214019.100

April 2014

STRUCTURAL FEASIBILTY REPORT

For

BASEMENT CONSTRUCTION FOR APARTMENT SCHEME

At

10a OAKHILL AVENUE
LONDON
NW3 7RE

For

MR ELI NATHENSON

ENGINUITY
ENGINEERING
INGENUITY

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1.0 Summary

This report considers the structural feasibility of constructing the proposed apartment building at 10a Oakhill Avenue, with particular reference to the basement and lower ground floor construction and the effects on nearby buildings. A concept structural layout and construction sequence has been developed as part of the considerations. This utilises a secant pile wall and top down construction techniques as are now frequently adopted for schemes of this type.

The proposals are considered entirely feasible using normal top down techniques with only minor risk of non structural damage to nearby structures.

The effects of the basement on the water table and on surface water flows have been considered by others and are covered in other supporting documents.

2.0 Instructions and Limitations

2.1 Instructions were received from you via your Architect requesting a Structural Methodology Statement on the proposal to construct a two storey deep basement at 10a Oakhill Avenue. We understand the report is required to supplement a Planning Application.

2.2 Our investigation and report is based on currently available ground data and is to supplement a Basement Impact assessment prepared by ESI Environmental Consultants. This report has been prepared in consideration of the basement only.

2.3 This report is prepared for the information, benefit and use of Eli Nathenson only and any liability of Ian Harban Consulting Engineers to any third party, whether in contract or in tort, is specifically excluded. Any third party finding themselves in possession of this report may not rely upon it without first obtaining the written authority of Ian Harban Consulting Engineers.

2.4 RHS refers to the right hand side of the building when viewed from the road.

2.5 LHS refers to the left hand side of the building when viewed from the road.

3.0 Description, History and Proposals

3.1 The site is broadly rectangular on plan with the existing building situated centrally on the site in a lateral position, and towards the front longitudinally.

3.2 The existing building is to be demolished to clear the site for the construction of the new building.

3.3 It is proposed to construct a building comprising apartments broadly on the site of the footprint of the existing building but extending further into the back garden.

3.4 The proposed building comprises Basement, Lower Ground, Upper Ground, First and second floors.

3.5 The basement is below external ground level, the lower ground floor level is at street level but below ground level at the rear

4.0 Site

4.1 Existing Structures

4.1.1 The existing building is predominantly load bearing masonry construction. Demolition will need to include the removal of existing ground floor structures and foundations and the ground will need to be brought back to form a flat surface marrying into existing site levels.

4.1.2 It is not considered likely that the presence of the existing building will significantly affect the structural methodology.

4.1.3 Buildings are present to either side of the site boundary and in close proximity to the flank walls of the proposed building. Consideration will need to be given to the stability of these buildings both during construction and in the permanent state.

4.2 Access

4.2.1 The current site access is off Oakhill Avenue and this will be used for construction access during the works. There is sufficient space between the Path and the front of the building to allow access directly into the site off the road.

4.3 Geotechnical

4.3.1 ESI Environment Specialists Basement Impact Assessment and Soil Consultants factual report provides borehole data. This suggests the site will comprise London Clay down to the excavation levels proposed by this development.

4.4 Groundwater

4.4.1 The boreholes encountered the water table at depths above basement floor level. Consideration will need to be given to waterproofing and uplift forces, along with temporary stability during construction.

5.0 Structural Proposal and Construction Methods

5.1 Structural Proposals

5.1.1 The drawings in Appendix A show the proposed concept structural layout and construction proposals with respect to the basement, lower ground and ground floor. The upper floors have not been considered in this report, not being affected by the underground construction.

5.1.2 It is proposed to install a secant pile wall to the perimeter of the footprint of the building. The piles have been designed to support both laterally imposed ground loads, including any thrust from the neighbouring buildings, along with potential temporary uplift forces from potential ground water uplift, along with permanent downward loads from the building. Consideration will also need to be given to any heave loads that may be imposed on the slab as a result of the removal of the overburden.

5.1.3 The floor plates of the basement, Lower ground and ground floor will be designed to provide lateral stability to the piles at these respective levels.

5.1.4 Pile supported and freestanding insitu-reinforced concrete walls will provide earth retention to the individual light wells and other localised support to the secant pile wall.

5.1.5 Pile design consideration will need to be given to the temporary condition developing as a result of the construction sequence outlined in the following section.

5.2 Proposed Basement Construction Method

5.2.1 The proposed sequence and method of construction needs to take account of temporary stability during construction, both of the site itself but also the neighbouring buildings.

5.2.2 The works would need to be undertaken by a contractor familiar with specialist piling methods and top down construction techniques.

5.2.3 More particularly the proposed structural sequence would be as follows, assuming other site set up/ welfare etc has been completed:

5.2.3.1 Isolate and make safe services to existing building.

5.2.3.2 Demolish existing buildings; grub out foundations and ground floor, filling any resulting voids with material arising but which will not impose obstructions for the piling rig. Levels to be made up, if necessary to underside of ground floor level and to provide a piling rig mat.

5.2.3.3 Install Secant pile wall to perimeter of building as shown on concept layout, including internal piles. Details of pile installation techniques will need to take into account the likely presence of water in the shaft, and advice should be sought from piling sub-co0ntractor with respect to rig types etc.

5.2.3.4 Excavate to ground floor level and cast ground floor reinforced insitu slab with perimeter cap beams and down stand beams supported on temporary internal piles. Leave void for access to lower levels as necessary. It is envisaged the stair void may be of sufficient size for this purpose, but detailed working methods may dictate a larger size which can be easily accommodated with the plan. Floor plate to be designed to provide support to piles at ground level.

5.2.3.5 After sufficient curing of ground floor slab, excavate below ground floor level to formation of lower ground floor. Excavated material to be removed through the access void to ground level and disposed off site using normal earth moving equipment. Break down isolated piles as necessary to achieve floor plan requirement. eg, to garage entrance.

5.2.3.6 Cast reinforced concrete lower ground floor slab, again designed to provide restraint to the piles at this level and using the internal temporary piles for vertical support as necessary.

5.2.3.7 After sufficient curing of ground floor slab, excavate below lower ground floor level to formation of basement floor. Excavated material to be removed through the access void to ground level and disposed off site using normal earth moving equipment.

5.2.3.8 Cast reinforced concrete lower ground floor slab, again designed to provide restraint to the piles at this level and using the internal temporary piles as necessary.

5.2.3.9 Form internal insitu concrete walls and columns to replace temporary piles as necessary and as required by detailed design considerations.

5.2.3.10 External retaining walls will be formed using normal reinforced concrete techniques.

5.3 Construction Good Practice.

5.3.1 As it is proposed to park vehicles inside the site boundary, wheel washing facilities will need to be provided.

5.3.2 Local parking is limited and therefore site operatives should use the many immediate public transport connections.

5.3.3 Demolition and excavation dust on site will be controlled by the watering of work at ground floor level. Inlets to the drainage system will be protected with filters bunded with sandbags to prevent slurry runoff entering the system.

5.3.4 The Contractor will adhere to, and respect any restrictions on working hours or the enforcement of silent periods throughout the day, which may be imposed by the Local Authority, Contract Documents or the Party Wall requirements.

5.3.5 All waste Substances from the site shall be disposed of offsite, under the appropriate Duty of Care and subject to approvals/consents from the relevant statutory bodies. Recycling is to be undertaken wherever appropriate. All vehicles leaving site carrying potentially dust-generating demolition or construction waste are to be completely sheeted with tarpaulin or netting, in good condition.

5.3.6 The site is to be securely horded along the boundary to the public highway. The hording is to be designed by the contractor's Charted Civil or Structural engineer to resist appropriate wind loadings as defined by 8S6399: 2.

5.3.7 Welfare facilities will not be placed on the public highway.

5.3.8 All live emergency exits and access routes on site will be maintained at all times.

6.0 Effects of Proposed Works

6.1 Neighbouring Structures

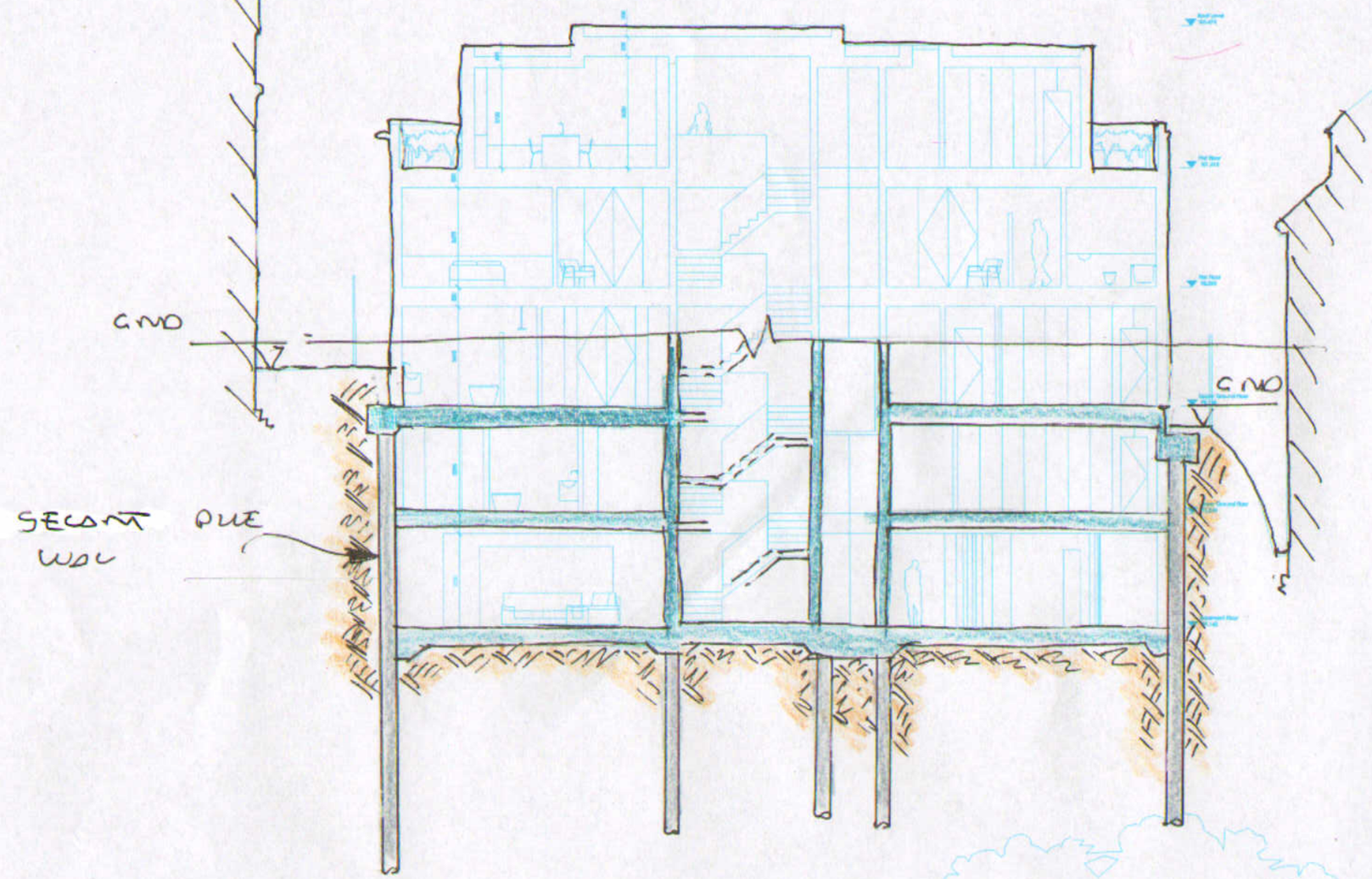
6.1.1 As with all construction of this type, some adjoining structures may suffer minor movement. Any settlement resulting from a properly executed piling and top down construction will be within reasonable limits and at worst may result in superficial cracking to applied finishes. Condition surveys should be undertaken as part of Party Wall Act requirements so that the effects of any minor movement that might occur can be monitored. We would also recommend datum level monitoring stations and targets are installed to monitor levels during the works.

6.1.2 Top down construction will also limit any lateral deflection, leading to minor vertical displacement.

6.1.3 The proposed works will not affect the structural stability or integrity of the neighbouring structures.

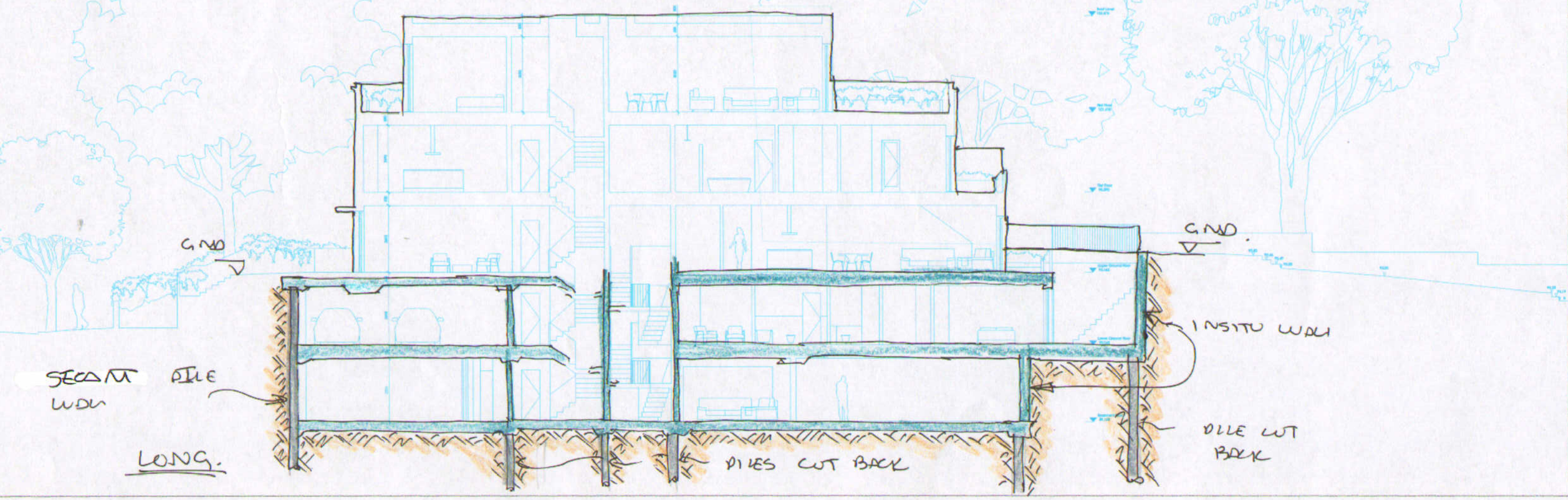
APPENDIX A

SKETCHES



CROSS

CONCEPT SECTIONS.



LONG.

CONSTRUCTION SEQUENCE

1) FORM PILE WALL
2) EXCAVATE TO U/S GROUND FLOOR
3) CAST GROUND FLOOR WITH ACCESS OPENING - CURE SLAB
4) EXCAVATE BELOW GROUND FLOOR TO LOWER GROUND FLOOR INCLUDING SUPPORT ON TEMPORARY PILES FOR GROUND FLOOR
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6) EXCAVATE BELOW LOWER GROUND FLOOR - TEMPORARY PILE SUPPORT TO FLOOR
7) CAST BASEMENT FLOOR AND CURE
8) FORM INTERNAL SUPPORTS AND REMOVE TEMPORARY PILES

SCALE CHECK

100mm @ A1
50mm @ A3

NOTES

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Rev.	Description	Date	By
-	Issued for comment	23/04/14	Ian

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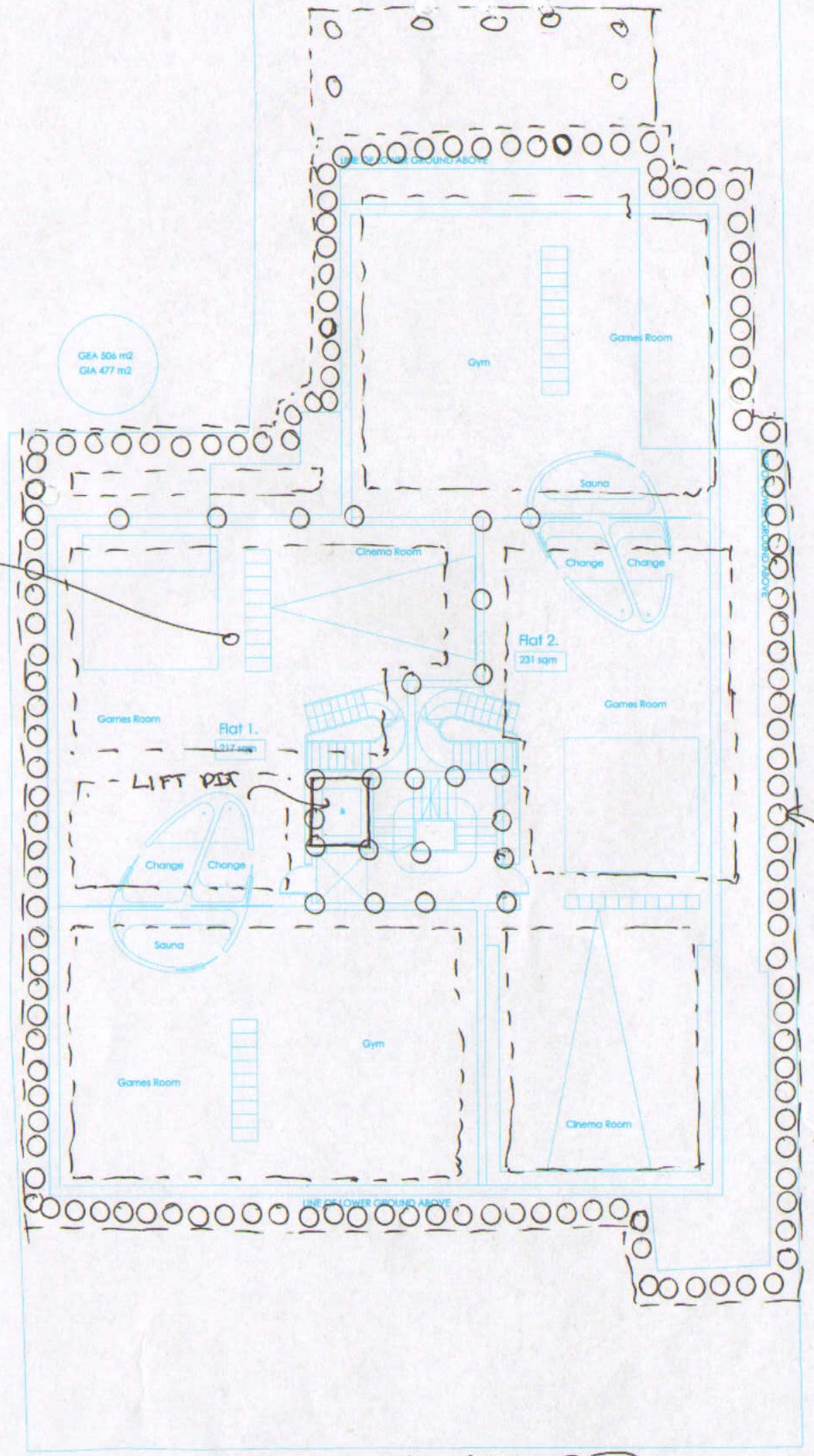
Client
Mr. Eli Nathenson

Job Name
10a Oakhill (Flats)

Drawing Title
Sections

Date	April '14	STAGE	STATUS	CHECKED
Drawn	Ian	Development	✓	
Scale @ Size	1:100 @ A1	Tender		
Scale @ Size	1:200 @ A3	Construction		
Original Size	A1	Final Construction Issue		
Job No. 214019		Drawing No. L10		Rev. -



GENERALLY 200mm THICK INSITU CONC. BASEMENT SLAB WITH 300mm THICK BEAMS AT EDGE AND TO LOAD BEARING LINES

SECANT INSITU PILE WALL

BASEMENT CONCEPT

SCALE CHECK

100mm @ A1
50mm @ A3

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Client
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Job Name
10a Oakhill (Flats)

Drawing Title
Basement Level G.A

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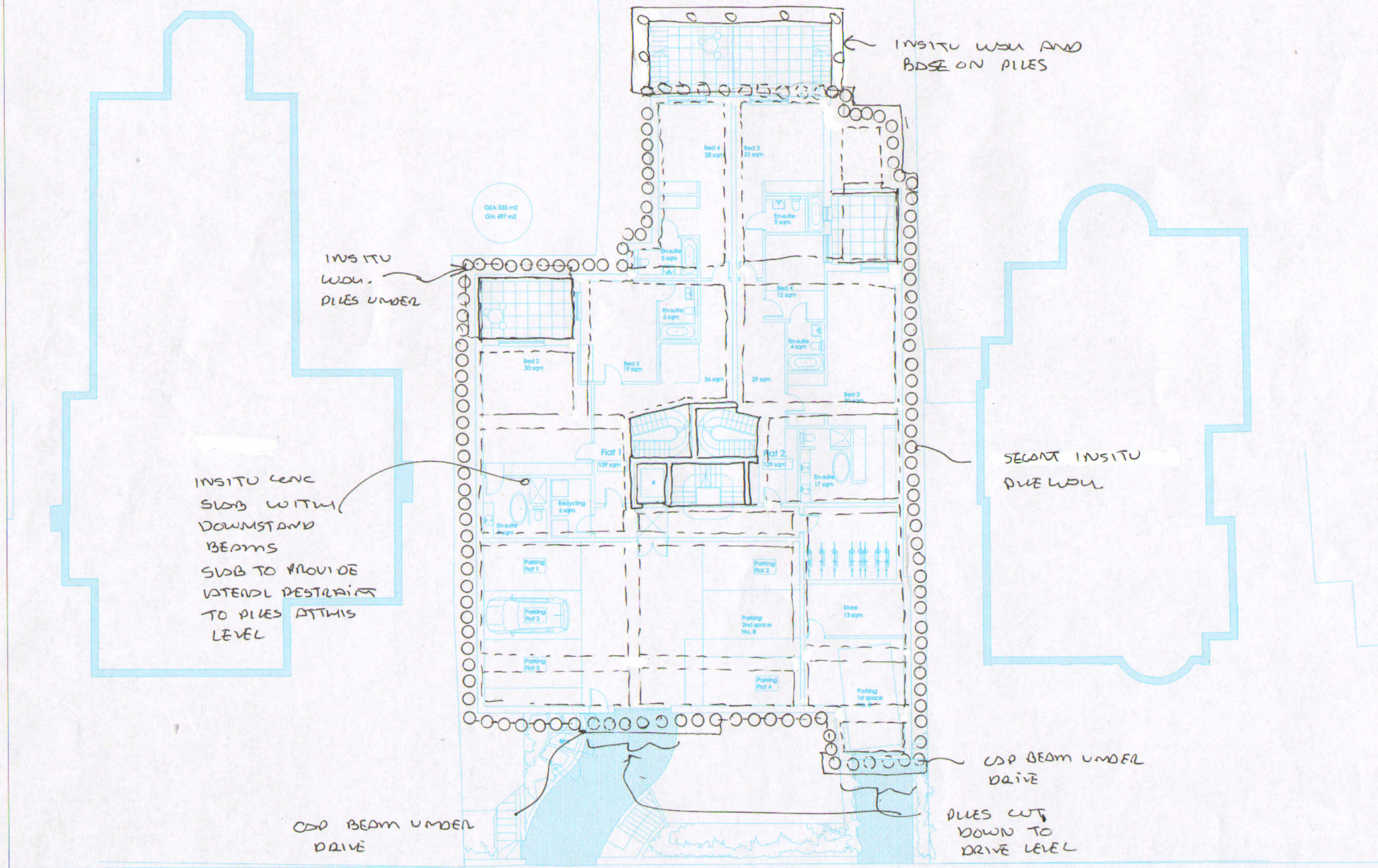

LOWER GROUND FLOOR CONCEPT.

SCALE CHECK

100mm @ A1
50mm @ A3

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Client
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Job Name
10a Oakhill (Flats)

Drawing Title
Lower Ground Floor G.A

Date	April '14	STAGE	STATUS	CHECKED
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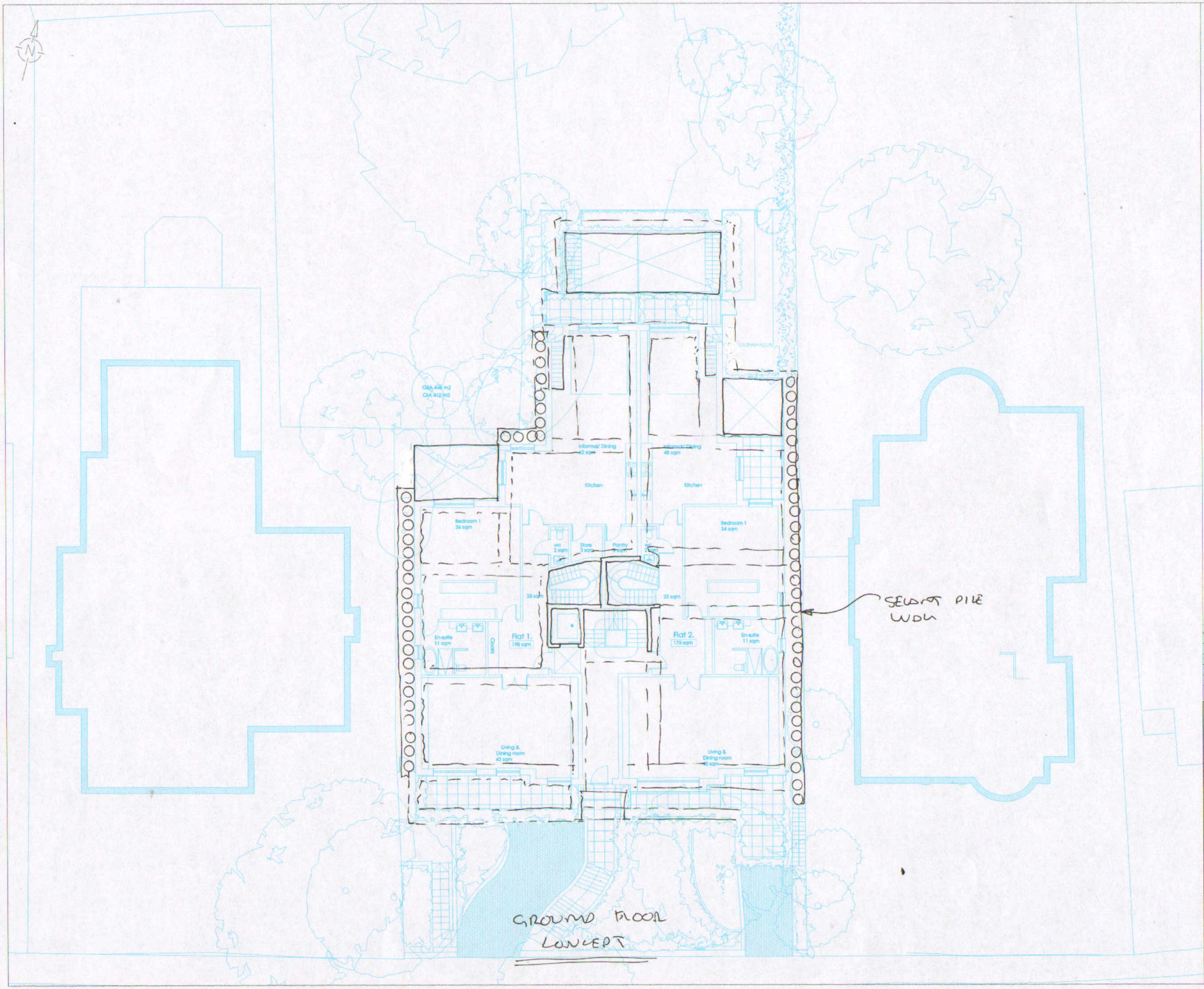

SCALE CHECK

100mm @ A1
50mm @ A3

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Job Name
10a Oakhill (Flats)

Drawing Title
Upper Ground Floor G.A

Date	April '14	STAGE	STATUS	CHECKED
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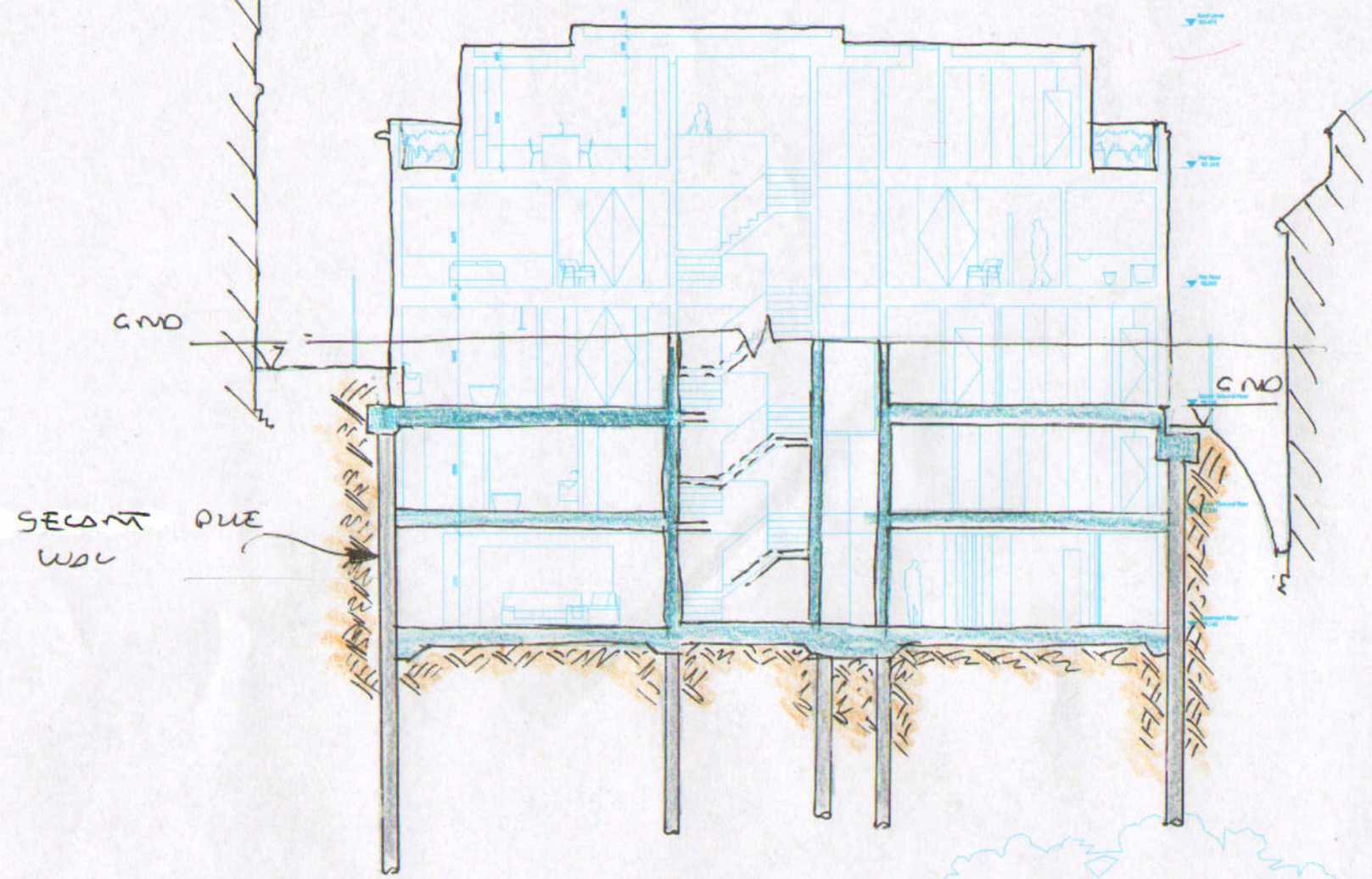
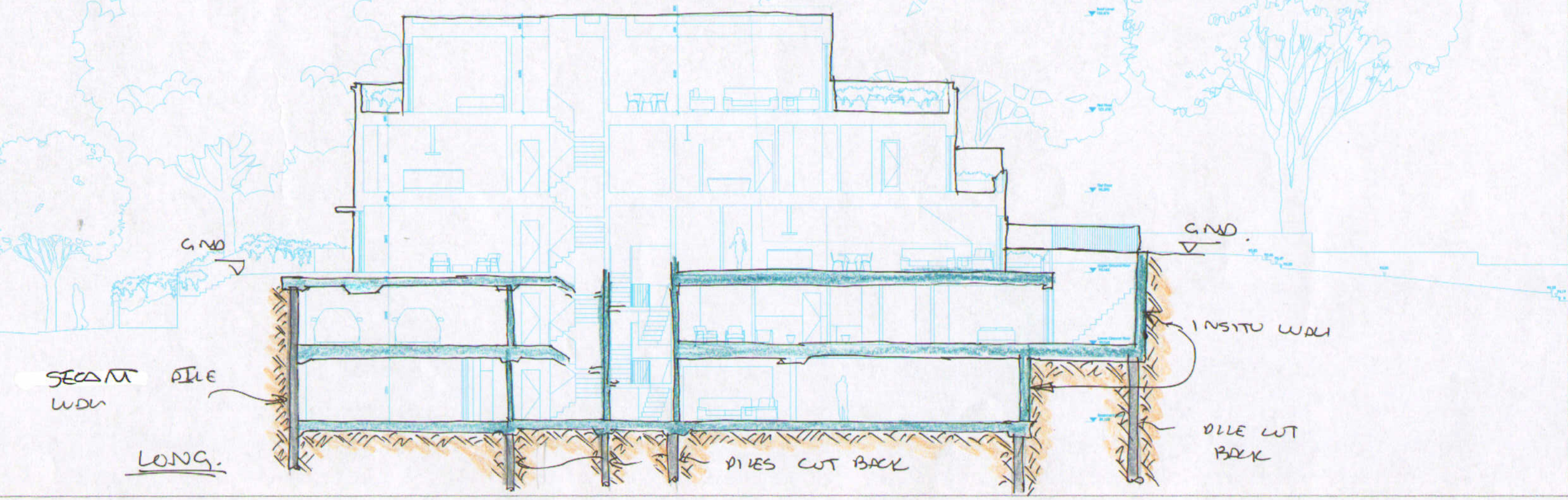


CROSS

CONCEPT SECTIONS.



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SCALE CHECK

100mm @ A1
50mm @ A3

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10a Oakhill (Flats)

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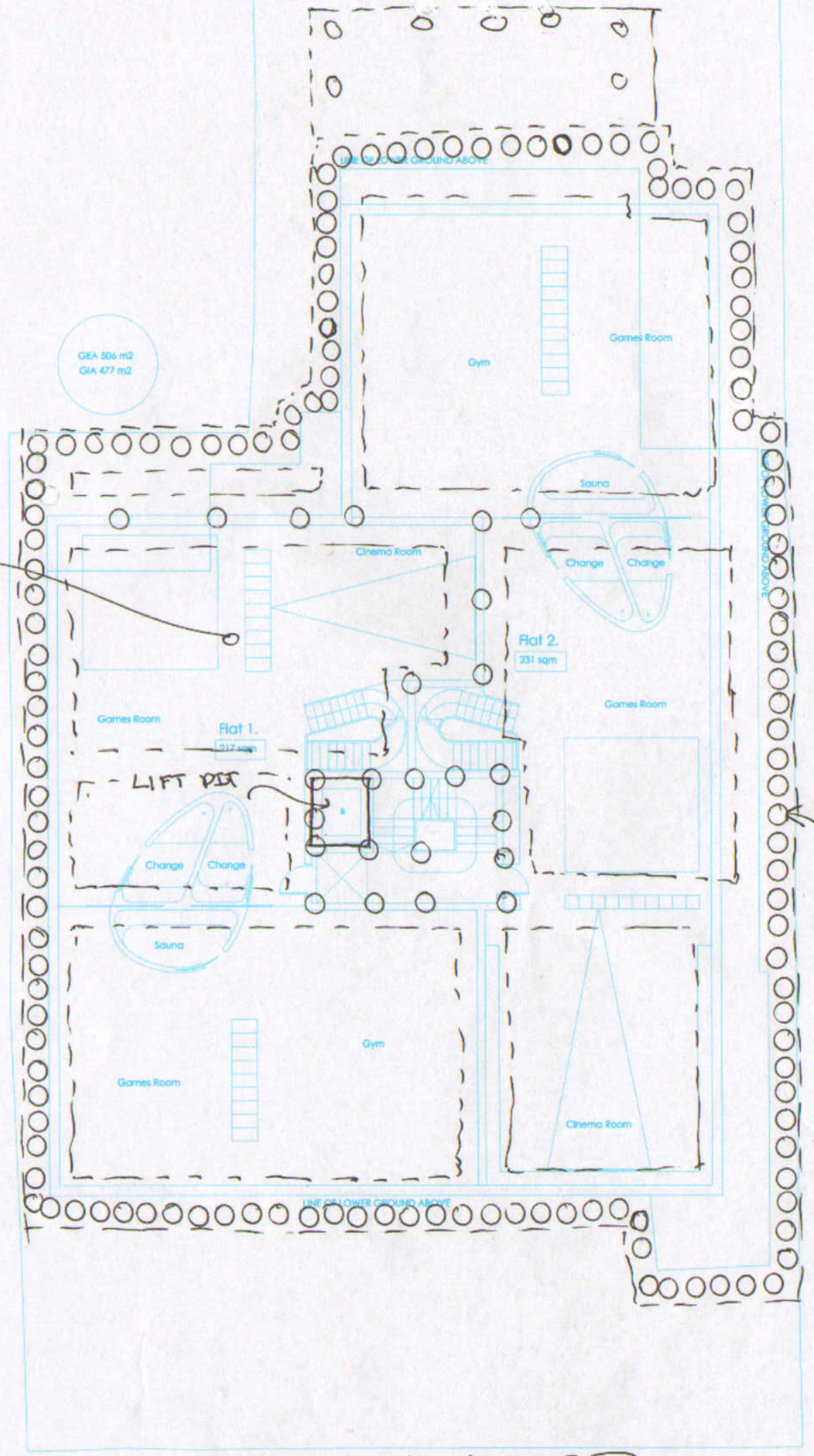

GENERALLY 200mm THICK INSITU CONC. BASEMENT SLAB WITH 300mm THICK BEAMS AT EDGE AND TO LOAD BEARING LINES

SECANT INSITU PILE WALL

BASEMENT CONCEPT

SCALE CHECK

100mm @ A1
50mm @ A3

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7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO TAKE SITE DIMENSIONS TO ENSURE SITE FIT OF STRUCTURAL ELEMENTS.
8. MASONRY WALLS HAVE BEEN DESIGNED TO BE RESTRAINED BY FLOORS, ROOFS AND OTHER STRUCTURE AND WILL REQUIRE TEMPORARY SUPPORT IF THE RESTRAINING ELEMENTS HAVE NOT BEEN BUILT.
9. FLOORS HAVE BEEN DESIGNED FOR A LIVE LOAD OF kN/m2. THE CONTRACTOR MUST ENSURE THAT THE STORAGE OF MATERIALS AND PLANT DOES NOT EXCEED THIS LOAD.
10. THE CONTRACTOR SHALL ENSURE THAT ALL EXPOSED EARTH FACES SHALL BE BACK TO 30° TO THE HORIZONTAL OR SHALL PROVIDE TEMPORARY SUPPORT.
11. UNLESS NOTED OTHERWISE ALL STEEL CONECTIONS WILL HAVE MINIMUM 2 No. M20 8.8 BOLTS, 10mm THICK PLATE AND 6mm FULL FILLET WELDS.
12. TENDERERS ARE TO ALLOW FOR THE PREPARATION OF FABRICATION DRAWINGS FOR ALL STEEL, ALUMINUM, GLASS, ENGINEERED TIMBER AND STEEL REQUIRED ELEMENTS WITH THEIR PRICE.

Rev.	Description	Date	By
-	Issued for comment	25/04/14	Ian

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CONSULTING ENGINEERS
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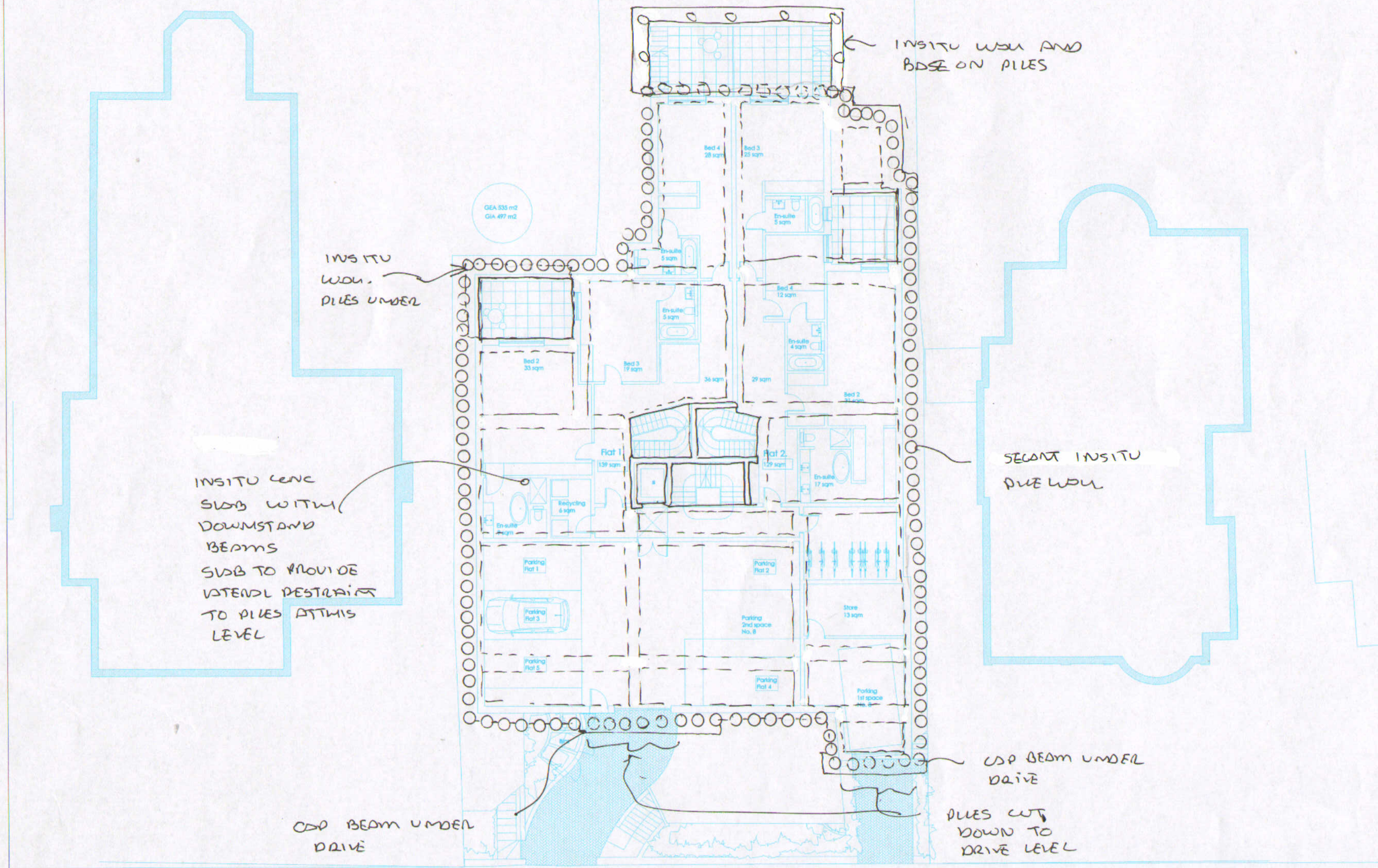
ENGINEERING INGENUITY

Client
Mr. Eli Nathenson

Job Name
10a Oakhill (Flats)

Drawing Title
Basement Level G.A

Date	April '14	STAGE	STATUS	CHECKED
Drawn	Ian	Development	✓	
Scale @ Size	1:100 @ A1	Tender		
Scale @ Size	1:200 @ A3	Construction		
Original Size	A1	Final Construction Issue		
Job No. 214019		Drawing No. L01		Rev. -



LOWER GROUND FLOOR CONCEPT.

SCALE CHECK

100mm @ A1
50mm @ A3

NOTES

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3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SCHEDULE OF WORKS SPECIFICATIONS, ALL OTHER DRAWINGS AND ANY OTHER RELEVANT DOCUMENTS
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-	Issued for comment	25/04/14	Ian

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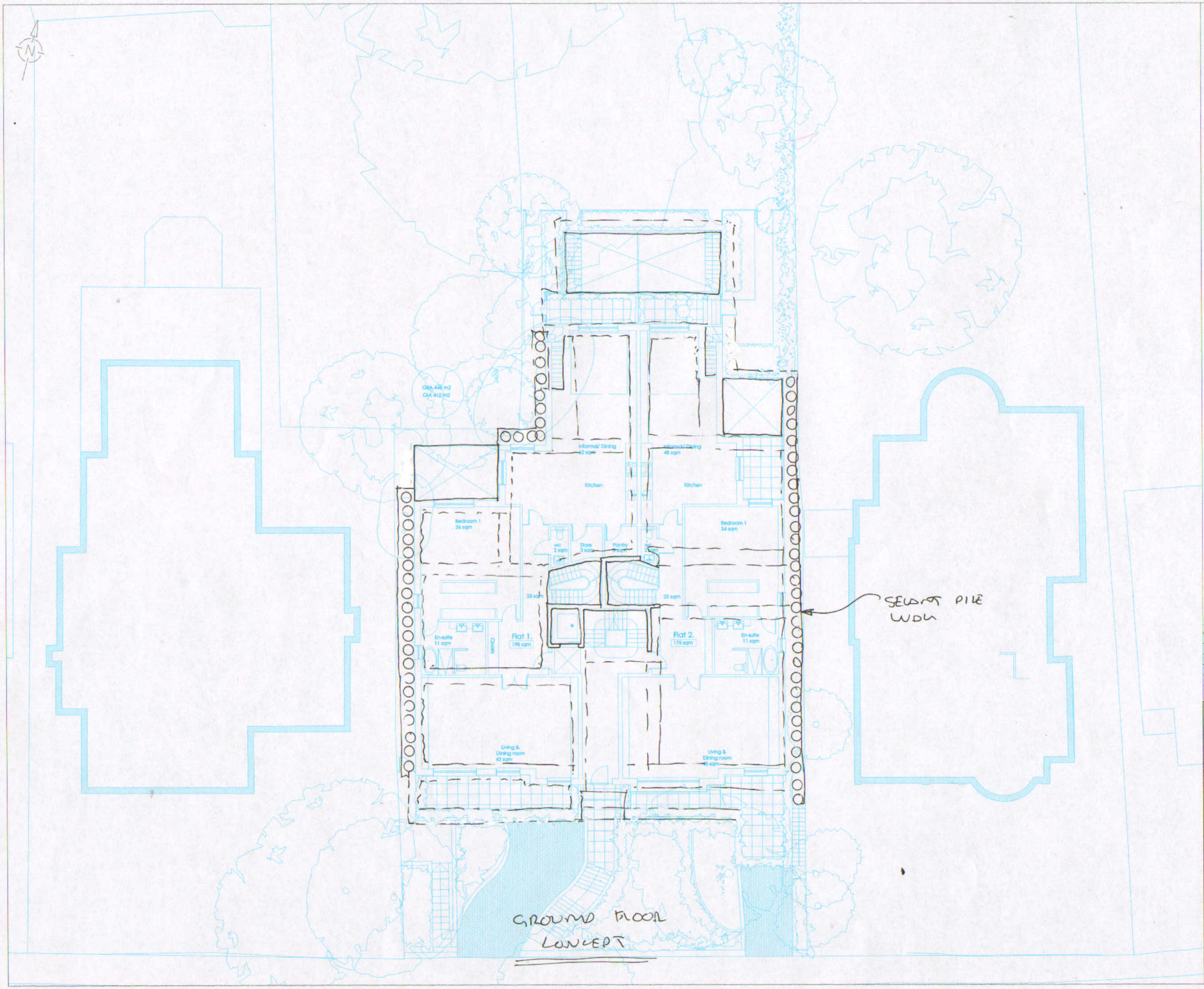
ENGINEERING INGENUITY

Client
Mr. Eli Nathenson

Job Name
10a Oakhill (Flats)

Drawing Title
Lower Ground Floor G.A

Date	April '14	STAGE	STATUS	CHECKED
Drawn	Ian	Development	✓	
Scale @ Size	1:100 @ A1	Tender		
Scale @ Size	1:200 @ A3	Construction		
Original Size	A1	Final Construction Issue		
Job No. 214019		Drawing No. L02		Rev. -



SCALE CHECK

100mm @ A1
50mm @ A3

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ENGINEERING INGENUITY

Client
Mr. Eli Nathenson

Job Name
10a Oakhill (Flats)

Drawing Title
Upper Ground Floor G.A

Date	April '14	STAGE	STATUS	CHECKED
Drawn	Ian	Development	✓	
Scale @ Size	1:100 @ A1	Tender		
Scale @ Size	1:200 @ A3	Construction		
Original Size	A1	Final Construction Issue		
Job No. 214019		Drawing No. L03		Rev. -

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C O N S U L T I N G E N G I N E E R S