CampbellReith
consulting engineers

7 Greville Place
London NW6 5JP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12336-63
Revision: D2

August 2016

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Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	16/06/16	Comment	NAjap-12336-63-060616-7 Greville Place-D1.doc	N Aalabaf	F G Acheson	E Brown
D2	12/08/16	Comment	NAjap-12336-63-120816-7 Greville Place-D2.doc	N Aalabaf	F G Acheson	E Brown

Document Details

Last saved	12/08/2016 10:00
Path	NAjap-12336-63-120816-7 Greville Place-D2.doc
Author	N Aalabaf, BEng MSc DIC
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12336-63
Project Name	7 Greville Place
Planning Reference	2016/1489/P

Contents

Appendix

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 7 Greville Place, London, NW6 5JP (planning reference 2016/1489/P). The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The Basement Impact Assessment (BIA), Geotechnical Desk Study and Ground Investigation have been carried out by Jomas Associates Ltd and a Structural Feasibility Report (SFR) was prepared by Halstead Associates.

1.5. The initial Basement Impact Assessment (BIA) raised a number of queries relating to BIA format, hydrology and stability of the proposed structure and neighbouring property. Further to the submission of CampbellReith's initial BIA audit report, supplementary information was provided in response to the queries raised. The current report takes account of that information and updates the BIA audit.

1.6. The qualifications of the author of the BIA did not comply with the requirements of CPG4. However, whilst CPG4 requires the input of a CEng from a member of the Engineering Council, C.WEM or a CEng MICE with respect to surface flow and flooding, it is considered that the BIA has appropriately addressed this issue.

1.7. The BIA confirmed the basement is to be founded within the London Clay and the water table is considered to be perched water. Sump pumping is proposed to deal with the anticipated perched water inflows. It is understood that a wine cellar is no longer required and therefore is omitted from the application.

1.8. A description of temporary works during construction and a construction sequence have now been provided.

1.9. No information was presented with respect to adjacent property foundations and presence or absence of adjacent buildings and this was requested. The response received to query no. 5 is contradictory and clarification is requested.

1.10. No estimates of horizontal and vertical movements from the underpinning, excavation and heave movements from the excavation have been provided and this is requested. This is an integral part of the impact assessment and needs to be undertaken at this stage. While it is not possible to determine the neighbouring property foundations at this stage, maximum differential depth should be assumed.

1.11. No assessment has been undertaken of the potential; damage to adjacent properties due to horizontal and vertical ground movements and this is requested.

1.12. No proposals are provided for a movement monitoring strategy during excavation and construction. Outline proposals are requested with details and trigger levels to be agreed as part of the Party Wall award.

1.13. The information provided with respect to hydrogeology is considered to be sufficient and it is accepted that there are no potential impacts to groundwater flow from the proposed development.

1.14. It is accepted that the site is not at risk of surface water flooding and there are no hydrological concerns with respect to the proposed development.

1.15. An outline works programme has now been provided as requested. A detailed programme should be submitted by the appointed contractor at a later date.

1.16. Queries and requests for further information are discussed in Section 4 and summarised in Appendix 2.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 19 May 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 7 Greville Place, London NW6 5JP, Camden Reference 2016/1489/P.

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance (CPG) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment;

c) avoid cumulative impacts upon structural stability or the water environment in the local area, and;

evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *"extension to the existing basement with it extending outwards beneath the existing drive."*

2.6. CampbellReith accessed LBC's Planning Portal on 20 May 2016 and gained access to the following relevant documents for audit purposes:

· Basement Impact Assessment Report (BIA)

- Structural Feasibility Report (SFR)
- Planning Application Drawings consisting of

  Location Plan

  Existing Plans

  Proposed Plans
- Design & Access Statement

2.7. Following the initial audit, supplementary information has been provided on 25th July 2016 by email. The documents provided are as follows:

- Outline programme
- Suggested constructions sequence drawing
- Proposed plans
- Drainage plans
- BIA queries responses

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See Audit paragraph 4.2.
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	See Audit paragraph 4.9.
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	See Audit paragraph 4.6.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See Audit paragraphs 4.7.
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See Audit paragraph 4.8.
Is a conceptual model presented?	Yes	BIA section 8.1 and 8.2.
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	No	See Audit paragraph 4.6.

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	N/A	No issues identified from screening.
Is factual ground investigation data provided?	Yes	GIR section 8.0 and Appendix 8.0.
Is monitoring data presented?	Yes	GIR section 8.2.2.
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	BIA section 2.2.
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	GIR section 13.2. Although this is considered incomplete. No information on retaining wall design parameters.
Does the geotechnical interpretation include information on retaining wall design?	No	Not included. See Audit paragraph 4.11.
Are reports on other investigations required by screening and scoping presented?	N/A	None identified.
Are the baseline conditions described, based on the GSD?	No	No description of neighbouring properties.
Do the base line conditions consider adjacent or nearby basements?	No	No description of neighbouring properties.

Item	Yes/No/NA	Comment
Is an Impact Assessment provided?	No	Not all of the impacts of the basement have been considered. An impact assessment has not been provided in accordance with the Arup GSD. See Audit paragraph 4.11.
Are estimates of ground movement and structural impact presented?	No	No estimates of ground movement and structural impact presented. See Audit paragraph 4.11 and 4.12.
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	No	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	Not all of the impacts of the basement have been considered.
Has the need for monitoring during construction been considered?	Yes	Briefly mentioned but no proposals presented (see Audit paragraph 4.14).
Have the residual (after mitigation) impacts been clearly identified?	N/A	No such issues identified.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	See Audit paragraphs 4.11 and 4.12.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	No	Damage to the surrounding buildings has not been identified (see Audit paragraph 4.10, 4.11 and 4.12.
Are non-technical summaries provided?	Yes	Provided.

4.0 DISCUSSION

4.1. The initial Basement Impact Assessment (BIA) raised a number of queries relating to BIA format, hydrology and stability of the proposed structure and neighbouring property. Further to the submission of CampbellReith's initial BIA audit report, supplementary information was provided in response to the queries raised. The current report takes account of the information and updates the BIA audit.

4.2. The qualifications of the author of the BIA did not comply with the requirements of CPG4. The BIA has been reviewed by a Chartered Geologist and whilst CPG4 requires the input of a CEng from a member of the Engineering Council, C.WEM or a CEng MICE with respect to surface flow and flooding, it is considered that the BIA has appropriately addressed this issue.

4.3. A Structural Feasibility Report was prepared by Halstead Associates and the author is a Chartered Engineer.

4.4. The existing building is a two storey semi-detached house with a basement under the footprint of the building, a garden at the back and a driveway at the front of the property. It is proposed to extend the existing basement toward the front of the property beneath the driveway.

4.5. The Architect's drawing indicated a new wine cellar excavated beneath the existing basement. The response received to query no. 2 of the Audit query notes that the wine cellar is no longer required and therefore is omitted from the application.

4.6. No information was presented in the BIA or in any other document with respect to adjacent property foundations. The response received to query no. 5 of the Audit query states that 'there will be no scope for establishing the precise depth of the foundations to the adjacent properties unless the neighbours grant access to carry out trial pit investigation'. The response also states that there are no basements in the adjacent properties and the proposed basement foundations will not noticeably increase the differential depth. However, this is contradictory. Increasing the depth of a foundation adjacent to properties with no basements will increase the differential depth.

4.7. Clarification was requested on the risk of shrink-swell and has now been provided. Whilst the geology comprises London Clay, there are no significant trees in the vicinity of the proposed works. It is understood that the risk of shrink-swell is not considered to have a significant effect on the proposed basement.

4.8. Clarification was requested on the proposed site drainage and whether or not surface water runoff will be infiltrated into the ground. The supplementary information has now been provided.

It is understood that surface water runoff from the site will be discharge into the existing network and no additional surface water will be discharged into the ground.

4.9. The proposed basement is to be formed by underpinning. It is stated that the construction of the walls of the new basement extension will involve "carrying out local excavations of around 1m in width and down to the formation level of the new basement". A description of temporary works during construction and construction sequence was requested and has now been provided.

4.10. Cl. 234 of the Arup GSD states that it is the applicant's responsibility to provide sufficient information proportionate to the potential impacts of the proposed basement. A thorough screening process with the requirements of CPG4 accurately followed needs to be completed with clear justification to the 'No' responses to demonstrate there are no potential impacts from the proposal.

4.11. No estimated vertical or horizontal movement from the underpinning and excavation have been presented. Although it is stated in Section 4.05 that '*allowance should be made within the design of the basement slab for theoretical heave pressures*', no assessment of the magnitude of the heave is presented. The response to query no. 6 of the Audit query states that '*estimates can be obtained after detailed structural engineering design information with type of construction at a later stage*'. However, this is an integral part of the impact assessment and needs to be undertaken at this stage.

4.12. In addition, there is no evidence presented with respect to the depths of the foundations to 7 Greville Place or the neighbouring properties to allow the differential depth, and any potential impact such as ground movements and building damage, to be determined. While it is not possible to determine the neighbouring property foundations at this stage, maximum differential depth should be assumed.

4.13. The structural impact to the public highway has now been considered. It is understood that no impact is expected on the public highway.

4.14. Although Section 6.6.2 of the BIA recommends movement monitoring to be undertaken, no outline proposals have been presented and this is requested. An outline of movement monitoring proposal based on an assessment of likely movement and building damage still needs to be provided. Details and trigger levels to be agreed as part of the party wall award.

4.15. An outline works programme has now been provided as requested. A detailed programme should be submitted by the appointed contractor at a later date.

5.0 CONCLUSIONS

5.1. Further to the submission of CampbellReith's initial BIA audit report, supplementary information was provided in response to the queries raised. The current report takes account of that information and updates the BIA audit.

5.2. The qualifications of the author of the BIA did not comply with the requirements of CPG4. Whilst CPG4 requires the input of a CEng from a member of the Engineering Council, C.WEM or a CEng MICE with respect to surface flow and flooding, it is considered that the BIA has appropriately addressed this issue.

5.3. The BIA confirmed the basement is to be founded within the London Clay and the water table is considered to be perched water. Sump pumping is proposed to deal with the anticipated perched water inflows. It is understood that a wine cellar is no longer required and therefore is omitted from the application.

5.4. A description of temporary works during construction and construction sequence has now been provided.

5.5. No information was presented with respect to adjacent property foundations and presence or absence of adjacent buildings and this was requested. The response received to query no. 5 is contradictory and clarification is requested.

5.6. No estimates of horizontal and vertical movements from the underpinning, excavation and heave movements from the excavation have been provided and this is requested. This is an integral part of the impact assessment and needs to be undertaken at this stage. While it is not possible to determine the neighbouring property foundations at this stage, maximum differential depth should be assumed.

5.7. No assessment has been undertaken of the potential; damage to adjacent properties due to horizontal and vertical ground movements and this is requested.

5.8. No proposals are provided for a movement monitoring strategy during excavation and construction. Outline proposals are requested with details and trigger levels to be agreed as part of the Party Wall award.

5.9. The information provided with respect to hydrogeology is considered to be sufficient and it is accepted that there are no potential impacts to groundwater flow from the proposed development.

5.10. It is accepted that the site is not at risk of surface water flooding and there are no hydrological concerns with respect to the proposed development.

5.11. An outline works programme has now been provided as requested. A detailed programme should be submitted by the appointed contractor at a later date.

Appendix 1: Residents' Consultation Comment

None

Appendix 2: Audit Query Tracker

CampbellReith
consulting engineers

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA format	Qualifications of individuals involved not in accordance with CPG4 requirements.	Closed- Qualifications of individuals involved meet the requirements.	10.08.16
2	BIA format	Proposal not sufficiently detailed.	Closed-Clarification made with respect to wine cellar and proposed basement dimensions. Works programme now provided.	10.08.16
3	BIA format	Works programme not provided	Closed- Outline programme provided.	10.08.16
4	Hydrology	Clarification requested on the proposed site drainage	Closed-Drainage proposal provided.	10.08.16
5	Stability	Neighbouring property foundations not determined and the response provided is contradictory (see Audit paragraph 4.6 and 4.12).	Open- Clarification is requested. Neighbouring foundations to be established or maximum differential depth assumed.	
6	Stability	Clarification is requested on the risk of shrink-swell	Closed-Clarification provided.	10.08.16
7	Stability	No estimates of ground movement and structural impact presented (see Audit paragraph 4.11)	Open- to be provided.	
8	Stability	No temporary works proposal provided	Closed- provided.	10.08.16
9	Stability	Damage category for neighbouring properties not provided (see Audit paragraph 4.12)	Open- Anticipated movements from all construction activities to be provided together with damage category for neighbouring properties.	
10	Stability	Movement monitoring proposal not provided (see Audit paragraph 4.14).	Open- Outline proposal to be provided. Details and trigger levels to be agreed as part of Party Wall awards.	

Appendix 3: Supplementary Supporting Documents

SCHNEIDER DESIGNERS
architecture. design. interiors

OUTLINE PROGRAMME

For information only

		DURATION (days)	START	END
1	**MOBILISATION & DEMOLITION**	**37.5**		
1.1	Site set up	6		
1.2	Hoarding erecting	8		
1.3	Preparation / demolition works before excavation	9.5		
1.4	Excavation works, prepartion for underpinning	14		
2	**SUPERSTRUTURE WORKS**	**156**		
2.1	Underspinning, reinforcement works	114		
2.2	New slab	30		
2.3	Drainage works, sump pump fittings	12		
3	**NEW WORKS**	**153**		
3.1	Structural alterations including new beams	78		
3.2	Tanking of walls and floor	18		
3.3	Construction of new partition walls, insulation			
3.4	Construction of new ceiling, insulation	18		
3.5	Skimmimg plaster throughout	12		
3.6	Tiling	15		
3.7	Flooring installation	12		
4	**PLUMBING**	**52.5**		
4.1	Hot/cold water connection 1st fix	18		
4.2	Installation of UFH	12		
4.3	Hot/cold water connection 2nd fix	18		
4.4	Connection to boiler and test	4.5		
5	**ELECTRICS**	**65**		
5.1	Temporary installation	5		
5.2	1st Fix power	12		
5.3	1st Fix lighting	12		
5.4	Connection to electric board and test	12		
5.5	2nd Fix power	12		
5.6	2nd Fix lighting	12		
6	**JOINERY**	**64**		
6.1	Intallation of new doors	12		
6.2	Installation of architraves	6		
6.3	Installation of skirtings	6		
6.4	Installation of windows	7		
6.5	Installation of joinery units	24		
6.6	Fitting of kitchen units	9		
7	**FINISHES**	**89**		
7.1	Preparation of walls and ceilings, etc	12		
7.2	Internal decoration	33		
7.3	External decoration	20		
7.4	Finishes	24		
	TOTAL	**38**	**Weeks**	
		9.5	**Months**	

PERIODS (weeks)

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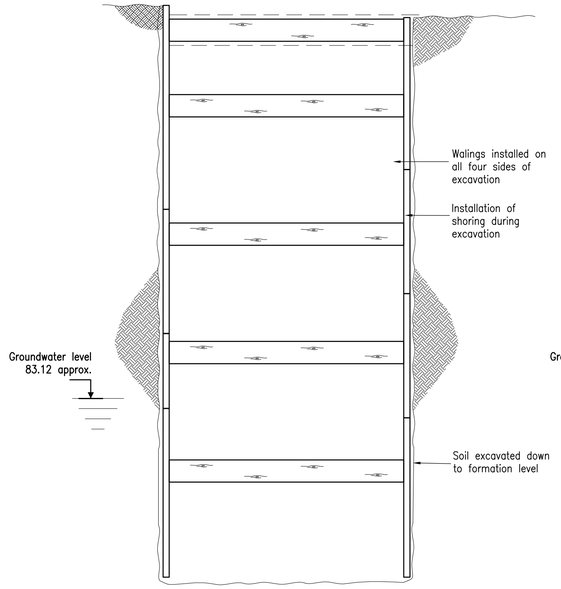

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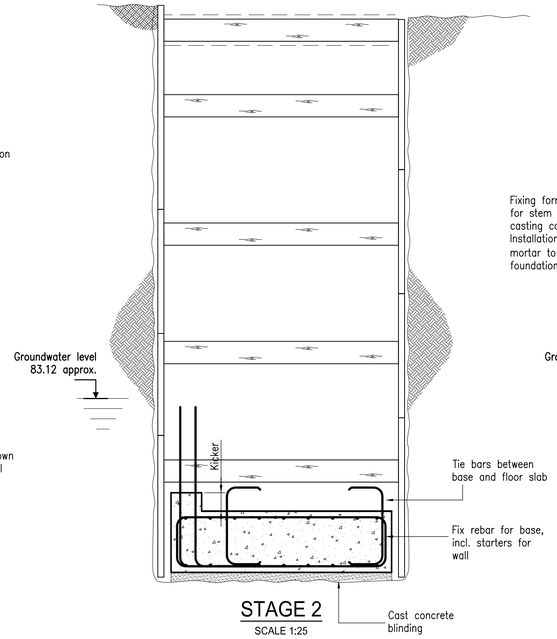

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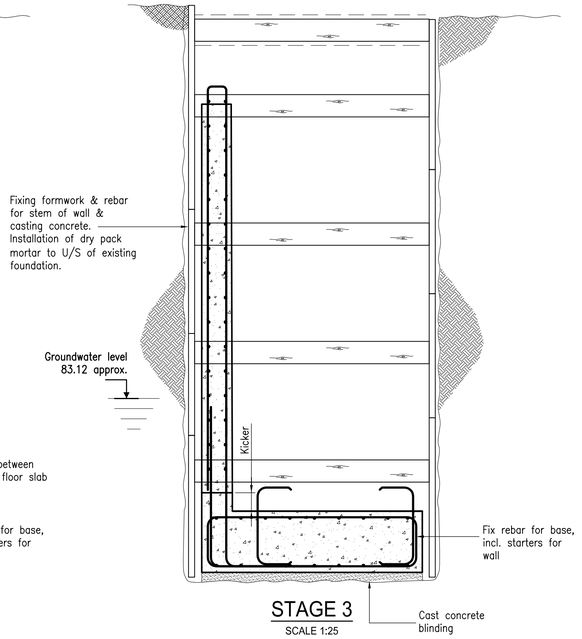

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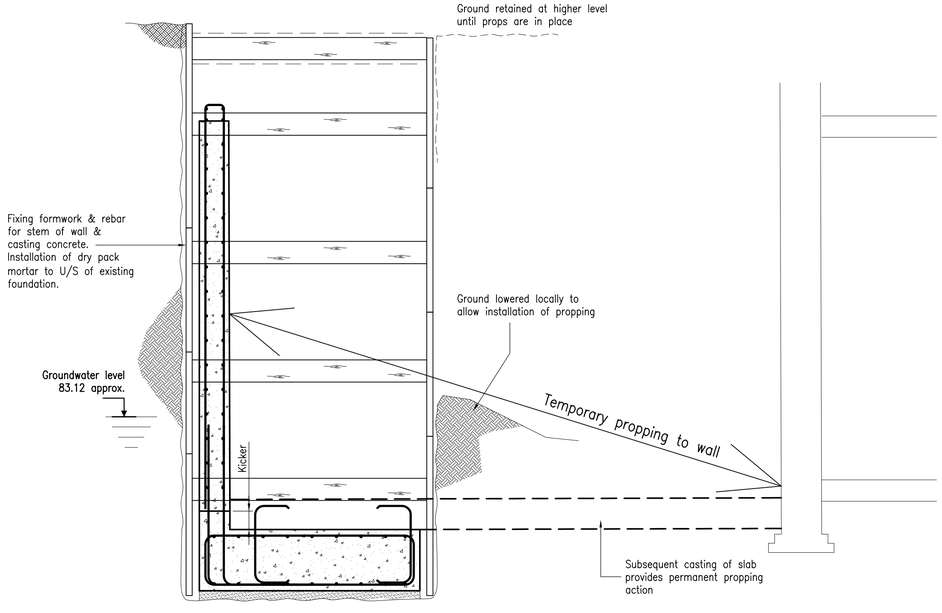

STAGE 4 ONWARDS
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FOR INFORMATION ONLY

Rev.	Date	Revisions	By	Engineer
A	20.07.16	Further sequencing information added.	DO	

Notes:
1. The drawing is to be read in conjunction with all relevant Consultant's drawings and specifications.

Project: 7 GREVILLE PLACE, NW6 5JP
Title: SUGGESTED CONSTRUCTION SEQUENCING FOR RETAINING WALL SECTIONS
Client: Mr N Raveendran
Architect: Schneider Designers

halstead ASSOCIATES CONSTRUCTION CONSULTANTS
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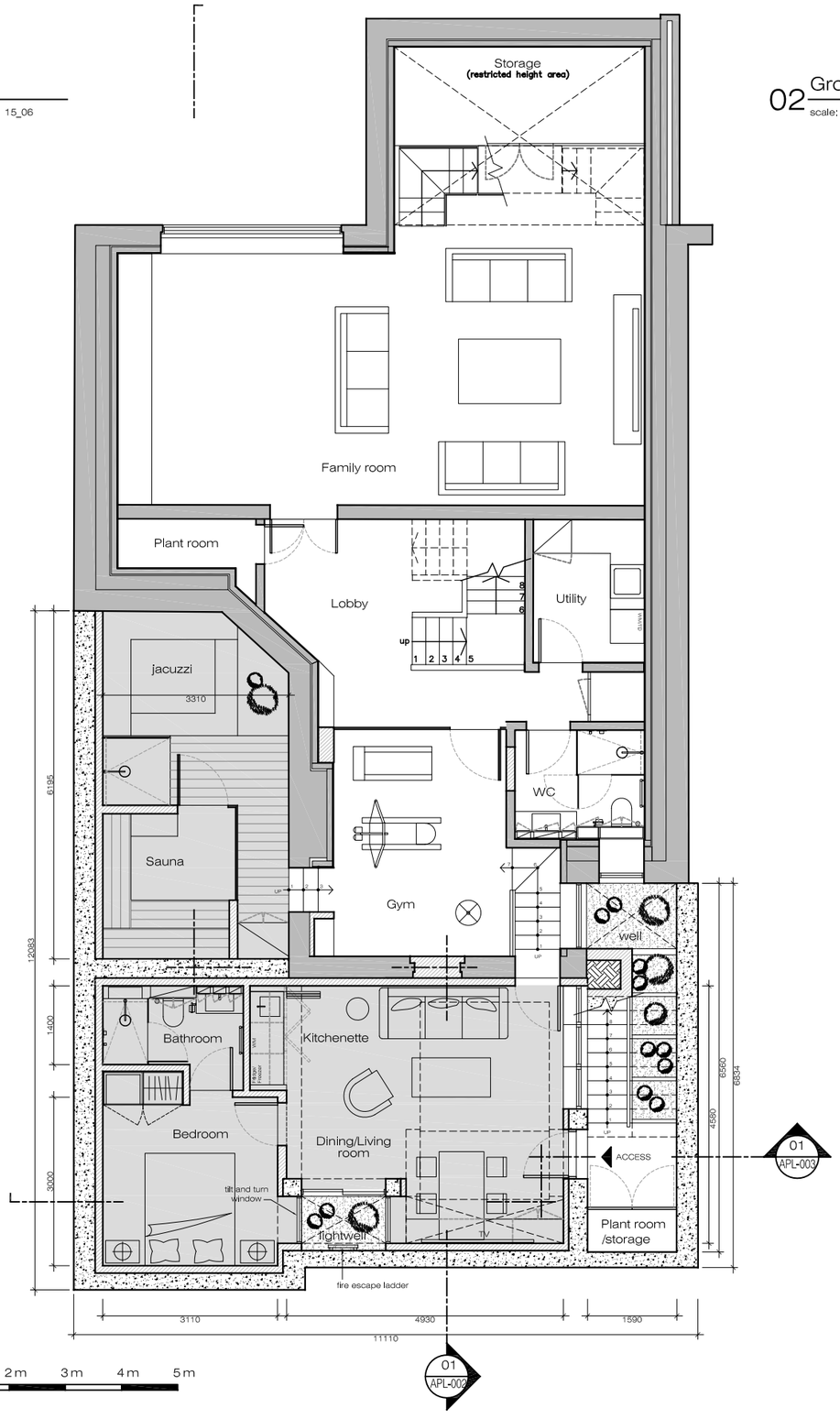
Drawn by: JK
Checked by: DO
Date: 26th February 2016
Scale: AS NOTED @ A1
Drawing No: 16497/PL03
A

01 Basement Floor

scale: 1:100 15_06



EXISTING WALLS

NEW WALLS

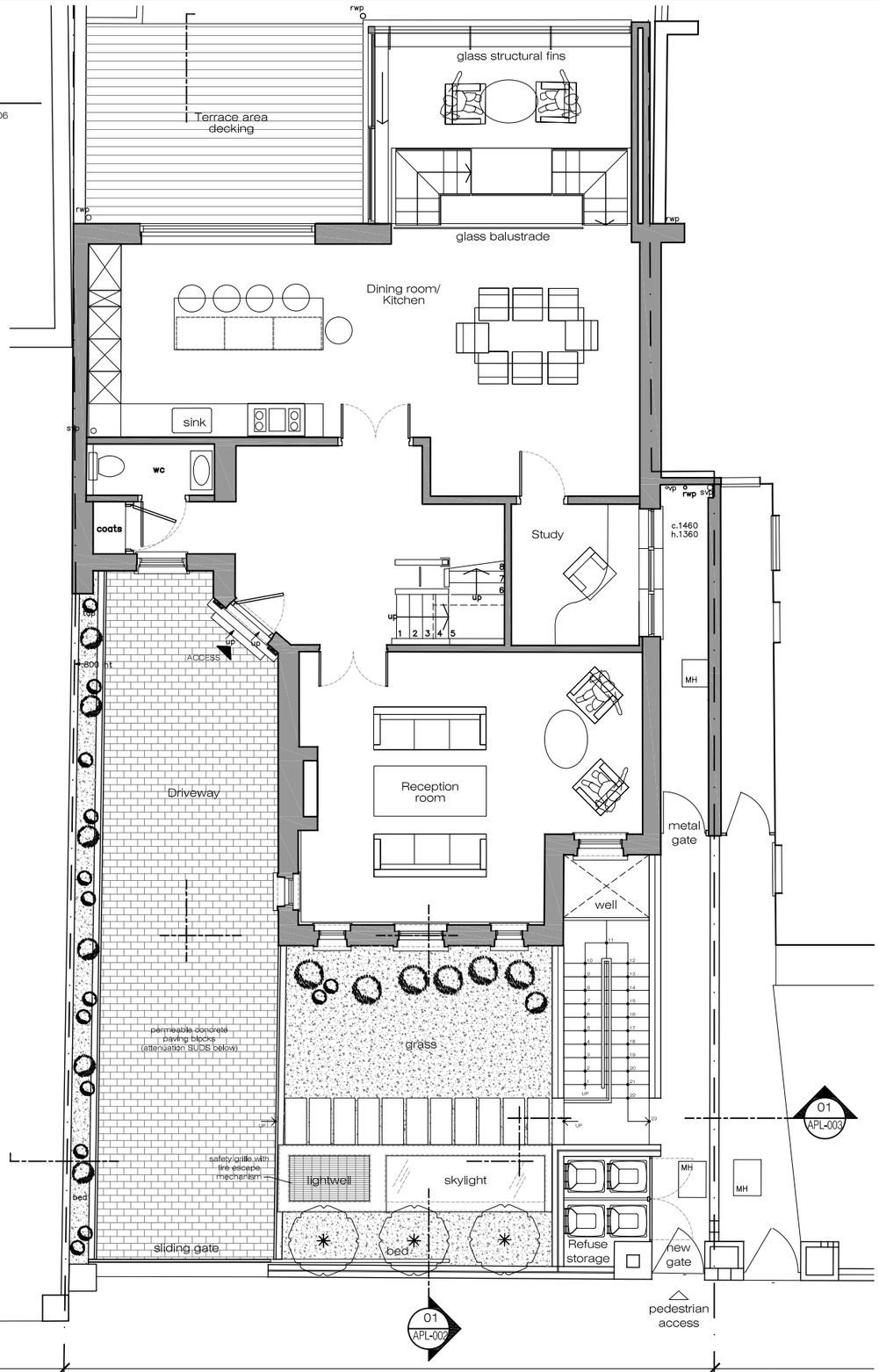
NEW CONCRETE WALLS

0m 1m 2m 3m 4m 5m

1:100

02 Ground Floor

scale: 1:100 15_06



PLEASE NOTE:

1. All dimensions to be checked on site before fabrication.
2. Contractor to refer to engineers drawings before proceeding with works.
3. All drawings and designs are covered by design right (intelectual property), and may not be distributed, copied or issue without written permission of the architect.
4. All design concepts are the sole property of the architect and no adaptations, reproductions or copies may be made without written permission of the architect.
5. These drawings are subject to any variation required or recommendation by any statutory authority, or for the better carrying out of the works.
6. Samples to be provided by contractor for the architect approval.
7. All finishes to architect satisfaction.
8. All drawings to be approved by the architect before construction.

ADDITIONAL NOTES:

Rev	Issued for	Date	By	Issued	Rev	Issued for	Date	By	Issued

Client
PRIVATE CLIENT

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Project
7 Greville Place
London, NW6 5JP

Title
Proposed Basement and Ground Floor Plans

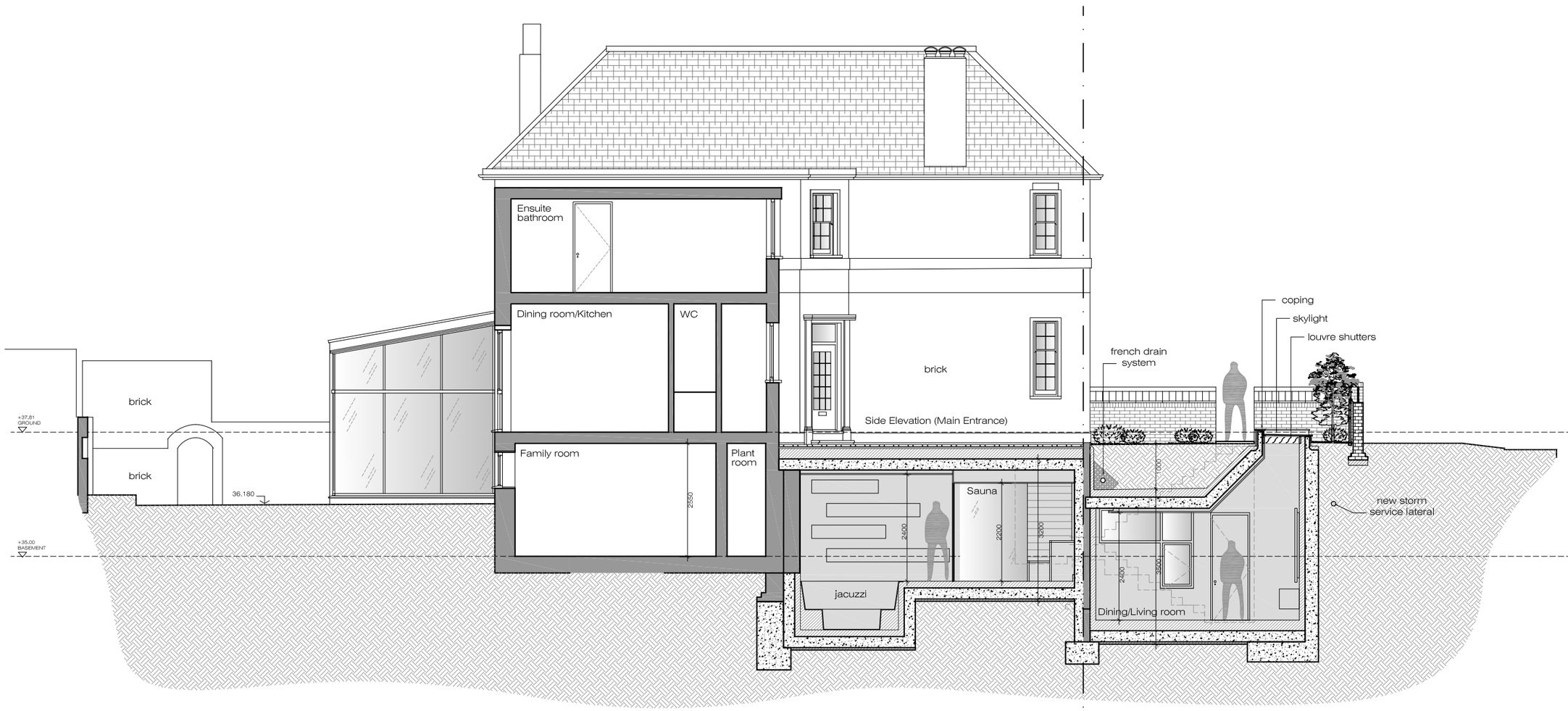
Status
Planning Application

Scale	Drawn	Issued	Date
1:100 @ A3	JL	JL	18-Jul-16

Drawing No
APL-102

Project No
15_08

Revision
01



01 Section A-A

scale: 1:100 15_06

EXISTING WALLS

NEW WALLS

NEW CONCRETE WALLS

0m 1m 2m 3m 4m 5m 10m

1:100

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Project
7 Greville Place
London, NW6 5JP

Title
Proposed
Section A-A

Status
Planning Application

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Drawing No
APL-300

Project No	Revision
15_08	01

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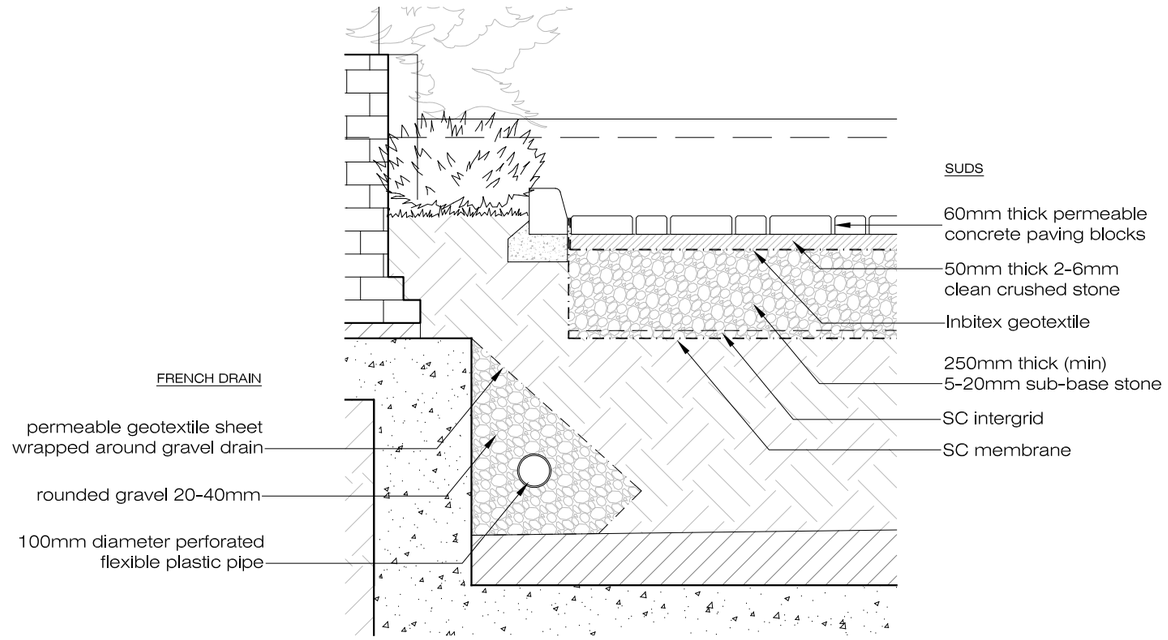

02 Detail of SUDS
scale: 1:20 15_06

EXISTING WALLS

NEW WALLS/FLOORS

NEW CONCRETE WALLS

0m 1m 2m 3m 4m 5m 10m
1:100

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Project
7 Greville Place
London, NW6 5JP

Title
Proposed
Section B-B

Status
Planning Application

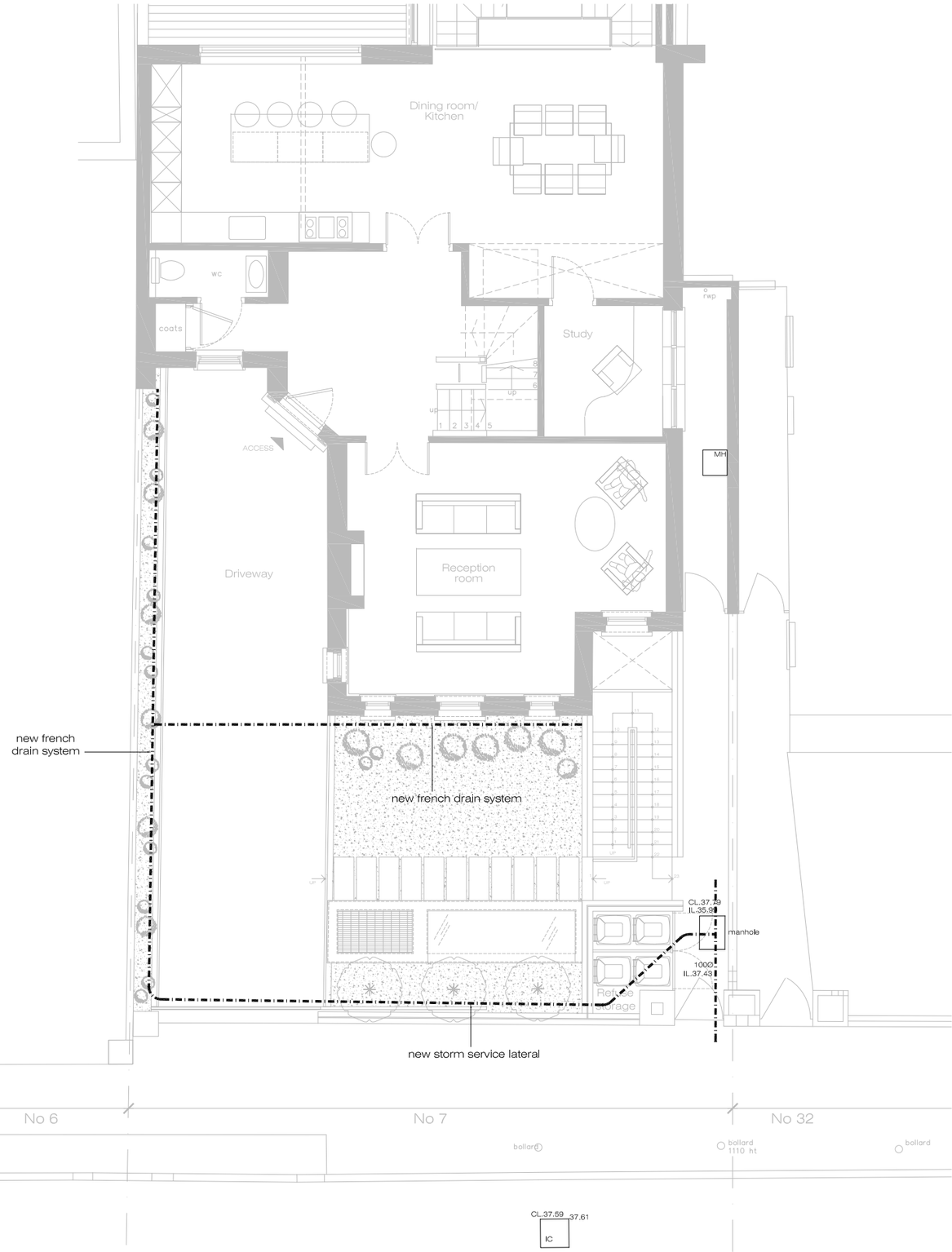
Scale	Drawn	Issued	Date
1:100 @ A3	JL	JL	18-Jul-16

Drawing No
APL-301

Project No	Revision
15_08	01

01 SUDS Schematic

scale: 1:100 15_06



0m 1m 2m 3m 4m 5m

1:100

PLEASE NOTE:

1. All dimensions to be checked on site before fabrication.
2. Contractor to refer to engineers drawings before proceeding with works.
3. All drawings and designs are covered by design right (intelectual property), and may not be distributed, copied or issue without written permission of the architect.
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5. These drawings are subject to any variation required or recommendation by any statutory authority, or for the better carrying out of the works.
6. Samples to be provided by contractor for the architect approval.
7. All finishes to architect satisfaction.
8. All drawings to be approved by the architect before construction.

ADDITIONAL NOTES:

Rev	Issued for	Date	By	Issued	Rev	Issued for	Date	By	Issued

Client
PRIVATE CLIENT

Architect
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15 Eldon Grove London NW3 6HH
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Project
7 Greville Place
London, NW6 5JP

Title
Proposed
Drainage
Schematic Plan

Status
Planning Application

Scale	Drawn	Issued	Date
1:100 @ A3	JL	JL	18-Jul-16

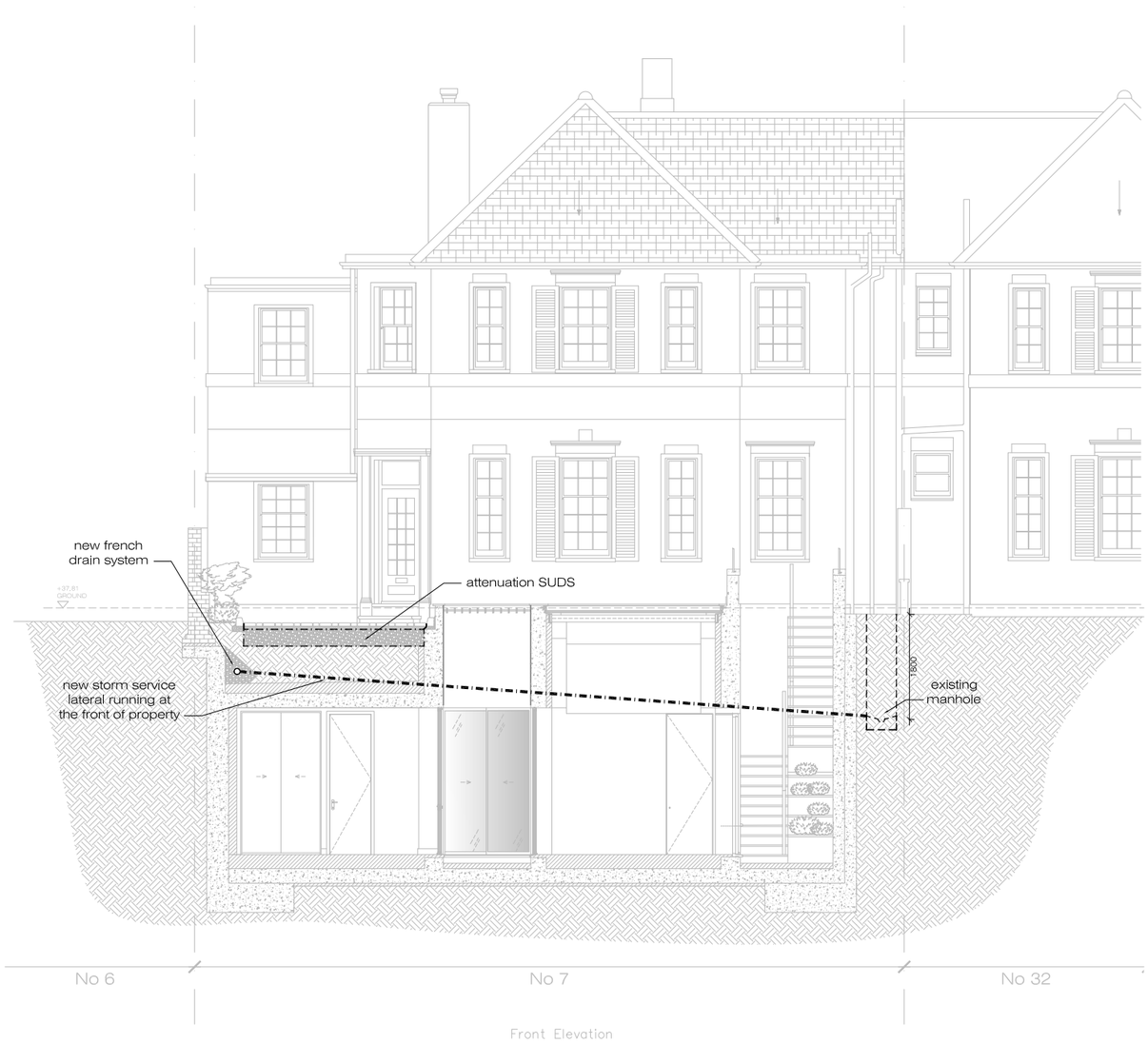
Drawing No
APL-303

Project No
15_08

Revision
00

01 SUDS Schematic

scale: 1:100 15_06



Front Elevation

0m 1m 2m 3m 4m 5m

1:100

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Project
7 Greville Place
London, NW6 5JP

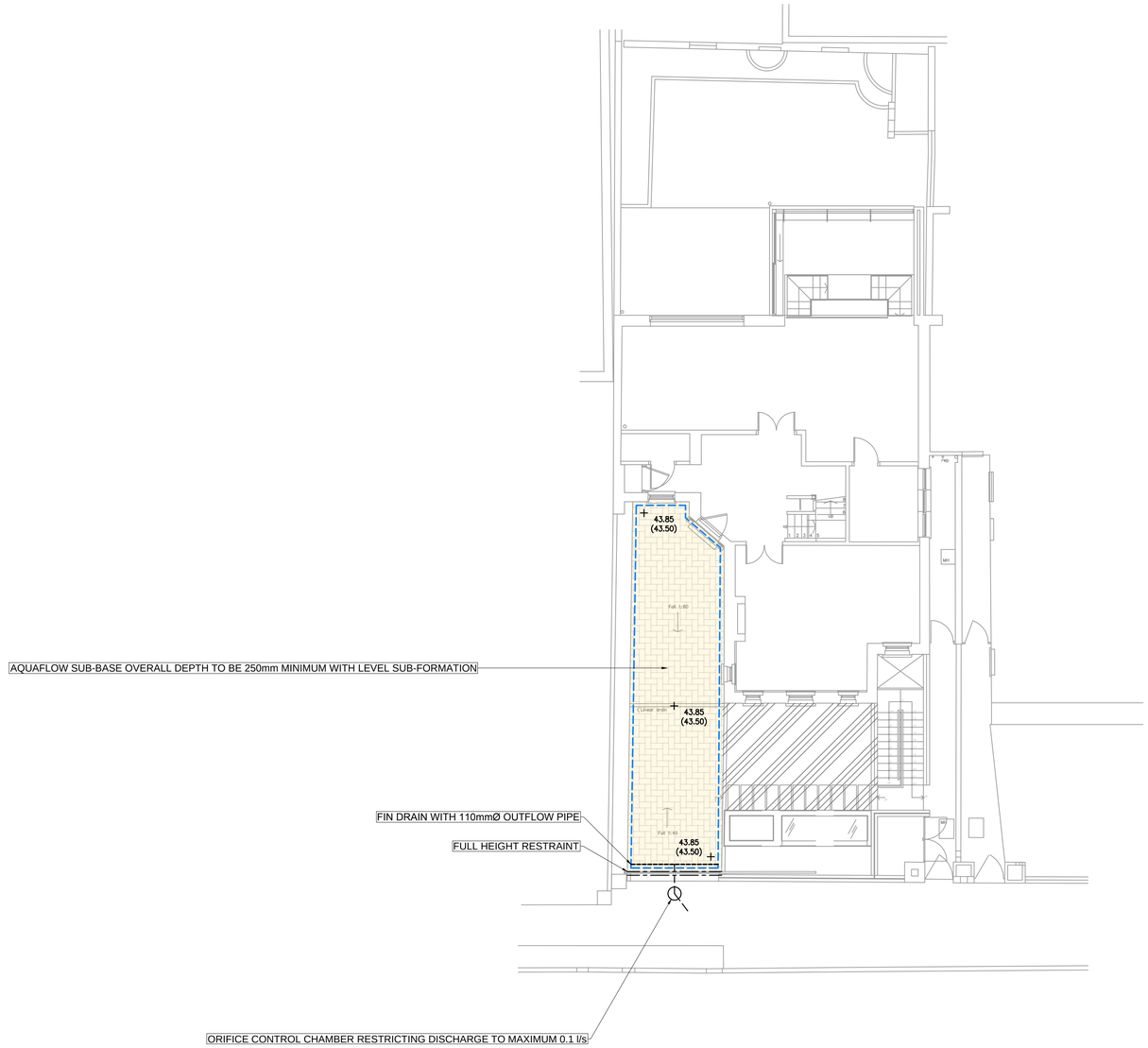
Title
Proposed
Drainage
Schematic Section

Status
Planning Application

Scale	Drawn	Issued	Date
1:100 @ A3	JL	JL	18-Jul-16

Drawing No
APL-304

Project No	Revision
15_08	00



FORMPAVE RECTANGULAR AQUAFLOW BLOCKS IN PARKING AREA

FORMPAVE RECTANGULAR AQUAFLOW BLOCKS WITH LEVEL SUB-FORMATION. *(FOR FORMATION DETAILS REFER TO DRAWING FSC3649-D100)*

AREA OF CATCHMENT INCLUDED IN DESIGN

FULL HEIGHT RESTRAINT

FIN DRAIN WITH 110mm OUTLET PIPE

0.000
(0.000)
AMENDED PROPOSED LEVELS
PROPOSED INVERT LEVELS

NOTES:

1. FOR CONSTRUCTION AND FORMATION DETAILS REFER TO DRAWING FSC3649-D100
2. DRAINAGE RUNS SHOWN FOR INDICATIVE PURPOSES ONLY - TO BE DESIGNED BY OTHERS.
3. LOWER FORMATION LOCALLY WHERE REQUIRED TO SUIT INVERT OF DISTRIBUTION BOXES

Rev. No.	Revision	Drawn By	Date
-	First Issue	TU	18.07.2016

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forterra.co.uk/formpave

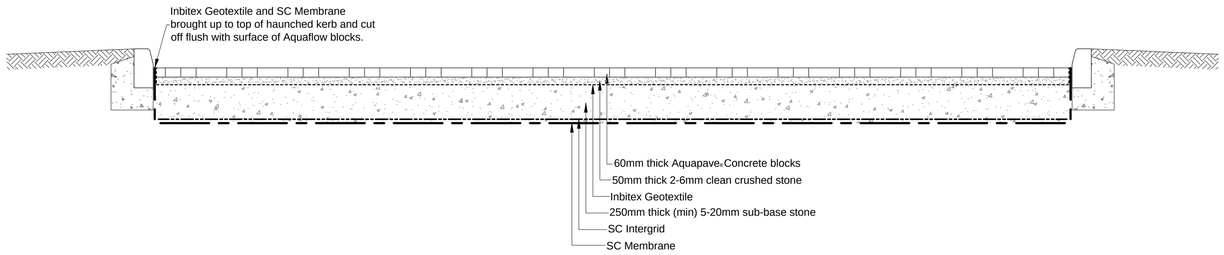
FORTERRA

Project
7 GREVILLE PLACE
KILBURN, LONDON. NW6 5JP

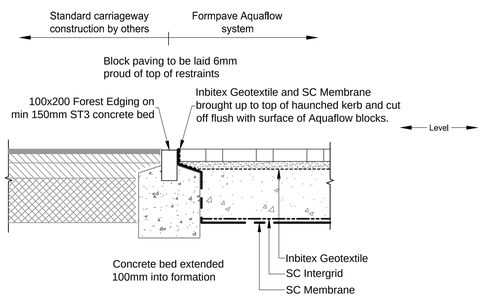
Title
AQUAFLOW PERMEABLE PAVING LAYOUT FOR PARKING AREA

Scale	Date	Drawn	Checked	Approved
1:100	18.07.2016	TU	JL	JL

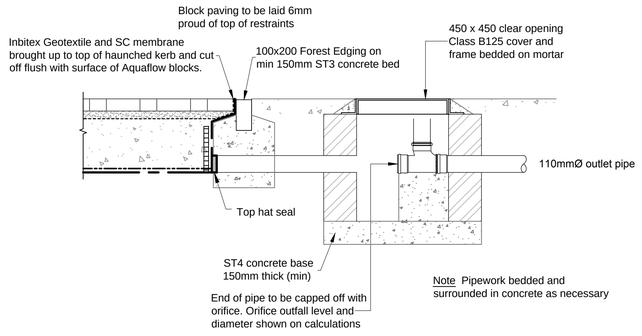
Project No.	Drg. No.	Revision
FSC3649	D1	-



TYPICAL SECTION THROUGH FORMPAVE AQUAFLOW ATTENUATION SYSTEM
(DRIVEWAY CONSTRUCTION)



FULL HEIGHT RESTRAINT DETAIL
(STANDARD ROAD CONSTRUCTION TO AQUAFLOW TRANSITION)



TYPICAL ORIFICE CONTROL CHAMBER WITH OVERFLOW

STORM WATER SOURCE CONTROL SYSTEM
Aquaflow paving.

TYPE(S) OF PAVING
Permeable concrete block paving

REFERENCE
Aquaflow

SIZE
100 x 200 x 80 Thick

COLOURS
Red brindle, Golden brindle, Natural, Charcoal, Burnt red.

SETTING OUT
Aquaflow and Aquasetts:
90Ø herringbone with double stretcher course around all perimeters.

KERBS
Standard kerb system or Forest Edging: both to be haunched with concrete.

LAYING COURSE*
50mm depth of 5mm. single size clean crushed stone to BS882.

GEOTEXTILE
Inbitex Geotextile as noted

SUB-BASE SPECIFICATION*
The granular sub-base material shall comprise crushed rock or concrete possessing well defined edges. It must be sound, clean, non friable and free from clay or other deleterious matter.

The material must be non plastic when tested in accordance with BS1377 Test No 4 *The crushed stone used for the laying course and sub-base must have a minimum 10% fines value of 150kN when tested in accordance with BS812 Part 111.

The selected test samples not be over dried and should be soaked in water at room temperature for 48-hours before the test. The 100mm deep upper layer of sub-base material should be graded 20mm-5mm to BS882.

The 63-10mm material should be graded as follows:-

BS Sieve size	%passing
100mm	100
63mm	90-100
37.5mm	60-80
20mm	15-30
10mm	0-5

DEPTH OF SUB-BASE
It is recommended that a sub-base depth of 350mm should be used. The depth of sub-base may be varied at the discretion of the engineer.

Intergrid(S) * - SC Intergrid

ASPHALT RUNNING COURSE
To be 20mm dense bitumen base course manufactured with 125pen bitumen to BS4987.

SURFACE FINISH
The blocks should be vibrated with a vibrating plate Type DVP75/22" or similar. Following the first pass with a vibrating plate a light dressing of 3mm single size clean stone should be applied to the surface and brushed in, approximately 2kg per m2. (available from Formpave in 40 kg bags). Blocks should again be vibrated and any debris brushed off.

Rev. No.	Revision	Drawn By	Date
-	First Issue	TU	18.07.2016

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E-mail: design.services@formpave.co.uk
forterra.co.uk/formpave

FORTERRA

Project
7 GREVILLE PLACE
KILBURN, LONDON

Title
AQUAFLOW PERMEABLE PAVING
FORMATION AND CONSTRUCTION DETAILS

Scale	Date	Drawn	Checked	Approved
N.T.S	18.07.2016	TU	JL	JL

Project No.	Drg. No.	Revision
FSC3649	D100	-

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 174 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	43.618	0.118	0.0	0.1	0.1	1.3	O K
30 min Summer	43.652	0.152	0.0	0.1	0.1	1.6	O K
60 min Summer	43.678	0.178	0.0	0.1	0.1	1.9	O K
120 min Summer	43.688	0.188	0.0	0.1	0.1	2.0	O K
180 min Summer	43.683	0.183	0.0	0.1	0.1	2.0	O K
240 min Summer	43.676	0.176	0.0	0.1	0.1	1.9	O K
360 min Summer	43.661	0.161	0.0	0.1	0.1	1.7	O K
480 min Summer	43.649	0.149	0.0	0.1	0.1	1.6	O K
600 min Summer	43.638	0.138	0.0	0.1	0.1	1.5	O K
720 min Summer	43.627	0.127	0.0	0.1	0.1	1.4	O K
960 min Summer	43.607	0.107	0.0	0.1	0.1	1.1	O K
1440 min Summer	43.573	0.073	0.0	0.1	0.1	0.8	O K
2160 min Summer	43.537	0.037	0.0	0.1	0.1	0.4	O K
2880 min Summer	43.515	0.015	0.0	0.1	0.1	0.2	O K
4320 min Summer	43.500	0.000	0.0	0.1	0.1	0.0	O K
5760 min Summer	43.500	0.000	0.0	0.1	0.1	0.0	O K
7200 min Summer	43.500	0.000	0.0	0.1	0.1	0.0	O K
8640 min Summer	43.500	0.000	0.0	0.0	0.0	0.0	O K
10080 min Summer	43.500	0.000	0.0	0.0	0.0	0.0	O K
15 min Winter	43.635	0.135	0.0	0.1	0.1	1.5	O K
30 min Winter	43.673	0.173	0.0	0.1	0.1	1.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	136.659	0.0	1.4	18
30 min Summer	88.315	0.0	1.8	33
60 min Summer	54.281	0.0	2.3	62
120 min Summer	32.230	0.0	2.7	120
180 min Summer	23.456	0.0	3.0	148
240 min Summer	18.621	0.0	3.2	180
360 min Summer	13.418	0.0	3.4	246
480 min Summer	10.633	0.0	3.6	314
600 min Summer	8.872	0.0	3.8	384
720 min Summer	7.649	0.0	3.9	450
960 min Summer	6.048	0.0	4.1	580
1440 min Summer	4.339	0.0	4.4	836
2160 min Summer	3.108	0.0	4.7	1188
2880 min Summer	2.451	0.0	4.9	1528
4320 min Summer	1.752	0.0	5.2	0
5760 min Summer	1.379	0.0	5.3	0
7200 min Summer	1.145	0.0	5.5	0
8640 min Summer	0.983	0.0	5.5	0
10080 min Summer	0.864	0.0	5.6	0
15 min Winter	136.659	0.0	1.5	18
30 min Winter	88.315	0.0	2.0	32

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	43.704	0.204	0.0	0.1	0.1	2.2	O K
120 min Winter	43.719	0.219	0.0	0.1	0.1	2.4	O K
180 min Winter	43.714	0.214	0.0	0.1	0.1	2.3	O K
240 min Winter	43.705	0.205	0.0	0.1	0.1	2.2	O K
360 min Winter	43.687	0.187	0.0	0.1	0.1	2.0	O K
480 min Winter	43.669	0.169	0.0	0.1	0.1	1.8	O K
600 min Winter	43.652	0.152	0.0	0.1	0.1	1.6	O K
720 min Winter	43.636	0.136	0.0	0.1	0.1	1.5	O K
960 min Winter	43.607	0.107	0.0	0.1	0.1	1.2	O K
1440 min Winter	43.560	0.060	0.0	0.1	0.1	0.6	O K
2160 min Winter	43.514	0.014	0.0	0.1	0.1	0.1	O K
2880 min Winter	43.500	0.000	0.0	0.1	0.1	0.0	O K
4320 min Winter	43.500	0.000	0.0	0.1	0.1	0.0	O K
5760 min Winter	43.500	0.000	0.0	0.0	0.0	0.0	O K
7200 min Winter	43.500	0.000	0.0	0.0	0.0	0.0	O K
8640 min Winter	43.500	0.000	0.0	0.0	0.0	0.0	O K
10080 min Winter	43.500	0.000	0.0	0.0	0.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	54.281	0.0	2.5	60
120 min Winter	32.230	0.0	3.1	116
180 min Winter	23.456	0.0	3.3	168
240 min Winter	18.621	0.0	3.5	190
360 min Winter	13.418	0.0	3.9	268
480 min Winter	10.633	0.0	4.1	342
600 min Winter	8.872	0.0	4.2	416
720 min Winter	7.649	0.0	4.4	486
960 min Winter	6.048	0.0	4.6	624
1440 min Winter	4.339	0.0	5.0	880
2160 min Winter	3.108	0.0	5.3	1208
2880 min Winter	2.451	0.0	5.5	0
4320 min Winter	1.752	0.0	5.9	0
5760 min Winter	1.379	0.0	6.1	0
7200 min Winter	1.145	0.0	6.2	0
8640 min Winter	0.983	0.0	6.3	0
10080 min Winter	0.864	0.0	6.4	0

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.600	Shortest Storm (mins)	15
Ratio R	0.437	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.006

Time (mins) From:	To:	Area (ha)
0	4	0.006

Model Details

Storage is Online Cover Level (m) 43.850

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.0
Membrane Percolation (mm/hr)	4500	Length (m)	6.0
Max Percolation (l/s)	45.0	Slope (1:X)	10000.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	43.500	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.010 Discharge Coefficient 0.600 Invert Level (m) 43.300

Query No	Subject	Query	Status	Design team comments 22/07/16
1	BIA format	Qualifications of individuals involved not in accordance with CPG4 requirements	Open- Input of a Chartered Engineer with respect to surface flow and flooding and land stability assessments	The BIA demonstrates that there is no surface flow and flooding, from EA information and review of OS plans. Consequently there is nothing for a CEng to assess. Halsteads acting as client's engineers provide the CEng Input. Jomas provide CGeol.
2	BIA format	Proposal not sufficiently detailed (see Audit paragraphs 4.3 and 4.4)	Open-Clarification requested	Please refer to attached updated Schneider Designers drawings for dimension information. The accompanying updated Halstead Associates drawing 16497/PL03A shows the general anticipated construction sequence. Retaining wall sections will be propped during the works until both the basement slab and ground floor slab are in place to provide a single monolithic construction. Wine cellar no longer required therefore omitted from application.
3	BIA format	Works programme not provided	Open- Outline programme to be provided	Please refer to Schneider Designers Outline Programme attached.
4	Hydrology	Clarification requested on the proposed site drainage (see Audit paragraph 4.8)	Open-Clarification requested	Jomas are not undertaking the drainage assessments. As far as possible understand from the survey carried out to the property the sewer network runs along the side passage. In response to guidance CPG3 and policy DP23 it is proposed a dual system of SUDS for the driveway and a French Drain System for the garden and remaining soil areas, connecting to the existing network. Please refer to attached Schneider Designers new drawings APL-303 and APL-304 together with SUDS consultant information FSC3649 - Design Calculations; FSC3649 - D1 and FSC3649 - D100. All to be consider provisional.

5	Stability	Neighbouring property foundations not determined (see Audit paragraph 4.6)	Open- to be established or maximum differential depth assumed	We note that Campbell Reith suggest the response to question 13) of the stability section should be 'unknown' with maximum differential depth assumed, and stated, until information on the neighbouring property foundations is forthcoming. There will be no scope for establishing the precise depth of the foundations to the adjacent properties unless the neighbours grant access to carry out trial pit investigation. As it is an extension to a current basement, I would argue that the foundations would be formed at the same or similar depth and therefore not noticeably increase the differential. Some minor differential increase may occur. It may be worth just going with this to ease things along. It is understood from the client that there are no basements in the adjacent structures.
6	Stability	Clarification is requested on the risk of shrink-swell (see Audit paragraph 4.6)	Open-Clarification requested	Table 13.2 of the BIA gives site specific geotechnical laboratory results obtained as part of the GI. Section 13.3.2 discusses the requirement for an arboricultural survey to assess the potential for Shrink – swell to occur. However at the depth of the basement it is not considered likely that shrink swell will have a significant effect. Furthermore, there are no significant trees in the vicinity of the proposed works.
7	Stability	No estimates of ground movement and structural impact presented (see Audit paragraph 4.10).	Open- to be provided	Given the low to very low compressibility of the London Clay it is not considered that the formation of the basement would allow significant movement. However estimates can be obtain after detailed structural engineering design information with type of construction and associated structural loadings is determined at a later stage.

8	Stability	No temporary works proposal provided (see Audit paragraph 4.4)	Open- to be provided	The summary of geotechnical testing undertaken is provided in Table 13.2 The accompanying Halstead Associates drawing 16497/PL03A shows the general sequencing for forming the perimeter retaining wall. Each section will be restrained and propped within its own excavation as shown until the base slab and ground floor slab are poured. The wall will be propped against the existing house while the infill soil is being removed.
9	Stability	Damage category for neighbouring properties not provided. No consideration of impact on public highway	Open- Anticipated movements from all construction activities to be provided together with damage category for neighbouring properties. Impact on pathway to be considered.	We do give recommendations on construction methodology to ensure that this is kept to a minimum, Section 14.3 The excavation is set back from the rear edge of the public footway and fully propped at all times during the works as previously described. As a result no impact is expected on the public highway.
10	Stability	Movement monitoring proposal not provided.	Open- Outline proposal to be provided. Details and trigger levels to be agreed as part of Party Wall awards.	Any outline proposal submitted now would may not be allowed to be performed on neighbouring properties or be the most adequate to the proposed works. Therefore once party wall negotiations are completed and it is known what access to the neighbouring building will be allowed a scheme to monitor movement can be proposed.

List of documents submitted with this BIA queries response:

Revised Information:

- APL-102_Proposed Floor Plans R1 – To replace APL-102_Proposed Floor Plans submitted on the 16/03/16
- APL-300_Proposed Section AA R1 – To replace APL-300_Proposed Section AA submitted on the 16/03/16
- APL-301_Proposed Section BB R1 – To replace APL-301_Proposed Section BB submitted on the 16/03/16

New Information:

- 15_08A_Programme – Outline Work Programme
- APL-303_Drainage Plan – French Drain Schematic Layout
- APL-304_Drainage Section – French Drain Schematic Section
- 16497_PL03A – Suggested Construction Sequence For Retaining Wall Sections
- FSC3649 - D1 – Proposed SUDS Permeable Paving Layout
- FSC3649 - D100 - Proposed SUDS Permeable Paving Construction Details
- FSC3649 - DC – Proposed SUDS Design Calculations

Re: FW: 7 Greville Road - 2016/1489/P - Audit Response

Liz Brown to: Phillips, Kate 29/07/2016 15:33
Cc: "'camdenaudit@campbellreith.com'", Nikoofar Aalabaf

Kate

Apologies for the delay in responding to your email. having reviewed the information provided, I would expect that we could issue our revised report on 12 August 2016.

Regards,
Elizabeth Brown
Partner

CampbellReith
consulting engineers
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41-45 Blackfriars Road,
London
SE1 8NZ

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"Phillips, Kate"	Good Morning, Please find extra information fro...	25/07/2016 10:05:37

From: "Phillips, Kate" <Kate.Phillips@camden.gov.uk>
To: "'camdenaudit@campbellreith.com'" <camdenaudit@campbellreith.com>
Date: 25/07/2016 10:05
Subject: FW: 7 Greville Road - 2016/1489/P - Audit Response

Good Morning,

Please find extra information from the applicant relating to the above.

Kind regards

Kate Phillips
Senior Planning Officer

Telephone: 0207 974 2521

From: Joao Lopes [mailto:Joao_l@schneiderdesigners.co.uk]
Sent: 22 July 2016 14:54
To: Phillips, Kate
Cc: Haji-Ismail, Zenab; Jack Schneider; niru raveendran
Subject: 7 Greville Road - 2016/1489/P - Audit Response

Dear Kate,

Apologies for the delay getting a response back to the above planning application BIA's audit, as per email below.

After revision and consideration please find attached our response to the auditors queries, accompanied by all the additional support documents.
I trust you forward these to Campbell Reith and should you or them require any further information please don't hesitate to contact us.

Looking forward to your reply.
Kind regards,

Joao Lopes

Lower Ground Unit
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Email: joao_l@schneiderdesigners.co.uk
Web: www.schneiderdesigners.co.uk

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From: Haji-Ismail, Zenab [mailto:Zenab.Haji-Ismail@camden.gov.uk]
Sent: 24 June 2016 16:46
To: Joao Lopes <Joao_l@schneiderdesigners.co.uk>
Subject: FW: 7 Greville Road

Dear Joao,

Please find attached the initial audit report on the BIA for 7 Greville Road. If you refer to Section 4 and Appendix 2, you will see that a number of queries have been raised, including having insufficient justification for some of the conclusions of the screening assessment.

If you have any questions, please let me know.

Kind regards,

Zenab Haji-Ismail
Senior Planning Officer

Telephone: 020 7974 3270

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