres. Remove sleeper walls and insert steel beams as a replacement. Steel beams to bear onto concrete padstones built into the masonry walls (refer to Structural Engineer's details for padstone and beam sizes)
5.3. Dismantle props and remove timber plates on completion of installation of permanent steel beams.

6. Supporting existing walls above basement excavation

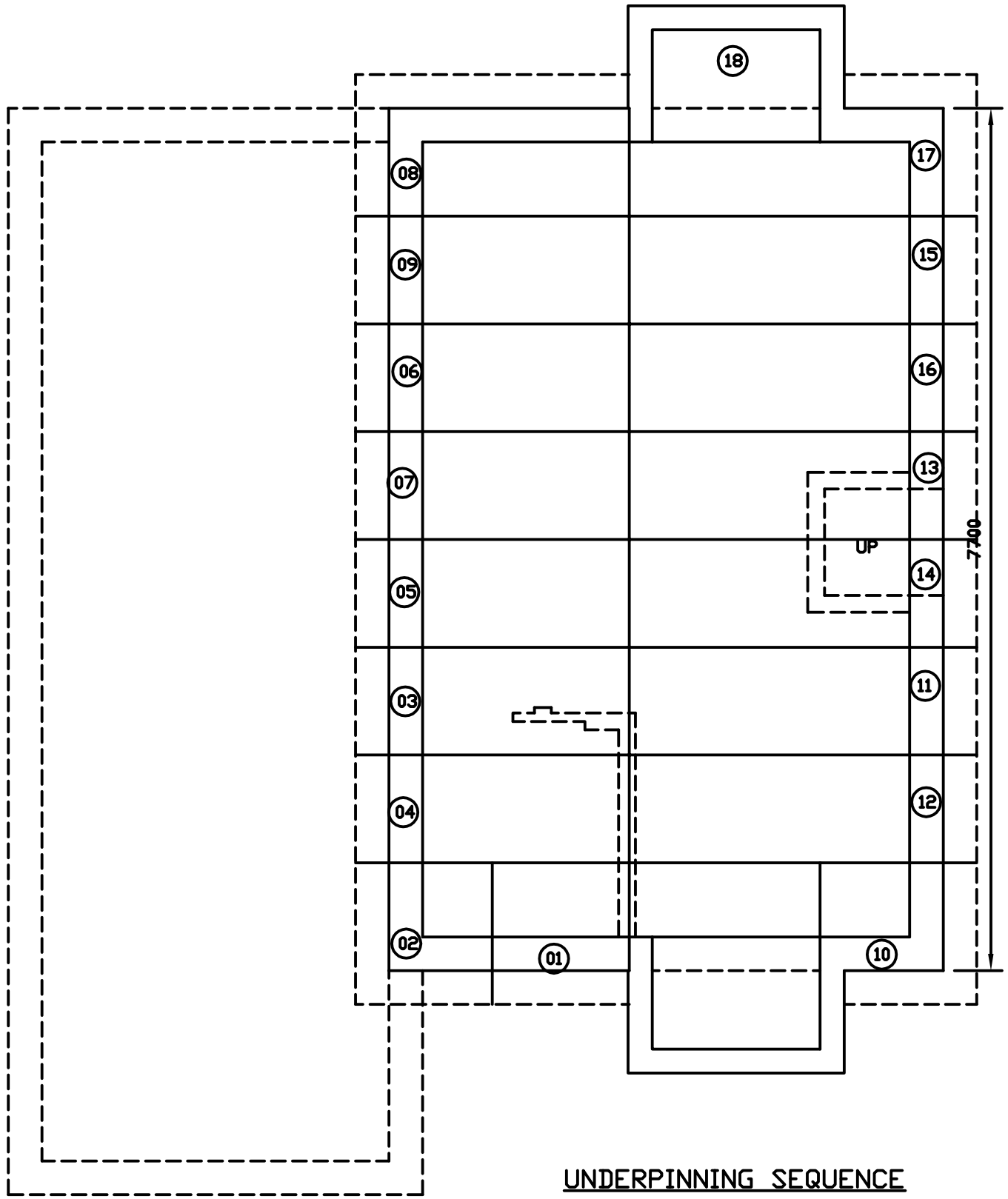
6.1. Where steel beams need to be installed directly under load-bearing walls, temporary works will be required to enable this installation. Support comprises the temporary installation of steel needle beams at high level, supported on vertical props. This will enable safe removal of brickwork below and installation of the new beams and columns.
6.1.1. The condition of the brickwork must be inspected by the foreman to determine its condition and to assess the centres of needles. The foreman must inspect upstairs to consider where loads are greatest. Point loads between windows should be given greater consideration.
6.1.2.Needles are to be spaced to prevent the brickwork above 'saw toothing'. Where brickwork is good, needles must be placed at a maximum of 1100mmcenters. Lighter needles or Strongboys should be placed at tighter centres under door thresholds
6.2. Props are to be placed on sleepers on firm ground or, if necessary, temporary footings will be cast.
6.3. Once the props are fully tightened, the brickwork will be broken out carefully by hand. All necessary platforms and crash decks will be provided during this operation.
6.4. Decking and support platforms to enable handling of steel beams and columns will be provided as required.
6.5. Once full structural bearing is provided via beams and columns down to the new basement floorlevel, the temporary works will be redundant and can be safely removed.

6.6. Any voids between the top of the permanent steel beams and the underside of the existing walls will be packed out as necessary. Voids will be drypacked with a 1:3 (cement: sharp sand) drypack layer, between the top of the steel and underside of brickwork above.
6.7. Any voids in the brickwork left after removal of needle beams can at this point be repaired by bricking up and/or drypacking, to ensure continuity of the structural fabric.

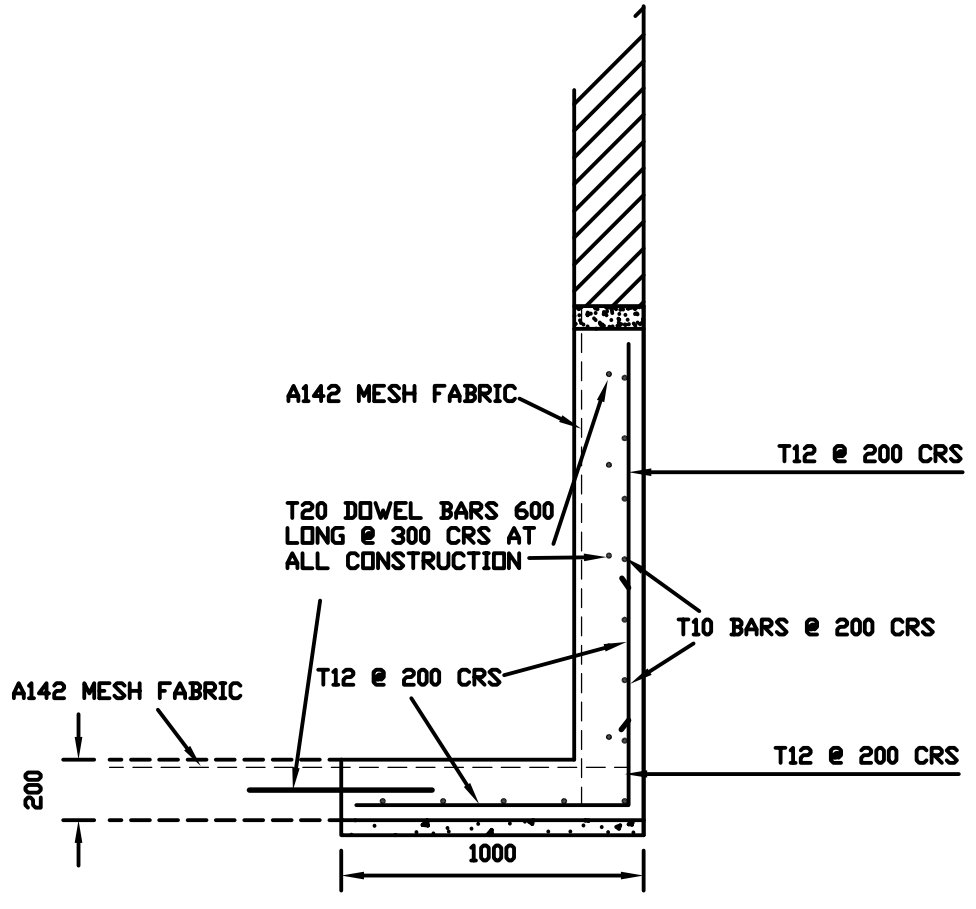
Approval

7.1. Building Control Officer/Approved Inspector to inspect pin bases and reinforcement prior to casting concrete.
7.2. Contractor to keep list of dates of pins inspected and cast.
7.3. One month after the work is completed, the contractor is to contact Adjoining Party Wall Surveyor to attend site and complete final condition survey and to sign off works.

Drawings & Structural Calculations



UNDERPINNING SEQUENCE



TYPICAL SECTION THRO' RETAINING WALL

PRELIMINARY

REF.	DETAILS
REVISIONS	
CLIENT	–

PROJECT

41B KINGSWEAR ROAD
HIGHGATE
LONDON

DESCRIPTION

PROPOSED
BASEMENT
EXTENSION

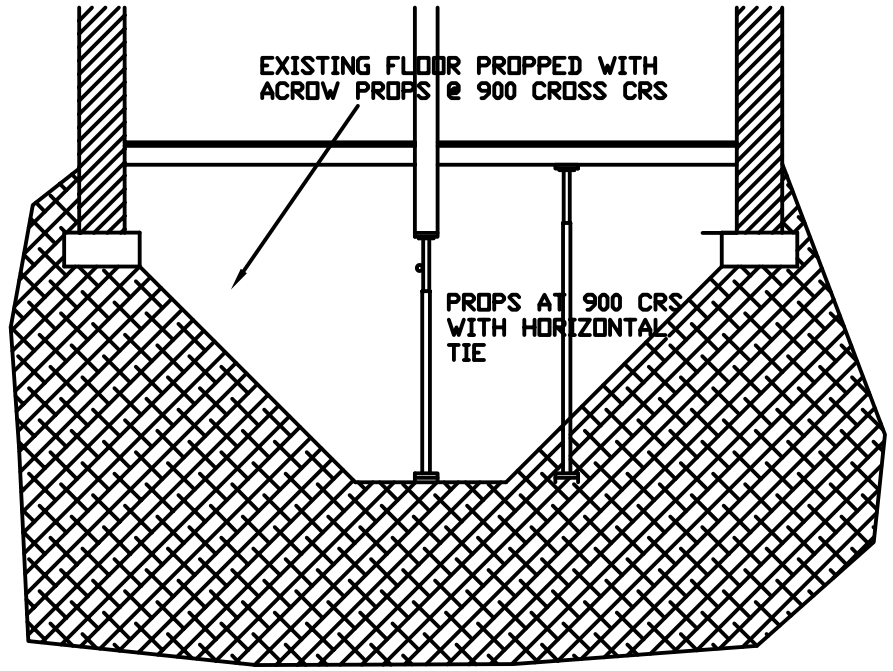
BUILD DESIGN

5, ELMFIELD ROAD
CHELTENHAM,
GLOS GL51 9JH
TEL/FAX No. 01242 693047
EMAIL. alan946@hotmail.com

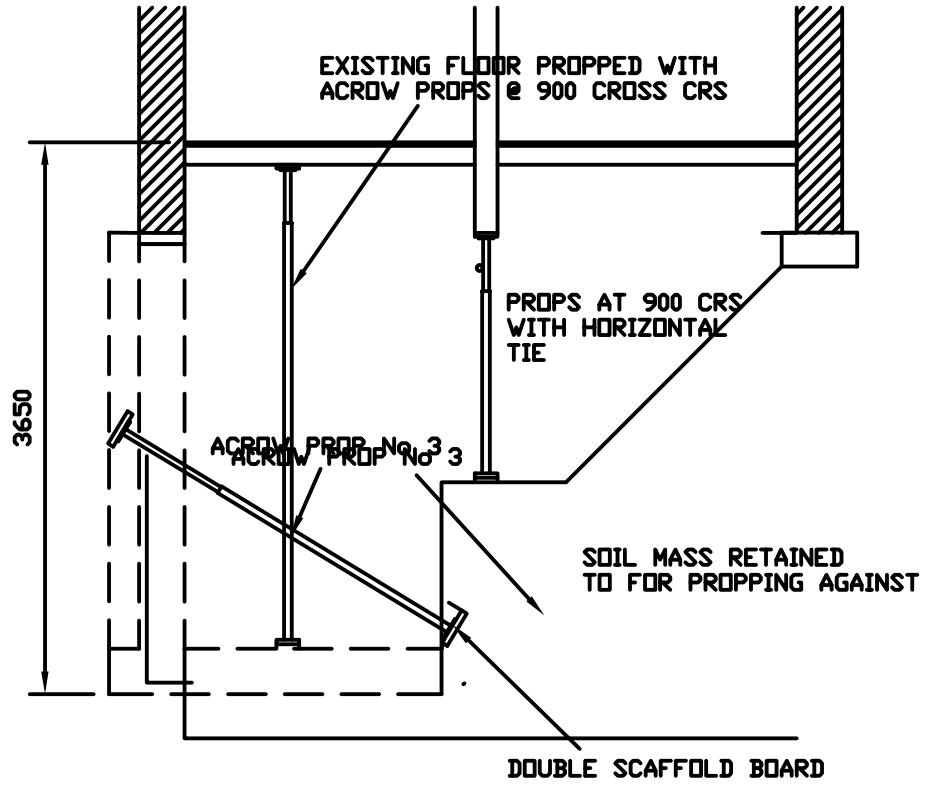
DATE	SCALE	REV
10/05/16	1:50	–

DRAWN	CHECKED	PROJECT No.	DRG No.
ASB	–	A3	01

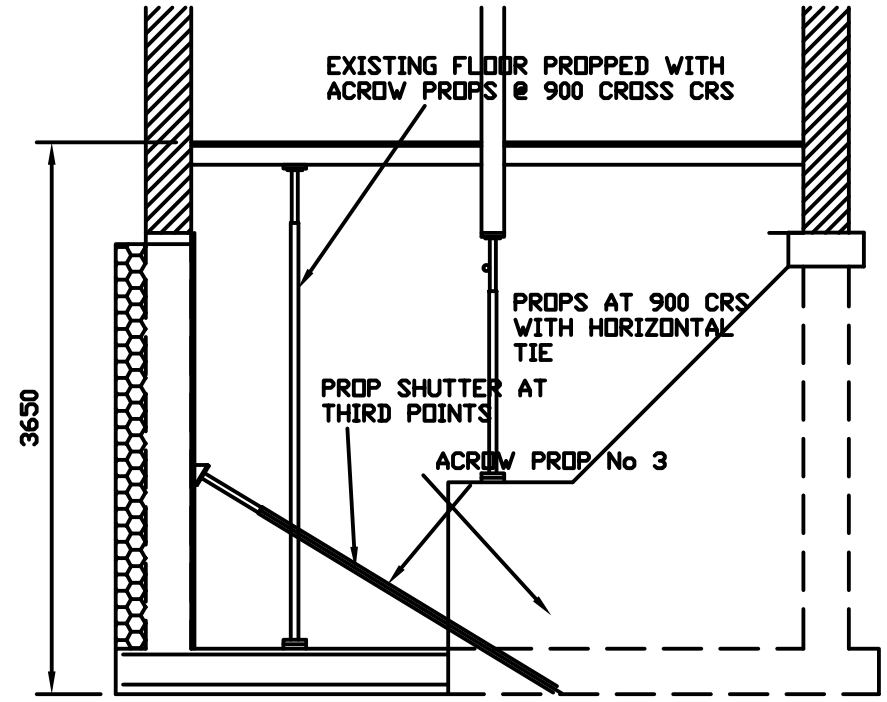
PRELIMINARY



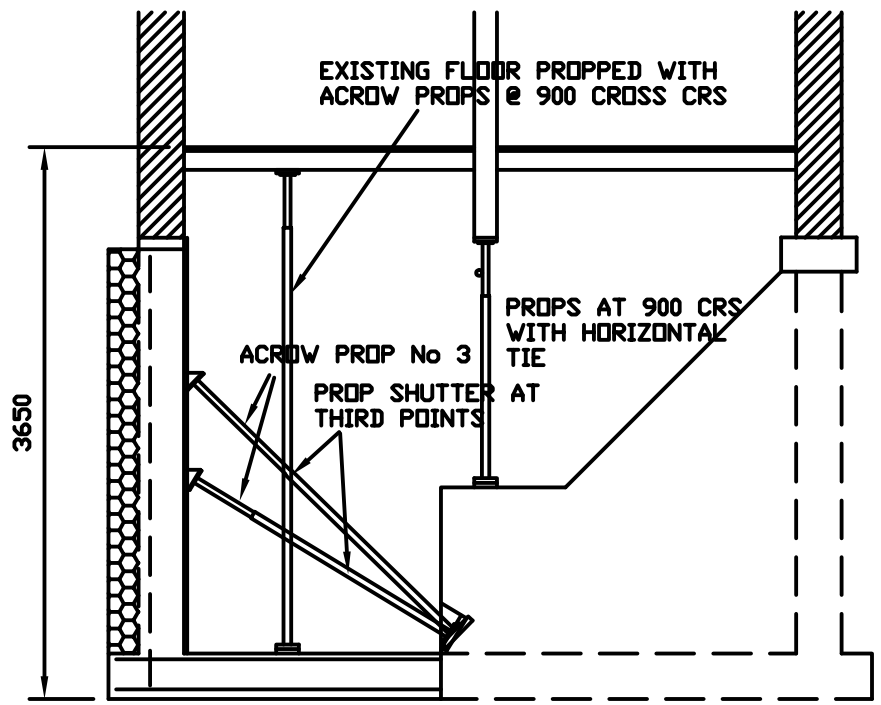
INITIAL EXCAVATION



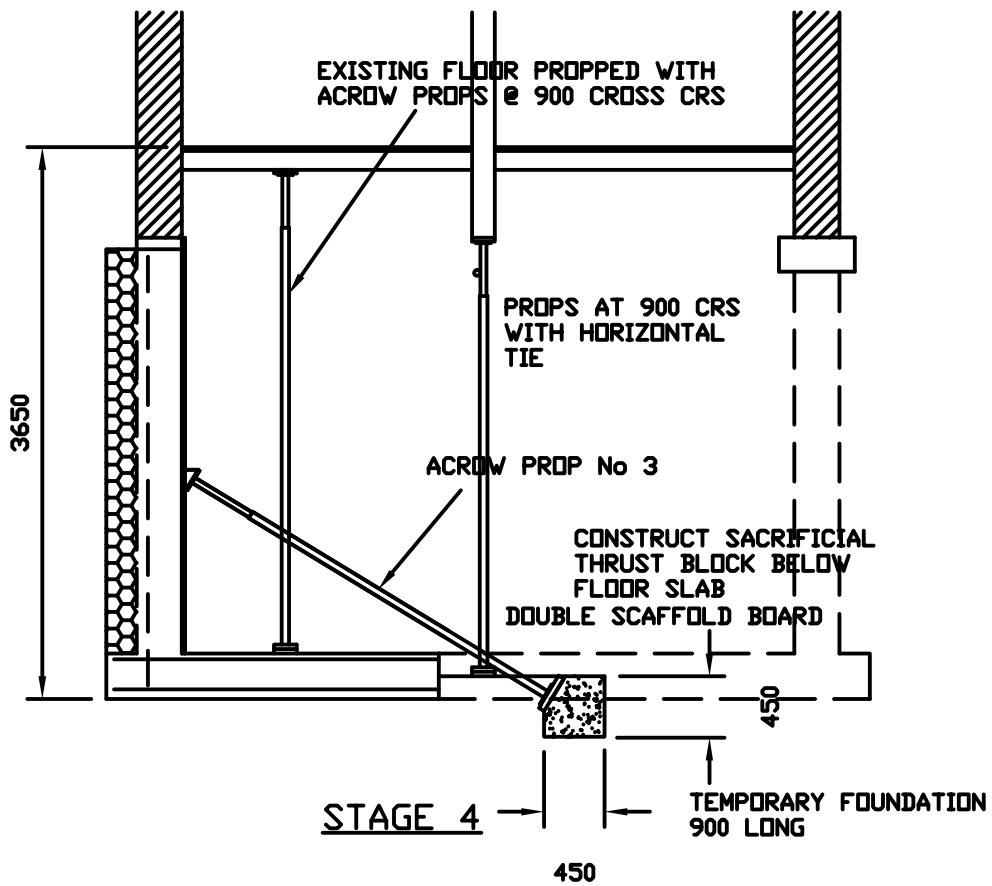
STAGE 1



STAGE 2



STAGE 3



STAGE 4

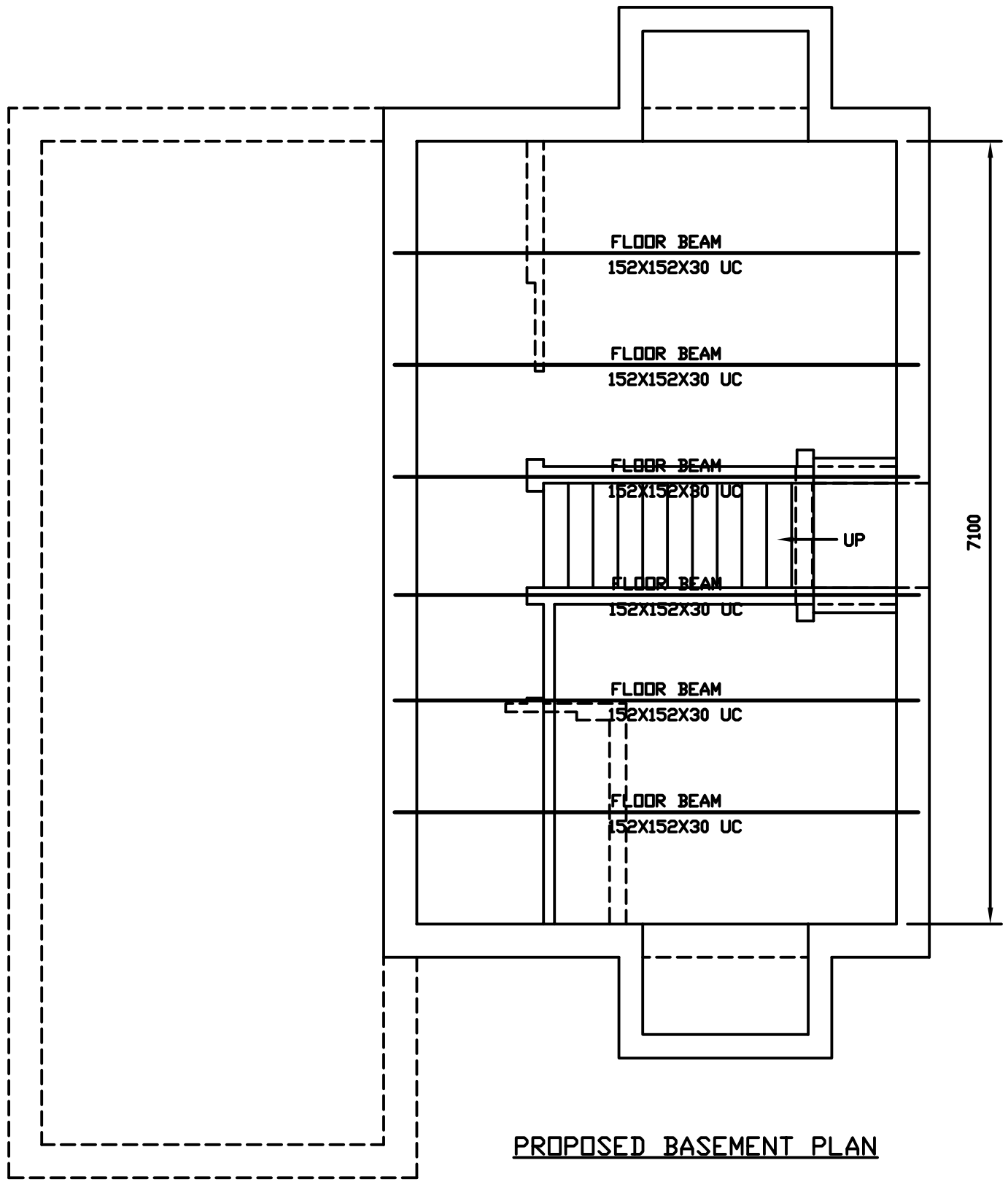
REF.	DETAILS
REVISIONS	
CLIENT	–
PROJECT	41B KINGSWEAR ROAD HIGHGATE LONDON
DESCRIPTION	PROPOSED BASEMENT EXTENSION

BUILD DESIGN

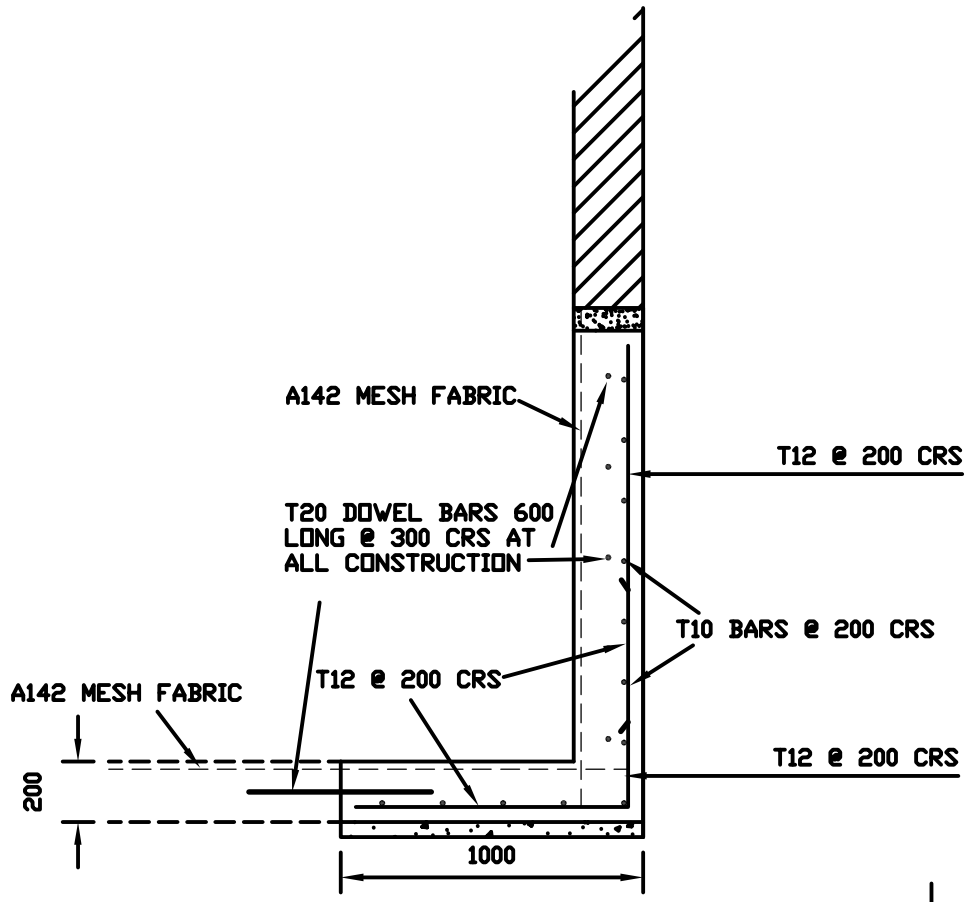
5, ELMFIELD ROAD
CHELTENHAM,
GLOS GL51 9JH
TEL/FAX No. 01242 693047
EMAIL. alan946@hotmail.com

DATE	SCALE	REV
10/05/16	1:50	–

DRAWN	CHECKED	PROJECT No.	DRG No.
ASB	–	A3	02



PROPOSED BASEMENT PLAN



TYPICAL SECTION THRO' RETAINING WALL

PRELIMINARY

REF.	DETAILS	DATE
REVISIONS		

CLIENT
-

PROJECT
41B KINGSWEAR ROAD
HIGHGATE
LONDON

DESCRIPTION
PROPOSED
BASEMENT
EXTENSION

BUILD DESIGN

5, ELMFIELD ROAD
CHELTENHAM,
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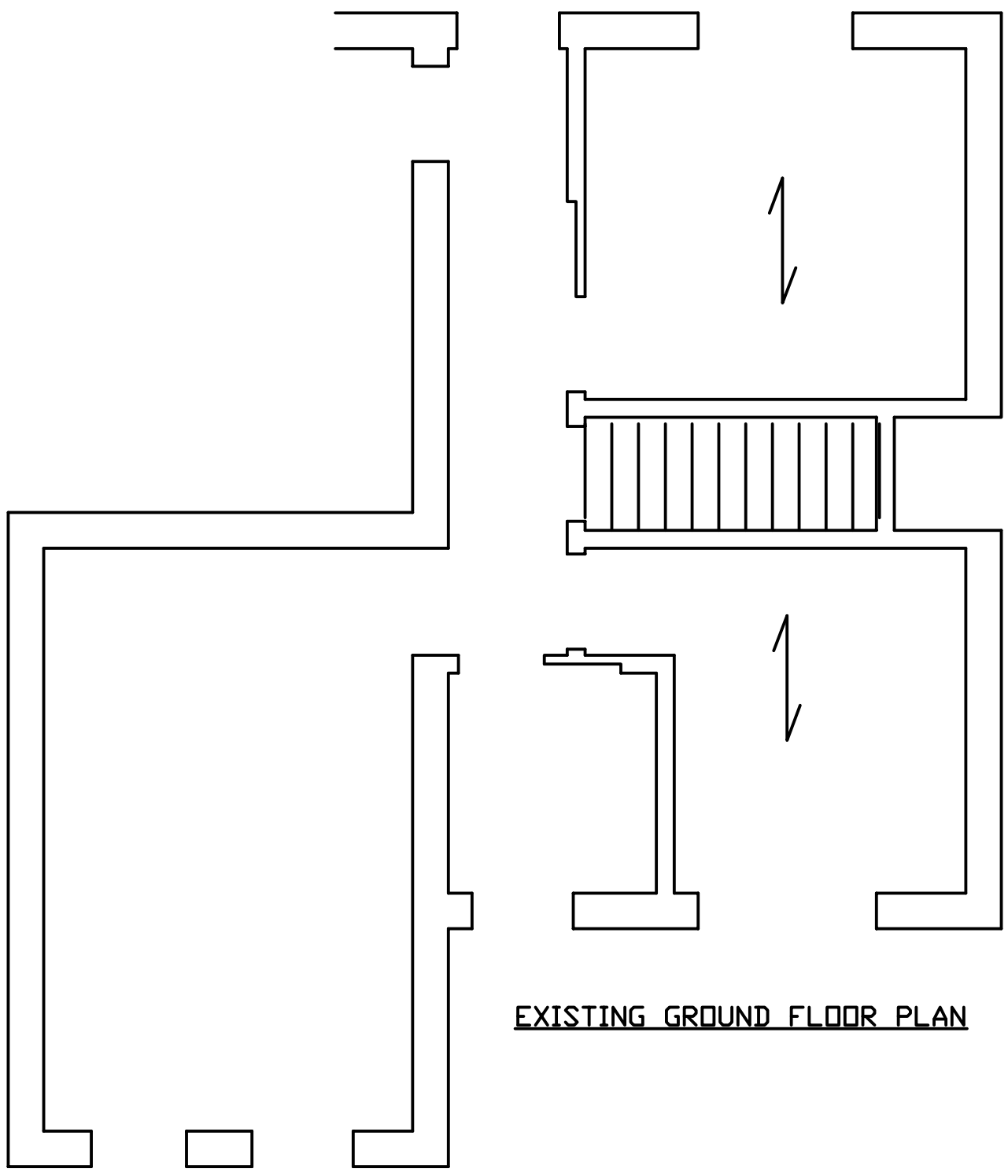
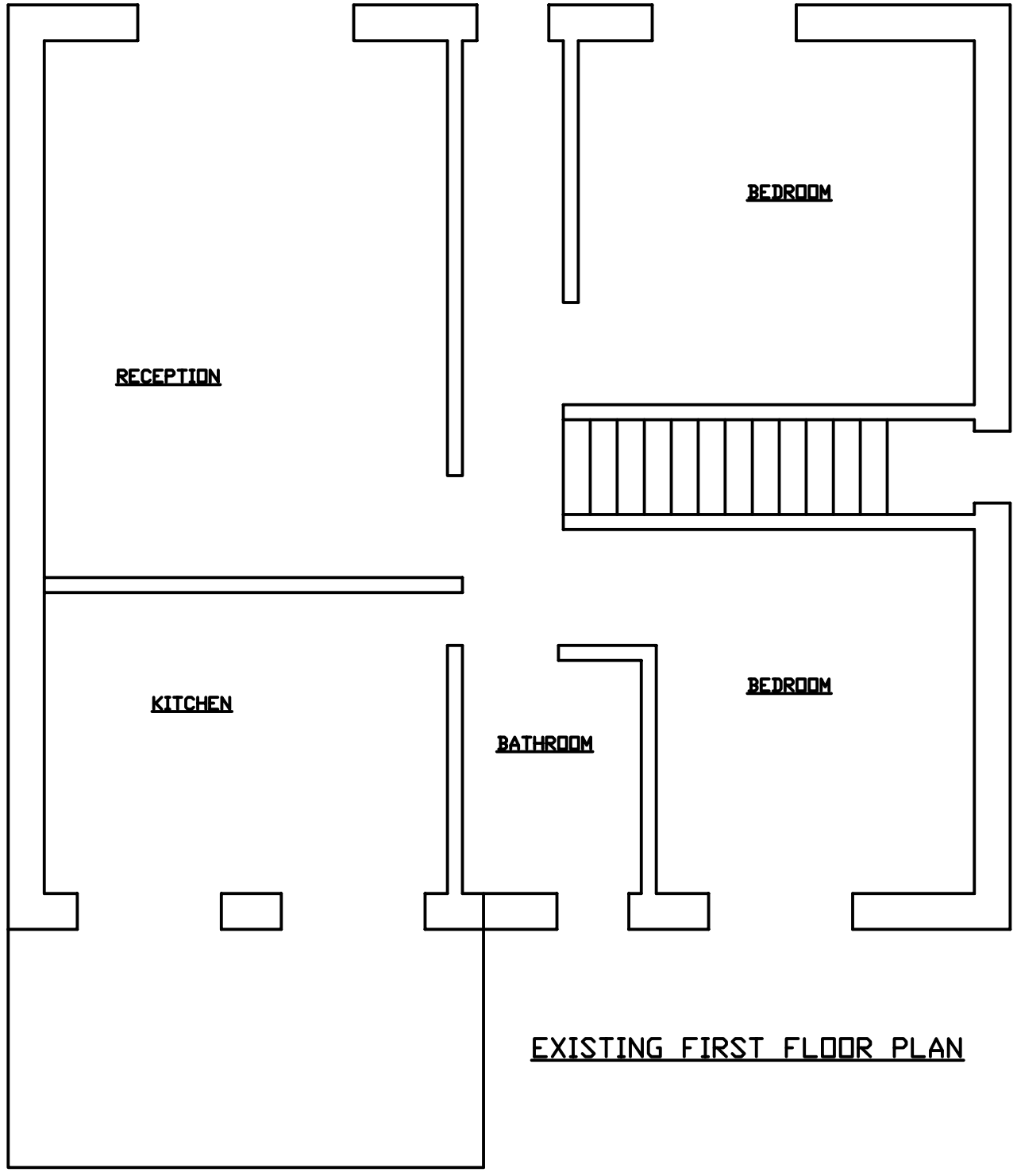


EXISTING GROUND FLOOR PLAN



EXISTING FIRST FLOOR PLAN

PRELIMINARY

CLIENT
–

PROJECT
41B KINGSWEAR ROAD
HIGHGATE
LONDON

DESCRIPTION
PROPOSED
BASEMENT
EXTENSION

BUILD DESIGN
5, ELMFIELD ROAD
CHELTENHAM,
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DATE	SCALE	REV
10/05/16	1:50	–

DRAWN	CHECKED	PROJECT No.	DRG No.
ASB	–	A3	04

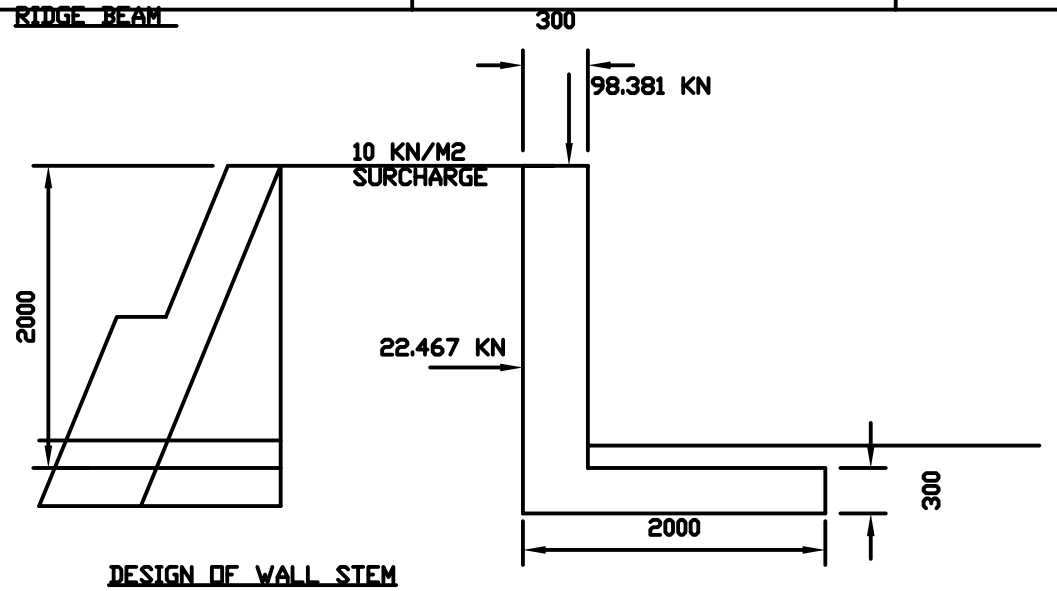
BUILD DESIGN
5 Elmfield Road
Cheltenham
Glos GL51 9JH
01242 693047

DATE	SCALE	REV	CLIENT
01/01/17			
DRAWN / CHECKED	PROJECT No.	SHEET No	CONTRACT
ASB	-	01	41B KINGSWEAR ROAD HIGHGATE LONDON

STRUCTURAL CALCULATIONS

DESCRIPTION: BASEMENT EXTENSION

RIDGE BEAM



DESIGN OF WALL STEM

C OF G OF HORIZONTAL LOADS

10 KN/M2 SURCHARGE = 0.33 X 18 X 0.556 X 2 = 6.605 KN @ 1.0

RETAINED EARTH = 0.33 X 18 X 1.0 X 1.0/2 = 2.97 KN AT 1.33

GROUND WATER = 9.8 X 1.5/2 = 7.35 KN AT 0.33

ULT BENDING MOMENT = (6.605 X 1 + 2.97 X 1.33 + 7.35 X 0.33) X 1.5= 19.471 KNM

b = 1000, d = 230 - 50 = 1801mm. FK = 460 N/mm2. fcu = 30 N/mm2

k = 19.471 X 1000000/1000 X 180 X 180 X 30 = 0.0192

z = 0.5 + $\sqrt{0.25 - 0.0192/0.9}$ = 0.95

Ast = 21.788 X 1000000/460 X 0.95 X 0.95 X 180 = 291.57mm2

PROVIDE T12 @ 200 CRS (565mm2)

DISTRIBUTION = 0.14 X 180 X 1000/100 = 252mm2

PROVIDE T10 BARS @ 200crs (393mm2)

FOUNDATIOS

ESTIMATE VERTCAL LOAD

FROM EXISTING PARTY WALL = 20 X 0.25 X 13 = 65 KN
FLOORS 3.1 X 2.0 X 3 = 18.6 KN/M
FROM ROOF = 1.927 X 3.0 = 5.781 KN/M
PARTITIONS = 1.0 X 3.0 X 3 = 9.0 KN/M
TOTAL = 98.381 KN

F OF S AGAINST OVER TURNING

F OF S = 98.381 X 1.85/12.98 = 14 > 1.50K

SLIDING

RETAINING WALL ABUTS SLAB AND RESISTED AGAINST OPOSITE RETAINING WALL

NO CHECK REQUIRED

HORIZONTAL LOADS

SURCHARGE = 0.33 X 18 X 0.556 X 2.25 = 7.431 KN	X 1.25 = 9.289 KNM/M	
RETAINED EARTH = 0.33 X 18 X 2.25 X 2.25/2 = 15.036 KN/M	X 0.75 = 11.277 KNM/M	
TOTAL = 22.467 KN/M	TOTAL = 20.566 KNM/M	

C OF G = 20.566/22.467 = 0.9154

BUILD DESIGN
5 Elmfield Road
Cheltenham
Glos GL51 9JH
01242 693047

DATE	SCALE	REV	CLIENT
01/01/17			
DRAWN / CHECKED	PROJECT No.	SHEET No	CONTRACT
ASB	-	02	41B KINGSWEAR ROAD HIGHGATE LONDON

STRUCTURAL CALCULATIONS

DESCRIPTION: BASEMENT EXTENSION

VERTICAL LOADS

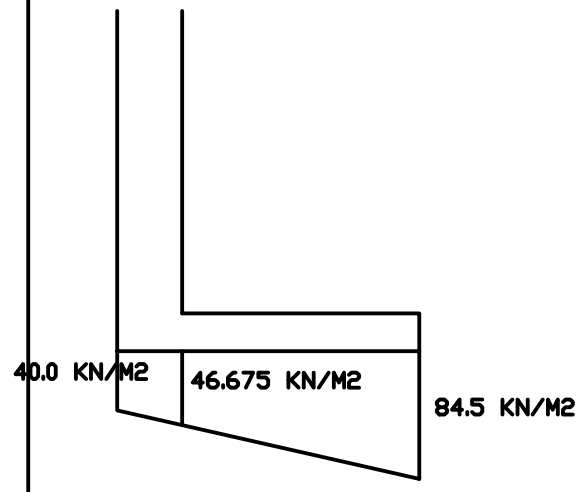
WALL LOAD = 98.381 KN/M	X 0.175 = 17.217 KNM/M	
WALL STEM = 24 X 0.3 X 2.0 = 14.4 KN/M	X 0.15 = 2.16 KNM/M	
BASE = 24 X 0.25 X 2.0 = 12.0 KN	X 1.0 = 12.0 KNM/M	
TOTAL = 124.781 KN/M	TOTAL = 31.377 KNM/M	

C OF G = 31.377/124.781 = 0.2515

x = 0.9154 x 31.377/124.780 = 0.23

e = 0.6 - 0.2515 - 0.23 = 0.1185 < D/6

MAX GROUND BEARING PRESSURE = 124.781/2.0 + 124.781 X 0.1185 X 6/2.0 X 2.0 = 84.5 KN/M2



300 THICK BASE

BENDING MOMENT = 46.675 X 1.7 X 1.7/2 + 37.825 X 1.7 X 1.1333/2 = 103.88 KNM

ULT BENDING MOMENT = 103.88 X 1.45 = 150.63 KNM

b = 1000; d = 300 - 50 = 250; fk = 460 N/mm2; Fcu = 35 N/mm2

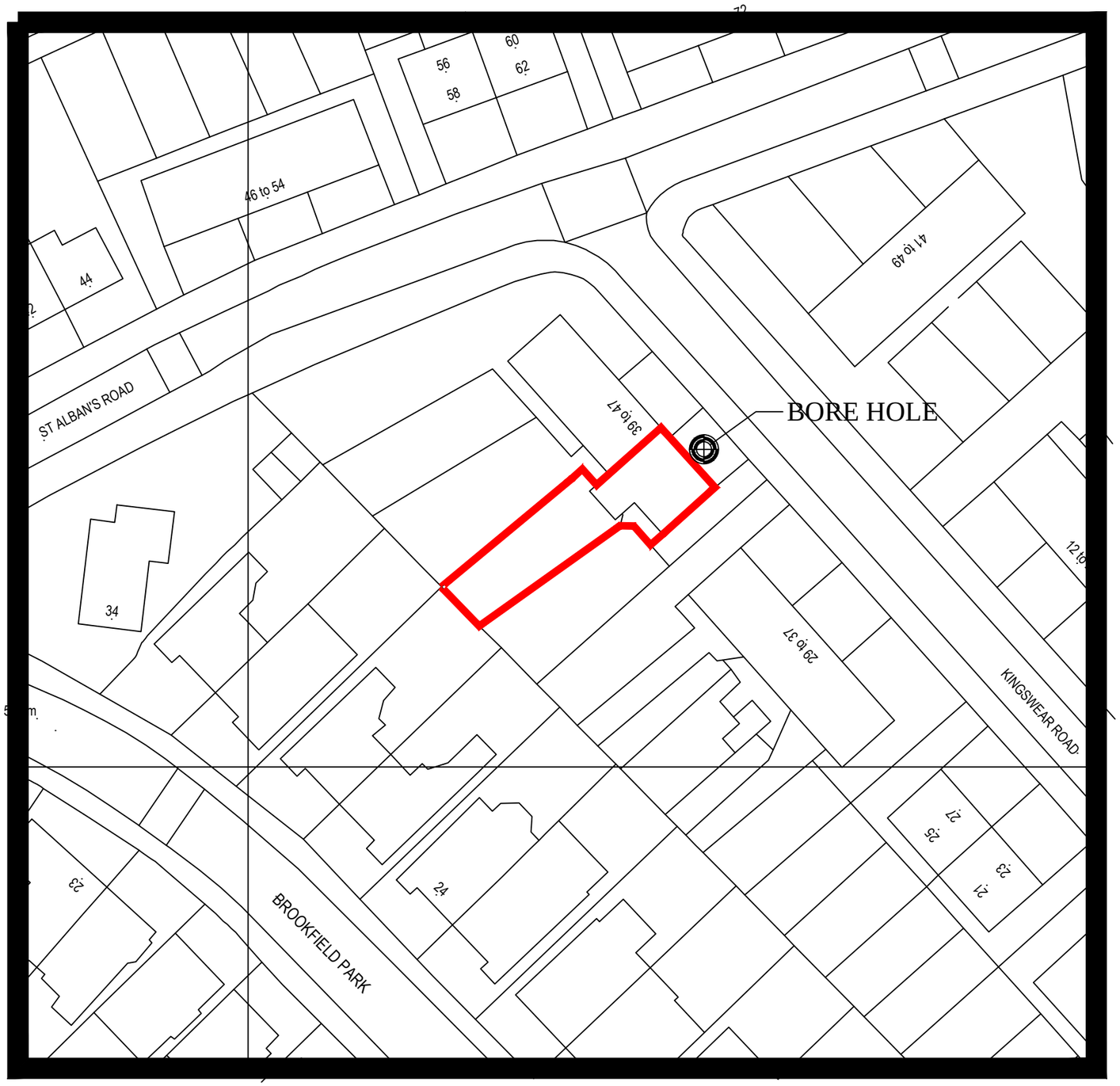
k = 150.63 X 10000000/1000 X 250 X 250 X 35 = 0.06886

z = 0.5 + 0.25 - 0.06886/0.9 = 0.926

Ast = 150.63 X 1000000/460 X 0.95 X 200 X 0.926 = 1489mm2

PROVIDE T20 @ 200crs

Borehole Location Plan



SPACE BASEMENTS LONDON LTD

Clarendon House
42 Clarence Street
Cheltenham
GL50 3PZ

Client
Mr. M. Orth
Miss. C. Lohmann

Project
41B Kingswear Road
Highgate
London
NW5 1EU

Drawing
Block Plan Showing Position of Bore Hole

Scales 1:500 @A3

Date January 2017

Drawn By A.J.Smith

2016. 22.125

Borehole Log

DRAFT

Drilled	CS/RB	**Start**	**Equipment, Methods and Remarks**	**Depth from (m)**	**to (m)**	**Diameter (mm)**	**Casing Depth (m)**	**Ground Level**	
Logged	KW	21/12/2016	Hand held window sampler					**Coordinates (m)**	
Checked	SNN	**End**	Inspection pit to 1.2m then hand held window sampling to 3.8m.					**National Grid**	
Approved		21/12/2016	No groundwater observed after 30 minutes observation. No odours noted.						

Samples and Tests

Strata Description

Depth	Type & No.	Records	Date Casing	Time Water	Main	Detail	Depth, Level (Thickness)	Legend	Backfill
0.20	D 1				Bark chippings over soft dark brown CLAY with frequent roots. (TOPSOIL)		(0.40)		
0.50	D 2				Soft dark brown slightly gravelly CLAY. Gravel is subangular of flint. (MADE GROUND?)		0.40 (0.40)		
0.90	D 3				Firm brown CLAY. (LONDON CLAY)		0.80		
1.00 - 1.25	D 4						(0.50)		
1.50 - 1.80	D 5				Firm to stiff light brown to brown CLAY. (LONDON CLAY)		1.30 (0.50)		
1.80 - 2.00	D 6					1.60 Subrounded medium gravel of siltstone.	1.80		
2.00 - 2.50	D 7				Firm light brown with occasional grey mottling CLAY. (LONDON CLAY)	1.90 Medium gravel sized pocket of fine and medium sand. 2.25 Occasional rootlet traces.			
2.50 - 3.00	D 8						(1.20)		
3.00 - 3.30	D 9					3.00 Pocket of yellow silt.	3.00		
3.30 - 3.60	D 10				Stiff possibly fissured brown mottled grey CLAY with frequent angular medium gravel of selenite crystals. Fissures may be extremely to closely spaced and randomly orientated. (LONDON CLAY)	3.25-3.50 Angular medium gravel of selenite crystals.	(0.80)		
3.60 - 3.80	D 11						3.80		
					END OF EXPLORATORY HOLE				

Groundwater Entries

No.	Depth Strike (m)	Remarks	Depth Sealed (m)

Depth Related Remarks

Depths (m)	Remarks

Hard Boring

Depths (m)	Duration (mins)	Tools used

Notes: For explanation of symbols and abbreviations see Key to Exploratory Hole Records. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.

Scale 1:50

Project 41B Kingswear Road, Highgate

Project No. G6138-16

Carried out for Space Basements

Borehole

WS1

Sheet 1 of 1

Utilities Search

Tuesday, 23 May 2017
Underground Utilities Search Report for:
LMB Geosolutions Ltd
Site Name : 41B Kingswear Road
Ref No 1 : LMB_Kings Ref No 2 :

Utility / Service	Attached	Comments
Gas	**Yes**	
Water	**Yes**	
Sewers	**Yes**	
BT	**Yes**	
Electricity	**Not Requested**	
Linesearch	**Yes**	
Vodafone	**Not Requested**	**Formerly Cable & Wireless & Thus**
Virgin Media	**Not Requested**	**Formerly ntl & Telewest**
BSkyB	**Not Requested**	**Formerly Easynet**
Vtesse	**Not Requested**	
Colt	**Not Requested**	
KPN	**Not Requested**	
Tata	**Not Requested**	
Sota	**Not Requested**	
CGI Logica	**Not Requested**	
Energetics	**Not Requested**	
City Fibre	**Not Requested**	
Telia Sonera	**Not Requested**	
Instalcom	**Not Requested**	**Includes Level3, GC (UK) Ltd, GC PEC, Fibrenet UK Ltd and Fibrespan Ltd**
KCom	**Not Requested**	**Formerly Kingston Communications**
Verizon	**Not Requested**	
Interoute	**Not Requested**	
Trafficmaster	**Not Requested**	
Independent Utilities	**Not Requested**	
Other	**Not Requested**	
NB: All responses that do not include plans apply to the **grid references** supplied only unless a plan of the site was provided. All plans / responses are valid for a maximum of three months unless noted otherwise		

91 Market Street Hoylake Wirral CH47 5AA
Tel. 0151 632 5142
Fax. 0870 762 6172
enquiries@cornerstoneprojects.co.uk
www.cornerstoneprojects.co.uk
VAT Reg. No. 851 4941 19
Company No. 5132353

CORNERSTONE PROJECTS LTD

GAS

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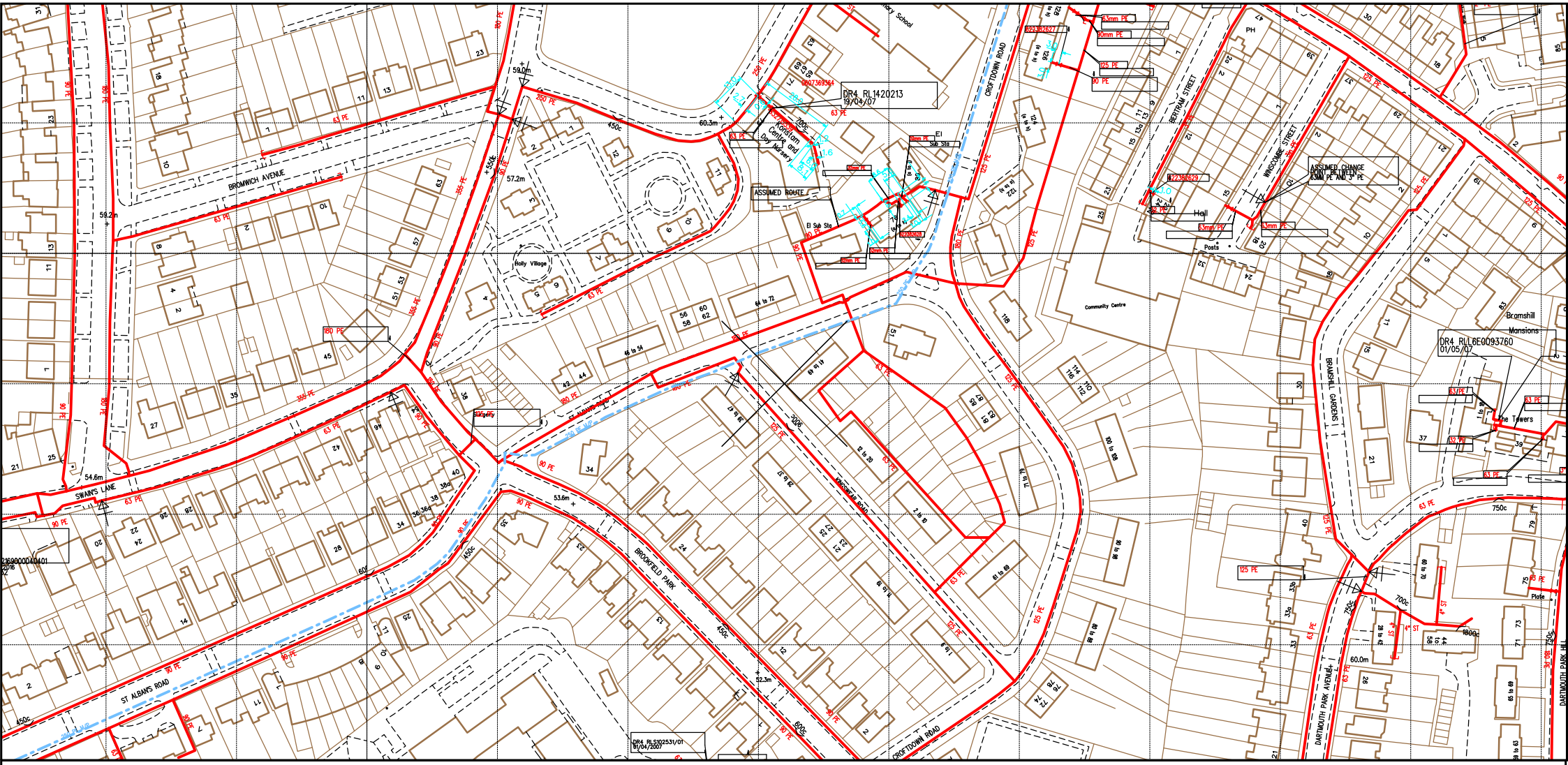


SCALE: Not to scale	LP MAINS
USER ID: Chris	MP MAINS
DATE: 19/05/2017	IP MAINS
EXTRACT DATE: 01/03/2017	LHP MAINS
MAP REF: TQ2886	NHP MAINS
CENTRE: 528660, 186451	

Some examples of Plant Items:

Valve | Depth of Cover | Syphon | Diameter Change | Material Change | Out of Standard Service

This plan shows those pipes owned by National Grid Gas plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

MAPS Viewer Version 5.7.0.0

Local Machine

CORNERSTONE PROJECTS LTD

WATER & SEWER

91 Market Street Hoylake Wirral CH47 5AA
Tel. 0151 632 5142
Fax. 0870 762 6172
enquiries@cornerstoneprojects.co.uk
www.cornerstoneprojects.co.uk
VAT Reg. No. 851 4941 19
Company No. 5132353

Asset location search

Property Searches

Cornerstone Projects LTD
91Market Street
HOYLAKE
WIRRAL
CH47 5AA

Search address supplied Kingswear Road

Your reference LMB_Kings

Our reference ALS/ALS Standard/2017_3572490

Search date 18 May 2017

Notification of Price Changes…

From **1 September 2016** Thames Water Property Searches will be increasing the prices of its Asset Location Searches. This will be the first price rise in three years and is in line with the RPI at 1.84%. The increase follows significant capital investment in improving our systems and infrastructure.

Enquiries received with a higher payment prior to 1 September 2016 will be non-refundable. For further details on the price increase please visit our website at

www.thameswater-propertysearches.co.uk

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: Kingswear Road,

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

Thames Water 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

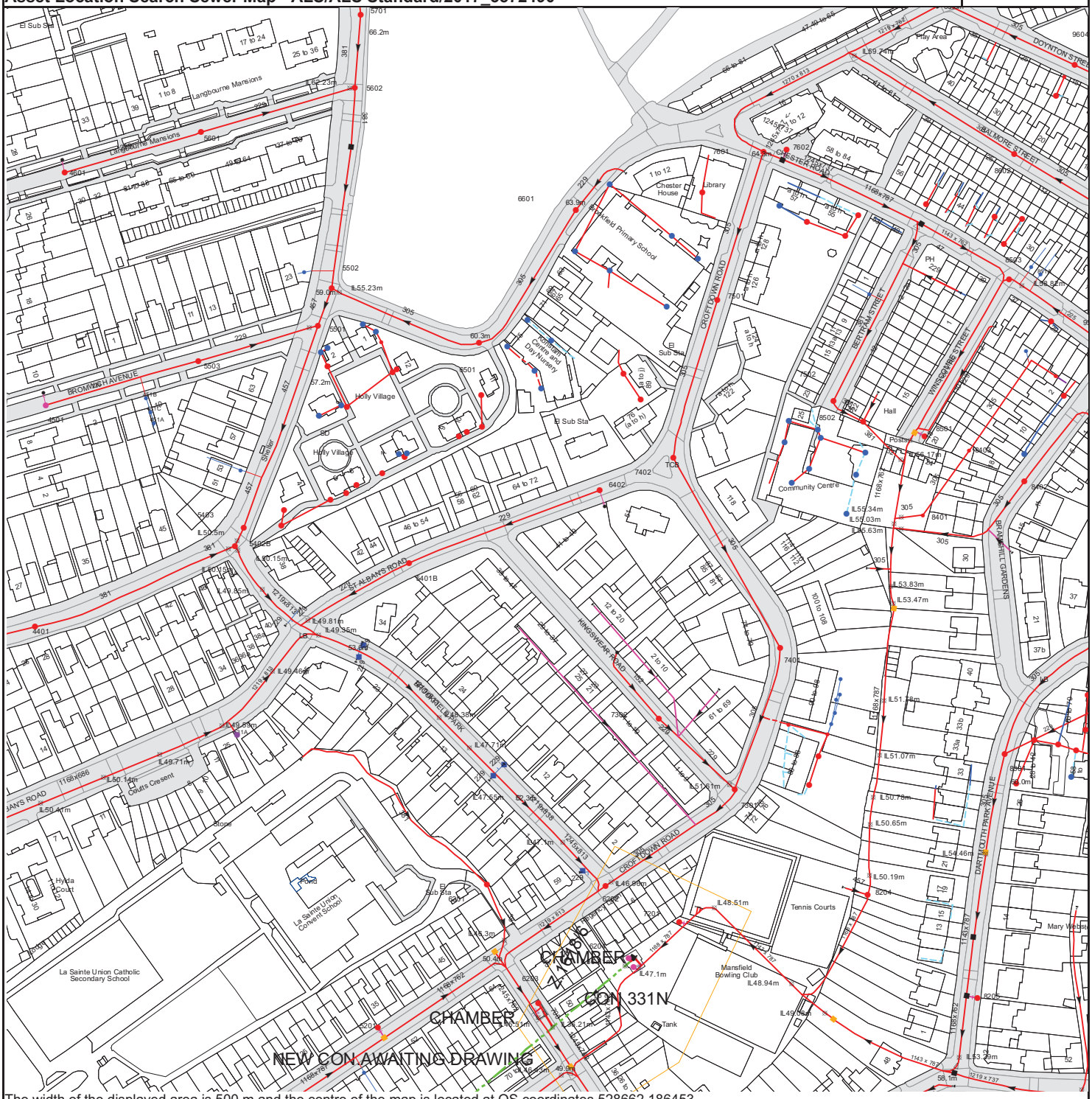
Clean Water queries

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_3572490



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 528662,186453

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
731C	n/a	n/a
8401	58.44	56.36
74AD	n/a	n/a
8402	62.47	58.87
84BG	n/a	n/a
84BE	n/a	n/a
84BH	n/a	n/a
8403	60.77	58.16
8501	n/a	n/a
8502	60.22	56.8
95BA	n/a	n/a
851C	n/a	n/a
851E	n/a	n/a
85DA	n/a	n/a
851F	n/a	n/a
8503	62.63	58.27
851A	n/a	n/a
851D	n/a	n/a
85DJ	n/a	n/a
75AI	n/a	n/a
86CB	n/a	n/a
86CD	n/a	n/a
86FC	n/a	n/a
86EH	n/a	n/a
8205	n/a	n/a
8204	n/a	n/a
83CA	n/a	n/a
93BH	n/a	n/a
8301	60.94	58.2
93BG	n/a	n/a
83BI	n/a	n/a
83BJ	n/a	n/a
93CA	n/a	n/a
731B	n/a	n/a
731D	n/a	n/a
93BJ	n/a	n/a
731A	n/a	n/a
65BC	n/a	n/a
65BE	n/a	n/a
65BD	n/a	n/a
65BB	n/a	n/a
65AE	n/a	n/a
6601	63.51	60.13
6402	60.81	57.38
66AE	n/a	n/a
65AD	n/a	n/a
65CB	n/a	n/a
75AJ	n/a	n/a
75AE	n/a	n/a
75AF	n/a	n/a
7402	62.27	58.45
75AG	n/a	n/a
76BE	n/a	n/a
7501	63.72	59.78
76AG	n/a	n/a
7401	57.99	54.24
75BF	n/a	n/a
75BE	n/a	n/a
74AE	n/a	n/a
76AI	n/a	n/a
74AF	n/a	n/a
75BD	n/a	n/a
75BC	n/a	n/a
7502	60.71	57.3
8602	64.37	61.01
7601	64.18	59.18
7602	63.88	59.02
86AH	n/a	n/a
5602	64.22	62.17
96BE	n/a	n/a
9604	65.6	61.78
5701	66.81	64.47
5501	58.21	54.35
55BH	n/a	n/a
55BB	n/a	n/a
55BD	n/a	n/a
55BC	n/a	n/a
54CG	n/a	n/a
5502	58.96	54.92
55BG	n/a	n/a
54CH	n/a	n/a
55BI	n/a	n/a
54CI	n/a	n/a
55AI	n/a	n/a
55AJ	n/a	n/a
55BA	n/a	n/a
54CJ	n/a	n/a
55BF	n/a	n/a
55BE	n/a	n/a
54CA	n/a	n/a
54CB	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
54BJ	n/a	n/a
5401B	55.5	53.49
65CE	n/a	n/a
65CF	n/a	n/a
6501	59.91	56.51
65CD	n/a	n/a
65CC	n/a	n/a
65BF	n/a	n/a
521B	n/a	n/a
5201	n/a	n/a
6203	49.85	n/a
7202	n/a	n/a
6204	51	n/a
7201	52.71	n/a
6202	51.42	n/a
6201	50.22	47.4
7301	54.89	51.01
73AJ	n/a	n/a
73BA	n/a	n/a
531A	n/a	n/a
73BB	n/a	n/a
73BC	n/a	n/a
731F	n/a	n/a
7302	56.24	54.67
4401	54.4	50.72
5402B	54.7	n/a
5403	54.69	50.85
54CF	n/a	n/a
54CE	n/a	n/a
541A	n/a	n/a
451A	n/a	n/a
451C	n/a	n/a
4501	58.77	56.75
451B	n/a	n/a
5503	n/a	55.22
551A	n/a	n/a
4601	67.39	64.2
5601	n/a	n/a

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

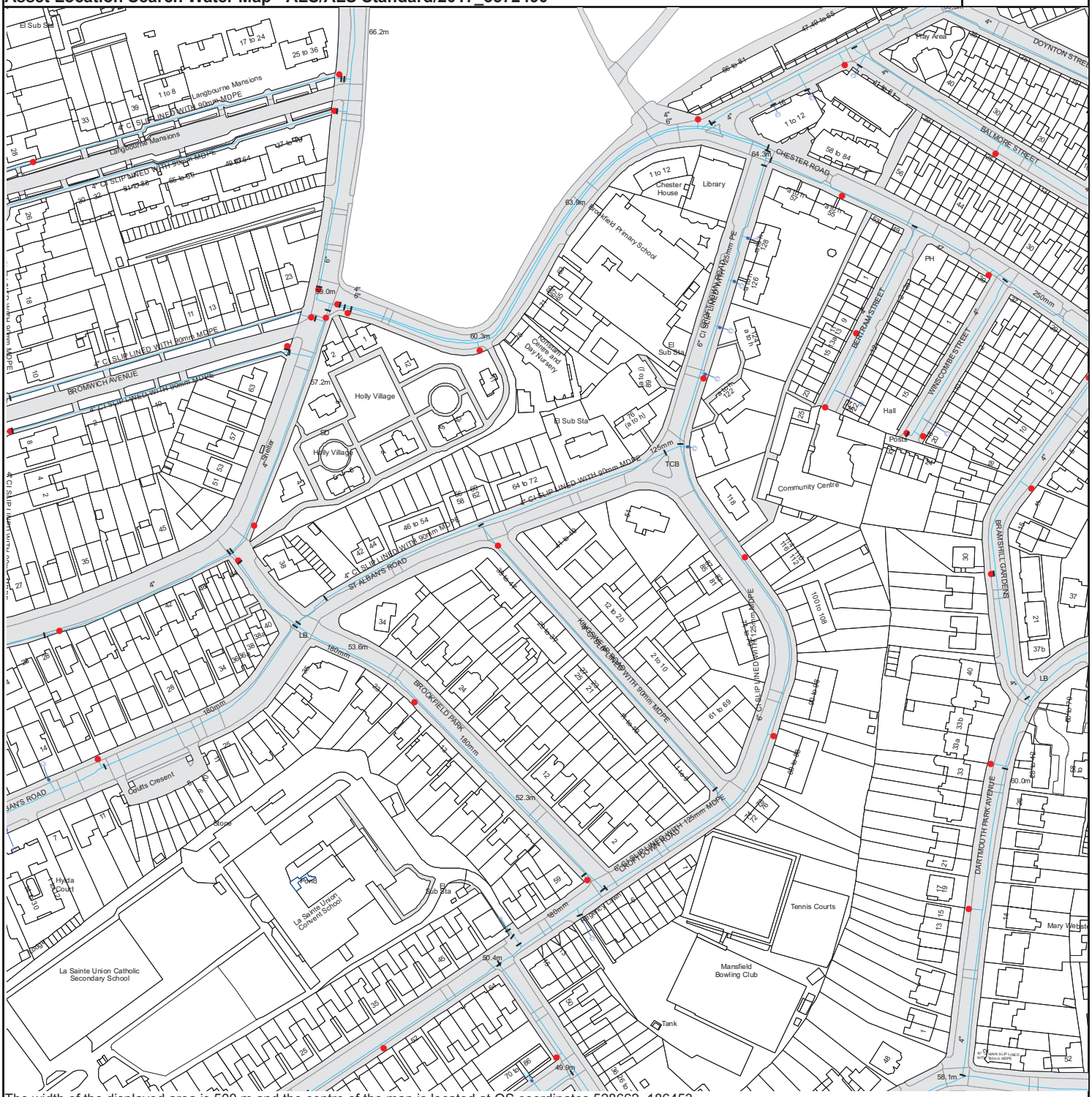
Proposed

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_3572490



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 528662, 186453.

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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.

CORNERSTONE PROJECTS LTD

BT

91 Market Street Hoylake Wirral CH47 5AA
Tel. 0151 632 5142
Fax. 0870 762 6172
enquiries@cornerstoneprojects.co.uk
www.cornerstoneprojects.co.uk
VAT Reg. No. 851 4941 19
Company No. 5132353

Our Ref: Ref shown on map

email: nnhc@openreach.co.uk

Date of issue shown on map

Dear Customer,

NR & SW ACT 1991 – PROPOSED WORKS AT:

Prior to commencement of work: for free onsite guidance and accurate up to date location of BT plant please contact our Plant Protection Service by the following methods
Email Dial before you dig CBYD@openreach.co.uk
Visit the website www.openreach.co.uk/cbyd

Thank you for your request of describing the above proposals.

Enclosed are copies of our drawing marked up to show the approximate locations of BT apparatus which is present in the immediate vicinity of your works. It is intended for general guidance only. No guarantee is given of its accuracy.

It should not be relied upon in the event of excavations or other works made near to British Telecommunications plc apparatus which may exist at various depths and may deviate from the marked route.

To avoid damage it is recommended that mechanical excavators or borers are not used within 600mm of British Telecommunications plc plant. If scaffolding is erected, please ensure that our equipment is not enclosed, blocked, covered or otherwise obstructed by the scaffolding.

In the event of BT apparatus being in the area of works we recommend that your plant/vehicle crossing is either resited, or apply for a budget estimate by submitting detailed plans to the above address, these will be forwarded to the appropriate department for their comments.

Please ensure you quote our reference on any future correspondence.

Yours faithfully,

Openreach Plant Maps Requested

NewSite Office (addresses can be found on the New Developments contact page)

Dear Sir/Madam,

You have downloaded copies of our drawings marked up to show the approximate location of Openreach apparatus, which is present in the immediate vicinity of your works. It is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works made near to Openreach apparatus, which may, exist at various depths and may deviate, from the marked route.

To avoid damage it is recommended that mechanical excavators or borers are not used within 600mm of Openreach plant. Please ensure that our equipment is not enclosed, blocked, covered or otherwise obstructed by your plant. In the event of clearance not being adequate we anticipate that your plant is either resited, or an order is placed with Openreach for rearrangements of its plant. If there are any difficulties with the Map please email cbyd@openreach.co.uk

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Please contact our Network Protection Service by Email on cbyd@openreach.co.uk giving four calendar weeks notice of your commencement date. This will provide you with on-site advice and a check of location for any Openreach apparatus.

Further to this, I hope the following points will assist you at the new development: -

Openreach has a licence obligation to provide service to any end customer requiring a connection. A Developer would not normally be charged for provision of service, our standard connection charges would apply to the end user when orders are placed with the communication provider of choice. However, should a Developer insist on an underground service in an area where Openreach plant is provided overhead, charges may be incurred.

When the Developer has obtained contract and planning permission Openreach would request a 'Clean', scaled Site Layout, Location Map and a covering letter be sent to the relevant newSite Office. We would particularly request that you give details of your programmed site start date and likely first occupancy date where possible. To obtain contact details of the newSite office covering the development area click on the URL below.

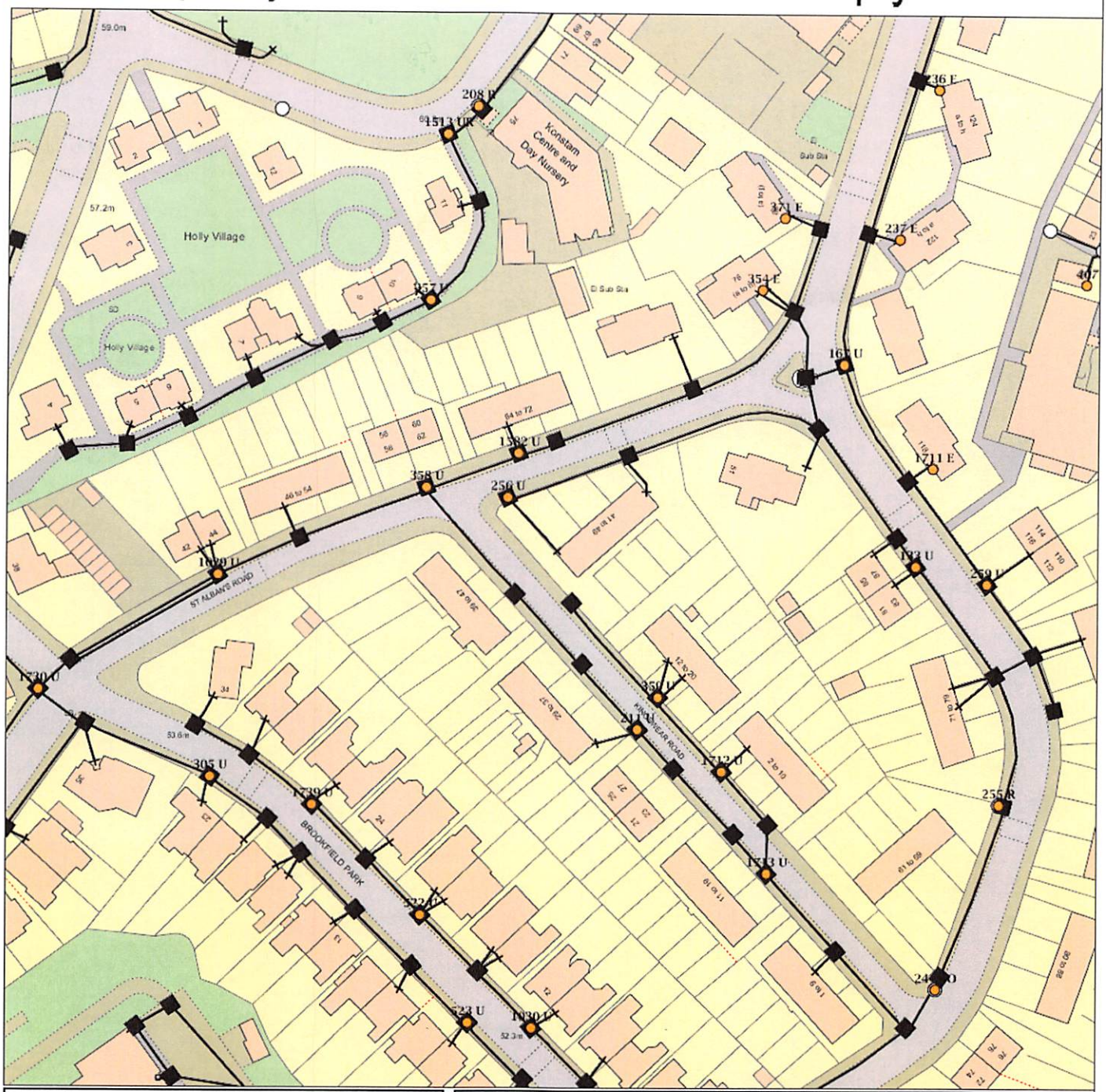
http://www.newdevelopments-openreach.co.uk/ContactUs.aspx

Where a development affects existing Openreach apparatus in the public highway, the cost of any necessary protection or diversionary works must be borne by the Developer. In this case where a budget estimate is required a Site Plan, Location Map and a covering letter should be forwarded to the Repayments Project Office. Please visit www.openreach.co.uk/alterationscontacts for contact details of the Repayments Office covering the development area.

Yours faithfully,

Openreach newSites

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.

openreach BT

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

KEY TO BT SYMBOLS

DP		Pole	
Planned DP		Planned Pole	
PCP		Joint Box	
Planned PCP		Change Of State	+
Built		Split Coupling	X
Planned		Duct Tee	▲
Inferred		Planned Box	
Building		Manhole	
Kiosk	K	Planned Manhole	
Hatchings		Cabinet	
		Planned Cabinet	

Other proposed plant is shown using dashed lines.
BT Symbols not listed above maybe disregarded.
Existing BT Plant may not be recorded.
Information valid at time of preparation

openreach a BT Group business BT

BT Ref : CWA03104B
Map Reference : (centre) TQ286608645C
Easting/Northing : (centre) 528660,186
Issued : 18/05/2017 15:10:16

WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

CORNERSTONE PROJECTS LTD

LINESEARCH

91 Market Street Hoylake Wirral CH47 5AA
Tel. 0151 632 5142
Fax. 0870 762 6172
enquiries@cornerstoneprojects.co.uk
www.cornerstoneprojects.co.uk
VAT Reg. No. 851 4941 19
Company No. 5132353

Enquiry Confirmation

LSBUD Ref: 10458202

Date of enquiry: 18/05/2017
Time of enquiry: 15:19

Enquirer

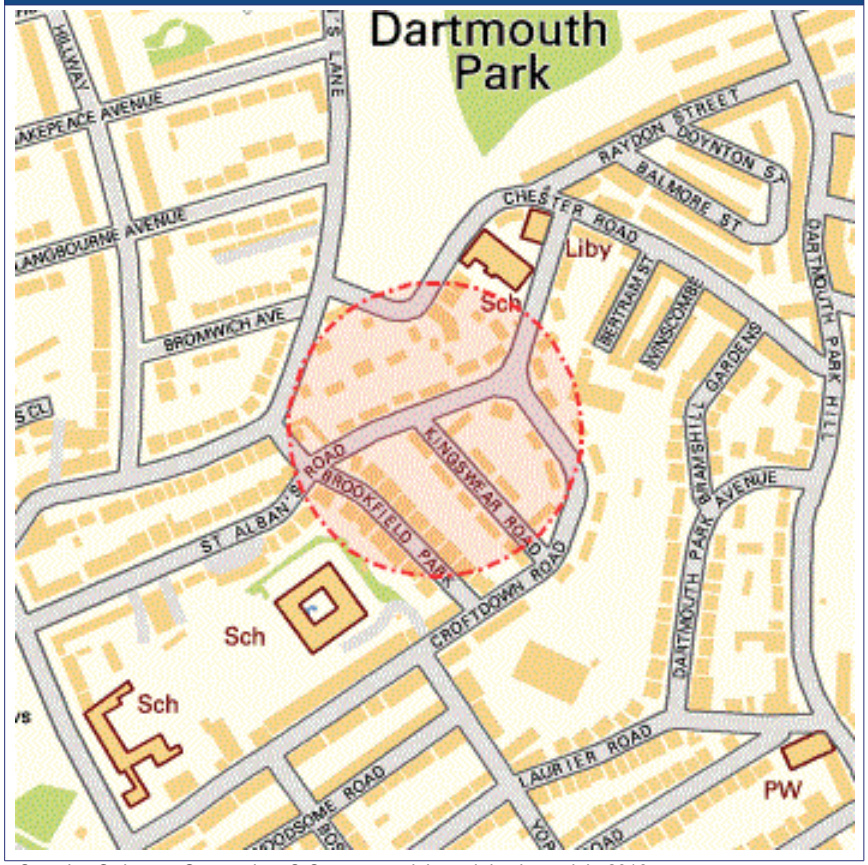
Name	Mr Duncan Phillips	Phone	01516325142
Company	Cornerstone Projects	Mobile	Not Supplied
		Fax	08707626172
Address	91 Market Street Hoylake Merseyside CH47 5AA		
Email	searches@cornerstoneprojects.co.uk		
Notes	Please ensure your contact details are correct and up to date on the system in case the LSBUD Members need to contact you.		

Enquiry Details

Scheme/Reference	LMB_Kings		
Enquiry type	Planned Works	Work category	Development Projects
Start date	19/06/2017	Work type	Commercial/industrial
End date	19/06/2017	Site size	245 metres diameter
Searched location	XY= 528660, 186450 Easting/Northing	Work type buffer*	75 metres
Confirmed location	528653 186451		

* The WORK TYPE BUFFER is a distance added to your search area based on the Work type you have chosen.

Site Map



V3.3.2

Enquiry Confirmation

LSBUD Ref: 10458202

Date of enquiry: 18/05/2017
Time of enquiry: 15:19

Asset Owners

Terms and Conditions. Please note that this enquiry is subject always to our standard terms and conditions available at www.linesearchbeforeudig.co.uk ("Terms of Use") and the disclaimer at the end of this document. Please note that in the event of any conflict or ambiguity between the terms of this Enquiry Confirmation and the Terms of Use, the Terms of Use shall take precedence.

Validity and search criteria. The results of this enquiry are based on the confirmed information you entered and are valid only as at the date of the enquiry. It is your responsibility to ensure that the Enquiry Details are correct, and LinesearchbeforeUdig accepts no responsibility for any errors or omissions in the Enquiry Details or any consequences thereof. LSBUD Members update their asset information on a regular basis so you are advised to consider this when undertaking any works. It is your responsibility to choose the period of time after which you need to resubmit any enquiry but the maximum time (after which your enquiry will no longer be dealt with by the LSBUD Helpdesk and LSBUD Members) is 28 days. If any details of the enquiry change, particularly including, but not limited to, the location of the work, then a further enquiry must be made.

Asset Owners & Responses. Please note the enquiry results include the following:

1. "LSBUD Members" who are asset owners who have registered their assets on the LSBUD service.
2. "Non LSBUD Members" are asset owners who have not registered their assets on the LSBUD service but LSBUD is aware of their existence. Please note that there could be other asset owners within your search area.

Below are three lists of asset owners:

1. LSBUD Members who have assets registered within your search area. ("Affected")
   a. These LSBUD Members will either:
      i. Ask for further information ("Email Additional Info" noted in status). The additional information includes: Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.

      ii. Respond directly to you ("Await Response"). In this response they may either send plans directly to you or ask for further information before being able to do so, particularly if any payments or authorisations are required.

2. LSBUD Members who do not have assets registered within your search area. ("Not Affected")

3. Non LSBUD Members who may have assets within your search area. Please note that this list is not exhaustive and all details are provided as a guide only. It is your responsibility to identify and consult with all asset owners before proceeding.

National Grid. Please note that the LSBUD service only contains information on National Grid's Gas above 7 bar asset, all National Grid Electricity Transmission assets and National Grid's Gas Distribution Limited above 2 bar asset.

For National Grid Gas Distribution Ltd below 2 bar asset information please go to www.beforeyoudig.nationalgrid.com

Enquiry Confirmation

LSBUD Ref: 10458202

Date of enquiry: 18/05/2017
Time of enquiry: 15:19

LSBUD Members who have assets registered on the LSBUD service within the vicinity of your search area.

List of affected LSBUD members
No LinesearchbeforeUdig Asset Owners within the Zone of Interest

LSBUD members who do not have assets registered on the LSBUD service within the vicinity of your search area. Please be aware that LSBUD members make regular changes to their assets.

List of not affected LSBUD members		
AWE Pipeline	Fulcrum Pipelines Limited	Phillips 66
BOC Limited (A Member of the Linde Group)	Gamma	Premier Transmission Ltd (SNIP)
BP Midstream Pipelines	Gateshead Energy Company	Prysmian Cables & Systems Ltd (c/o Western Link)
BPA	Gigaclear PLC	Redundant Pipelines - LPDA
Carrington Gas Pipeline	Humbly Grove Energy	RWEnpower (Little Barford and South Haven)
CATS Pipeline c/o Wood Group PSN	IGas Energy	SABIC UK Petrochemicals
Cemex	INEOS Manufacturing (Scotland and TSEP)	Scottish Power Generation
Centrica Energy	INOVYN Enterprises Limited	Seabank Power Ltd
Centrica Storage Ltd	Intergen (Coryton Energy or Spalding Energy)	SGN
CLH Pipeline System Ltd	Lark Energy	Shell (St Fergus to Mossmorran)
Concept Solutions People Ltd	Mainline Pipelines Limited	Shell Pipelines
ConocoPhillips (UK) Ltd	Manchester Jetline Limited	Total (Finaline, Colnbrook & Colwick Pipelines)
DIO (MOD Abandoned Pipelines)	Manx Cable Company	Transmission Capital
Dong Energy (UK) Ltd	Marchwood Power Ltd (Gas Pipeline)	Uniper UK Ltd
E.ON UK CHP Limited	Melbourn Solar Limited	Vattenfall
EirGrid	National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission	Veolia ES SELCHP Limited
Electricity North West Limited	Northumbrian Water Group	Western Power Distribution
ENI & Himor c/o Penspen Ltd	NPower CHP Pipelines	Wingas Storage UK Ltd
ESP Utilities Group	Oikos Storage Limited	Zayo Group UK Ltd c/o JSM Group Ltd
ESSAR	Perenco UK Limited (Purbeck Southampton Pipeline)	
Esso Petroleum Company Limited	Petroineos	