

# FINAL PROJECT: DETACHED HOUSE

Cartagena, Murcia (Spain)

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descriptive memory

# INDEX

1. GENERAL INFORMATION.....	1
1.1. PROJECT .....	1
1.2. SITUATION .....	1
1.3. INFORMATION ABOUT THE LOCATION .....	2
1.4. PLANNING REGULATIONS.....	3
1.5. URBAN SPECIAL REGULATIONS.....	3
1.6. OCCUPATION.....	3
1.7. SLOPING ROOF .....	3
1.8. OTHER CONSIDERATIONS .....	4
2. URBAN AREAS ELIGIBLE PURPOSES.....	4
3. SCHEDULE OF REQUIREMENT AND DESCRIPTION OF BUILDING. ....	5
3.1. DURABILITY CONSIDERATIONS.....	5
3.2. FORMAL ASPECTS.....	5
3.3. CONSTRUCTION FEATURES .....	6
3.3.2. FACADES AND PARTITIONS.....	6
3.3.3. CARPENTRY AND LOCKSMITHING .....	7
3.3.4. SANITATION.....	7
3.3.5. COVERINGS.....	7
3.3.6. REQUIREMENTS FOR IMPLEMENTATION.....	8
4. REGULATIONS OF THE PROJECT .....	8
5. BUILDING SERVICES IN CONNECTION WITH REQUIREMENTS OF CTE.....	10
5.1. BASIC REQUIREMENTS FOR FIRE SAFETY FS (SI).....	10
5.2. SECURITY BASIC DEMANDS OF USE (SU).....	11
5.3. BASIC REQUIREMENTS FOR ENERGY SAVING (HE) .....	11
6. REQUIREMENTS OF BUILDING.....	12
6.1. BENEFITS OF BUILDING.....	12
6.2. BASIC REQUIREMENTS REGARDING SAFETY .....	13
6.3. BASIC REQUIREMENTS RELATING TO HABITABILITY .....	13
6.4. OTHER ASPECTS.....	13

# DESCRIPTIVE MEMORY

## 1. GENERAL INFORMATION

### 1.1. PROJECT

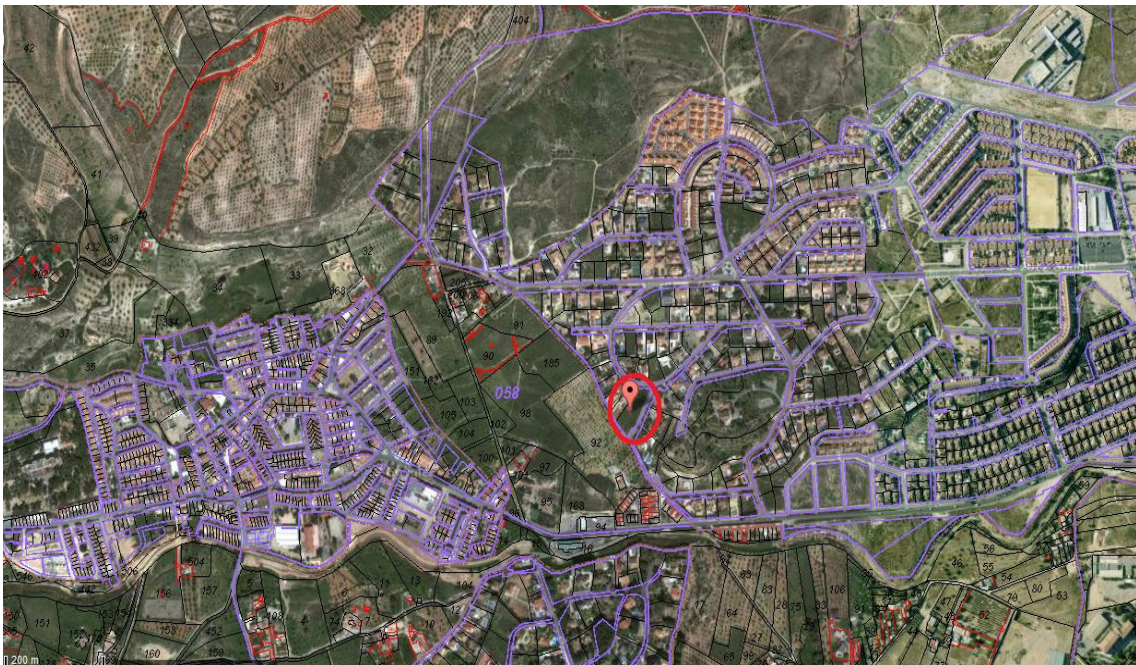
The Project is a detached house, with the completely determination of materials specifications and details, elements, construction systems and equipment. Its content will be enough to obtain the necessary visa to begin the work.

### 1.2. SITUATION

Municipal area of Cartagena, province Murcia.

C/ Loma Chica, 11

CARTAGENA:



PLOT:



EMPLACEMENT with distances and measuring in plan nº1.

### 1.3. INFORMATION ABOUT THE LOCATION

The plot is situated in urban ground non-consolidated and its use is residential for detached house .

It has 2 accesses: by Loma Chica street (north) or Loma Oso street (east).

Has a plot surface of 3.035, occupied surface 202'68m<sup>2</sup>

The potable water comes from the mains municipal supply and it counts with canalization for the connection planned in front of the plot.

The electricity supply it's going to be made from the low voltage distribution running on public roads.

The road into the building is planned from a public thoroughfare and it's going to be totally surfaced.

#### 1.4. PLANNING REGULATIONS

Shall apply, in terms of Town Planning Regulations, the revised urban rules of Municipal General Plan Management of Cartagena adopted in December 29<sup>th</sup>, 2011 and General Plan of Murcia.

#### 1.5. URBAN SPECIAL REGULATIONS

This building is following parameters as the Partial Plan of the sector "Loma de Canteras" in the General Urban Planning of Cartagena and all the specific applicable ordinances:

- Land classification: Unconsolidated urban.
- Zone classification: Urban land.
- Plot:
  - Minimum Area: 1,200 m<sup>2</sup>.
  - Maximum height: 2 storeys.
  - Build ability index: 0.2 m<sup>2</sup>/m<sup>2</sup>.
  - Separation from boundaries: 2/3 of the height and provided that not less than 3 m., which will apply this value as minimum separation.
  - Maximum occupancy: 20%.

#### 1.6. OCCUPATION

- Buildable: 0'4 m<sup>2</sup>/m<sup>2</sup>, area in detached house.
- Occupation: 0'3 m<sup>2</sup>/m<sup>2</sup>, area in detached house.
- Cantilever: when designing the new works has glass galleries, they are accounted for 50% of its surface.

#### 1.7. SLOPING ROOF

All slopes are 35%.

1.8. OTHER CONSIDERATIONS

The new house must respect and adapt to the basics, the environment and traditional environment in which they are located.

**2. URBAN AREAS ELIGIBLE PURPOSES**

- Constructed surface: 298'46 m2
- Useful surface: 245'86 m2

Breakdown useful surface:

FLOOR	ROOM	USEFUL AREA	CONSTRUCTED AREA
Basement floor	hall	7'34 m2	9'82 m2
	kitchen	29'38 m2	36'43 m2
	living room	33'66 m2	39'33 m2
	l.r.	12'18 m2	13'05 m2
	bedroom 1	17'11 m2	21'71 m2
	game room	23'74 m2	26'70m2
	bath 1	7'13 m2	9'71 m2
	toilet	6'15 m2	7'94 m2
	corridor 1	6'70 m2	7'95 m2
total ground floor		143'39 m2	172'64 m2
First floor	bedroom 2	23'30 m2	28'11 m2
	bedroom 3	15'78 m2	19'29 m2
	bedroom 4	17'64 m2	21'80 m2
	bath 2	13'16 m2	17'36 m2
	toilet 2	9'63 m2	13'52 m2
	dresser	5'42 m2	6'91 m2
	corridor 2	17'54 m2	18'83 m2
total first floor		102'47 m2	125'82 m2
TOTAL		245'86 m2	298'46 m2

### 3. SCHEDULE OF REQUIREMENT AND DESCRIPTION OF BUILDING.

The building to which this project is intended to use the house unit and all its dependencies allow the accomplishment of the assigned function.

The conditions and requirements that have served as a premise for this project is required by law for the PFC, providing the necessary documentation for actual implementation and fulfilling the statement provided to members of the court assigned.

#### 3.1. DURABILITY CONSIDERATIONS

This house is projected to meet the essential requirements of mechanical strength and stability, fire safety, hygiene, health, environment and safety in use. Compliance with these requirements is expected to meet during the life of 50 years, during which the user has to prove the maintenance manual which is part of the book building.

#### 3.2. FORMAL ASPECTS

This project develops an isolated house with rectangular forms in its plant. Based on the conditions and requirements listed above, the property has the following formal aspects:

Choosing the most suitable location for the building.

Act on the existing environmental conditions surrounding the building.

Provide the building of appropriate general volumetric characteristics with respect to energy exchanges with the outside.

Act on the characteristics of the building envelope for optimal performance of interior-exterior energy transfer and to address its permeability.

Consider the effects that space, and interior finishing elements that indicate the building's energy performance.



### 3.3. CONSTRUCTION FEATURES

#### 3.3.1. FOUNDATION AND STRUCTURE

The structure of the building is going to be resolved with steel concrete and can be decomposed , for purposes of calculation, in: Foundations, supports, floors and unique elements.

The geometric description of the structure which is included in the plans for Execution Project shall be constructed and controlled in accordance with what indicated in the Technical Building (Código Técnico de la Edificación). The interpretation of plans and implementation requirements of the structure are ultimately subject to the directives and orders during the Construction of it imparts the Architect of the work.

The frameworks are made with a total depth of 25 + 5 cm., interaxis concrete vault of 70 cm., steel joists, trusses and complementary distribution, filling of breasts and compression layer of 5 cm. thick, all executed as established under current legislation. The framework will be concrete vault.

Based in the geotechnical study, adopted the following principles of typology and calculation of foundation and construction features of the same: A system using surface footings with walls of 0.25 m supported on them.

Concrete elements will be carried out in situ with steel concrete H-25 N/mm<sup>2</sup>, T. max. 40mm in foundation and T.max. 20 mm. placed on structure formed by walls, pillars, beams bands, wrought beams and slabs, pouring consistency and compacted with vibrating plastic, steel trusses B-500-S.

Transverse joints will shrink every 25 m<sup>2</sup>, with distances between them not exceeding 5.00 m. being the depth of not less than 1 / 3 the thickness and width of 3 mm. The sill will include its corresponding mesh and bituminous waterproofing.

#### 3.3.2. FACADES AND PARTITIONS

- *Covers:* the roof was done with pieces of ceramic Arabic curve tiles. All roof slopes are 35% and terraces 3%.
- *Cladding:* the facades are made of face-brick (24x11'5x9cm), mortar layer, extruded polystyrene, air camera and wall of bricks (4cm).

### 3.3.3. CARPENTRY AND LOCKSMITHING

As for the external joinery have windows and balcony/terrace doors composed of aluminum.

Interior doors as well as the front door will be solid wood.

Exterior handrails shall be of aluminum but the railing of the staircase is solid wood.

Measures can be viewed in the plane\*

### 3.3.4. SANITATION

The sewerage system will collect the studs' wet rooms housing and the rain. These are grouped into different collectors following his path to the connection with the general coffers to the general thrust of release. General collectors and drains toilets, sinks, washing machine are made by PVC pipe of varying diameter and according to the layout and dimensions established at the project. The network will carry a minimum slope of 1.5% and placed properly sized recordable boxes for network maintenance, drains, etc.

### 3.3.5. COVERINGS

The flooring, coping, outer faces, interior walls and ceilings are described in the plans of finishes\*

- *Paint:* The interior walls are made with matte plastic paint color, sanded and preparation based on background and two coats of finish.  
Metal struts are painted with paint on base type ferro scraped, cleaned and a coat of electrolytic.  
The wood supports are finished with varnish applied to protect and hand sanding.
- *Glasses:* The type of glass used in the external woodwork consists of two panes of 4mm dehydrated and air gap of 6mm. The glass located on the inside will be low emissivity in order to stop the flow of heat, reflecting inward emissions units of heating equipment, preventing their loss to the outside. This system avoids the phenomenon of "cold wall" getting better use shelf units saving energy.  
In all cases, the set is not subject to contractions, expansions or deformation of the support or in contact with other glass, concrete or metal. The glass will be completely watertight.

### 3.3.6. REQUIREMENTS FOR IMPLEMENTATION

The accreditation of qualities required of the materials will be checked for reception work.

The requirements for the laying of prefabricated materials shall conform to the BD (basic document) that applies to them and to the manufacturer's instructions. In particular, it will

strictly observe the construction and structural joints as well as auction meetings with manufacturing waterproofing materials, fireplaces, furniture and drainage elements contained in this project and the corresponding BD.

## 4. REGULATIONS OF THE PROJECT

Content	Type of regulation
<b>TECHNICAL BUILDING CODE (CTE)</b>	
<b>STRUCTURE</b>	
DB- SE-AE STRUCTURAL SAFETY. ACTIONS OF BUILDING	RD 314/06
DB SE-A STRUCTURAL SAFETY.STEEL	RD 314/06
<b>FIRE</b>	
DB SI SAFETY IN CASE OF FIRE	RD 314/06
<b>USE</b>	
DB SU SAFETY OF USE	RD 314/06
<b>HEALTHINESS</b>	
DB HS HEALTHINESS	RD 314/06
<b>NOISE</b>	
DB HR NOISE PROTECTION	RD 314/07
<b>ENERGY</b>	
DB HE ENERGY SAVING	RD 314/06
<b>FUNCTION PROFESSIONAL ACTIVITIES</b>	
LAW BUILDING MANAGEMENT	Law 38/99
FORMAN BUILDER. FACULTIES AND RESPONSABILITIES	RD 265/71
FORMAN BUILDER. FUNCTIONS	D 16/07/35
DUTIES OF CONTRACTORS AND BUILDERS	D 16/07/35
PRODUCT LIABILITY	Law 22/94
RESPONSIBILITIES OF BUILDERS	Order 22/10/63

<b>CONSTRUCTION PROJECT MANAGEMENT</b>	
(CTE) APROVAL OF PROTECTION AGAINST NOISE BD-HR AND MODIFICATION	RD 314/2006 RD 1371/2007
RULES OF ORDER AND ATTENDANCE BOOKO.MODIFIC.	Order 09/06/71
FINAL CERTIFICATE OF LOCATION WORKS	Order 20/01/72
COLLECTION OF AMOUNTS ANTICIPATED IN HOUSING	Law 57/68
SALE AND LEASE HOUSING INFORMATION	RD 515/89

<b>STRUCTURE</b>	
NCSE-02. CONSTRUCTION STANDARD EARTHQUAKE-RESISTANT	RD 997/02
CONCRETE STRUCTURAL INSTRUCTION (EHE)	RD 1247/08
<b>PROTECTION</b>	
REGULATION WHICH DEVELOPES NOISE LAW	RD 1367/2007
NOISE LAW	Law 37/03
CLASSIFICATION OF CONSTRUCTION PRODUCTS AND ELEMENTS OF CONSTRUCTION	RD 110/2008
REGULATION OF FACILITIES OF FIRE PROTECTION	RD 19 42/93
BASIC PROCESS FOR ENERGY EFFICIENCY CERTIFICATION	RD 47/07
<b>ELECTRICITY</b>	
REGULATIONS FOR HIGH VOLTAGE OVERHEAD LINES	D 3151/68
SECURITY REQUIREMENTS IN POWER DEVELOPEMENT	RD 7/88
REGULAIONS AND RULES ABOUT ELECTRICAL CONNECTIONS	RD 2949/82
REGULATION OF LOW ELECTROTECHNICAL CURRENT TECHNIQUES AND ADDITIONAL FACILITIES ITC-BT-01 A 51	RD 842/02
<b>THERMAL SYSTEM</b>	
REGULATION OF THERMAL SYSTEM IN BUILDINGS RITE-2007	RD 1027/07
<b>SPECIFICATIONS</b>	
TECHNICAL SPECIFICATION, DRAINAGE PIPES	Order 15/09/86
TECHNICAL SPECIFICATION, WATER PIPES	Order 28/07/74
INSTRUCTION FOR THE RECEIPT OF CEMENT	RD 1797/03
TECHNICAL ESPECIFICATIONS	Order 04/06/73

<b>HEALTHY CONDITIONS</b>	
HOUSING - Murcia (Spain)	
BUILDING DESIGN STANDARDS FOR HOUSING	RD 1/2002
BOOK OF THE BUILDING IN MURCIA	RD 2642/1982

PLANNING	
REGIME OF SOIL AND LAND MANAGEMENT	
LAW OF REGIME AND VALUATION OF SOIL	Law 6/98
PLANNING REGULATION	RD 2159/78
URBAN DISCIPLINE REGULATION	RD 2187/78
EASEMENTS	
EASEMENTS: CIVIL CODE	Law 30/81
DISTANCE BETWEEN TREES AND ADJACENT BUILDINGS	D 2661/67
SERVICE: ELECTRICITY, EXPROPIATIONS AND WAY EASEMENTS	Law 10/60
REGULATION OF APPLICATION	D 2219/66

**5. BUILDING SERVICES IN CONNECTION WITH REQUIREMENTS OF CTE.**

**5.1. BASIC REQUIREMENTS FOR FIRE SAFETY FS (SI)**

*Basic Requirement SI 1: Internal propagation*

The property subject of this project ensures the limitation of the risk of spread of fire inside.

*Basic requirement SI 2: Outdoor propagation*

The features and ensure housing situation which limits the risk of spread outside of a fire, in the same house as other buildings.

*Basic requirement SI 3: Evacuation of the occupants*

The property has adequate means of escape for the occupants to leave the same or reach safety

*Basic requirement SI 4: Fire protection facilities*

The house has those equipment and facilities required in terms of their use and condition to enable the detection, control and extinguish a fire.

*Basic requirement SI 5: Fire intervention*

The house and its surroundings have the conditions that are required to facilitate the involvement of rescue and firefighting.

*Basic requirement SI 6: Fire resistance el the structure*

The supporting structure is designed to maintain the required fire resistance for the time necessary for them to carry out the basics requirements above.

## 5.2. SECURITY BASIC DEMANDS OF USE (SU)

### *Basic requirement SU 1: Security against the risk of falls*

The morphology of the building and its parts has been designed to offer the followings benefits:

- It limited the risk of falling users.
- The floor favor people not to slipping, tripping or will be difficult mobility.
- It's limited the risk of falling through holes in changes of level, on stairs and ramps.
- Cleaning the exterior glazing can be done safety.

### *Basic requirement SU 2: Safety against the risk of impact or entrapment*

Proper design of fixed and building practices ensures that the risk that users may suffer impact or entrapment with them, should be limited safety.

### *Basic requirement SU 3: Security against risk of imprisonment*

The building has been designed to limit the possibility for users to accidentally get trapped somewhere.

### *Basic requirement SU 4: Security against the risk caused by inadequate lightning*

The lighting proposal ensures that the risk of users suffer damage due to it both in circulation areas in the interior and exterior, is limited, even in an emergency or failure of normal lighting.

### *Basic requirement SU 5: Security against the risk caused by high occupancy situations.*

The use and the ability of the property failure guarantee the impossibility of risk caused by high occupancy situations.

### *Basic requirement SU 6: Security against the risk of drowning.*

There are no items in the home which could cause risk due to drowning.

### *Basic requirement SU 7: Security against the risk caused by moving vehicles*

This project is a detached house, the risk caused by moving vehicles is considered limited.

### *Basic requirement SU 8: Security against the risk related to the action of lightning*

The purpose of this project has been designed so that the risk of electrocution and fire caused by lightning is limited

## 5.3. BASIC REQUIREMENTS FOR ENERGY SAVING (HE)

### *Basic requirement HE1: Limited energy demand*

The envelope of the house has all the necessary requirements to guarantee the limitation of energy demand to ensure adequate thermal comfort depending on your local climate and its use.

In that way, it has appropriate characteristics of isolation and inertia, air permeability and exposure to solar radiation, preventing the development of humidity and interstitial condensation.

***Basic requirement HE2: Performance of thermal system***

Thermal systems of the house ensure thermal comfort of its occupants and all requirements set forth in the existing Regulation of Thermal Systems in Buildings (RITE).

***Basic requirement HE3: Energy efficiency of lighting system***

Lighting systems are designed according to the needs from the proper use of energy efficient housing and through a control system that adjusts the ignition to the actual occupancy of each area.

The house has also a system of regulation of natural light that takes full advantage of it in the required areas.

***Basic requirement HE4: Minimum solar contribution to sanitary hot water.***

The house has a system for collecting, storing and using solar energy at low temperature, suitable for the global solar radiation of the location and hot water demand of the house itself, ensuring that portion of the total thermal energy needs are covered by this system.

***Basic requirement HE5: Contribution minimum photovoltaic power***

This project doesn't incorporate feedback system and solar energy conversion by photovoltaic processes.

## 6. REQUIREMENTS OF BUILDING

### 6.1. BENEFITS OF BUILDING

- ***Using:***  
The house has been designed that the arrangement and the dimensions of spaces, and the facilities provision, facilitate the life to the proper and its functions on it.
- ***Accessibility:***  
The property has all the requirements according to their characteristic in terms of accessibility.
- ***Telecommunication services:***  
The house has been designed that meet all the requirements of current legislation, both in the '*Real Decreto Ley1/1998, of 27<sup>th</sup> of February*', a common infrastructure in the buildings for access to the telecommunication services and regulation governing the common infrastructure of telecommunications for access to telecommunication services in indoor and activity installation of telecommunications equipment and systems (*Real Decreto 401/2003 of 4<sup>th</sup> April, and Ley 32/2003, general de telecomunicaciones.*)

## 6.2. BASIC REQUIREMENTS REGARDING SAFETY

- *Structural safety:*  
The house is designed to have all the necessary requirements to avoid any damage, or the property itself or any of its parts, which have their origin in the foundation, supports, frameworks, floors, walls or load other structural element, or affect them, ensuring the mechanical strength and stability of the house.

## 6.3. BASIC REQUIREMENTS RELATING TO HABITABILITY

- *Hygiene, health and environmental protection:*  
The property has conditions of safety and proper sealing in your indoor environment, and it doesn't deteriorate the environment in their immediate environment, ensuring a great waste management.
- *Protection against noise:*  
The house's characteristics ensure that the health of users of the same isn't in danger because of the perceived noise and can perform so successfully in the same activities.

## 6.4. OTHER ASPECTS

The property has also requirements of all mandatory standards that apply, according to the relationship expressed in previous sections.



**constructive memory**

# INDEX

1. SOIL CHARACTERISTICS.....	1
2. FOUNDATION AND STRUCTURE.....	1
2.1. METHOD OF CALCULATION – STRUCTURE.....	1
2.2. FOUNDATION CHARACTERISTICS.....	3
2.3. STRUCTURE .....	3
2.3.1. GRAVITATIONAL ACTIONS.....	3
2.3.2. REACTION AND FIRE RESISTANCE.....	4
2.3.3. WIND ACTION .....	4
2.3.4. SEISMIC ACTION.....	4
2.3.5. THERMICAL AND RHEOLOGICAL ACTIONS .....	4
3. PARTITIONS, COVERING, FINISHES.....	5
3.1. FACADES .....	5
3.1.1. DESCRIPTION .....	5
3.1.2. PHYSICAL BEHAVIOR.....	5
3.2. COVERS.....	6
3.2.1. DESCRIPTION .....	6
3.2.2. PHYSICAL BEHAVIOR.....	7
3.3 VOIDS IN FACADES .....	7
3.3.1. PHYSICAL BEHAVIOR.....	7
3.4. INTERIOR PARAMENTS.....	8
3.4.1 DESCRIPTION .....	8
3.4.2. PHYSICAL BEHAVIOR.....	8
3.5 FINISHES .....	8
4. CONDITIONS AND FACILITIES APPLICABLE TO THE BUILDING.....	9
4.1. ACOUSTIC INSULATION.....	9
4.2. FACILITIES IN BUILDINGS.....	9
4.2.1. ELECTRICITY MEMORY .....	10
4.2.2. PLUMMBING MEMORY.....	12
4.2.3. FIRE PROTECTION MEMORY .....	14
4.3.4. EXTRACTION AND VENTILATION MEMORY .....	14

4.2.5. TELECOMMUNICATION MEMORY .....	14
4.2.6. LIGHTNING ROD.....	14
5. JUSTIFICATION OF COMPLIANCE REGULATIONS .....	15
5.1 ACCORDING TO EHE-08 .....	15
5.2. LOW VOLTAGE : ELECTROTECHNICAL REGULATIONS (RBET) .....	15
5.3. SANITATION AND EVACUATION.....	16
5.4. PLUMBING.....	17
5.5. TELECOMMUNICATIONS .....	19
5.6. MUNICIPAL ORDINANCES .....	19

# CONSTRUCTIVE MEMORY

## 1. SOIL CHARACTERISTICS

The geotechnical study has been done in accordance with the parameters set out in "Artículo 3 del Documento Básico SE-C del CTE", and committed for a qualified technician designed by the developer and have the college visa.

All points of recognition, in planimetry and altimetry are reflected in the foundation plane, referred to fixed points clearly recognizable in the environment and enclosed.

Nature of the foundation layer: **Sand**

Specific weight: **1,8 t/m<sup>3</sup>**

Cohesion: **0,0 KN/m<sup>2</sup>**

Internal friction angle: **30°**

Considered permissive stress: **200 KN/m<sup>2</sup>**

Water ground level: **Below the foundation elevation.**

Previous to the construction of the foundation it has to be done the tastings prescribed by the architects.

## 2. FOUNDATION AND STRUCTURE

### 2.1. METHOD OF CALCULATION – STRUCTURE

The numerical calculation was done by a computer program, based on the matrix formulation of the method of balance. The software used is CYPE 2009 program. The calculation method is adapted to the current legislation. Likewise it has been used tables and/or abacus of specialized publications.

The method of calculation used for the design of the concrete footing and its reinforcement is reflected in the EHE-08 regulation. In the slabs and reinforced concrete has been checking out the deformations according to the regulation EHE (*concrete instruction*) too.

To calculate the different types of resistive elements it has been in consideration several hypotheses: total vertical load, alternating overload, and vertical load combined with wind.

The structure of the floors is done with one-way slab and beams supporting reinforced concrete pillars. In all cases was used one-way reinforced concrete slabs, the height is (25+5) 30 cm.

# CALCULATION SECTION OF THE SLAB

$$h_{\min} = \delta_1 \delta_2 \frac{L}{C}$$

$\delta_1$ : Factor that depends on the total charge and has the value of  $\sqrt{(q / 7)}$  where  $q$  is the total load in kN/m<sup>2</sup>

$\delta_2$ : Factor that has the value of  $(L / 6)^{1/4}$

$L$ : The calculation of the slab in m

$C$ : Coefficient whose value is taken from Table 50.2.2.1.b from the EHE (spanish normative)

Kind of slab	Kind of loads	Kind of stretch		
		Isolated	End	Interior
Armed joists	Partitions or walls	17	21	24
	Roofs	20	24	27
Prestressed joists	Partitions or walls	19	23	26
	Roofs	22	26	29
Prestressed hollow core slabs	Partitions or walls	36	--	--
	Roofs	45	--	--

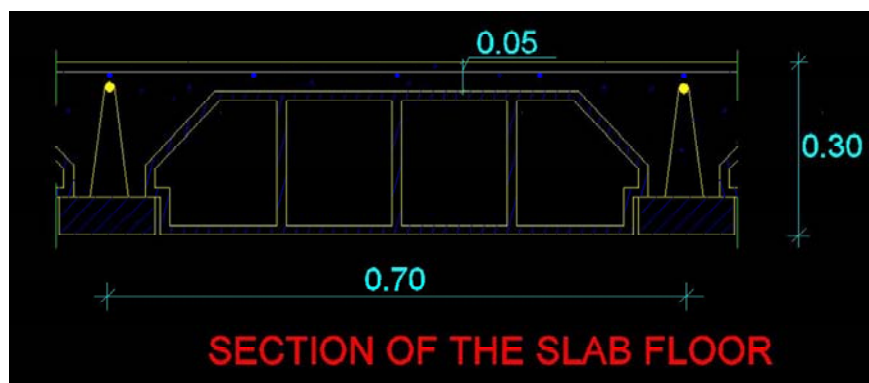
$q$ : 8'82 kN/m<sup>2</sup> (ground cover)

$L$ : 5'01 m

$C$ : 21

$\delta_1$ :  $\sqrt{(8'82/7)} = \sqrt{1'26} = 1'122$  ;  $\delta_2$ :  $(5'01/6)^{1/4} = 0'956$

$H_{\min} = 1'122 \cdot 0'956 \cdot (5'01/21) = 0'256 \rightarrow 0'30 \text{ m}$  (25+5cm)



It has taken for granted that materials have an elastic behavior, and for the design of the different elements has been followed the method of calculation based on the ultimate limit and service states. In the particular case of the concrete, it has been taken as a model of behavior the normatively admitted: parabola-rectangle, rectangle diagram.

## 2.2. FOUNDATION CHARACTERISTICS

The chosen system is shallow spread footings with low walls for create a suspended floor.

The method of calculation used for the design of footings and walls, and their reinforcement is reflected in the regulation EHE-08.

As seen, the value of the allowable stress is prudent, however I will be taken as correct which determines the geotechnical report of the land.

## 2.3. STRUCTURE

### 2.3.1. GRAVITATIONAL ACTIONS

GROUND FLOOR	
Slab own weight	3,70 kN/m <sup>2</sup>
Partitions overload	1,00 kN/m <sup>2</sup>
Own weight flooring	1,00 kN/m <sup>2</sup>
Use overload	2,00 kN/m <sup>2</sup>
<b>TOTAL</b>	<b>7,70 kN/m<sup>2</sup></b>
FIRST FLOOR	
Own weight slab	3,70 kN/m <sup>2</sup>
Partitions overload	1,00 kN/m <sup>2</sup>
Own weight flooring	1,00 kN/m <sup>2</sup>
Overload use	2,00 kN/m <sup>2</sup>
<b>TOTAL</b>	<b>7,70 kN/m<sup>2</sup></b>
GROUND COVER	
Slab own weight	3,70 kN/m <sup>2</sup>
Gable tile on planks and brick openwork own weight	3,00 kN/m <sup>2</sup>
Wind overload	1,52 kN/m <sup>2</sup>
Snow overload	0,60 kN/m <sup>2</sup>
<b>TOTAL</b>	<b>8,82 kN/m<sup>2</sup></b>

STAIR SLAB	
Slab self weight	3,70 kN/m <sup>2</sup>
Step own weight	1,85 kN/m <sup>2</sup>
Use overload	2,00 kN/m <sup>2</sup>
Own weight flooring	1,00 kN/m <sup>2</sup>
<b>TOTAL</b>	<b>8,55 kN/m<sup>2</sup></b>
ENCLOSURE AND RAILING	
Façade walls	7,00 kN/m
Handrails on stairs	3,00 kN/m
Ledge	1,00 kN/m

### 2.3.2. REACTION AND FIRE RESISTANCE

- Supporting elements without separation function against fire → **R30**
- Supporting elements with separation function against fire → **R90, EI90**

### 2.3.3. WIND ACTION

Height of the building	< 15m
Building situation	Zone B (E0,V2,2)- according to DB-SE-AE
Wind speed	27 m/s
Wind dynamic pressure	0'5 KN/m <sup>2</sup>
Wind coefficient (suction-pressure)	0'7-0'3

### 2.3.4. SEISMIC ACTION

Seismic actions are regulated by NSCE, seismic building standards: general part and building.

Our building is in a moderate seismic zone, where the contribution coefficient (k) is between 0.04 g and 0'08g.

### 2.3.5. THERMICAL AND RHEOLOGICAL ACTIONS

Not considered because the dimensions of the building are reduced. For this reason, it requires no structural expansion joint.

### 2.3.6. RESISTANT PROPERTIES OF STRUCTURAL MATERIALS

According to EHE-08, it has been taken the following safety coefficients relation to control levels to make:

CHARACTERISTICS ACCORDING TO THE EHE					
CONCRETE					
STRUCTURAL ELEMENT	Kind of concrete	Level of control	Parcial safety coefficient ( $\gamma_c$ )	Resistance calculation ( $N/mm^2$ )	Minimum cover (mm)
Foundation	HA-25/P/40/IIIa	STATISTICAL	1,50	16,6	45
Structure	HA-25/P/20/IIIa	STATISTICAL	1,50	16,6	45
STEEL					
STRUCTURAL ELEMENT	Kind of steel	Level of control	Parcial safety coefficient ( $\gamma_s$ )	Resistance calculation ( $N/mm^2$ )	The steel in the reinforcement will be guaranteed by AENOR mark
Foundation	B 500 S	NORMAL	1,15	348	
Walls	B 500 S	NORMAL	1,15	348	
Columns	B 500 S	NORMAL	1,15	348	
Beams and slabs	B 500 S	NORMAL	1,15	348	
EXECUTION					
KIND OF ACTION	Level of control	Parcial safety coefficient			
		Favourable effect	Adverse effect		
Permanent	NORMAL	$\gamma_s = 1,00$	$\gamma_s = 1,50$		
Permanent with constant value	NORMAL	$\gamma_c = 1,00$	$\gamma_s = 1,60$		
Variable	NORMAL	$\gamma_s = 0,00$	$\gamma_s = 1,60$		

## 3. PARTITIONS, COVERING, FINISHES

### 3.1. FACADES

#### 3.1.1. DESCRIPTION

*Vertical enclosures in contact with outside (facades):* will contain face-brick (1/2 foot), mortar layer, layer insulation in the chamber of air and coated hole brick (4cm) inside. Total 24cm (thickness).

#### 3.1.2. PHYSICAL BEHAVIOR

- **Thermal insulation:**

The property has the following percentages of voids in facades: < 15% (aprox. 10%). In all these fronts the void ratio is less than 60% of its surface. For these reasons, we applied the simplified option in the DB HE 1 of CTE for the calculation of energy demand. The property is located in a climatic zone C3. All



spaces considered low components of internal load, the use to which they will be posted. The thermal envelope of the flowing elements:

- Cover
- Soil contact area uninhabitable
- Facades
- Interior partitions in contact with area uninhabitable

- **Reaction and fire resistance:**

The constituent materials of the facades are classified according to their reaction to fire class A1. They also meet the minimum strength EI 120 in accordance with the DB SI 2.

- **Mechanical resistance:**

Outside the factory has been designed to withstand the gravitational action, wind and earthquake.

- **Sealing:**

The sealing of the penetration of water will be subject to the relevant checks to the final receiving of the building. In particular, take note of woodworking supplies due to the factory, and the willingness and sealing of windows.

- **Soundproofing:**

- Blind part of the facade: Airborne sound insulation R of 47dbA
- Interior walls in contact with non-residential spaces: Airborne sound insulation R of 47 dbA.

## 3.2. COVERS

### 3.2.1. DESCRIPTION

The skirts will comprise partition walls consist of double hollow brick "Palomero" 1.00 m apart, braced longitudinally every 2 m, and over them a tongue and groove board of 100x30 cm pieces with compression layer of cement mortar. On the deck slab is placed for thermal and acoustic insulation blanket glass wool IBR-80.

The cover material will be sitting curved tiles with cement mortar. They will receive one of five courses and eaves all mouthpieces, which mounted two pieces.

For the ventilation of the cameras used special pieces. Also the placement of appropriate safety equipment to perform maintenance work and repair.

According to art. 1.3.5 of the QB-90 "Tires with bituminous materials", the airborne sound insulation of the roof meets the provisions of NBE-CA/88, "Acoustic Conditions in Buildings",

and the heat transfer coefficient cover conforms to the provisions of NBE-CT/79 "Thermal Conditions in Buildings".

### 3.2.2. PHYSICAL BEHAVIOR

- **Thermal insulation**  
The thermal transmittance value of 0,32W/m<sup>2</sup>K complies with regulatory constraints. Calculation is provided in support of the absence of surface humidity and interstitial condensation.
- **Mechanical resistance**  
The cover is designed to withstand the gravitational action, wind and earthquake.
- **Sealing**  
The waterproofing system used comprises a waterproofing asphalt to be applied attached to support the entire surface and reinforce all joints and meetings with vertical and outgoing items. This system will ensure the tightness of the cover at each point. The sealing of the penetration of water will be subject to the relevant checks to the final receiving of the building. In particular, the perimeter deliveries due to drainage elements, and arrangement of joints.
- **Soundproofing**  
The materials used in the sloping roof and the thickness of each of them behaves as sound insulation according to the needs of the building being airborne sound R of 58,8 dbA, meeting the limit values required by current regulations.

## 3.3 VOIDS IN FACADES

### 3.3.1. PHYSICAL BEHAVIOR

- **Thermal insulation**  
The thermal transmittance of the window woodwork frames is 2,2 W/m<sup>2</sup>K. The transmittance of the semitransparent part of the same is 3,00 W/m<sup>2</sup>K. The resulting transmittance of the hole in the door is 2.83 W/m<sup>2</sup>K. These transmittance values are taken into account in the calculation of the average thermal transmittance of each facade, provided with the required limits, which have to apply the corrector factor.
- **Safety requirements for use**

Each of the holes and protections are designed to meet requirements compared to the drop in thrust or impact actions prescribed in the DB SU. Geometric characteristics are material constitution defined in the plans of the project.

- ***Durability against environmental aggression of the components of the building envelope***

Keeping all elements of the building envelope must be observed the requirements of maintenance plan that necessarily has to consider the user to comply with the relevant periodic reviews.

- ***Sealing***

To ensure air tightness of the holes is designed woodwork inside and aluminum on the outside, whose components, due to squaring, and sealing elements, classify it as A-3. The water sealing is made with the placement of the windowsills and after the waterproofing of the parapet and after the placement of the casing. Jamb deliveries will be at least 2 cm lateral to the plane. The slope of the windowsills shall not be less than 10°. The outer edges of the windowsills are separated sufficiently from façade and will have eaves. The sealing of the penetration of water will be subject to the relevant checks to the end reception of the building.

- ***Soundproofing***

The airborne sound insulation carpentry holes are 32dbA, the maximum required to comply with current regulations.

### 3.4. INTERIOR PARAMENTS

#### 3.4.1 DESCRIPTION

#### 3.4.2. PHYSICAL BEHAVIOR

- ***Soundproofing***

For the materials and the thickness of interior walls is used an acoustic insulation of 36 dbA between areas of equal and different uses, meeting both with the limits prescribed in the regulations.

### 3.5 FINISHES

Both interior and exterior finishes are detailed in the plans num. 11,12,13 & 14 , and all of them must comply with the DB-SU.

## 4. CONDITIONS AND FACILITIES APPLICABLE TO THE BUILDING

The acoustic conditions due to the various elements of the building shall be as provided in Chapters III and IV of the Basic Building "NBE-CA-88. Acoustic conditions in buildings "(art. 13).

The mission of the construction elements that make up the exhibition is to prevent that they are above the levels set forth above (Article 13).

### 4.1. ACOUSTIC INSULATION

The Airborne Sound Insulation R required for the construction elements of the building, according to the NBE-CA-88, is as follows (art. 14):

- *Interior partitions:* Areas of the same use: **30 dB**  
Different areas of use: **35 dB**
- *Covers:* **45 dB**
- *Walls separating different user properties* or **45 dB**
- *Walls separating indoor common areas:* **45 dB**
- *Separation between horizontal elements* plants use the same **45 dB**
- *Horizontal elements* separating the ground floor of 1st housing (art. 15): **55 dB**
- *Elements engine rooms separators:* **55 dB**
- *Facades:* **30 dB**

As for the cast that separates the ground floor of the first floor, having no particular purpose designed premises, it shall take corrective measures at the time of installation of the activity, which is based on this.

Compliance with these requirements is made in the summary sheet of the Basic Building "NBE-CA-88. Acoustic conditions in buildings. "

### 4.2. FACILITIES IN BUILDINGS

The general building facilities such as elevators, heating, ventilation, air conditioning, water elevation, electrical transformers, etc., Shall be installed so that the noise transmitted by them does not exceed the limits established under Part III of the

Municipal regulations, using, where is necessary, appropriate isolation measures and keeping in proper condition (Art. 16.1 and 16.2).

- In order to avoid transmission of vibrations through the building structure will take into account the following (Art. 16.3):
- An item with moving parts are kept in perfect condition, especially in regard to their dynamic or static balance and smooth running of the bearings or raceways.
- Do not place the direct anchoring of machines or support the same or any moving part in the party walls, ceilings or floors separating premises of any class or activity or building construction elements.
- The anchor of any machine or the mobile in soils or party walls or structures not directly connected with the building blocks of the building shall provide, in any case, inserting appropriate anti-vibration devices.
- Violent boot machines, which work by blows or sudden shocks and equipped with reciprocating bodies must be anchored in benches of inertia weight between 1.5 and 2.5 times that of the machinery that supports, antivibration support the Joint calculated explicitly.
- All machines are positioned so that its most prominent parts, to limit travel, are at a minimum distance of 0.70 m. of the perimeter walls and floors, must be raised to 1.0 m. this distance elements in the case of sharecroppers.
- Drainage lines carrying fluids and gas in forcefully, directly connected to machines that have moving parts, they will have separation to prevent the transmission of vibrations in such machines. Flanges and brackets ducts have vibration. Openings in the walls for the passage of pipes will be filled with absorbent materials to vibration. Any other conduct likely to transmit vibrations, whether or not to be united moving parts shall meet as specified in this paragraph.
- In water systems will take care not to present the "water hammer" and the sections and devices for valves and fittings should be such that the fluid flows through them in laminar regime for nominal costs.

#### 4.2.1. ELECTRICITY MEMORY

Check the relevant part of low voltage Electro-technical Regulations within the justification of compliance with other applicable regulations. (REBT)

### **Ground wire**

In compliance with the ITC-BT-26 in the new Low Voltage Electrotechnical Regulation, RD 842/2002, dated August 2, provides a protective ground, according to the following scheme:

Be installed at the bottom of the foundation trenches, and before it, a stiff wire bare copper, building and electrical resistance as Class 2 of the UNE 21,022, with a minimum diameter of 35 mm<sup>2</sup>, forming a ring Closed walking around the perimeter of the building. In this ring electrodes are connected vertically driven into the ground where it is envisaged the need to reduce ground resistance that may arise from the ring conductor.

The driver ring or to the electrodes, are connected, where appropriate, the metal structure of the building. (Case concrete footings: connects a number of bars of the main considered and at least one shoe). Connections are established reliably and safely, by aluminothermic welding or soldering.

Ground conductors are copper also 25 mm<sup>2</sup>, based on Table 1 of the ITC-BT-18, not required corrosion protection. On these ground conductors shall be provided in an accessible place, a device for measuring the resistance of the corresponding ground and must be mechanically safe and ensure electrical continuity. 24, 61 Project Name specification and Rationale.

The protective conductors, ie those between the masses of the ground wire installation will have a minimum section, pursuant to Table 2 of the ITC-BT-18, 16 mm<sup>2</sup>.

A grounding set will connect all existing major metallic mass and the metal frames of receivers available when the class of insulation or installation conditions so require. They must also connect the metal parts of the heating of the water and the radio and television antennas.

Protective conductors shall be installed, accompanying the conductors on the circuit housing to the point of use, and copper will present the same live conductors insulation, green-yellow. Be installed in the same pipeline that they and their minimum diameter is 16 mm<sup>2</sup>.

Is calculated considering the ground contact stresses exceed not exceeding 24 V, in any mass of the building, and that the resistance from the furthest point of the installation does not exceed 10 Ohm, calculation is performed according to the formula set out in Table 5 of the ITC-BT-18, depending on soil resistivity and the length of horizontally buried conductor ( $R = 2\rho / L$ ).

The ground is necessarily checked by the installer at the time of discharge the facility for commissioning.

Given the importance from the standpoint of safety, have this facility, technically competent personnel carry out the installation testing ground, at least annually, at the

time when the ground is drier. To do this, measure the earth resistance, and urgently repair the defects found.

#### 4.2.2. PLUMMING MEMORY

The plumbing fixtures are glazed porcelain, with the bath sheet steel enamel. The facility will be equipped with shut-off valves in general and equipment, flexible hoses and the necessary accessories for proper operation. Pipes designed for the drainage system will be PVC "C" series.

The counter is located in the monolith and it will leave the derivation of the house with copper pipes of varying diameter depending on the flow necessary for different sections projected.

The bathroom fittings will be chrome monobloc, setting general stopcocks and appliances and outdoor water taps.

Partly to wean the installation in each wet room are planned valves to remove and to make repairs or replacements in the same without affecting the operation of other.

The circuits shall be located as close as possible to the ceiling, a maximum of 30 cm, and well insulated with shells.

Pipelines will separate hot and cold water, and vertical walls, the cold will run under hot water, with a gap greater than 4 cm. Also there will be a protective separation between parallel plumbing pipes and any driving or cabinet, so as to be greater than 30 cm.

The hot water pipes will be located parallel to the cold water pipe will have to return another always starting from the farthest point of consumption.

There will be thermal insulation of hot water pipes where they pass through areas not heated or pass on the outside.

The holes in walls for passage will be made with sufficient slack to allow for expansion, sealing the space around the tube for proper sealing.

The network will be a pressure-tight double the rate of use. No installment will be exposed to frost.

It will allow the free expansion of the piping.

In the implementation of the network control the alignment of the pipes and their perfect support to prevent stresses from being transmitted to the valves, etc. Couplings or flanges shall be provided on all items subject to removal.

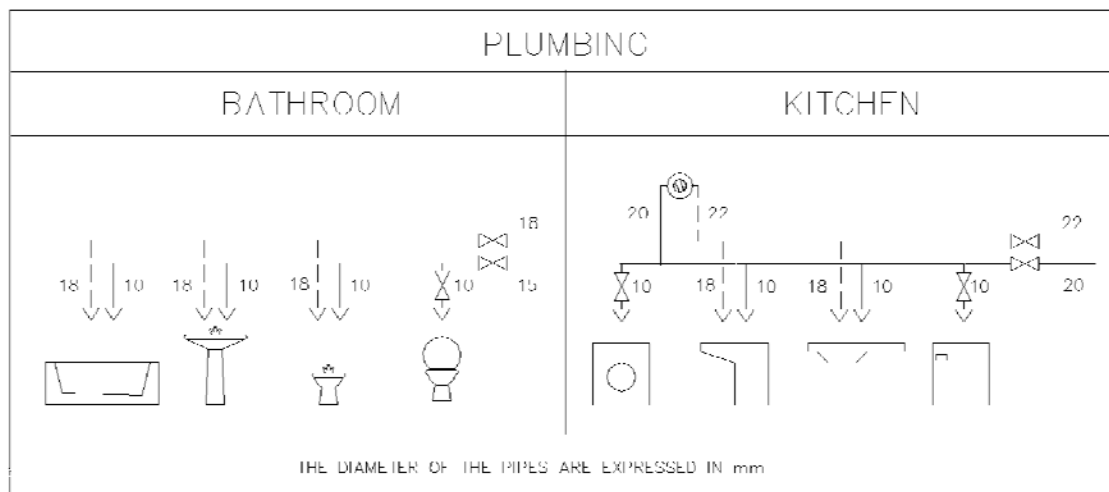
May not be dented pipes. It shall ensure that, once placed inside the distributions, which flow through the soil would be covered with cement to prevent crushing during the execution of works.

At the end of the plugs shall be located to prevent the introduction into the network of foreign matter.

The layout of the vertical network of water drainage, downspouts, is the simplest possible term to ensure drainage at all points of consumption, with the provision of downpipes for, and get a gravity circulation. It will be perfectly watertight and shall not exude any obstructions, sealing their boards to be fully Plug-cord. His section is uniform throughout the stack. Be securely fastened to walls with clamps, with fixings every 1.5 m, so that each section of downspout is freestanding. Be protected from temperature changes, mechanical shock and chemical actions of other materials.

There will be a primary ventilation (as it does not exceed six stories high), by extending downspouts to cover up to 2.5 m above the roof of the building, in order to:

- Provide input to the outside air into the exhaust system to facilitate the movement in it and seek a way out noxious gases above the deck.
- Avoid siphon and therefore, the loss of the water seal of the apparatus.
- Seek detachment by drying of the particles adhering to the walls of pipes, avoiding, if possible, the horizontal runs of the vent pipe.





#### 4.2.3. FIRE PROTECTION MEMORY

Check the DB for the SI in the justification of compliance with the requirements of the CTE of his report.

#### 4.3.4. EXTRACTION AND VENTILATION MEMORY

Check the DB for the HS-3: Indoor air quality within the justification of compliance with the requirements of CTE.

#### 4.2.5. TELECOMMUNICATION MEMORY

***TV + FM:***

The installation consists of individual antenna capture equipment with 4 TV and FM sockets, ready to receive all the terrestrial TV channels.

***Telephone:***

The laying of the lines is done in a pipeline under recordable tube.

The pipe is usually performed through the common area to attack the house. There will be a greater separation of 25 cm between these facilities and water, gas or electricity.

Telephone installation meets the specifications CTNE. Are planned phone jacks in the living room, kitchen and all bedrooms.

In the access will install a door entry system, with wall-mounted phone.

#### 4.2.6. LIGHTNING ROD

According to the supporting installation of lightning protection attached to this report, the building for its formal characteristics, environment and use, doesn't requires this facility, having completed the requirements contained in section 8 of the DB SU.

## 5. JUSTIFICATION OF COMPLIANCE REGULATIONS

### 5.1 ACCORDING TO EHE-08

Its fulfillment is justified in:

- Descriptive Memory
- Constructive Memory
- Plans

### 5.2. LOW VOLTAGE : ELECTROTECHNICAL REGULATIONS (RBET)

Its fulfillment is justified:

- Descriptive Memory
- Constructive Memory
- Compliance CTE
- Plans

The general device control and protection, in compliance with the ITC-BT-17 are located near the front door of access to housing by placing a box for Power Control Switch, immediately before the other devices in independent and sealable compartment, which is placed in the same table where you place the control-devices and protection. The height at which the devices will be placed general and individual control and protection circuits, measured from ground level, will be between 1.4 and 2m.

General and individual devices of control and protection shall be at least:

- A switch-breaker pole, manually operated, with a minimum rated 25 A, and a breaking capacity sufficient for the short circuit current that may occur at the point of installation of 4,500 A or more.
- Two general circuit breakers, designed for protection against indirect contact of all circuits, with a residual differential current-maximum rated 30 mA or higher than the switch. (Two, to surpass the five circuits installed) (In case of basic electrification, as only five circuits, simply place a single differential).
- Devices pole cut, designed to protect against overload and short circuit of each of the circuits inside the house, which will be cutting the protected poles corresponding to the number of phases of the circuit they protect.

Calculating the single lead, made of copper conductors on a 750 Vand PVC insulation, under the tube, was performed as follows:

- Calculation of voltage drop 2PL

P = power

L = length

c = 56 (Copper)

e = voltage drop

V = voltage

$$S = \frac{2PL}{ceV} =$$

The entire facility will be built on flexible plastic tube that will meet the specifications in Tables 3 and 5 of the ITC-BT-21. It will also comply with the specifications in section 3 of the ITC-BT-20 as the passage of pipes through building elements.

On the premises of the bathrooms will be taken into account the limitations set fort in ITC-BT-27, which defines the four volumes.

The light points and sockets are those indicated in the plans for electricity, respecting the minimum and assignment to circuits that are set out in Table 2 of the ITC-BT-25.

### 5.3. SANITATION AND EVACUATION

The pipes, downpipes and horizontal network has been rated as the NTE-ISS, so as to meet the minimum evacuation time set for hearing, taking into account the housing m<sup>2</sup> to evacuate, the numbers of appliances and toilets.

To design the sewage drainpipes and dirty was considered the number of units that collect and discharge coefficient of simultaneous use of medical devices, having taken a minimum diameter of 110 mm for ease of installation.

To design the rainwater downpipes has taken the collection surface (top view) and the maximum rainfall intensity rainfall area which is located in the building, having taken a minimum diameter of 110 mm for the same considerations, with a minimum of two stews.

Referrals, (pipes that link drains sanitary fittings with studs) will have a slope of between 2.5 and 5% in any case less distance steeper and vice versa and fro under the slab, hidden camera air from the ceiling.

The disposal of medical devices is done through PVC pipes of high strength, with diameters as indicated, being recordable by boats Traps at the places specified in terms of facilities, sanitary equipment drains independent or isolated made directly to

the nearest downspout, and will be equipped with the corresponding individual siphon. The pipes to downspouts devices have more than 3% slope.

Drainage conditions of the apparatus are as follows:

The drains of sinks, bidets, showers and baths will be across Traps registrable boats that desagüarán directly to the downspout, or if possible, the drain of the toilet. Toilets connected to the downspout directly or through a shank of length 1 m maximum.

The sink, washing machine and dishwasher will siphon individual, each of them.

The distance of the siphon pot to downpipe should be a maximum of 1 m.

The diameter of the drain tables are set according to the corresponding NTE-ISS, being for private use as follows, in mm:

DEVICES	DRAIN
Lavatory	30 mm
Bidet	30 mm
Bath	40 mm
Shower	35 mm
Sink	35 mm
Washing machine	35 mm
Dishwasher	35 mm
Toilet	110 mm
Siphon pot	40 mm

#### 5.4. PLUMBING

The installation consists of:

- Rush from network distribution company.
- Accountant General in closet.
- Distribution network from cabinet to counter master cock.
- Distribution circuit to a local cocks wet.
- Internal Network in wet cold and hot water.

The rush of utility company made from the general public distribution network to the overall counter cabinet, connecting with enough gravity pressure.

The accountant general anger in the closet installed on the plot, as specified by the utility.

From this cabinet will leave the distribution network that will provide the points of consumption through copper tubing. This network will be undertaken by a qualified installer.

The material used in pipes and fittings inside the facility will meet the following conditions:

- To be able, in general and at least for a working pressure of 15 kg / cm<sup>2</sup>, to support the service and water hammer caused by the closing of the taps.

- Be resistant to corrosion and completely stable over time in their physical properties (resistance, roughness, etc.).

- Do not alter any of the characteristics of water (taste, odor, drinking, etc.).

We study the diameters of the pipes constituting the interior of the home network, to ensure the accurate flow to each fixture and the necessary pressure so that water reaches all the taps in all operating conditions, simultaneous other network devices. It is also intended to obtain the minimum diameters in response to the economy of the facility, consistent with the proper functioning of it.

For this calculation you choose the worst circuit, ie it will pose a greater pressure drop and increasing geometric height, knowing that if this section is properly sized, will, a fortiori, the rest installation, that having low pressure drop will reach higher values of residual pressure at the point of consumption.

First we calculate the instantaneous flow rates and installed. The estimated consumption for the calculation and the water demand of housing, respecting the minimum instantaneous flow household appliances that provide the basic rules are those listed in the table below. The diameter of these branches is directly fixed by practical experience for a good performance, and therefore it is not necessary calculation.

DEVICES	Nº	CONSUMPTION	DIAMETER
shower	3	0'2 l/s	1/2"
bath	2	0'3 l/s	3/4"
toilet	3	0'1 l/s	1/2"
lavatory	5	0'1 l/s	1/2"
sink	1	0'2 l/s	1/2"
dishwasher	1	0'2 l/s	3/4"
bidet	1	0'2 l/s	1/2"
washing machine	1	0'2 l/s	3/4"
<b>TOTAL</b>	<b>17</b>	<b>2'5 l/s</b>	

Installed according to the flow of supply (the sum of the minimum instantaneous flow rates for all devices installed in the home), it fixes the rate of supply. Then it is a type D supply installed at a flow rate between 2 and 3 l / sec.

Spending by the referrals is set in response to a coefficient of simultaneous use of different sanitary appliances, depending on the type of grouping for bathroom and kitchen:

A bathroom + kitchen → bath – washing machine → SPENDING= 0'40 l/s

A bathroom → bath → SPENDING= 0'3 l/s

**Simultaneity coefficient**, in function of number of devices:

$$K = 1/\sqrt{(n-1)}$$

## 5.5. TELECOMMUNICATIONS

Common infrastructures, its fulfillment in complementary project

## 5.6. MUNICIPAL ORDINANCES

In this project have considered all effective Municipal ordinances of the city council of Cartagena and according to the General Plan of Murcia, also following the Subsidiary Norms of "Loma de Canteras".



plans

## INDEX

1. EMPLACEMENT
2. FURNITURES AND AREAS (GROUND FLOOR)
3. FURNITURES AND AREAS (FIRST FLOOR)
4. LAYOUT OF COLUMNS
5. MEDITATIONS (GROUND FLOOR)
6. MEDITATIONS (FIRST FLOOR)
7. MEDITATIONS (ROOF)
8. SECTION A-A
9. SECTION B-B
10. SECTION C-C
11. PRINCIPAL FACADE
12. RIGTH ELEVATION
13. LEFT ELEVATION
14. POSTERIOR FAÇADE

### STRUCTURE

15. FOUNDATION
16. SANITARY SLAB
17. GROUND FLOOR SLAB
18. FIRST FLOOR SLAB

### DETAILS

19. BALCONY + START OF FACADE
20. FACADE WITH SLAB (2)
21. SLAB-COLUMN + SLAB-FACADE
22. WINDOW-FACADE
23. STAIRS FINISHING
24. SLOPING ROOF

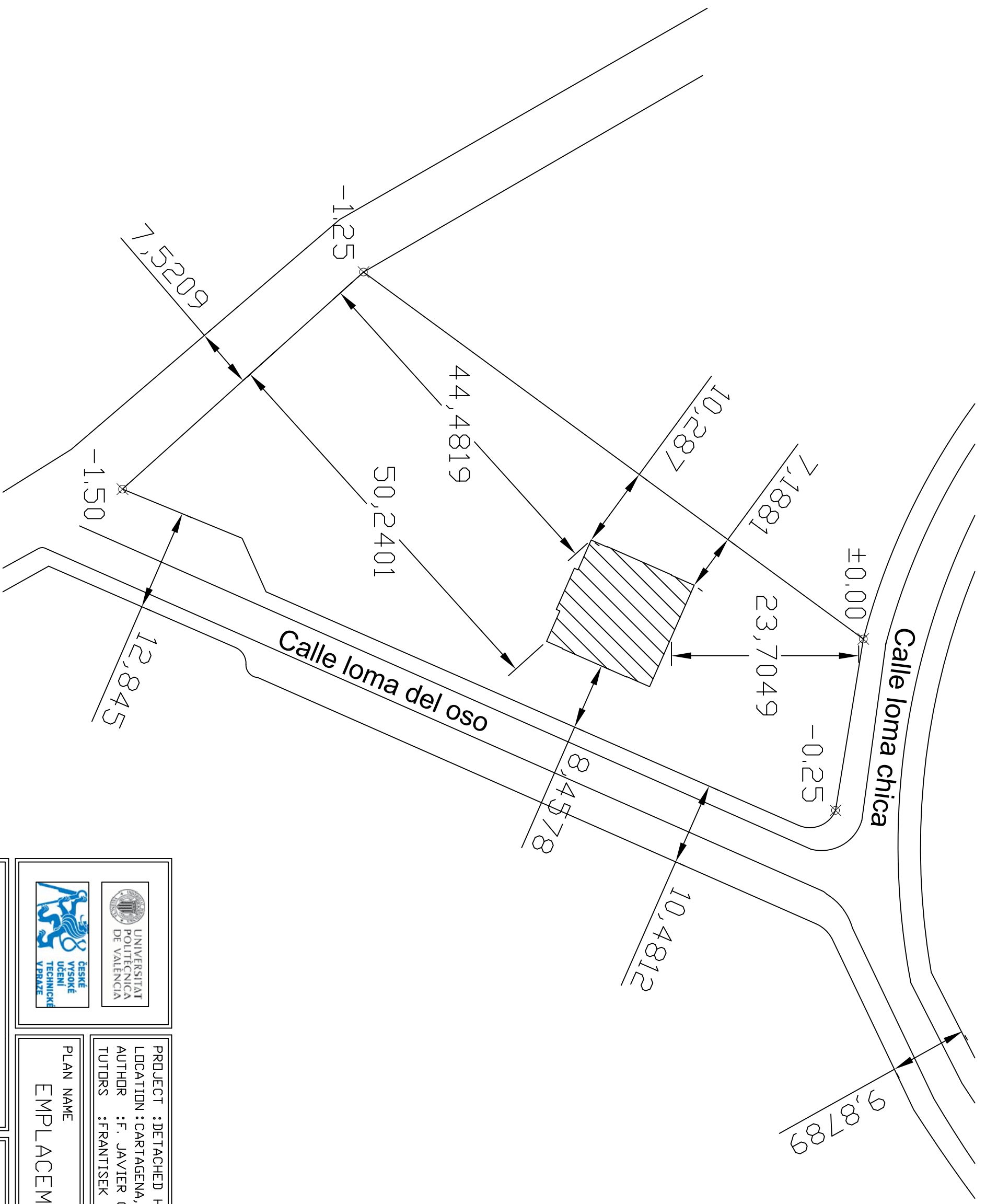
### CARPENTRY MEMORY

25. ALUMINIUM CARPENTRY
26. WOOD CARPENTRY

### FACILITIES

27. SEWAGE
28. NATURAL VENTILATION (GROUND FLOOR)
29. NATURAL VENTILATION (FIRST FLOOR)
30. HEATING (GROUND FLOOR)
31. HEATING (FIRST FLOOR)
32. PLUMBING (GROUND FLOOR)
33. PLUMBING (FIRST FLOOR)
34. ELECTRICITY (GROUND FLOOR)
35. ELECTRICITY (FIRST FLOOR)

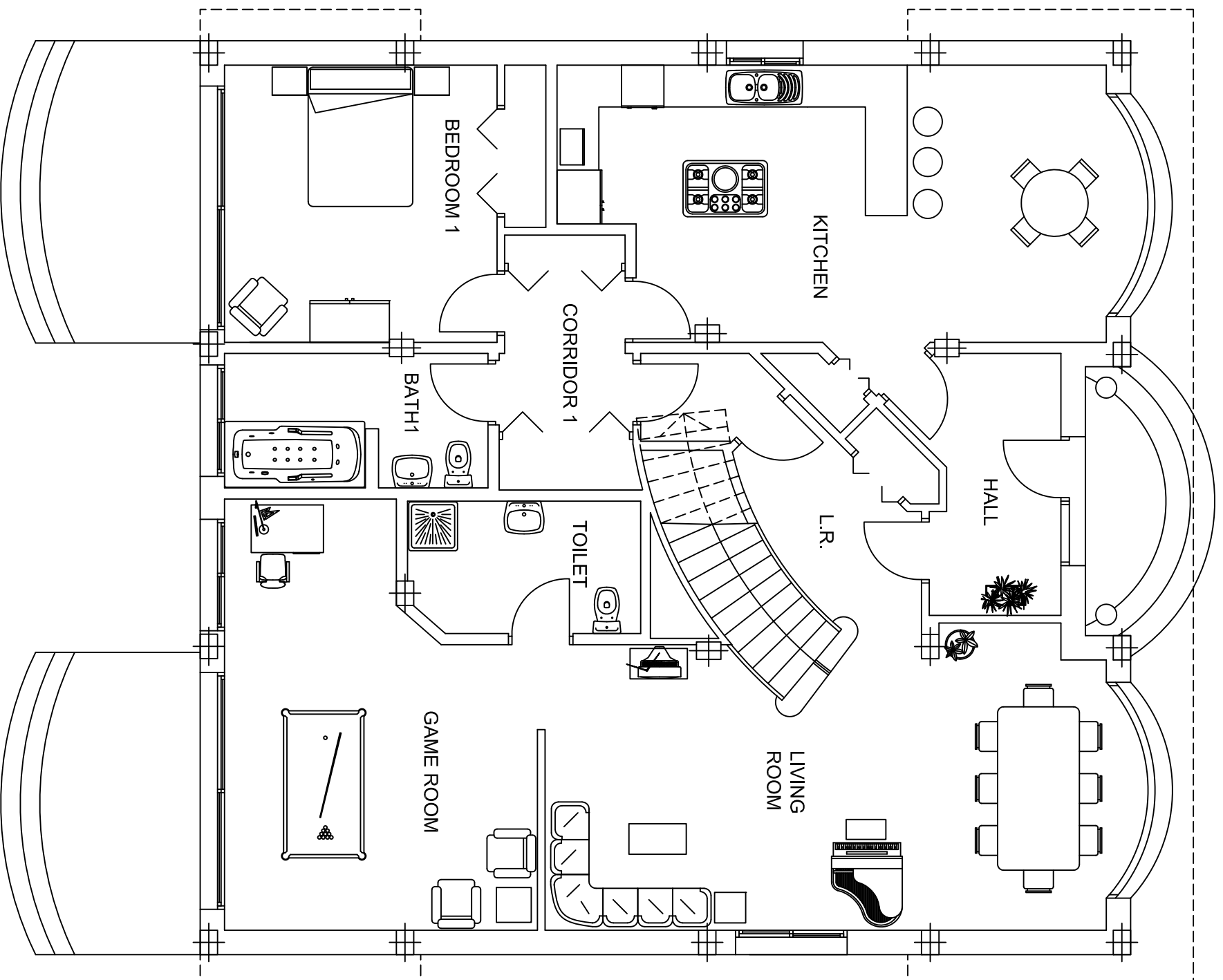




PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDN  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 EMPLACEMENT, PLOT

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/500	1



**GROUND FLOOR AREAS**

ROOM	USEFULL AREA	CONSTRUCTED AREA
HALL	7.34 m <sup>2</sup>	9.82 m <sup>2</sup>
KITCHEN	29.38 m <sup>2</sup>	36.43 m <sup>2</sup>
LIVING ROOM	33.66 m <sup>2</sup>	39.33 m <sup>2</sup>
L.R.	12.18 m <sup>2</sup>	13.05 m <sup>2</sup>
BEDROOM1	17.11 m <sup>2</sup>	21.71 m <sup>2</sup>
GAME ROOM	23.74 m <sup>2</sup>	26.70 m <sup>2</sup>
BATH1	7.13 m <sup>2</sup>	9.71 m <sup>2</sup>
TOILET	6.15 m <sup>2</sup>	7.94 m <sup>2</sup>
CORRIDOR 1	6.70 m <sup>2</sup>	7.95 m <sup>2</sup>

TOTAL	143.39 m <sup>2</sup>	172.64 m <sup>2</sup>
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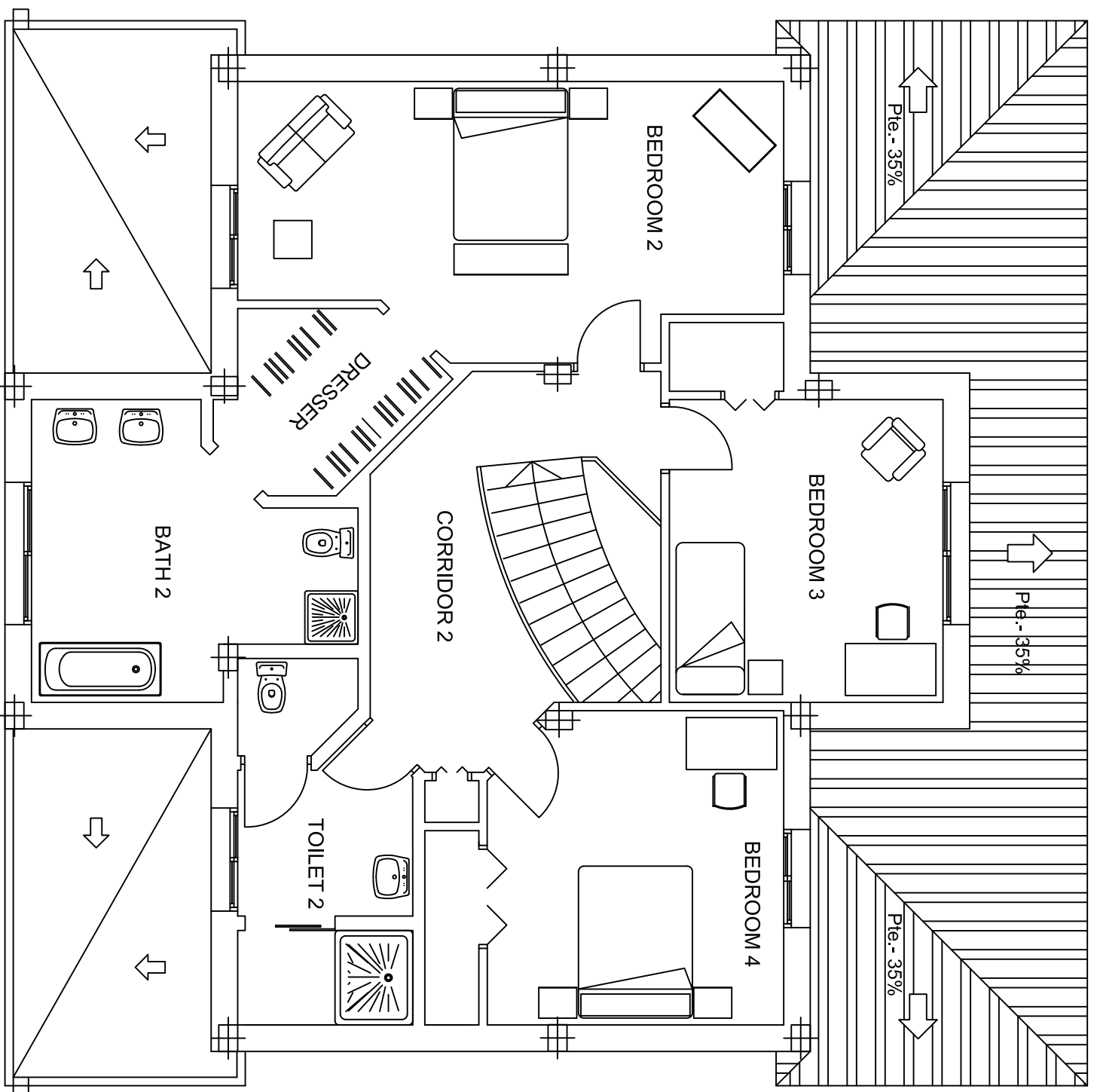
PLAN NAME  
**FURNITURES AND AREAS**

SIGN

DATE  
 JUNE 2012

SCALE  
 1/75

N PLAN  
**2**



**FIRST FLOOR AREAS**

ROOM	USEFULL AREAS	CONSTRUCTED AREAS
BEDROOM 2	23.30 m <sup>2</sup>	28.11 m <sup>2</sup>
BEDROOM 3	15.78 m <sup>2</sup>	19.29 m <sup>2</sup>
BEDROOM 4	17.64 m <sup>2</sup>	21.80 m <sup>2</sup>
BATH 2	13.16 m <sup>2</sup>	17.36 m <sup>2</sup>
TOILET 2	9.63 m <sup>2</sup>	13.52 m <sup>2</sup>
DRESSER	5.42 m <sup>2</sup>	6.91 m <sup>2</sup>
CORRIDOR 2	17.54 m <sup>2</sup>	18.83 m <sup>2</sup>

TOTAL	102.47 m <sup>2</sup>	125.82 m <sup>2</sup>
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PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

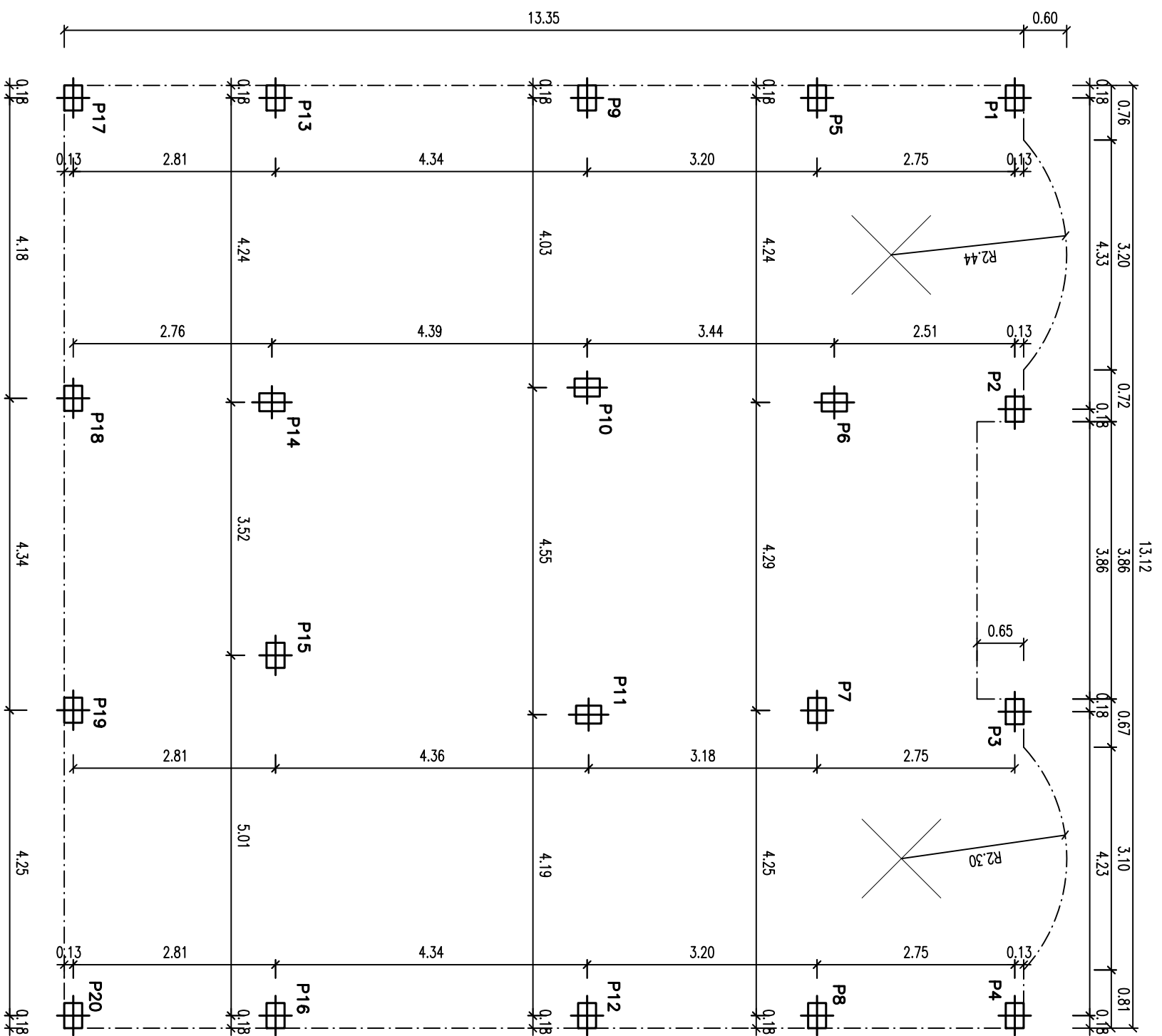
PLAN NAME  
**FURNITURES AND AREAS**

SIGN

DATE  
 JUNE 2012

SCALE  
 1/75

N PLAN  
**3**



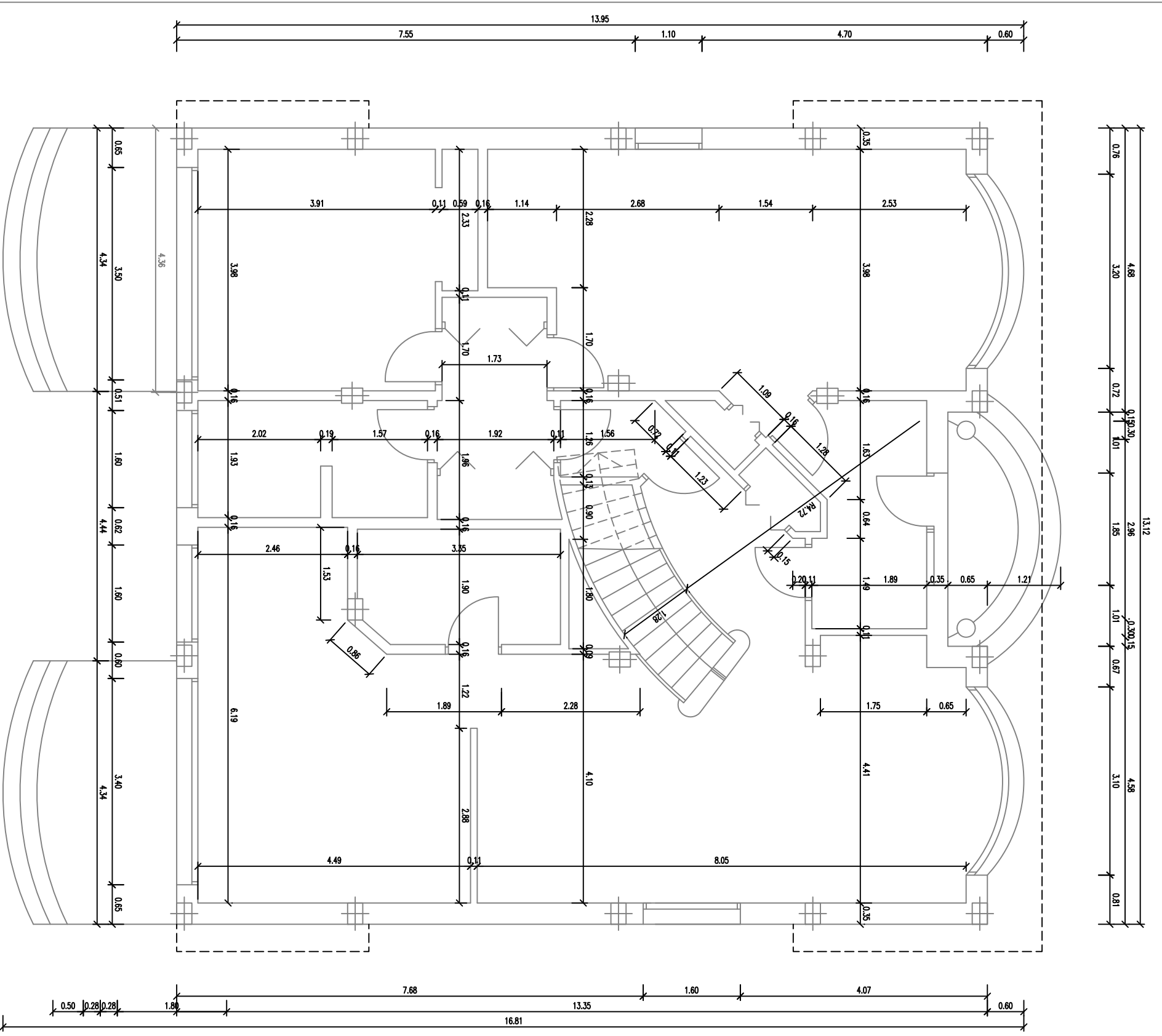
LAYOUT OF COLUMNS



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**LAYOUT OF COLUMNS**

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	<b>4</b>



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**MEDITATIONS GROUND FLOOR**

SIGN

DATE

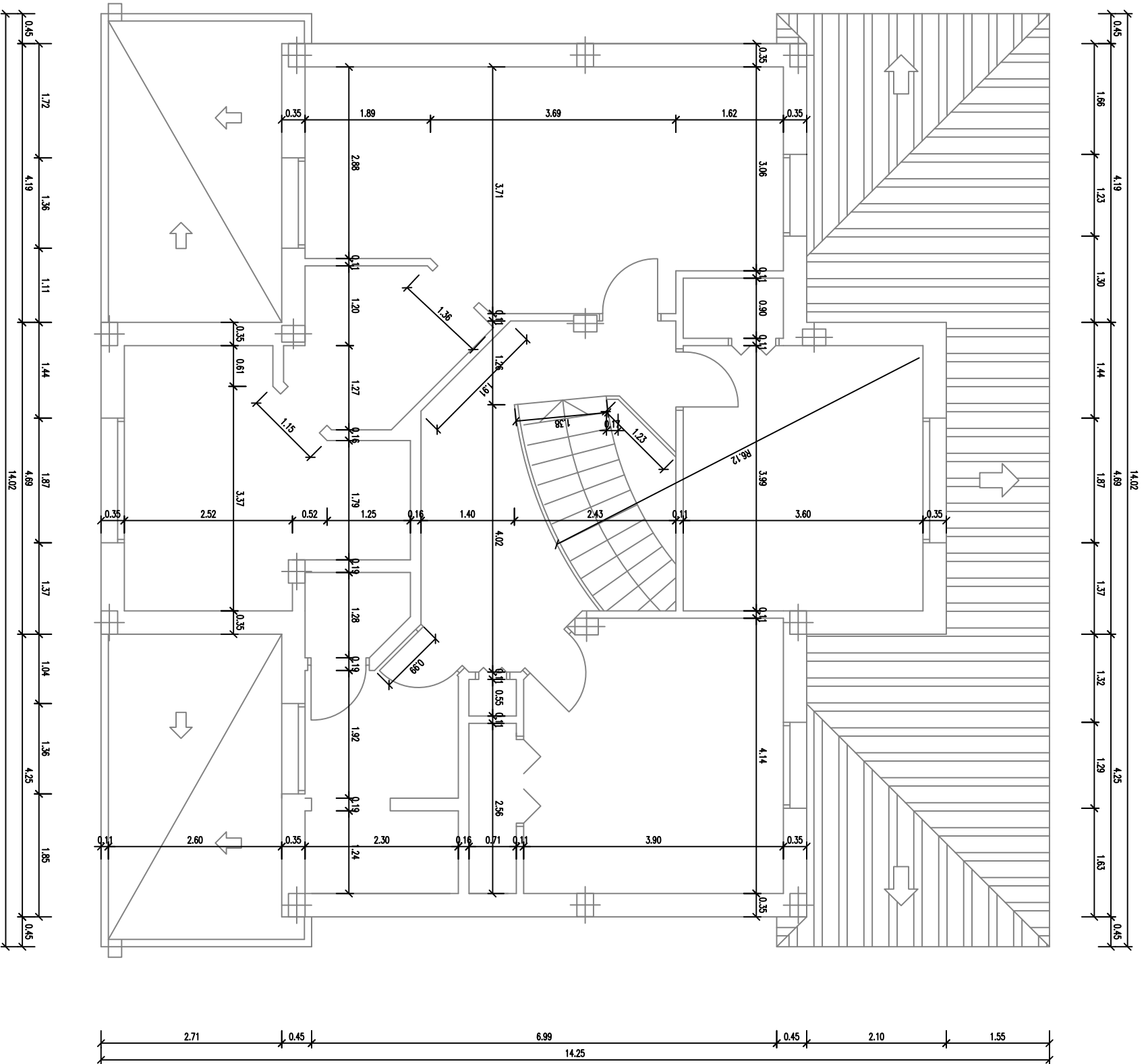
JUNE 2012

SCALE

1/75

N PLAN

5



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILLAGROS IBORRA

PLAN NAME  
**MEDITATIONS FIRST FLOOR**

SIGN

DATE

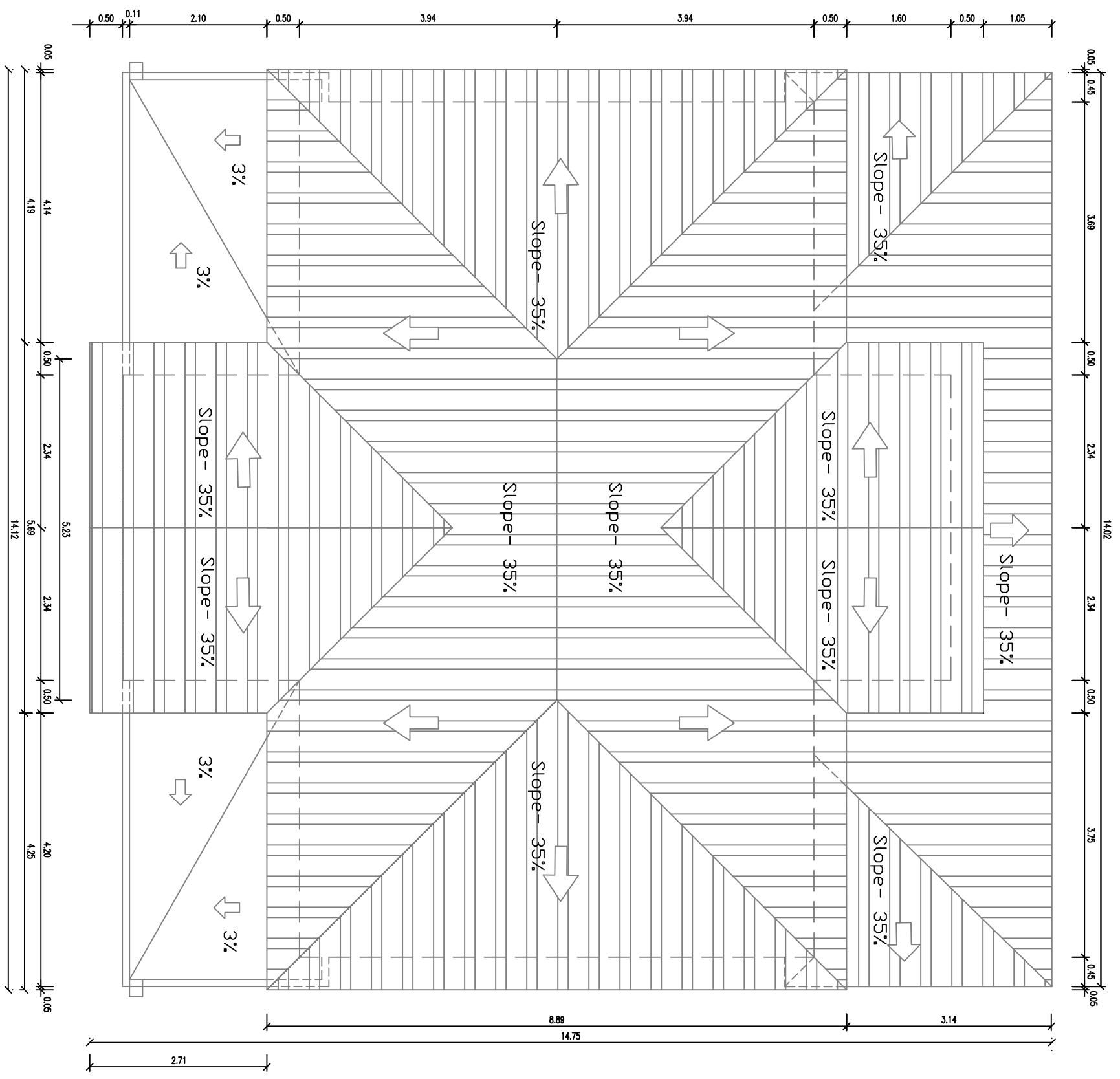
JUNE 2012

SCALE

1/75

N PLAN

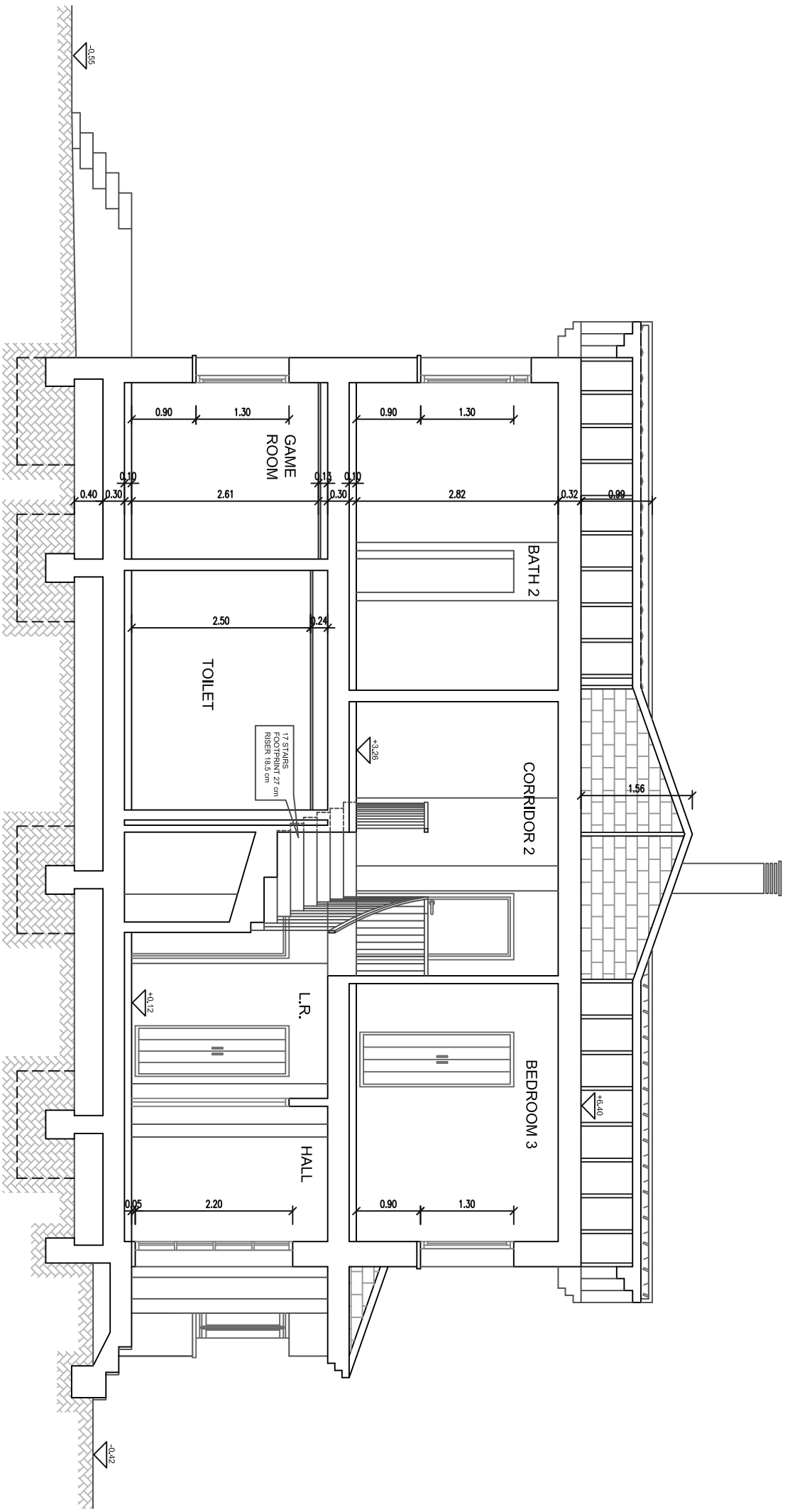
6



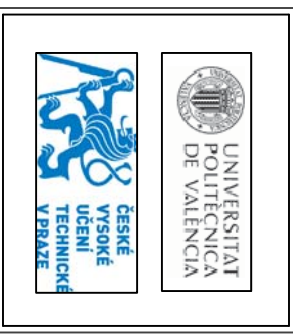
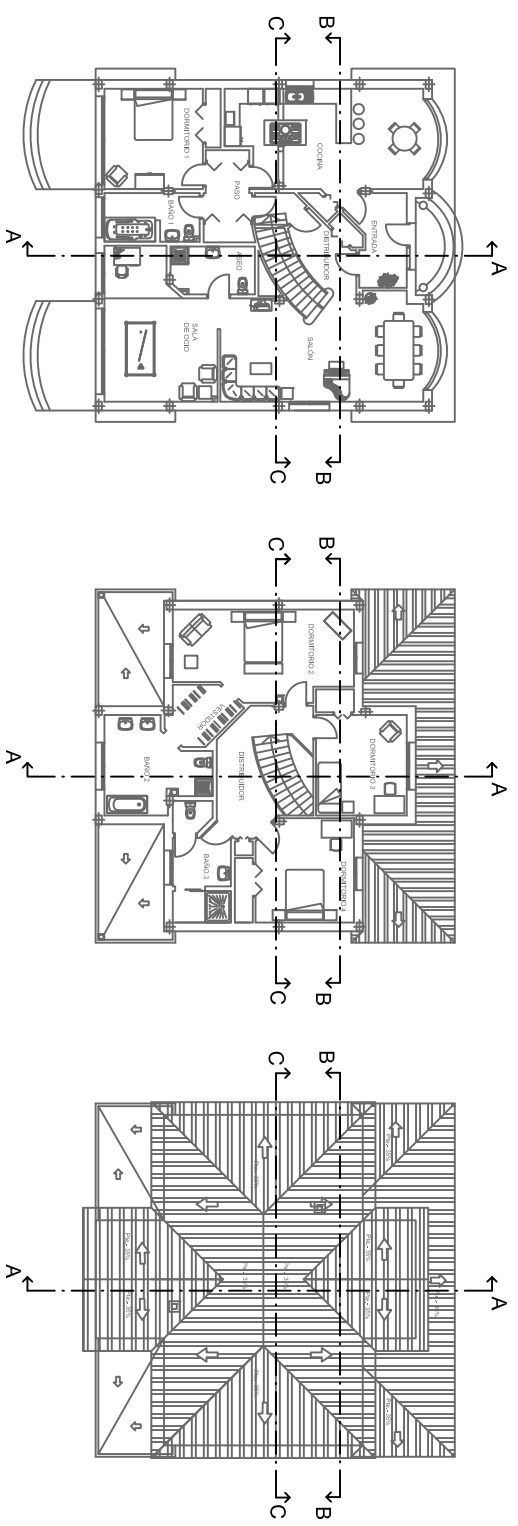
PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDN  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**MEDITATIONS ROOF**

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	7



SECTION A-A

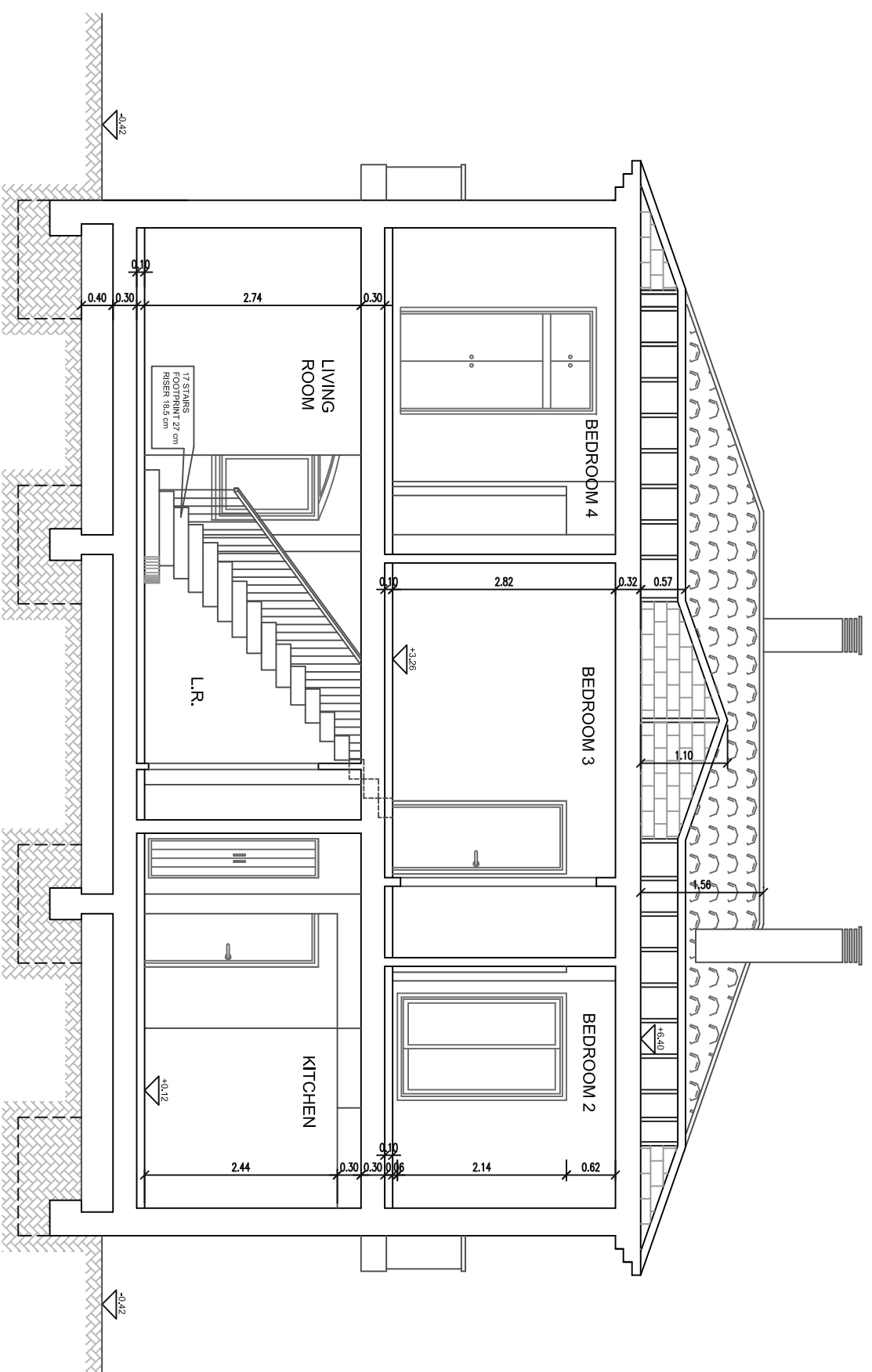


PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

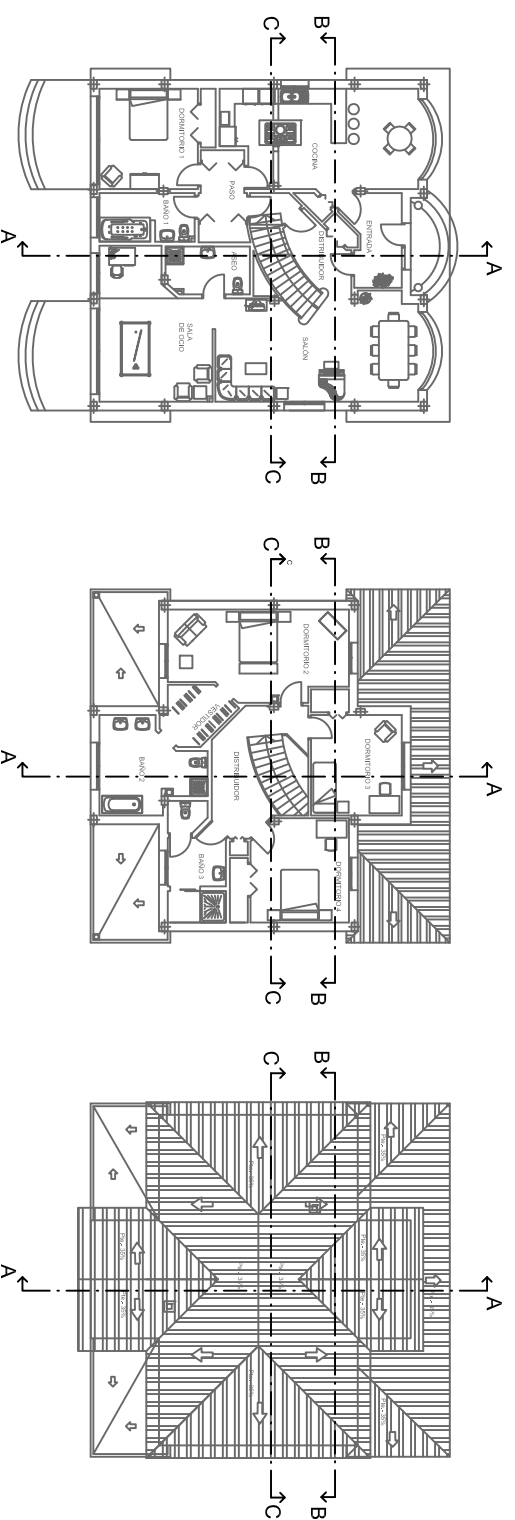
PLAN NAME  
**SECTION A-A**

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	8





SECTION B-B



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**SECTION B-B**



SIGN

DATE

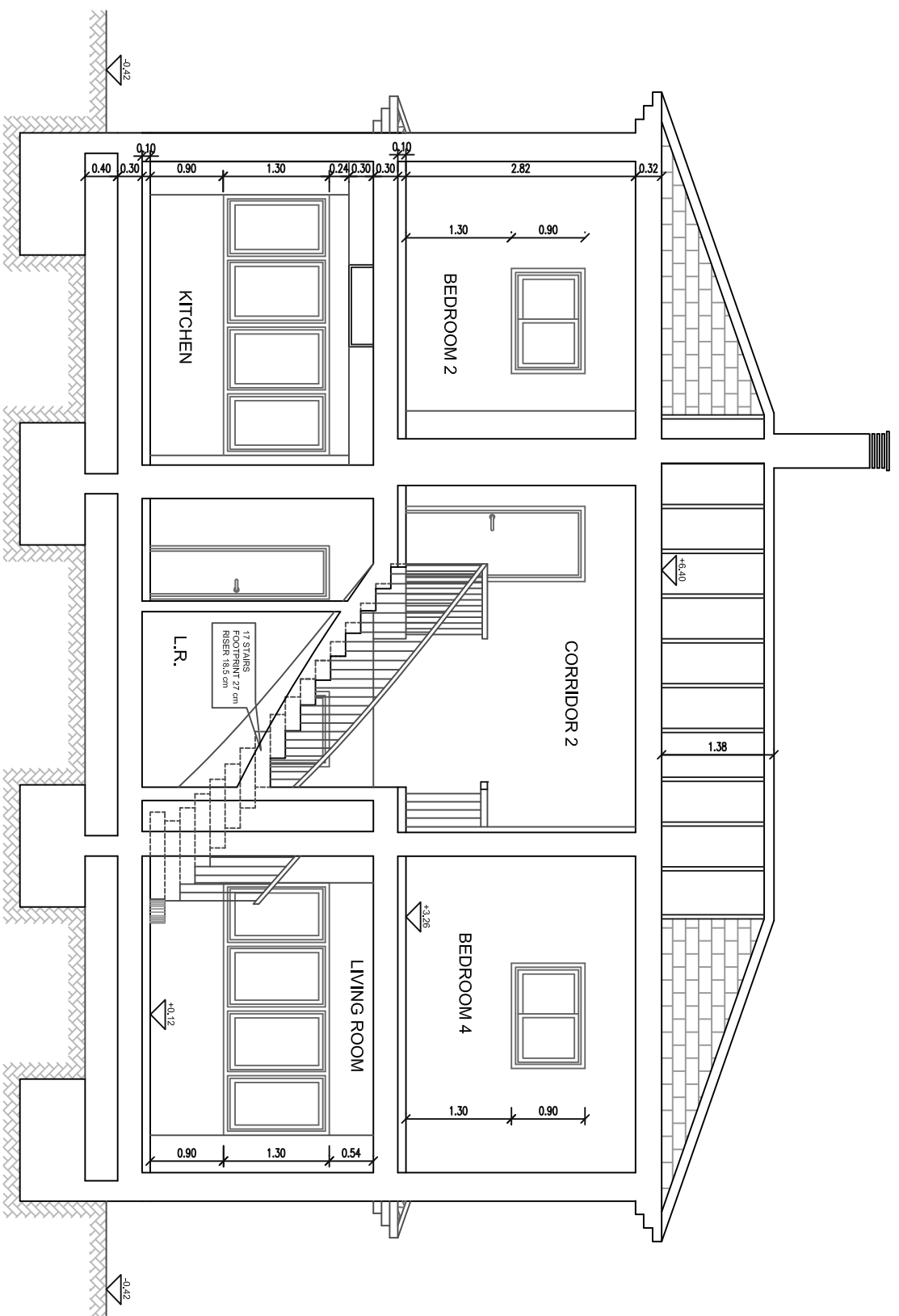
JUNE 2012

SCALE

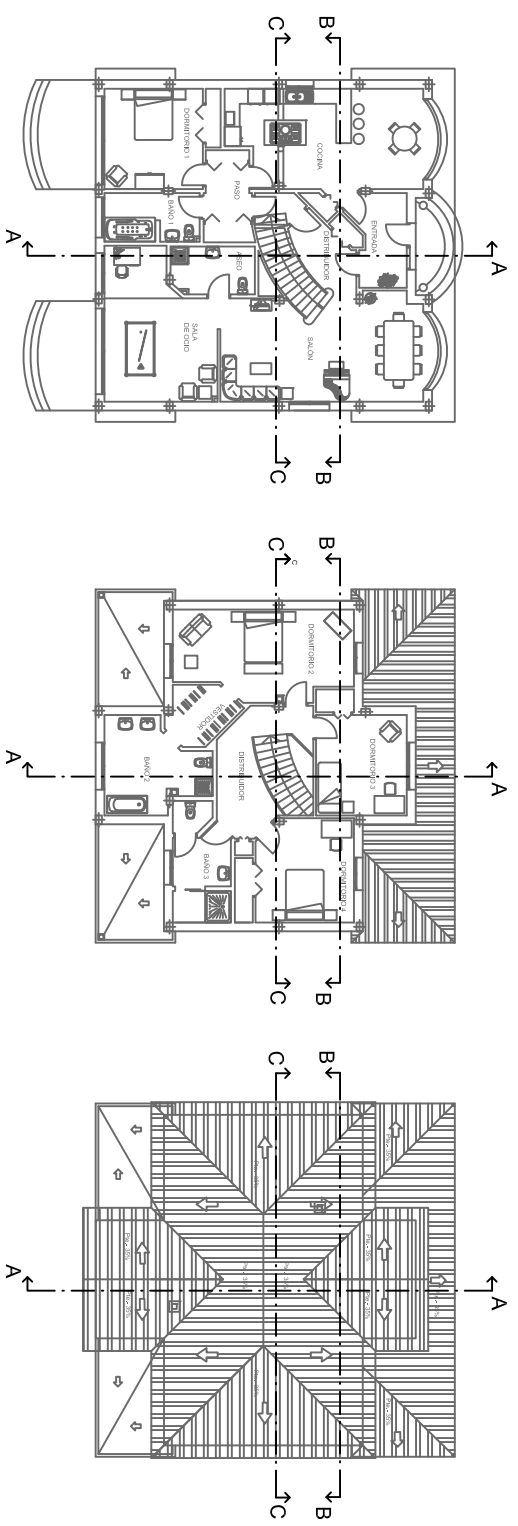
1/75

N PLAN

9



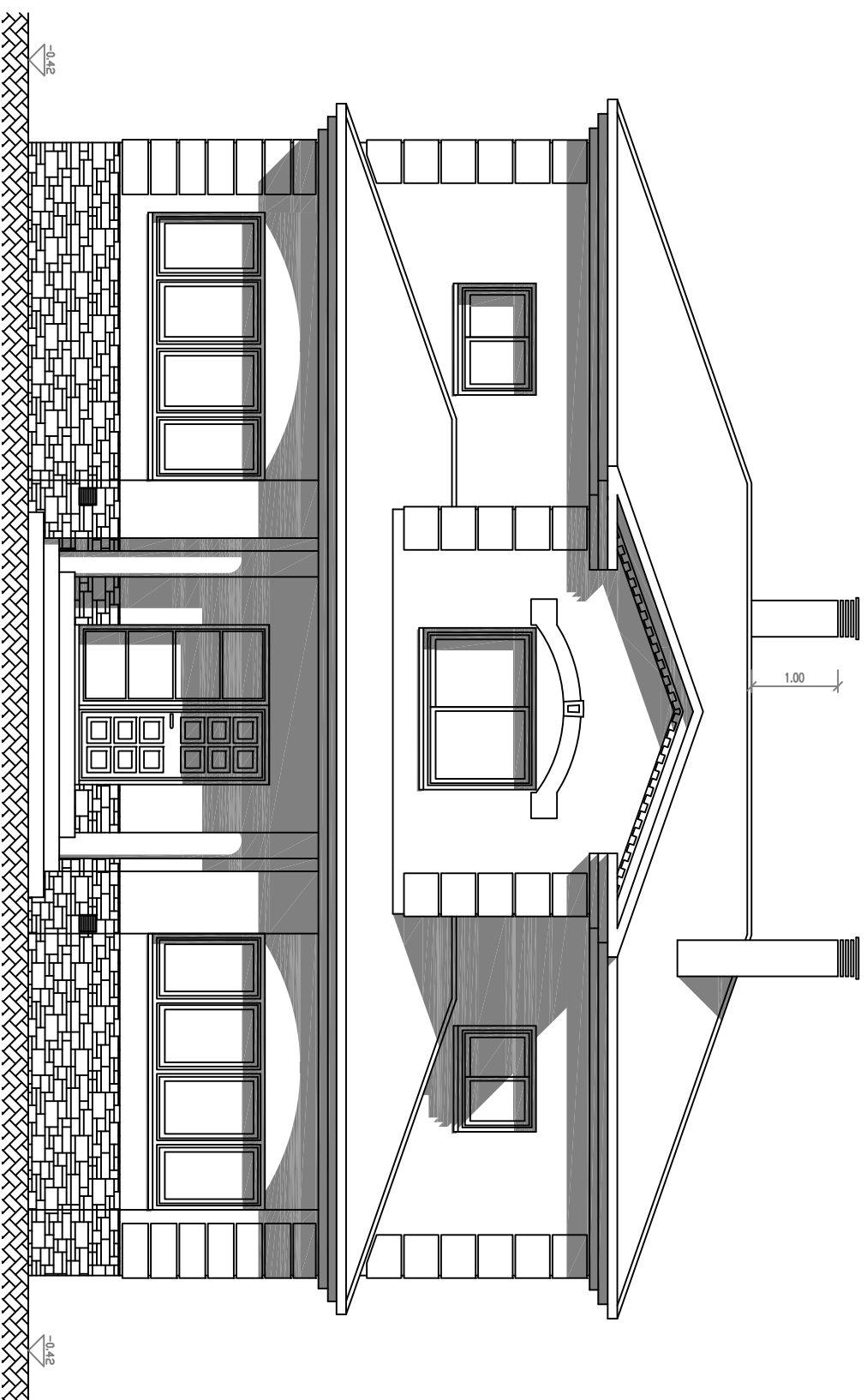
SECTION C-C



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

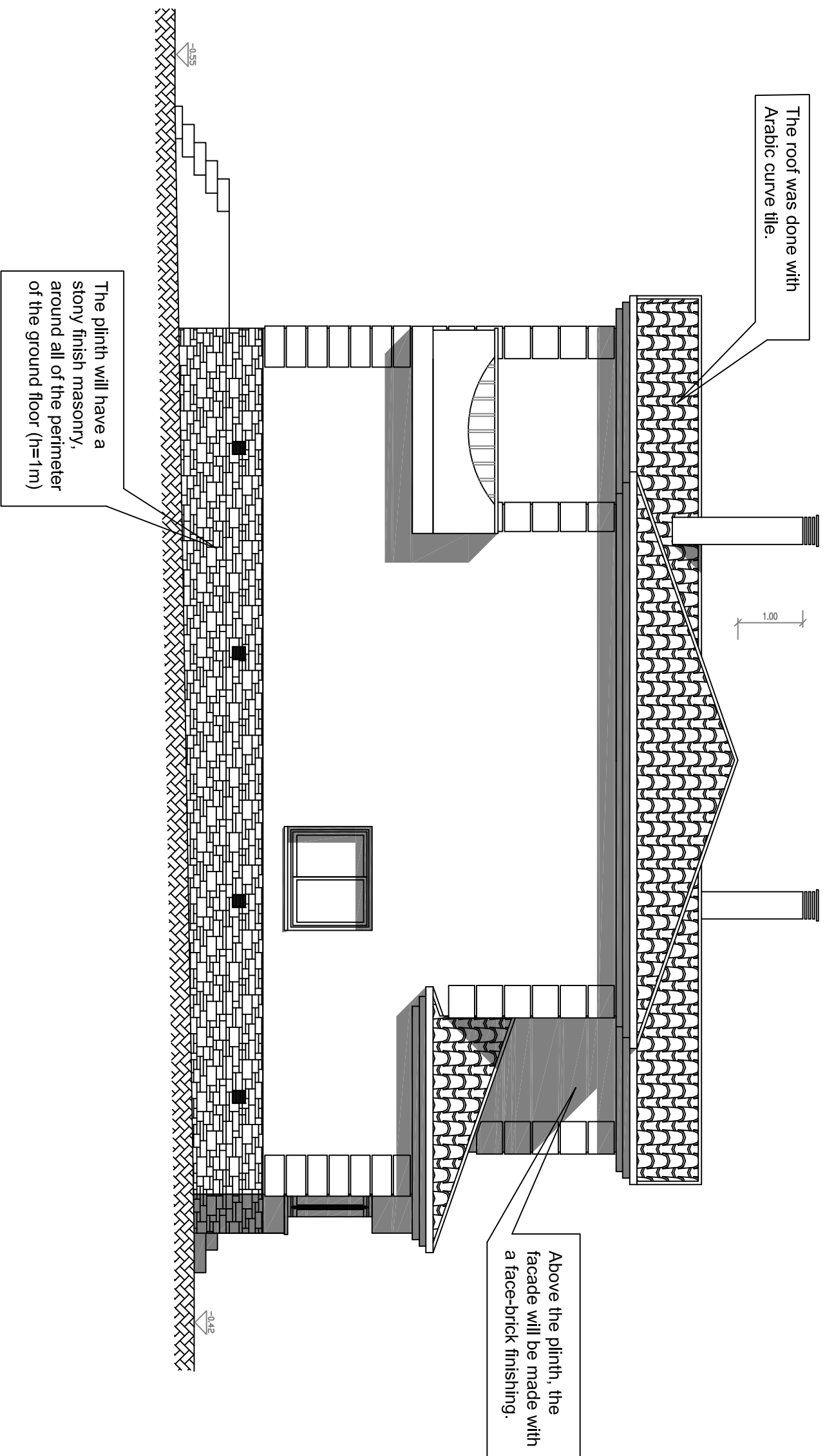
PLAN NAME  
**SECTION C-C**

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	10



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA  
 PLAN NAME  
**PRINCIPAL FACADE**

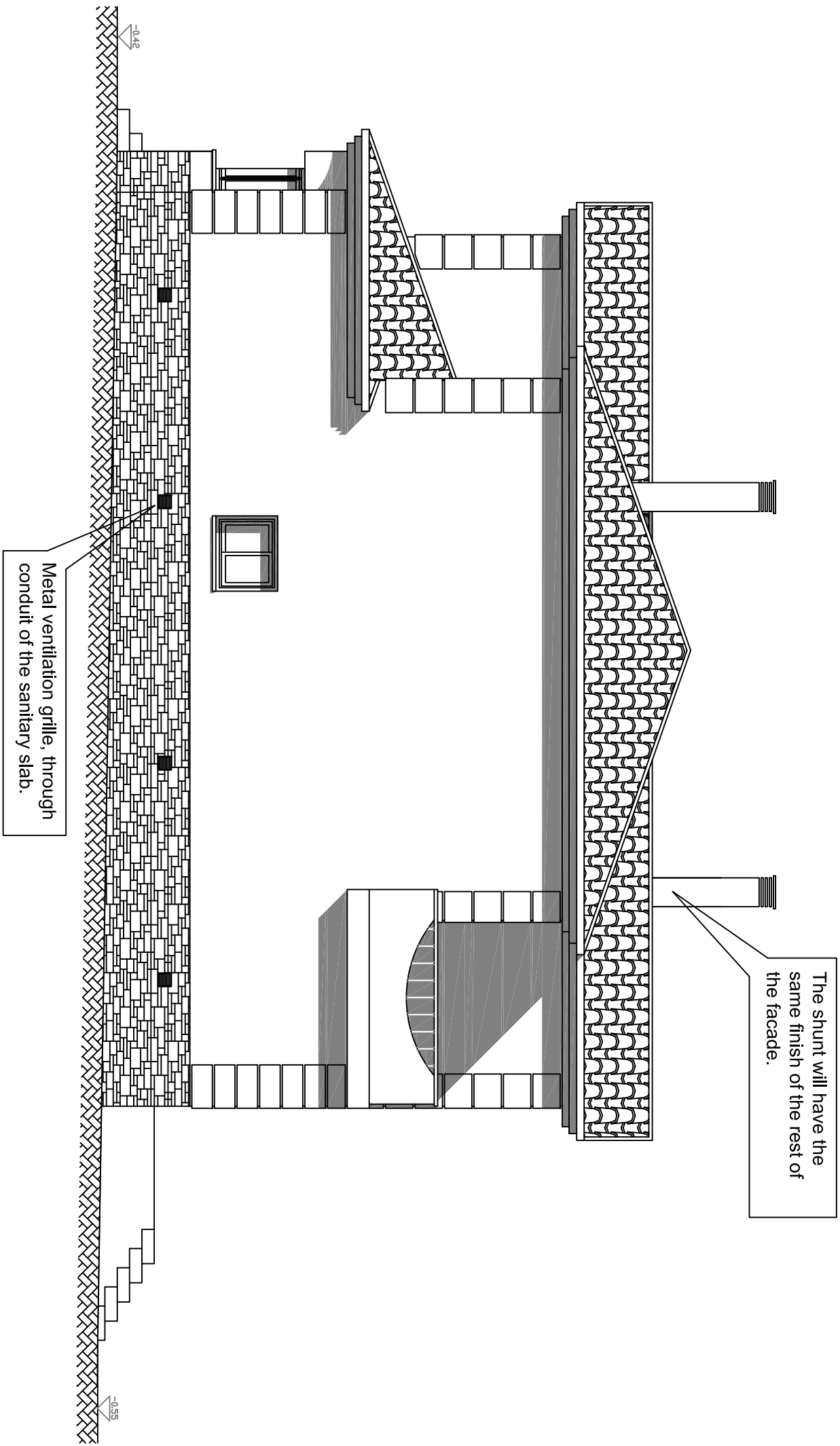
SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	11




PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 RIGHT ELEVATION

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	12

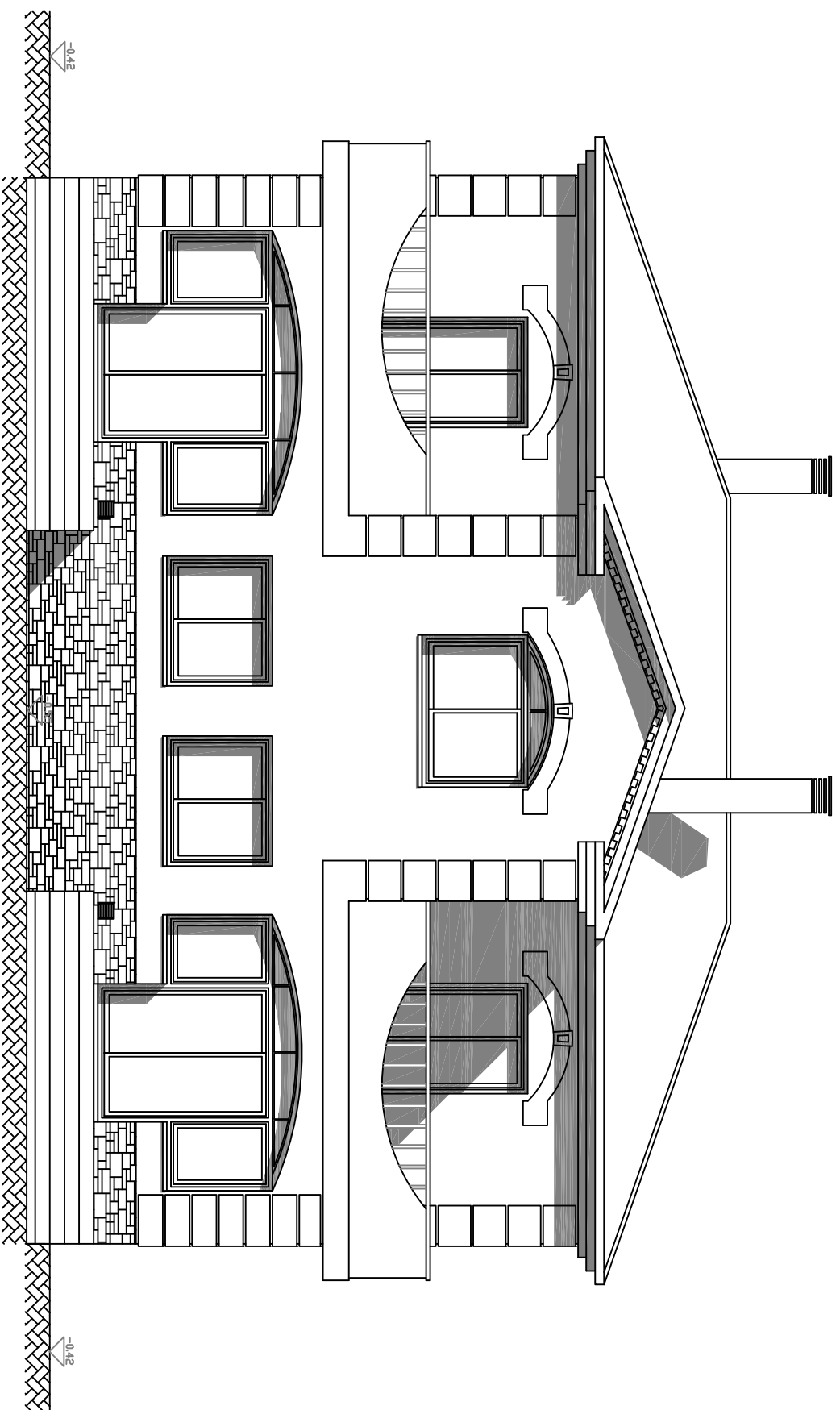


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PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**LEFT ELEVATION**

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	13

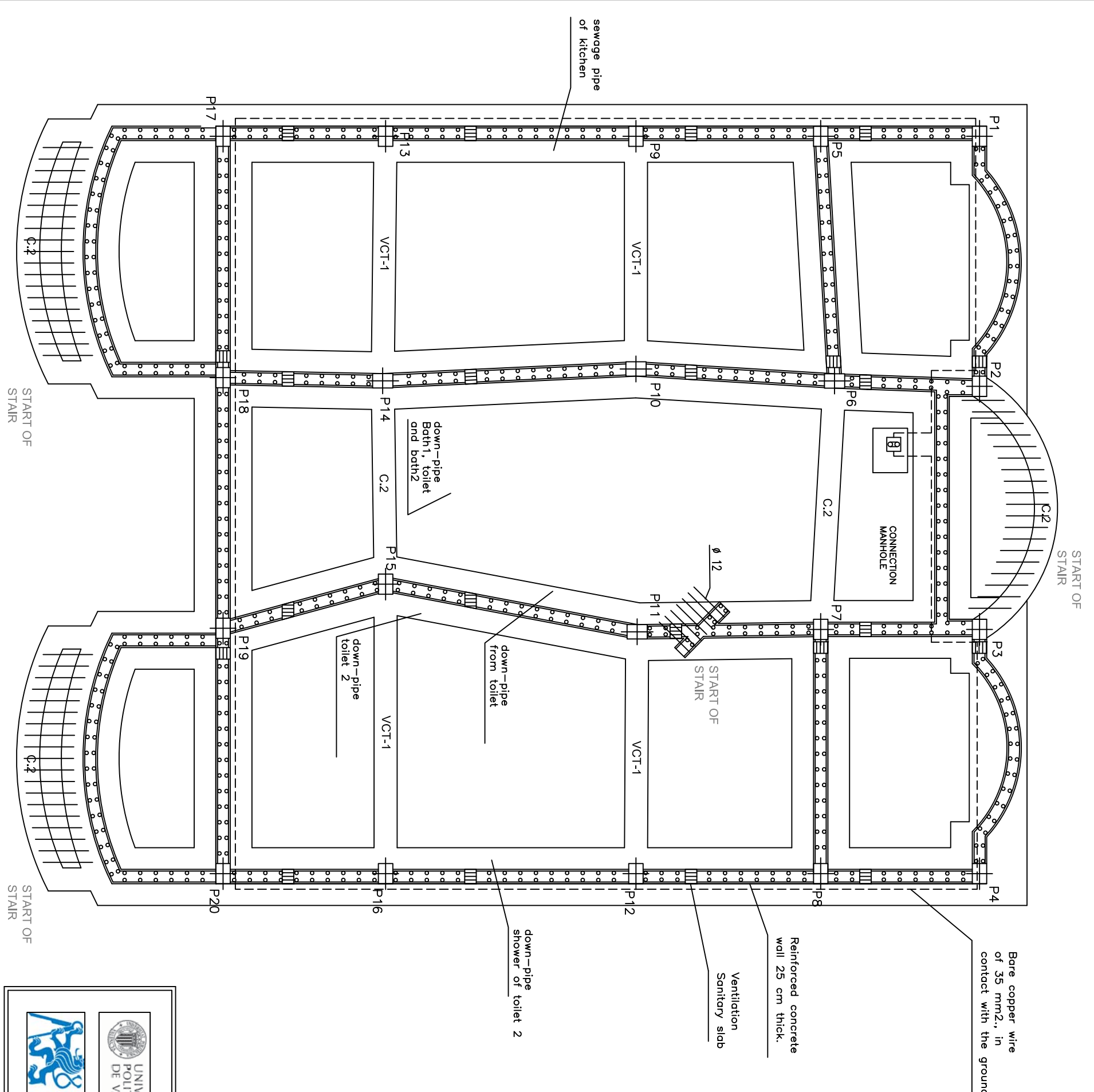


PROJECT : DETACHED HOUSE  
LOCATION : CARTAGENA, MURCIA (SPAIN)  
AUTHOR : F. JAVIER GIMENEZ ZANDON  
TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
POSTERIOR FACADE



SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	14



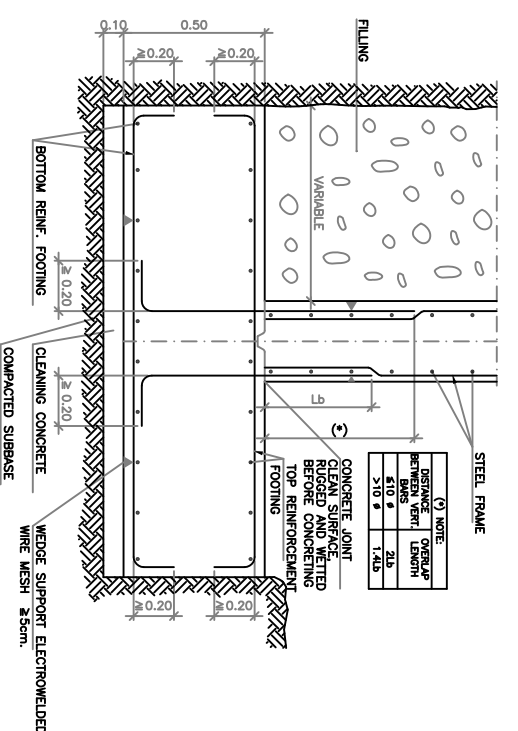
Bare copper wire of 35 mm<sup>2</sup>, in contact with the ground

Reinforced concrete wall 25 cm thick.

Ventilation Sanitary slab

down-pipe shower of toilet 2

Start of wall in centered strip footing



CHARACTERISTICS ACCORDING TO THE EHE

CONCRETE		STEEL			
STRUCTURAL ELEMENT	Kind of concrete	Level of control	Partial safety coefficient (γ <sub>s</sub> )	Resistance calc.- Minimum (N/mm <sup>2</sup> )	Minimum cover (mm)
Foundation	HA-25/P/40/IIIa	STATISTICAL	1,50	16,6	45
Structure	HA-25/P/20/IIIa	STATISTICAL	1,50	16,6	45
STRUCTURAL ELEMENT	Kind of steel	Level of control	Partial safety coefficient (γ <sub>s</sub> )	Resistance calc.- Minimum (N/mm <sup>2</sup> )	The steel in the reinforcement will be guaranteed by AENOR mark
Foundation	B 500 S	NORMAL	1,15	348	
Walls	B 500 S	NORMAL	1,15	348	
Columns	B 500 S	NORMAL	1,15	348	
Beams and slabs	B 500 S	NORMAL	1,15	348	
EXECUTION					
KIND OF ACTION	Level of control	Partial safety coefficient			
Variable	Permanent with constant value	Favourable effect	γ <sub>s</sub> = 1,00	Adverse effect	
			γ <sub>s</sub> = 1,50		
			γ <sub>s</sub> = 1,50		
	Variable		γ <sub>s</sub> = 0,00	γ <sub>s</sub> = 1,50	

TIE BEAMS	STRAP BEAMS
<p>40 ←</p> <p>C:2</p> <p>Top reinf.: 2 Ø16</p> <p>Bottom reinf.: 2 Ø16</p> <p>Stirrups: 1xØ8 c/ 30</p>	<p>40 ←</p> <p>VCT-1</p> <p>Top reinf.: 4 Ø16</p> <p>Skin reinf.: 2 Ø10</p> <p>Bottom reinf.: 3 Ø12</p> <p>Stirrups: 1xØ8 c/ 30</p>

**PROJECT :** DETACHED HOUSE  
**LOCATION :** CARTAGENA, MURCIA (SPAIN)  
**AUTHOR :** F. JAVIER GIMENEZ ZANON  
**TUTORS :** FRANTISEK KULHANEK / MILAGROS IBORRA

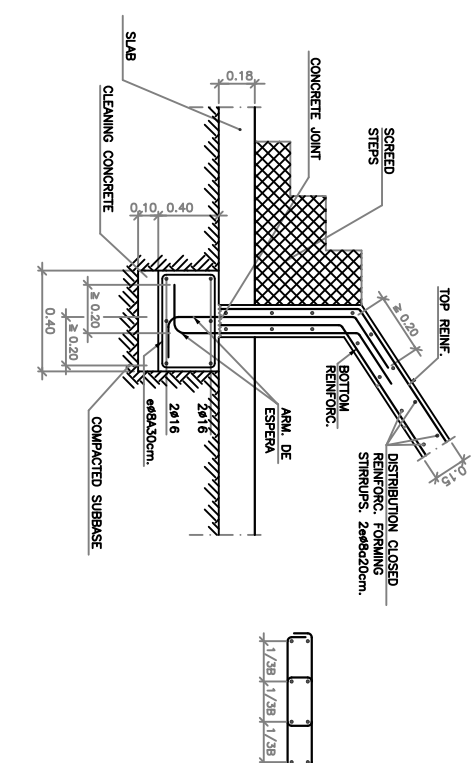
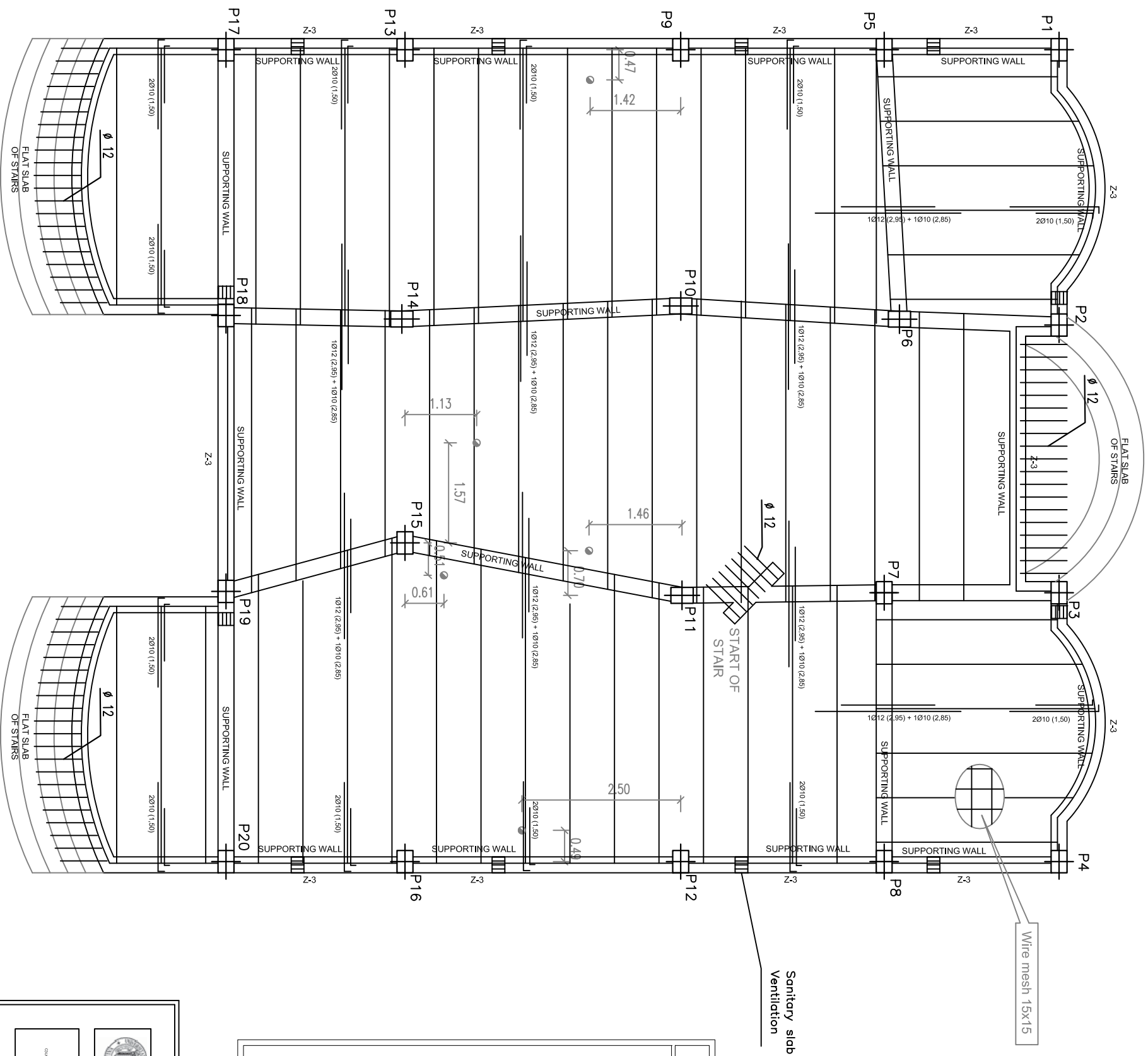
**PLAN NAME**  
**FOUNDATION**

**SIGN**

**DATE**  
 JUNE 2012

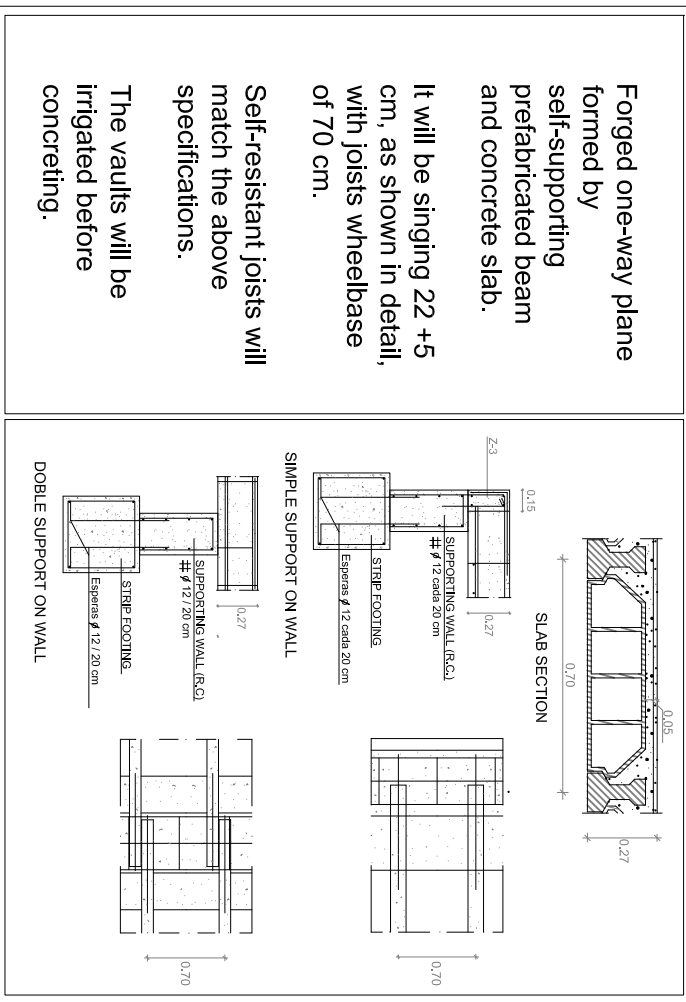
**SCALE**  
 1/75

**N PLAN**  
 15




Start of stair from footing

SLAB DETAILS



Forged one-way plane formed by self-supporting prefabricated beam and concrete slab. It will be singing 22 +5 cm, as shown in detail, with joists wheelbase of 70 cm. Self-resistant joists will match the above specifications. The vaults will be irrigated before concreting.



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PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

---

PLAN NAME

## SANITARY SLAB

SIGN

DATE

JUNE 2012

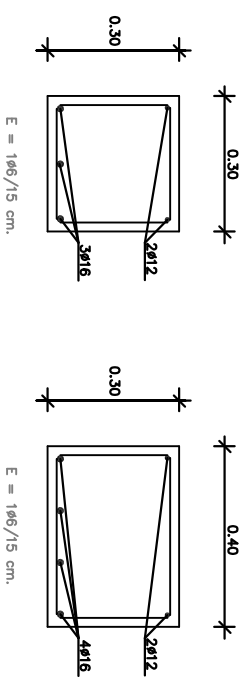
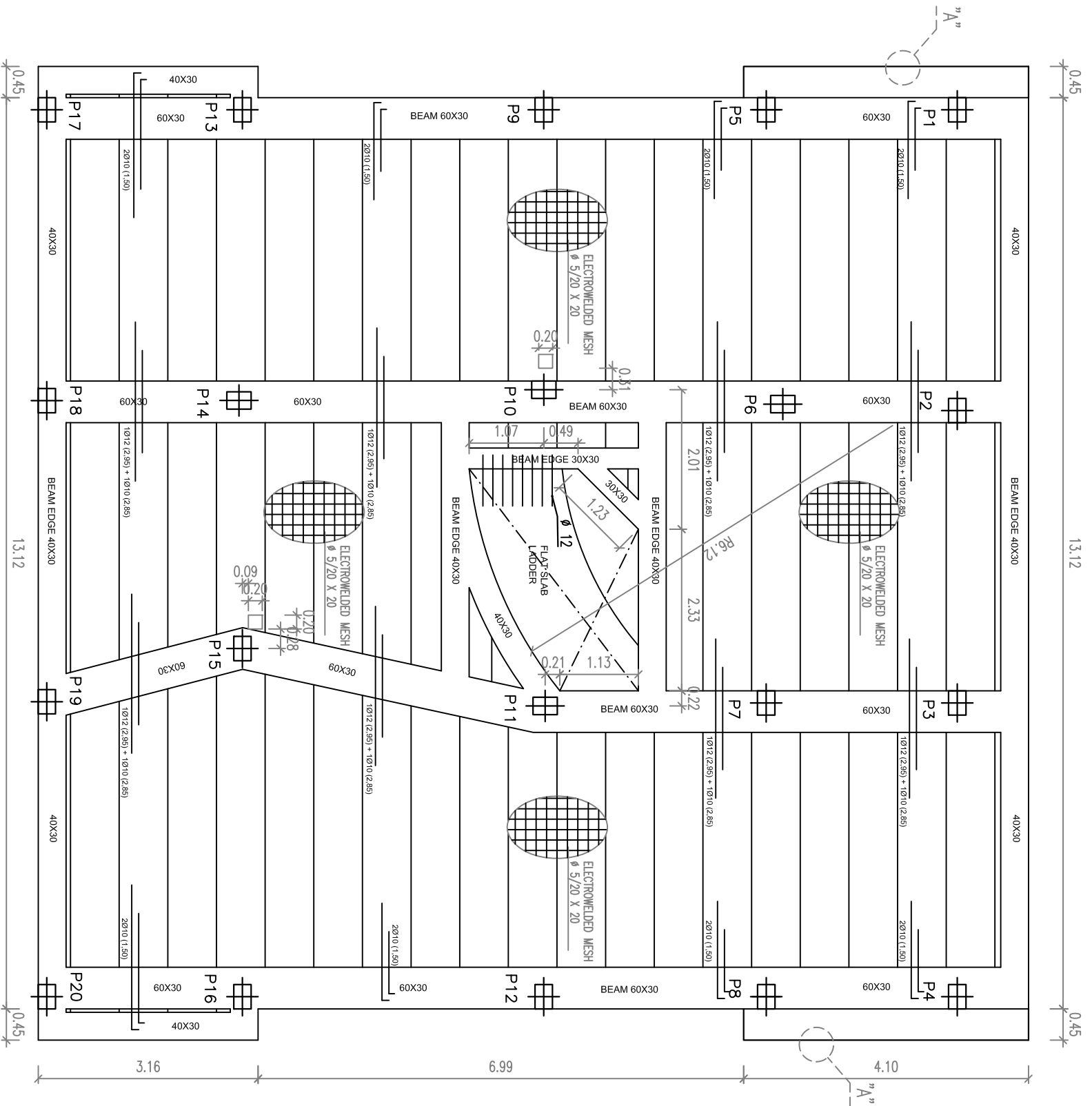
SCALE

1/75

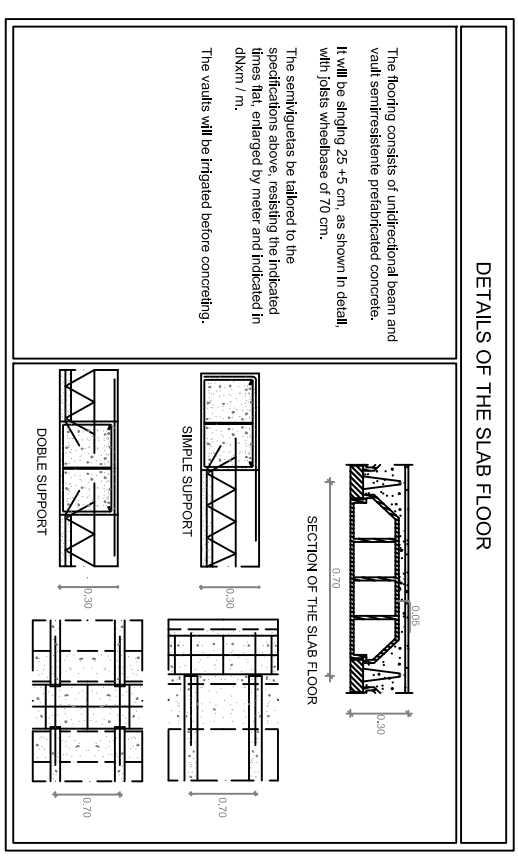
N PLAN

16

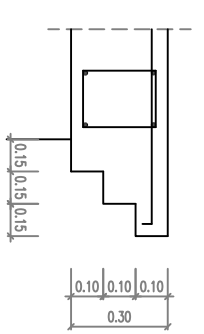




DETAILS OF BEAMS EDGES

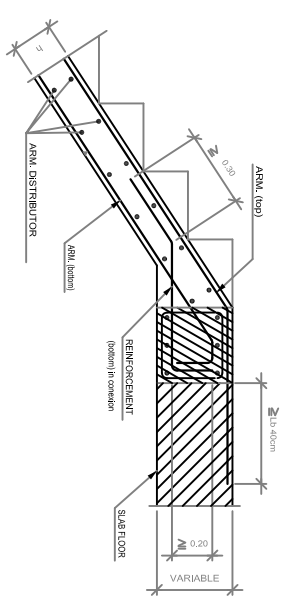


DETAILS OF THE SLAB FLOOR



DETAIL " A " (MOLDING)

Delivery of the ladder slab into embeded beam



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
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 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

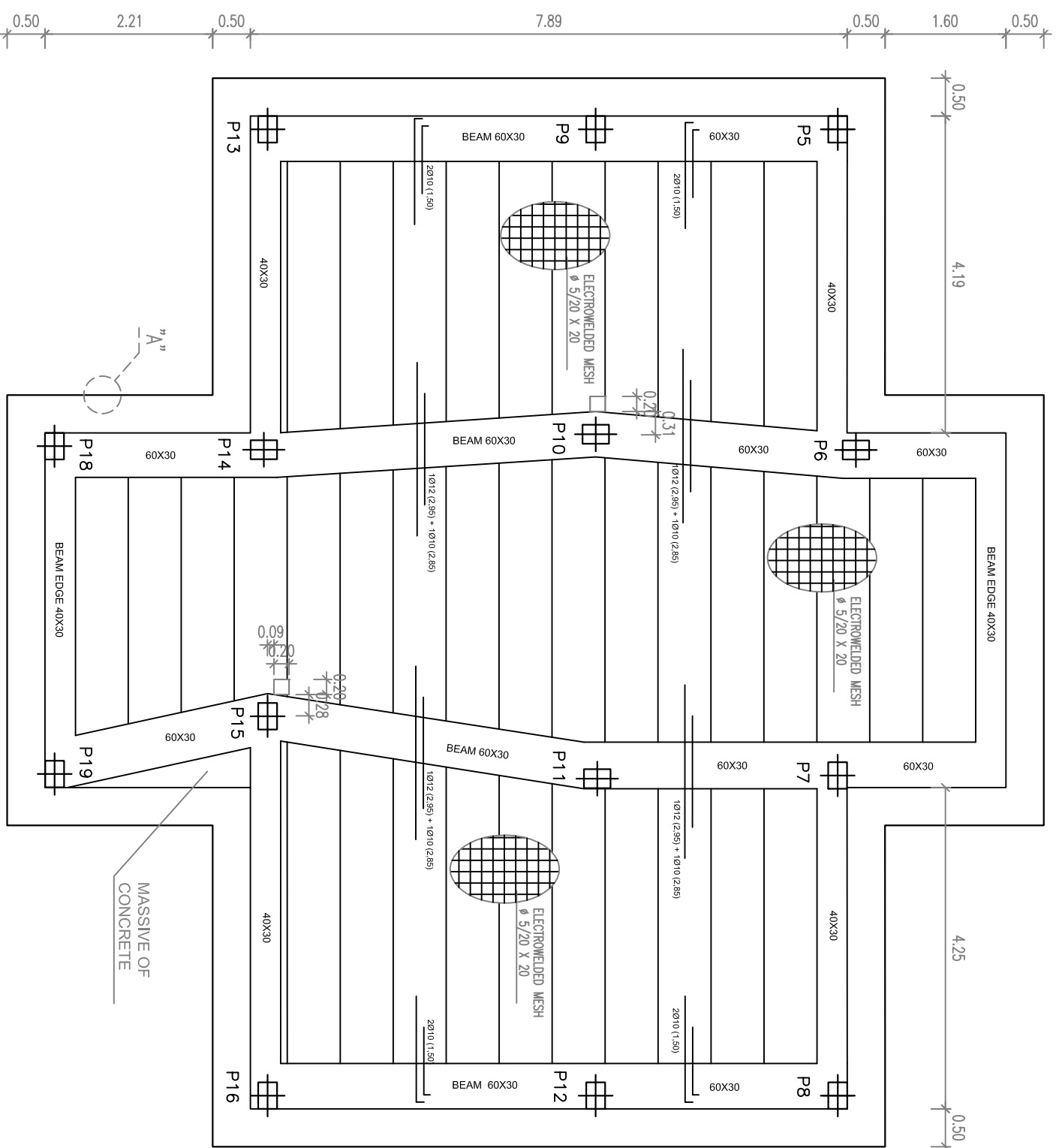
PLAN NAME  
**GROUND FLOOR SLAB**

SIGN

DATE  
 JUNE 2012

SCALE  
 1/75

N PLAN  
 17



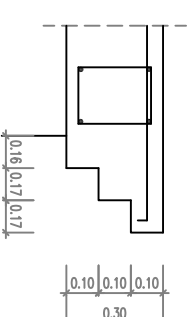
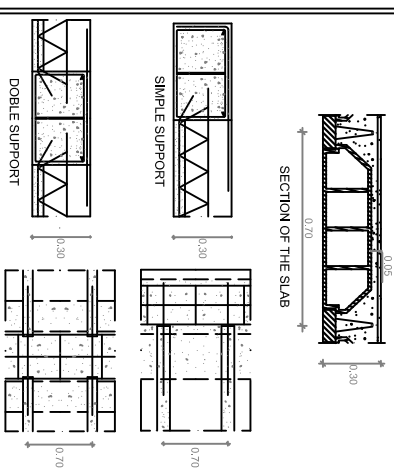
**DETALLES DEL FORJADO**

The flooring consists of unidirectional beam and vault semirresistente prefabricated concrete.

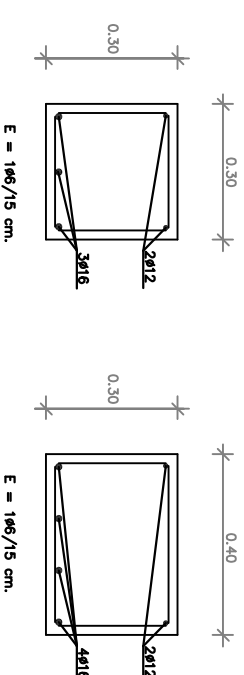
It will be slinging 25 +45 cm, as shown in detail, with joists wheelbase of 770 cm.

The sanitiguetas be tailored to the specifications above, resisting the indicated times flat, enlarged by meter and indicated in dNxm / m.

The vaults will be fringed before concreting.



**DETAIL " A " (MOLDING)**



**DETAILS OF BEAMS EDGES**

PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME

**FIRST FLOOR SLAB**



SIGN

DATE

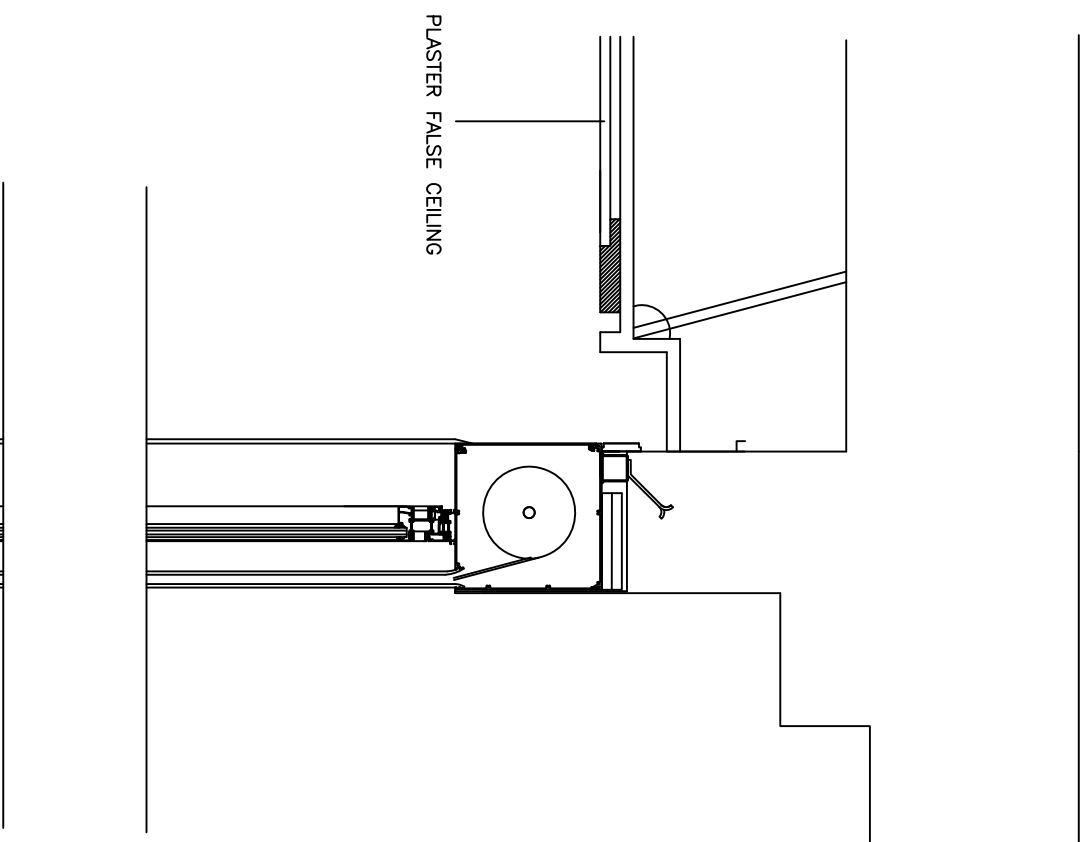
JUNE 2012

SCALE

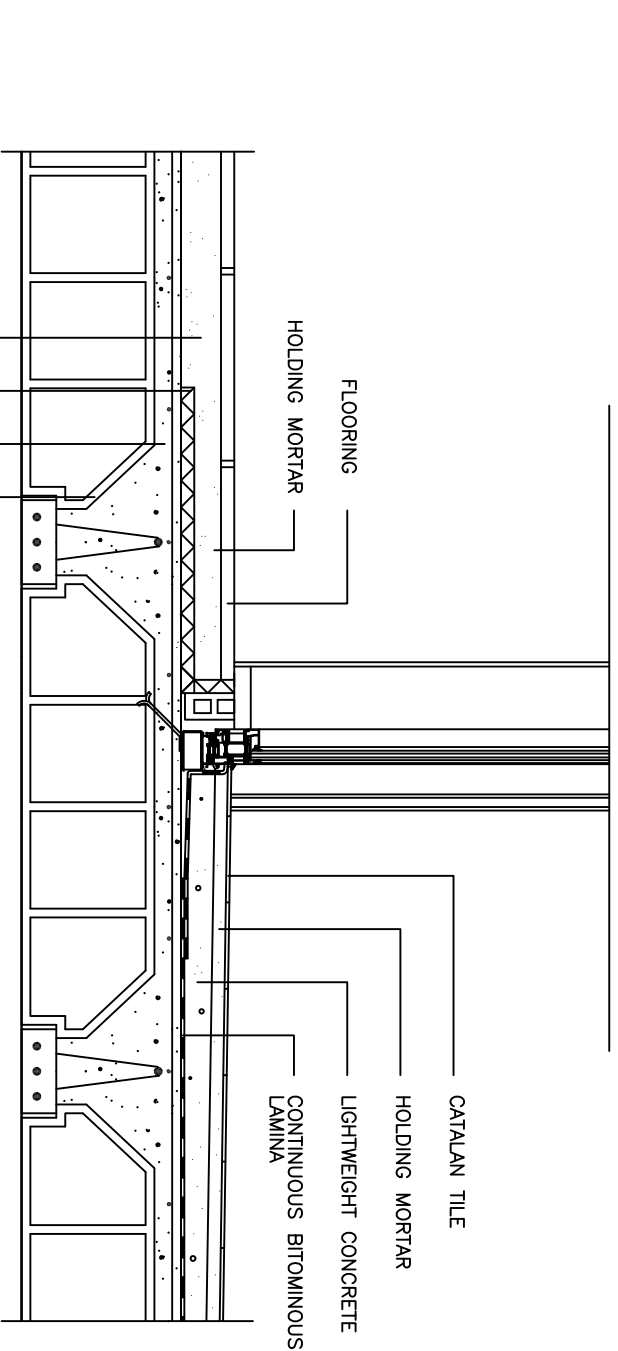
1/75

N PLAN

18



PLASTER FALSE CEILING

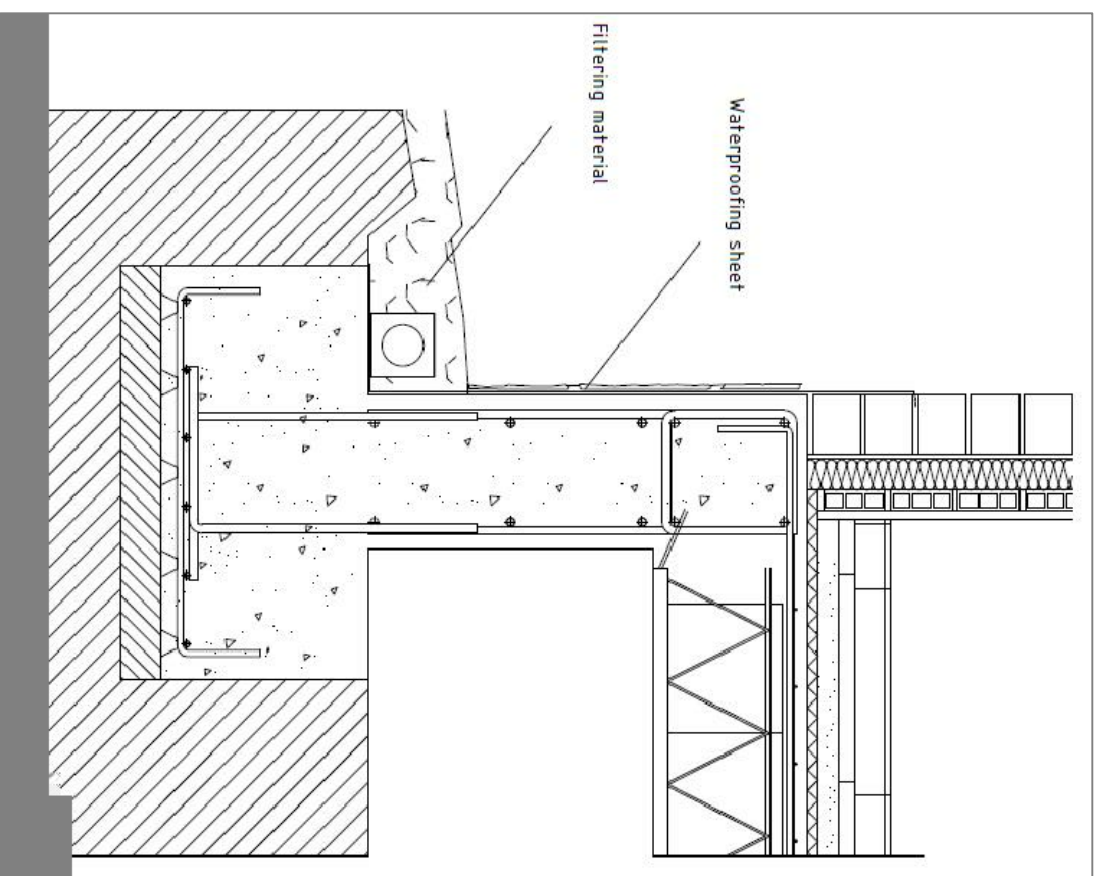


FLOORING  
HOLDING MORTAR

CATALAN TILE  
HOLDING MORTAR  
LIGHTWEIGHT CONCRETE  
CONTINUOUS BITUMINOUS LAMINA

BALCONY - INTERIOR

LAYER OF SAND  
INSULATION LAYER  
NEGATIVE REINFORCEMENT  
FORGED: SEMI-JOIST + CONCRETE VAULT



Waterproofing sheet

Filtering material

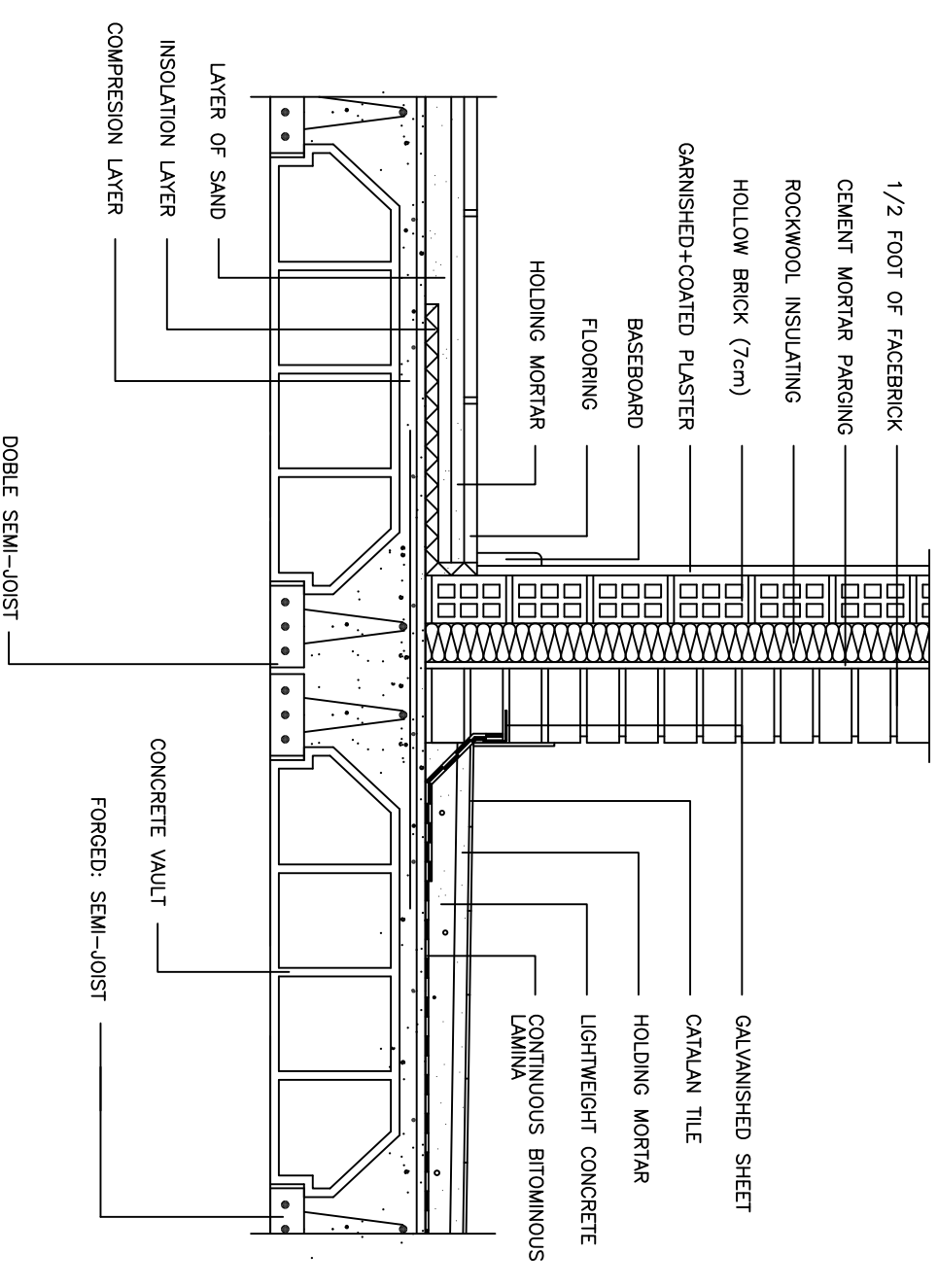
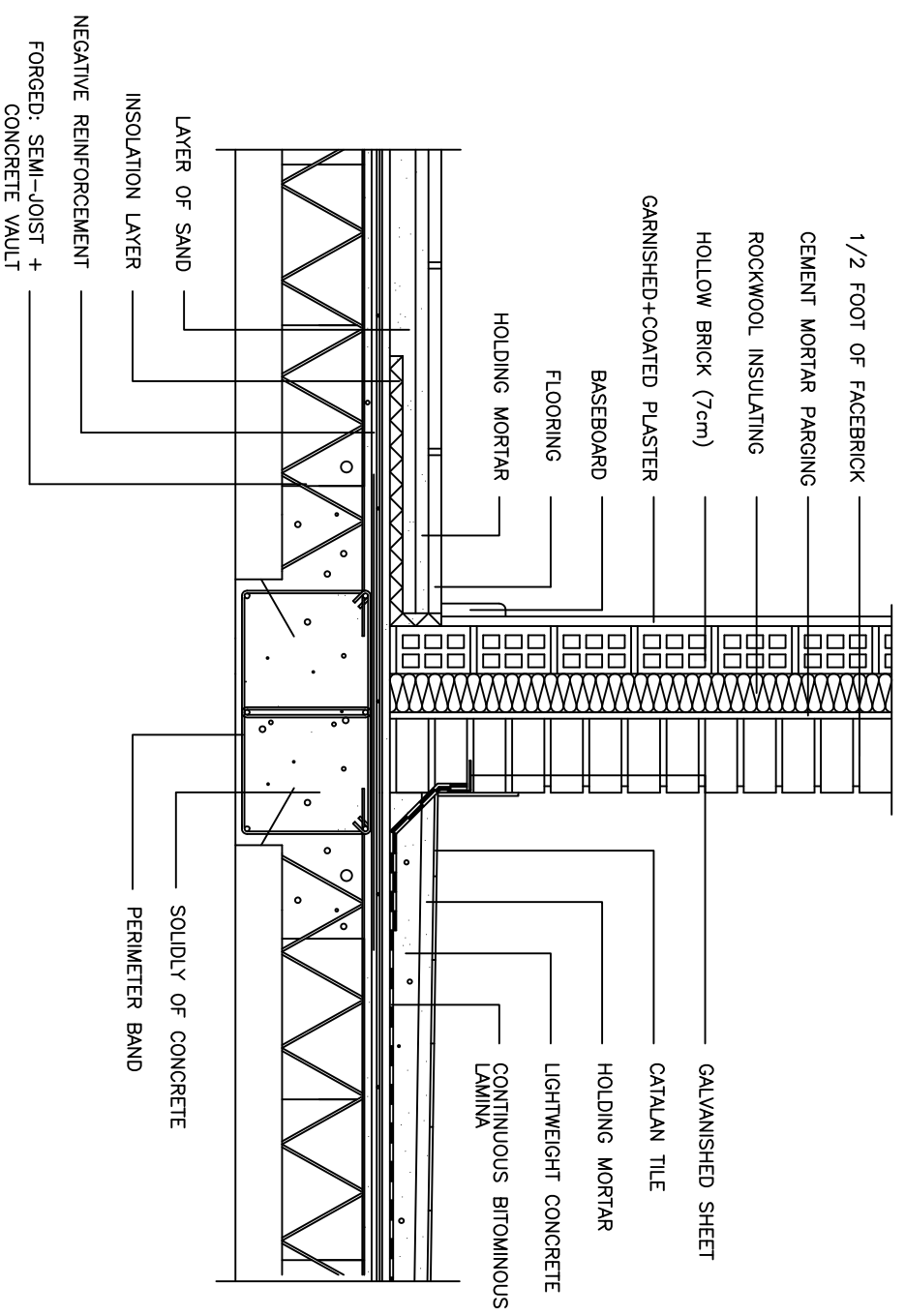
START OF FACADE



PROJECT : DETACHED HOUSE  
LOCATION : CARTAGENA, MURCIA (SPAIN)  
AUTHOR : F. JAVIER GIMENEZ ZANDON  
TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
DETAILS FACADE

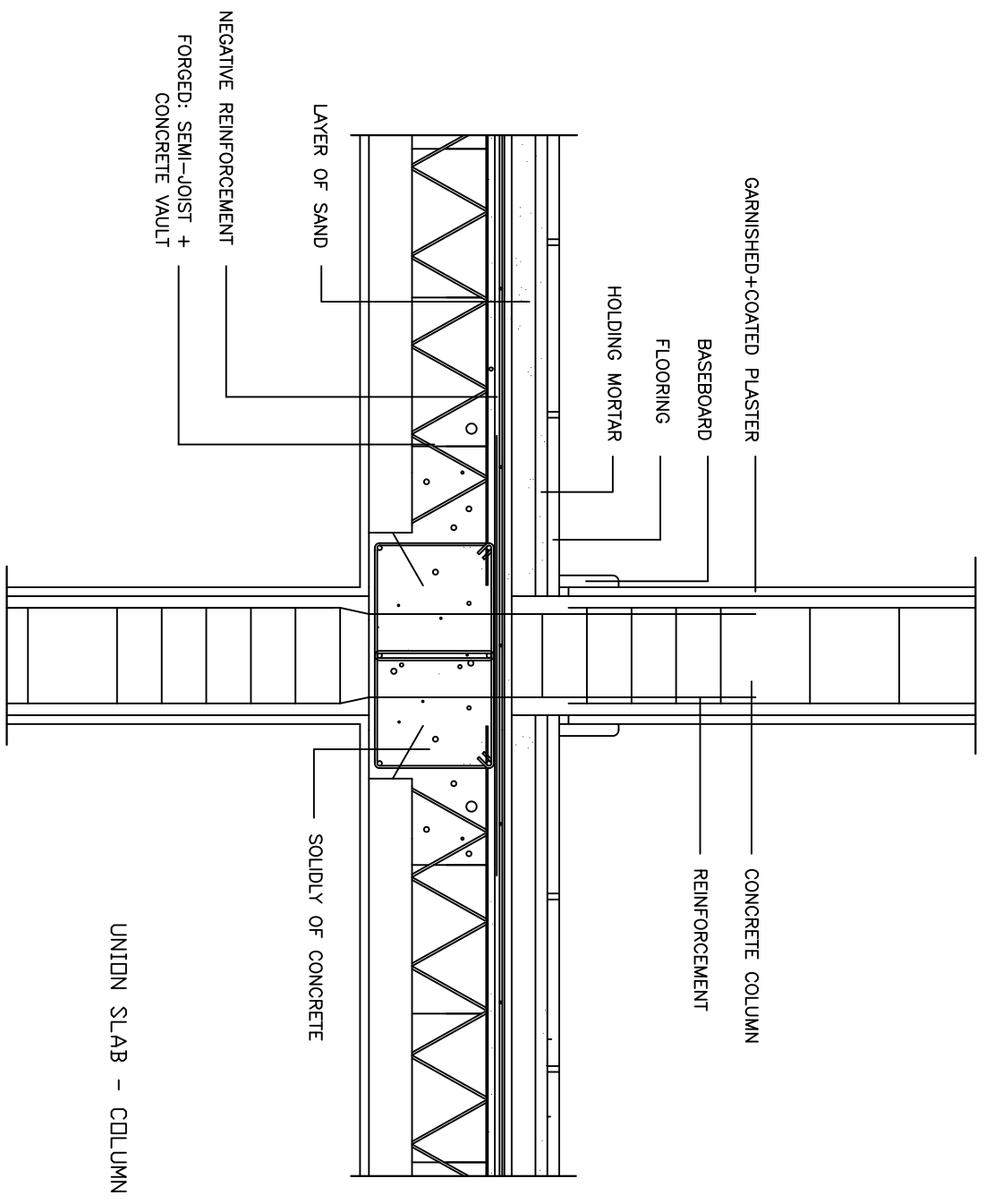
SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/10	19



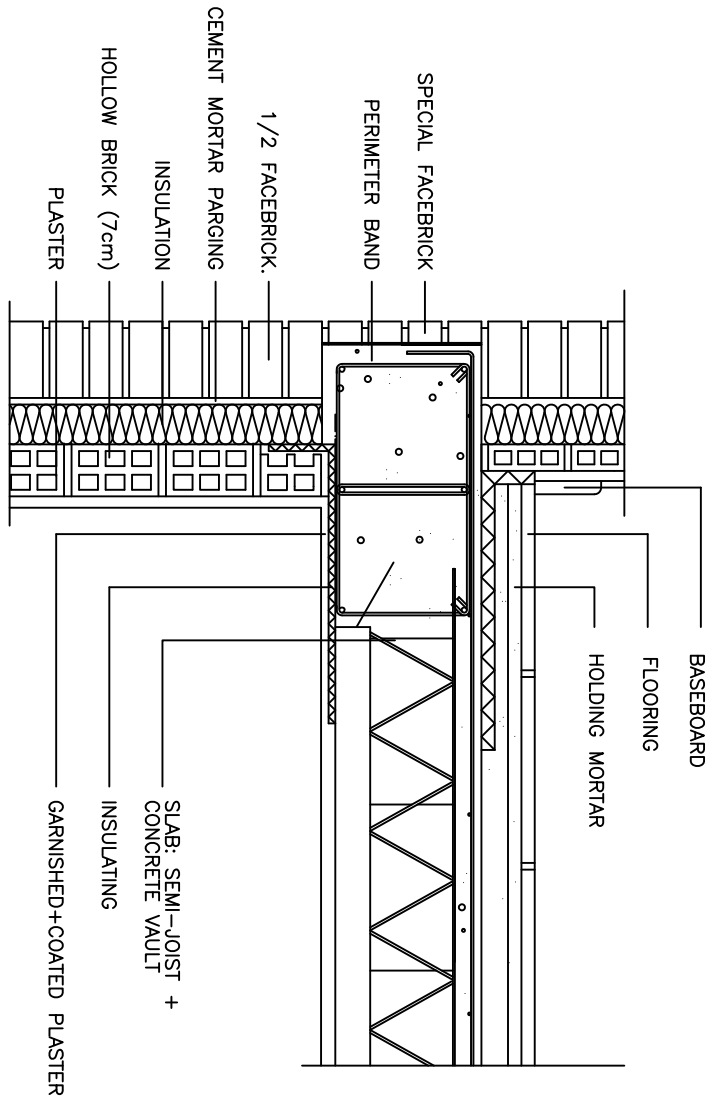
PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDN  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 DETAILS FACADE WITH SLAB

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/10	20



UNION SLAB - COLUMN



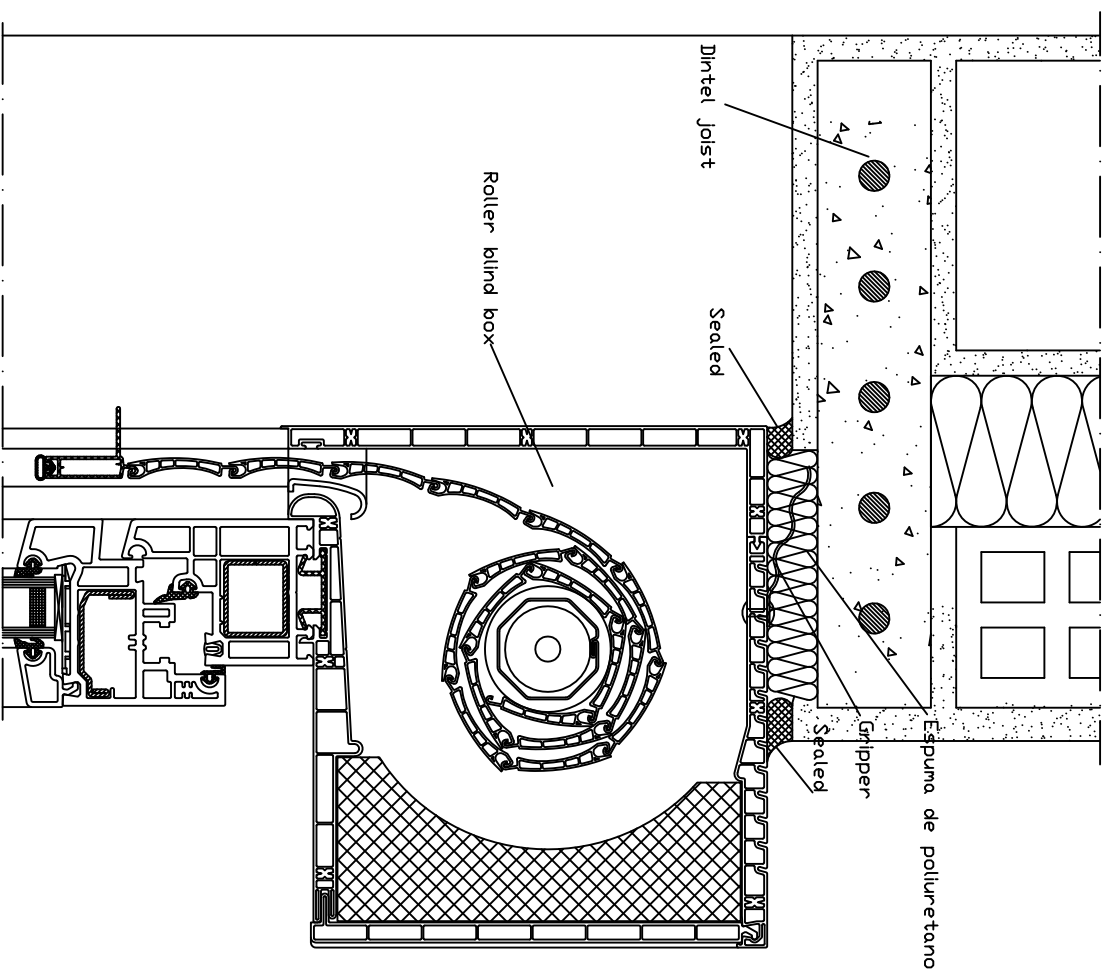
UNION SLAB - FACADE



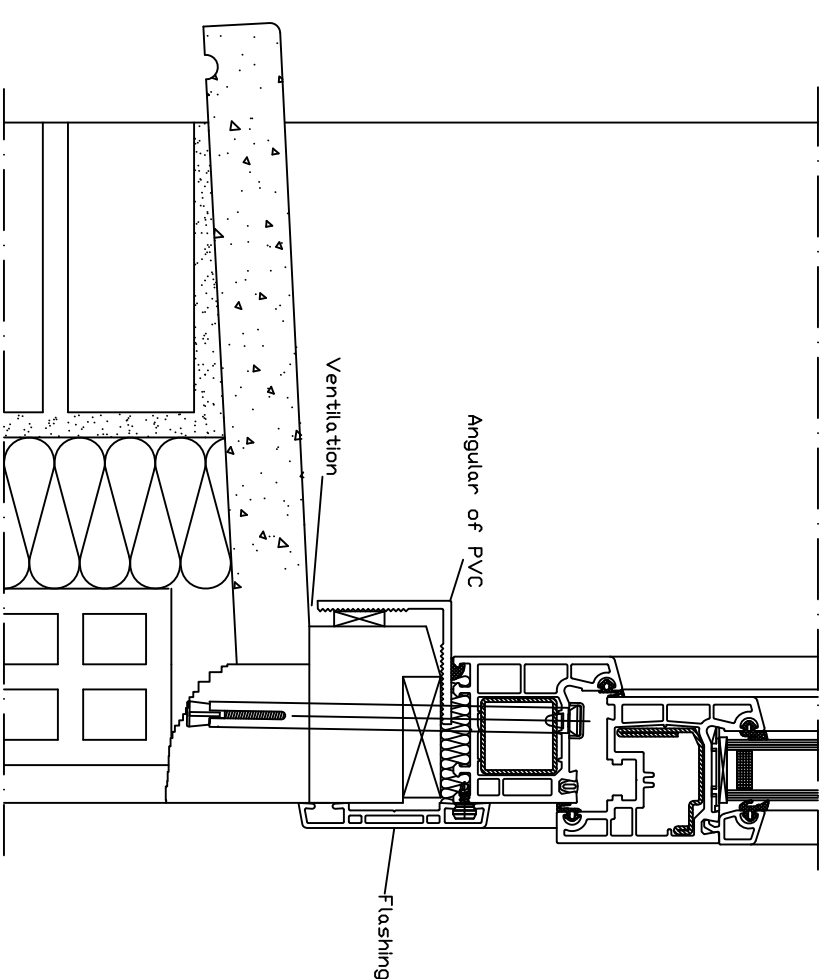
PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 DETAILS OF STRUCTURE

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/10	21



DETAIL OF WINDOW (TOP)



DETAIL OF WINDOW (BOTTOM)



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDN  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 DETAIL WINDOW-FACADE

SIGN

DATE

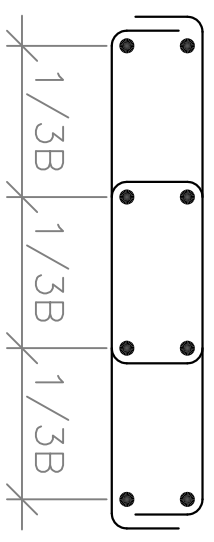
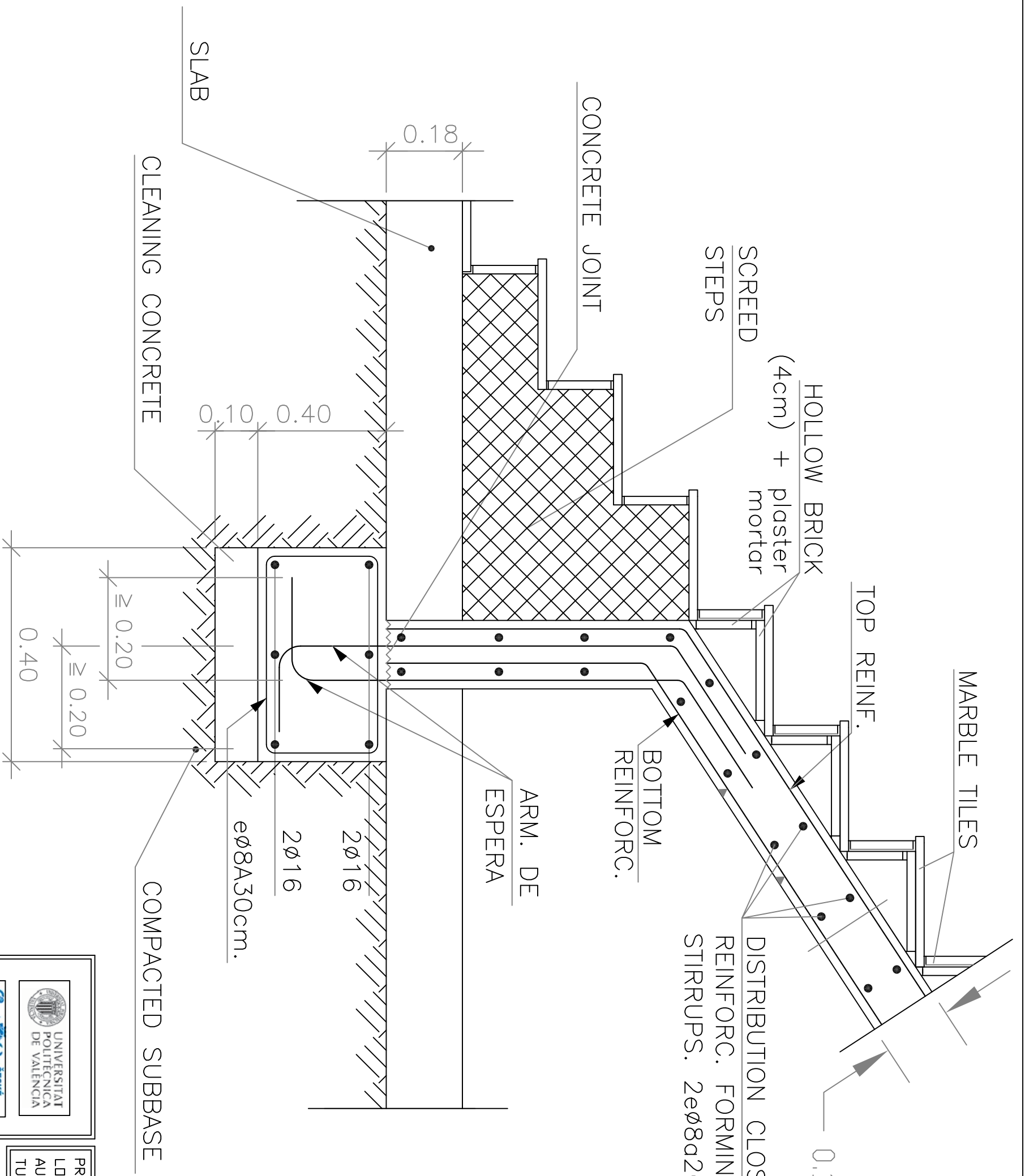
SCALE

N PLAN

JUNE 2012

1/3

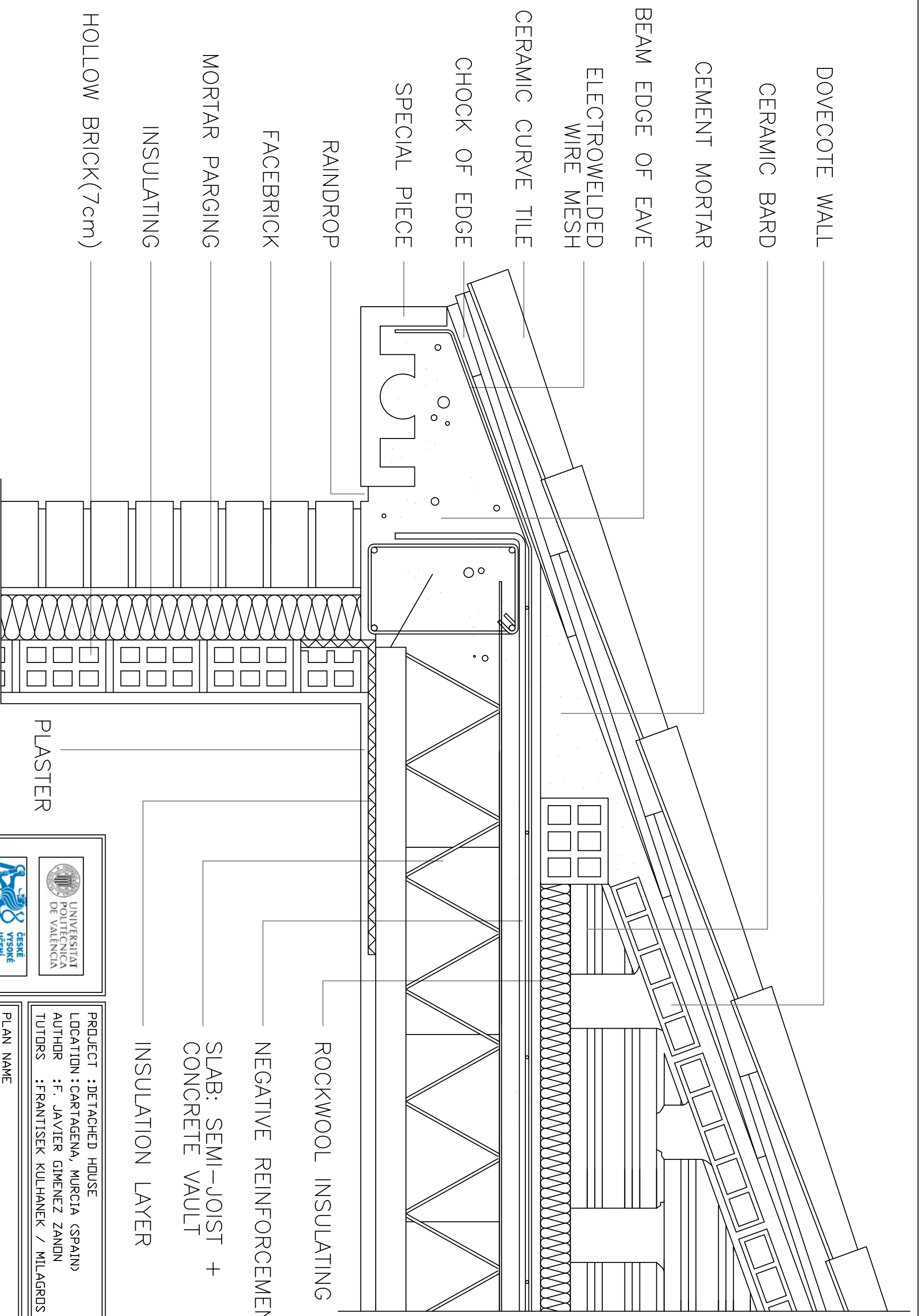
22



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDN  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 DETAIL OF STAIR FINISHING

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/20	23



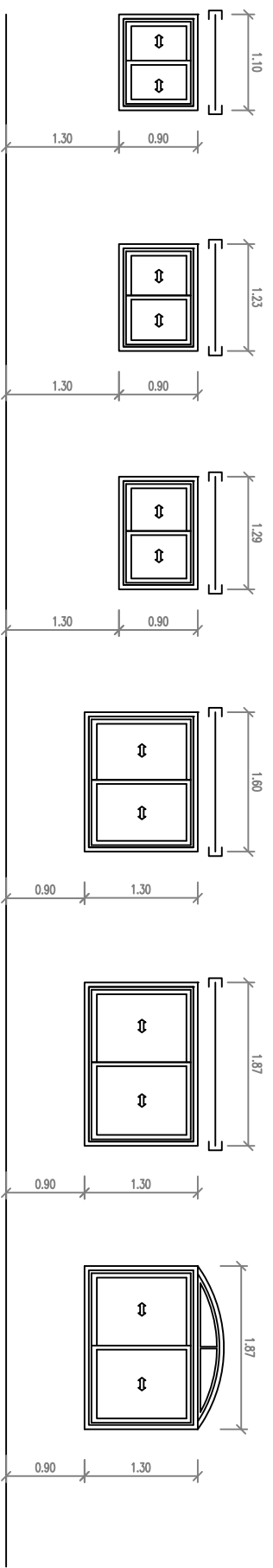
PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 DETAIL OF SLOPING ROOF

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/5	24



# ALUMINIUM CARPENTRY



TYPE V1
1 UNIT.
Powder coated aluminium
Glass 4+6+4
2 sifting

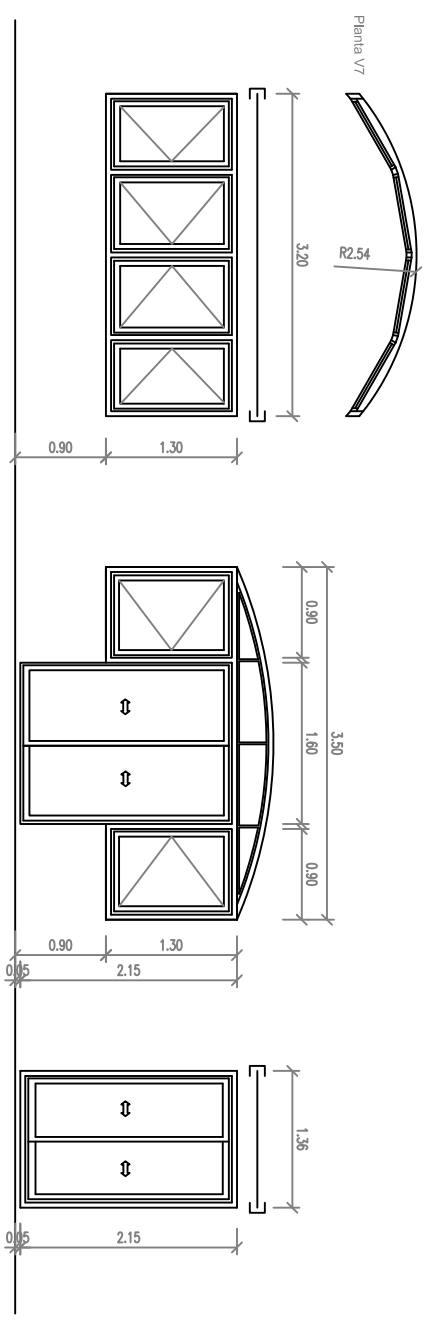
TYPE V2
1 UNIT.
Powder coated aluminium
Glass 4+6+4
2 sifting

TYPE V3
1 UNIT.
Powder coated aluminium
Glass 4+6+4
2 sifting

TYPE V4
3 UNIT.
Powder coated aluminium
Glass 4+6+4
2 sifting

TYPE V5
1 UNIT.
Powder coated aluminium
Glass 4+6+4
2 sifting

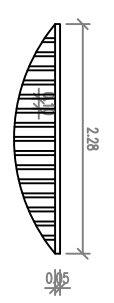
TYPE V6
1 UNIT.
Powder coated aluminium
Glass 4+6+4
2 sifting



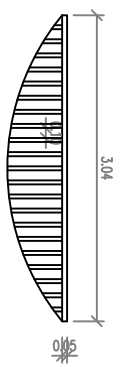
TYPE V7
2 UDS.
Powder coated aluminium
Glass 4+6+4
4 folding sashes

TYPE V8
2 UDS.
Powder coated aluminium
Glass 4+6+4
2 folding sashes + 2 sifting

TYPE V9
2 UDS.
Powder coated aluminium
Glass 4+6+4
2 sifting

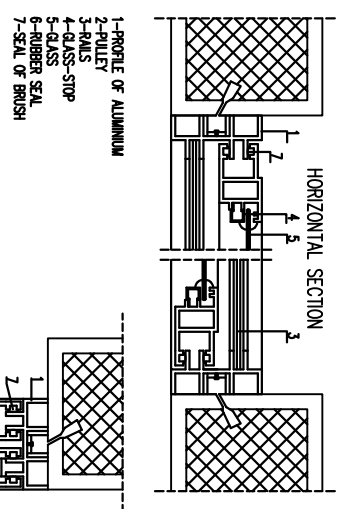


TIPO B-3
2 UDS.
Powder coated alumin.



TYPE B-2
2 UDS.
Powder coated aluminium

E:1/75

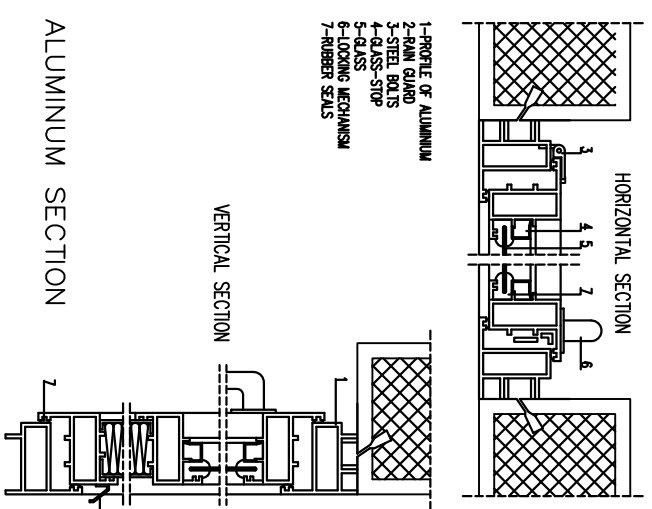


- 1-PROFILE OF ALUMINIUM
- 2-PULLEY
- 3-ROLLER
- 4-GLASS-STOP
- 5-GLASS
- 6-RUBBER SEAL
- 7-SEAL OF BRUSH



- 1-PROFILE OF ALUMINIUM
- 2-RAIN GUARD
- 3-STEEL BOLTS
- 4-GLASS-STOP
- 5-GLASS
- 6-LOOKING MECHANISM
- 7-RUBBER SEALS

E:1/12



- 1-PROFILE OF ALUMINIUM
- 2-RAIN GUARD
- 3-STEEL BOLTS
- 4-GLASS-STOP
- 5-GLASS
- 6-LOOKING MECHANISM
- 7-RUBBER SEALS

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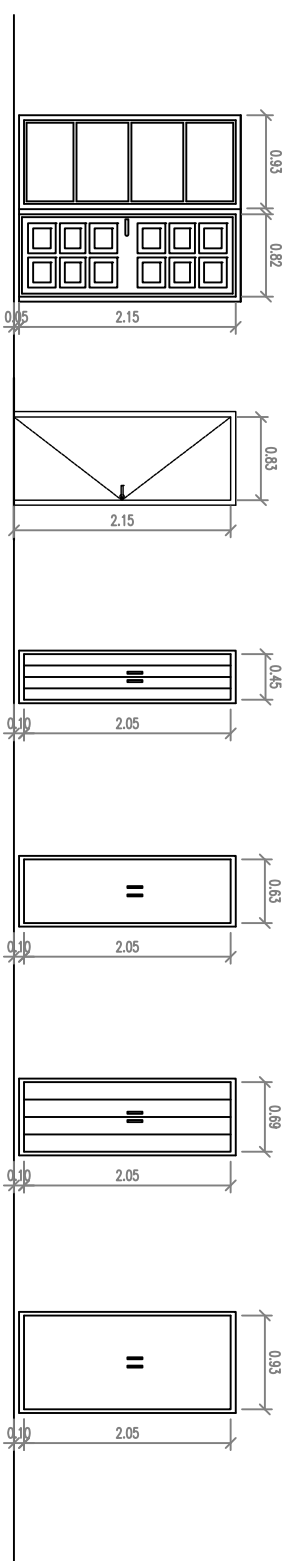
ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**CARPENTRY MEMORY (ALUMINIUM)**

SIGN	DATE	SCALE
	JUNE 2012	1/75 1/12
		N PLAN
25		

# WOOD CARPENTRY



TYPE P-1
1 UN.
1 folding door
Safety translucent glass
With lock

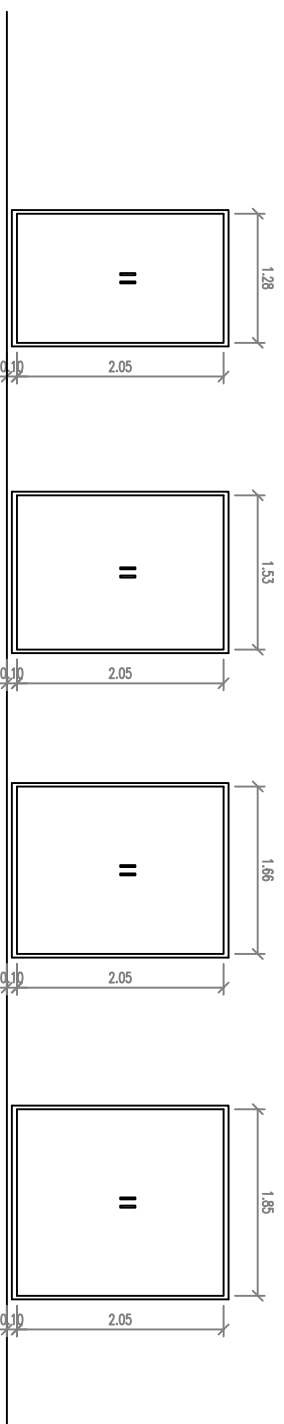
TYPE P-2
13 UN.
1 folding door

TYPE P-3
1 UN.
2 folding/sliding doors

TYPE P-4
1 UN.
2 folding/sliding doors

TYPE P-5
1 UN.
2 folding/sliding doors

TYPE P-6
1 UN.
2 folding/sliding doors

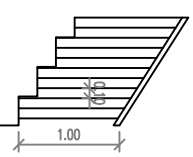


TYPE P-7
1 UN.
2 folding/sliding doors

TYPE P-8
1 UN.
2 folding/sliding doors

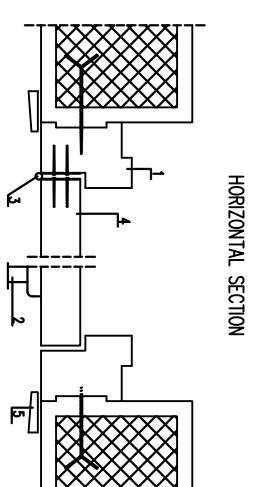
TYPE P-9
1 UN.
2 folding/sliding doors

TYPE P-10
UN.
2 folding/sliding doors



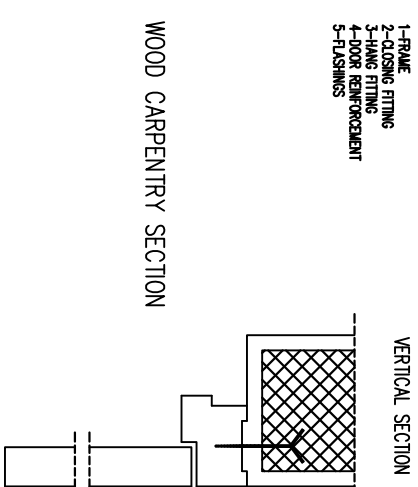
TYPE B-1
1 UN.
4.40ML

E:1/75



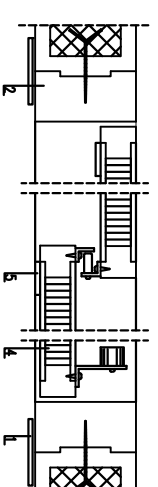
HORIZONTAL SECTION

- 1-FRAME
- 2-CLOSING FITTING
- 3-HANG FITTING
- 4-DOOR REINFORCEMENT
- 5-FLASHINGS



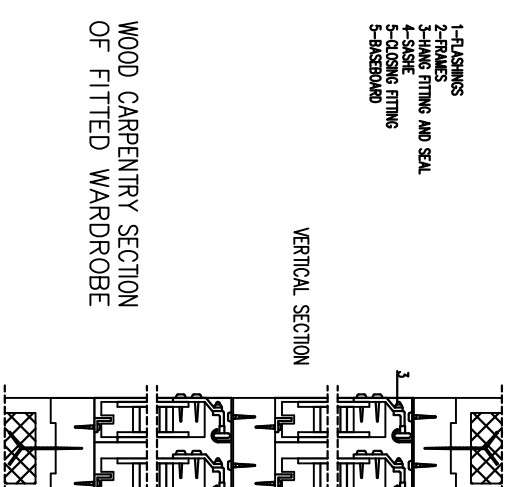
VERTICAL SECTION

WOOD CARPENTRY SECTION



HORIZONTAL SECTION

- 1-FLASHINGS
- 2-FRAMES
- 3-HANG FITTING AND SEAL
- 4-SISSE
- 5-CLOSING FITTING
- 5-RISEBOARD



VERTICAL SECTION

WOOD CARPENTRY SECTION OF FITTED WARDROBE

E:1/12

PROJECT : DETACHED HOUSE  
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 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**CARPENTRY MEMORY (WOOD)**



SIGN

DATE

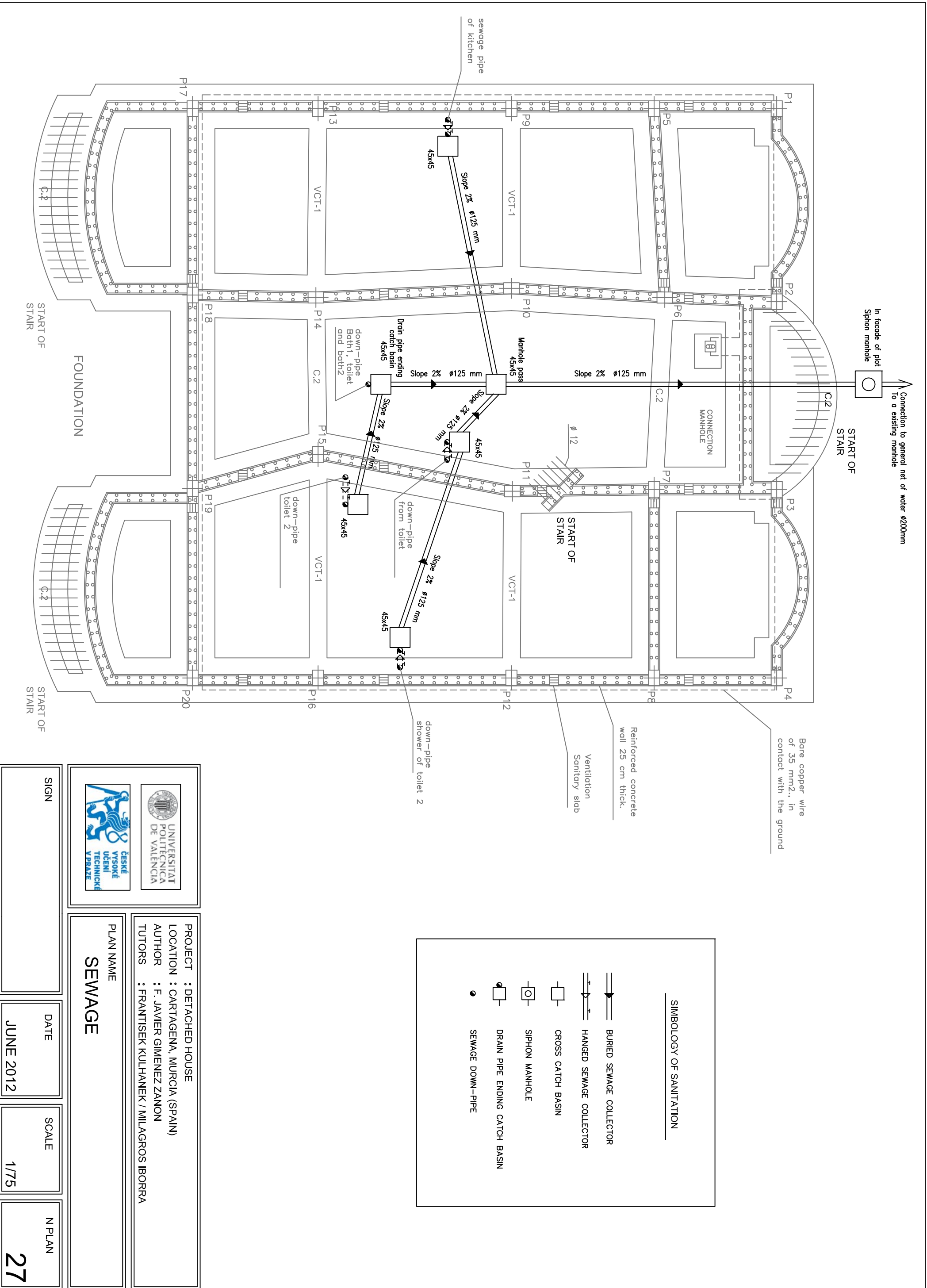
JUNE 2012

SCALE

1/75  
1/12

N PLAN

26



Bare copper wire of 35 mm<sup>2</sup>, in contact with the ground

Reinforced concrete wall 25 cm thick.

Ventilation Sanitary slab

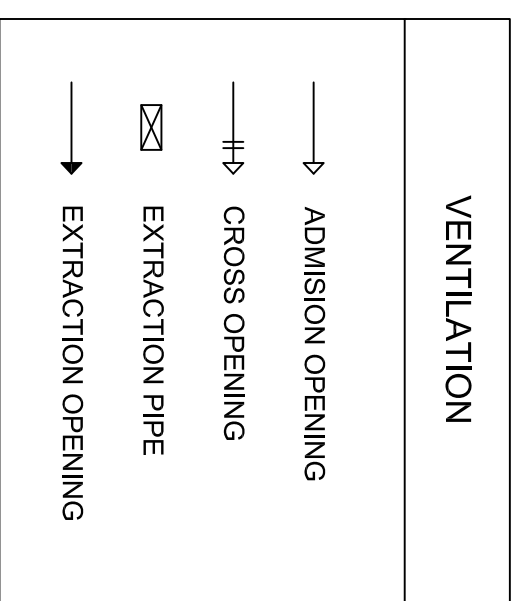
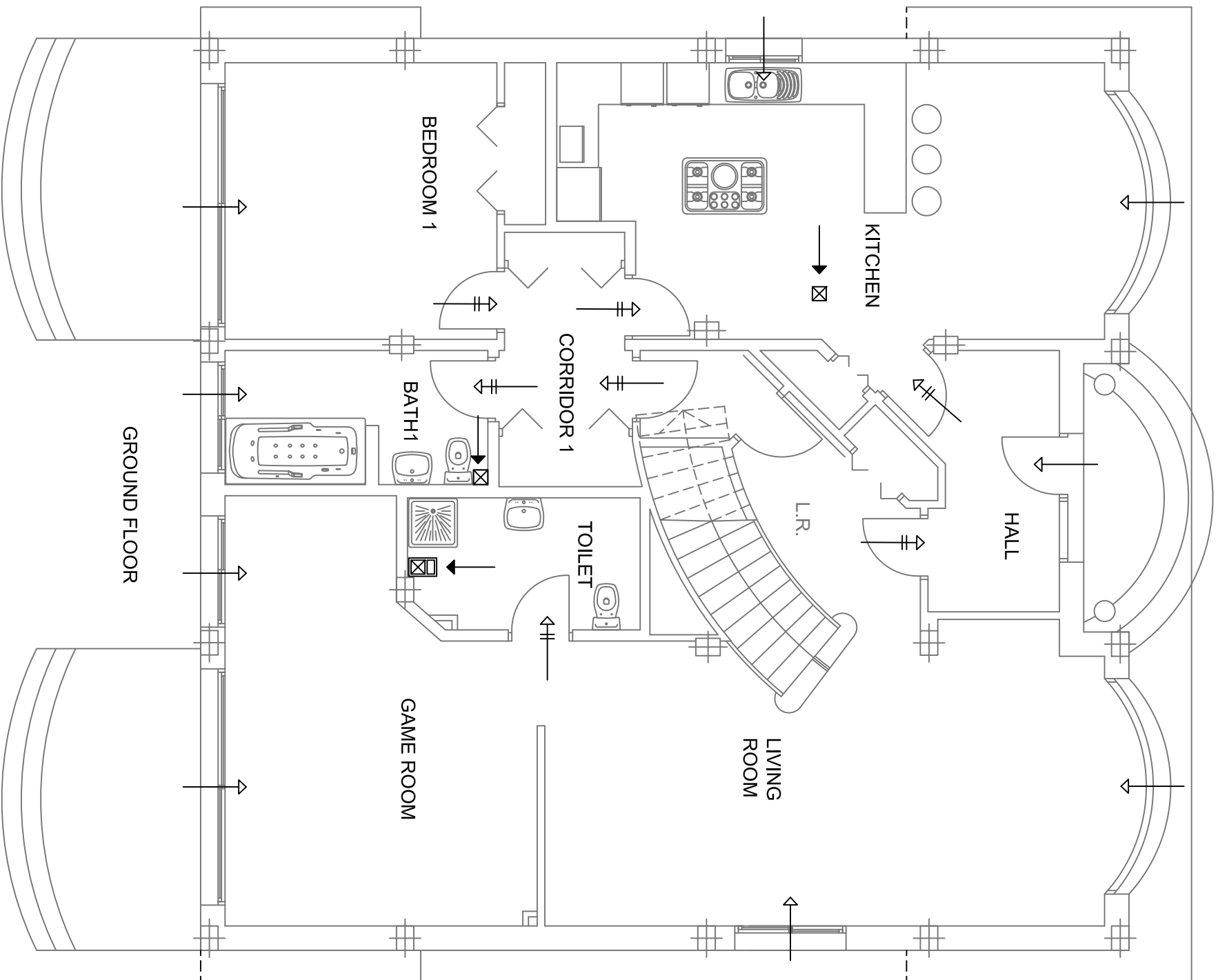
down-pipe shower of toilet 2



PROJECT : DETACHED HOUSE  
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 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**SEWAGE**

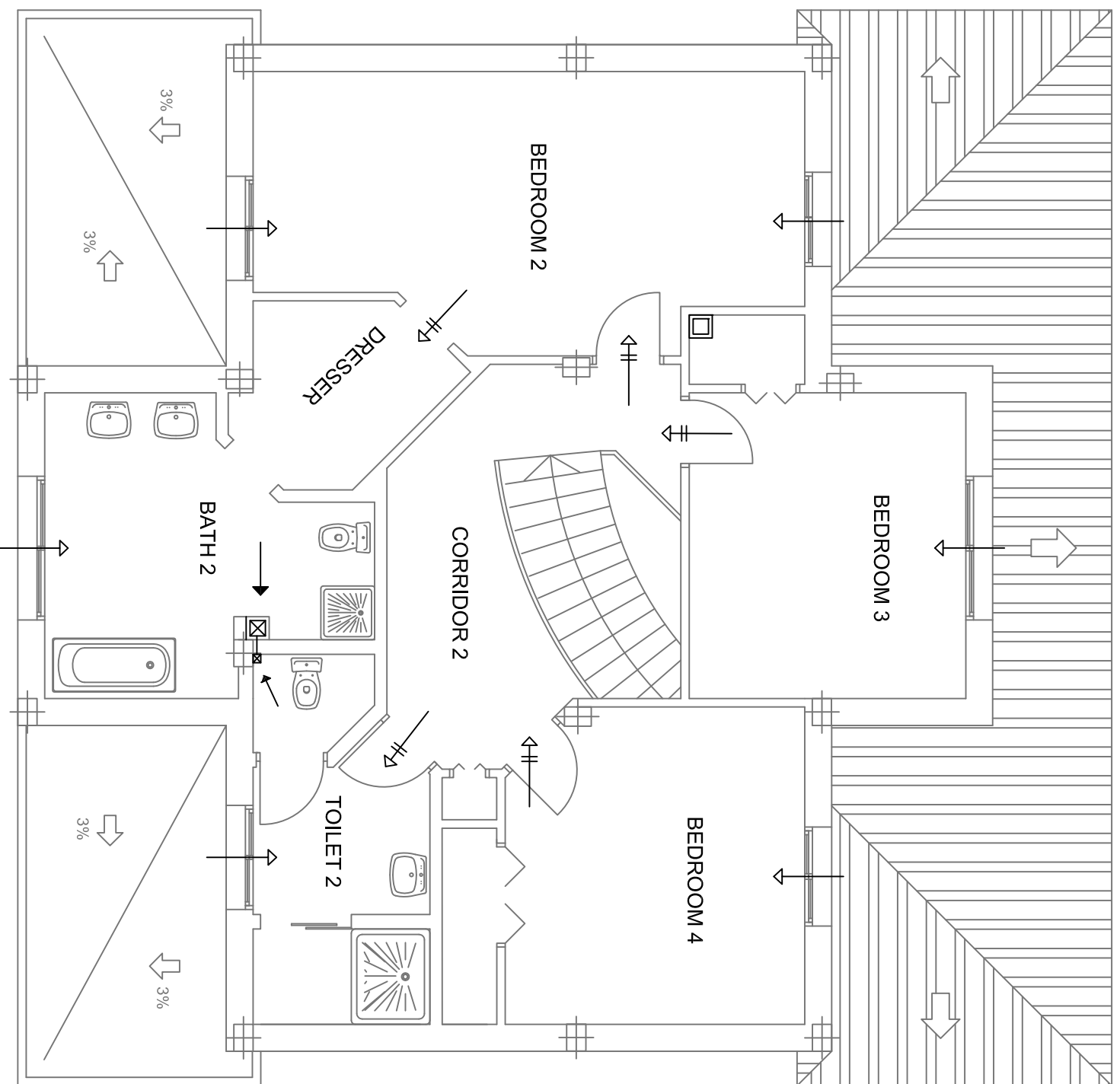
SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	27



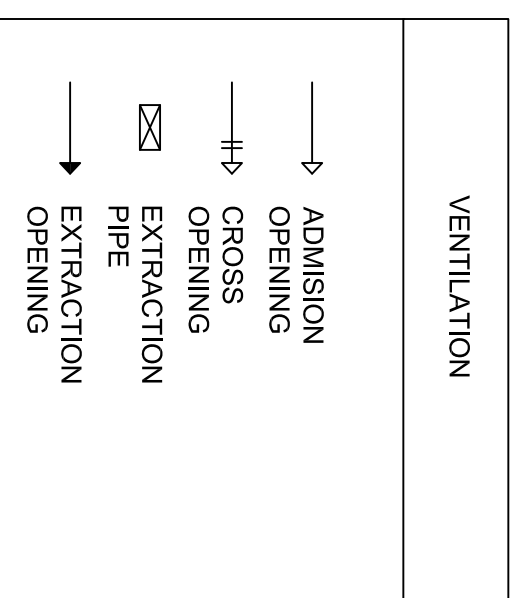
PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**NATURAL VENTILATION**

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	28



FIRST FLOOR



PROJECT: DETACHED HOUSE  
 LOCATION: CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

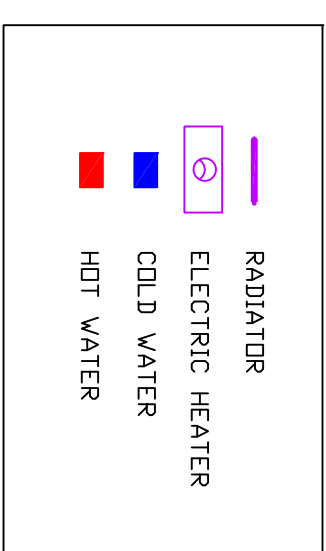
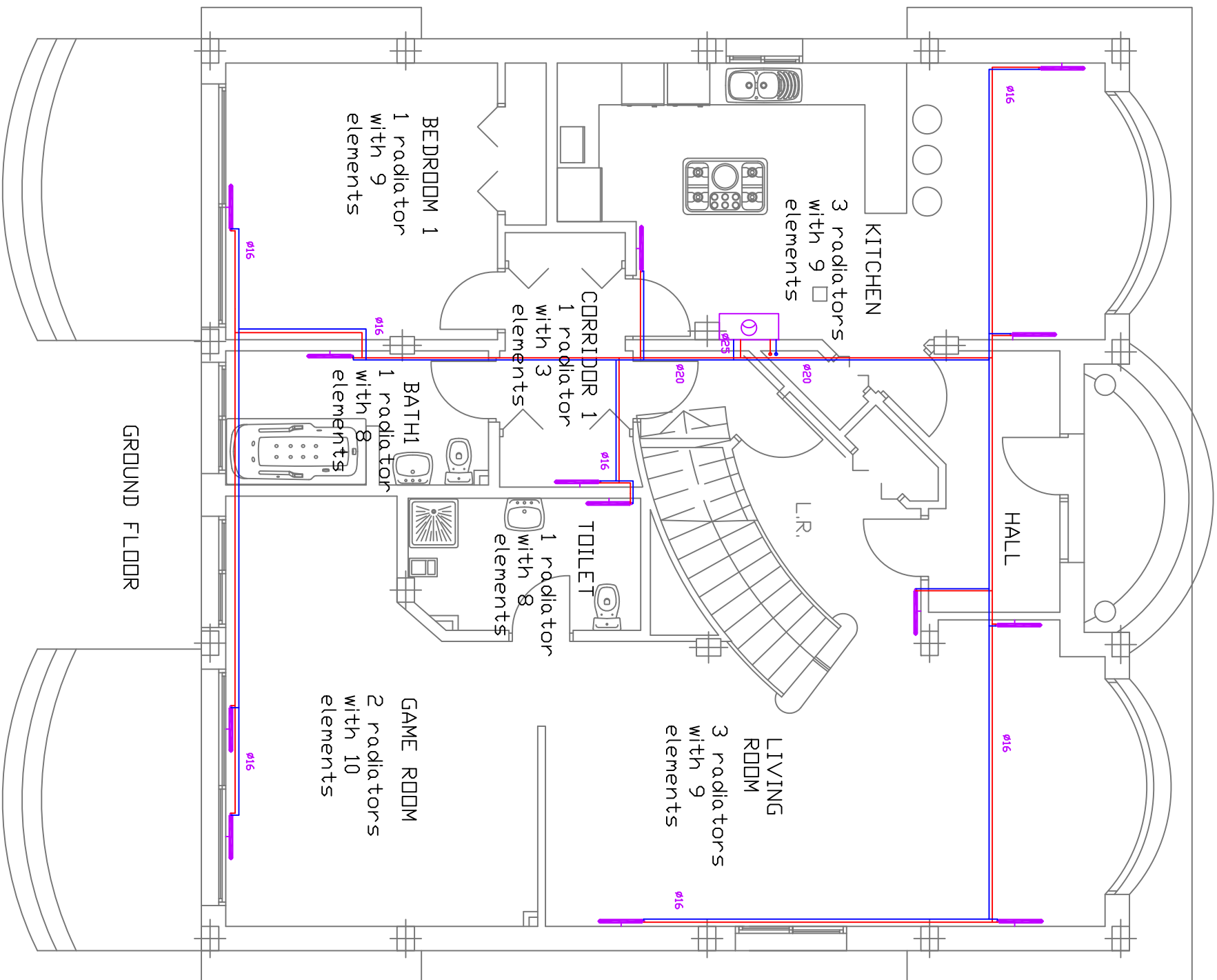
PLAN NAME  
 NATURAL VENTILATION

SIGN

DATE  
 JUNE 2012

SCALE  
 1/75

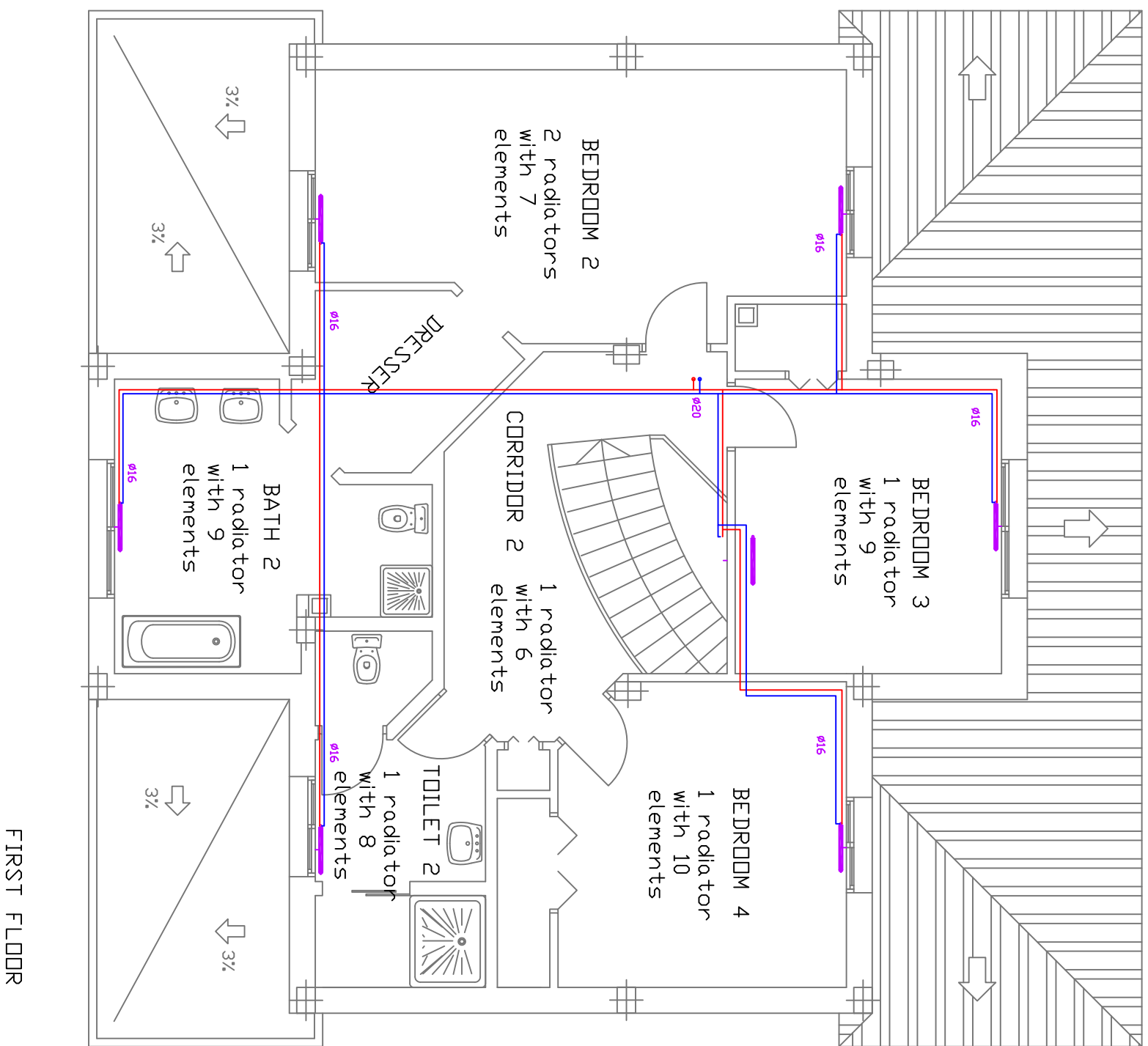
N PLAN  
 29



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 HEATING

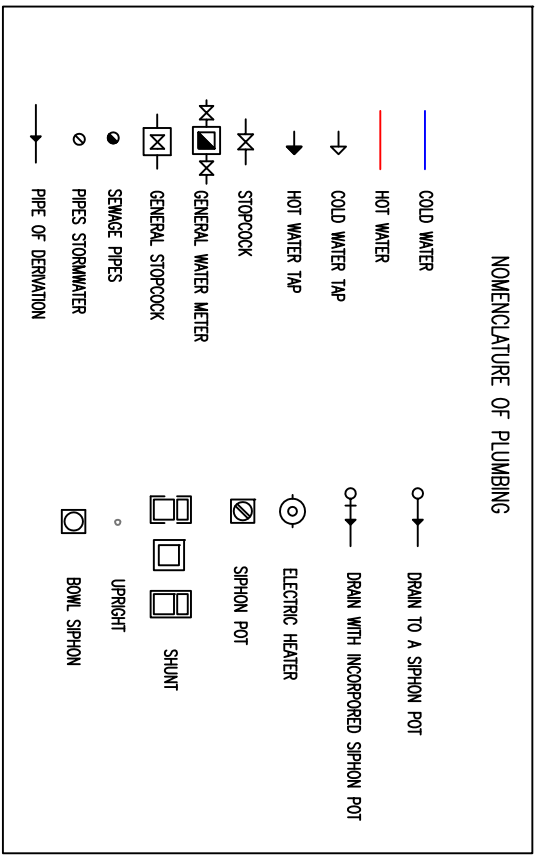
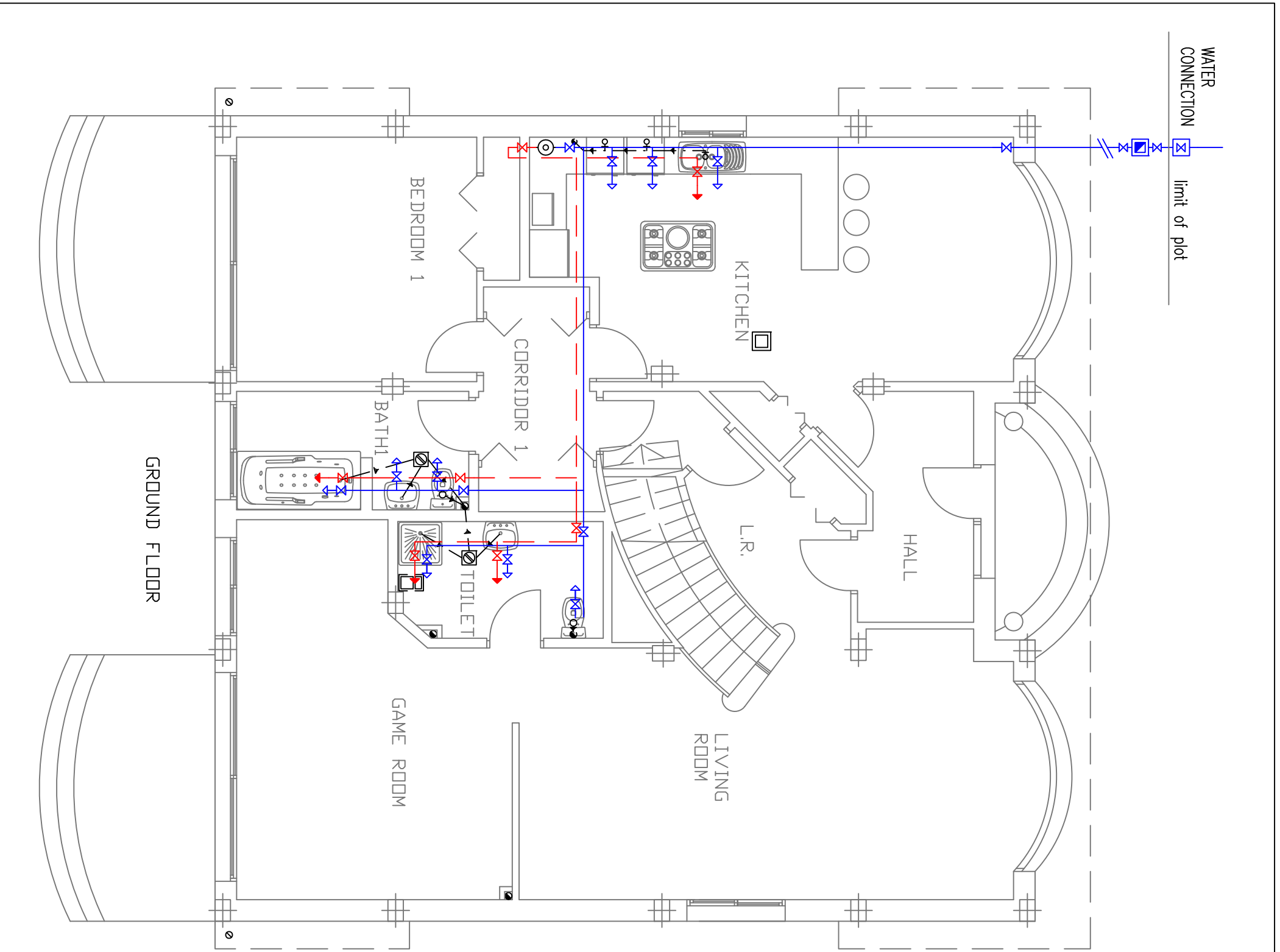
SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	30



PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHDR : F. JAVIER GIMENEZ ZANDN  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
 HEATING

SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	31



**SPECIFICATIONS:**

- ALL SIPHONIC ELEMENTS HAVE HYDRAULIC CLOSURES OF 50 mm.
  - THE MINIMUM DIAMETERS OF THE DRAIN PIPES:
  - SINK = 40 mm.
  - DISHWASHER = 40 mm.
  - WASHING MAC. = 40 mm.
  - WASHPAN = 32 mm.
  - SHOWER = 40 mm.
  - SHOUBT = 39 mm.
  - BIOT = 39 mm.
  - TOILET = 110 mm.
- SIPHON TOP IS TO BE INSTALLED IN ALL COMMON BATHROOM AND TOILETS
- THE SYSTEM IS SO ALLOW THE EXPANSION OF THE ELEMENTS FORMING THROUGH RUBBER JOINTS FITTINGS, HOSES,WALL BUSHINGS 15MM DIAMETER OUTSIDE TOP OF THE PIPE.

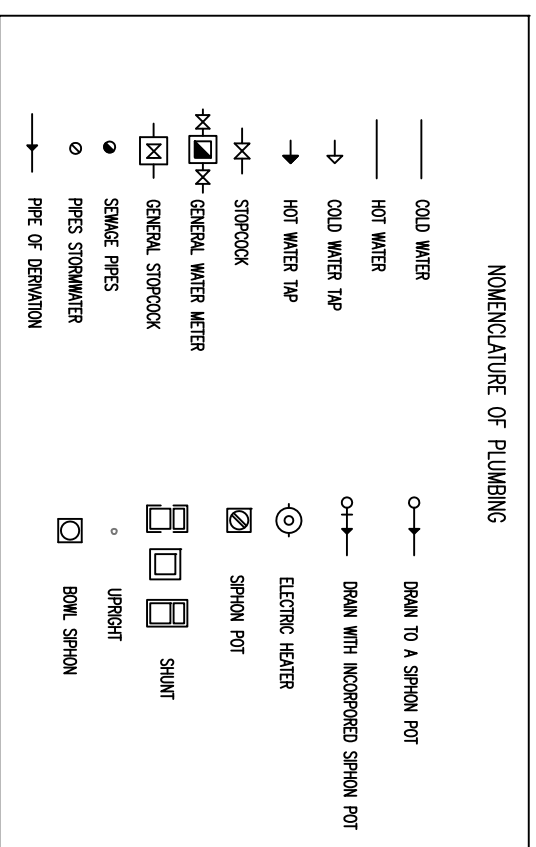
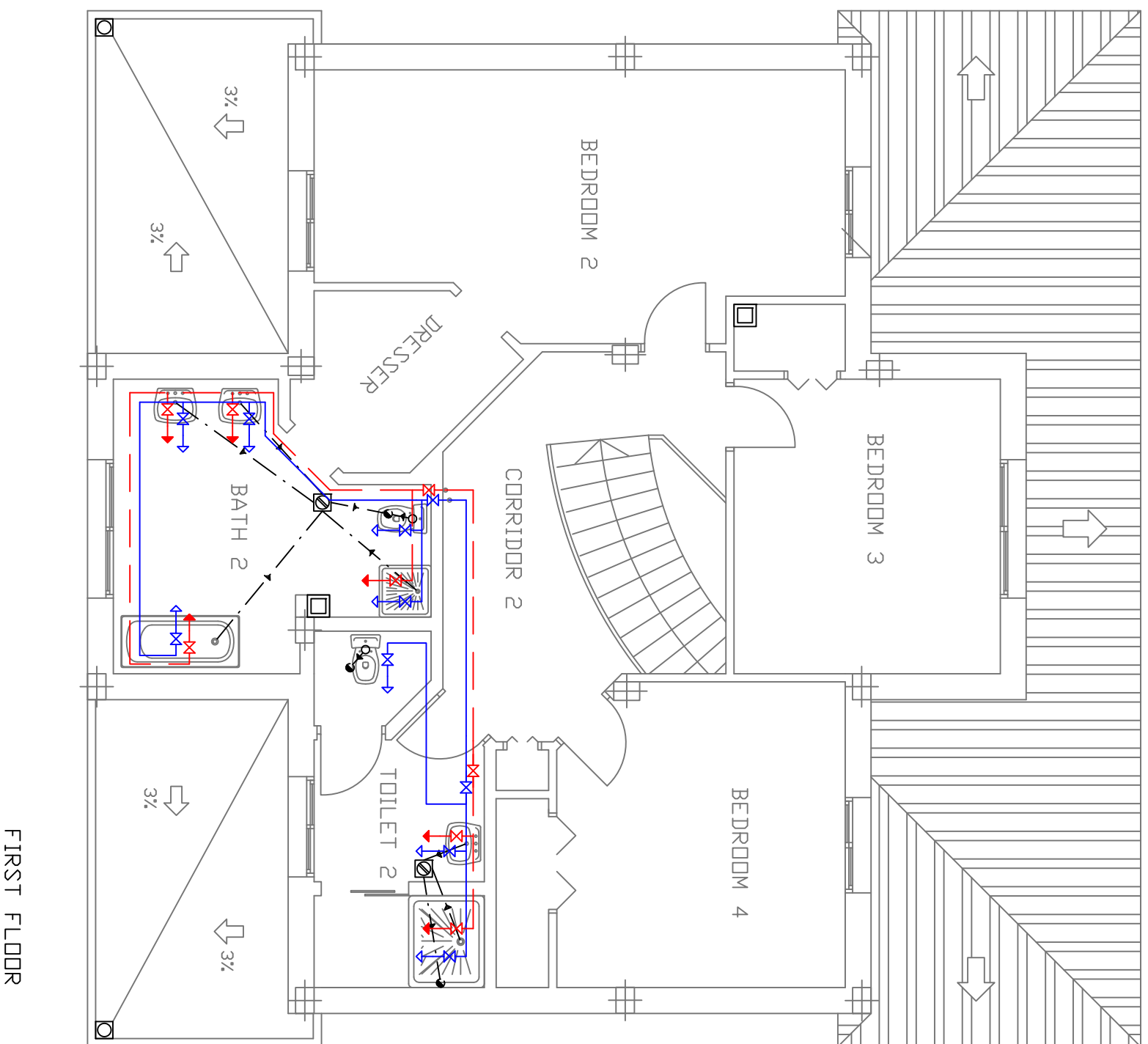


PROJECT : DETACHED HOUSE  
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 AUTHOR : F. JAVIER GIMENEZ ZANDON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

PLAN NAME  
**PLUMBING**



SIGN	DATE	SCALE	N PLAN
	JUNE 2012	1/75	32



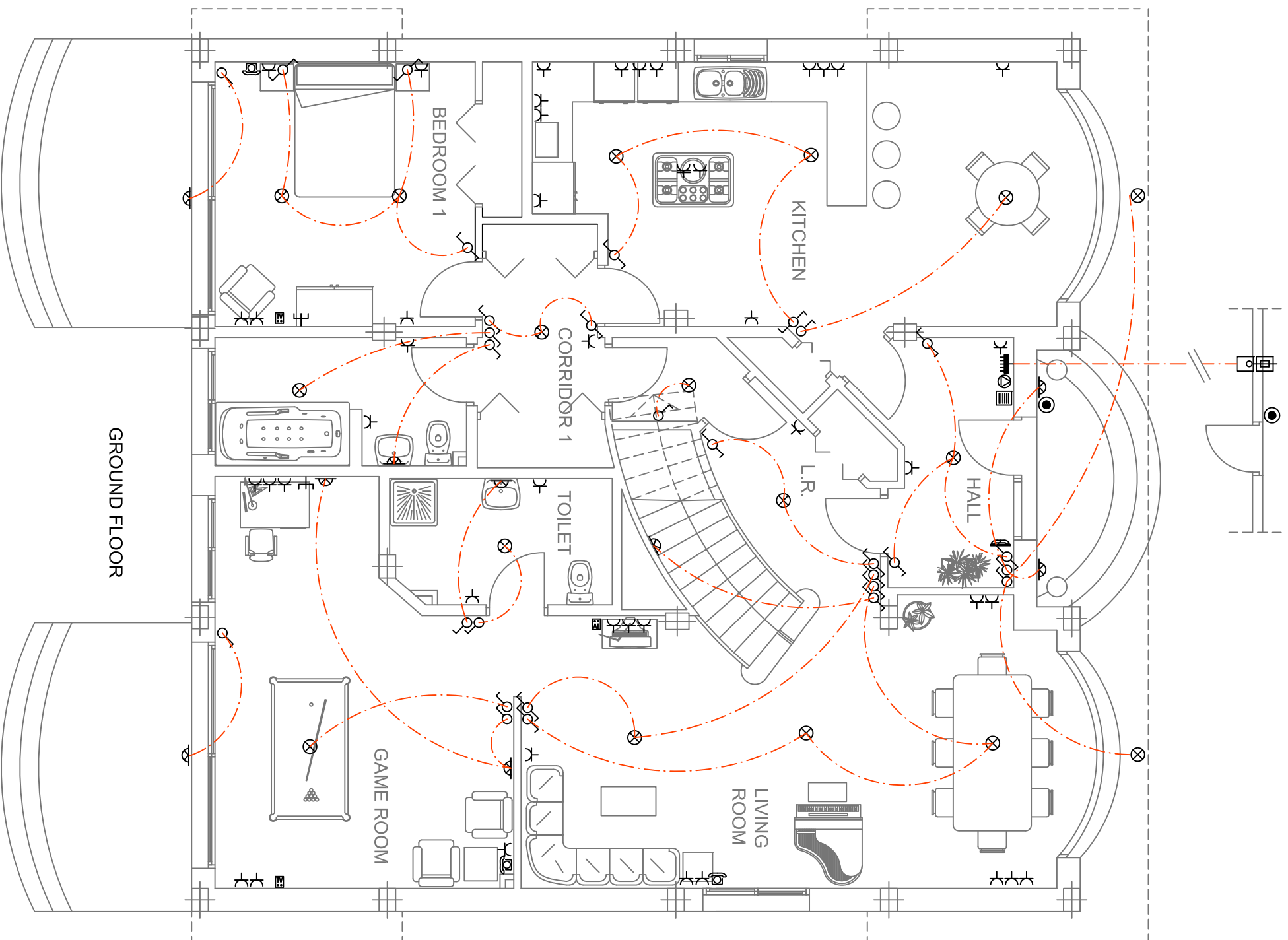


**SPECIFICATIONS:**

- ALL SIPHONIC ELEMENTS HAVE HYDRAULIC CLOSURES OF 50 mm.
  - THE MINIMUM DIAMETERS OF THE DRAIN PIPES:
- |              |           |
|--------------|-----------|
| SINK         | = 40 mm.  |
| DISHWASHER   | = 40 mm.  |
| WASHING MAC. | = 40 mm.  |
| WASHBASIN    | = 32 mm.  |
| SHOWER       | = 40 mm.  |
| BATH         | = 40 mm.  |
| BIDET        | = 32 mm.  |
| TOILET       | = 110 mm. |
- SIPHON TOP IS TO BE INSTALLED IN ALL COMMON BATHROOM AND TOILETS
  - THE SYSTEM IS SO ALLOW THE EXPANSION OF THE ELEMENTS FORMING THROUGH RUBBER JOINTS FITTINGS, HOSES,WALL BUSHINGS 15MM DIAMETER OUTSIDE TOP OF THE PIPE.

 UNIVERSITAT POLITÈCNICA DE VALÈNCIA	 ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE
PROJECT : DETACHED HOUSE LOCATION : CARTAGENA, MURCIA (SPAIN) AUTHOR : F. JAVIER GIMENEZ ZANDON TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA	
PLAN NAME <h2 style="margin: 0;">PLUMBING</h2>	

SIGN	DATE	SCALE	N PLAN
JUNE 2012	1/75	33	

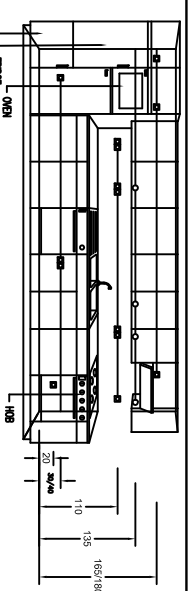


GROUND FLOOR

NOMENCLATURE OF ELECTRICITY

- WALL LAMP
- BLIP
- SWITCH BELL
- BELL
- GENERAL PROTECTION PANEL
- ELECTRICITY METER
- MAIN DISTRIBUTION BOARD
- INTERCOM POINT
- SWITCH
- COMMUNICATOR
- PLUG OF 16A
- PLUG OF 25A
- BASIC TELEPHONE+DIGITAL SERVICES
- TV AND SAT. POINT
- USER ACCESS POINT
- BROAD BAND POINT

LOCATION OF POWER POINTS IN THE KITCHEN

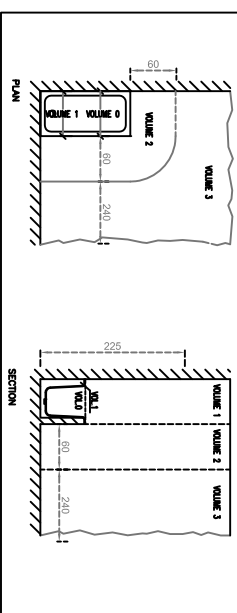


ELECTRICAL INSULATION IN BATHROOMS (IEC-IE-27)

Degree of protection	Cabling	Mechanisms (2)	Other features (3)
Volume 0	Insulated by the necessary to prevent contact with the conductive parts.	The protection.	Insulation on the conductive parts is not required in the volume.
Volume 1	The IEC 27-27 requires the highest level of protection to be applied to the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).	The protection of the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).	IEC 27-27 requires the highest level of protection to be applied to the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).
Volume 2	The IEC 27-27 requires the highest level of protection to be applied to the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).	The protection of the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).	IEC 27-27 requires the highest level of protection to be applied to the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).
Volume 3	The IEC 27-27 requires the highest level of protection to be applied to the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).	The protection of the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).	IEC 27-27 requires the highest level of protection to be applied to the conductive parts of the electrical equipment and to the conductive parts of the equipment in the bath or shower area (1).

(1) The external surfaces shall have a level of protection which is not less than that of the general public.  
 (2) The external surfaces shall have a level of protection which is not less than that of the general public.  
 (3) The external surfaces shall have a level of protection which is not less than that of the general public.

ROLES OF THE CLASSIFICATION OF VOLUMES.



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TECHNICKÉ  
V PRAZE

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PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
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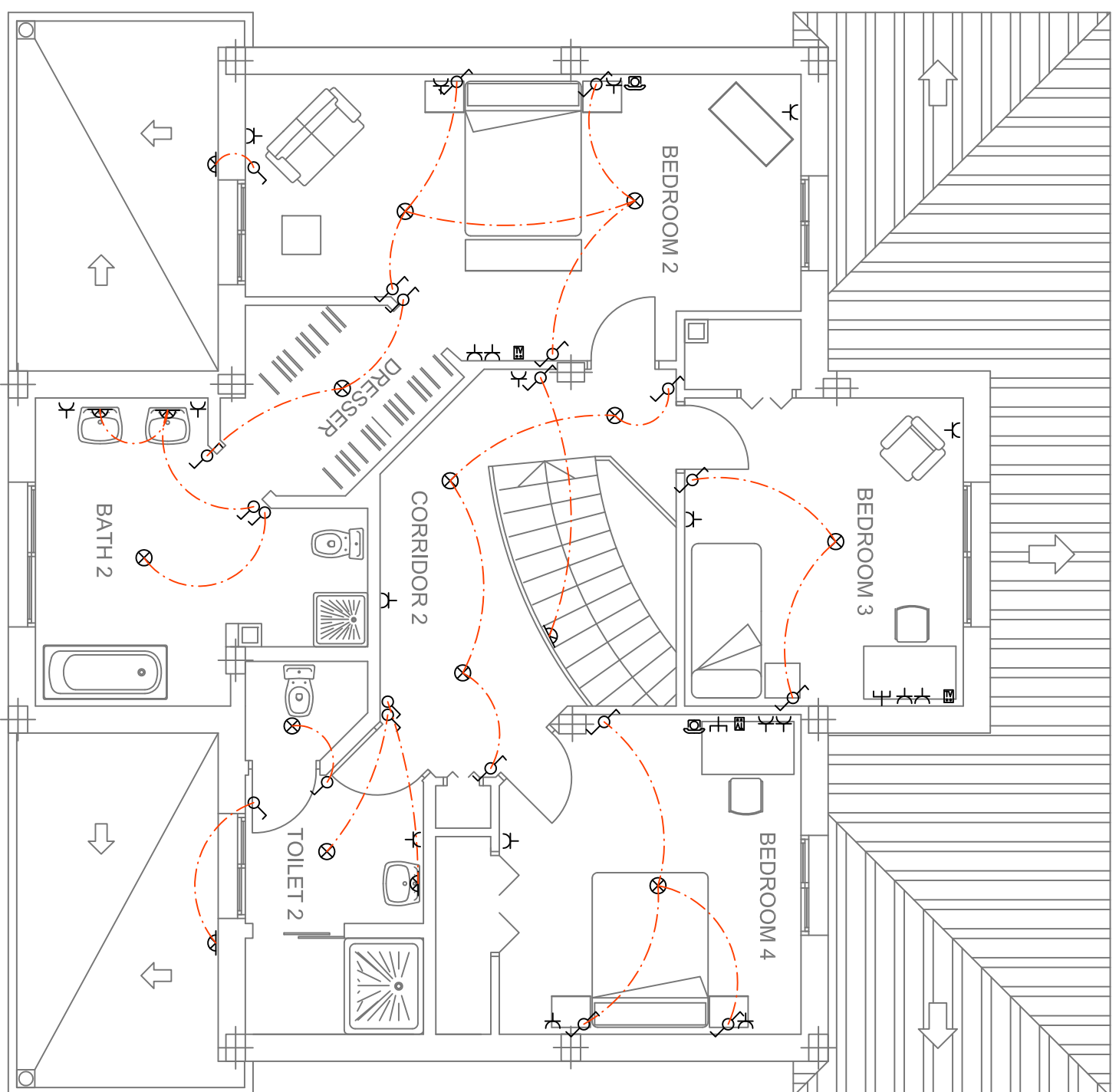
PLAN NAME  
**ELECTRICITY**

SIGN

DATE  
JUNE 2012

SCALE  
1/75

N PLAN  
**34**

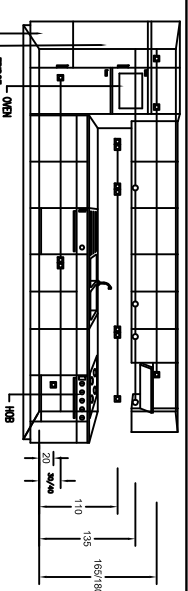


FIRST FLOOR

NOMENCLATURE OF ELECTRICITY

- WALL LAMP
- BLIP
- SWITCH BELL
- BELL
- GENERAL PROTECTION PANEL
- ELECTRICITY METER
- MAIN DISTRIBUTION BOARD
- INTERCOM POINT
- SWITCH
- COMMUNICATOR
- PLUG OF 16A
- PLUG OF 25A
- BASIC TELEPHONE+DIGITAL SERVICES
- TV AND SAT. POINT
- USER ACCESS POINT
- BROAD BAND POINT

LOCATION OF POWER POINTS IN THE KITCHEN



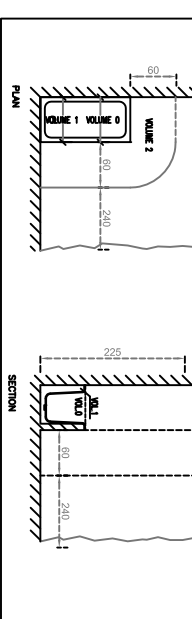
The sockets are placed outside of a volume bounded by vertical planes at 0.25 m from the side and top of appliances.

ELECTRICAL INSTALLATION IN BATHROOMS (ITC-BF-27)

Degree of protection	Cabling	Mechanisms (2)	Other fixtures (3)
Volume 0 IPX0	Isolated by the necessary protection level in the volume.	Not permitted.	Isolated by the necessary protection level in the volume.
Volume 1 IPX1	Not permitted. The degree of protection must be at least IPX2.	Not permitted. The degree of protection must be at least IPX2.	Not permitted. The degree of protection must be at least IPX2.
Volume 2 IPX2	Not permitted. The degree of protection must be at least IPX3.	Not permitted. The degree of protection must be at least IPX3.	Not permitted. The degree of protection must be at least IPX3.
Volume 3 IPX3	Not permitted. The degree of protection must be at least IPX4.	Not permitted. The degree of protection must be at least IPX4.	Not permitted. The degree of protection must be at least IPX4.

(1) The external volume shall have fixed a double, switching, earth contact and shall be done and by the general public.  
 (2) The external switching shall include an element in Volume 1 and 2, provided they meet the requirements of the ITC-CE 0000-1.  
 (3) The switching shall not be installed in any volume, provided other than volume are covered by a protected metal mesh or metal ceiling connected to a fixed supporting means.

ROLES OF THE CLASSIFICATION OF VOLUMES.



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PROJECT : DETACHED HOUSE  
 LOCATION : CARTAGENA, MURCIA (SPAIN)  
 AUTHOR : F. JAVIER GIMENEZ ZANON  
 TUTORS : FRANTISEK KULHANEK / MILAGROS IBORRA

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PLAN NAME  
**ELECTRICITY**

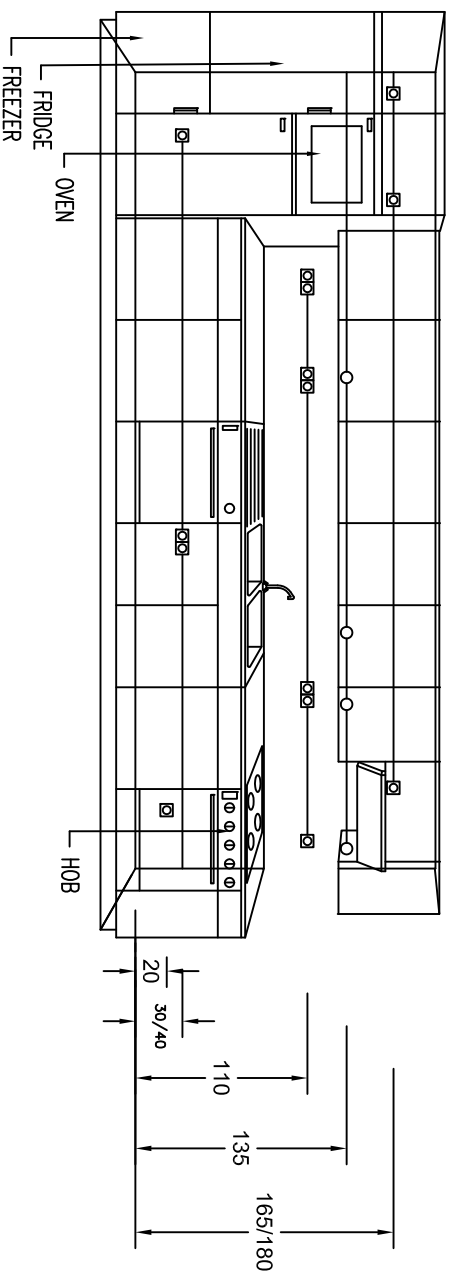
SIGN

DATE  
JUNE 2012

SCALE  
1/75

N PLAN  
**35**

LOCATION OF POWER POINTS IN THE KITCHEN



ELECTRICAL INSTALLATION IN BATHROOMS (IC-BT-27)

Degree of protection	Cabling	Mechanisms (2)	Other fixtures (3)
Volume 0 IPX7.	Limited to that necessary to supply stationary electrical equipment located in this volume.	Not permitted.	Devices can be installed only in volume 0 and must be adapted to the conditions of this volume.
Volume 1 IPX2, above the highest level of a fixed diffuser. IPX5 in electrical equipment and hot tubs in the bathrooms common in that they can produce jets of water for cleaning the same (1).	Limited to that required to power electrical equipment placed in fixed volumes 0 and 1.	Not permitted, with the exception of circuit breakers MBTS fed to a nominal voltage of 12 V ms at 30 V AC or continuously, the power supply being installed outside the 0,1 and 2 volumes.	MBTS powered devices not exceeding 12 V ac or 30 V cc. Water heaters, shower pumps and electrical equipment for spas that meet the applicable standard, if its supply is further protected with a protective device differential current of a value not exceeding 30 mA, according to UNE-20460 4-41.
Volume 2 IPX4, above the highest level of a fixed diffuser. IPX5, in common in that they can produce jets of water during cleaning of them (1).	Limited to that necessary to supply stationary electrical equipment located in the volume 0, 1 and 2, and 3 of the volume located below the tub or shower.	Not permitted, with the exception of switches or buses MBTS circuit whose power supply is installed outside the 0,1 and 2 volumes. It also allows the installation of power supplies of showers that comply with the UNE-EN 60742 or UNE-EN 61556-2-5.	All permitted for volume 1. Lights, fans, heaters and mobile units for spas that meet their applicable standard, if its supply is further protected with a protective device leakage current of a value not exceeding 30 mA, according to UNE 20460-4, 41.
Volume 3 IPX5, in common, when jets of water may occur during the cleaning of them.	Limited to that required to power electrical equipment placed in fixed volumes 0, 1, 2 and 3.	Basis are allowed only if they are protected either by an isolation transformer, or MBTS, or a automatic switch of supply with device differential current protection level not exceeding 30 mA, all as required of UNE 20.460-4-41.	Devices are permitted only if they are protected, either by an isolation transformer or a MBTS, or by a protective device differential current value not exceeding 30 mA, all as required by the UNE 20460-4-41.

- (1): The communal bathrooms include baths found in schools, factories, sports centers and include all those used by the general public.  
 (2): The cordless insulating handle switches are allowed in Volumes 1 and 2, provided they meet the requirements of the UNE-EN 60669-1.  
 (3): The underfloor heating can be installed in any volume, provided under these volumes are covered by a grounded metal mesh or metal casing connected to a local supplementary bonding.

FIGURES OF THE CLASSIFICATION OF VOLUMES.

