AKERA ENGINEERS
Consulting Structural Engineers

124a St STEPHENS AVENUE
LONDON W12 8JD

CONSTRUCTION METHOD STATEMENT

CONSTRUCTION OF A LOWER GROUND FLOOR UNDER A NEW THREE STOREY BUILDING

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

INDEX

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

INTRODUCTION

124a St Stephen's Avenue is a single storey garage building adjacent to the gable end wall of a Victorian end of terrace property at 124 St Stephen's Avenue and backing onto a two storey masonry building at 124B St Stephen's Avenue.
The neighbouring building at 124 St Stephen's Avenue is a three storey (ground, first and second floor) building constructed in the late 1800s. It is of typical construction of its age with load bearing London stock masonry walls and timber joisted floors spanning onto the internal and external walls.

The following is a summary of the proposed alterations to the existing building

Removal of the existing single storey garage building and construction of a three story building with a basement. The property is going to be split into two flats; Flat 1 on ground and lower ground floor level and Flat 2 on first and second floor level.

The following is a summary of the proposed construction on the site

Demolition
- demolition of the existing single storey garage building

Excavations
- excavation to create a basement under the footprint of the proposed three storey building

To form these excavations, the following construction and temporary work is required
- underpinning the existing foundations under the gable end wall of 124 St Stephen's Avenue
- underpinning the existing foundations under the rear wall of 124B St Stephen's Avenue
- installing a piled wall to retain the earth around the excavations

These underpinned foundations and piled walls are to be propped and shored until a suitably designed stiff reinforced concrete surrounding wall, basement raft/slab and ground floor structure has been constructed (designed to resist and support the forces from the surrounding earth pressures and the loads from the building above.

The proposed development will not have adverse effect on the hydrology/hydrogeology of the surrounding area and the structural works will be implemented without risking the structural integrity of the adjoining buildings.

New Construction
The proposed new construction consists of
- construction of a three storey building on top of the newly formed basement box.

The main vertical loads from the new building are to be supported by the basement reinforced concrete structures created below them.

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

GEOTECHNICAL INFORMATION
GROUND CONDITIONS AND EXISTING FOUNDATIONS

The Geotelogical Survey sheet of the area, sheet number 270 (South London) indicates that the naturally occurring subsoil is River Terrace Gravels (Kempton Park Grave) over London Clay. Refer to Appendix A that shows an extract of sheet 270 (with the site location highlighted on it) together with a key.

A report on the ground investigation (carried out by Fastrack) is included in Appendix B.
Three trial pits were excavated on site to determine the type and depths of the existing foundations under the garage and to determine the ground conditions below the existing structure.

The trial pits that were excavated in the ground floor areas of the property confirmed that the existing garage building is founded on gravels.
The foundations of the existing party wall with the neighbouring end of terrace building are corbelled brick footings on a concrete footing founded on the gravels.
No ground water was encountered in the trial pits.
A borehole was sunk down to 5 metres and was dry.

The proposal is to carry out further ground investigations at a later date using a flight augered borehole in order to determine the ground conditions of the ground deeper down. Further laboratory geotechnical analysis is to be carried out to obtain the parameters for the design of the concrete piles and reinforced concrete retaining walls and foundations.

DESIGN DESCRIPTION

The proposed new construction of the basement beneath the new three storey building at 124a St Stephen's Avenue will be designed as a stiff reinforced concrete box, with reinforced concrete floors and walls. The reinforced concrete box will be capable of supporting the loads from the new building, the neighbouring buildings and the neighbour's boundary wall and distributing the loads safely to the ground. The bearing loads under the new reinforced concrete box and concrete underpins will be within the acceptable bearing capacities of the gravel.

A method of construction has been devised that will provide safe support to the existing boundary walls and neighbouring properties at all times and stages of the construction of the basement and will limit any ground movements in order to avoid any damage to the existing building and neighbouring properties.

A number of alternatives were considered before arriving at the proposed method.
The main deciding factor that led to the current proposal was to minimise any vibrations while working adjacent to the walls of the neighbouring properties.

Underpinning

The single storey brickwork garage has been built against the gable end wall of the end of terrace property. 124A St Stephen's Avenue shares a party wall with the property at 124 St Stephen's Avenue.

There is no party wall at the rear boundary of the site. The rear wall of the single storey brickwork garage of 124A St Stephen's Avenue has been built adjacent to the rear wall of the neighbour's two storey brickwork building at 124B St Stephen's Avenue.

In order to minimise vibrations while working adjacent the neighbouring properties and under the boundary walls, the proposal is to underpin the party wall on the left side boundary and the adjacent neighbouring wall on the rear boundary with mass concrete underpins taken down to a level below the basement formation level.
The underpinning excavations will be hand dug to minimise vibrations.
The underpins will be carried out in two hits.
The underpins will be propped with steel waling beams and struts to retain the surrounding ground.
A reinforced concrete box is to be cast in front of the underpins.
The steel waling beams and struts are to remain in place until the reinforced concrete box is cast and has cured to the appropriate strength.

Piling and Excavations

A permanent SFA piled retaining wall is to be installed to retain the ground on the two sides facing the site boundaries at the front and at the right side.
To minimise noise and vibrations, the proposal is to use sectional flight auger mini piles installed using a minipiling rigs. The piles can be installed with minimal noise levels and no vibrations.
Refer to the Roger Bullivant SFA Piling details in Appendix C.
A reinforced concrete box is to be cast in front of the permanent SFA piled retaining wall.
The permanent SFA piled retaining wall will be propped with steel waling beams and struts to retain the surrounding ground until the reinforced concrete box is cast and has cured to the appropriate strength.

Refer to Appendices D and E for the proposed basement construction sequence and sketches.

SETTLEMENTS AND INFLUNCE OF THE CONSTRUCTION ON THE SURROUNDING PROPERTIES

The design of the new basement will follow the guidelines set out by the London Borough of Hammersmith and Fulham within the Planning Guidance Supplementary Planning Document 2013 and the Development Management Local Plan 2013. Policies relevant to basement construction include:

- SPD Housing Policy 9 Basements,
- SPD Design Policy 12 Assessment of Proposals for Lightwells and Basement Excavation,
- SPD Design Policy 13 Proposals for basements,
- Housing Policy DM A8 Basement Accommodation and Lightwells.

The underpin widths and piling will be designed in order to limit the bearing pressures under the pins to below the levels indicated in the ground investigation report.

The limiting bearing pressures at basement level will be determined following the augered borehole exercise and the full ground investigation report.
The underpin widths and piling will be designed in order to limit the bearing pressures under the pins to below the levels that will be indicated in the ground investigation report.
The bearing pressures under the basement slab/raft level will be limited to below the levels that will be indicated in the ground investigation report.

By limiting the bearing pressures in the gravel, the settlements will be minimal.

Refer to Appendix C for the proposed basement construction sequence that includes the proposed sequence for the temporary works. The proposed sequence and temporary works

have been developed and designed to mitigate any effects on neighbouring properties and to avoid any slope instability that may threaten the neighbouring properties.

During the excavation of the sub-basement, there maybe some immediate heave of the London Clay. This heave will be within the excavation and is unlikely to result into building movements because the surrounding building walls will be supported on underpins founded below the basement formation level.

The weight of the reinforced concrete sub-basement and basement box will be of a similar order of the weight of the excavated clay from the formation of the new sub-basement.
When the reinforced concrete box and the extension above it is constructed, the immediate settlement should balance out the immediate heave and the long term settlements should be minimal.

An accurate CCTV survey of the drainage is still to be carried out.
It is likely that the wet services within the new basement construction will be lower than the existing drain invert levels.
The drainage from the basement wet services will be pumped up and connected to the existing gravity drainage system.

There was no ground water encountered in the trial pits and the borehole hence the deepening the existing ground and creating the new basement will not have any effect ground water flows and levels.

Below the formation level of the basement slab, the concrete SFA Piles have gaps between the piles. The piles below the basement slab will not create any damming of shallow groundwater. The ground water can flow in the gaps between the piles.

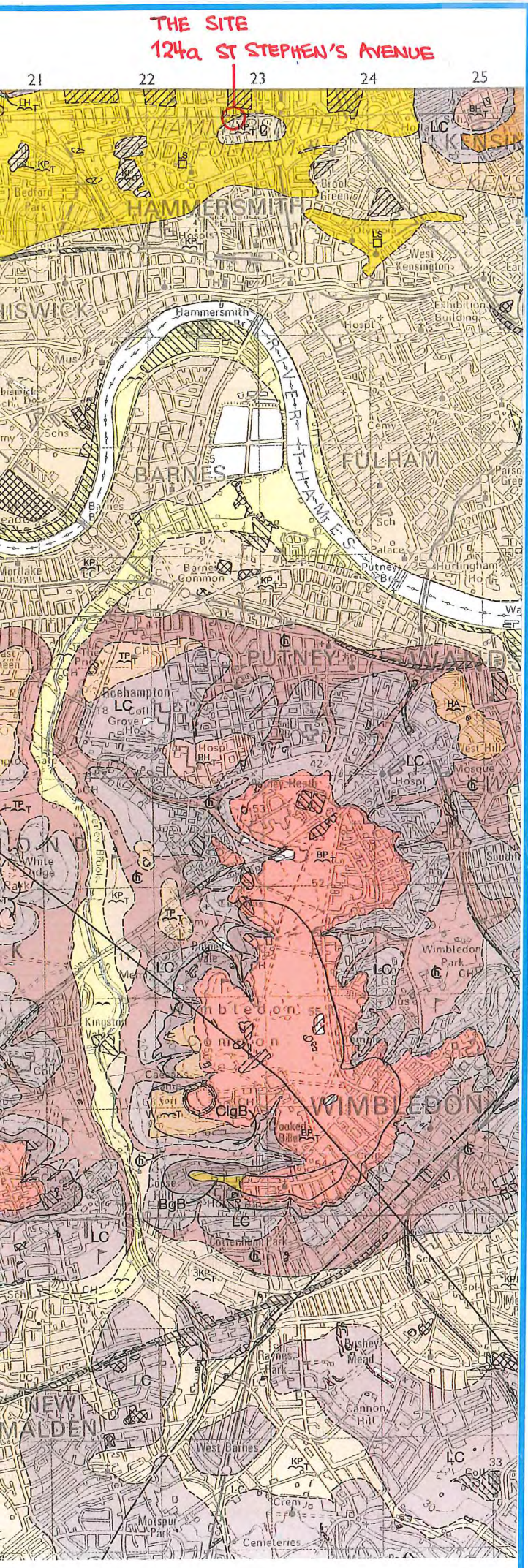
David Akera
MEng MIstructE

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

Appendix A

Extract of Geological Survey sheet 270

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com



BRITISH GEOLOGICAL SURVEY

1:50 000 Series

ENGLAND AND WALES SHEET 270

SOUTH LONDON

Solid and Drift Geology

KEY

DRIFT

- Worked Ground
- Made Ground
- Worked Ground and Made Ground
- Landscaped Ground
- Disturbed Ground
- Landslip
- Head: silt, sand and clay with variable gravel
- Clay-with-Flints: unworn flints in clay matrix
- Peat
- Alluvium: mainly sand, silt and clay
- Langley Silt: sandy clay and silt ('Brickearth')

QUATERNARY

PLEISTOCENE AND HOLOCENE

ANGLIAN TO FLANDRIAN

- Kempton Park Gravel
- Taplow Gravel
- Hackney Gravel
- Lynch Hill Gravel
- Boyn Hill Gravel
- Black Park Gravel

Post-diversionary Thames River Terrace Deposits: gravel, sandy and clayey in part

- Undifferentiated
- Interglacial Lacustrine Deposits: Organic-rich mud and sand

PRE-ANGLIAN

- Sand and Gravel of Uncertain Origin: pebbly gravel and sand

Drift deposits listed above are not necessarily in order of superposition

The relationships of the principal Quaternary deposits are shown schematically in a tablet below

For Solid symbols and colours see Generalized Vertical Section

- Geological boundary, Drift
- Geological boundary, Solid
- Fault, crossmark on downthrow side

Within the urban areas much of the surface has been disturbed by human activity but not all areas of made, worked and landscaped ground have been shown

Near Hounslow West [1250 7650] the boundary between the Lynch Hill and Taplow gravels is shown concealed beneath Langley Silt

Symbol indicates Quaternary deposit at surface and Solid formation at rockhead; other Quaternary deposits may intervene

Appendix B

Geotechnical Survey Report 124 St Stephen Avenue

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

Geotechnical Survey Report

FSI Ref:	10034
Issue Date:	August 2016
Client Name:	Antonio Giuliari
Risk Address:	124 St Stephens Avenue London W12 8NR

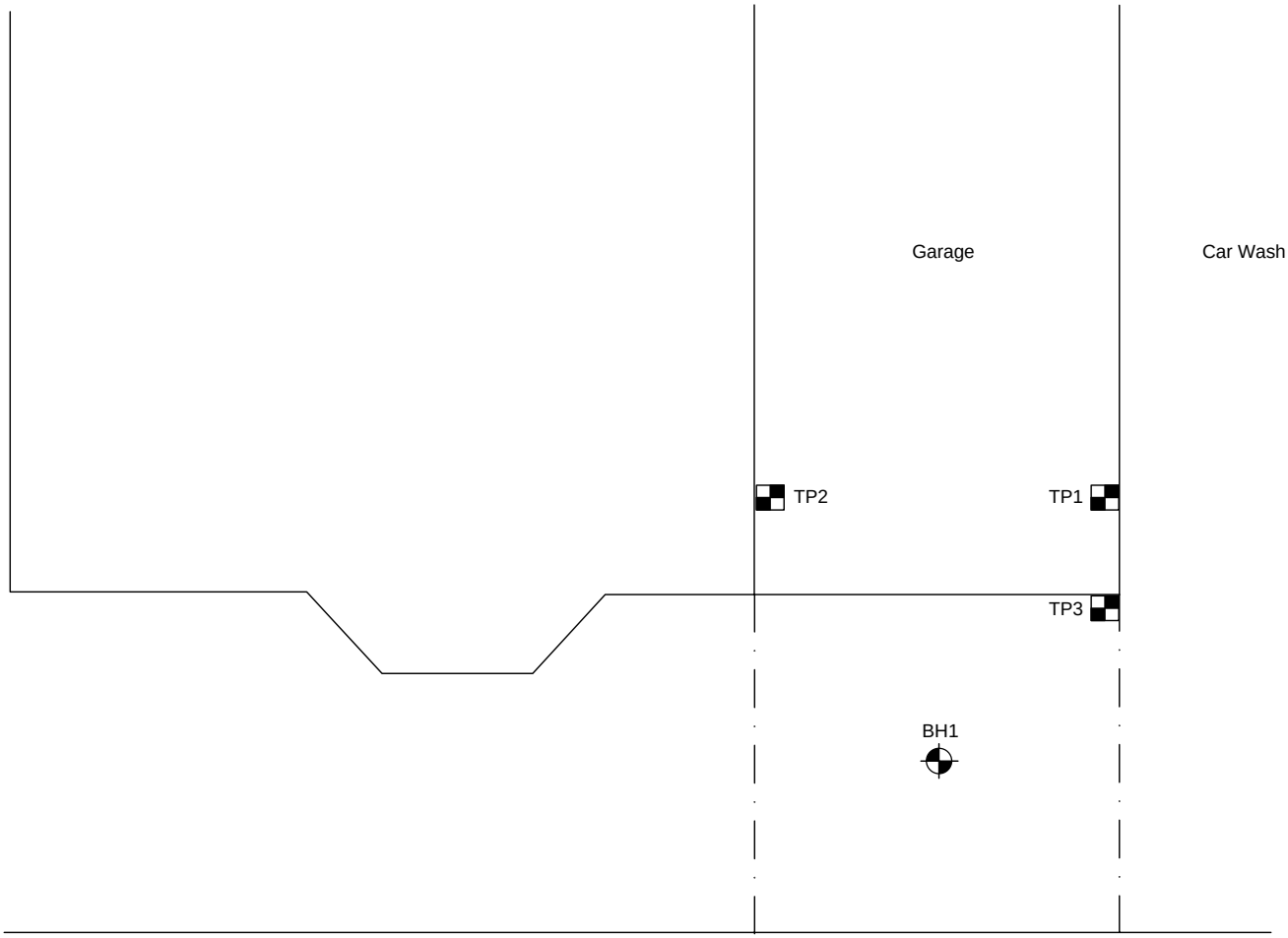
Director:	Martin Rush MSc FGS
Office Manager:	Louise Hiscock BSc (Hons)
CAD Technician:	Perry Martin AMCIHT
Laboratory Manager:	Lara Knight

FASTRACK
Tyndales Farm, Southend Road, Woodham Mortimer,
Maldon, Essex, CM9 6TQ
Telephone: 0844 3358908
Fax: 0844 3358907
Email:enquiries@fastrackgroup.co.uk
Web: www.fastrackgroup.co.uk

Appendix No: 1
FSI Ref: 10034

SITE PLAN

Property Address: 124 St Stephens Avenue, London, W12 8NR
Client Claim Ref: N/A **Survey date:** 29/07/2016 **Operative:** SE1



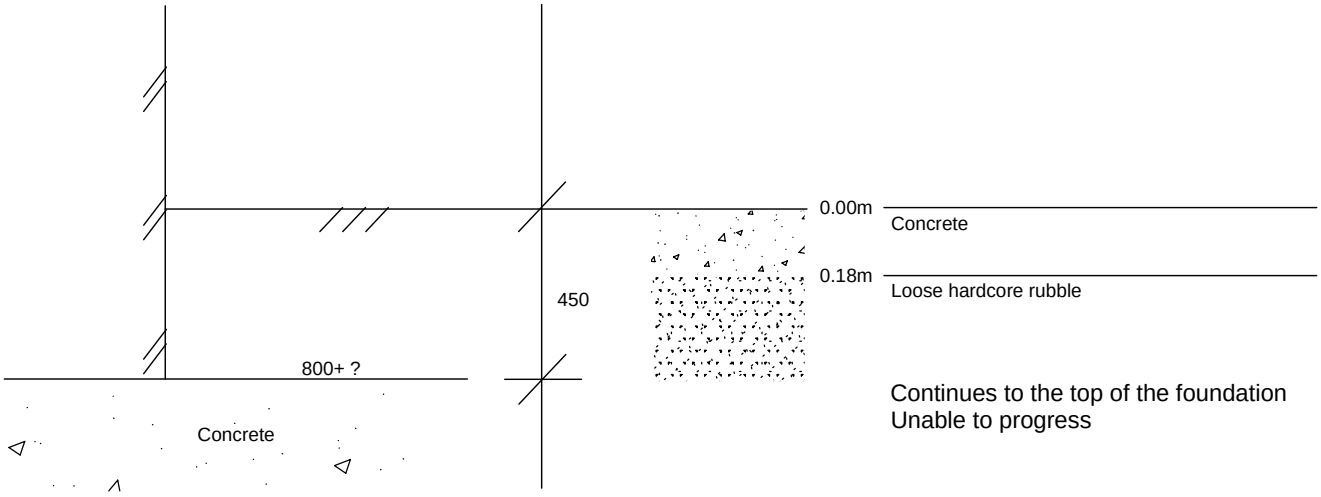
Scale:	Drawn by:	Key:
NTS	PM	Trial Pit, Borehole, Manholes, Rain Water Pipe, Soil & Vent Pipe, Surface Water Gully, Foul Water Gully, Shrub, Tree (Conifer), Tree (Deciduous)

FASTRACK
Tyndales Farm, Southend Road, Woodham Mortimer,
Maldon, Essex, CM9 6TQ
Telephone: 0844 3358908
Fax: 0844 3358907
Email:enquiries@fastrackgroup.co.uk
Web: www.fastrackgroup.co.uk

Appendix No: 2
FSI Ref: 10034

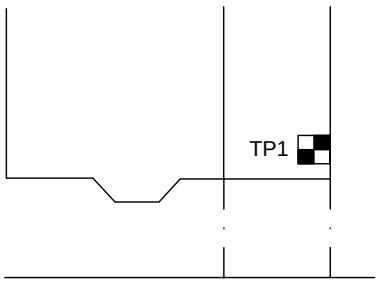
TRIAL PIT 1

Property Address: 124 St Stephens Avenue, London, W12 8NR
Client Claim Ref: N/A **Survey date:** 29/07/2016 **Operative:** SE1



Continues to the top of the foundation
Unable to progress

Trial Pit Location:



Drawn by: PM

Scale: 1:20

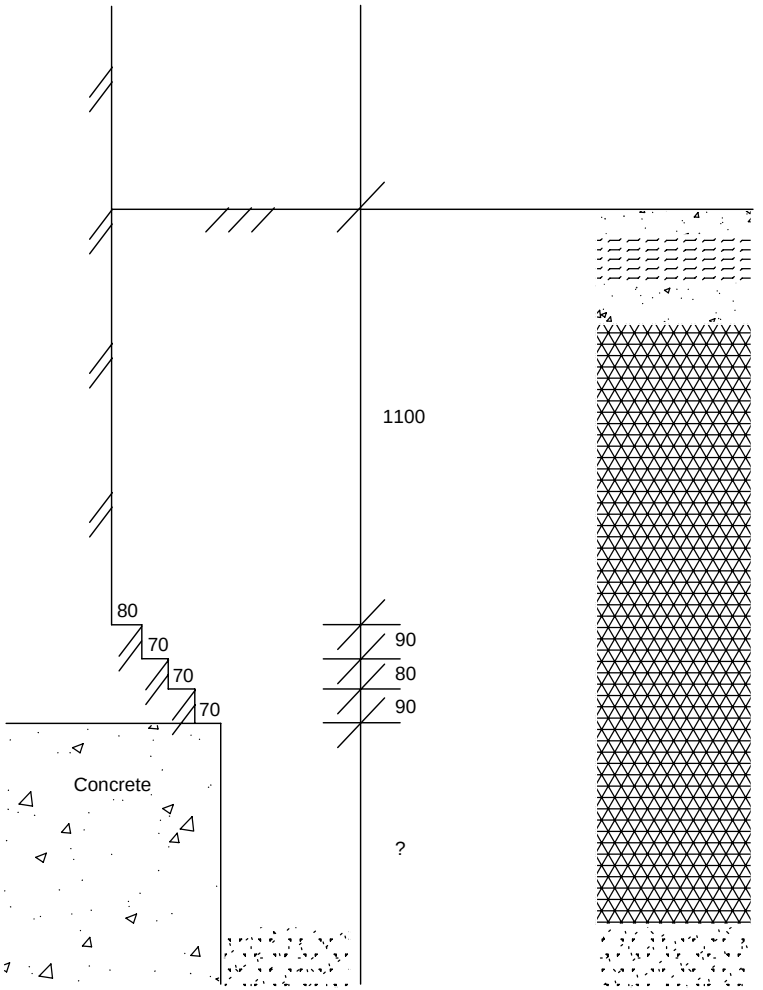
D= small disturbed sample, B= large bulk sample, U= undisturbed sample,
MP= mackintosh proble blow counts, V= shear vane reading (kPa)

FASTRACK
Tyndales Farm, Southend Road, Woodham Mortimer,
Maldon, Essex, CM9 6TQ
Telephone: 0844 3358908
Fax: 0844 3358907
Email:enquiries@fastrackgroup.co.uk
Web: www.fastrackgroup.co.uk

Appendix No: 2
FSI Ref: 10034

TRIAL PIT 2

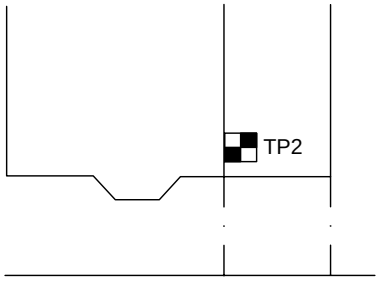
Property Address: 124 St Stephens Avenue, London, W12 8NR
Client Claim Ref: N/A
Survey date: 29/07/2016
Operative: SE1



0.00m — Concrete
0.07m — Loose brick hardcore
0.20m — Concrete layer
0.30m — Dark brown silty sandy clayey MADE GROUND containing brick, stone & gravel
1.90m — SAND & GRAVEL containing brick
2.00m

No progress was made by augering down the side of the concrete foundation due to sand, brick, stone & gravel

Trial Pit Location:



Drawn by: PM

Scale: 1:20

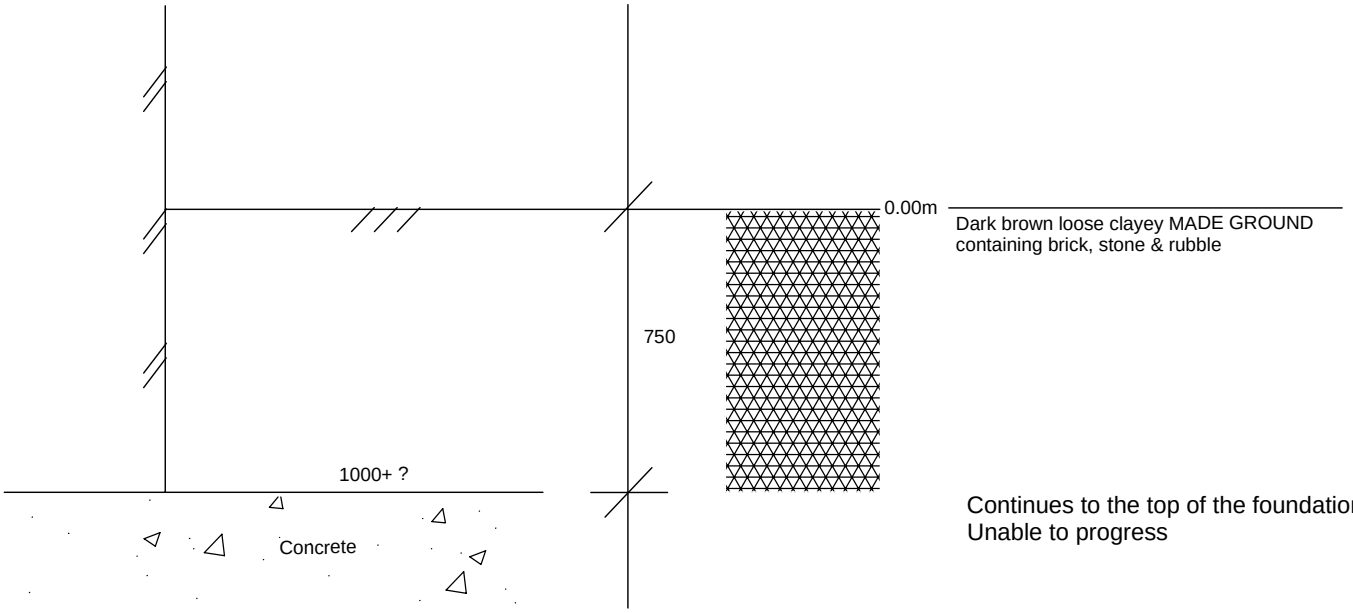
D= small disturbed sample, B= large bulk sample, U= undisturbed sample, MP= mackintosh proble blow counts, V= shear vane reading (kPa)

FASTRACK
Tyndales Farm, Southend Road, Woodham Mortimer,
Maldon, Essex, CM9 6TQ
Telephone: 0844 3358908
Fax: 0844 3358907
Email:enquiries@fastrackgroup.co.uk
Web: www.fastrackgroup.co.uk

Appendix No: 2
FSI Ref: 10034

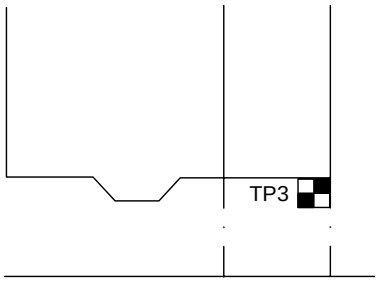
TRIAL PIT 3

Property Address: 124 St Stephens Avenue, London, W12 8NR
Client Claim Ref: N/A
Survey date: 29/07/2016
Operative: SE1



Continues to the top of the foundation
Unable to progress

Trial Pit Location:



Drawn by: PM

Scale: 1:20

D= small disturbed sample, B= large bulk sample, U= undisturbed sample,
MP= mackintosh proble blow counts, V= shear vane reading (kPa)

FASTRACK
Tyndales Farm, Southend Road, Woodham Mortimer
Maldon, Essex, CM9 6TQ
Tel: 0844 3358908
Fax: 0844 3358907
Email: enquiries@fastrack-geotechnical.co.uk
Web: www.fastrack-geotechnical.co.uk

Appendix No: 2
FSI Job No: 10034

BOREHOLE LOG

Property Address: 124 St Stephens Avenue, London, W12 8NR
Client Claim Ref: N/A **Survey date:** 29/07/2016 **Operative:** SE1

Borehole ID: BH1 Hole Type: FA Scale: 1:28

Water Strikes	Samples Type	Samples Depth (m)	Insitu Tests Type	Insitu Tests Results	Depth (m)	Legend	Stratum Description and Observations
					0.06		CONCRETE slab
					0.08		SAND layer
							Dark brown silty sandy CLAY containing sand pockets
		1.00	V	70.00			Noted to be firm at 1.00m
			V	72.00			
					1.60		SAND and GRAVEL
		2.00	MP	14/ 75mm			Noted to beome medium dense at 2.00m
		2.08	MP	15/ 75mm			
		2.15	MP	17/ 75mm			
		2.23	MP	19/ 75mm			
		3.00	MP	23/ 75mm			
		3.08	MP	23/ 75mm			
		3.15	MP	25/ 75mm			
		3.23	MP	29/ 75mm			
		4.00	MP	31/ 75mm			
		4.08	MP	32/ 75mm			
		4.15	MP	32/ 75mm			
		4.23	MP	34/ 75mm			
		5.00	MP	37/ 75mm	5.00		Noted to become dense at 5.00m
		5.08	MP	39/ 75mm			End of Borehole at 5.00 m
		5.15	MP	39/ 75mm			
		5.23	MP	42/ 75mm			

Key: ▽ Water Strike D Disturbed Sample V Insitu vane test MP Mackintosh Probe Test

Remarks: Borehole was closed at 5.00m as instructed
Borehole was noted to be dry on completion
N.b. Unless otherwise stated small vane paddle used

AGS

Appendix C

Roger Bullivant Sectonal Flight Auger (SFA) Piling Details

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

At the forefront of foundation engineering

	(16)	(17)	AKY

April 1990, revised May 2000

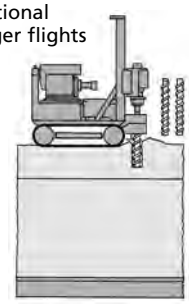
TECHNICAL DATA SHEET

MP3

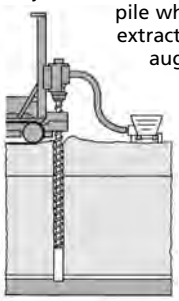
ROGER BULLIVANT

RB SECTIONAL FLIGHT AUGER (SFA) PILES

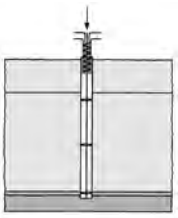
Auger boring using either solid stem or hollow stem sectional auger flights



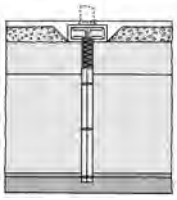
Controlled concrete or grout injection to form the pile whilst extracting augers



Reinforcement inserted normally single bar plus cage of starter bars



Typical completed pile and foundation



Construction of a grout-injected 200mm dia RB SFA pile.

PILE TYPE

Concrete or grout injected sectional flight auger pile

SIZE (NOM) & GENERAL LOAD CAPABILITY

Dia	SWL (kN)*	Dia	SWL (kN)*
150mm	150	400mm	500
200mm	250	450mm	600
250mm	300		

**Dependent upon ground conditions.*

APPLICATION

These piles are ideally suited to projects where restrictions exist, particularly in terms of confined access, limited working areas and low headroom. The equipment used for forming these piles has been specially designed and manufactured to accommodate the site constraints described. Rapid mobilisation, accommodation of unusual working hours and high levels of rig manoeuvrability provide total flexibility to the customer.

INSTALLATION

A range of track-mounted rigs are available, all with sectional flight auger supplementary equipment as standard. Grout and concrete, mixing, pumping and placing equipment forms an integral part of the project plant resource.

Piles are bored using either solid stem or hollow stem sectional flight augers, depending upon ground conditions. If it is considered that the bore will stay open at correct cross-sectional area, until concreting or grouting takes place then solid stem augers will suffice. If, however side wall material is in any way unstable, hollow stem augers will be used, through which concrete or grout will be pumped upon removal of the auger flight. Withdrawal is carefully monitored to ensure stability of the bore and immediate replacement of the auger flight with the concrete or grout takes place.

Reinforcement is usually installed immediately after concreting the bore. A starter bar cage can also be installed in the top of the pile as required to connect to the foundation above.

RB limited access rig constructing 450mm contiguous piled retaining wall.

RB 1000 series rig installing SFA pile in limited working conditions.

SITE REQUIREMENTS

Ideally the site should be firm, dry, flat and level, and capable of sustaining the load of the rig and auxiliary equipment. Precise rig weights can be supplied for each of the rigs within the range, to allow cost effective preparation of pile working platforms.

These rigs are designed to operate in basements and other difficult/restricted access situations both internally and externally.

Working alongside and in close proximity to delicate or hazardous features such as railway tracks, installations where vibration is prohibited and locations close to services, cables and pipes can be easily accommodated with this equipment and using these systems, as can piling in remote mountainous regions or in locations where airlifting is the only mobilisation method.

Pylons, towers, masts, overhead line posts, signs, gantries, tower cranes, wind-turbines and indeed any other structure or installation that requires a foundation can be cost effectively dealt with using these products and construction methods.

ADVANTAGES

- Limited access - rigs are less than 1.5m wide and can be manoeuvred into confined working areas.
- Low headroom - rigs can be operated in headroom restrictions of 3.5m or less with special adaptations.
- Powerful - up to 450mm dia augered piles can be installed up to 30m in depth.
- Adaptable - many of the models within the fleet can be split to separate the power pack from the drilling mast, making them even more manoeuvrable.
- Primary power options - electric power pack option available for all rig sizes to cover environmental considerations.
- Large range of rig sizes - smaller models are available for very restricted working, typically access via pedestrian doors or windows.

ROGER BULLIVANT

ROGER BULLIVANT LTD
Walton Road, Drakelow, Burton-on-Trent,
Staffordshire DE15 9UA.
Tel: 01283 511115. Fax: 01283 512233.
E-mail: marketing@roger-bullivant.co.uk
Web site: www.roger-bullivant.co.uk

Appendix D

Proposed Basement Construction Sequence

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

The following suggested construction sequence sets out the main steps to be carried out to create the new basement area but is not necessarily exhaustive.

It covers all the major structural work and the work. The sequence is set out in a particular order so as to form the proposed basement without causing any movement and damage to the existing and surrounding buildings.

The main contractor carrying out the work is to appoint a temporary works engineer.

The temporary works engineer is to develop the proposed sequence for construction purposes and provide supporting calculations.

To be read in conjunction with the following

- Muro Blanco Architects drawings and documents
- The attached sketches and preliminary drawings (Appendix E)
- The attached piling technical data sheets (Appendix C)
- The attached geotechnical survey report. Refer to the attached Fastrack report (Appendix B)

Prior to carrying out any of the proposed basement excavation works

- A geotechnical soils investigation report is to be produced providing the parameters for the design of the piles and reinforced concrete retaining walls.
- Surveys will be carried out to determine the locations of all the incoming services and drain runs.
- All the necessary service diversions will be carried out prior to the basement works.
- A condition survey of the existing and surrounding buildings will be carried out.

Proposed sequence

Read in conjunction with drawings 2381/TW01 to 2381/TW10.

1. Demolish the existing garage walls and roof taking care not to damage the side party wall and neighbouring wall adjacent at the rear. Break out the existing concrete ground floor slab.

2. Install the RB sectional flight auger (SFA) piles using a minipilining rig at 400mm centres as shown on 2381/TW02. The back face of the piles is to be inside the site boundary line.

3. Excavate the existing ground down to the pilecap level.

4. Cast the pilecaps.

5. Place 200mm mass concrete cube/block in front of the side party wall and neighbouring wall adjacent at the rear.

6. Install the steelwork waling beams against each block and pilecap and struts to prop and restrain the surrounding walls and concrete pile cap edge beam (as shown on drawings 2381/TW03).
   Use Mabey system 160 waling beams and struts. Use adjustable ends on the struts to push the waling beams tight up against the concrete blocks/ pile cap edge beam.

7. Locally excavate down to expose the existing foundations of the party/neighbouring walls. Carefully trim off and remove the corbelled brick nib to enable the new basement walls to be installed as close to the walls as possible.

8. Cast the first flight of mass concrete underpins below the existing foundations of the party/neighbouring walls in the sequence shown on drawing TW04.
   Follow the proposed underpinning details and specification (see below).
   Dry pack between the top of the pins and the u/s of the retained portion of the existing footings.

9. Excavate the site 1.50 metres down from the lowered from step S3 ground level.

10. Place 200mm mass concrete cube/block in front of the underpins of the party/neighbouring walls and the piles of the boundary lines.

11. Install the steelwork waling beams against each block and struts to prop and restrain the surrounding walls and concrete pile cap edge beam (as shown on drawings 2381/TW03).
    Use Mabey system 160 waling beams and struts. Use adjustable ends on the struts to push the waling beams tight up against the concrete blocks.

12. Cast the second flight of mass concrete underpins below the new underpins in the sequence shown on drawing TW04.
    Follow the proposed underpinning details and specification (see below).
    Dry pack between the gap between lower and higher underpins.
    The extended underpins are to have toes as indicated in section 1-1/e on drawing TW09.
    The formation level of the pins is to be 500mm below the formation level of the basement slab.

13. Excavate the site 1.50 metres down from the lowered from step S9 ground level.

14. Place 200mm mass concrete cube/block in front of the underpins of the side and rear party/neighbouring walls and the piles of the boundary lines.

15. Install the steelwork waling beams against each block and struts to prop and restrain the surrounding walls and concrete pile cap edge beam (as shown on drawings 2381/TW03).
    Use Mabey system 160 waling beams and struts. Use adjustable ends on the struts to push the walling beams tight up against the concrete blocks.

16. Prepare the ground with hardcore and blinding.
    Place the basement slab reinforcement.
    Cast the basement slab.

17. Place the wall reinforcement.
    The reinforcement is to be places around the mass concrete blocks.
    Place and strut a shutter in between the waling beams.
    Cast the basement walls.

18. Shutter and cast the RC ground floor slab.

19. After the appropriate time periods, strike the wall and slab shutters.

20. After the appropriate period of time (to allow the reinforced concrete to cure and achieve the minimum design strength) dismantle and remove all of the waling beams and struts.

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

Underpinning details for steps S8 and S12

- The underpinning is to be carried out in short sections of about 1 metre in length.
- The bottoms of the foundation shall be inspected and approved by the Engineer and the Building Inspector before concrete is poured.
- The underside of the footings are to be cleaned and hacked free of dirt, soil or loose materials before underpinning.
- The body of the underpinning is to be constructed in 1:2:4 mix concrete and is to be cast to the widths shown
- Excavation and concreting of any section of underpinning shall be carried out on the same day.
- The mass concrete is to be stopped off 75mm below the underside of the existing footing

  The final pinning up over the whole of the footing is to be carried out with dry pack mortar (1:3 mix cement to sharp sand)

  Ram the dry pack into the 75mm gap 24 hours after the mass concrete underpin has been poured.
- Excavation to any section of underpinning shall not be started until at least 48 hours after completion of any adjacent sections of the work.
- The sides of the previous underpinning bays are to be roughened or keyed
- Sequence of underpinning to be as shown on 2381/TW04

  All sections marked 1 to be excavated, cast and dry packed before starting excavation of section marked 2 and all sections marked 2 to be complete before excavation for sections marked 3 etc.
- A record of the sequence and dimensions of the underpinning carried out is to be kept

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

Appendix E

Construction Sequence / Preliminary Design Drawings

Ground Floor West, Coate House, 1-3 Coate Street, London E2 9AG
Tel 020 7613 2324 David.Akera@ AkeraEngineers.com

AKERA ENGINEERS

Consulting Structural Engineers

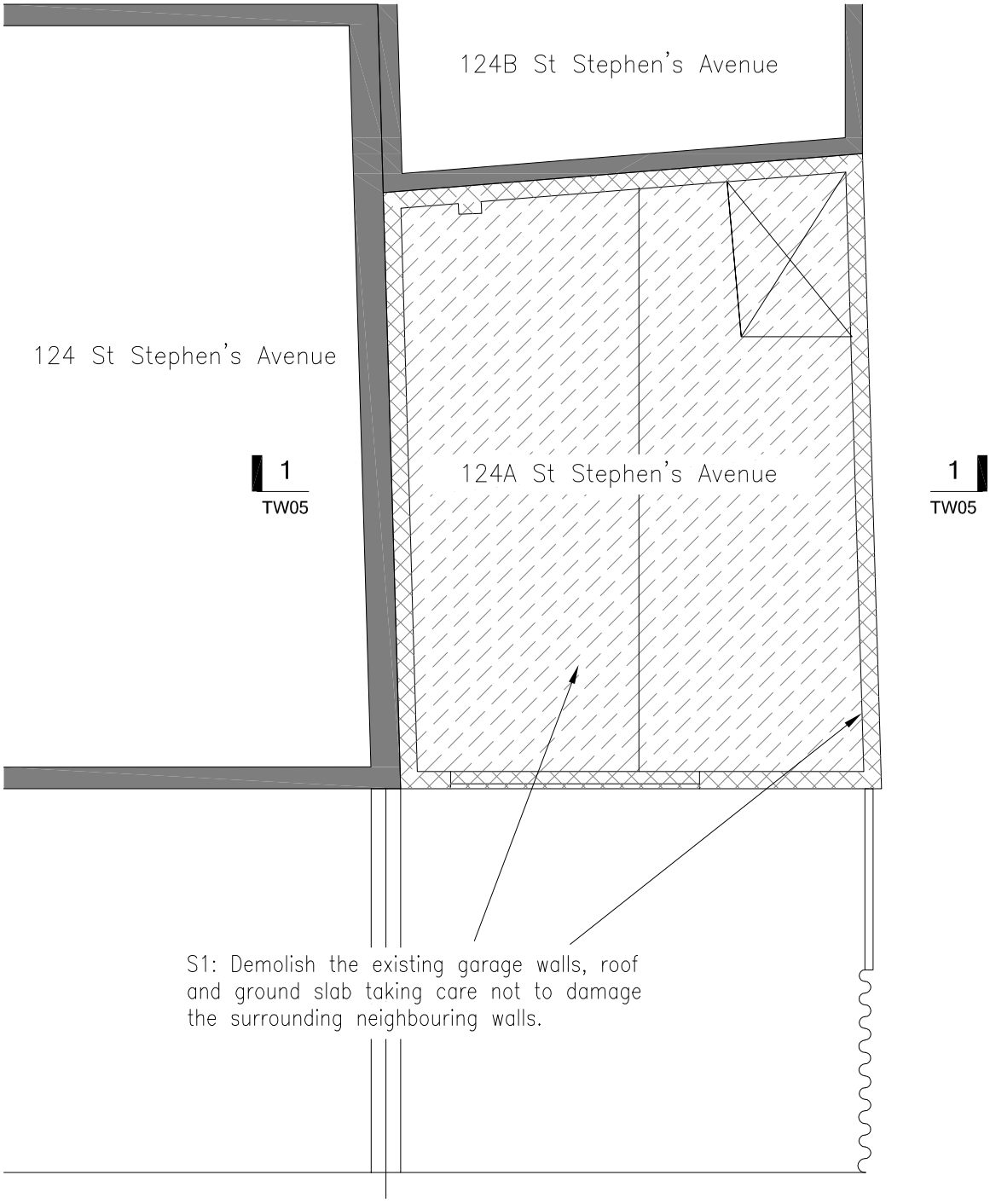
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project

124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement Construction Sequence

Project no.	2381	Drawing	TW01
Date	AUG '16	Revision	P1
Engineer	KT	Checked DA	Scale at A1 1:75

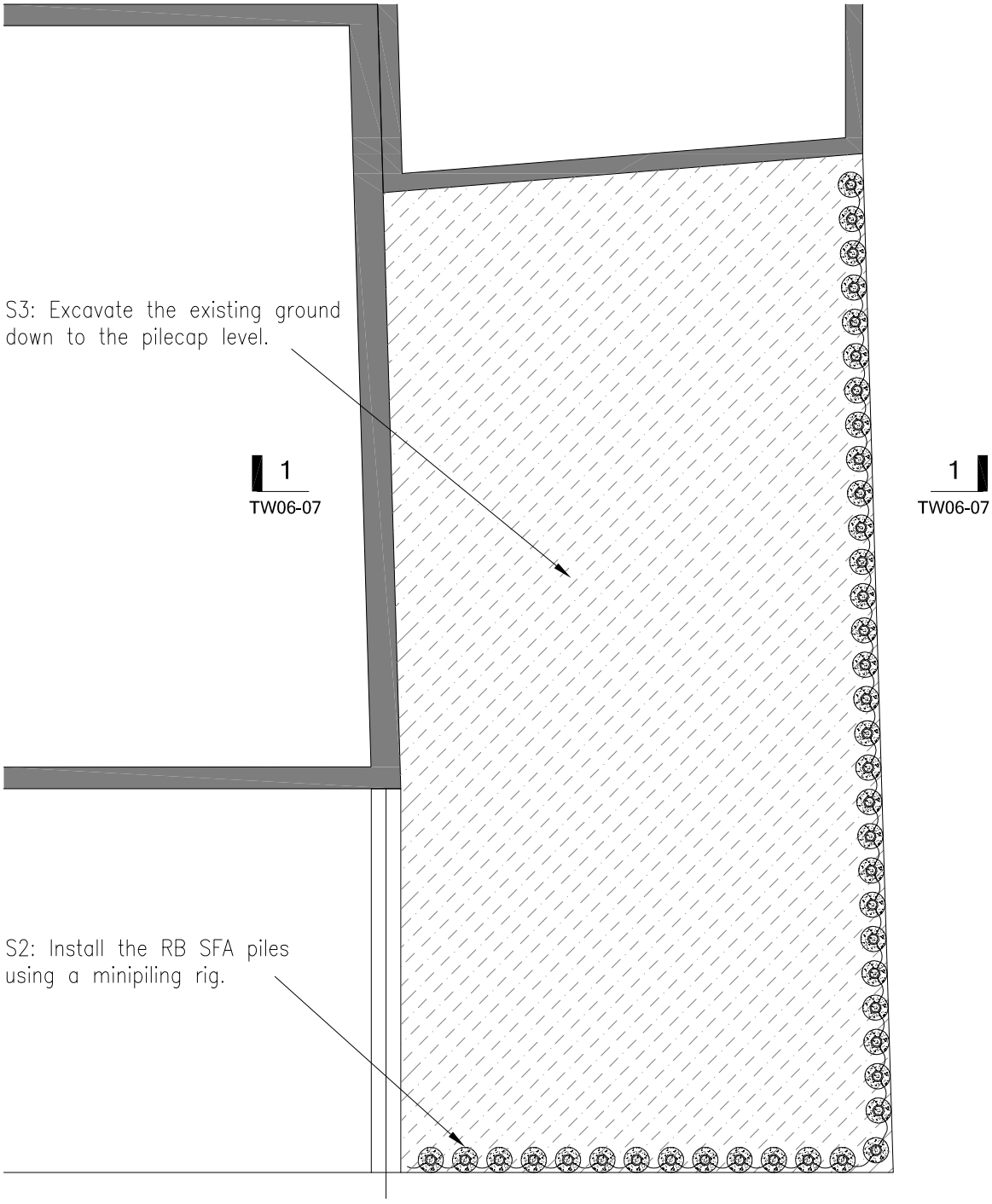


AKERA ENGINEERS
Consulting Structural Engineers
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no. 2381 Drawing TW02
Date AUG '16 Revision P1
Engineer KT Checked DA Scale at A1 1:75



AKERA ENGINEERS

Consulting Structural Engineers

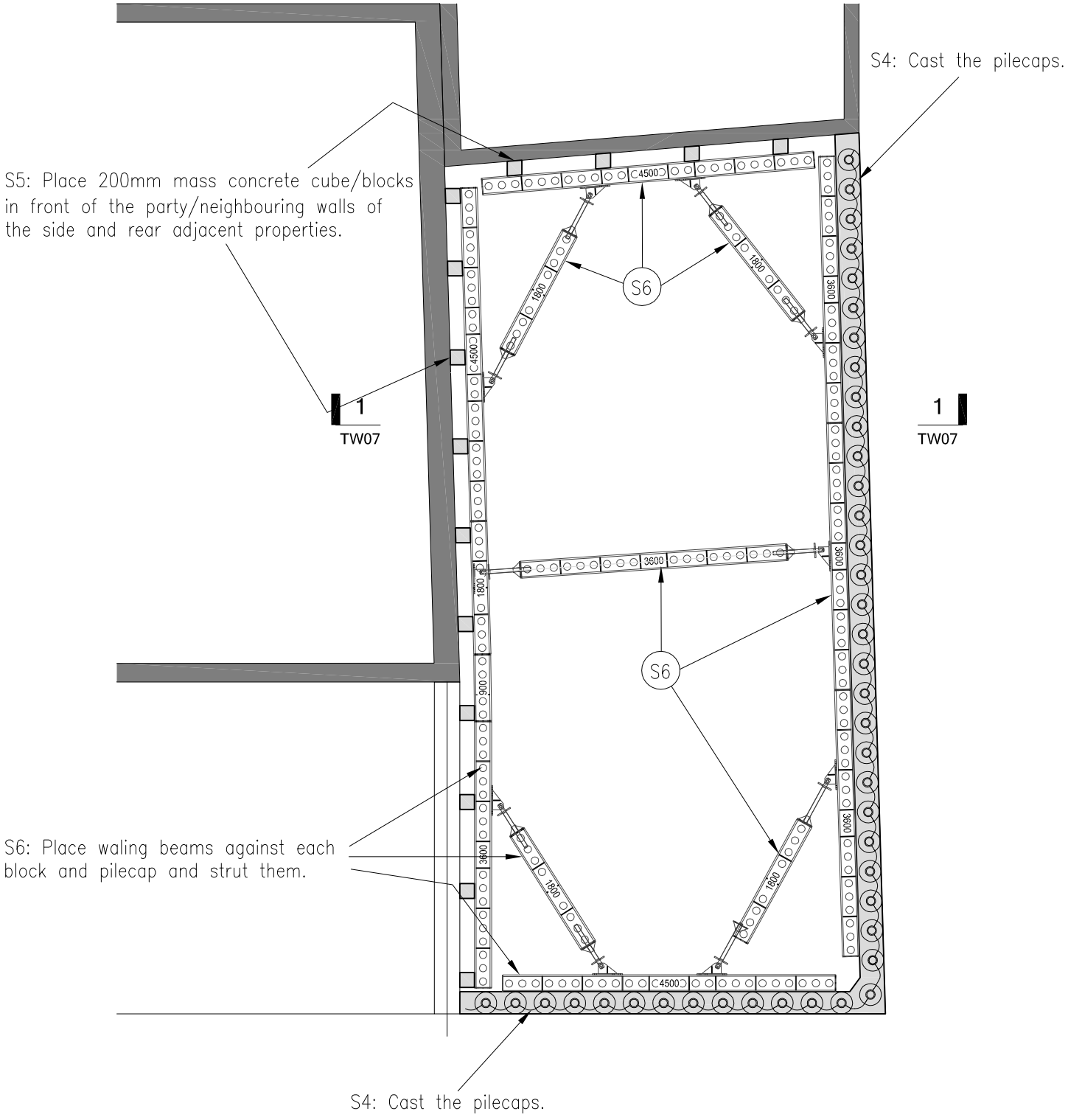
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project

124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no.	2381	Drawing	TW03
Date	AUG '16	Revision	P1
Engineer	KT	Checked DA	Scale at A1 1:75



AKERA ENGINEERS

Consulting Structural Engineers

Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project

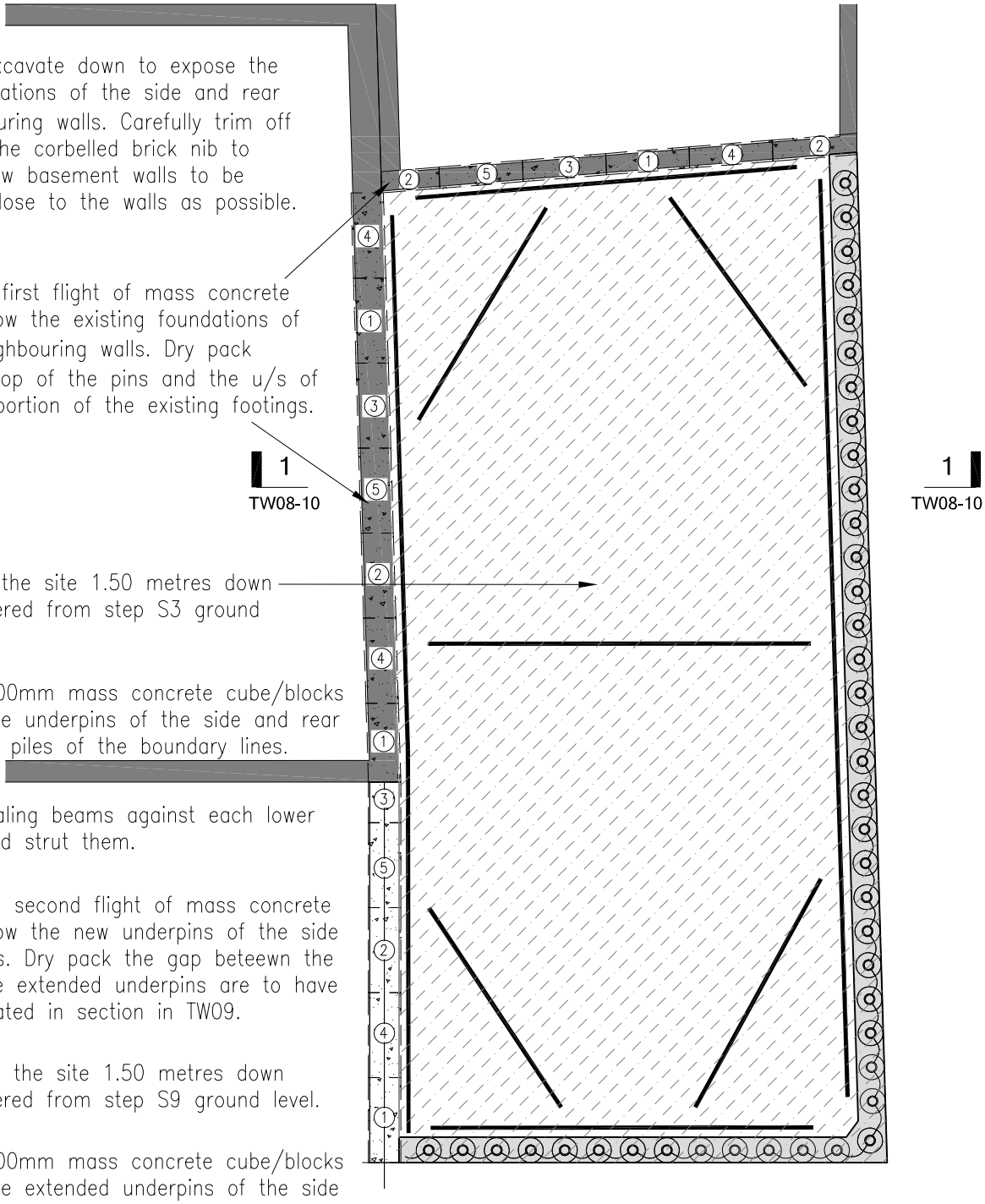
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement Construction Sequence

Project no.	2381	Drawing	TW04
Date	AUG '16	Revision	P1
Engineer	KT Checked DA	Scale at A1	1:75

S7: Locally excavate down to expose the existing foundations of the side and rear party/neighbouring walls. Carefully trim off and remove the corbelled brick nib to enable the new basement walls to be installed as close to the walls as possible.

S8: Cast the first flight of mass concrete underpins below the existing foundations of the party/neighbouring walls. Dry pack between the top of the pins and the u/s of the retained portion of the existing footings.



S9: Excavate the site 1.50 metres down from the lowered from step S3 ground level.

S10: Place 200mm mass concrete cube/blocks in front of the underpins of the side and rear walls and the piles of the boundary lines.

S11: Place waling beams against each lower level block and strut them.

S12: Cast the second flight of mass concrete underpins below the new underpins of the side and rear walls. Dry pack the gap beteewn the underpins. The extended underpins are to have toes as indicated in section in TW09.

S13: Excavate the site 1.50 metres down from the lowered from step S9 ground level.

S14: Place 200mm mass concrete cube/blocks in front of the extended underpins of the side and rear walls and the piles of the boundary lines.

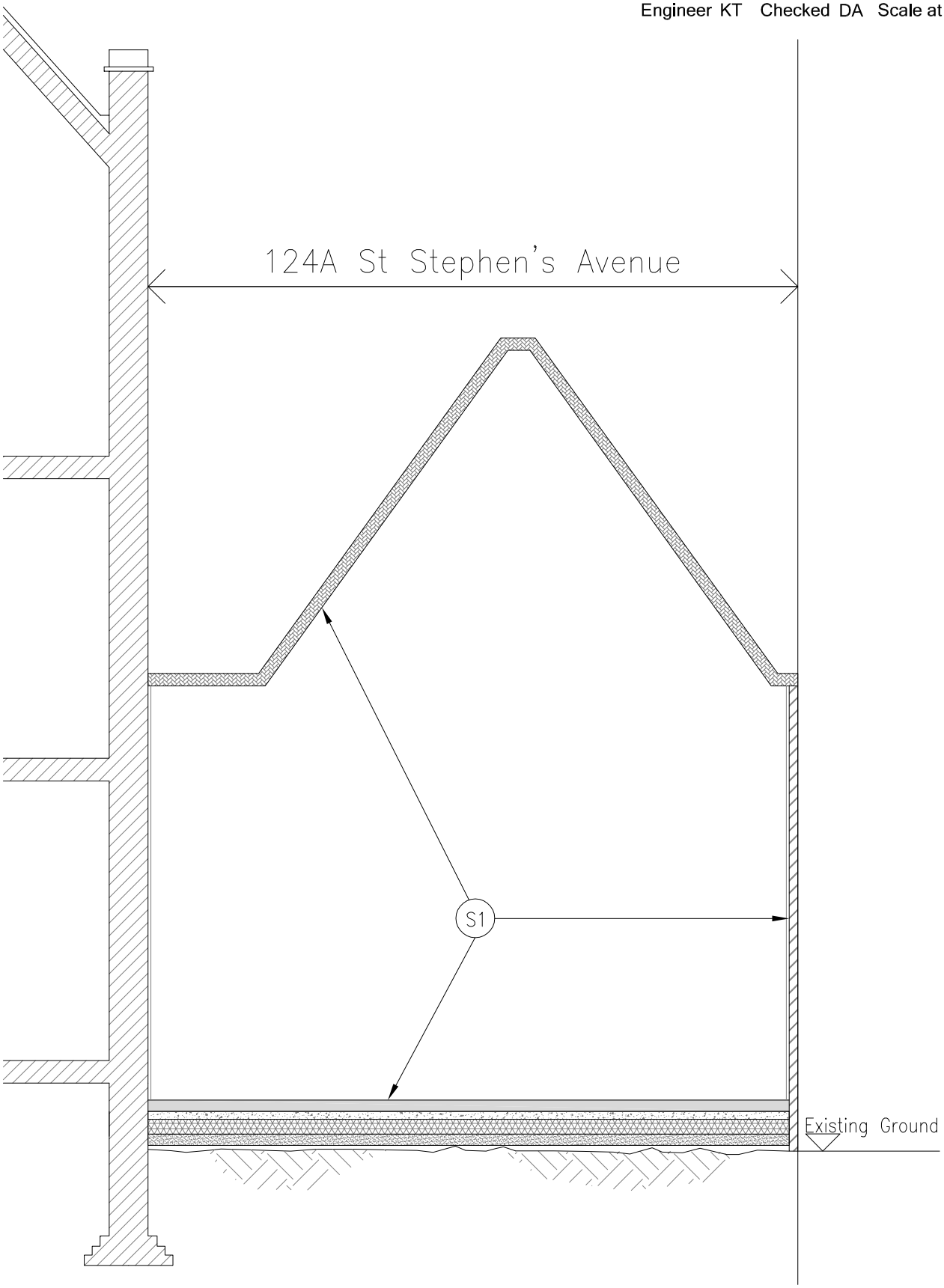
S15: Place waling beams against each lower level block and strut them.

AKERA ENGINEERS
Consulting Structural Engineers
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no. 2381 Drawing TW05
Date AUG '16 Revision P1
Engineer KT Checked DA Scale at A1 1:50



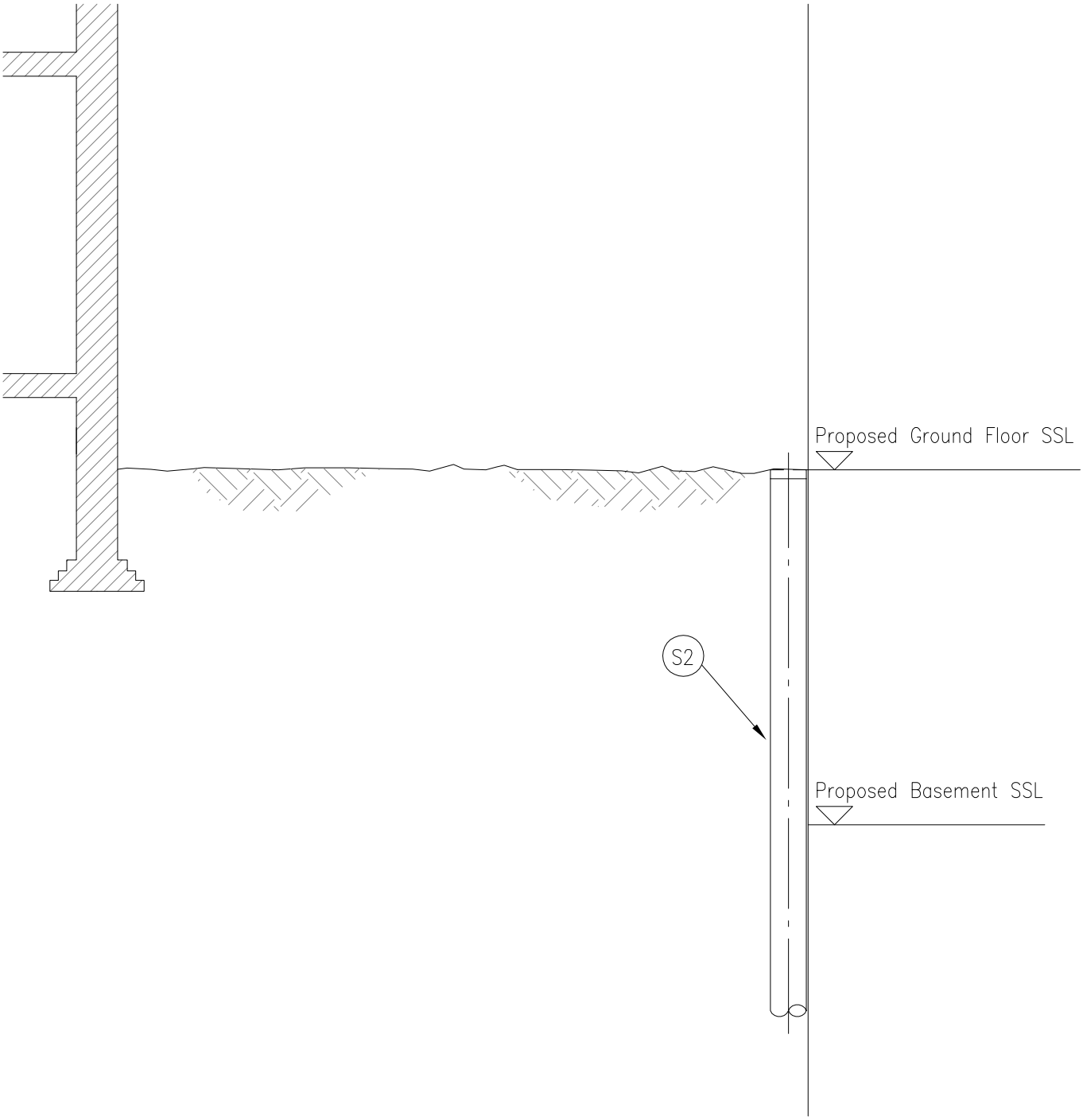
PROPOSED SECTION 1-1/a

AKERA ENGINEERS
Consulting Structural Engineers
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no.	2381	Drawing	TW06
Date	AUG '16	Revision	P1
Engineer	KT Checked DA	Scale at A1	1:50



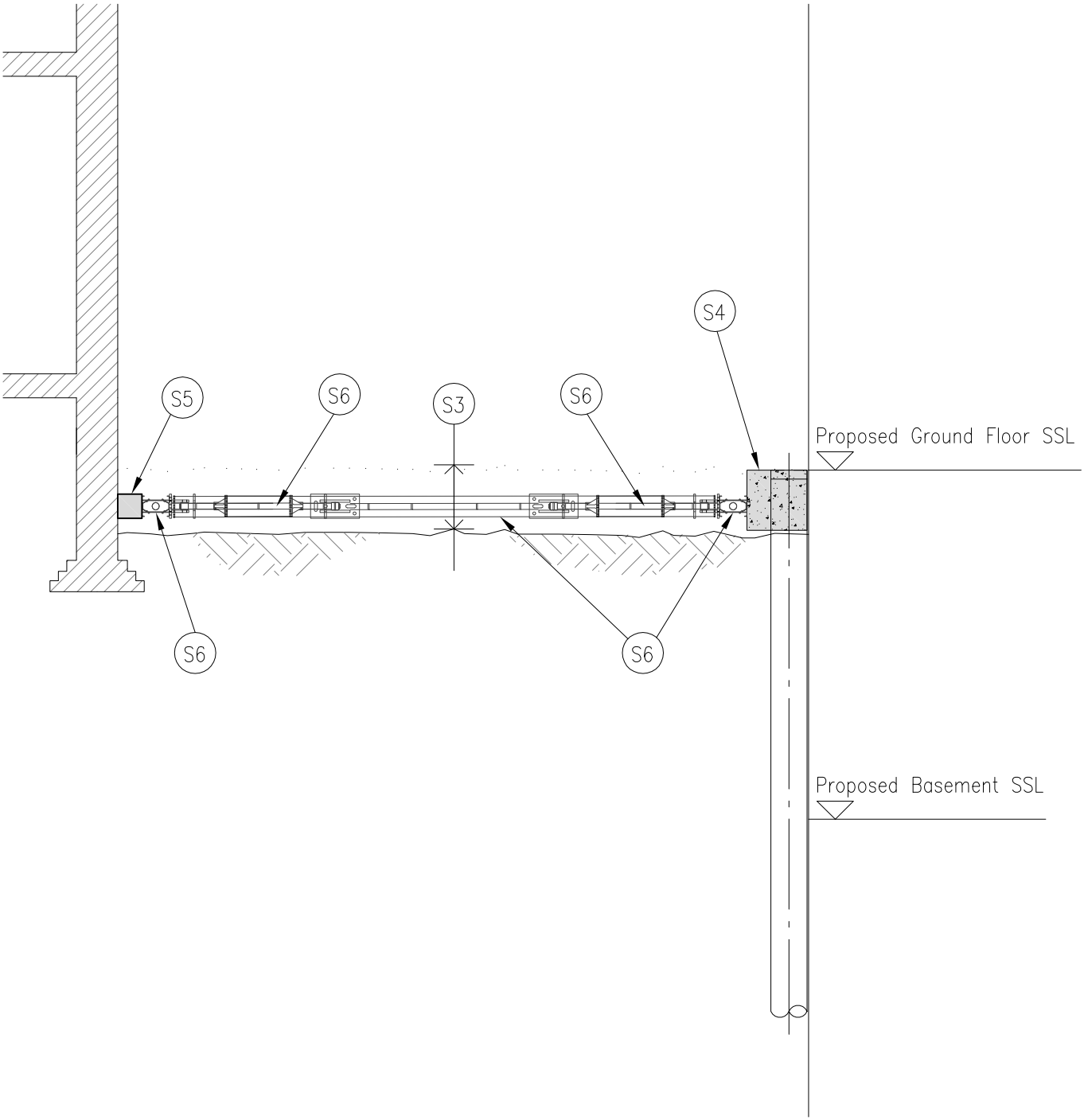
PROPOSED SECTION 1-1/b

AKERA ENGINEERS
Consulting Structural Engineers
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no. 2381 Drawing TW07
Date AUG '16 Revision P1
Engineer KT Checked DA Scale at A1 1:50



PROPOSED SECTION 1-1/c

AKERA ENGINEERS

Consulting Structural Engineers

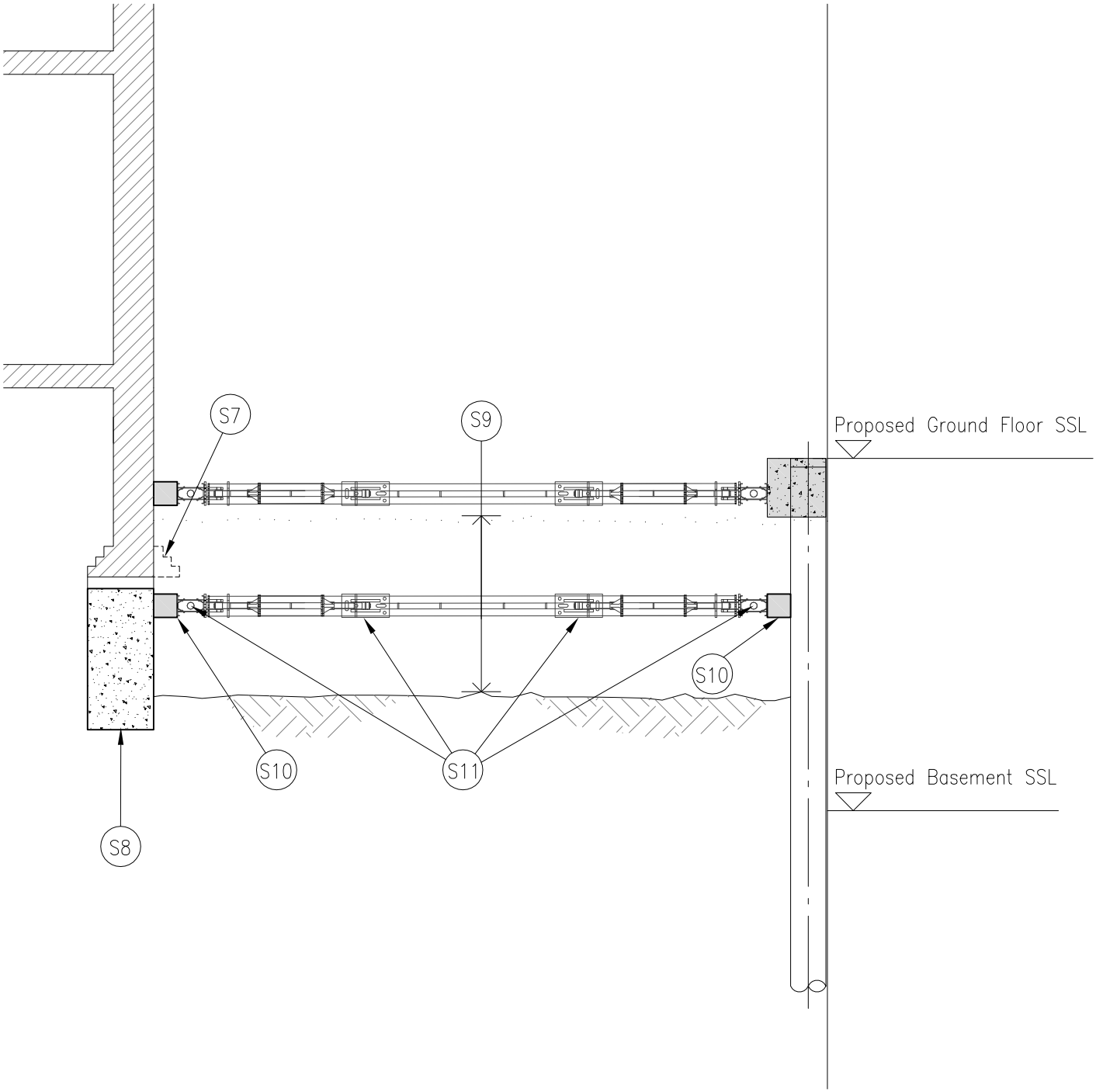
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project

124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no.	2381	Drawing	TW08
Date	AUG '16	Revision	P1
Engineer	KT	Checked DA	Scale at A1 1:50



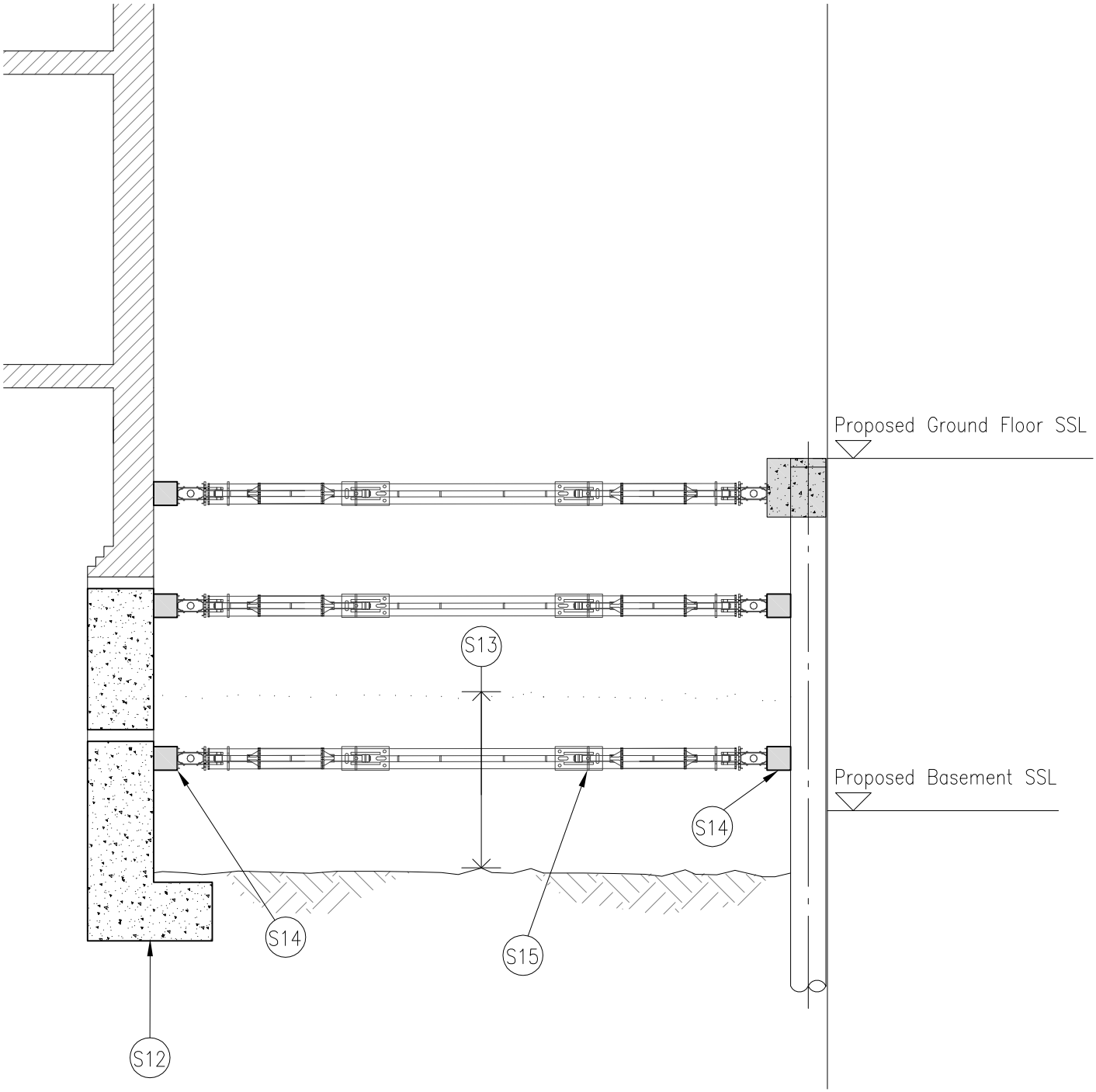
PROPOSED SECTION 1-1/d

AKERA ENGINEERS
Consulting Structural Engineers
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no. 2381 Drawing TW09
Date AUG '16 Revision P1
Engineer KT Checked DA Scale at A1 1:50



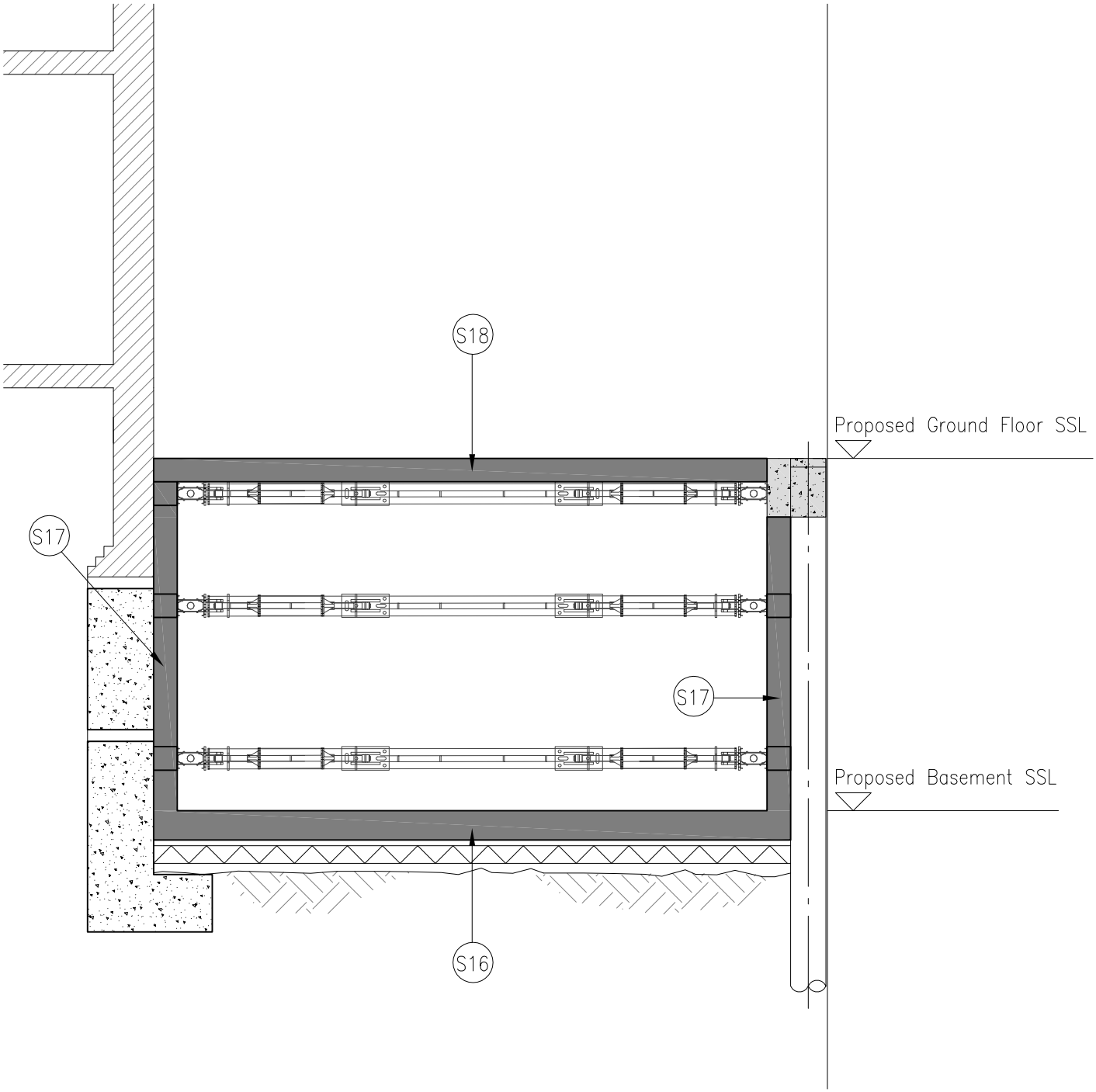
PROPOSED SECTION 1-1/e

AKERA ENGINEERS
Consulting Structural Engineers
Ground Floor West Coate House
1-3 Coate Street London E2 9AG
Tel 020 7690 2868

Project
124A St STEPHEN'S AVENUE
LONDON, W12 8JD

Proposed Basement
Construction Sequence

Project no.	2381	Drawing	TW10
Date	AUG '16	Revision	P1
Engineer	KT	Checked DA	Scale at A1 1:50



PROPOSED SECTION 1-1/f