

214019.100

April 2014

**STRUCTURAL FEASIBILITY REPORT**

**For**

**BASEMENT CONSTRUCTION FOR APARTMENT SCHEME**

**At**

**10a OAKHILL AVENUE  
LONDON  
NW3 7RE**

**For**

**MR ELI NATHENSON**



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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-contractor 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 banded 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 Chartered Civil or Structural engineer to resist appropriate wind loadings as defined by BS6399: 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**

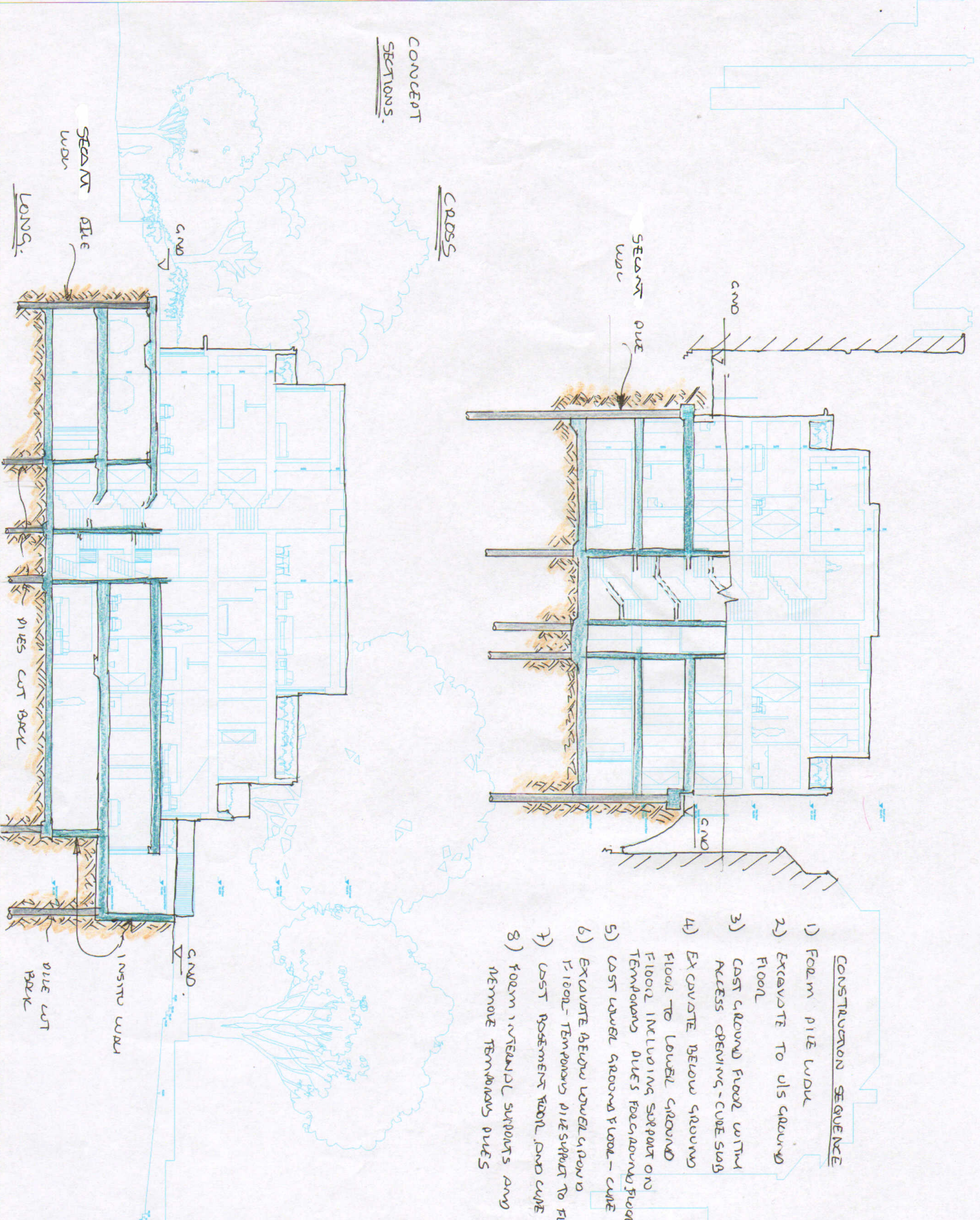
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7. IT IS THE CONTRACTORS RESPONSIBILITY TO TAKE SITE DIMENSIONS TO DETERMINE THE FIT OF STRUCTURAL ELEMENTS
8. HISTORY WALLS HAVE BEEN ASSIGNED TO BE RESTORED IN FLOOR JOINS AND OTHER STRUCTURE AND WILL REQUIRE TYPICAL SUPPORT BY THE RESTORATION ELEMENTS HAVE NOT BEEN BUILT
9. FLOORS HAVE BEEN ASSIGNED FOR A LIVE LOAD OF 1000 N/M<sup>2</sup> UNLESS NOTED OTHERWISE
10. THE CONTRACTOR MUST ENSURE THAT THE STRONGE OF MATERIALS AND LIMIT DOES NOT EXCEED THIS LOAD
11. UNLESS NOTED OTHERWISE ALL STEEL CONNECTIONS WILL HAVE HEIGHT 2 No. M20 x 80 TX, 10mm THICK PLATE AND 6mm FULL PENET WELDS
12. TENDERS ARE TO ALLOW FOR THE REGULATION OF FOUNDATION DRAWINGS ELEMENTS WITH THESE NOTES

CONSTRUCTION SEQUENCE

- 1) Form pile wall
- 2) Excavate to 1/3 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 below ground floor
- 5) Cast lower ground floor - cure
- 6) Excavate below lower ground floor floor - temporary pile support to floor
- 7) Cast Rosement floor and cure
- 8) Form internal supports and remove temporary piles

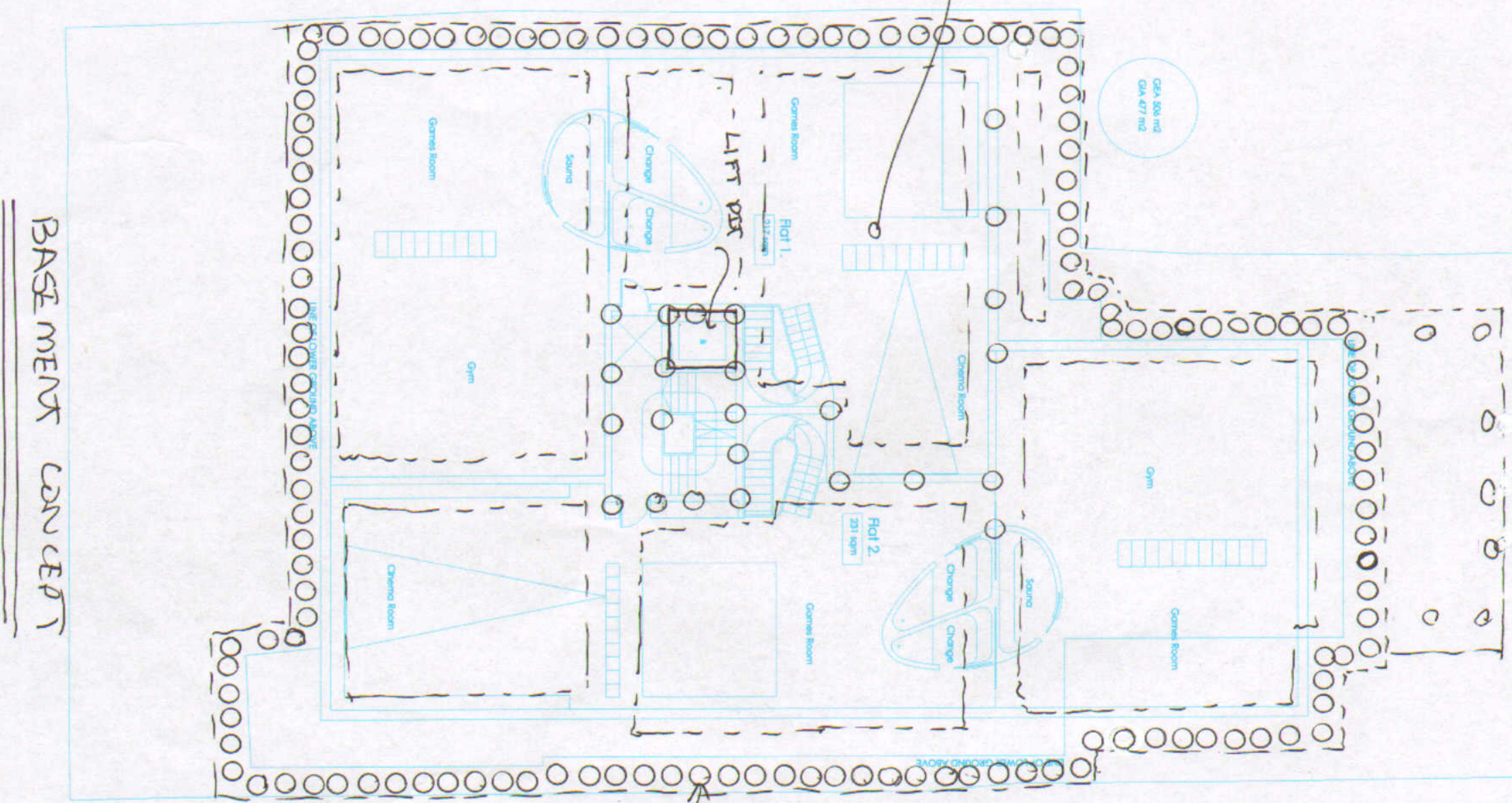
CONCEPT SECTIONS.



<p><b>I A N H A R B A N</b> CONSULTANTS ENGINEERS</p> <p>Unit 12, Kough Road, Wetherby, West Yorkshire LS23 7BQ T: 01937 571511 F: 01937 579177 <a href="http://www.ianharban.com">www.ianharban.com</a></p> <p>ENGINEERING INCENTIVE</p>		<p>Client: Mr. Eli Matherson</p> <p>Site Name: 10a Oakhill (Fisks)</p>
<p>Drawn: [Name]</p> <p>Checked: [Name]</p> <p>Date: 11/01/2019</p> <p>Scale: 1:200 @ A3</p> <p>Original Size: A3</p> <p>Drawing No.: 214019</p>	<p>Issue: 1</p> <p>Date: 11/01/2019</p> <p>By: [Name]</p> <p>For: [Name]</p>	<p>STATUS: [ ]</p> <p>DESIGNED: [ ]</p>



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



BASEMENT CONCEPT

SEPARATE INSITU PILE WALL

SCALE CHECK 100mm @ A1 50mm @ A3

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- MAJORING DETAILS HAVE BEEN DESIGNED TO BE RESTRAINED BY FLOOR SLABS AND OTHER STRUCTURE AND WILL REQUIRE TEMPORARY SUPPORT BY THE RETAINMENT ELEMENTS SHOWN NOT BEEN BUILT.
- FLOORS HAVE BEEN DESIGNED FOR A LIVE LOAD OF 4.0 KPa UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST INSURE THAT THE STORAGE OF WAREHOUSES AND MATERIAL DOES NOT EXCEED THIS LOAD.
- THE CONSTRUCTION SHALL INSURE THAT ALL PROPOSED PARTITIONS SHALL BE BACK TO 200 TO THE HORIZONTAL, OR SHALL PROVIDE TEMPORARY SUPPORT.
- UNLESS NOTED OTHERWISE ALL STEEL CONNECTIONS SHALL HAVE HORIZONTAL 2 NO. HOX 8.8 BOLTS, SHOWN THICK PLATE AND 6mm FULL PENETRATION WELDS.
- TENDERS ARE TO ALLOW FOR THE PREPARATION OF FOUNDATION DRAWINGS FOR ALL STEEL, CEMENT, GROUT, ENGINEERED TIMBER AND STEEL REQUIRED IDENTIFY WITH THESE NOTES.

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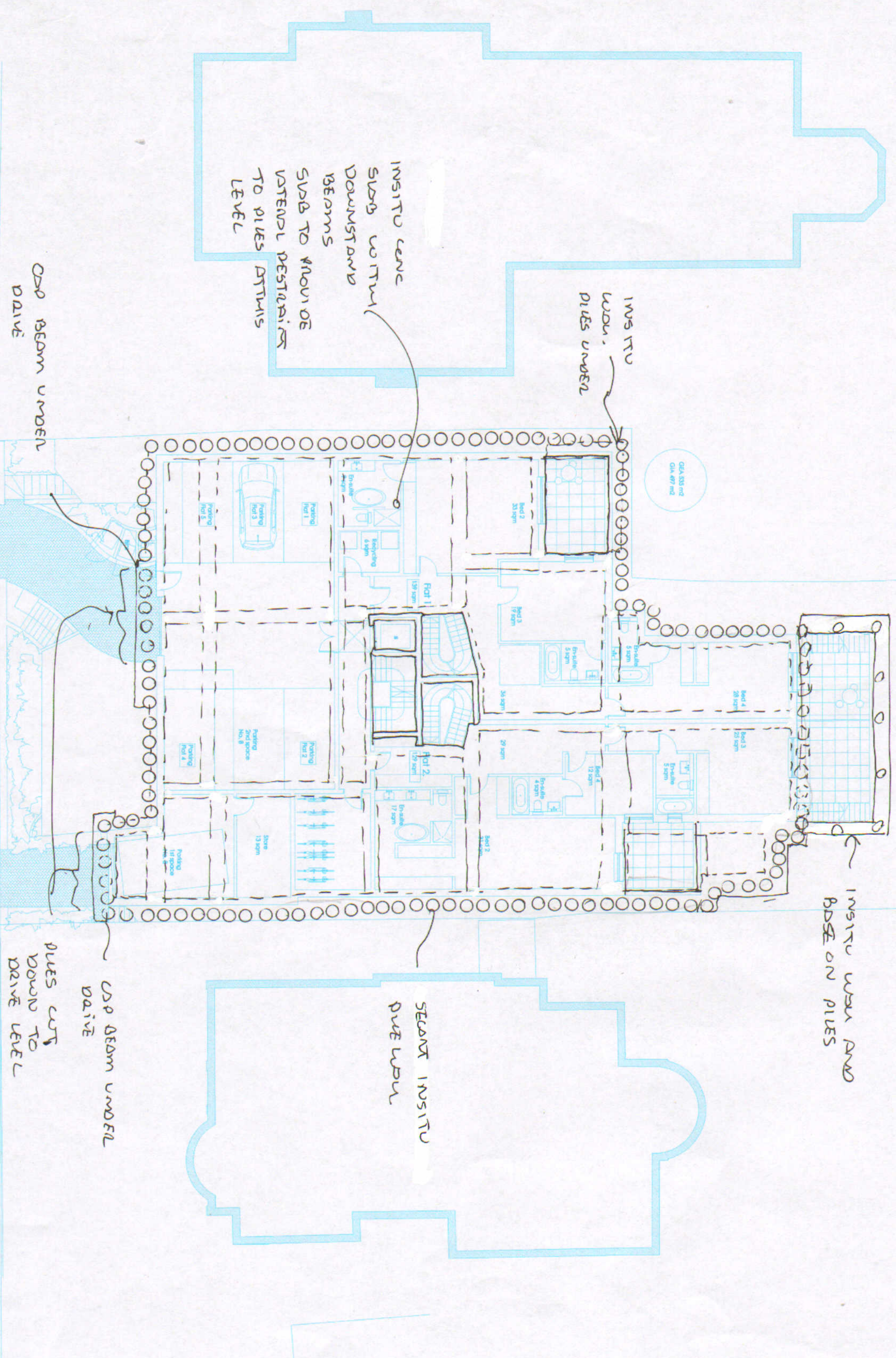
Unit 12 Borealis House Melbourne Road Boroondara VIC 3103  
TEL: 9438 2713 / 0328 278777 / info@ianharban.com.au

Client: **M. El Natherson**

10a Oakhill (Flats)

Project Title: **Basement Level G/A**

Date	Drawn	Checked	By
April 14	ST/CS	ST/CS	Checked
1:00 @ A1	1:00 @ A1		
1:00 @ A3	1:00 @ A3		
Original Size	A1	Print Generated Size	
Doc No.	214019	Drawing No.	101



SCALE CHECK 10mm @ A1 50mm @ A2

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8. FLOORS HAVE BEEN DESIGNED FOR A LIVE LOAD OF 1.5 kN/m<sup>2</sup> UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST ENSURE THAT THE STORAGE OF MATERIALS AND WASTE DOES NOT EXCEED THIS LOAD.
9. THE CONTRACTOR SHALL ENSURE THAT ALL EXPOSED EARTH WORKS SHALL BE BACK TO 200 TO THE HORIZONTAL OR SHALL INCREASE TEMPORARY SUPPORT.
10. UNLESS NOTED OTHERWISE ALL STEEL CONNECTIONS WILL HAVE MINIMUM 2 No. 10mm DIA BOLTS, 10mm THICK PLATE AND 6mm FULL PENET WELDS
11. DIMENSIONS ARE TO ALLOW FOR THE PREPARATION OF FABRICATION DRAWINGS ELEMENTS WITH THESE MARGINS

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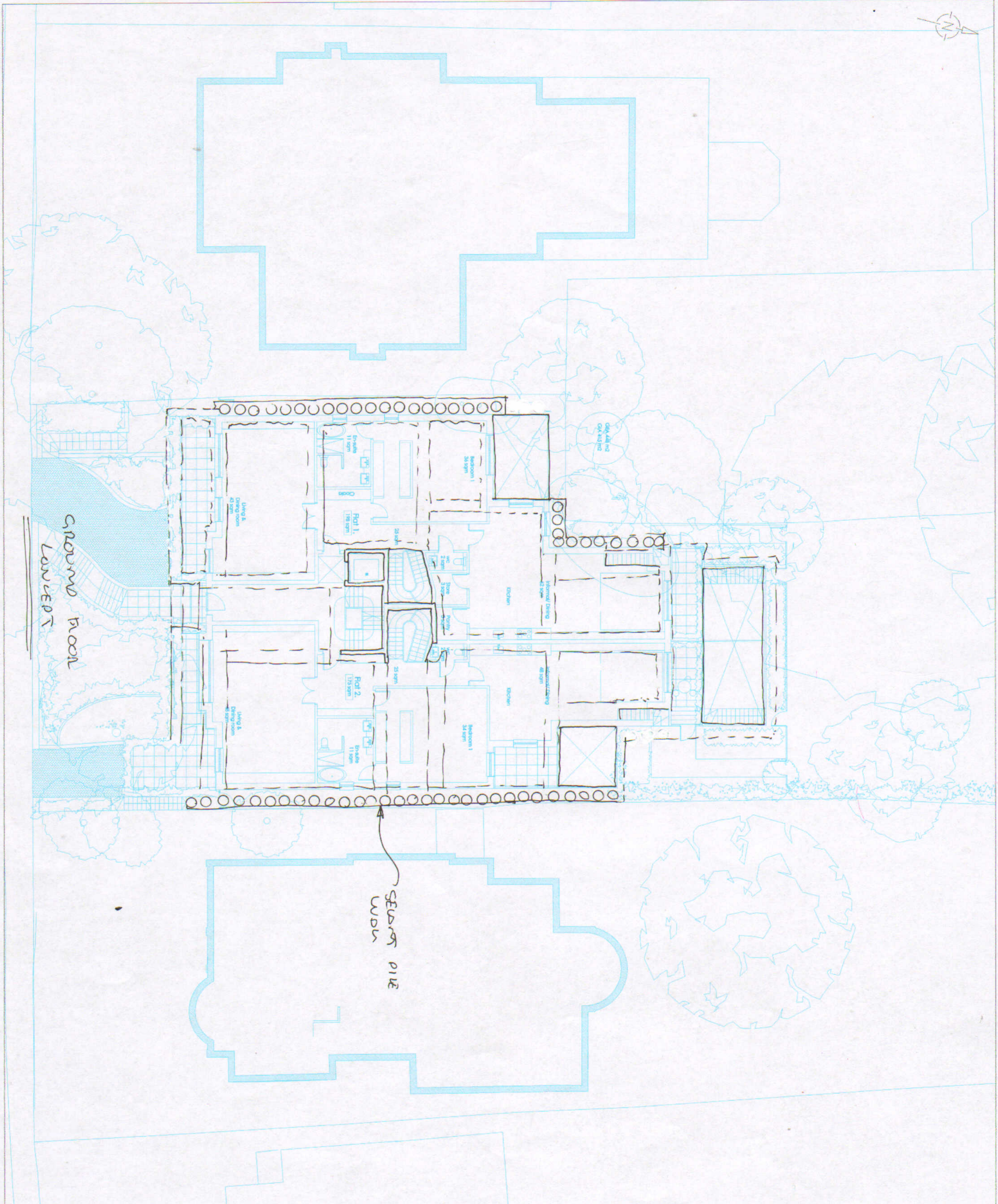
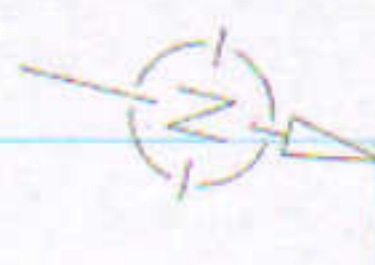
Unit 11 South Hill, Wetherby, West Yorkshire LS23 7BT  
Tel: 01937 571111 Fax: 01937 571177 Email: info@inequality.co.uk

Client: **Mr. Eli Matherson**

10a Oakhill (Flats)

Drawing Title: **Lower Ground Floor GA**

Date	14th April 2014	Issue	1
Drawn by	AM	Checked by	AM
Scale	1:100 @ A1	Scale	1:200 @ A2
Original Size	A1	Printed/Checked by	AM
Job No.	214019	Drawing No.	102



SCALE CHECK 100mm @ A1  
50mm @ A3

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12. DIMENSIONS ARE TO ALLOW FOR THE PREPARATION OF FABRICATION DRAWINGS ELEMENTS WITH THEIR FINISH

Client	M. El Nathenson		
Site Name	10a Oakhill (Flats)		
Drawing Title	Upper Ground Floor GA		
Date	April 14	Scale	AS10
Drawn By	MEI	Checked By	MEI
Issue & Size	1:100 @ A1	Issue & Size	1:100 @ A3
Original Size	A1	Printed/Checked/Scale	
Job No.	214019	Drawing No.	103

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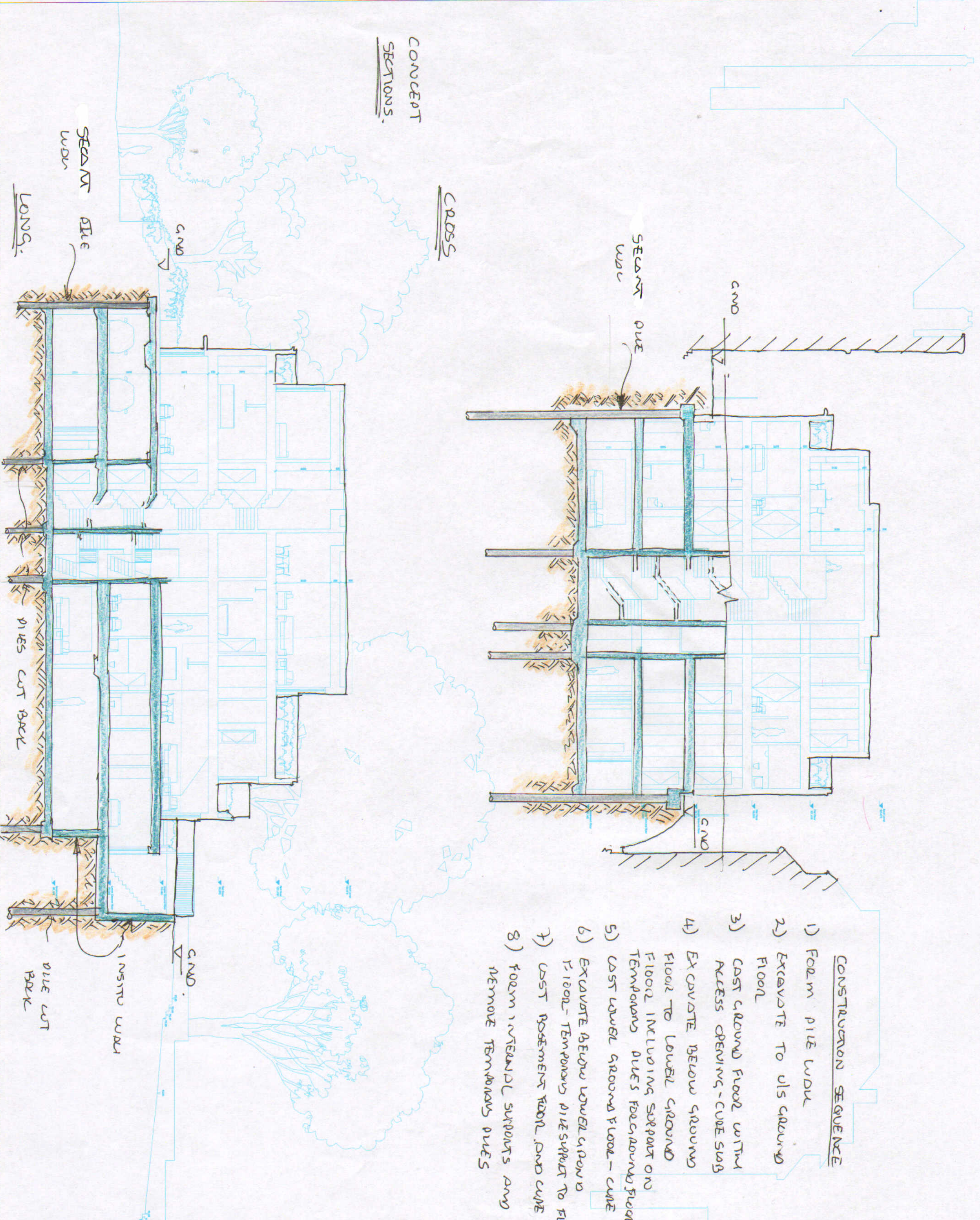
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9. FLOORS HAVE BEEN DESIGNED FOR A LIVE LOAD OF 1.5 KNC/M<sup>2</sup>
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CONSTRUCTION SEQUENCE

- 1) Form pile wall
- 2) Excavate to 1/3 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 below ground floor
- 5) Cast lower ground floor - cure
- 6) Excavate below lower ground floor floor - temporary pile support to floor
- 7) Cast Rosement floor and cure
- 8) Form internal supports and remove temporary piles

CONCEPT SECTIONS.



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Client: **Mr. El Matherson**

Site: **10a Oakhill (F&S)**

Project Title: **Sections**

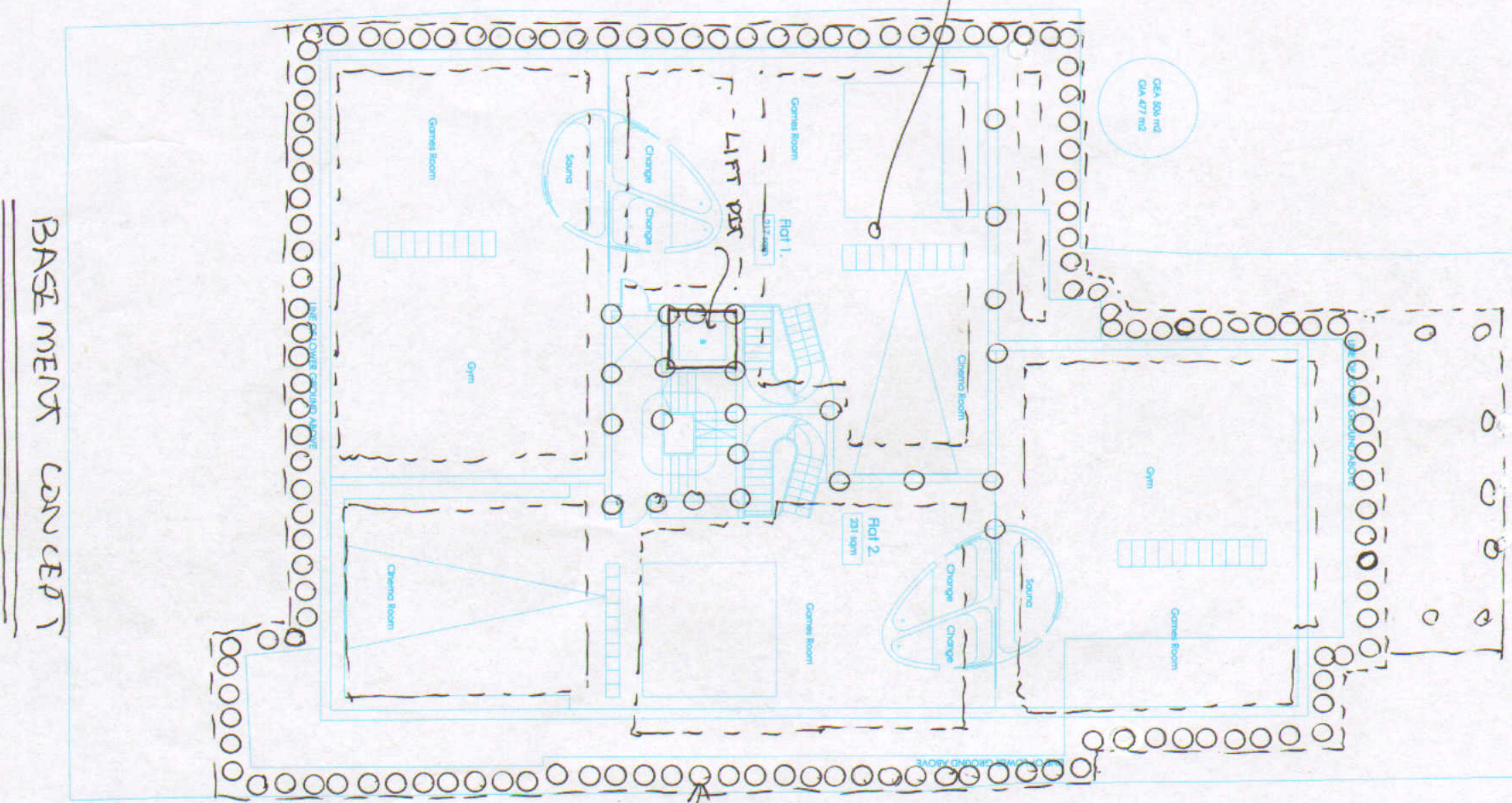
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April 14	AMT	CHG	1:100 @ A1	✓	
April 14	AMT	CHG	1:300 @ A3	✓	
Original Date	AMT	CHG	1:100 @ A1		

Proj No: **214019** Drawing No: **L10**





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



BASEMENT CONCEPT

SEALANT INSITU PILE WALL

SCALE CHECK 100mm @ A1 50mm @ A3

**NOTES**

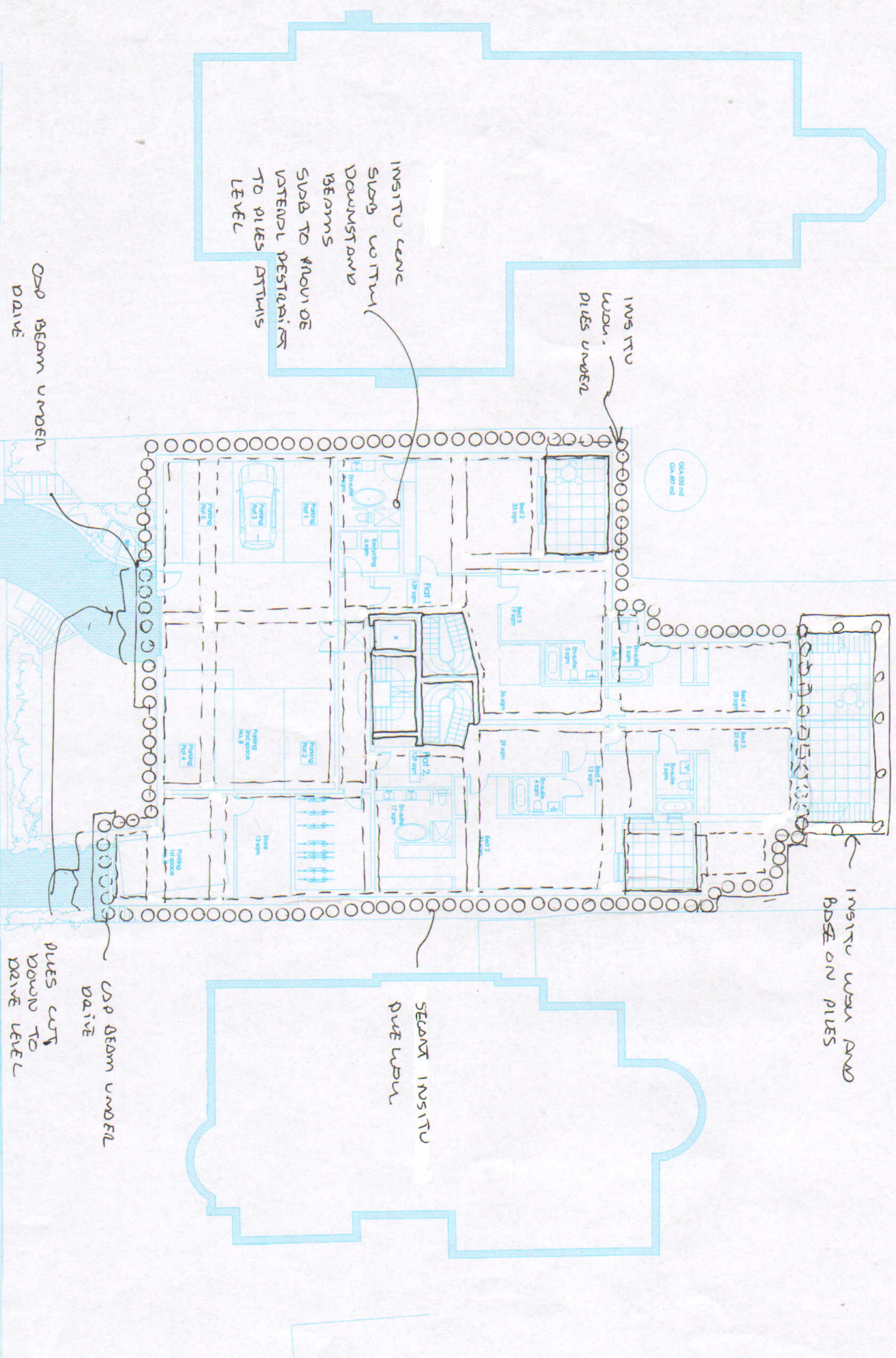
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8. UNLESS NOTED OTHERWISE ALL STEEL CONNECTIONS SHALL HAVE HORIZONTAL 2 NO. HO 8.8 BOLTS, SHOWN THICK PLATE AND 6mm FULL PENETRATION WELDS.
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**M. El Nathanson**  
10a Oakhill (Flats)  
Basement Level G/A

Date	Drawn	Checked	By
April 14	ST/CS	ST/CS	Checked
1:00 @ A1	1:00 @ A1		
1:00 @ A3	1:00 @ A3		
Original	AI	Prof. Charalabos Saka	
Doc No.	214019	Drawing No.	101



LOWER GROUND FLOOR  
CONC CRT.

SCALE CHECK 10mm @ A1  
50mm @ A2

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10. THE CONTRACTOR SHALL ENSURE THAT ALL EXPOSED BARTH ENDS SHALL BE PROTECTED TO PREVENT CORROSION. ALL BARTH ENDS SHALL BE PROTECTED WITH AN APPROPRIATE PRODUCT.
11. UNLESS NOTED OTHERWISE ALL STEEL CONNECTIONS SHALL HAVE MINIMUM 2 NO. 10mm DIA BOLTS, 10mm THICK PLATE AND 6mm FULL PENETRATION WELDS
12. DIMENSIONS ARE TO ALLOW FOR THE PREPARATION OF FABRICATION DRAWINGS AND TO BE IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REQUIREMENTS

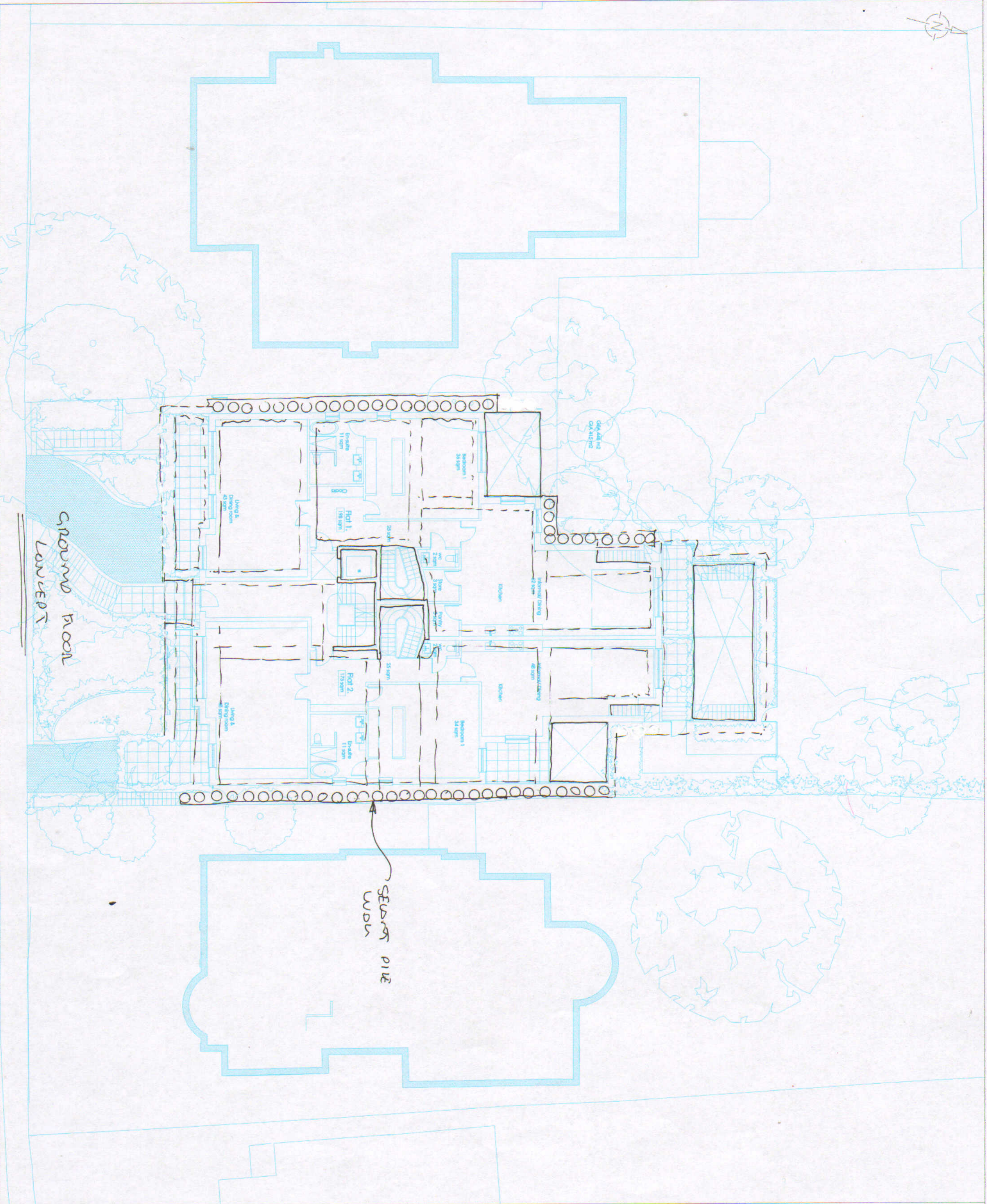
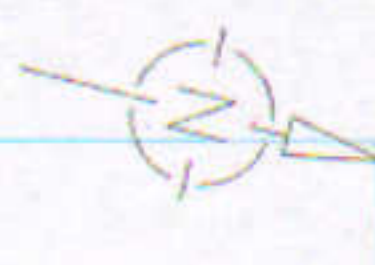
**I A N H A R B A N**  
ENGINEERING INEQUALITY

Site 11 Group 10a Oakhill Road, Bayswater, Victoria 3084  
Tel: 03 9388 7713 | 03 9388 7717 | [www.ianharban.com.au](http://www.ianharban.com.au)

Client: Mr. Eli Matherson  
10a Oakhill (Flats)  
Drawing Title: Lower Ground Floor GA

Date	By	Check	Status	Comments
April 14	IAH	EM	✓	Issue for construction
1:00 @ A1	1:00 @ A2	1:00 @ A3		

Doc No: 214019 | Drawing No: 102



SCALE CHECK 100mm @ A1  
50mm @ A3

**NOTES**

1. THIS DRAWING IS THE PROPERTY OF ENGINEERING INDUSTRY ©
2. ALL WORKING METHODS AND PROCEDURES ARE TO BE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND SPECIFICATIONS AND THE RELEVANT CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS 2017
3. THIS DRAWING IS TO BE USED IN CONNECTION WITH THE SPECIFIC WORKS SPECIFICATIONS, ALL OTHER DRAWINGS AND ANY OTHER RELEVANT DOCUMENTS
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
5. ONLY REQUIRED DIMENSIONS ARE TO BE USED, DO NOT SCALE FROM THE DRAWING
6. ALL PROPERTIES FROM THIS SET TO BE INCORPORATED INTO THE WORKS SPECIFICATIONS IN ACCORDANCE WITH THE RELEVANT STANDARDS AND SPECIFICATIONS
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO TAKE SITE CONDITIONS TO BE AWARE
8. MASSIVE WALLS HAVE BEEN DESIGNED TO BE ESTABLISHED BY FLOOR, ROOF AND OTHER STRUCTURE AND WILL REQUIRE TEMPORARY SUPPORT AT THE RESTRAINED ELEMENTS HAVE NOT BEEN SHOWN
9. FLOORS HAVE BEEN DESIGNED FOR A LIVE LOAD OF 1500N/M<sup>2</sup>
10. THE CONTRACTOR MUST ENSURE THAT THE STORAGE OF MATERIALS AND PLANT DOES NOT EXCEED THIS LOAD
11. UNLESS NOTED OTHERWISE ALL STEEL CONNECTIONS WILL HAVE MINIMUM 2 NO. M20 B. BOLTS, STEEL THICK PLATE AND 8MM FULL PENETRATION WELDS
12. DIMENSIONS ARE TO ALLOW FOR THE PREPARATION OF FABRICATION DRAWINGS ELEMENTS WITH THEIR FINISH

**I A N H A R B A N**  
ENGINEERING  
INDUSTRY

Unit 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

**M. El Nathenson**  
Chief

**10a Oakhill (Flats)**  
Site No.

**Upper Ground Floor GA**  
Drawing Title

Date	By	Check	Status	Checked
April 14	EN	EN	✓	
Issue & Rev	1:100 @ A1	Issue		
Issue & Rev	1:200 @ A3	Construction		
Original Size	A1	Final Construction Size		
Job No.	214019	Drawing No.	103	Rev.

**I A N H A R B A N**

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