

DESIGN PROJECT OF THE STRUCTURE OF A RESIDENTIAL BUILDING IN THE CITY OF CASTELLÓN STREET PASEO RIBALTA N°1

Trabajo Fin de Master

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1. Localization

The building is located in the municipality of Castellón, belonging to the province of Castellón, in the Valencian Community (Spain).

The adress is Street Paseo Ribalta nº1.

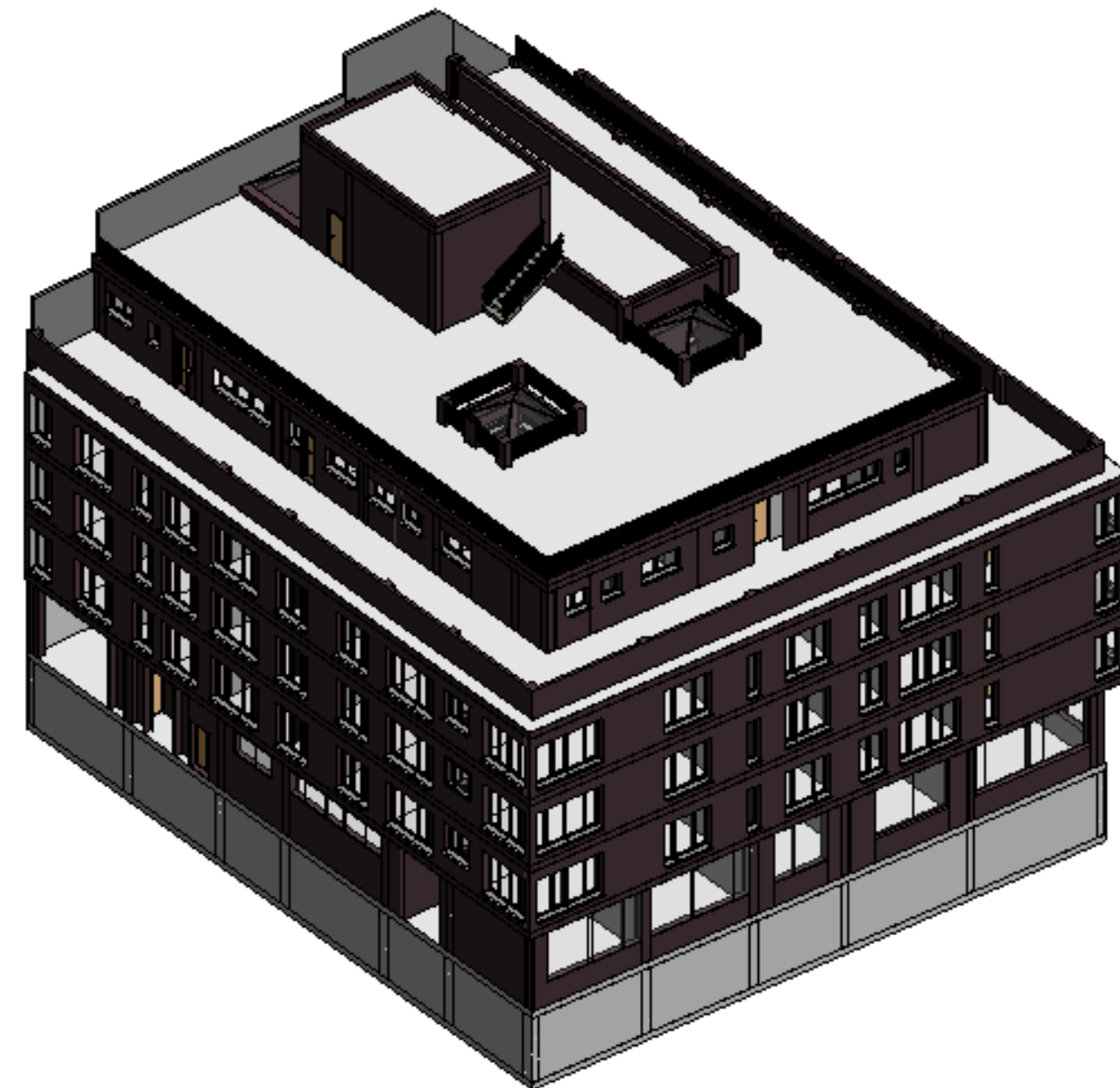


2. Geotechnical study

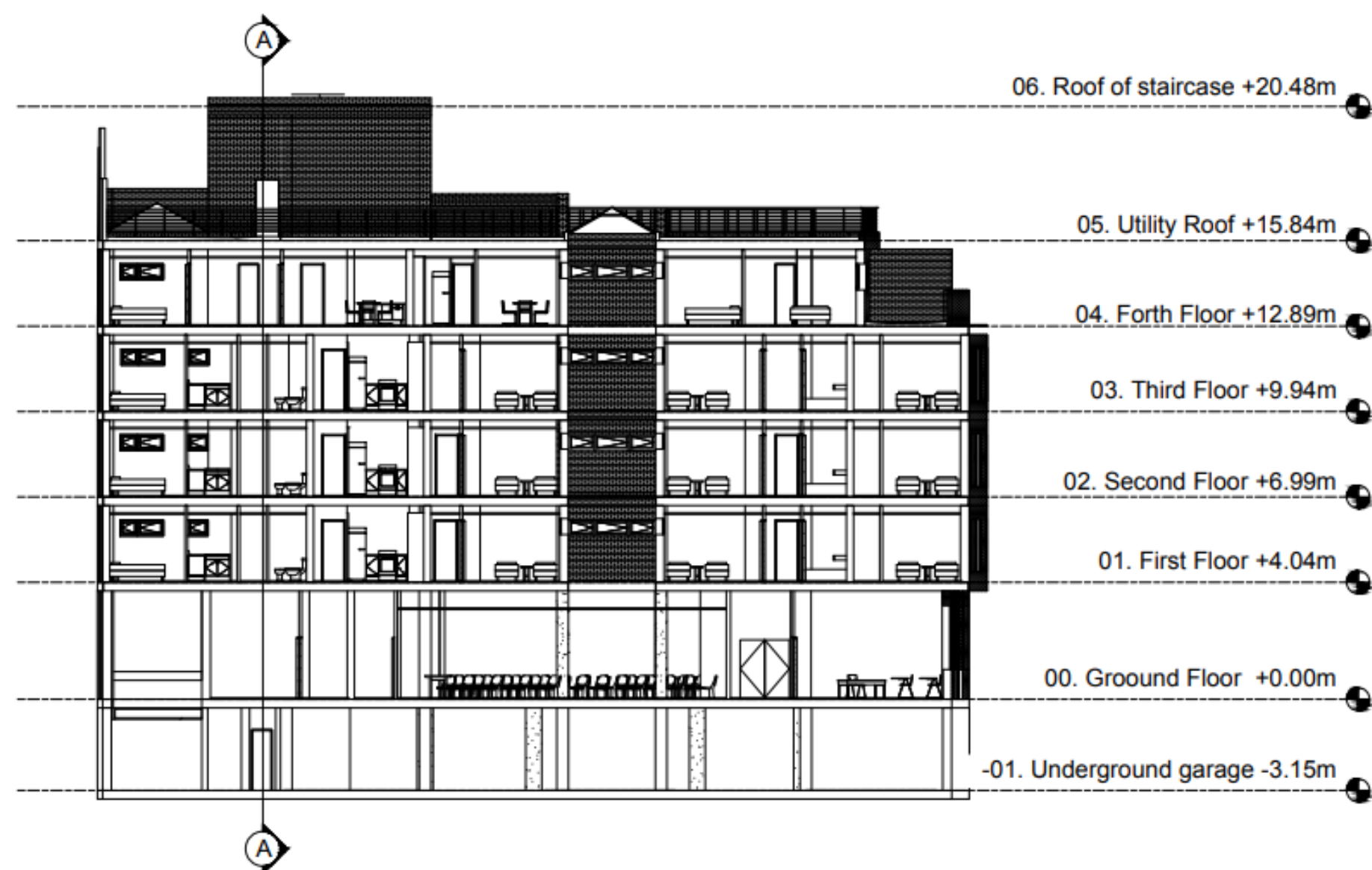
The data used in the calculations have been obtained from the study carried out by the company Maestrat Global S.L.

The detected soil have been sand-gravel mix. Regarding the most relevant data of the study, the parameters used for the calculation are the following:

- Degree of plasticity: $IL=0,75$ - soft plastic
- Angle of internal friction: $\varphi=40,5^{\circ}$
- Cohesion : $c=0$
- Weight of the ground: $\gamma_g=18,2$ kN/m3

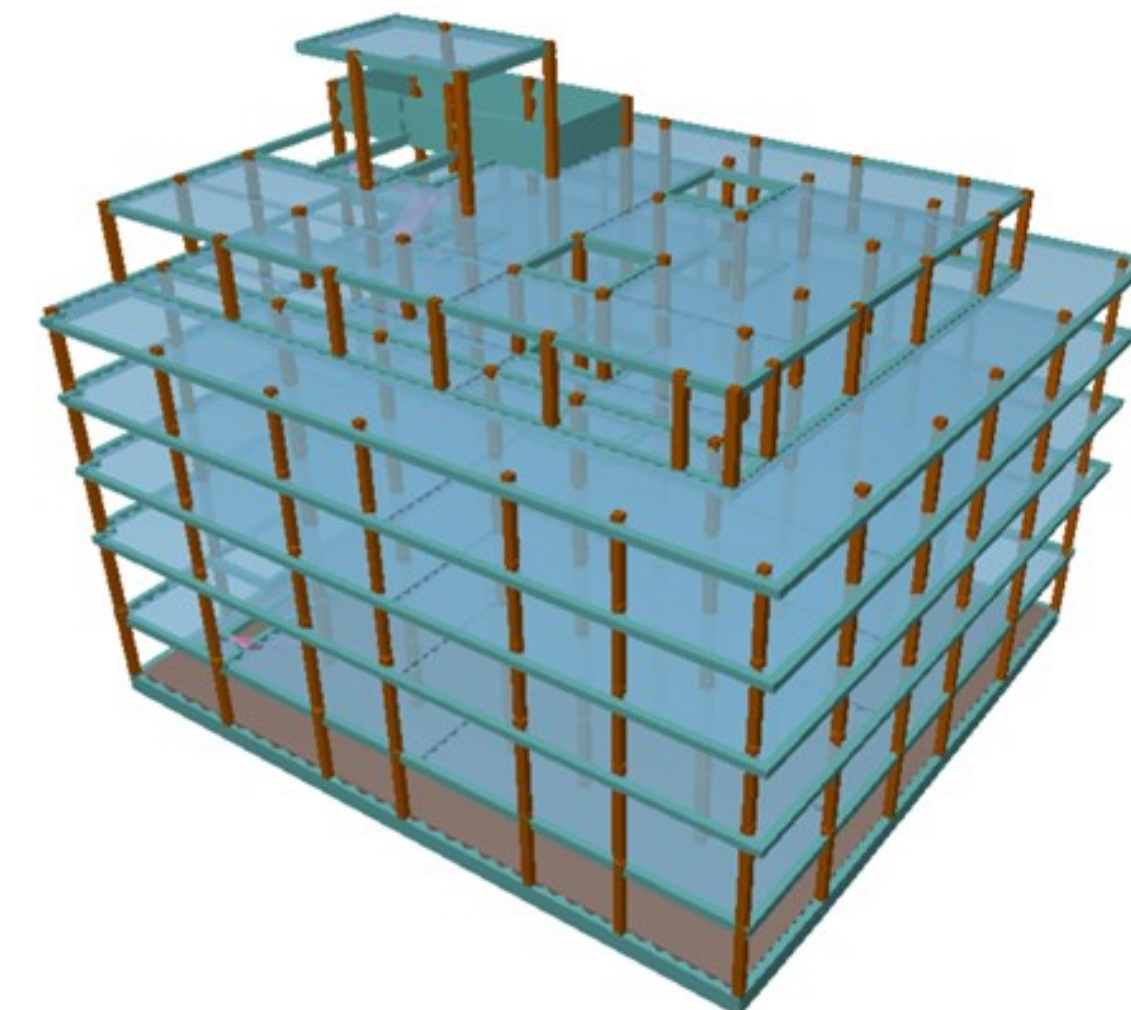


Foundations	Is composed of mat foundation of 80cm Depth of concrete C25/30 and foundation beams of dimensions 30x80cm of concrete C25/30
Columns	The building is composed of 66 columns. Their dimensions are variable depends on which floor they are and the position of the columns in the building. The range of the dimensions is between 30x30cm to 45x45cm.
Beams	There are different sizes of beams depending on the area of the building. In most cases the beams have dimensions of 30x30cm around slabs, but in some more loaded areas the height of the beam incrise to 35cm, 40 or 45cm and the width incrise to 35cm.
Slabs	The slabs that form the floors are bidirectional slabs of reinforced concrete with the depth of 30cm.



3. Description of the structure

The building is going to be a student residencial complex. It is situated 2,5km from Universitat Jaume I in Castellón. It has 7 foors including underground garage and utility roof, on which will be located swimming pool with dimensions of 15,7mx4,6mx1,5m. On the gound floor there are going to be an auditorium, 4 small conference rooms, 4 study rooms of different sizes and 3 offices. On the floors 1 to 4 there are going to be accommodations for the students that includes dormitory, kitchen, bathroom and living room. On the 5th floor there is going to be a utility roof with a terrace and a swimming pool.



The total height of the building is 20,48m. The relative height are:

- underground garage 3,15m
- ground floor 4,04m
- floor 1,2,3,4,5 2,95m

The distance between the columns is variable. In the horizontal direction it is between 3,40m and 6,28m and in vertical direction 4,85m and 5,85m.

Strength class of concrete: C25/30

Class of reinforcing steel: B500-S

4. Economic Evaluation

	Amount (€)
1 Foundations	
1.1 Basement excavation	8.996,56
1.2 Blinding concrete layer	5.396.10
1.3 Foundation slab	103.229,04
1.5 Basement walls	24.767,75
Total 1 Foundation:	142.389,48
2 Structure	
2.1 Slabs	321.333.20
2.1 Pilars	55.122,25
2.1 Beams	61.734,11
2.1 Stairs	20.413,17
Total 2 Structure:	458602,73
Budget of material and labor execution	600.992.22
13% de general costs	78.128,99
6% de industrial benefit	36.059,53
Contract execution budget	715.180,74
21% VAT	150.187,96€
Contract execution budget with VAT	865.368,69€