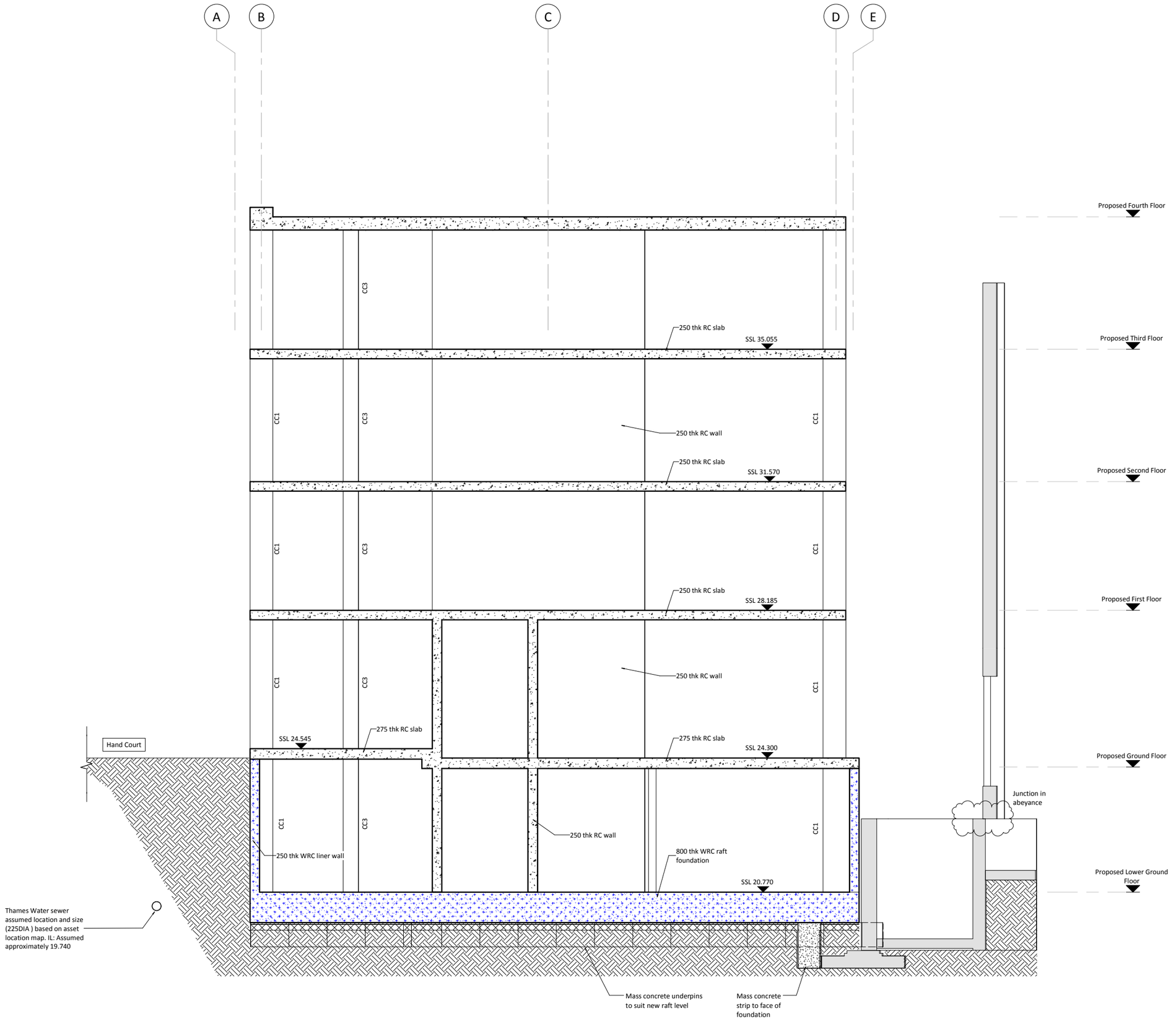


100mm @ A1 (50mm @ A3)

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

2 Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm

Column Schedule

C1	152x152x23 UC	CC3	400 x 400 RC
CC1	600 x 400 RC	CC4	550 Ø RC
CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

hts.uk.com

Job Name

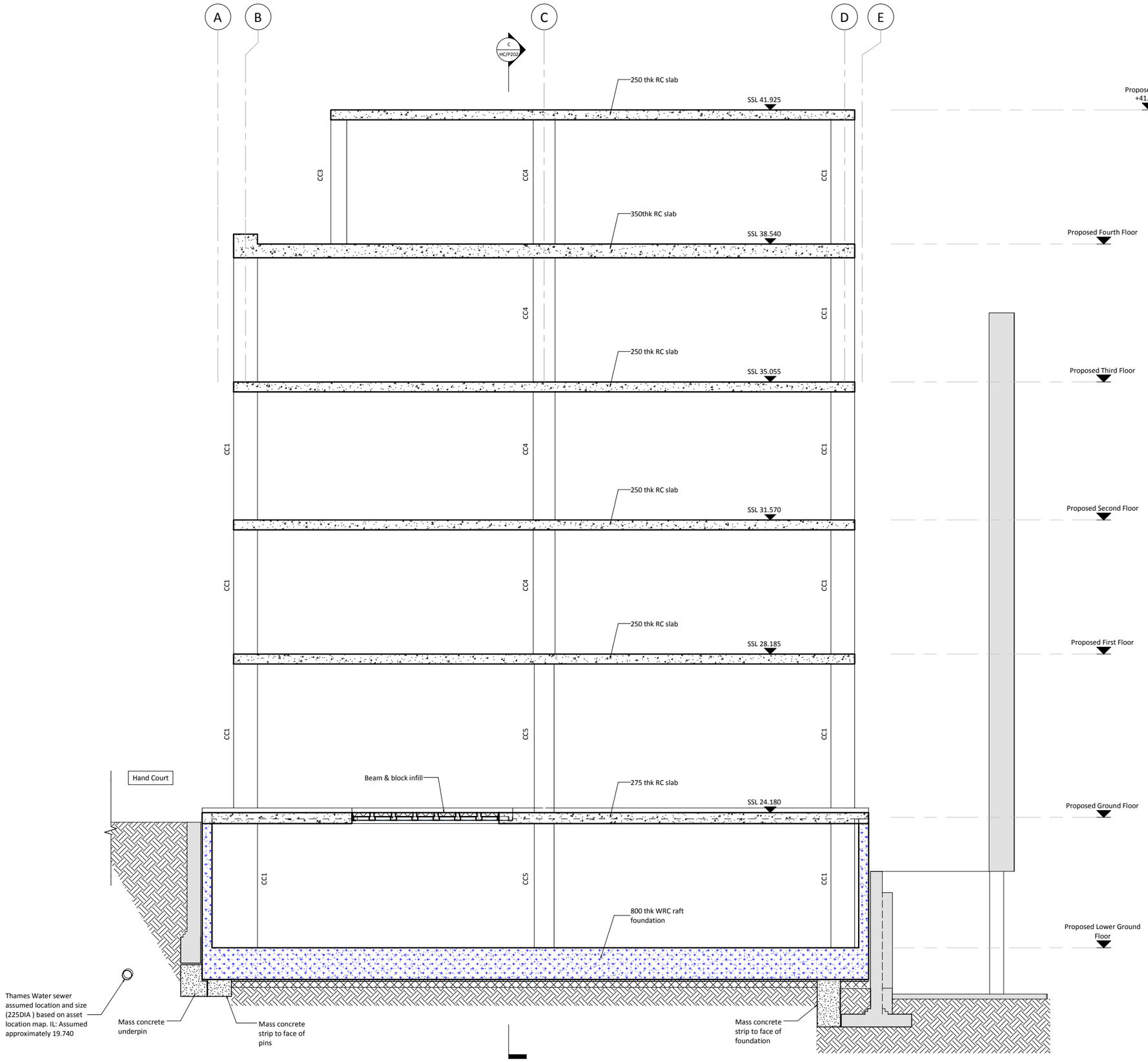
High Holborn Estate
18-21 Hand Court

Drawing Title

Proposed Section A-A

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P200** Rev **P1**



100mm @ A1 (50mm @ A3)

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	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

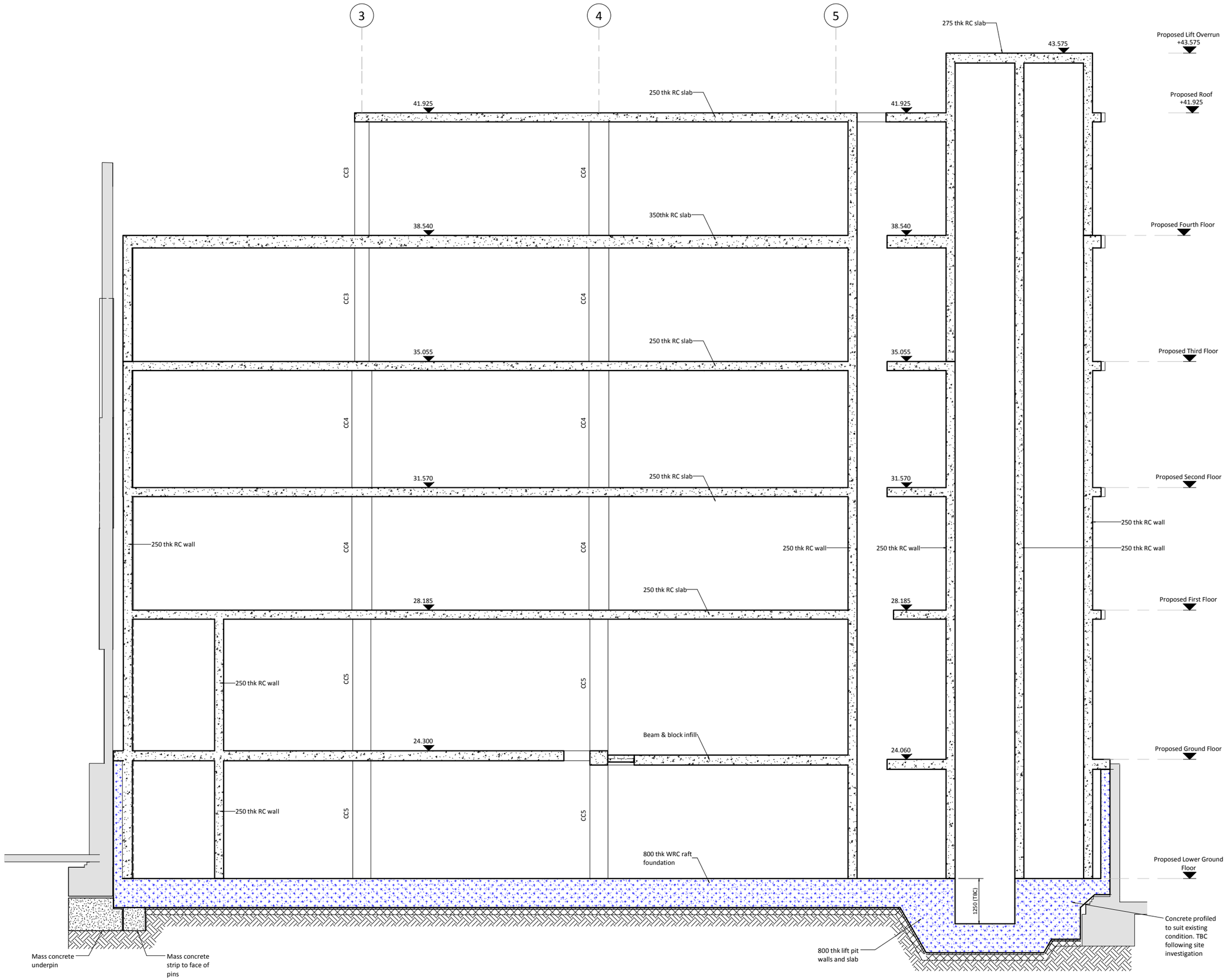
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Section B-B

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P201** Rev **P1**



100mm @ A1 (50mm @ A3)

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

2 Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm long

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

hts.uk.com

Job Name

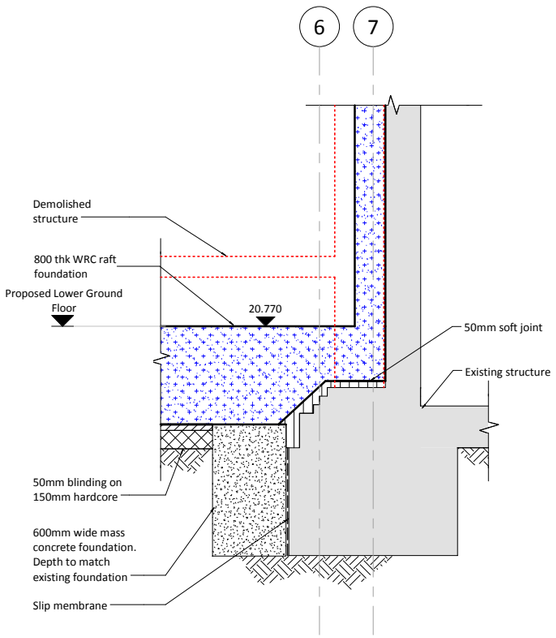
High Holborn Estate
18-21 Hand Court

Drawing Title

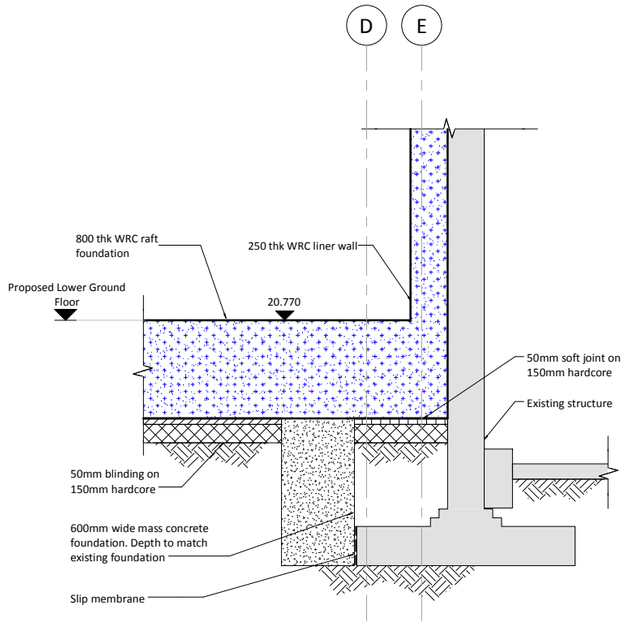
Proposed Section C-C

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

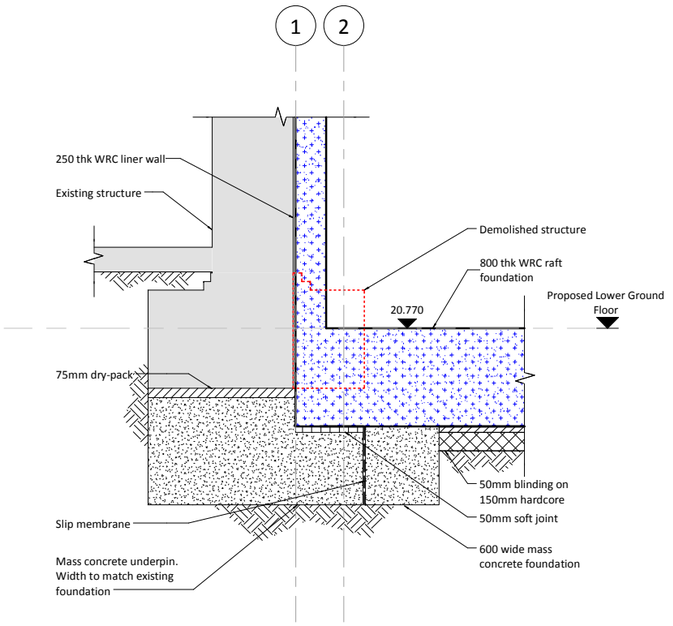
Drawing No **1508 / HC/P202** Rev **P1**



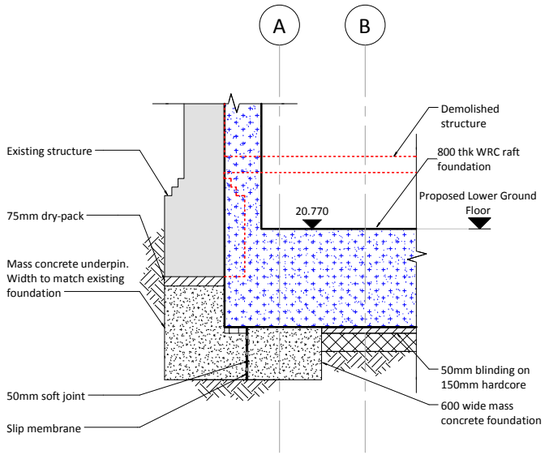
DWG HC/P090 **Section 1-1**
1 : 25



DWG HC/P090 **Section 2-2**
1 : 25



DWG HC/P090 **Section 3-3**
1 : 25



DWG HC/P090 **Section 4-4**
1 : 25

100mm @ A1 (50mm @ A3)

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

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3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Underpinning Section

Purpose of Issue **Stage 2** Scale at A1 **1 : 25**

Drawing No **1508 / HC/P250** Rev **P1**

Appendix C

Trial Pit Investigations

8th May 2017
Ref: 1508-04
Visit by: Sam Ling

HEYNE TILLETT STEEL

High Holborn Estate - Site Visit Report No.04

This report summarises the findings of the trial pit inspection carried out by HTS on 27/04/17. Please see appended location plan for trial pit locations.

Trial Pit 1 - 18-21 Hand Court/Caroline House Party Wall

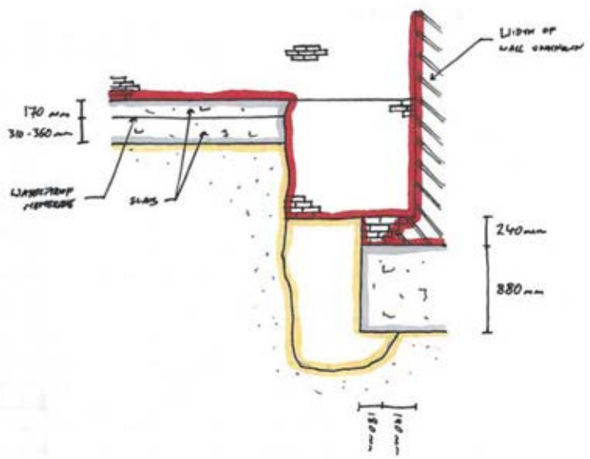
The contractor has exposed the interface between the party wall and the strip footings below.

The trial pit was undertaken within untenanted space in the 18-21 Hand Court basement.

Two strip footings are present below the party wall at different levels. They appear to merge into one footing.

There are masonry corbels spreading the load onto each strip footing.

There are large areas of overpour exposed within the pit, at varying depths and locations.



Section 1-1

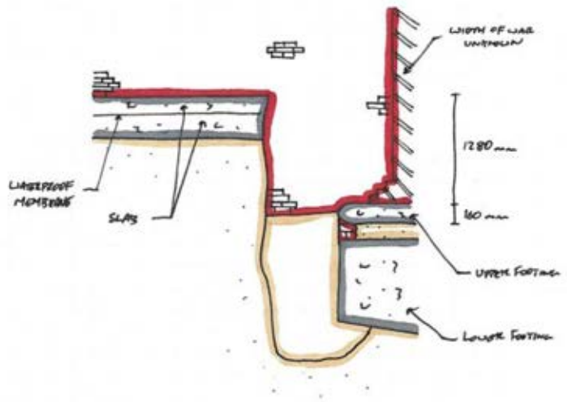
Lower Strip:
The top of the strip footing was found approximately 1560mm below floor level and it is approximately 880mm deep. The base of the footing tapers, with the depth increasing towards the wall. Maximum depth is unknown.

The lower strip footing was found to extrude approximately 370mm from the party wall. This was measured on the 18-21 Hand Court side of the wall only.

Upper Strip:
The top of the upper footing was found at 1280mm below SSL. The footing is approximately 160mm deep at its thinnest. This increases to 280mm where it joins the lower strip.

No footing was found below the retaining wall.

Soil was identified as made ground to approximately 500mm with gravels below.



Section 2-2

No water was found within the pit suggesting that the wall is founded above the water table.

The slab construction is:
- 170mm concrete (top)
- Waterproof membrane
- 310-360mm concrete (bottom)

Trial Pit 2 - Hand Court Retaining Wall

The contractor has exposed the interface between 2 masonry piers and their footings along the Hand Court retaining wall within 18-21 Hand Court.

The trial pit was undertaken within untenanted space in the 18-21 Hand Court basement.

There is a masonry corbel at the base of the pier to spread the load into the footing. There is also a corbel at the base of the adjacent wall.

The footing does not extend to below the base of the adjacent wall. Whether this is specifically to allow the pipe through is unclear.

The top of the footing was found at approximately 330mm below floor level and it is approximately 600mm deep. The base of the footing tapers, increasing towards the wall. Maximum footing depth is unknown.

The corbel extrudes 140mm from the wall with the footing extruding a further 120mm.

A similar depth footing was also found below the neighboring pier, but was not fully exposed.

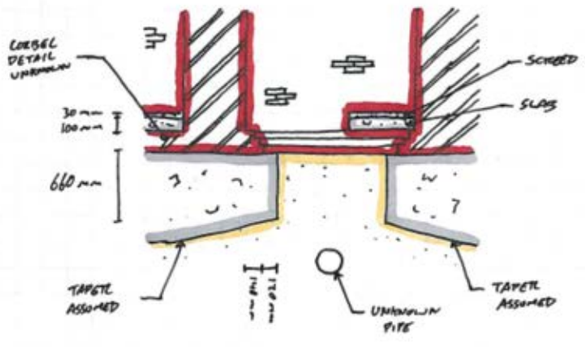
Soil was identified as made ground on top of gravels.

No water was found within the pit suggesting that the piers are founded above the water table.

The slab construction is:

- 30mm screed (top)
- 100mm concrete (bottom)
- No membrane

The top of the pipe is 910mm below floor level and it has an approximate diameter of 180mm.



Section 3-3

Trial Pit 3 – 22-23 Hand Court Retaining Wall

The contractor has exposed the interface between the masonry wall, a masonry pier, and their footings along the retaining wall to the rear of 22-23 Hand Court.

The trial pit was undertaken within untenanted space in the 22-23 Hand Court basement.

There is a masonry corbel at the base of the wall and the pier to spread the load into the footing.

The footing is a strip footing which is assumed to run below the length of the wall. The width of the footing does not change to accommodate for the pier.

The top of the footing was found 320mm below the top of the screed, and it is 800mm deep. The base of the footing tapers, increasing towards the wall. Maximum depth of footing is unknown.

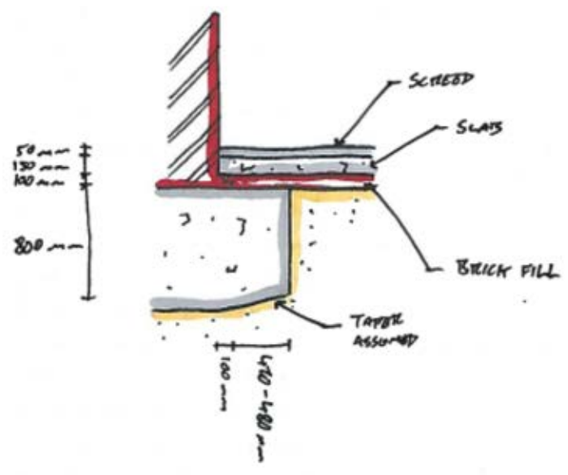
The corbel extrudes 100mm from the wall with the foundation extruding a further 420-480mm. At the pier, the slab extrudes 240-290mm further than the corbels.

The soil was identified as made ground above clay-like gravels.

No water was found within the pit suggesting that the wall is founded above the water table.

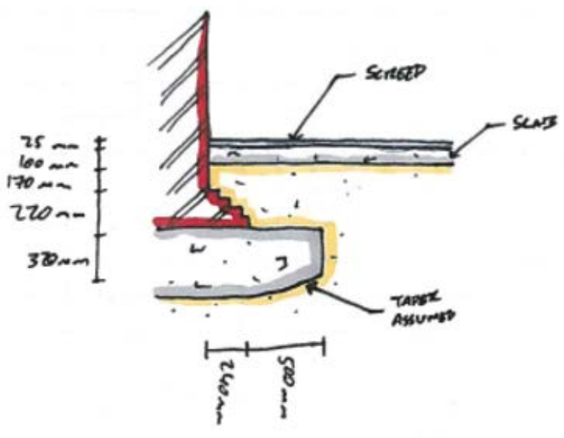
The slab construction is:

- 50mm screed (top)
- 130-150mm concrete
- 100mm brick fill (bottom)



Section 4-4

Trial Pit 4 – High Holborn House Retaining Wall



Section 5-5

The contractor has exposed the interface between the masonry wall, a masonry pier, and their footings along the retaining wall to the rear of High Holborn House.

The trial pit was undertaken within the High Holborn House basement.

There is a masonry corbel at the base of the wall and the pier to spread the load into the footing.

The footing is a strip foundation which is assumed to run along the length of the wall. The footing extends away from the wall in the pier location. The width of this extension could not be found due to access constraints. We assume that the pier is located centrally above the footing.

The top of the footing was found 515mm below the top of the screed, and it is 320mm deep. The base of the footing tapers, increasing towards the wall. Maximum depth is unknown.

The corbel extrudes 240mm from the wall with the foundation extruding a further 150mm. At the pier, the slab extrudes 500mm beyond the corbels.

The soil was identified as made ground above reworked sand and gravels

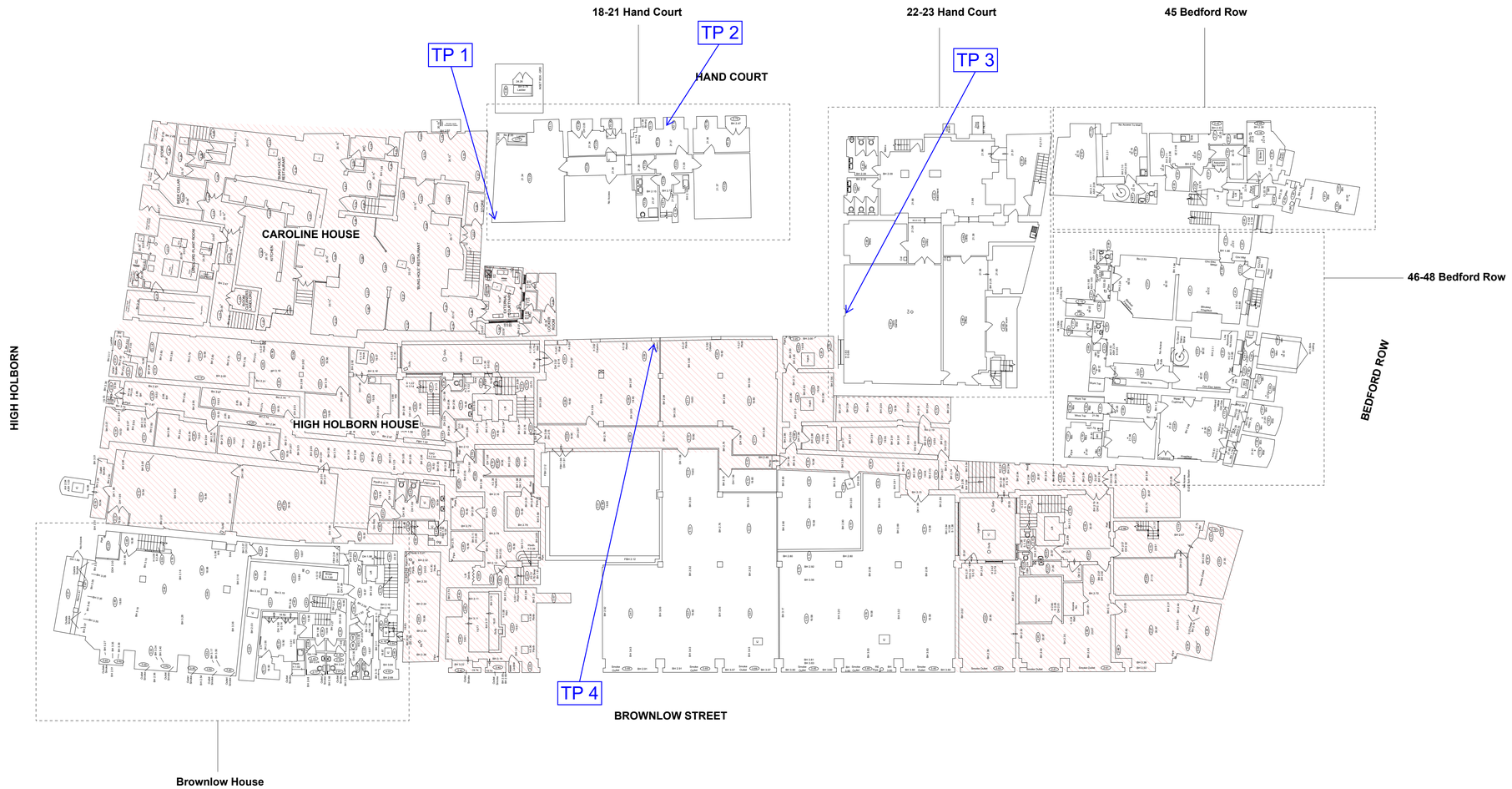
No water was found within the pit suggesting that the wall is founded above the water table.

The slab construction is:

- 25mm screed (top)
- 100mm concrete (bottom)

Notes:

- To be read in conjunction with Site Visit Report 04



1 Existing Basement Floor Site Plan
1:200 at A1

Key

TP Trial Pit

GENERAL NOTES.

All dimensions to be checked on site prior to commencement of any works, and/or preparation of any shop drawings.

Sizes of and dimensions to any structural elements are indicative only. See structural engineers drawings for actual sizes / dimensions.

Sizes of and dimensions to any service elements are indicative only. See service engineers drawings for actual sizes and dimensions.

This drawing to be read in conjunction with all other Architect's drawings, specifications and other Consultants' information.

All proprietary systems shown on this drawing are to be installed strictly in accordance with the Manufacturers/Suppliers recommended details.

Any discrepancies between information shown on this drawing and any other contract information or manufacturers/suppliers recommendations is to be brought to the attention of the Architect

DO NOT SCALE FROM THIS DRAWING.

NOTES.

Area Outside Project Scope

xxx **Existing ceiling heights**

0 5 10 M

HEYNE TILLETT STEEL

Job No.: 1508
Project: High Holborn Estate
Title: Trial Pit Locations

Date: 08/05/17
Eng: SL

Drawing: 1508 / SK / 063
Rev: -

REVISION	DATE

Buckley Gray Yeoman

Studio 4.04 The Tea Building 56 Shoreditch High Street
London E1 6JJ T: 020 7033 9913 F: 020 7033 9914

CLIENT	SRG Holding Ltd
PROJECT	High Holborn Estate
DRAWING	Existing Basement Site Plan
SCALE	1:200 @ A1
DATE	Mar. 2016
DRAWN BY	AH
DWG No.	975_EX_B1
REVISION	-
DRAWING STATUS	Information

Appendix D

Basement Impact Assesment-
RSK

HEYNE
TILLETT
STEEL

SRG Holdings Limited

18-21 Hand Court, High Holborn Estate, Holborn, London

Basement Impact Assessment

Project no. 371547 – 03 (02)

JULY 2018

RSK GENERAL NOTES

Report No.: 371547 - 03 (02)

Title: Basement Impact Assessment for 18-21 Hand Court, High Holborn Estate

Client: SRG Holdings Limited

Date: 11th July 2018

Office: RSK, 18 Frogmore Rd, Hemel Hempstead, HP3 9RT

Status: Final

Author	Claire Siberry / Andy Tyler BSc MSc CGeol UKRoGEP Senior / Principal Geotechnical Engineer	
Reviewed and Approved by	Jon Bailey BSc CGeol EuroGeol UKRoGEP Director	
Reviewed and Approved by	Adrian Marsh BSc MSc CEng FIMMM MIHT CGeol FGS Director	
Reviewed and Approved by	Vivien Dent BSc CGeol Associate Technical Director (Hydrogeologist)	

CONTENTS

TABLES

FIGURES

APPENDICES

NON-TECHNICAL SUMMARY

NON-TECHNICAL SUMMARY	
Site description	The site is located at 18-21 Hand Court, London, WC1V 6JF at grid reference TQ 30852 81660. It comprises commercial premises in the Holborn area of London. Commercial buildings bound the site to the north, east and south. The topography of the site is generally level with a very minor sloping southwards towards High Holborn road. The topography in the immediate site area is also of a similar nature, largely very flat with a shallow sloping descent to the south. The current building on site houses a series of offices and consists of a two-storey building above a single basement level. A number of buildings bound the site, 23 Hand Court to the north, High Holborn House to the east and 57 High Holborn to the south, of which all are understood to also have existing single storey basement levels.
Proposed development	The proposed redevelopment will involve the demolition of the existing structure on site and the construction of a new five storey reinforced concrete framed structure for mixed commercial and retail use. The new structure will cover the footprint of the existing buildings on site, however, the envisaged basement extension is understood to cover the full footprint and extended a further 1.38m to 4.26m.bgl. Currently, the existing single storey basement covers some 50% of the current site. The existing development comprises a basement with a finished floor level (FFL) of approximately 21.35m AOD with the proposed basement understood to have a structural slab level (SSL) of 20.77m AOD. A raft foundation requiring excavations to some 19.97mAOD, locally deepened to 18.69mAOD, is expected. It is proposed that the basement perimeter retaining wall would be formed using underpins to the existing foundations to facilitate the construction of the reinforced concrete basement box. The retaining walls are expected to be propped in the temporary condition. A number of foundation options have been proposed, however it is understood that a raft foundation is preferred, locally thickened at the edges to match the depth of any adjacent building footings.
Ground / Groundwater conditions	Intrusive site investigation works undertaken by RSK confirmed the ground conditions comprise a variable thickness of Made Ground across the site, ranging from 0.35m to 0.91m thick overlying the Lynch Hill Gravel Member which generally comprised a brown, orangish brown sand and gravel of fine to coarse flint and mixed lithology. This unit was proven to be some 3.70 to 3.95m in thickness and extended to depths ranging from 4.30 to 4.40m.bgl.

	The London Clay Formation was encountered beneath the Lynch Hill Gravel Member within BH1 and BH2. The upper part of the London Clay was encountered as a firm to stiff, dark brown slightly silty clay with localised angular coarse gravel sized iron pyrite clasts and rare bright red / orange fine to medium sand pockets to depths of 5.80 to 6.45m.bgl, where the stratum becomes a stiff to very stiff, very high strength, dark grey slightly silty clay with rare fine selenite crystals and fine shell fragments. The Lambeth Group was encountered beneath the London Clay Formation within BH2 only from a depth of 26.80m.bgl. This unit comprised a very stiff to hard, extremely high strength, light grey mottled light blue and light brown silty clay overlying a very stiff to hard, extremely high strength, dark red and brown mottled slightly silty clay below 28.00m.bgl. Observations made during RSKs site works and subsequent groundwater monitoring indicates that water is present at the site within the Lynch Hill Gravel Member at depths ranging 2.79 and 3.34m.bgl or at elevations between 17.86 and 18.55mAOD as detailed in Figure 4. It should be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations. Ongoing monitoring would be required to establish both the full range of conditions and any trends in groundwater levels.
Screening and scoping	**Subterranean (ground water):** Potential impacts identified: • The site located directly above an aquifer **Surface flow and flooding:** No potential impacts identified beyond the scoping stage **Land stability:** Potential impacts identified: • Retaining wall installation and ground excavation; and • Elastic heave of the London Clay in the basement excavation.
Impact Assessment	The following nearby structures were identified for assessment relating to potential ground movements: • Mid City Place beyond western site boundary. • The buildings adjacent to the site have been referenced as the following for the purpose of this assessment: High Holborn House 1 to the north (22-23 Hand Court), High Holborn House 2 to the east (High Holborn House) and High Holborn House 3 to the south (Caroline House). **Structural stability of adjacent structures from retaining wall installation, basement excavation and proposed development construction.** Movement analyses have been undertaken in accordance with CIRIA C760. All building structures fall into 'Category 0' (Negligible) to 'Category 1' ('Very Slight Damage'). The results fulfil the requirements of CPG4 in that they do not exceed the damage category of 'Very Slight' (Category 1) and reflect categories of cosmetic rather than structural damage.
Cumulative	No potential cumulative impacts have been identified for the proposed

Impacts	development.

1 INTRODUCTION

1.1 Instructions

RSK Environment Limited (RSK) was commissioned by SRG Holdings Limited to carry out a Basement Impact Assessment for a proposed development at 18-21 Hand Court located within the London Borough of Camden.

1.2 Regulatory Context

This assessment is designed to be compliant with guidance provided by the London Borough of Camden (Camden) in their guidance document 'Camden Planning Guidance for Basements (March 2018) and its supporting study 'Camden Geological, Hydrogeological and Hydrological Study' produced for Camden by ARUP in November 2010. All the technical analysis and recommendations contained within the planning guidance are taken from this latter study, which is treated as the evidence base and technical advice when Camden are assessing Basement Impact Assessments.

This guidance applies to all developments in Camden that propose a new basement development, or an extension to existing basement accommodation where planning permission is required. In accordance with Policy A5 Basements and Policy CC3 Water and flooding, Camden will only permit basement and other underground development where it can be demonstrated that it will not cause harm to the built and natural environment, including to the local water environment and ground conditions.

Addressing these issues requires the submission of a Basement Impact Assessment (BIA). A BIA will be specific to a particular site and proposed development, but includes the following stages:

- *Screening*; the identification of any matters of concern with regard to hydrogeology, hydrology or ground stability, which should be investigated.
- *Scoping*; production of a statement that defines further the matters of concern identified at the screening stage.
- *Site Investigation and Study*; undertaken to establish the baseline conditions. This can be done by utilising existing information and/or collecting new information.
- *Impact Assessment*; undertaken to determine the impact of the proposed basement on the baseline conditions, taking into account any mitigation measures proposed.
- *Review and Decision-Making*; this final stage is undertaken by Camden and consists of an audit of the information supplied and a decision on the acceptability of the impacts of the basement proposal.

The purpose of the BIA is to enable Camden Council to 'assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated by the developer'.

1.3 Background

By way of background to the current project, a desk study and intrusive site investigation have been undertaken at the site by RSK report ref. 371547-01 (00), dated July 2017. The current assessment draws on the results of that report. For full details reference should be made to the original report.

This report provides comprehensive site specific information and are compliant with the data requirements as set out in Appendix G of 'Camden Geological, Hydrogeological and Hydrological Study' produced for Camden by ARUP in November 2010. The conditions at the site have not changed since these reports were commissioned and, therefore, the information within these reports is wholly relevant to the proposed scheme described herein.

1.4 Standards and Limitations

This report is based on information available at the time of writing. This report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

2 SITE DETAILS

2.1 Site description

The site is located at 18-21 Hand Court, London, WC1V 6JF at grid reference TQ 30852 81660, as shown on Figure 1. It comprises commercial premises in the Holborn area of London.

The site is surrounded predominantly by commercial buildings, as detailed in Table 1.

Table 1: Site setting

To the north:	Part of the High Holborn Estate encompassing the 22-23 Hand Court building beyond which is located 45 Bedford Row and Bedford Row. Both of these are commercial in use.
To the east:	Part of the High Holborn Estate encompassing High Holborn House and Brownlow House, both comprising commercial uses. Brownlow Street is located beyond.
To the south:	Part of the High Holborn Estate, Caroline House. High Holborn Road is located beyond.
To the west:	Hand Court is immediately to the west with the MidCity building opposite, this building comprises various commercial offices.

The site covers approximately 190m^2 at an elevation of approximately 25m above Ordnance Datum (AOD).

The topography of the site is generally level with a very minor sloping southwards towards High Holborn road. The topography in the immediate site area is also of a similar nature, largely very flat with a shallow sloping descent to the south.

The current building on site houses a series of offices and consists of a two-storey building above a single basement level.

A number of buildings bound the site, 23 Hand Court to the north, High Holborn House to the east and 57 High Holborn to the south, of which all are understood to also have existing single storey basement levels.

2.2 Planning records

A search of publicly available planning records on Camden's planning website revealed a number of planning permissions related to the site, mainly concerning change of uses, the addition of a shop front in 1983 and more recently this redevelopment. After contacting the council, it is confirmed no further records are held by them concerning this site.

2.3 Ground / Groundwater Conditions

2.3.1 British Geological Survey Data

Published maps (British Geological Survey, 2006) and borehole records for the area indicate the geology of the site to be characterised by the succession recorded in Table 2, generally comprising the superficial Lynch Hill Gravel Member underlain by the London Clay Formation. Underlying this is a further succession of the Lambeth Group, the Thanet Sand and the White Chalk Sub Group.

Table 2: Geology at the site

Geological unit	Description	Estimated thickness (m)
Lynch Hill Gravel Member (superficial)	Sand and gravel, locally with lenses of silt, clay or peat	Approximately 8m
London Clay Formation	Silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay	Approximately 20m
Lambeth Group	Sands at base (Bottom Bed), overlain by grey clays and sands (Woolwich Beds), and variegated clays and sands (Reading Beds).	Approximately 20m
Thanet Sand	Nodular flint at base, overlain by pale yellow-brown, fine-grained sand that can be clayey	Approximately 4m
White Chalk Sub Group	Chalk, with or without flint	Variable, 400-560m
Source: Map – BGS sheet number 256, 2006. Descriptions – BGS Lexicon of Named Rock Units – "http://www.bgs.ac.uk/lexicon/"		

Five borehole records were downloaded from the British Geological Survey website to provide further information regarding ground conditions in the vicinity of the site.

Approximately 35.00m to the east Borehole ref TQ38SW1905 (BH13) indicates made ground (including the pavement) to 3.10m underlain by gravel to 6.00m, this is underlain by the London Clay Formation to 8.40m where the borehole terminated.

Approximately 94.00m to the north Borehole ref TQ38SW1904 (BH12) indicates made ground to 3.80m underlain by gravel to 9.30m, this is underlain by the London Clay Formation to 11.50m where the borehole terminated.

Approximately 25.00m to the south Borehole ref TQ38SW1906 (BH14) indicates made ground to 2.10m underlain by gravel to 5.80m, this is underlain by the London Clay Formation to 7.90m where the borehole terminated.

Approximately 50.00m to the south-east Boreholes ref TQ38SW2827 and TQ38SW2828, indicate made ground and superficial deposits to 2.30m underlain by the London Clay Formation to 23.00m and 23.70m. This is underlain by the Lambeth Group to 44.20m and 44.50m, the Thanet Formation to 48.60m and 48.00m and finally the Chalk Group to 152.40m where the boreholes terminate.

Copies of these borehole records are included in Appendix C.

The location and the fact it is already developed suggests that, in addition to natural strata, made ground should be expected beneath the site, as also indicated by the nearby BGS borehole logs.

A number of images such as Illustrations 1 and 2 below have been inserted into this report from the 'Camden Geological, Hydrogeological and Hydrological Study' produced for Camden by ARUP in November 2010. This report has been referenced and any pertinent figures reproduced and included and where relevant these figures have been discussed during the screening and scoping stages.

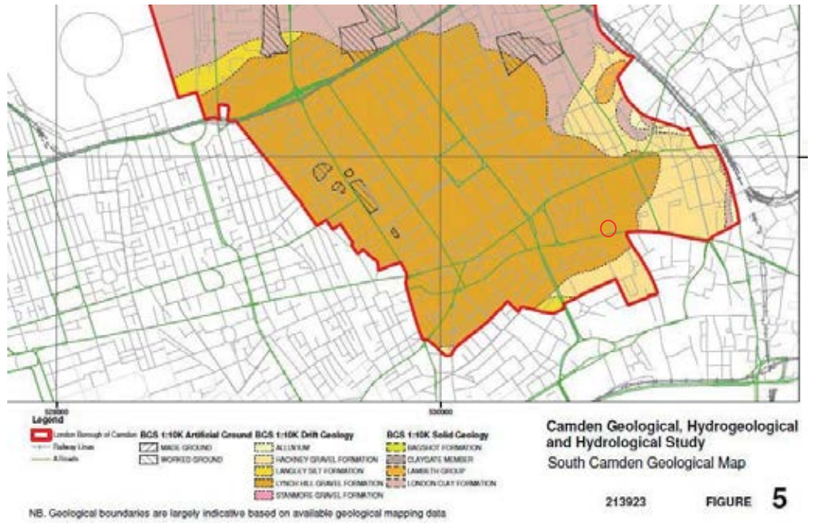


Illustration 1: ARUP Report Figure 5

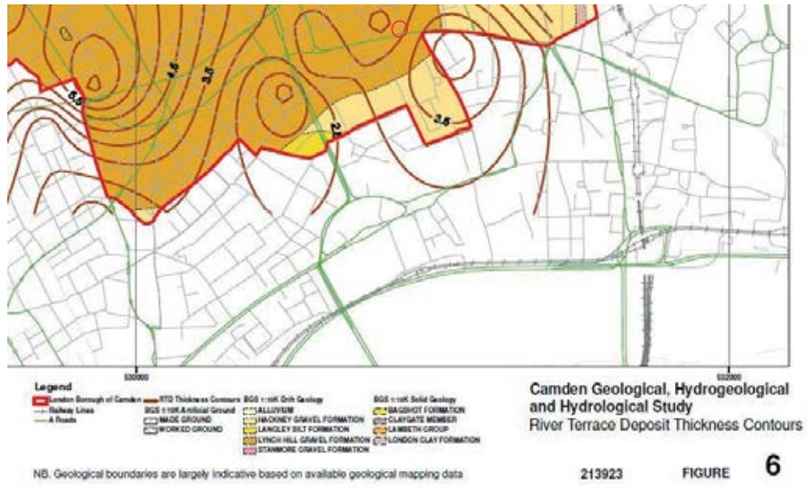


Illustration 2: ARUP Report Figure 6

2.3.2 Site Specific Intrusive Investigation Data

2.3.2.1 RSK Investigations

Intrusive site investigation works were undertaken at the site by RSK, details of which are provided within RSK report 371547-01(00), dated July 2017. Two cable-percussive boreholes were drilled to depths of between 8.50m and 30.00m.bgl, one drive-in sampler borehole was advanced to a depth of 4.00m.bgl and four hand dug foundation inspection pits were undertaken to a maximum depth of 2.80m.bgl.

The RSK exploratory holes confirmed the ground conditions as described in Section 2.3.1 and encountered a variable thickness of Made Ground across the site, ranging from 0.35m to 0.91m thick. The Made Ground generally comprised reworked Lynch Hill Gravel Member sands and gravels with fragments of brick and concrete.

The Lynch Hill Gravel Member was encountered beneath the Made Ground and generally comprised a brown, orangish brown sand and gravel of fine to coarse flint and mixed lithology. This unit was proven to be some 3.70 to 3.95m in thickness and extended to depths ranging from 4.30 to 4.40m.bgl.

The London Clay Formation was encountered beneath the Lynch Hill Gravel Member within BH1 and BH2. The upper part of the London Clay was encountered as a firm to stiff, dark brown slightly silty clay with localised angular coarse gravel sized iron pyrite clasts and rare bright red / orange fine to medium sand pockets to depths of 5.80 to 6.45m.bgl. Below this, the stratum becomes a stiff to very stiff, very high strength, dark grey slightly silty clay with rare fine selenite crystals and fine shell fragments. Plasticity classification testing indicates that the clays are of high plasticity, typical of the London Clay.

The Lambeth Group was encountered beneath the London Clay Formation within BH2 only from a depth of 26.80m.bgl. This unit comprised a very stiff to hard, extremely high strength, light grey mottled light blue and light brown silty clay overlying a very stiff to hard, extremely high strength, dark red and brown mottled slightly silty clay below 28.00m.bgl. Plasticity classification testing indicates that the clays are of intermediate plasticity.

The locations of the RSK boreholes are shown on Figure 2.

2.3.2.2 Hydrological/Hydrogeological Conditions Determined by the Site Investigations

A hydrogeological assessment was undertaken by RSK, with groundwater monitoring undertaken on three visits within RSK's boreholes in May to July 2017. Observations made during RSKs site works and subsequent groundwater monitoring indicates that water is present at the site within the Lynch Hill Gravel Member at depths ranging 2.79 and 3.34m.bgl or at elevations between 17.86 and 18.55mAOD as detailed in Figure 4. It should be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations. Ongoing monitoring would be required to establish both the full range of conditions and any trends in groundwater levels.

2.3.3 Radon

The environmental database report (GroundSure report, 4 April 2017) indicates that the site is not located within an 'Affected Area' as defined by the Documents of the National Radiological Protection Board (Radon Atlas of England and Wales, NRPB-W26-2002) and therefore the risk of significant ingress of radon into structures on-site is considered low.

2.3.4 Mining and quarrying

Evidence has been sought to identify any mining and quarrying operations, past and present, which have taken place in the vicinity of the site. The sources of information referenced in this element of the desk study include:

- an environmental database report
- records held by local authority/EA
- old Ordnance Survey maps and plans
- geological maps

With reference to the above data, there are no recorded mines or quarries within a 1000m radius of the site.

The environmental database report (GroundSure report, 4 April 2017) indicates that the site does not lie within the likely zone of influence on the surface from current or historical underground coal workings.

The report indicates the site is within 1000m of a Johnson Poole and Bloomer (JPB) mining area, however JPB have confirmed they have no records pertaining to the site.

2.3.5 Landfilling and land reclamation

Evidence has been sought to identify any landfilling or land reclamation operations, past and present, which have taken place in the vicinity of the site. The sources of information referenced in this element of the desk study include:

- environmental database report
- records held by local authority/EA
- old Ordnance Survey maps and plans
- geological maps

There are no records of landfill sites (former or current) within 250m of the site (i.e. within the planning consultation zone). The nearest historic landfill is located approximately 334m south of the site at Portugal Street, Lincoln's Inn Fields. No further records are held pertaining to this landfill. A further landfill is noted approximately 938m north-east of the site at Rosoman Street and Skinner Street, Finsbury and accepted inert waste between 1975 and 1978.

2.4 Unexploded Ordnance (UXO)

It is noted that an initial search of online resources indicated that buildings in close proximity to the site had been the subject of some quite severe bomb damage during WWII. Following these initial findings a preliminary and subsequent detailed UXO assessment were completed by 1st Line Defence and have been issued separately. References are as follows:

- 1st Line Defence: EP4694-00 Express Preliminary UXO Risk Assessment, 18 to 21 Hand Court, dated 6th April 2017.
- 1st Line Defence: DA4694-00 Detailed UXO Risk Assessment, 18 to 21 Hand Court, dated 3rd May 2017.

Following the completion of the above desk based assessments 1st Line Defence concluded that there is a Medium Risk that items of unexploded German air-delivered ordnance could have fallen unnoticed and unrecorded within the site boundary. As such, the most likely scenarios under which items of UXO could be encountered during construction works are during piling, drilling operations or bulk excavations. The risk of encountering will depend on the extent of the works, such as the numbers of piles and the volume of the excavations. Details of the recommended mitigation measures can be found within the latter of the two reports.

2.5 Hydrogeology

2.5.1 Aquifer characteristics

Based on the published geological map referred to above, the hydrogeology of the site is likely to be characterised by the presence of an unconfined shallow aquifer comprising the Lynch Hill Gravel Member.

Underlying the London Clay Formation is a deep aquifer, comprising a sequence of deposits consisting of the successions beneath the clay as listed in Table 2. These units are expected to be in hydraulic continuity and together form the aquifer.

The anticipated depth to the groundwater table is within the superficial strata, i.e. within the top 10m. Shallow groundwater in the site area is anticipated to flow in a southerly direction, i.e. towards the River Thames.

It is also possible that localised perched water may be present in the made ground.

2.5.2 Vulnerability of groundwater resources

The site has been classified by the EA website to overlie a:

- secondary A aquifer: permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers
- 'unproductive' strata: low permeability with negligible significance for water supply or river base flow.

Illustration 3: ARUP Report Figure 7

Confined by the London Clay Formation is a deep aquifer, comprising a sequence of deposits consisting of the lower part of the Lambeth Group and Thanet Sands (Basal Sands) and the White Chalk. These units are expected to be in hydraulic continuity.

2.5.3 Risk from rising groundwater levels

Rising groundwater levels can effect foundations and structures and may result in flooding if not properly controlled. In certain areas groundwater levels are rising owing to reduced groundwater abstraction by industry. London is at particular risk but the situations in Birmingham, Liverpool, Glasgow and Nottingham are also being monitored.

As defined within CIRIA Special Publication 69 (Simpson et al., 1989) the site lies close to the border of critical areas in the London basin in which deep foundations and basements are potentially at risk from the rising groundwater levels in the deep aquifer. The rise in groundwater levels started during the mid-1960s as a result of a significant reduction in groundwater abstraction from the Chalk aquifer. Prior to this, the Chalk aquifer had been increasingly exploited as a result of increasing industrialisation throughout the 19th century and early part of the 20th century.

The deep aquifer beneath the site comprises a sequence of Tertiary Deposits (consisting of the lower part of the Lambeth Group and Thanet Sands) and the Chalk. These units are expected to be in hydraulic continuity and therefore have been considered as a single aquifer unit.

Following the issue of CIRIA Special Publication 69 (Simpson et al., 1989), the Rising Groundwater Level Working Group (GARDIT) was formed in March 1998. This group publicly launched a strategy proposal for controlling rising groundwater beneath London. As a result of the implementation of the GARDIT strategy, groundwater levels are now considered to be stabilising across much of the London Basin and the GARDIT Strategy is considered to have been successful. There will be ongoing monitoring and control of groundwater levels in the London Basin using the abstraction licensing process.

The EA status report issued in 2016 'Management of the London Basin Chalk Aquifer' indicates that the potentiometric surface of the groundwater in the deep aquifer in the site area in January 2016 was at approximately -30mAOD, i.e. approximately 55m

below ground level. The risk of rising groundwater levels to the proposed development would therefore appear to be low.

2.6 Hydrology

2.6.1 Surface watercourses

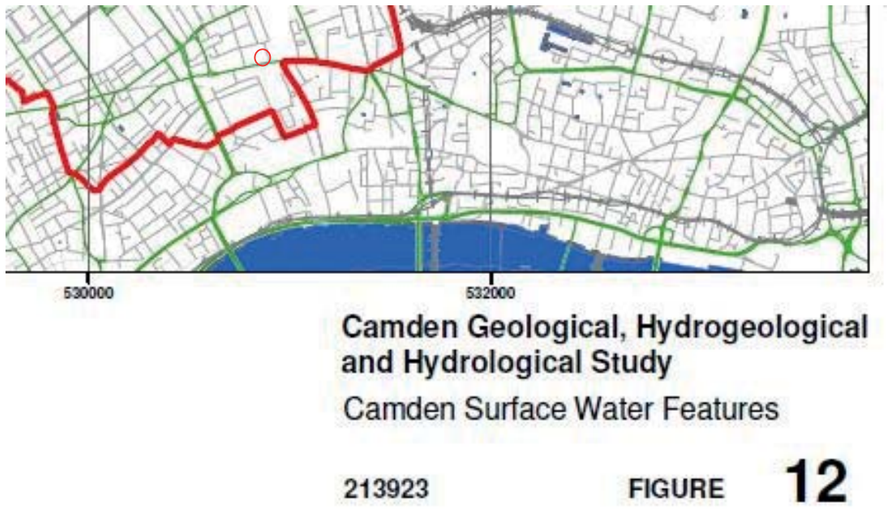
There are no ponds, streams or drainage ditches on or adjacent to the site. The nearest identified surface watercourse to the site is the River Thames located approximately 850m to the south of the site. The River Thames displays tidal effects.

There are no available EA river quality values for the Thames within a relevant distance downstream from the site.

The environmental database report (GroundSure report, 4 April 2017) also notes the presence of two culverts, one running north-west to south-east approximately 276m to the west and one running north-east to south-west approximately 190m to the east.

The base flow of the River Thames is likely to be recharged by groundwater in the shallow aquifer in the site area. A linkage between the river and any ground or groundwater contamination beneath the site may therefore exist.

Illustration 4: ARUP Report Figure 12



In addition there are no historic water courses noted in close proximity to the site as noted in Illustration 5.

Illustration 5: ARUP Report Figure 11

2.6.2 Site drainage

Surface and foul water drainage have been confirmed to be connected to Thames Water public sewers. It is therefore assumed that no other soakaway or SUDS systems are present on site.

2.6.3 Preliminary flood risk assessment

The flood probability and risk maps for the area, published by the EA, show that the risk of flooding has been assessed by the EA as low, and for planning purposes is in a flood zone 1 meaning a flood risk assessment is not required.

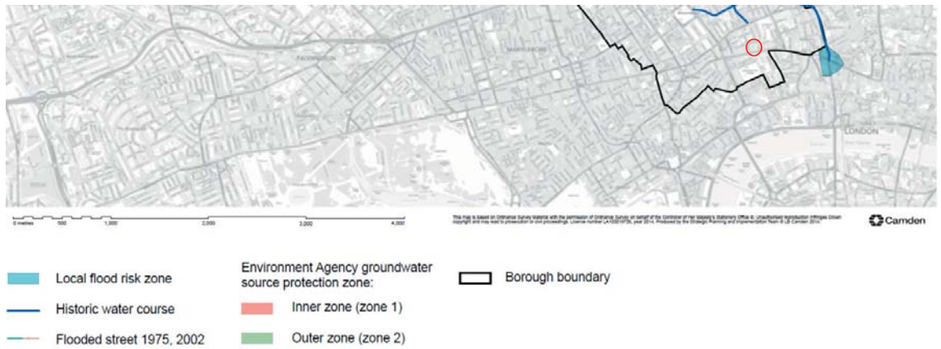


Illustration 6: Camden Local Plan Map 6: Historic Flooding and Local Flood Risk Zones

Figure 5 from Core Strategy, London Borough of Camden

Illustration 7: ARUP Report Figure 15

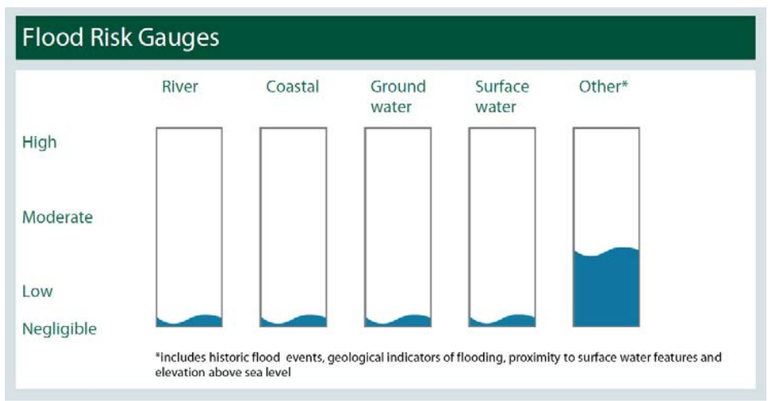


Illustration 8: Flooding potential findings

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

2.7 History of site and surrounding area

The history of the land-use and development of the site and surrounding area has been assessed based on the following sources:

- historical maps within the environmental database from 1875 to 2014

Copies of OS and County Series maps are included in the environmental database report in Appendix F Reference to historical maps provides invaluable information regarding the land use history of the site, but historical evidence is incomplete for the period pre-dating the first edition and between successive maps.

The development history of the site and surrounding area from the above sources is detailed in Table 3 and summarised below.

As seen in the historical map below and in Appendix F the earliest maps show the site and surrounding area as developed, much as it is today with limited changes of note since then. Further searches of maps of the Regency period have revealed some limited development was previously present prior to the first map issue of 1875 within the environmental database report.

Plate 1: Extract from mapping sources of the Regency Period 1799 - 1819

Table 3: Summary of historical development

Date	Land use/features on site	Land use/features in vicinity of site (of relevance to the assessment)
1799-1819	A limited number of buildings are present on site, the use of which is unknown.	It appears to be largely residential in appearance, however, this cannot be confirmed.
1875	High Holborn estate already developed, much in same state as today. Hand Court named as it is today	Built up in much the same state as today.
1916	No significant change	Pump noted 10m north of the site
1951	High Holborn House named as it is today	Ruins noted 10m west, possibly indicating war time damage
1957-1958	Montagu House named as it is today	No significant change

3 PROPOSED DEVELOPMENT

The proposed redevelopment will involve the demolition of the existing structure on site and the construction of a new five storey reinforced concrete framed structure for mixed commercial and retail use. The new structure will cover the footprint of the existing buildings on site, however, the envisaged basement extension is understood to cover the full footprint and extended a further 1.38m to 4.26m.bgl. Currently, the existing single storey basement covers some 50% of the current site.

The existing development comprises a basement with a finished floor level (FFL) of approximately 21.35mAOD with the proposed basement understood to have a structural slab level (SSL) of 20.77mAOD. A raft foundation requiring excavations to some 19.97mAOD, locally deepened to 18.69mAOD, is expected.

Proposed engineering plans and sections for the development are included in Appendix B.

It is proposed that the basement perimeter retaining wall would be formed using underpins to the existing foundations to facilitate the construction of the reinforced concrete basement box. The retaining walls are expected to be propped in the temporary condition.

A number of foundation options have been proposed, however it is understood that a raft foundation is preferred, locally thickened at the edges to match the depth of any adjacent building footings.

4 STAGE 1 - SCREENING

This section of the report provides information for the purpose of screening in accordance with the CPG for basements and addresses all questions raised within the relevant sections of that document. Tables summarising the screening flowcharts are shown as Tables 1 to 3. In accordance with procedure, where a ‘yes’ or ‘unknown’ response is returned, the potential issue is taken to the scoping stage in Section 5.

5 STAGE 2 – SCOPING

As defined in CPG for basements, the scoping stage is used to identify the potential impacts of the proposed scheme for each of the matters of concern identified in the previous screening stage (i.e. those questions answered with a “yes” or “unknown” response). The sections below present statements that define further the matters of concern identified at the screening stage. The data summarised in Section 2 and Section 3 has been used to develop a conceptual ground model to carry out the scoping stage.

5.1 Subterranean (Ground water) Scoping

5.1.1 QUESTION: Is the site located directly above an aquifer?

POTENTIAL IMPACT: Potentially the basement may extend into the underlying aquifer and thus affect the groundwater flow regime.

The site is underlain by 4.30 to 4.40m of generally granular Lynch Hill Gravel Member which is classified as a Secondary A Aquifer. As such, the site does lie within an aquifer.

The proposed development is envisaged to comprise a reduction in site levels to some 19.97mAOD (base of raft), locally deepened at the edges to a maximum of 18.69mAOD to match adjacent building footings. At present the groundwater levels beneath the site have been measured at some 18.50mAOD and therefore it is unlikely that dewatering will be required. It should, however, be noted that groundwater levels might fluctuate for a number of reasons including seasonal variations. Ongoing monitoring would be required to establish both the full range of conditions and any trends in groundwater levels.

Should it be demonstrated with longer term monitoring that groundwater levels were indeed above the deepest level of proposed excavation it is worth noting the following statement which can be found within the ARUP report:

“In the City of London (the Square Mile), the natural, near-surface geology is very similar to that present under the southern area of the LB Camden south of Euston Road, with River Terrace Deposits overlying London Clay. In and around the City, the pressure on available real estate has meant that the installation of large basements has been the norm since the post war period. Even earlier than this, most bank buildings had basements as this offered greater security for vaults and storage. Across swathes of the City, the basements of adjoining buildings touch their neighbours such that there is little or no soil left in the ground down to the depth of the basements, which typically extend as deep as the upper part of the London Clay. In such areas, the only remaining shallow, permeable soil exists underneath the roadways.

The large-scale removal of the River Terrace Deposits from the City has not caused significant problems associated with localised “damming” in the shallow groundwater table. The groundwater, where it is present and if it is moving, simply finds another route if it becomes “blocked” by a subterranean structure at a particular location, although there may be local rises in level. In the City, this alternative route for

groundwater flow is under the roads. The loss of storage and transmissivity due to the removal of the River Terrace Deposits has been balanced by reduction in infiltration due to hard surfacing. The urbanisation of London has significantly altered ground water levels in the Upper Aquifer and the natural trends and directions of flow within this aquifer. For example, the sealing of the ground surface by pavements and buildings; leakage from water mains and sewers, culverting of the Fleet and Tyburn, the cut-and-cover construction of London Underground tunnels in the north of this area have all acted to alter groundwater levels and flow regimes.”

In summary given the density of existing basement developments that bound the site to the north east and south in addition to those within the local area of the site coupled with the absence of any evidence to suggest these basement excavations have resulted in an increase in surface water flooding events, it is concluded that the proposed development will have little or no impact on the existing subterranean water flows.

5.2 Surface Flow and Flooding Scoping

No issues raised.

5.3 Land Stability Scoping

5.3.1 QUESTION: Is the site within 5m of a highway or pedestrian right of way?

POTENTIAL IMPACT: Excavation for a basement may result in damage to the road, pavement or any underground services buried in trenches beneath the road or pavement.

The western boundary of the site lies immediately adjacent to the pavement along Hand Court.

There is the potential for ground movements associated with basement excavation to impact the adjacent pedestrian walkway. An impact assessment addressing this issue is reported in Section 7.

6 STAGE 3 – SITE INVESTIGATION AND STUDY

As previously noted, a full desk study, intrusive site investigation and monitoring programme was undertaken at the site by RSK between May and July 2017, as detailed in the RSK report 371547-01 (00), dated July 2017. The investigation is compliant with the data requirements as set out in Appendix G of 'Camden Geological, Hydrogeological and Hydrological Study' produced for Camden by ARUP in November 2010.

7 STAGE 4 - IMPACT ASSESSMENT

7.1 Building Damage Assessment

7.2 Introduction

This stage is concerned with evaluating the direct and indirect implications of the proposed basement development. It involves describing, quantifying and aggregating the effects of the development on those attributes or features which have been identified in the scoping stage as being potentially affected.

The only potential impacts that have been identified by this assessment relate to ground stability hazards associated with:

- Movements associated with basement retaining wall installation and ground excavation; and
- Elastic heave of the Lynch Hill Gravel Member and London Clay Formation in the basement excavation associated with stress release.

The following nearby structures have been identified for assessment in relation to potential ground movements

- Mid City Place beyond western site boundary.
- High Holborn House buildings adjacent to the developed site, identified as High Holborn House 1 (north), High Holborn House 2 (east) and High Holborn House 3 (south) in the assessment.

7.3 Scope of Works

The scope of works following the screening and scoping stages has been summarised and is as presented below:

1. Model the construction sequence on site from demolition through to the proposed development using OASYS PDISP 19.3.0.15 elastic analysis package.
2. Output displacements along the line of the neighbouring building foundations at the various stages of construction.
3. Estimate the likely ground movements resulting from installation of the proposed underpinned walls and basement excavation based on the empirical information contained in CIRIA C760 "Embedded Retaining Walls – Guidance for Economic Design" using the OASYS XDISP 19.4.0.10 software.
4. Use the program XDISP to combine the ground displacements determined from the numerical analyses PDISP and the former CIRIA C580 assessment, now CIRIA C760 assessment.
5. From the resulting displacements determine the strains that are likely to be induced in the neighbouring buildings to derive a likely damage classification.
6. Production of report summarising our findings.

7.4 Ground Model Parameters

The distribution of Young's modulus and other soil parameters with depth have been based on the results of the site investigations previously undertaken by RSK in report 371547-01 (00), dated July 2017.

A Young's modulus increasing with depth has been assumed for the purpose of this analysis. This has been calculated from the measured shear strength results using the correlation presented by Jamiolkowski, et al, contained within CIRIA Special Publication 27, Settlement of Structures on Clay Soils, 1983.

Jamiolkowski, et al, considered that for undrained soils of a known plasticity and over-consolidation ratio the following correlations with undrained shear strength could be adopted for estimating undrained soil stiffness:

$$E_u = 500\ c_u \text{ (U100 Samples)}$$

In the undrained condition Jamiolkowski recommended using the following equation to derive drained soil stiffness for the London Clay Formation:

$$E' = 0.6\ E_u$$

The parameters adopted for the ground movement assessment in PDISP are summarised below in Table 7.

Table 7: Ground Model Parameters

Material	Young's Modulus (kN/m^2)	Young's Modulus – Increase with Depth ($kN/m^2/m$)	Poisson's Ratio
Made Ground - Drained	1,000	N/A	0.2
Lynch Hill Gravel Member - Drained	50,000	N/A	0.5
London Clay - Undrained	33,000	3,693	0.5
London Clay - Drained	20,000	2,297	0.2
Lambeth Group - Undrained	205,000	5,000	0.5
Lambeth Group - Drained	120,000	3,000	0.2

7.5 Adopted Ground Profile

The ground profile adopted for the ground movement assessment in PDISP is summarised below in Table 8.

Table 8: Adopted ground profile

Material	Top of Stratum (mAOD)	Thickness (m)
Made Ground	25.00	1.00
Lynch Hill Gravel Member	24.00	6.80
London Clay Formation	17.20	22.20

Material	Top of Stratum (mAOD)	Thickness (m)
Lambeth Group	-5.00	~10.00

A rigid boundary layer was assumed at -49.00mAOD, below which no movement is considered to occur.

7.6 PDISP - Ground Model Construction

A settlement / heave analysis has been completed adopting the OASYS PDISP 19.3 software produced by ARUP to assess the likely ground movements to be expected from the proposed development activities.

The PDISP computer package adopts the Boussinesq method of elastic analysis to calculate the stresses and strains generated within the soil, due to an applied loading and determines the associated displacements by integrating the vertical strains. Settlements are defined as positive movements and heave as negative movements.

The loads applied in the PDISP model are split into two elements; negative loads to represent unloading or basement excavation and positive loads to represent reloading or construction. The negative loads have been applied at a level at which they are considered to be acting; at the basement excavation / at the base of the proposed foundations.

7.7 Empirical Assessment of Building Damage

The approach adopted for the purpose of this assessment, combines both CIRIA C760 and the net long term vertical movements from for the various construction stages, obtained from PDISP.

In this case the results of numerical modelling using PDISP for various construction stages have been imported into the XDISP software and an assessment of potential damage for each stage has been completed using the C760 approach of assessing lateral strain and deflection ratio to determine potential damage category.

The deformations and associated potential damage of the various adjacent buildings have been determined at the end of the stages of construction presented in Table 9.

Table 9: Stages of construction at which building damage is assessed

No.	Construction Stage	Short / Long Term	Cumulative Effect
1	Demolition of existing structure	Short	(A)
2	Demolition and basement construction	Short	(A) + (C) + (D)
3	Demolition, basement construction and proposed development	Long	(B) + (C) + (D) + {(F) – (E)} + (H)

The various elements of work used to determine the deformations for the buildings at the various stages of construction are given in Table 10. This table also defines how the associated movements have been determined and whether they are long or short term.

Table 10: Construction sequence

Element	Construction Component	Calculation Method	Short or Long Term
A	Demolition of existing structure	PDISP	Short Term
B	Demolition of existing structure	PDISP	Long Term
C	Basement wall installation	CIRIA C760 (XDISP)	Short Term
D	Basement excavation	CIRIA C760 (XDISP)	Short Term
E	Basement excavation	PDISP	Short Term
F	Basement excavation	PDISP	Long Term
G	Loading of new structure	PDISP	Short Term
H	Loading of new structure	PDISP	Long Term

The ground deformations and building damage categories following each of these stages of construction have been derived by combining the deformations calculated for the various elements of work carried out. For example the long term deformations and building damage category after construction of the proposed building have been calculated by summing the displacements resulting from the long term movements from the demolition of the existing structure (B), installation of the underpin wall, as estimated from CIRIA C760 (C), the long term movements resulting from excavation of the basement (E) deducted from the short term movements resulting from excavation estimated from CIRIA C760 (D) and the long term settlements resulting from loading of the building as calculated by PDISP (H).

The assessment has been undertaken using XDISP version 19.4.0.10 computer package supplied by OASYS, which uses the empirical approach outlined in CIRIA C580 to assess vertical and horizontal ground movements resulting from installation of embedded retaining walls and excavation in front of walls. It should be noted that XDISP version 19.4.0.10 was developed at which time CIRIA C580 was still the current guidance, the only observable difference with regards to assessing building damage is a change to the ground movement curves for excavation in front of a low stiffness wall which were reduced in CIRIA C760.

The empirical approach is well described in CIRIA C760 “Guidance on Embedded Retaining Wall Design” 2017. This document provides charts of vertical and horizontal ground movements resulting from installation of embedded retaining walls and excavation in front of the walls. These charts have been normalised with wall length and excavation depth to facilitate their use for new development. As noted above the charts remain applicable for the purpose of this assessment, the only difference being a more conservative approach has been adopted for excavations in front of a low stiffness wall in the updated CIRIA C760.

In the absence of ground movement curves within CIRIA C760 for the installation and excavation in front of underpinned walls we have conservatively modelled the effect of the installation and excavation in front of a planar diaphragm wall and excavation in front of a high stiffness wall as it is assumed that the walls will be propped during construction.

7.8 Assessment of Damage to Adjacent Properties

CIRIA C760 also provides a methodology to assessing the potential damage to properties within the zone of influence of the basement excavation. Figures 6.17 and 6.27 of CIRIA C760 summarise this approach. This methodology uses the relationship between Damage Category, horizontal strain and deflection ratio developed by Boscardin and Cording (1989) and Burland (2001).

The definition of the categories is presented below. The categories assume brick masonry with cement mortar and as such represent a conservative estimate of likely damage that will occur at these properties.

Table 11: Classification of damage category (from Table 6.4, CIRIA C760)

Category of damage	Description of typical damage	Approximate crack width (mm)	Limiting tensile strain ε_{lim} (%)
0 Negligible	Hairline cracks of less than about 0.1mm are classed as negligible.	<0.1	0.0- 0.05
1 Very slight	Fine cracks that can easily be treated during normal decoration. Cracks in external brickwork visible on inspection.	<1	0.05–0.075
2 Slight	Cracks easily filled. Redecoration probably required. Cracks are visible externally and some repointing may be required externally to ensure watertightness. Doors and windows may stick slightly.	<5	0.075 – 0.15
3 Moderate	The cracks require some opening up and can be patched by a mason. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5 – 15 or a number of cracks >3	0.15 – 0.3
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.	15 – 25 but also depends on number of cracks	>0.3
5 Very severe	This requires a major repair involving partial or complete rebuilding. Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	Usually >25 but depends on number of cracks	

From the development drawings supplied by HTS and details known about the former development construction we are able to derive a suite of parameters to assist in the completion of this portion of the assessment. Where site specific information is not known then conservative assumptions have been made.

On the basis of the available information, a summary of the specific dimensions and construction details used for these analyses are presented below.

Table 12: Specific dimensions used for analyses

Adjacent Property Reference	Adopted Excavation Level (m.AOD)	Approximate Distance to Face of Property (m)	Approximate Length of Property Perpendicular to Basement (m)
Mid City Place	18.69	8.00	58.00
High Holborn House 1 (22-23 Hand Court)	18.69	0	16.00
High Holborn House 2 (High Holborn House)	18.69	0	22.00
High Holborn House 3 (Caroline House)	19.10	0	27.00

Where trial pits have been excavated as part of the intrusive investigation, the depth of the footings have been used in Table 12. An assumed 1.00m deep foundation has been used for High Holborn House 3 in the absence of intrusive data. Foundation levels appropriate to the survey details provided by SRG Holdings Ltd and presented on the exploratory hole plan in Figure 2.

Table 13: Specific construction details

Adjacent Property Reference	Building Material	Foundation Type	Foundation Level (m.AOD)
Mid City Place	Concrete	Pile	>9.00
High Holborn House 1 (22-23 Hand Court)	Brick	Strip	20.27
High Holborn House 2 (High Holborn House)	Brick	Strip	18.69
High Holborn House 3 (Caroline House)	Brick	Strip	19.10

These parameters have then been used to determine the displacements and horizontal tensile strains and Deflection Ratios for the adjacent properties in the way described below.

7.9 Results of Empirical Assessment of Ground Movements and Building Strains

A summary of estimated ground movements at the front and rear of the adjacent properties and the calculated horizontal strains and deflection ratios for each property during the key stages of construction are presented in Tables 13 to 18.

7.9.1 Demolition

A summary of the estimated ground movements likely to be experienced during the demolition stage are presented in Table 14.

Table 14: Ground movements resulting from demolition

Adjacent Property Reference	Ground Movement at Front of Adjacent Property		Ground Movement at Rear of Adjacent Property	
	Lateral (mm)	Vertical (mm)	Lateral (mm)	Vertical (mm)
Mid City Place	0	0	0	0
High Holborn House 1 (22-23 Hand Court)	0	-2	0	0
High Holborn House 2 (High Holborn House)	0	-2	0	0
High Holborn House 3 (Caroline House)	0	-3	0	0

Notes:
- Lateral displacement recorded as movement along the line.
- Positive lateral displacement values indicate ground movement towards the excavation.
- Negative vertical displacement values indicate ground heave.

The resulting horizontal strains and deflection ratios are presented in Table 15.

Table 15: Calculated horizontal strains and deflection ratios

Adjacent Property Reference	Horizontal Strain (%)	Deflection Ratio (%)	Damage Category
Mid City Place	0.00	0.000	Negligible
High Holborn House 1 (22-23 Hand Court)	0.00	0.003	Negligible
High Holborn House 2 (High Holborn House)	0.00	0.004	Negligible
High Holborn House 3 (Caroline House)	0.00	0.006	Negligible

7.9.2 Basement Construction

A summary of the estimated ground movements likely to be experienced following completion of the basement excavation are presented in Table 16.

Table 16: Ground movements resulting from basement excavation

Adjacent Property Reference	Ground Movement at Front of Adjacent Property		Ground Movement at Rear of Adjacent Property	
	Lateral (mm)	Vertical (mm)	Lateral (mm)	Vertical (mm)
Mid City Place	4	2	0	0

Adjacent Property Reference	Ground Movement at Front of Adjacent Property		Ground Movement at Rear of Adjacent Property	
	Lateral (mm)	Vertical (mm)	Lateral (mm)	Vertical (mm)
High Holborn House 1 (22-23 Hand Court)	-11	4	2	1
High Holborn House 2 (High Holborn House)	0	-2	0	0
High Holborn House 3 (Caroline House)	-6	4	0	0

Notes:
- Lateral displacement recorded as movement along the line.
- Positive lateral displacement values indicate ground movement towards the excavation.
- Negative vertical displacement values indicate ground heave.

The resulting horizontal strains and deflection ratios are presented in Table 17 below.

Table 17: Calculated horizontal strains and deflection ratios

Adjacent Property Reference	Horizontal Strain (%)	Deflection Ratio (%)	Damage Category
Mid City Place	-0.01	0.003	Negligible
High Holborn House 1 (22-23 Hand Court)	0.06	0.009	Very Slight
High Holborn House 2 (High Holborn House)	0.00	0.004	Negligible
High Holborn House 3 (Caroline House)	-0.08	0.03	Negligible

7.9.3 Long Term Proposed Loading

A summary of the estimated ground movements likely to be experienced following completion of the development are presented in Table 18.

Table 18: Ground movements resulting from long term loading

Adjacent Property Reference	Ground Movement at Front of Adjacent Property		Ground Movement at Rear of Adjacent Property	
	Lateral (mm)	Vertical (mm)	Lateral (mm)	Vertical (mm)
Mid City Place	3	2	0	0
High Holborn House 1 (22-23 Hand Court)	-11	16	2	1
High Holborn House 2 (High Holborn House)	0	14	0	0
High Holborn House 3 (Caroline House)	-10	18	0	0

Adjacent Property Reference	Ground Movement at Front of Adjacent Property		Ground Movement at Rear of Adjacent Property	
	Lateral (mm)	Vertical (mm)	Lateral (mm)	Vertical (mm)

Notes:
- Lateral displacement recorded as movement along the line.
- Positive lateral displacement values indicate ground movement towards the excavation.
- Negative vertical displacement values indicate ground heave.

The resulting horizontal strains and deflection ratios are presented in Table 19 below.

Table 19: Calculated horizontal strains and deflection ratios

Adjacent Property Reference	Horizontal Strain (%)	Deflection Ratio (%)	Damage Category
Mid City Place	0.01	0.004	Negligible
High Holborn House 1 (22-23 Hand Court)	0.01	0.052	Very Slight
High Holborn House 2 (High Holborn House)	0.00	0.021	Negligible
High Holborn House 3 (Caroline House)	0.06	0.006	Very Slight

7.10 Conclusions

From the assessment above, it is evident that damage categories exhibited for each of the adjacent structures during the various phases of development are largely confined to Category 1 (Very Slight) or below and as such, there does not appear to be any due cause for concern.

It should be stressed that the magnitude of ground movements depends to a great extent upon the quality of workmanship. As such, large local ground movements may occur where construction problems are encountered. Such movements have not been predicted by this work.

8 CUMULATIVE IMPACTS

A requirement of CPG for basements is to consider the aggregate (cumulative) potential for impacts associated with basement construction.

A search of publicly available planning records (dating back to 1924) on Camden's planning website revealed records of granted permissions for basement/lower ground floor development/extension in a number of properties in the site area, including those bordering the site and at Mid City Place, i.e. the block bounded by Red Lion Street, Sandland Street, Brownlow Street and High Holborn. In addition to the information available on the planning website, it was also noted during the walkover that the majority of the properties within the local area contain basements which most likely predated the earliest planning records held by Camden.

8.1 Hydrogeology

Based on the information collated to date, it is noted that the proposed basement will be contained within a cluster of basements beneath the remainder of the Hand Court and Mid City Place, and it is not anticipated to extend deeper than the existing deepest adjacent basement to 18.69mAOD such that a significant change in direction of groundwater flow is expected.

Further, the proposed raft foundation will bear within Lynch Hill Gravel with an approximate 1.50m thickness of gravel remaining beneath the raft structure, and the new excavation works are also not anticipated to extend into the groundwater table at 18.50mAOD, such that groundwater flow beneath the site should remain uninterrupted.

In summary, given the density of existing basement developments that bound the site and within the local area of the site, coupled with the absence of any evidence to suggest these basement excavations have resulted in an increase in surface water flooding events, it is concluded that the proposed development will have little or no impact on the existing subterranean water flows.

8.2 Hydrology

In the absence of any recovered flooding events, the distance from any flood zones and surface watercourses and given that the site is located within an area known to contain an abundance of basements without causing any undue changes to the local hydrology, it is considered that there will be negligible potential for impact and no cumulative impact on shallow water flows in the vicinity of the proposed development.

8.3 Land Stability

From the results of the elastic displacement analyses it is indicated that in both the short-term and long-term (once building loads are applied) net movements beyond the site boundary will be very slight to negligible.

For cumulative ground movements associated with the underpinning and basement excavation, resultant horizontal strains and deflection ratios are very small and are unlikely to be damaging to the identified features.

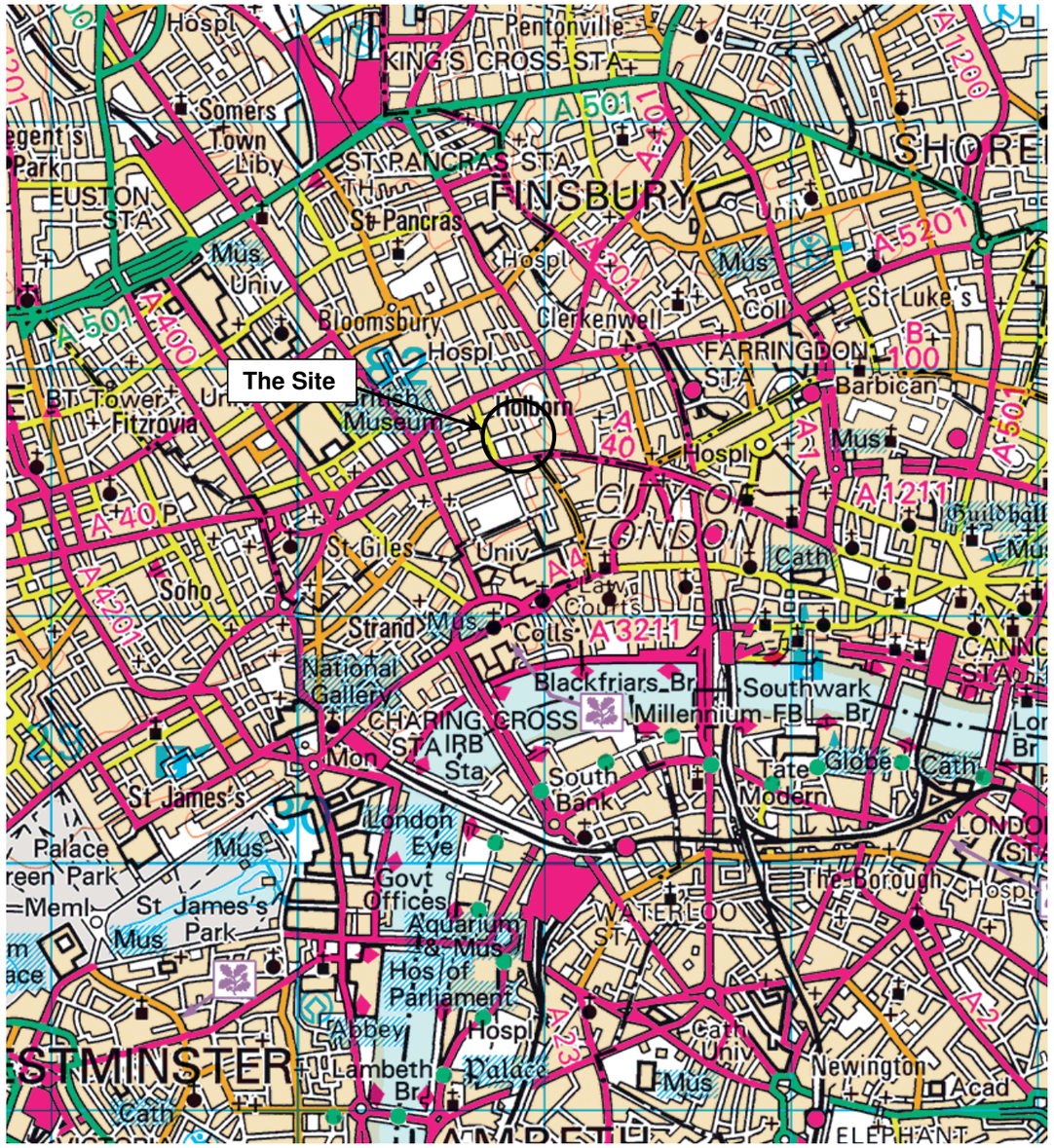
It should be noted that the calculations undertaken as part of this assessment are necessarily preliminary and these calculations should be re-checked at the detailed design stage to ensure that more detailed predicted movements are within tolerable limits.

8.3.1 Control of ground movements

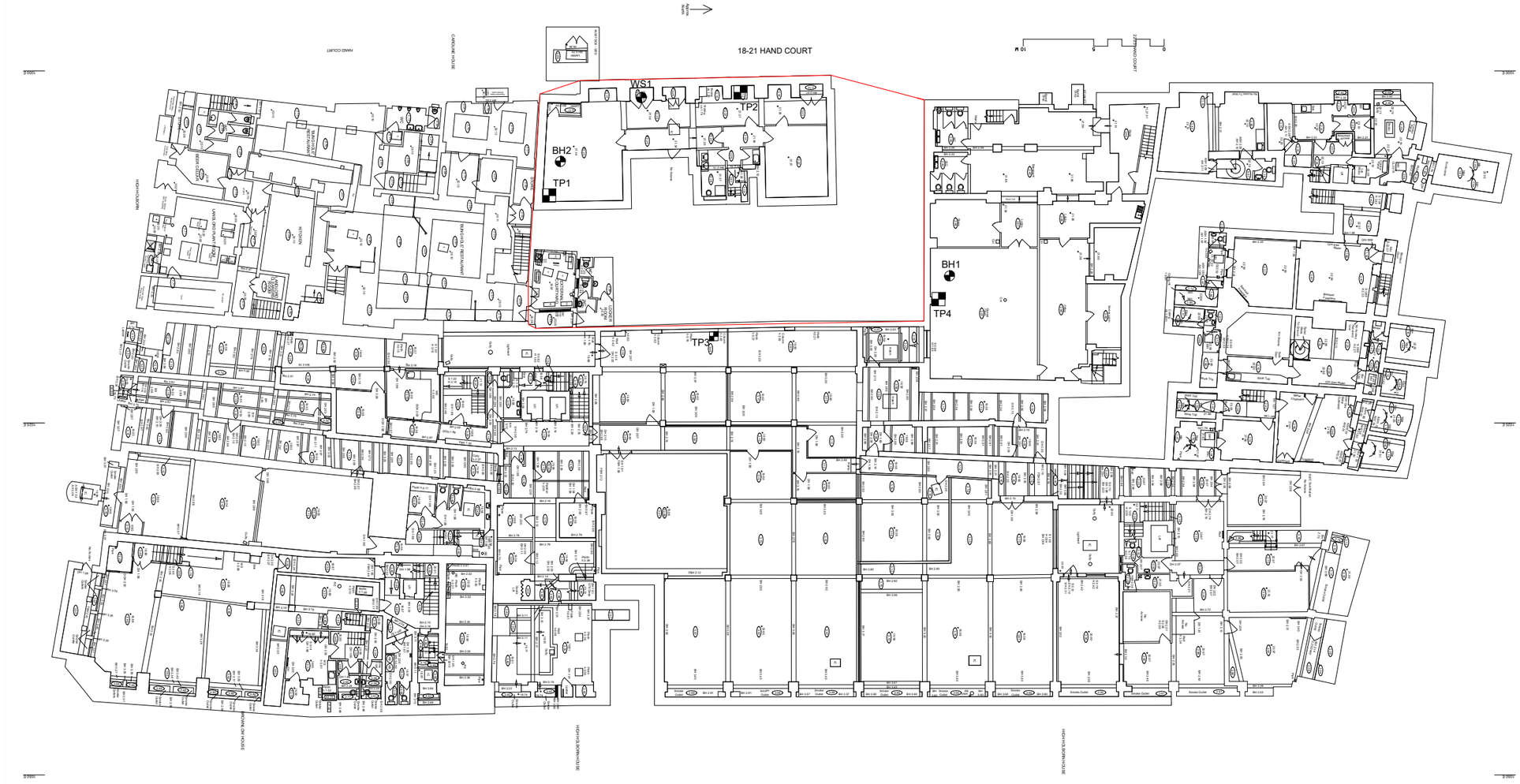
In order to reduce the potential for any movement over and above that expected, the following methods of safe practice should be considered prior to and during construction:

- Good workmanship will be required to ensure that the underpinned and retaining wall installation induced settlements are kept to a minimum. It will be essential to ensure that the made ground or non-self supporting natural soils are not allowed to collapse during underpinning. Consideration will need to be given to preventative measures should running sands or other such issues be encountered. Should such conditions be encountered then works should stop immediately and working practices reassessed;
- Any supports should be installed as early as possible in the construction sequence;
- Where temporary props are required they should be designed to provide adequate restraint to limit lateral ground movements. Walings should be tied in so they do not rely on friction or adhesion between the prop end and waling to be held in place;
- The construction of the wall and its support systems should not be delayed;
- Over-excavation should be avoided;
- It should be ensured that basement slab is cast as early as possible and tight to the retaining wall. Sufficient time should be given for the slab to cure and gain strength prior to continuation of excavation below;
- Monitoring both above and below ground should be carried out to ensure that the expected displacements are not exceeded. Limits of lateral and vertical displacement should be set beyond which the method of construction should be re-assessed.

FIGURES



RSK	**SITE LOCATION PLAN**	**Client: SRG Holdings Limited**	**Figure No: 1**
		Site: 18-21 Hand Court	**Job No: 371547**
		Scale: NTS	**Source: OS**



Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK
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HP3 9RT
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Tel: +44 (0) 1442 437500
Fax: +44 (0) 1442 437550
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client

SRG HOLDINGS LIMITED

Project Title

HIGH HOLBORN ESTATE

Drawing Title

EXPLORATORY HOLE LOCATION PLAN

Drawn	Date	Checked	Date	Approved	Date
AT	10-07-17	AT	10-07-17	AT	10-07-17

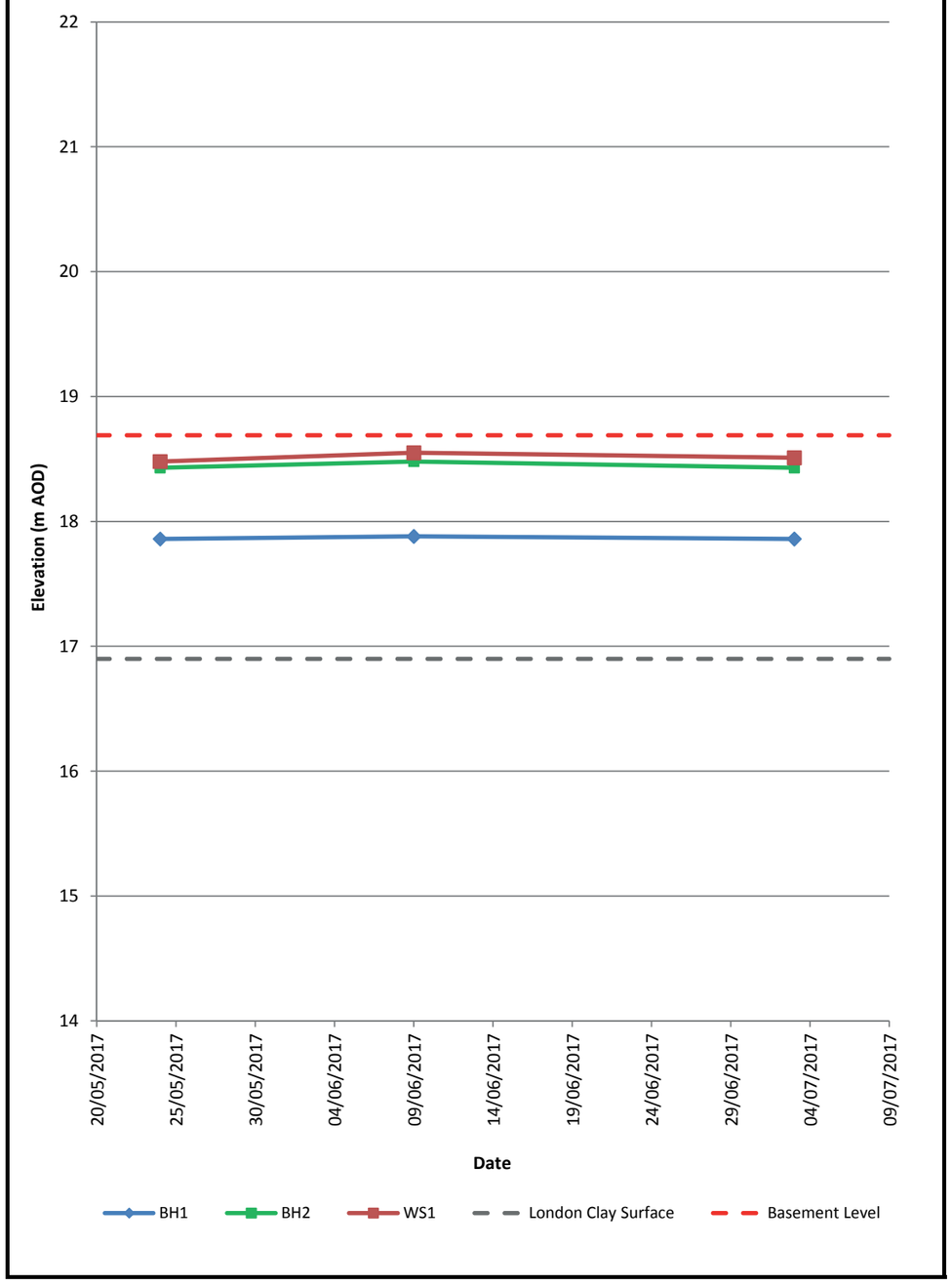
Scale	Orig Size	Dimensions
NTS	A3	NTS

Project No.	Drawing File
371547	371547_FIG2

Drawing No.	Rev.
371547_01_FIG2	R

RSK	**BUILDING LAYOUT PLAN**	**Client:**	SRG Holdings Limited	**Figure No:**	3
		Site:	18-21 Hand Court	**Job No:**	371547
		Scale:	NTS	**Source:**	Google

RSK	GROUNDWATER MONITORING vs ELEVATION		
Site: High Holborn Estate	Client: SRG Holdings Ltd	Job Number:	371547
		Figure:	4



APPENDIX A
SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for SRG Holdings Limited (the "client") in accordance with the terms of a contract between RSK and the "client", dated 23 January 2017. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

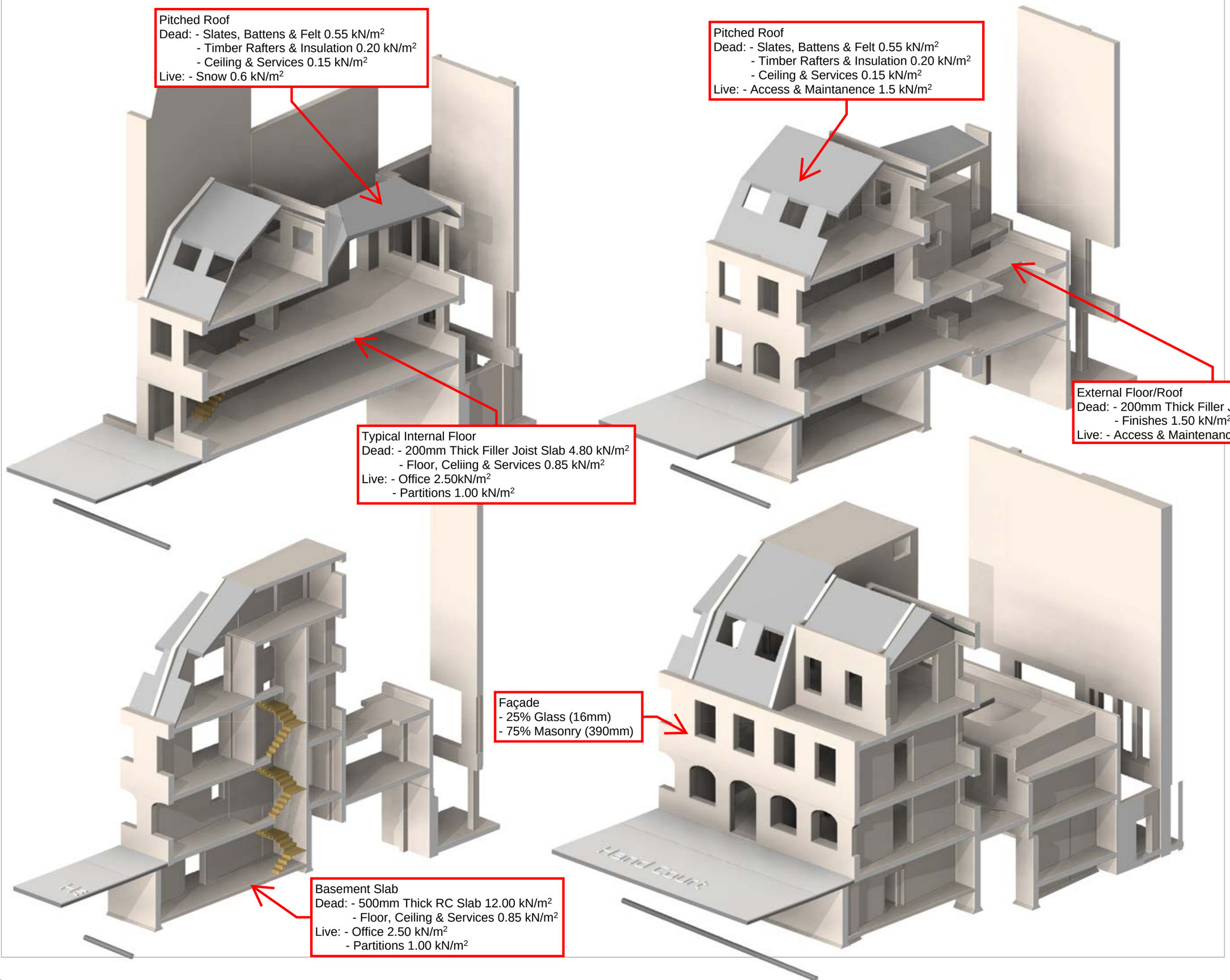
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
EXISTING AND PROPOSED DEVELOPMENT PLANS AND SECTIONS

SRG Holdings Limited
BIA: 18-21 Hand Court, High Holborn Estate
371547-03 (02)



100mm @ A1 (50mm @ A3)

Notes:

Basement slab thickness based on trial pit investigation.

All other materials/construction types assumed and to be verified on site.

All non-ground bearing slabs assumed to span approximately north to south.

Work In Progress

Date / Time Printed - 06/07/2017 12:38:42

This is not a formal drawing issue and as such may contain uncoordinated or incomplete information. Full drawing issue to follow

Rev	Date	By	Eng	Amendments
P1	??.??.??	DV	SOB	Preliminary Issue

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

hts.uk.com

Job Name

High Holborn Estate

18-21 Hand Court

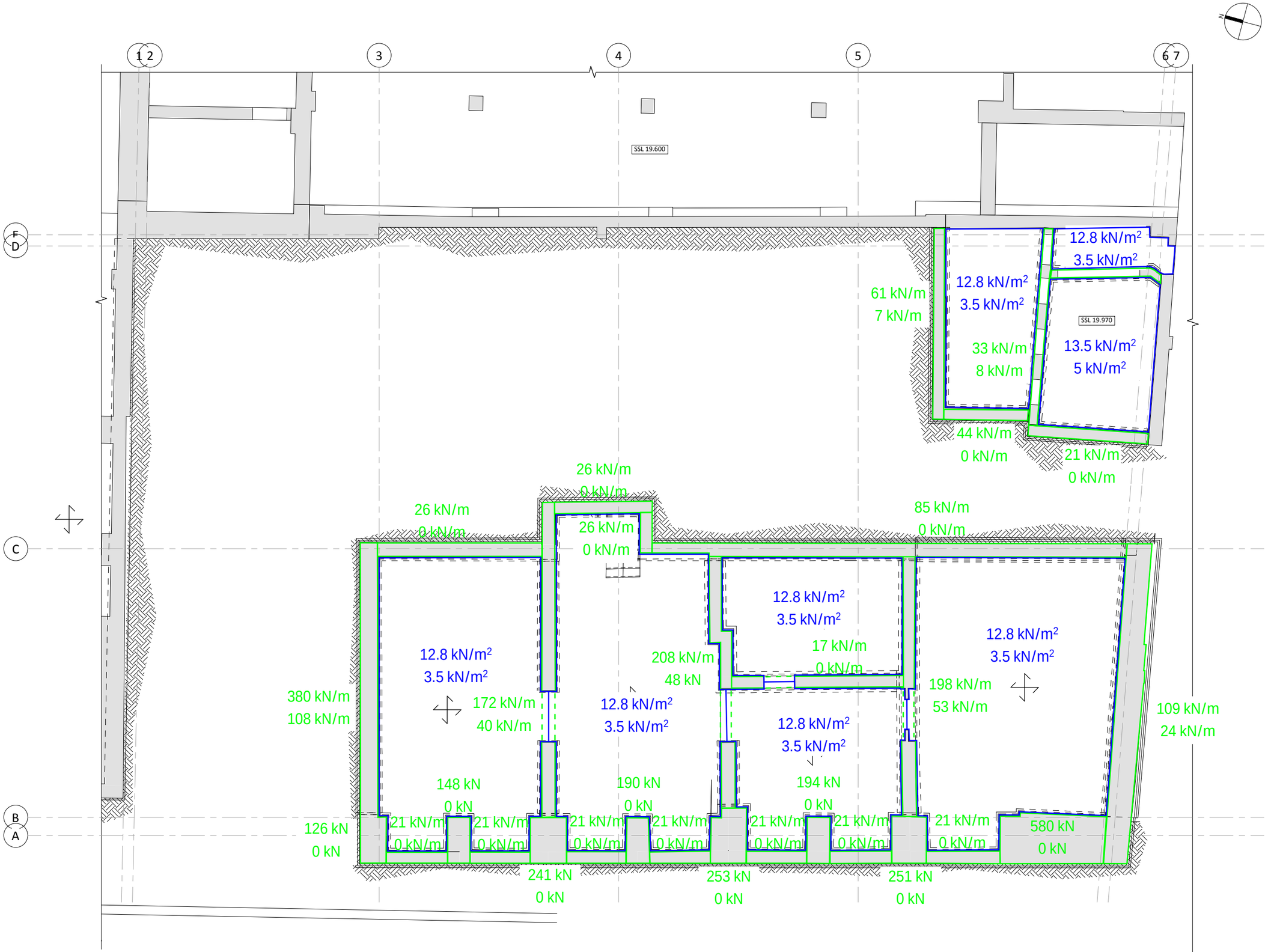
Drawing Title

Existing Isometric Section

Assumed Construction Type

Purpose of Issue **Preliminary** Scale at A1

Drawing No **1508 / HC/SK065** Rev **P1**



Ground Bearing Slab Loads

Wall/Pier Loads

(Dead Loads Top, Live Loads Bottom)

100mm @ A1 (50mm @ A3)

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

2 Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm long

3 Add notes

4 Add notes

NOTE:
All existing details shown are based on archive drawings and limited opening up works. Assumptions have been made regarding existing construction. Materials, construction, framing and spans of existing slabs and walls to be confirmed during enabling works.

Existing Column Schedule

Existing Beam Schedule

Existing legend

E	Existing RC floor as indicated on drawing
e	Existing timber joists, dimensions, crs and span as indicated on drawing.
	Existing structural walls
	Existing structure below
	Existing padstone, TBC on site

Work In Progress

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Rev	Date	By	Eng	Amendments
P1	??.??.??	DV	SOB	Preliminary Issue

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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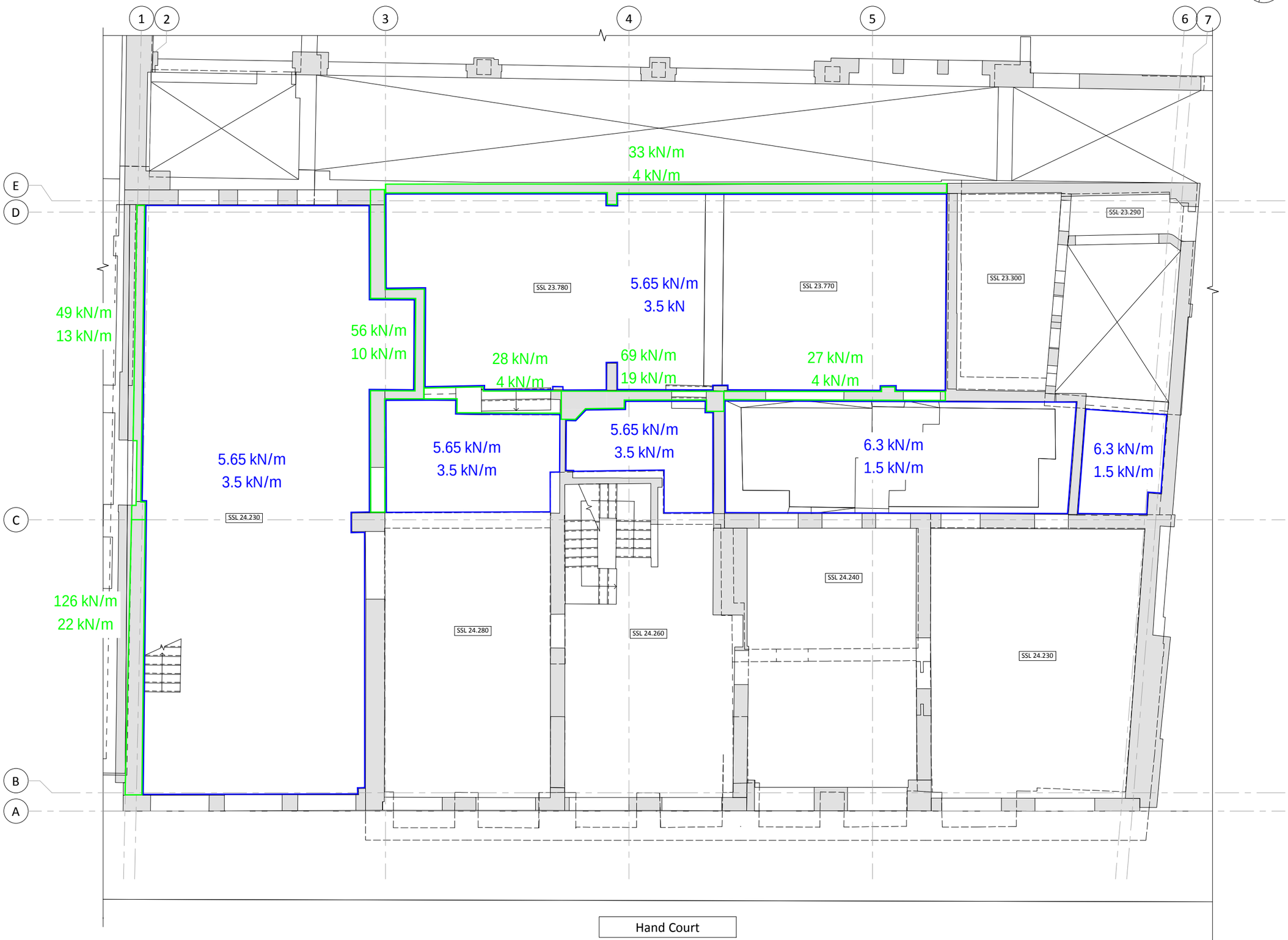
Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Existing Loads
Lower Ground Floor

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/SK066** Rev **P1**



Ground Bearing Slab Loads

Wall Loads

(Dead Loads Top, Live Loads Bottom)

100mm @ A1 (50mm @ A3)

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

2 Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm long

3 Add notes

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NOTE:
All existing details shown are based on archive drawings and limited opening up works. Assumptions have been made regarding existing construction. Materials, construction, framing and spans of existing slabs and walls to be confirmed during enabling works.

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Existing Beam Schedule

Existing legend

E	Existing RC floor as indicated on drawing
e	Existing timber joists, dimensions, crs and span as indicated on drawing.
	Existing structural walls
	Existing structure below
	Existing padstone, TBC on site

Work In Progress

Date / Time Printed - 06/07/2017 12:38:53

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Rev	Date	By	Eng	Amendments
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HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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Job Name

High Holborn Estate

18-21 Hand Court

Drawing Title

Existing Loads

Ground Floor

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/**SK067 Rev **P1**

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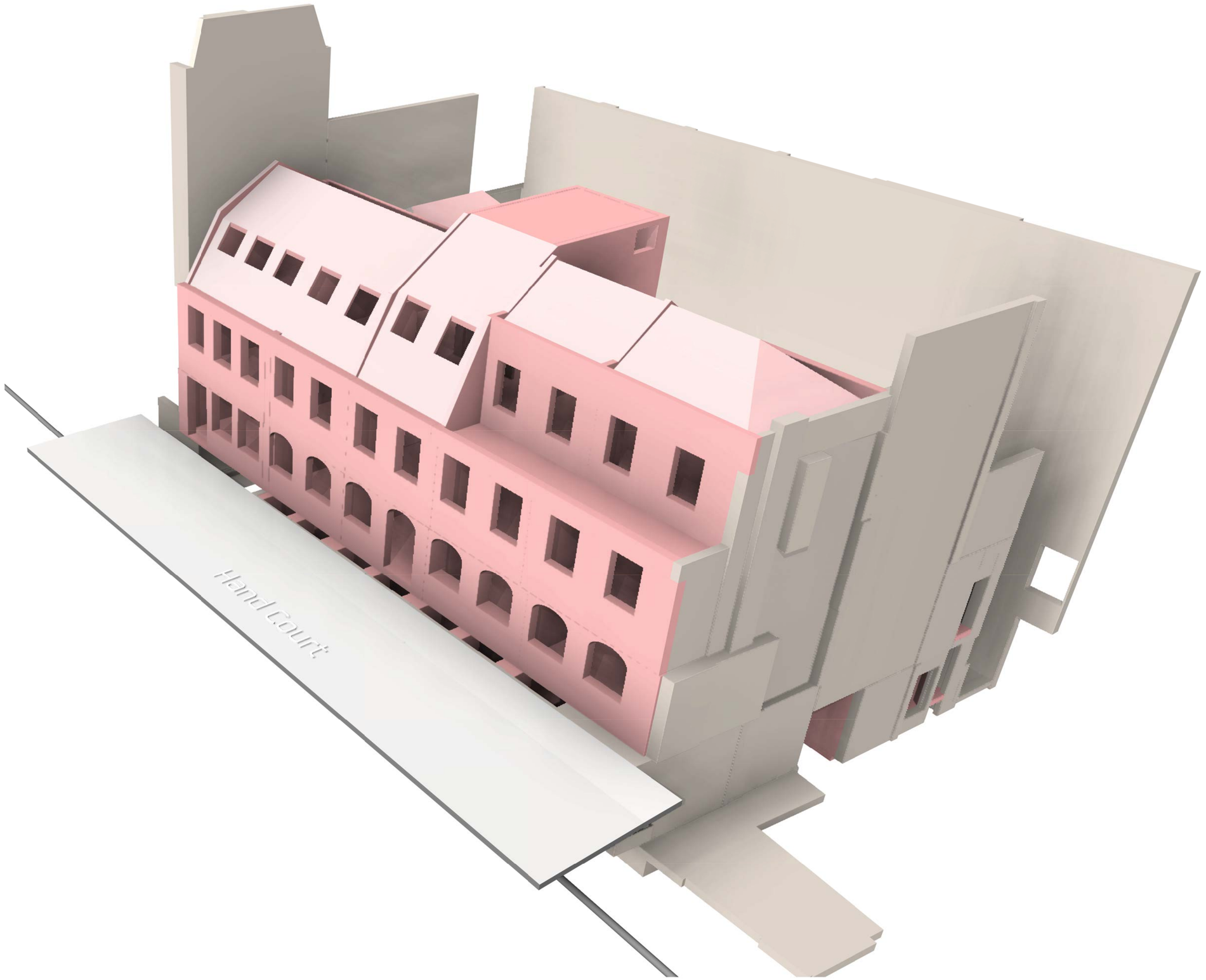

Work In Progress

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Rev	Date	By	Eng	Amendments
P1	??.??.??	IZ	SL	Preliminary Issue

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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Job Name

High Holborn Estate
18-21 Hand Court

Drawing Title

Demolition
Perspective View

Purpose of Issue **Preliminary** Scale at A1

Drawing No 1508 / HC/D005 Rev P1

100mm @ A1 (50mm @ A3)

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

2 Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm long

3 All demolition drawings are to be read in conjunction with proposed plans

4 Assume all edges of RC are to be disc-cut UNO Where edges of slab are to be demolished, floors are to be disc cut to face of nearest beam if applicable.

5 Care to be taken not to cut / adversely affect existing retained beams / columns while demolition is taking place. Contractor to undertake careful exploratory works and submit appropriate method statement to ensure retained structure is not damaged undertaking areas of demolition

6 Treat all cut concrete faces with Ronabond concrete repair system by Ronacrete, or similar concrete repair system

7 Temporary bracing required prior to demolition of existing stability cores and until the new stability structure is in placeprior to construction of new stability structure. Contractor to submit full temporary works and sequencing proposal to the CA for review prior to commencing work

8 The foundations of the existing structure must not be undermined. Upon exposing the retained structures the contractor should identify if any proposed excavation levels are deeper than the existing founding levels and notify the engineer accordingly

The existing structural information shown on these drawings is based on visual inspection of the building, limited opening up works and relevant archive information. All details of the existing construction are subject to confirmation by the Contractor during the works on site. No materials are to be ordered until the relevant details and conditions are confirmed by the Contractor on site. Should the contractor discover any discrepancies between the assumed existing structure and what is found on site they should notify the engineer immediately, and await further instruction

Demolition legend

	Area of floor to be demolished
	Beam demolished / removed
	Column demolished / removed
	RC / Masonry wall demolished

Demolition Key

1	Notes
2	Notes

Work In Progress

Date / Time Printed - 02/05/2018 17:52:14

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Rev	Date	By	Eng	Amendments
P1	??.??.??	IZ	SL	Preliminary Issue

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

hts.uk.com

Job Name

High Holborn Estate
18-21 Hand Court

Drawing Title

Demolition Plans
Lower Ground Floor

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/D090** Rev **P1**

100mm @ A1 (50mm @ A3)

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

2 Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm long

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Demolition legend

	Area of floor to be demolished
	Beam demolished / removed
I	Column demolished / removed
	RC / Masonry wall demolished

Demolition Key

1	Notes
2	Notes

Rev	Date	By	Eng	Amendments
P1	??.??.??	IZ	SL	Preliminary Issue

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

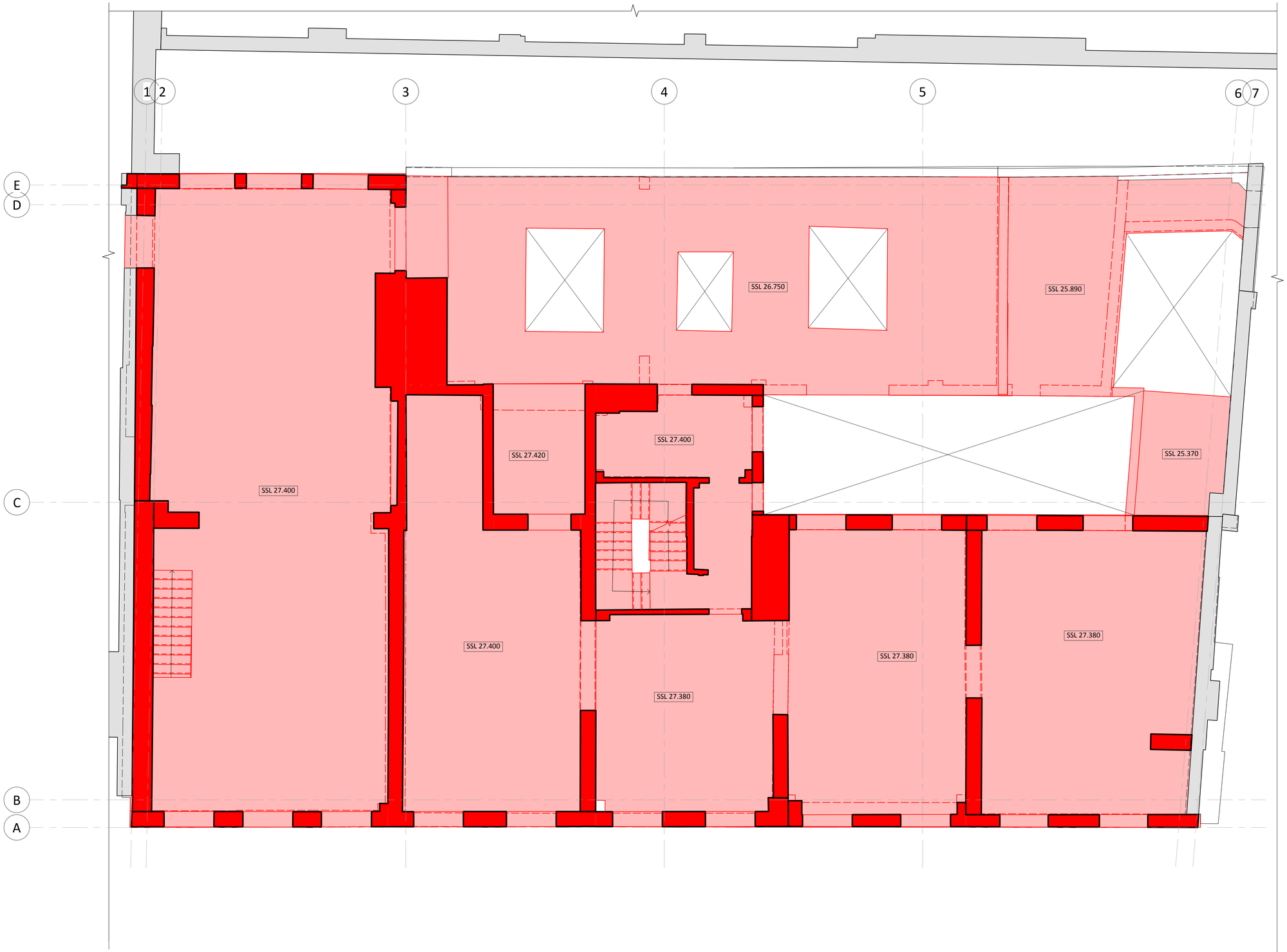
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Demolition Plans
Ground Floor

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/D100** Rev **P1**



100mm @ A1 (50mm @ A3)

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

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3 All demolition drawings are to be read in conjunction with proposed plans

4 Assume all edges of RC are to be disc-cut UNO Where edges of slab are to be demolished, floors are to be disc cut to face of nearest beam if applicable.

5 Care to be taken not to cut / adversely affect existing retained beams / columns while demolition is taking place. Contractor to undertake careful exploratory works and submit appropriate method statement to ensure retained structure is not damaged undertaking areas of demolition

6 Treat all cut concrete faces with Ronabond concrete repair system by Ronacrete, or similar concrete repair system

7 Temporary bracing required prior to demolition of existing stability cores and until the new stability structure is in placeprior to construction of new stability structure. Contractor to submit full temporary works and sequencing proposal to the CA for review prior to commencing work

8 The foundations of the existing structure must not be undermined. Upon exposing the retained structures the contractor should identify if any proposed excavation levels are deeper than the existing founding levels and notify the engineer accordingly

The existing structural information shown on these drawings is based on visual inspection of the building, limited opening up works and relevant archive information. All details of the existing construction are subject to confirmation by the Contractor during the works on site. No materials are to be ordered until the relevant details and conditions are confirmed by the Contractor on site. Should the contractor discover any discrepancies between the assumed existing structure and what is found on site they should notify the engineer immediately, and await further instruction

Demolition legend

	Area of floor to be demolished
	Beam demolished / removed
	Column demolished / removed
	RC / Masonry wall demolished

Demolition Key

1	Notes
2	Notes

Rev	Date	By	Eng	Amendments
P1	??.??.??	IZ	SL	Preliminary Issue

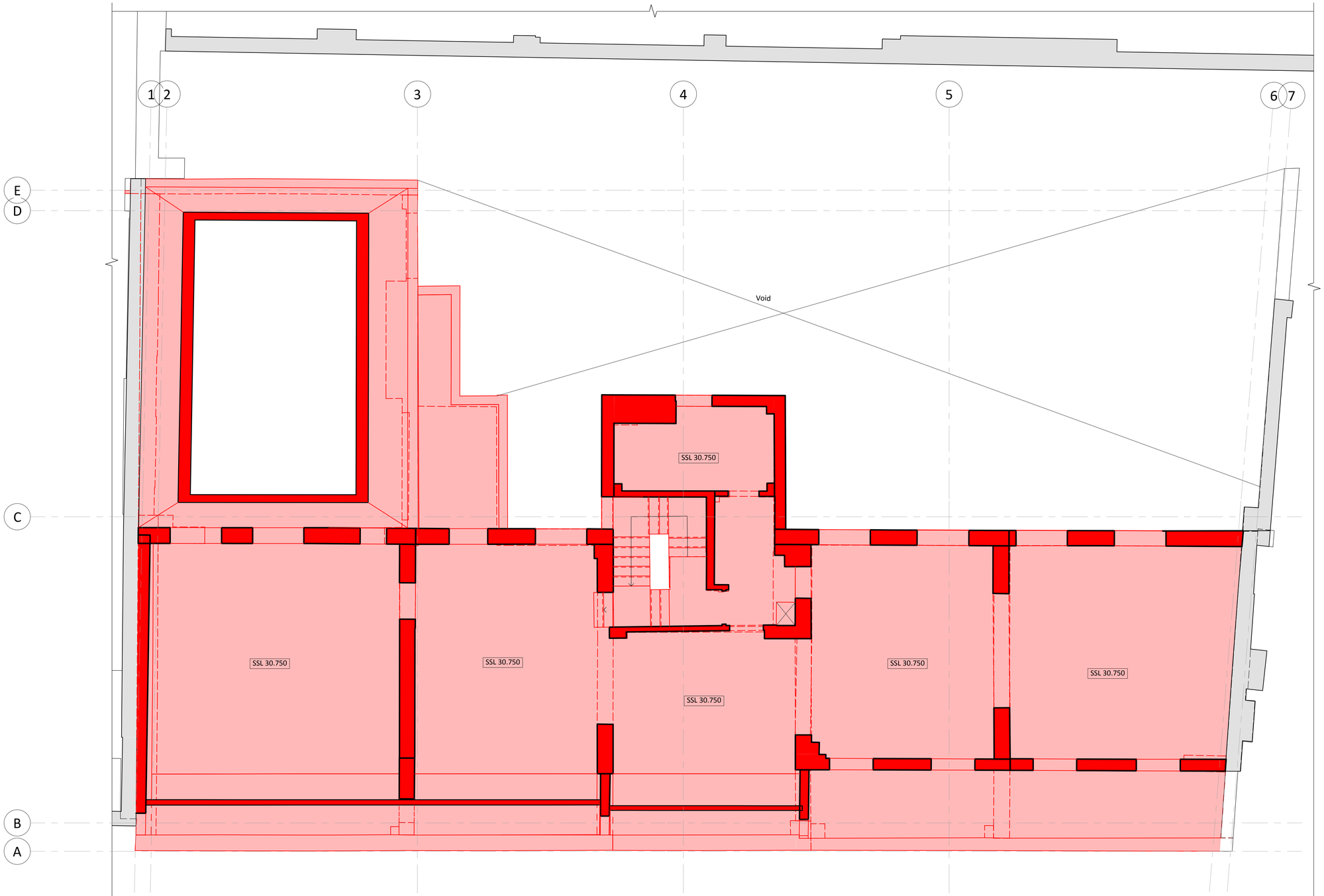
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Demolition Plans
First Floor

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/D110** Rev **P1**



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Demolition legend

	Area of floor to be demolished
	Beam demolished / removed
	Column demolished / removed
	RC / Masonry wall demolished

Demolition Key

1	Notes
2	Notes

Rev	Date	By	Eng	Amendments
P1	??.??.??	IZ	SL	Preliminary Issue

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

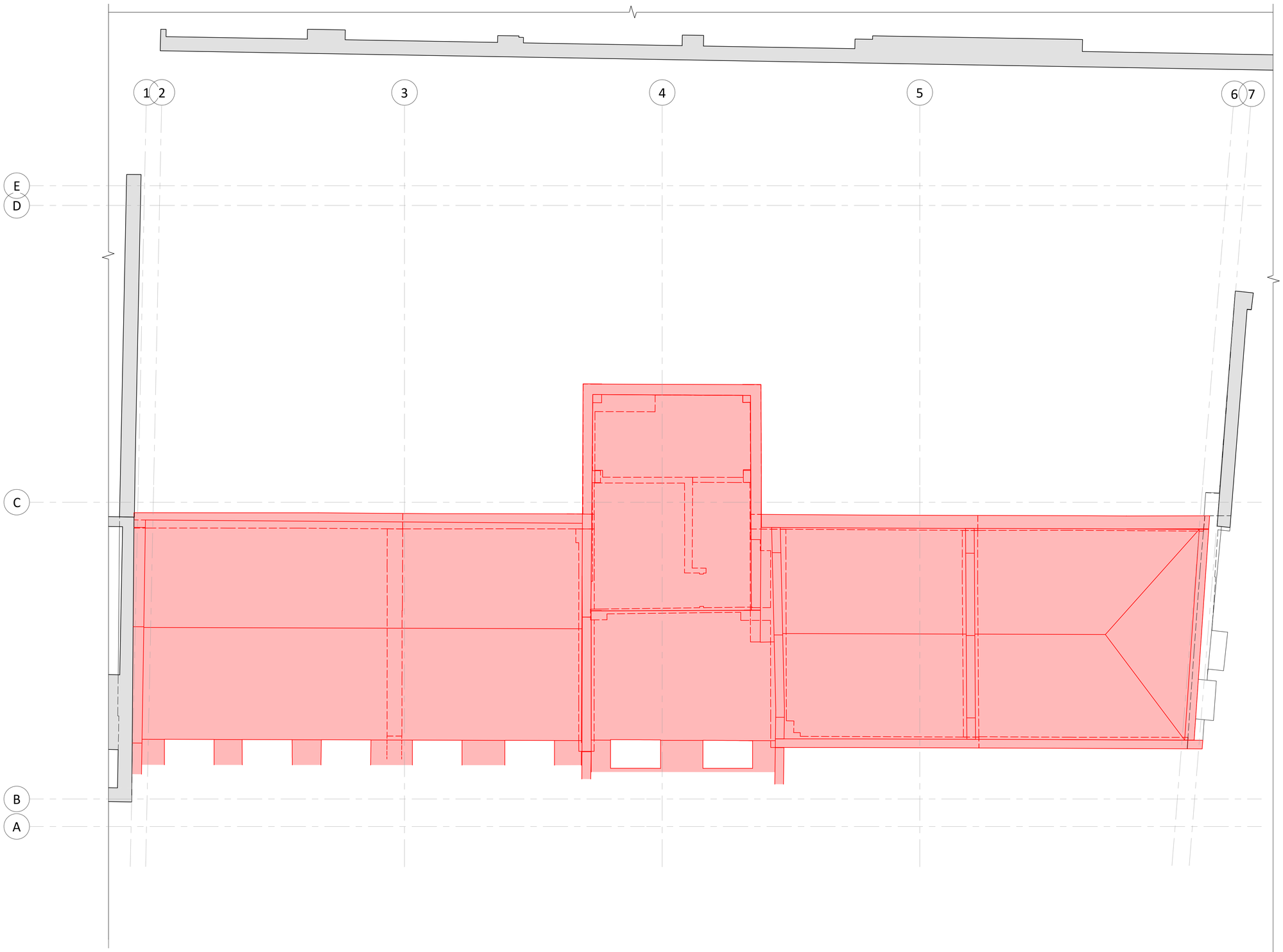
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Demolition Plans
Second Floor

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/D120** Rev **P1**



100mm @ A1 (50mm @ A3)

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Demolition legend

	Area of floor to be demolished
	Beam demolished / removed
I	Column demolished / removed
	RC / Masonry wall demolished

Demolition Key

1	Notes
2	Notes

Rev	Date	By	Eng	Amendments
P1	??.??.??	IZ	SL	Preliminary Issue

HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

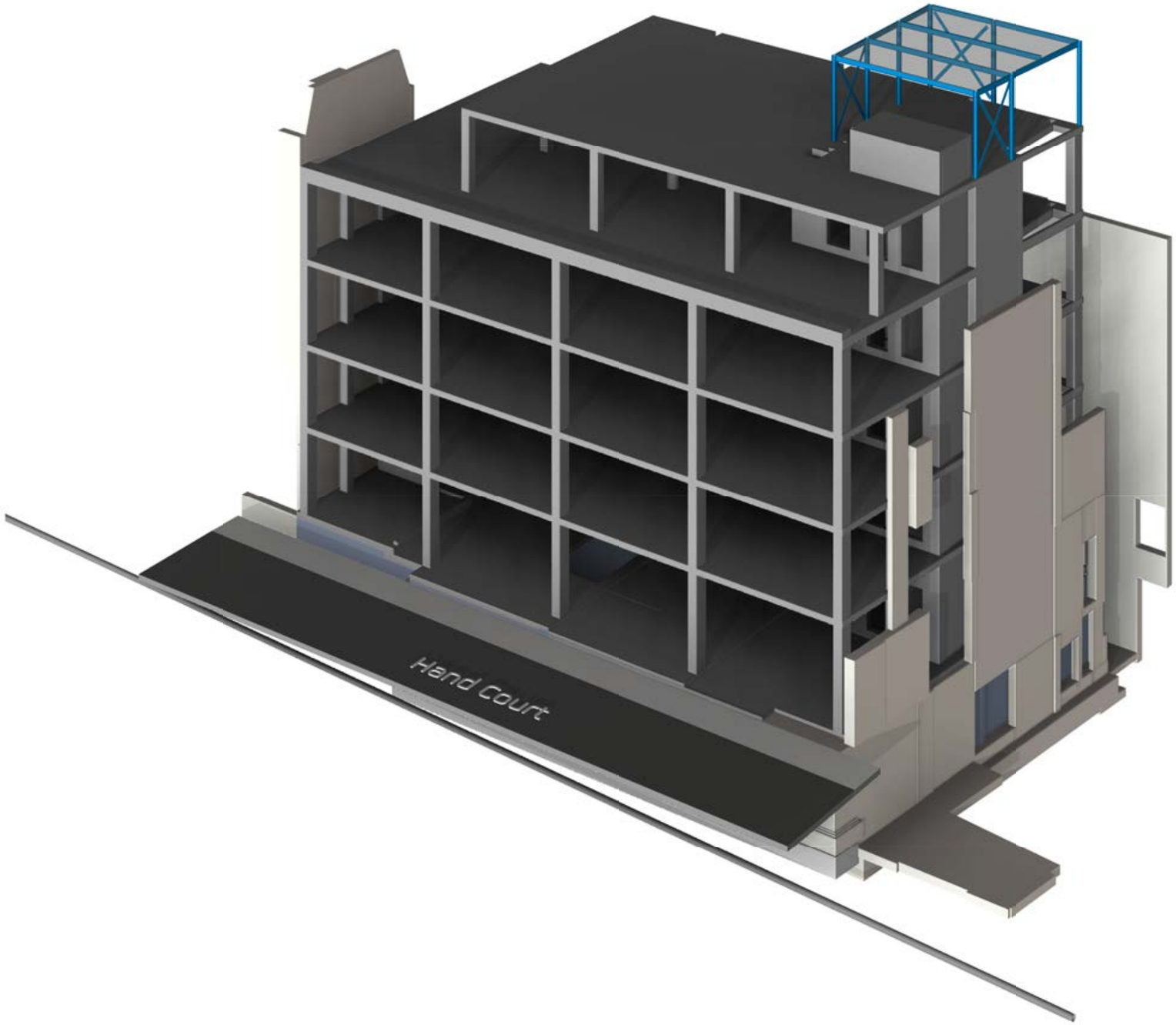
Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Demolition Plans
Roof

Purpose of Issue **Preliminary** Scale at A1 **1 : 50**

Drawing No **1508 / HC/D130** Rev **P1**

100mm @ A1 (50mm @ A3)



Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

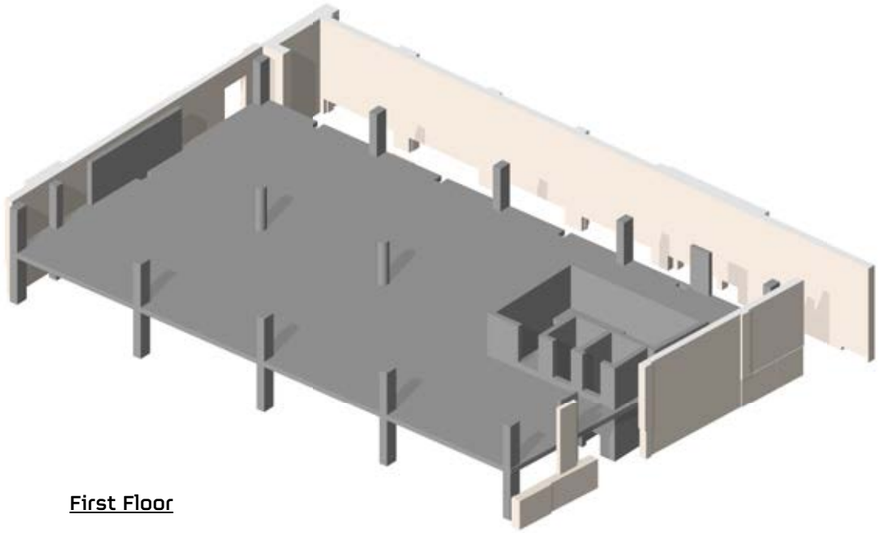
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed
Perspective View

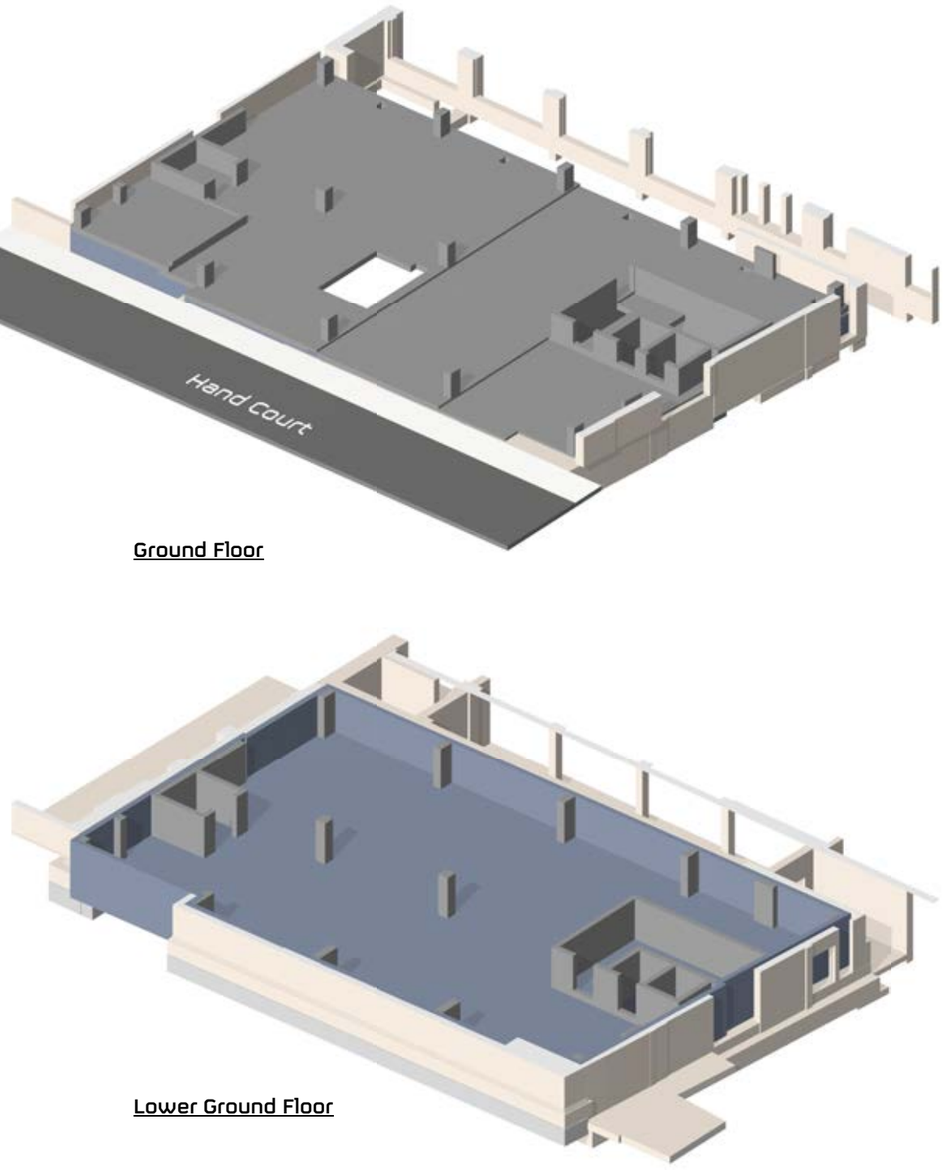
Purpose of Issue **Stage 2** Scale at A1

Drawing No **1508 / HC/P004** Rev **P1**

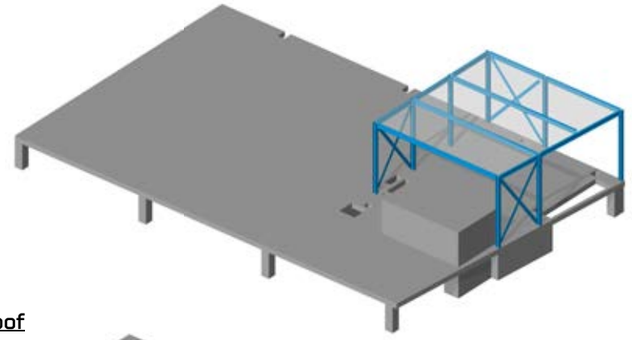


First Floor

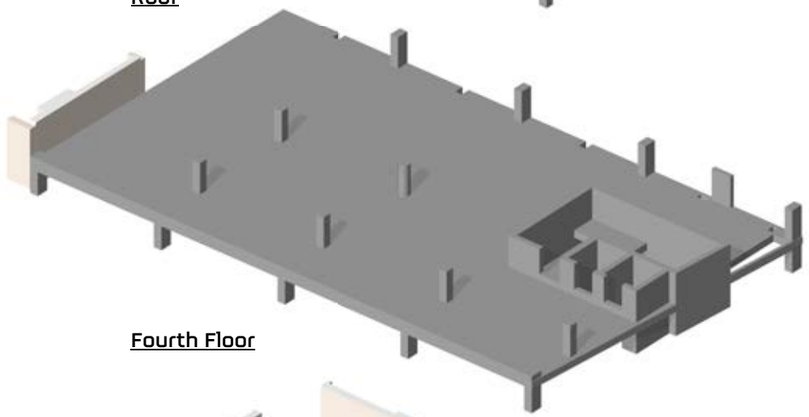
Ground Floor



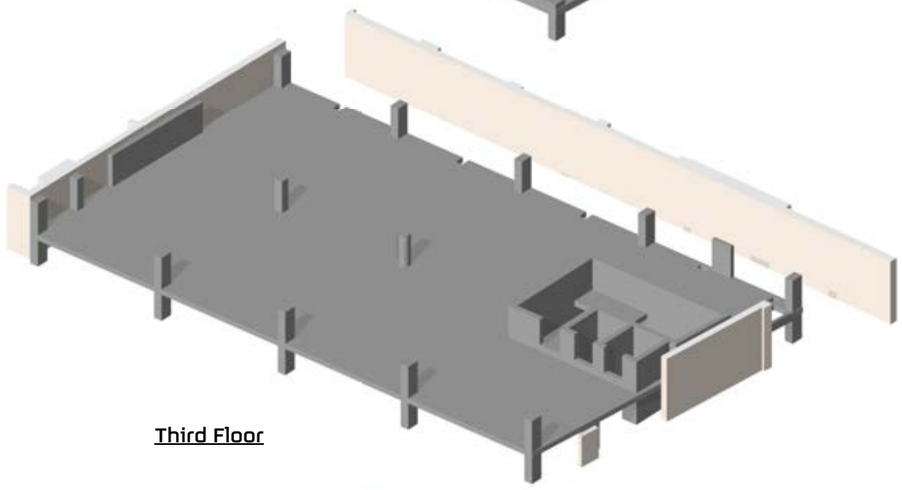
Lower Ground Floor



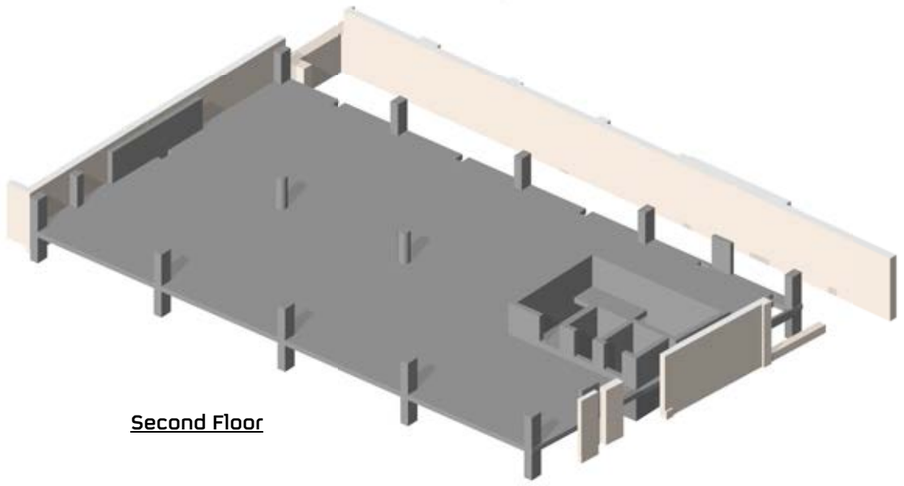
Roof



Fourth Floor



Third Floor



Second Floor

100mm @ A1 (50mm @ A3)

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

hts.uk.com

Job Name

High Holborn Estate
18-21 Hand Court

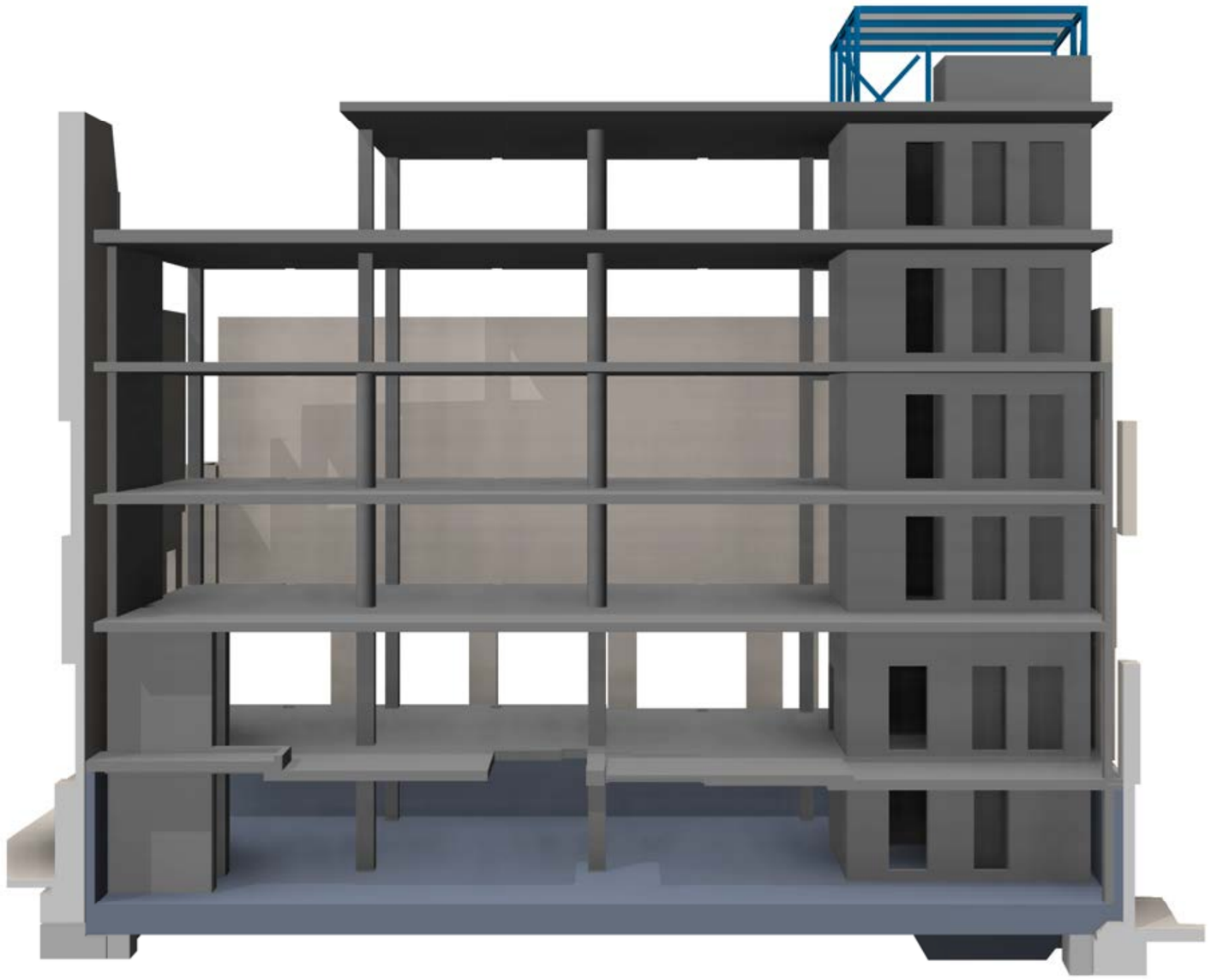
Drawing Title

Proposed Floor Plates

Purpose of Issue **Stage 2** Scale at A1

Drawing No **1508 / HC/P006** Rev **P1**

100mm @ A1 (50mm @ A3)



Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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Job Name

High Holborn Estate
18-21 Hand Court

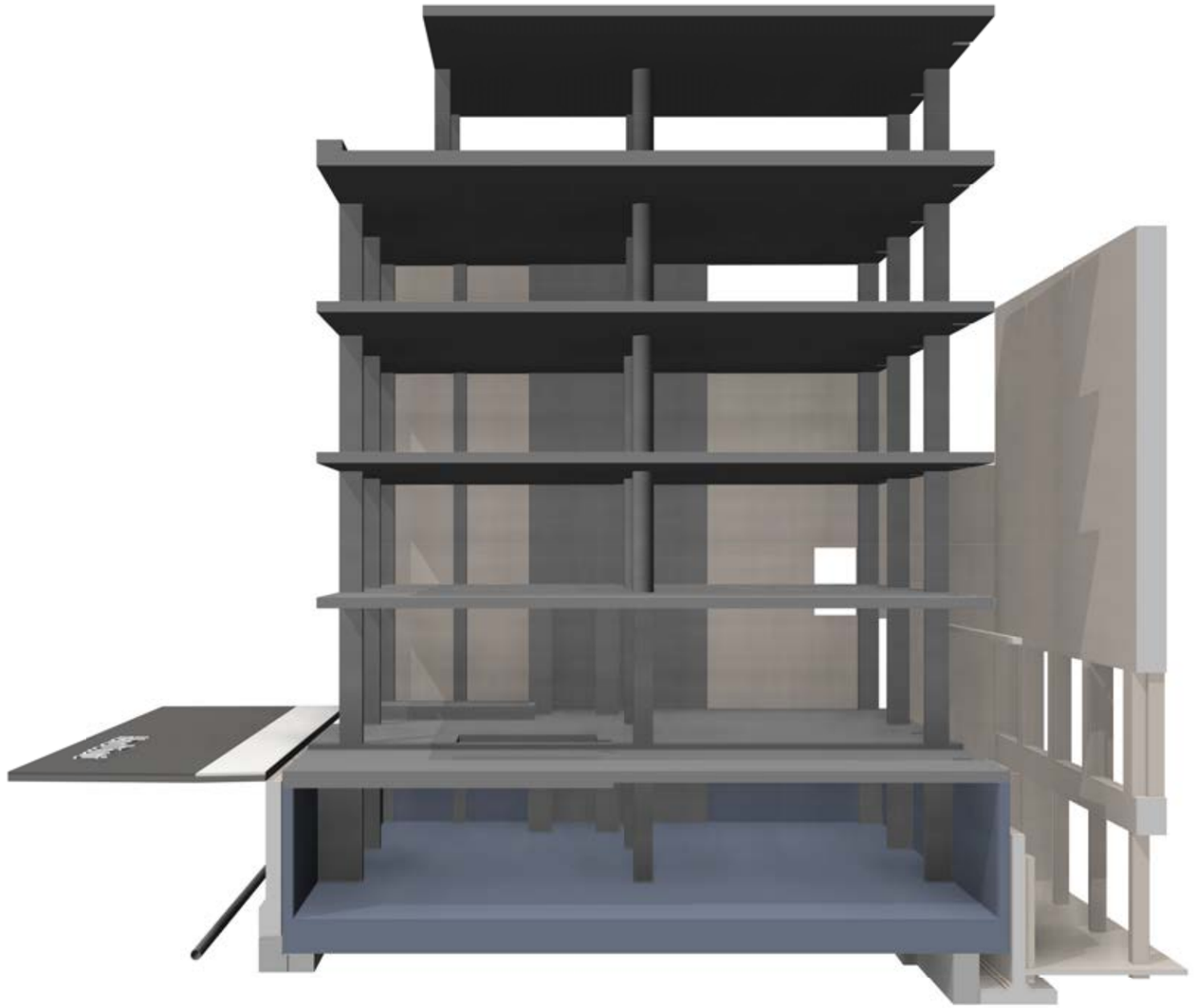
Drawing Title

Proposed Perspective Sections

Purpose of Issue **Stage 2** Scale at A1

Drawing No **1508 / HC/P008** Rev **P1**

100mm @ A1 (50mm @ A3)



Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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Job Name

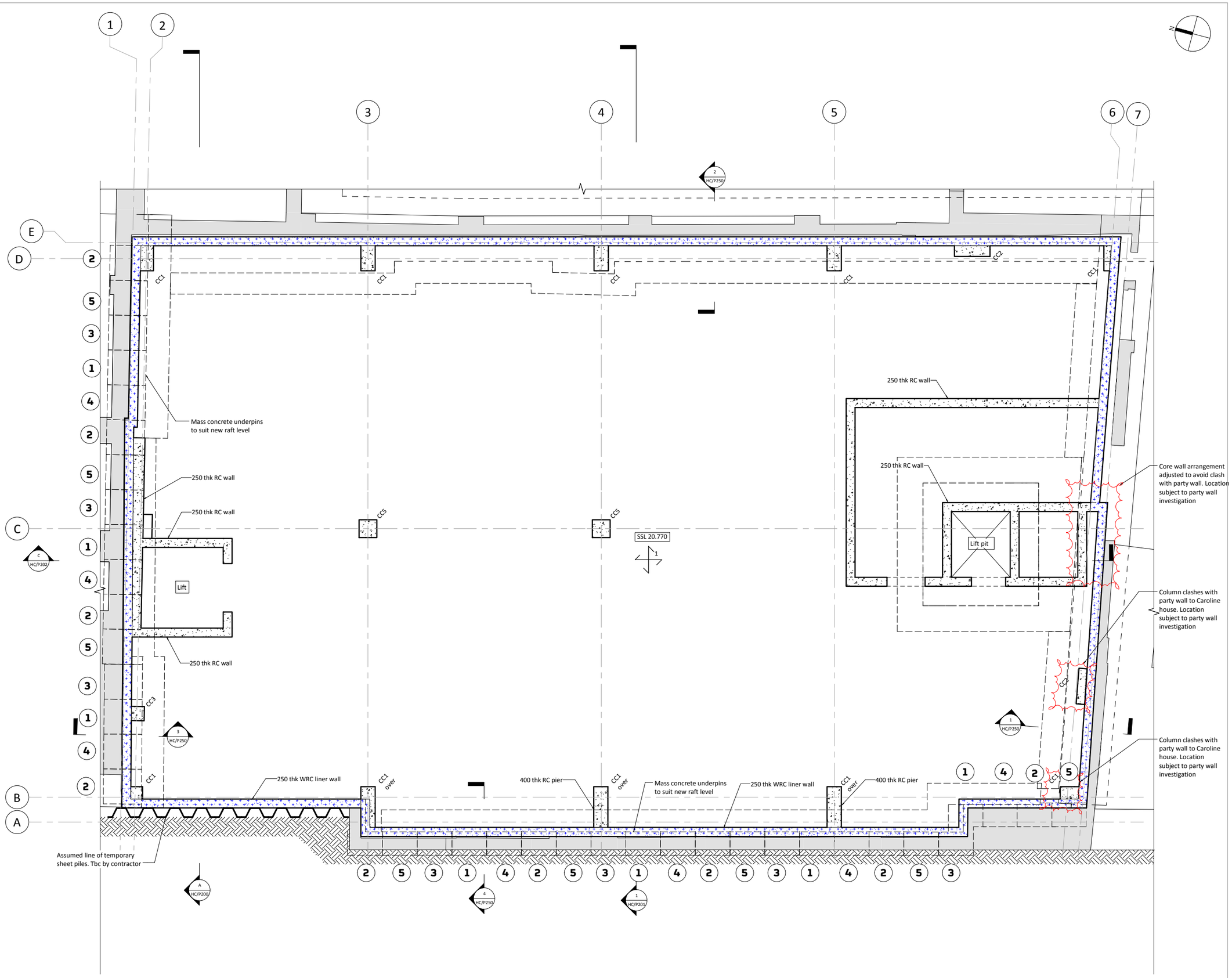
High Holborn Estate
18-21 Hand Court

Drawing Title

Proposed
Perspective Sections

Purpose of Issue **Stage 2** Scale at A1

Drawing No **1508 / HC/P009** Rev **P1**



100mm @ A1 (50mm @ A3)

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Column Schedule

C1	152x152x23 UC	CC3	400 x 400 RC
CC1	600 x 400 RC	CC4	550 Ø RC
CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

hts.uk.com

Job Name

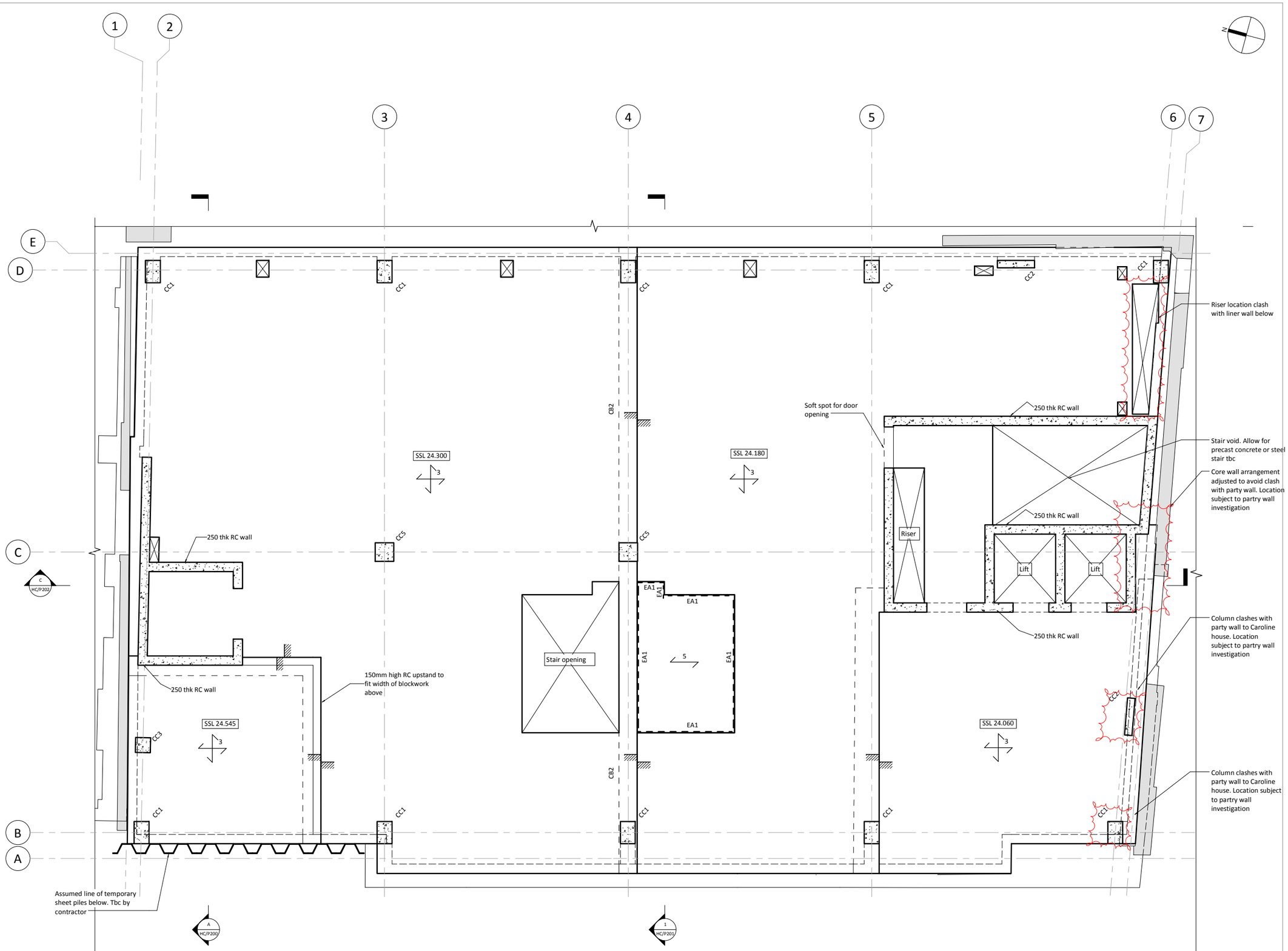
High Holborn Estate
18-21 Hand Court

Drawing Title

Proposed Plans
Lower Ground Floor

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P090** Rev **P1**



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Column Schedule

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CC1	600 x 400 RC	CC4	550 Ø RC
CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

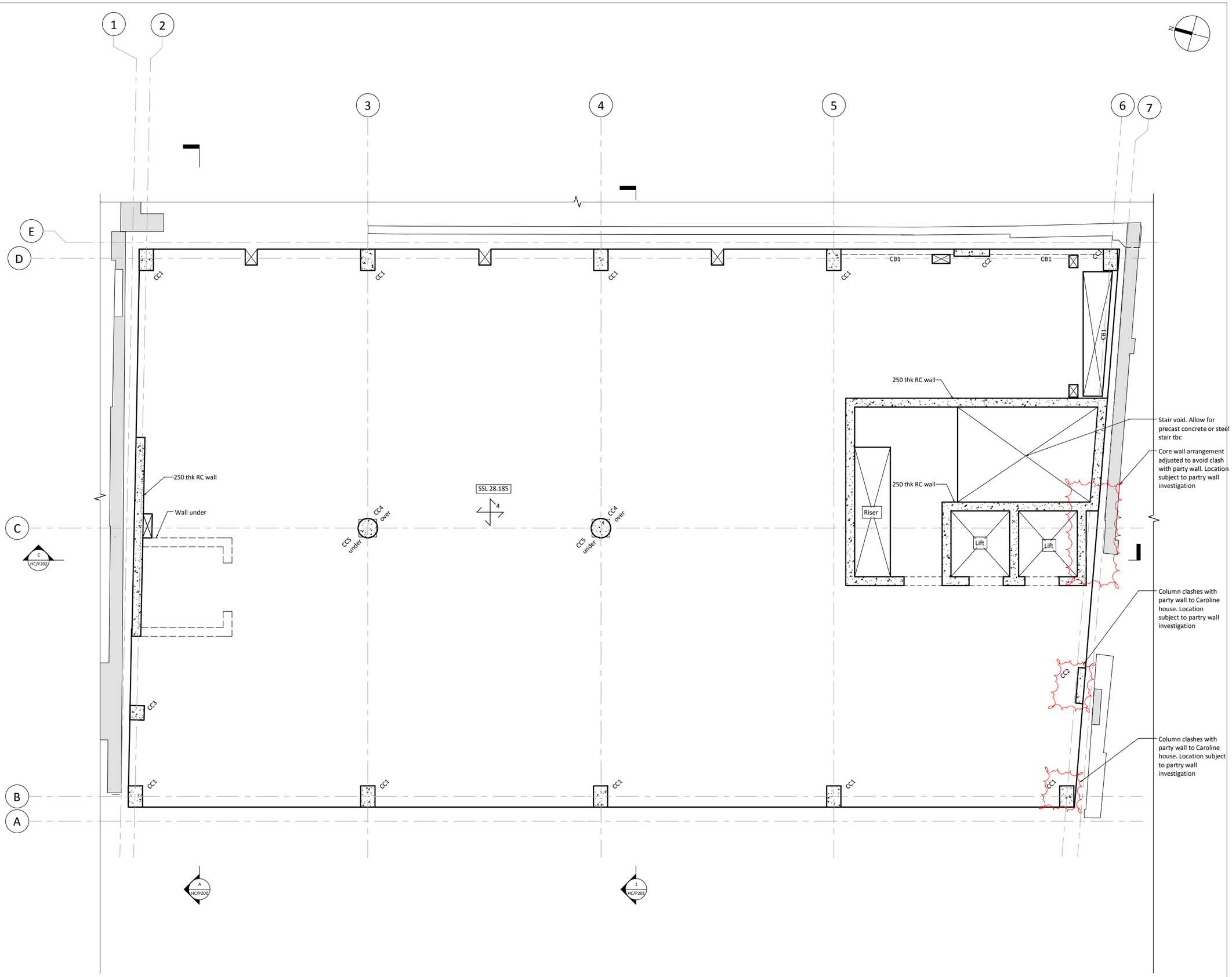
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Plans
Ground Floor

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P100** Rev **P1**



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Beam Schedule

B1	203x102x23 UB
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CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

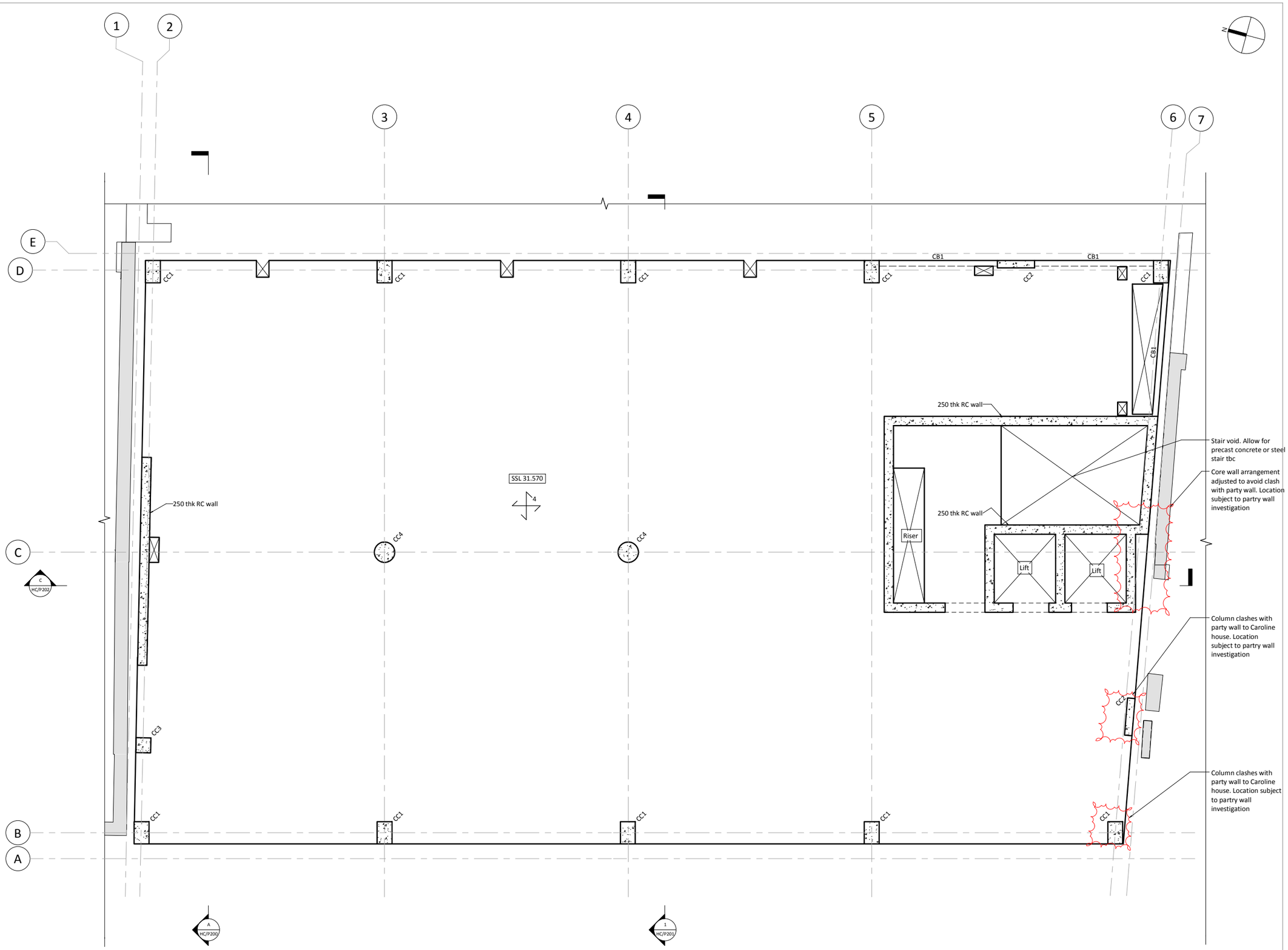
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Plans
First Floor

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P110** Rev **P1**



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CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

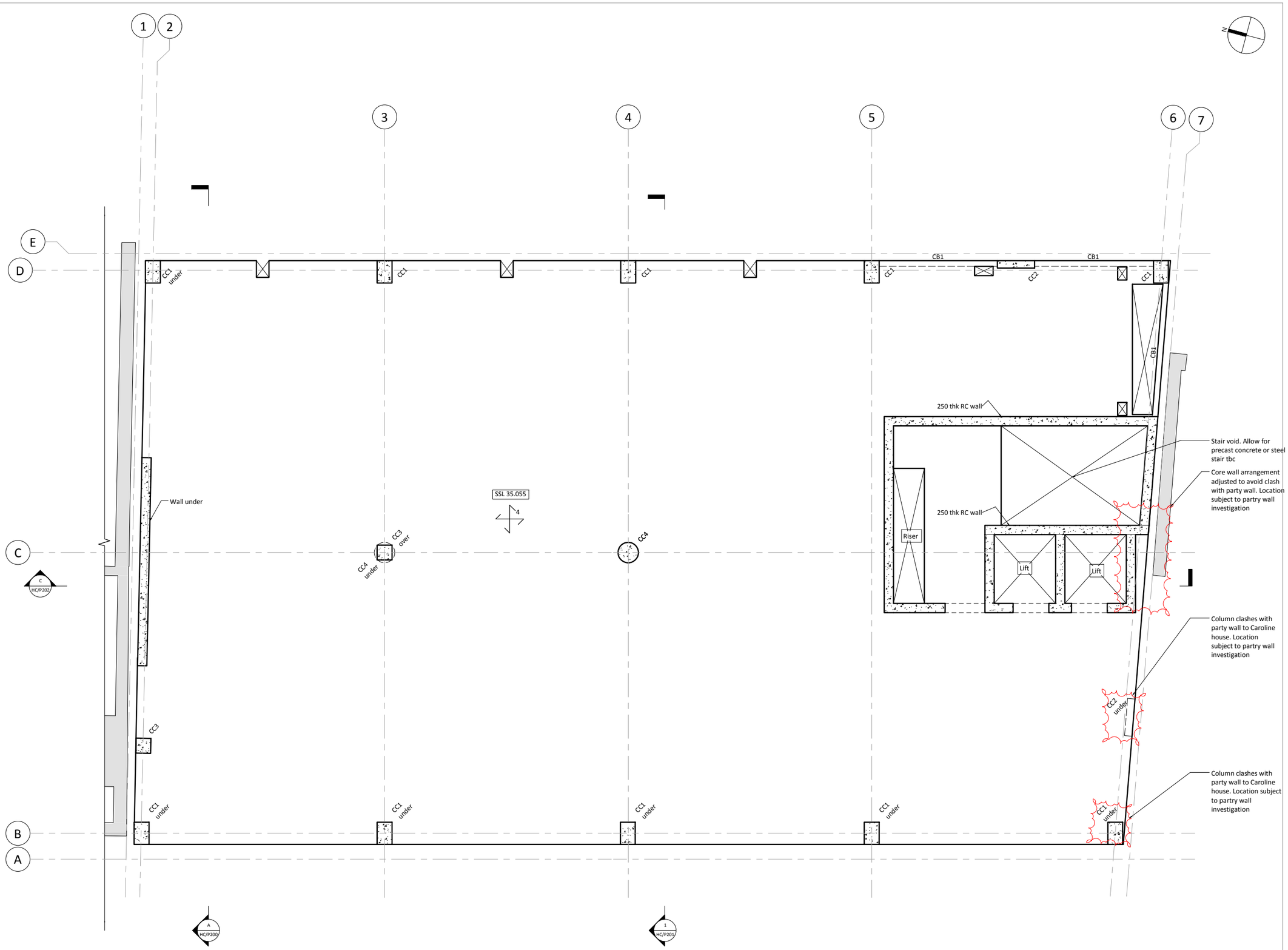
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Plans
Second Floor

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P120** Rev **P1**



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CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

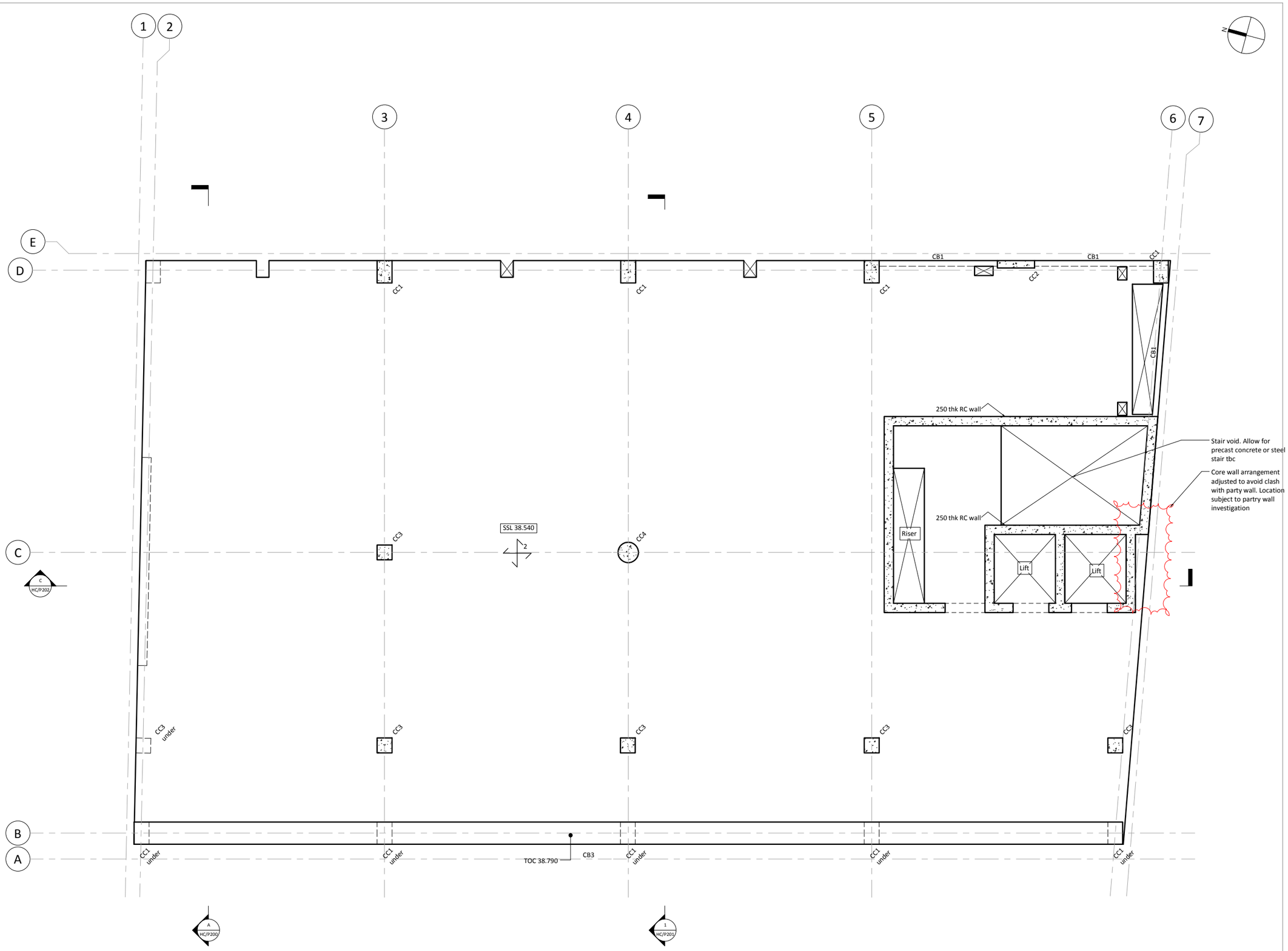
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Plans
Third Floor

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P130** Rev **P1**



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Column Schedule

C1	152x152x23 UC	CC3	400 x 400 RC
CC1	600 x 400 RC	CC4	550 Ø RC
CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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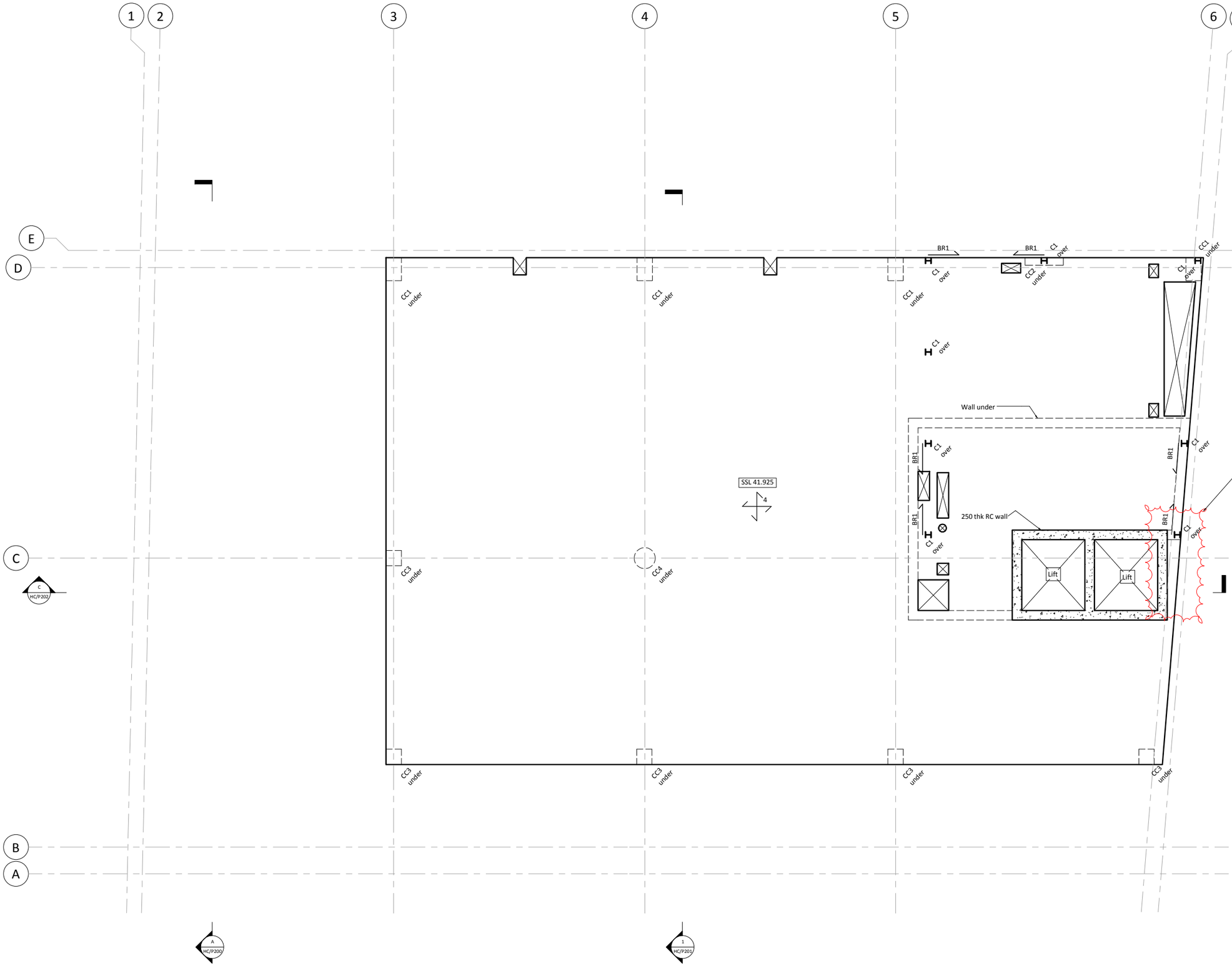
Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Plans
Fourth Floor

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P140** Rev **P1**



100mm @ A1 (50mm @ A3)

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Column Schedule

C1	152x152x23 UC	CC3	400 x 400 RC
CC1	600 x 400 RC	CC4	550 Ø RC
CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

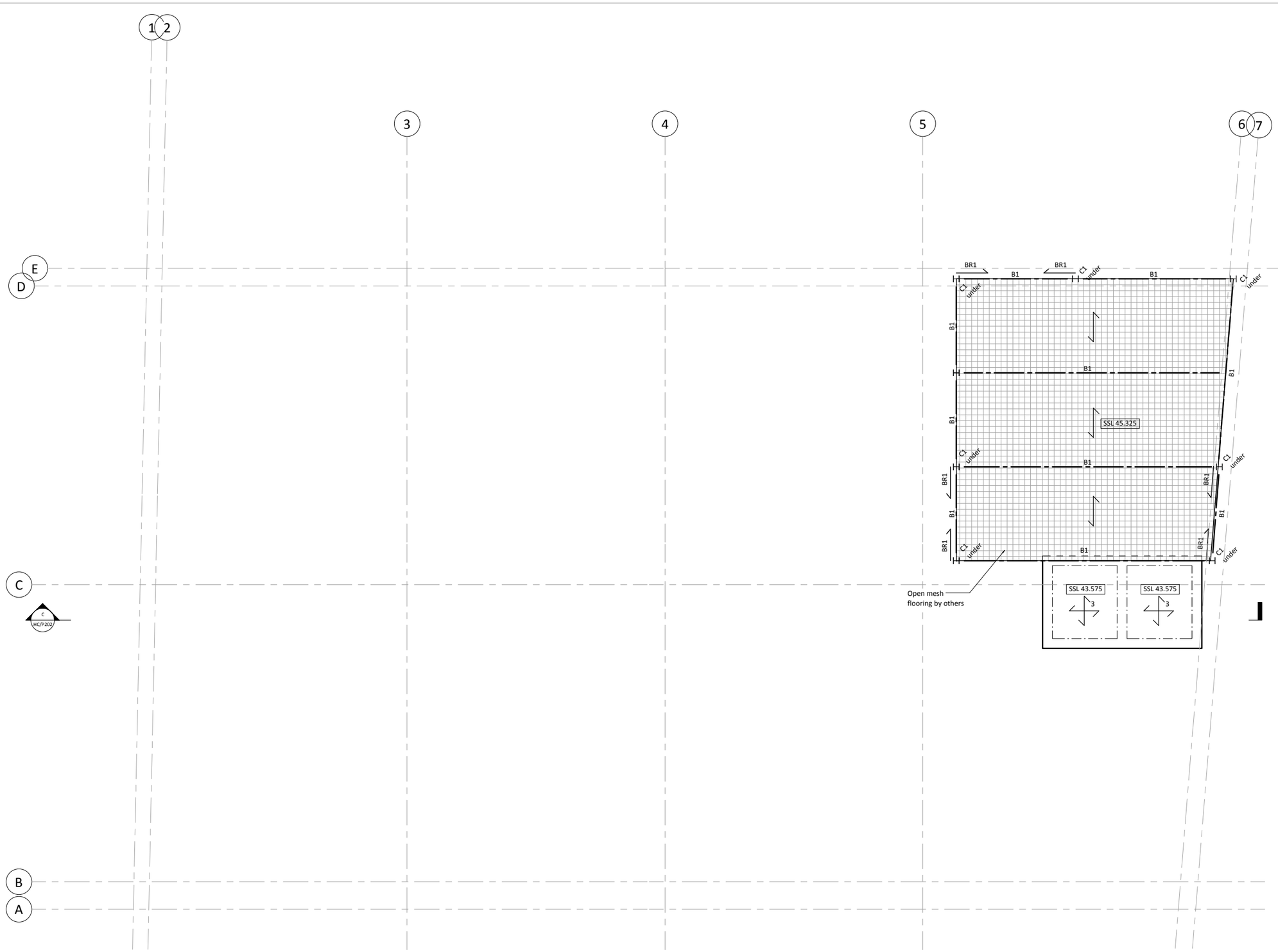
HEYNE TILLETT STEEL
STRUCTURAL ENGINEERS
hts.uk.com

Job Name
High Holborn Estate
18-21 Hand Court

Drawing Title
Proposed Plans
Roof

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P150** Rev **P1**



100mm @ A1 (50mm @ A3)

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Column Schedule

C1	152x152x23 UC	CC3	400 x 400 RC
CC1	600 x 400 RC	CC4	550 Ø RC
CC2	1000 x 200 RC	CC5	500 x 500 RC

Beam Schedule

B1	203x102x23 UB
BR1	150 x 10 MS plate cross-brace
CB1	400d x 150w RC
CB2	395d x 490w RC
CB3	600d x 600w RC upstand
EA1	100x100x8 EA

Floor Schedule

Profiled deck	Timber Floor	RC slab	
1	800 thk WRC raft foundation		
2	350 thk RC slab		
3	275 thk RC slab		
4	250 thk RC slab		
5	Beam and block infill		

Legend

	Proposed RC structure
	Proposed WRC structure
	Proposed Steel Framing

Rev	Date	By	Eng	Amendments
P1	29.06.18	IZ	SL	STAGE 2

HEYNE TILLETT STEEL

STRUCTURAL ENGINEERS

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Job Name

High Holborn Estate
18-21 Hand Court

Drawing Title

Proposed Plans
Roof Plant and Lift Overrun

Purpose of Issue **Stage 2** Scale at A1 **1 : 50**

Drawing No **1508 / HC/P160** Rev **P1**