

# **DIPLOMA PROJECT**

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**-ROLLA PRODUCTION HALL BUILDING-**



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## 6.1 PROJECT DESCRIPTION

### Hungarian constructive sector

#### **Regulations. Recent changes.**

Nowadays the Hungarian construction law has introduced a reform of building regulations with the mandatory use of the electronic administration of building matters. The objective of this change is to increase flexibility, transparency and authority control in the entire construction process. To get this change a complex application has been designed, Electronic Documentation System (EDS). With this application is useful to implement e-administration of building licensing proceedings, adoption of authority resolutions and communication between authorities and applicants. Simultaneously, a Building Documentation and Information has been set up, and as an interactive subsystem to the central database has been created, the National Building Registry.

One of the changes introduced with this new law is the mandatory use of electronic construction logs. After the registration a single separate e-log is associated with each construction project. The e-log is kept in and initially determines in Hungarian the object and site of construction, the building permit number, the adequacy certificates, and other associated documents.

The building authority automatically puts the e-log in standby mode upon the issuance of a building permit; the standby mode may also be “switched on” electronically by the property owner/developer. Actual e-log application is then activated and opened upon the takeover of the building site by the contractor.

A so-called “main log” section is opened and kept up-to-date by the general contractor in charge, while individual “sub-logs” are kept by each of the sub-contractors. The main log and the sub-logs are further articulated to virtual title pages, registry parts, and summary sheets, as well as associated disclosures, such as: authority notes, fulfilment verification log, subcontractor registry, etc. All e-log chapters remain opened until the contractor leaves the building site post completion.

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The standard procedure to get building licences permitted in Hungary takes both time and costs, with a wide range of situations as shown in the following:

<p><b>Request and obtain certificate of site ownership and site map from the Földhivatal</b></p>		
<p>Land <i>Agency</i>: Földhivatal</p>	<p>1 day</p>	<p>HUF 10,000</p>
<p><sup>1</sup> The site map is obtained by BuildCo. The site ownership certificate can be obtained either by BuildCo or by the local construction authority. The authorities have introduced an electronic application and database and internal administrative processes have become more efficient.</p>	<p>45 days</p>	<p>HUF 105,000</p>
<p><b>Request and obtain construction license</b></p>		
<p><sup>2</sup> <i>Agency</i>: Municipality</p>		
<p><b>Receive on-site inspection from the Municipality</b></p>	<p>1 day</p>	<p>no charge</p>
<p><i>Agency</i>: Municipality</p>		
<p><sup>*3</sup> BuildCo does not have to request the inspection. After the construction license is obtained, the local construction authority decides when it will conduct the inspection. In general, for smaller scale projects, the inspection may never even take place.</p>	<p>1 day</p>	<p>no charge</p>
<p><b>Receive on-site inspection from the Municipality</b></p>		
<p><i>Agency</i>: Municipality</p>		
<p><sup>*4</sup> The inspection may take place anytime during the construction cycle. BuildCo does not have to request it.</p>	<p>1 day</p>	<p>no charge</p>
<p><b>Request an authorization from the water authorities</b></p>		
<p><i>Agency</i>: Budapest Water Company</p>		
<p><sup>*5</sup> A written authorization from the water utility must be obtained. The authorization must be obtained before the construction license is issued, but it can be processed simultaneously with the construction license.</p>	<p>1 day</p>	<p>no charge</p>
<p><b>Request an authorization from the sewage authorities</b></p>		
<p><i>Agency</i>: Sewage Works</p>		
<p><sup>*6</sup> A written authorization from the sewerage utility must be obtained. The authorization must be obtained before the construction license is</p>		

	issued, but it can be processed simultaneously with the construction license.		
* 7	<b>Receive inspection from the water authorities</b> <i>Agency: Budapest Water Company</i>	1 day	no charge
* 8	<b>Receive inspection from the sewage authorities</b> <i>Agency: Sewage Works</i>	1 day	no charge
* 9	<b>Obtain authorization from the water authorities</b> <i>Agency: Budapest Water Company</i>	29 days	no charge
* 10	<b>Obtain authorization from the sewage authorities</b> <i>Agency: Sewage Works</i>	29 days	no charge
	<b>Request and obtain fire protection authorization</b> <i>Agency: Fire Authority</i>		
* 11	The architectural plans contain the fire protection statement, which must be approved by the Fire Department. The authorization must be obtained before the construction license is issued, but it can be processed simultaneously with the construction license. <b>Provide evidence of the availability of a licensed site manager and notify authorities about commencement of construction</b> <i>Agency: County Government Office</i>	30 days	no charge
	BuildCo is required to submit all documents 15 days prior to the start of the construction. The Public Works Authority may require BuildCo to pay a regular fee to the public network (e.g., sewerage) to cover operational costs. The construction authority may conduct an inspection at any stage.		
* 12	If the value of any construction project exceeds HUF 30 million, BuildCo must notify the County Government Office of its intention to start construction. The Regional Administrative Office must either approve or disapprove the start of construction. The office has authority over the participants, their liability, the construction license, the state of the neighboring buildings (which must be documented), and provides information to the tax authority (to curb unauthorized activity) and to the local authority. <b>Request and obtain letter from Tax Authority</b> <i>Agency: Tax Authority</i>	5 days	no charge
* 13	Beginning in 2005, data reporting to the Tax Authority is required for all construction projects valued at more than HUF 10 million. BuildCo submits a letter to the Tax Authority along with the application for a construction license.	30 days	no charge

	<p>If the value of the construction project is above HUF 10 million, the local authority informs the following institutions:</p> <ul style="list-style-type: none"> <li>• Tax Authority</li> <li>• Construction Authority (for quality control)</li> <li>• Labor Authority (to control the informal economy)</li> </ul>		
* 14	<p><b>Request and receive connection to the sewerage network</b> <i>Agency: Sewage Works</i></p>	21 days	no charge
* 15	<p><b>Contact a registered technician to set up sewerage system</b> <i>Agency: Registered Technician</i></p> <p><b>Request water connection</b> <i>Agency: Budapest Water Company</i></p>	1 day	no charge
* 16	<p>The water connection consists of two parts: the on-site part (which must be done by a registered technician) and the off-site part (which is the connection from the existing utility to the on-site part). BuildCo must contact the people in charge of each part separately.</p>	1 day	HUF 100,000
	<p>The cost depends on the position of the building (distance from the source, local situation, etc.). Costs are specific to each case, depending on the expenditures involved.</p>		
17	<p><b>Contact a registered technician to set up water connection</b> <i>Agency: Registered Technician</i></p>	1 day	no charge
18	<p><b>Receive on-site inspection to check on the cleanliness for water connection</b> <i>Agency: Budapest Water Company</i></p>	1 day	no charge
	<p>The inspection is requested when the connection is requested.</p>		
19	<p><b>Receive connection to water</b> <i>Agency: Budapest Water Company</i></p> <p><b>Notify authorities of the completion of construction</b> <i>Agency: Municipality</i></p>	10 days	no charge
20	<p>When the building is completed and the Municipality has been notified, BuildCo must arrange for a site inspection by the municipal experts; water, electricity, and sewerage providers; and the Fire Department.</p>	1 day	no charge
	<p>After the on-site inspection, all the inspectors must declare that the building has been completed in compliance with the technical plans or identify any unfinished work. If there is unfinished work, the deadline for completion must be stated in a document. After completion, the</p>		

authority issues the occupancy permit.

<sup>21</sup> **Receive final inspection**

*Agency:* Municipality

**Obtain occupancy permit**

*Agency:* Municipality

<sup>22</sup>

The fee for the Occupancy Certificate is the same as the cost of obtaining the building permit.

**Register the building with the Land Registry Office**

*Agency:* Land Registry Office

BuildCo must submit a “realization plan” to the Land Registry Office to register the new building and the owner’s name on the official site map. In small villages, registration takes 30 days; in big cities and especially in the capital, registration might take from 30 days to 4 years, depending on the specifications of the lot. There is no registration fee, but there is the cost of a lawyer’s services (HUF 15,000.00), although the company’s in-house lawyer may handle the process.

1 day	no charge
30 days	HUF 105,000

### Economy on the present

The actual economical state in Hungary is quite difficult right now, far to be out of the remarked crisis, which has affect all over the world. However, nowadays we could see the economical state of the country is getting better every year. Actually, the Hungarian economy got an economical increase of 1,1% in 2013, which has been increased a 2,3% more in 2014 and which is expected will be increased another 2% in 2015.

Based on the book “Doing Business” we can easily compare the Hungarian economy with the economies of other countries. For example, after the economic analysis of "Doing Business", Hungary is classified on a rank a little bit over the average, which means it’s one of the countries with more potential of east Europe.

With this analysis, we even have the chance to check the economical increase has been produced in Hungary on last year. The number of new business has been doubled and the percentage of income per capita is 5 times higher in 2015 than in 2014.



Unfortunately we can't feel this improvement on the construction sector as big as on the other areas as long as the economy of the country is based on the industrial and service sector mainly. But the important point is the investment on Hungarian companies produced around 65.000 million of Euros, and on the last years, both sectors have felt an accelerated increased. That fact is shaking and boosting the economy in Hungary, and sooner or later this improvement will be palpable as well on the construction sector if Hungary goes on working on the right direction.

## Investor History: Futureal

Futureal is a leading real estate developer and investor in Central and Eastern European property market, situated the 22nd of the top biggest real estate developers in Europe according to Property EU 2013.

This enterprise has completed several projects during the course of the recent financial crisis. The countries that Futureal has most taken part to invest are Hungary, Poland, Czech Republic, Slovakia, Austria, Germany, Serbia, Romania.

Over and above the financial investment, Futureal contributes with substantial added value to the success of the projects, bringing its experience in leasing, design, engineering and funding to the table.

Some of its relevant projects, which covers either residential and office as well as urban, being ran currently by Futureal are:

### -VISION TOWERS OFFICES

This office is located in one of the most popular business areas of central Budapest, the Váci út corridor (corner Váci road and Dózsa György road) that represents the largest office submarket in the city. The three towers have different heights and slightly different facades, various green building solutions and very ergonomic and effective floor layouts for offices, storages and parking places.



## -CONCORDIA PARK RESIDENCE I

This area containing an enormous green inner yard, is the construction of its latest residential building, located in the heart of the city in Nagytemplom útca and including 227 apartments expected to be handed over at the end of 2015. The speciality of Cordia Park Residence flats is the Corvin Promenade itself, where you can enjoy all the advantages of a brand-new service environment.



## -CORVIN CITY REGENERATION

The Corvin City Regeneration, known as the Corvin Szigony Project, is considered to be the largest urban regeneration project in CEE over 22 acres in the center of Budapest. Altogether 500 thousand square meters newly built area out of which 250 thousand square meters is currently under development.



### Location of present construction

Rolla Production Hall Building takes place for construction activity at 2310 Szigetszentmiklós, street Petofi S. 137, 12902/19. u. The building land belongs to Gksz-06 zone (industrial area).



### Typology and Function Building

The planned new production hall and office building for the Rolla Project, was just started after the previous hall building was finished and which is currently in use. It was decided specifically to incorporate Rolla's windows and doors designs made of aluminum profiles, consisting for the industrial shed in concrete stanchions with concrete block walls in its perimeter and corrugated steel sheets for the deck. By the other side, curtain walls with its pertinent steel framed structure, welded all itself and consisting in steel angles and bracing for its lifting.

This planned hall basically has two distinctive and separate functions, being on one hand production and warehousing whereas on the other it is used as an office in terms of trading and more into a social block.

### Plan for Building needs

The planned activities and its developed dimensions decided for this new production hall and office building were based on its significant influence on the demand for space technology to be placed inside it.

The design of the hall space was strictly planned to follow the noise sound-proof isolation, in first place, so that it could cope with the double function it was built for, both administrative and work atmosphere for the offices and the manufacturing and warehousing for the industrial shed.

On other side, considering the service road facing part of the building will be located on the ground floor to create the entrance for the sales offices and social service block. Separated from these, workers formed the background for the entry, where the changing rooms and corridors are opened. The planned hall will be located in an air space of the gallery and showrooms are at the upstairs offices and server installations.

The two separate parts of the fire section are connected by a fire door, following and considering all regulations figured at the OTEK in terms of accessibility and fire protection.

The land vehicle approaches before passing the parcel service road done, which is connected to the Petofi Sandor road. The plot is approximately flat, fact that is considered unnecessary for a major landscaping.

The installation mode is free standing and the maximum allowable building height of 6-12 m be the maximum permissible built-up rate covers the 40%, as for the smallest rate of 20% green space.

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## 6.2 DIMENSIONAL ANALYSIS

General surface features Hall Building:

BUILDING FEATURES		
Zoning	Gksz-06	
Mounting Type	Detached	
Installation percent max .	40%	
Green Surface indicator min .	20%	
Building Height	6-12 m	
Land area	12,068 m <sup>2</sup>	
Built area	4823 m <sup>2</sup>	
Installation percent	4823m <sup>2</sup> / 12068m <sup>2</sup> = 39.96% <40% MEETS	
Surface Green indicator	29.22% > 20% MEETS	
USEFUL BASIC AREAS		
<b>GROUND FLOOR :</b>		
office block	504.58 m <sup>2</sup>	
Production hall building	4164,72m <sup>2</sup>	
Ground floor total	4,669.30 m <sup>2</sup>	
<b>FIRST FLOOR:</b>		
office block	394.20 m <sup>2</sup>	
<b>TOTAL USABLE AREA</b> building	5,063.50 m <sup>2</sup>	
BUILDING OUTLINE LEVELS		
Flooring Line	± 0,00 m +3.30 m	
Pavement Line	-0.02 -0.30 m M <sub>-</sub>	
Building height	9.34 m = 2790m <sup>2</sup> / 298,80 6m <9.34 <12m MEET	
FACADE	SURFACE	DISTRICT
North-east	528m <sup>2</sup>	54.71
	51m <sup>2</sup>	6.05
	44 m <sup>2</sup>	3.86
North-West	348m <sup>2</sup>	36.05
	166m <sup>2</sup>	16.56
	161m <sup>2</sup>	20.58
	107m <sup>2</sup>	11.52
South-east	816m <sup>2</sup>	84,80
South-West	413m <sup>2</sup>	42.80
	55 m <sup>2</sup>	5.67
	101 m <sup>2</sup>	16.20
<b>TOTAL</b>	2 790 298,80 m <sup>2</sup>	

## Ground floor surfaces Hall Building:

Spaces number	Room name	Coverage	Area m2
<b>GROUND FLOOR</b>			
F-01	Vestibule	Tiles	176,10
F-02	Archives	Tiles	36,61
F-03	Sales office	Tiles	84,77
F-04	Conference room	Laminate	25,23
F-05	Production manager / shift leaders OFFICE	Laminate	16,49
F-06	Personnel dining	Tiles	29,99
F-07	Communicating	Tiles	52,88
F-08	Women's showers	Tiles	2,98
F-09	Women's WC	Tiles	1,44
F-10	Cleaning room	Tiles	1,86
F-11	Men's showers	Tiles	4,43
F-12	Men's WC	Tiles	6,4
F-13	Women's showers	Tiles	1,98
F-14	Women's locker rooms	Tiles	5,84
F-15	Women's showers	Tiles	3,73
F-16	Men's lobby	Tiles	2,63
F-17	Men's Dressing Room	Tiles	28,81
F-18	Men's shower	Tiles	10,15
F-19	Men's WC	Tiles	1,57
F-20	Women's WC	Tiles	1,75
F-21	Women lobby	Tiles	2,31
F-22	Men's lobby	Tiles	2,2
F-23	Men's WC	Tiles	3,72
F-24	Men's WC	concrete floor	1041,72
F-25	Raw material warehouse	concrete floor	606,49
F-26	Assembly Square	concrete floor	1964,64
F-27	Finished goods warehouse	concrete floor	551,87
Ground position:			4668,59

## First floor surfaces Hall Building:

Spaces number	Room name	Coverage	Area m2
<b>FIRST FLOOR</b>			
E-01	Designers	Tiles	196,82
E-02	Office	Laminate	47,49
E-03	Office	Laminate	59,11
E-04	Dining room	Tiles	28,04
E-05	Navigating	Tiles	27,34
E-06	Staircase	Tiles	15,2
E-07	Men's WC	Tiles	6,04
E-08	Storage room	Tiles	1,61
E-09	Women's WC	Tiles	6,43
E-10	Mechanical Engineering	Tiles	8,42
E-11	Servers	Conductive floor	5,05
E-12	Kitchen	Tiles	1,69
First floor position:			403,24
<b>GRAND TOTAL :</b>			<b>5071,83 m2</b>

### **6.3 BUILDING REGULATIONS. OTEK.**

Rolla Production Hall Building has been materialised following closely on what attends to the different features recompiled on the OTEK (Országos településrendezési és építési követelményekről) in order to make from it a safe building that legally complies with the Hungarian regulations for its approval.

With this objective, our building should satisfy a list of requirements concerning the following points:

- Planning: Building height, minimum green surface, heritage protection and technical requirements.
- Protection: Safe protection, work and use safety, load bearing capacity and heather resistance.
- Material: Material quality with the proper testing.
- Construction: Energy consumption, use performances and endurance requirements.
- Standard requirements: Documentation requirements and process protocol.

In the following, are including the most relevant regulations with its features, that figures in the below mentioned OTEK and that meet with the requirements of our building hall project under study:

#### **Acoustic**

Protection against noise and vibration of the construction works and parts, structures must be designed and implemented to the environment by noise and vibration effects (eg. Seismic and traffic vibration influences) the required resistance to, or would allay the extent specified.

The construction works and parts of units which, premises will be carried out to the building materials, building structures and fixed fixtures should be selected and installed that generated by the intended use of noise and vibration impact of the building's premises, spaces, and the proper use of the external

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environment is not hindered, the prescribed rate increased noise and vibration impact not charged, and comply with appropriate legislation and standards requirements.

### **Thermal**

The parts of the structure that will be designed and implemented for the construction product is selected and installed to the proper and safe use of energy required to a minimum. The possibility of the use of energy from renewable energy sources in the planning program, it will be in all cases examined.

Referring to the building envelope structures and building systems - combined to ensure the premises are suitable for its intended and required ventilation - according to the energy, thermal and fire protection regulations.

### **Habitability**

Separate destination unit for the residential purposes of permanent residence, whose residential premises (living room, dining room etc), cooking premises (kitchen, kitchenette), health premises (toilet, sink, shower, toilet), hallway premises ( hall, lobby, entrance, vestibule, hallway, corridor), and storage premises (storage room, greenery room, storage room etc) must be designed so that they can jointly enable:

- a) the rest (sleep) and the continued activities of the home,
- b) cooking, washing dishes and meals,
- c) of clean, washing the toilet use,
- d) the storage of materials and objects necessary lifestyle design program (eg. food storage, placement opportunity refrigerators, equipment, clothing, housing maintenance tools, other tools and sports equipment for the purpose of positioning the wash).

The living room of the apartment for any purpose of direct natural light and ventilation, heating, permanent residence, of at least 8 m<sup>2</sup> usable area of premises that will allow activities to continue under paragraph (1) a) - with the exception of work for income acquisition - and related equipment placement.

The usable area of 337 m<sup>2</sup> and 30 apartments with a living room with a minimum useful floor area must be at least 16 m<sup>2</sup>. And into the living room

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space there shall not be counted for the purpose of cooking and the dining room also features, part of the usable area of space where the living room have zones in common.

Must be the housing heated, preferably in every room to be adequate for its intended ventilation, natural lighting provided.

### **Fire protection**


The fire safety of the construction works and parts of units which, premises will be carried out for the construction materials, building design and built-in equipment must be selected and installed that may arise in case of fire:

- a) Their stability is maintained in the prescribed time,
- b) 169 fire and smoke generation and spread is limited,
- c) the fire to neighbouring units which, structures preferably not spread further,
- d) those who leave the structure in the works within the stipulated time or opportunity to be rescued by a technically assured,
- e) the activities of rescue units and be provided with a safe.

### **Accessibility**

The accessibility of the building should be accessible to the way they have been designed. Wheelchair and prams can be designed to be accessible for public use buildings. Even the slope will be made to ensure the approach ramps, it must be designed in such a way as to achieve at least 1,5x1,5 m horizontal and should be at an open space.

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## 6.4 STUDY AND ANALYSIS OF CONSTRUCTING ELEMENTS

Rolla Production Hall Building counts on a wide range of different materials that have been used and chosen attending to both, legal regulations and the variations of structural health, durability and exposure parameters, depending on the specifically context each constructive element suffers.

Fireproof and isolation matters, as well as the environmental are decisive to select these materials, which are not included in the known technical parameters but in the legal ones, in terms of health and safety, as for social and contaminating limits that must be also respected and not exceeded.

### Foundation

Under the proposed building blocks exist concrete foundations, which are composed of two layers of different concrete quality, made from lean concrete on the inferior layer and reinforced on the top one. Precast concrete shall be placed before the prefabricated block chalice funds, under the top layer of concrete construction for columns. During the two-layer wall structures, the arrangement of the reinforced footings funds is practically the same. Foundation and support structure are built according to the exact design of the static work parts.

Applied material qualities:

- Fill concrete C12 / 15 X0b (H) -32 + F2 sulphate resistant cement
- Chalice Fund concrete : C25 / 30 XA1-16 -F3
- Precast concrete chalice neck : C30 / 37 -F4 XA1-16
  
- Reinforcement : S500B

### Substructure

The hall building structures of the ascending part constructed as funds are 50/50, 50/40, and 50/30 cm reinforced concrete stanchions. The columns of 18x18 and 18x12 made as girts, offshore six columns along the facades. The roof

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consists in 6 m supported by precast prestressed concrete T-beams, shall ensure that 18 m span are up to 120 cm primary frames. The building will be built in the stiffness of 20/45 cm precast face edge. The sub-floor hall gravel is planted 30 cm to 16 cm of thick steel hair consisting on the main concrete floor slab.

The centre part of the ground floor houses 35cm diameter made from reinforced concrete pillars leaning 20 cm thick on the reinforced concrete slab dealers 6m span.

The building itself is designed without columns on the gallery level and the lobby holds a lamellar structure with spinal column steel frame HEA 360 design, with the panel edges meeting the stanchion sections with HEA 200 frames provided.

The office is part of the floor structure, provided of 15 cm thick reinforced liners.

Applied material qualities:

- Ground floor plate: C30 / 37 XC2-XK1 (H) -16-F3.
- Office space reinforced substrates: C25 / 30 XC2-16-F3.
- Prefabricated base: Concrete: C30 / 37-F4 XC2-16.

Reinforcement: S500B.

- Reinforced concrete pillars / columns in concrete: C25 / 30 XC1-16-F3.

Precast concrete C30 / 37-XC2-16-F4.

Reinforcement: S500B.

- Horizontal load-bearing structures: Monolithic Concrete: C25 / 30 XC1-16-F3.

Precast concrete C30 / 37-XC1-16-F4.

Prestressed Precast Concrete: C40 / 50-XC1-16-F4.

Reinforcement: S500B.

Strand: Fp100 / 1770 R2.

- The outer and inner layers of backfill to be compressed = 90% degree of compactness.
- Steel S235 (according to EN 10025).

### **Masonry, lintels**

In fire and prescribed fire cross, the line distance between infill walls are made of prefabricated concrete pillars Silka HML 300 NF + GT Porotherm 38, a ceramic tile, made of 30cm thick (333x199x300mm) Ytong masonry that exports joints of 2-3 mm of thickness. The bricklaying works the corners and doors starting from the element's minimum 12,5 cm bond and during the entire first fugue Ytong masonry openings.

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Below the line 2 is D8, which consists in a ribbed surface and it is called as steel rods. It is provided sill reinforcement and the iron shall be drawn up in the slot at the side of 80-80cm-inch overhanging. The masonry fill openings are created to bridge damper elements being used. The minimum bearing length of the bridge beams 20-20 cm should be below the contact surface element when possible, but at least at the line below the bridge abutment surface of the bearing length to avoid falling vertical joints.

The elements of the "U" connected to each other on both sides by mortar of the formwork elements must be supported before concreting or the grid must be connected.

Silka masonry 10cm Front Rock Rockwool RP-PT resin bonded, plastered and the total cross-section of the repellent is non-combustible rock wool, with sound and thermal insulation properties due.

Bulkheads inside the hall is part of Kingspan 1150TL PIR foam-filled, looking mount or wall panel are arranged around a heavy machining parts KS1150 FA 100 soundproof wall panel. Among the interiors KS1000 WL38 as cellular polycarbonate skylight panels are made with hidden fixing.

### **Roof structure**

The hall and the office building area are both the typology of flat roofing. Precast reinforced concrete purlins are placed 6 m span 150/280 / 0.88 trapezoidal steel. The trapezoidal adhesive sheet Mapeplan VB Pe working as a vapor barrier, then also 2x8cm thick Rockwool insulation Monrock MAX. By other side, the slope corrects elements to make the horizontal valley point slope shall apply. The insulation panels need to fix Polydren 120g PP film. The waterproofing Mapeplan M15 PVC sheet insulation ensures mechanical lock, and the air welding at hot laps.

### **Skylights and smoke vents**

The hall is part of a building point skylight, as well as heat and smoke control domes are made for this purpose. Hexasteel MoP 100/200's size plastic with insulation attached, insulated plastic domes footing, wind deflector plate and an opening angle of 170°. The heat and smoke control function panels are installed within cartridge design, the engine is to be opened, pike can be suitable ventilation design. Opener heat and smoke control functions of the fire alarm system signalling and fire that can able to control room. On other side, the ventilation function and switch are manually leader. The skylights Hexasteel

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round domes has a hard finishing. The trigger hollow domes are made under static framework plan.

Piecewise fire smoke signal are placed in vertical surfaces (windows) to ensure the supply of fresh air. These counter-stressed structures, fire signal (but no other damage in case of a power failure) are fixed electromagnetic for the locks opening.

### **Assembled structures**

The building consists in a dry KNAUF system. According to the expected loads and the choice and used building, plating properties are according to 12.5 cm thick. Also metal framed building drywall partitions plated are made of a single support frame, twice two layers of drywall construction panel cover Knauf W112 marked partition CW 75 support frame, UA profiles necessary for doors and installation of 2 × 2 layers of 12.5 mm thick.

Standard drywall (A13) and impregnated with plaster (HA13) building plate. EI 60, R'w = 49 dB (partitions each case, the necessary technical aids fitted joints and screw heads, base assembly into thermal insulation, an appropriate level of sound insulation 5 cm thick. 40 kg / m<sup>3</sup> density mineral fibre insulation ensures the internal rib density distribution as a function of the height should be in accordance with the requirements of the system used.

### **Plumbing ballast walls:**

10 cm of thickness Drywall metal framed and building clad mounting plate front walls are made of a single support frame, once two layers of drywall construction panel cover Knauf W623 CW signal front wall support frame 75, 1 × 12.5 mm thick 2rtg impregnated plaster (HA13) building plate.

Mounted partitions: The water blocks mounted partitions made by:

LTT-Oy elapsed Ab system was mounted partition, according to the type of natural grey anodized aluminium profiles, floor height adjustable stand, wall anchor lock, top seal profiles by type, 24mm thick laminated chipboard, choice of colours and decorative head screws by type.

### **Ceilings**

Dry building is KNAUF system.

Monolithic ceiling:

KNAUF gypsum construction panel is coated monolithic ceiling; CD50 / 27 with frame, 50 cm fin spacing, slab attached or suspended slab, a layer of 12.5 mm

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thick sheet covering normal drywall construction, finish, impregnated wet rooms, equipped with the necessary technical aids, joints and screw heads sites. The man in the locker room ceiling main support frame, shall be designed to be above the ventilation openings to the drop-down fixer.

#### Applied ceiling types:

AK1 - public traffic / road: AMF Star Classic suspended ceiling is exposed, L trim section, 15 mm in width foot forward and cross-device pads mineral material placement, 60x60 cm increments, 60x60x1,5 cm removable panels. SK Edge Detail, white.

K2 - offices / meeting: AMF Thermofon acoustic exposed suspended ceilings made from L trim section, 15 mm base width of main and cross-device pads mineral material placement, 60x60 cm increments, 60x60x1,5 cm removable panels; SK-edge finish, white.

AK3 - wet-plan rooms: AMF Cleanactive hygiene suspended ceiling is exposed, L trim section, 15 mm in width foot forward and cross-device pads mineral material placement, 60x60 cm increments, 60x60x1,5 cm removable panels; SK Edge Detail, white.

#### Coverage

##### Doormat:

Mud mat placement of the main entrance, 20mm aluminium frame enclosed inset, pivotally connected with extruded aluminium metal slats, removable fabric strips assembled foot grille insert, the textile surface Rolla logo 2,00x1,00 m in size, Cleartex make ALUTREND Mini Dry - branded mat treads: Set textile fibre surface mounting depth 21mm.

##### Tiling:

The building's interior spaces generally made of ceramic flooring. The public traffic areas, high wear resistant ceramic tiles, the aqueous spaces non-slip tiles, water "C" rating anti-skidding. Cold feet of coatings made of same material. The wet room is with tiles up to a height of 2.40 m.

##### Applied flooring types:

Traffic on the production floor Marazzi audience System B tinted 10mm thick cut stone porcelain stoneware plate, putting mesh, sheet size 60x60cm. Sanitary flooring 'C' wet-slip rating, putting mesh, sheet size 30x30cm, wall coloured

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porcelain stoneware 10 mm thick plate, satin-polished surface, mesh packed, page size 30x60cm, Solid trimming. The mechanical room and archives are Zalakerámia floor and wall covering gets.

Used in adhesives, grouts:

Surface preparation, coating, and substrate structure Mapei Eco Prim Grip acrylic resin-based; it contains silica sand in aqueous dispersion. Foundation (general area), and Mapei ULTRAPLAN equalizer (wet areas) happens. Walls and flooring in Mapei Keraflex S1 flexible adhesive and grout grouting Keraflexy prepared.

Hot Housing:

In offices, highly wear-resistant and scratch-resistant (strong wear resistance class (AC4, AC5), laminate flooring is made of chipped click system without gluing, 10 mm thick, poly foam underlay felt 10 inches tall hardwood legs. Specifically, quality and colour later agreed.

Levelling floor:

In the hall floor is made of structural steel in concrete hairy crusty surface 2rtg PE foil insulation. The hall space highly stressed wear-resistant concrete material Mastertop® 400 K. The 400 K MASTERTOP monolithic concrete is ready for use, and cement containing corundum abrasives. 4mm thickness applied.

Outdoor enclosures:

The building sidewalks and paved surfaces are around 20 × 20 × 6 cm thick. SEMMELROCK pastel pavement elements fine grit of 4 cm thick, laid on sand bedding layer of 20 cm thick sand-gravel are the planted supporting layer. The borders of the palisades of the system are made thin concrete ballast bed. The lawn grid pavement for parking and asphalt roads follow the construction according to plan.

Internal doors

Enclosing frame made by Novoferm pressed steel door frames for internal placement of 12.5 cm thick plasterboard wall structure and Kingspan 1150TL wall panel and pressed steel plate is subsequently an anchor mason corner frame-mounted by variable sizes, T60 finish.

Placing interior door panels Westag Portalit holes, pushed or solid chipboard door panels, HPL laminate, and Novoferm Elite boxed fireproof door panels of galvanized sheet steel, T60 finish, variable dimensions, fitting with handle.

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Where necessary a lock needs fixing or sealing, should be covered the gap by type.

Fireproof doors open towards escape sense. Door of movements by type, firm electromagnetic switches are open, fire signal automatically closes the door, with automatic threshold, T60 finish.

Basic NovoSpeed indoors and interior doors are made fastened. The bottom edge is aluminium and rubber profile safety sensor which is connected.

In the hall between the automatic phase 2 smokes, smoke-pop apron will be located:

Make: PROTEX 600 tissue

Tissue thickness: 0.5 mm +/- 5%

Weight: 600 g / m<sup>2</sup> +/- 5%

Smoke Apron closing speed of 0.15 m / s

Operating temperature: 600 ° C / 60 min

Reaction to fire: A2, according to EN 13823

Temperature / time classes: D120, DH30 EN 13501-2

### **Front doors**

Automatic entrance doors will be opening with wicket panic device equipped with smoke signal which is automatically opened. Sliding doors GEZE Slim drive SL-FR, 70 mm of movements, two motor design with powder-coated, 2rétegű heat reflective glazing ( $U_g = 1.0 \text{ W / m}^2\text{K}$ ), it is necessary bonding, sealing, covering the gap, reinforcement according to type of door wings VSG, composed by laminated safety glass.

Aluminium structure curtain walls are made SCHÜCO FW 50+ and SCHÜCO FW 60+ (office space curtain walls – with consignment stated) exposed to thermal break aluminium profile rib system profile frame and wing structure, powder-coated, thermal insulation (reflective tempered ESG and glued laminated safety glass) glazing (10 + 20 + 4.4.2 mm  $U_g = 1.1 \text{ W / m}^2\text{K}$ ,  $R_w = 32\text{db}$ ) necessary bonding, sealing, by type of reinforcement, concrete floors, ceilings, attached to aluminium frames with stainless fasteners. Required areas of thick-walled steel RHS will be provided with hollow rings as unique designs.

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Aluminium doors and portals are made with thermal break SCHÜCO AWS 60 SCHÜCO ADS 60 profile frame and wing structure, powder-coated, 2 insulating glazing ( $U_g = 1.1 \text{ W / m}^2\text{K}$ ), required fixing, sealing and reinforcement according to type of door wings VSG.

The lobby area fire signal flaps are made of pressurised structures, fire alarm system integrated.

Exterior doors made from Novoferm coated pressed steel corner frame, GAE-D rebated on three sides, 50 mm rock wool inserts 0.88 mm galvanized sheet steel clad plate structure made of hardware with lever handle, where necessary lock needed fixing and sealing as well as covering the gaps with type when is needed.

The hall building is part of Thermo 45 Novoferm insulated double-shell session marinated industrial doors are made of sheet metal, machine design, custom-made interior, moving up security grille.

### **Front finishes**

The facade of the building has a metallic armament and Kingspan insulated panels made of 10 cm thick. The hall is part of Kingspan 1150TL PIR foam-filled and is placed vertically to a height of 3.65 m, above the horizontal design. Upper panels Drag T160.80.5 and the columns extension of steel section happens to be positioned as m-6. The vertical and horizontal panels of change 120.100.4 are steel hollow beam and L140.100.4 gauge steel panels, which will be installed on the gripping. It will be dragged the vertical through the lower panel prefabricated base to be placed in a closed steel section L80.60.4 in case slip occurs.

The office building will be placed in the area with Kingspan 1000FH 10cm thick mineral wool-filled, hidden wall panel-mount, counting on a horizontal design.

After the pre-cast concrete plinth sandwich Baumit contact surface preparation with Baumit Mosaic get resin bonded with a plaster base. The forward-looking exterior components manufactured by BASF after Prince Colour Multi Top HYDROFOB impregnating and primer Prince Colour Multi Top-repellent, with high opacity received silicone resin for the facade painting.

Facade made of steel structure design elements (logos, captions) based on a specific product plans, and 7.00 m high steel are placed in 3-bearer bars. Made according to plan and front facade colors and textures

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### Metal structures

The rails mounted with galvanized powder and coated steel structures with bolted joints. QUICKRAIL kind of brushed stainless steel effect, brushed anodized aluminium column with a few external plane fixed 4 + 4 mm tempered, laminated safety with glass fields and columns D42,4 mm handrails. The railing posts by its type soles are recorded in two M8 dowels, handrail with a height of 1.00 m.

Necessary horizontal flat roof areas of the sandwich panel and gauge steel gripping T160.80.5, with the columns extension placement at 6.0 meters. Sandwich panels gauge steel top drag L80.80.3 placement.

### Finishes

Sealers will be place at interior walls and ceilings previously of being painted.

#### Interior painting:

Painting will be putted in two layers, previously in prepared wall, with surface cleaning, washing of and adhesive plaster if needed, horizontal and vertical smooth plaster, drywall surface, as interior wall paint. The interior walls and ceilings, will consist on a vapour barrier and an inhibit mould in humid areas with other areas breathable and anti-mould agent and painted. Over the two layers of the ceiling painting is required purity.

#### Metal ware:

Indoor and outdoor steel structures are for the interior and exterior steel doors and frames.

Steel structures painting of fire are retardant elements T45 fire resistance limit of insurance, Char 21 (P.280), diluted with water, white, intumescent fire protective paint.

Fire limit: 45 minutes (R 45).

Application quantity (total dry film thickness) 1450 microns.

Application quantity: only fire protective paint 2217 g / m<sup>2</sup> g / m<sup>2</sup>.

Water-based, intumescent fire protective paint, metal surface, fire protection of steel surfaces: indoor and outdoor use airless spray application CHAR 21 by applying a primer: Suitable primers: Primer Tema Euro, or GPL TEMACOAT S Tikkurila called primary products, 40-60 microns thick layer / layers.

According to recommend protective paint as RAL table of 48 or P Sestriere products called AK 58 per layer: 50-80 microns.

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Flashing:

Kingspan trapezoidal sheet covers the steel rain gutter drainage system. Gutters of  $\varnothing 120$  diameter used 80 inflow stub diameter for drainage channels, with additional fastening elements within the system together.

The building tinker edges are made with Kingspan system. Making skirting edge prefabricated structure fixed to 25 cm in width unfolded. Covering the two waters attic finished by a Kingspan sheet, with general location of 30 cm and 60 cm fireproof walls spread out wide.

Custom contoured profile of 2 mm thick of aluminium sheet bluish grey colour, in addition to horizontal ribs curtain fixed nose under water training, spread out to a width of 15 cm.

Making the outdoor house roof with a protect line system, protective cage design, apron fitted with galvanized surfaces and painted finishing having the hall building a flat roof section approach.

Fences and gates:

The concrete fence set galvanized and plastic coated, as well as a welded panel fencing system to fix the columns with a Bekaert Nylofor® product.

They are electrically operated sliding doors in self-column structure. The sliding door opens an aperture of 7.50, the final height is of 140 cm and the slope with the lights is made of more concrete. The goal behind the plane of the fence will be installed on the lot, taking into account the space needs for the foundation. Door Upright 2 100.100.5 hollow, the column arriving to the roof, 1 hollow 100.100.5 cross, a minimum of 90 inches deep, with a minimum of bearing heavy soils with reinforced funds concreting a fixed point. The door frame structure of hollow sections 80.60.3 and 60.60.3 1 horizontal ribs hollow, 20:40:25 segmented vertical wand, are made of galvanized finishing. The gate drive kit consists of a 600 kg payload motor drive, 8 m shelves and 10 remote controls.

Canopies:

The entrance of the office building is part of steel roof. The roof rack is a segmented structure of hot-rolled steel truss bracket and attached to the main body, glass wall thick-walled with hollow column support. Between the bearing section 30.30.2 steel there are placed hollow auxiliary holders, which form the hidden channel and this structure of Keulen recorded compact analyse 30.30.2 aluminium hollow vase, receiving the Alucobond 4mm thick compact disc of aluminium armour thickness of 0.5 mm, being the total thickness of 4 mm.

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It has the interior roof drainage which is the line with the internal heating element along the gully and channel. The design of the slope invested with wedged planks made of mineral wool, warm air waterproofing technology streaming of a Mapeplan M15 1.5mm thick plastic membrane. The insulating board for the entire upper level of the roof must be covered (under the parapet parts), and provided with alucobond because the disk is not watertight.

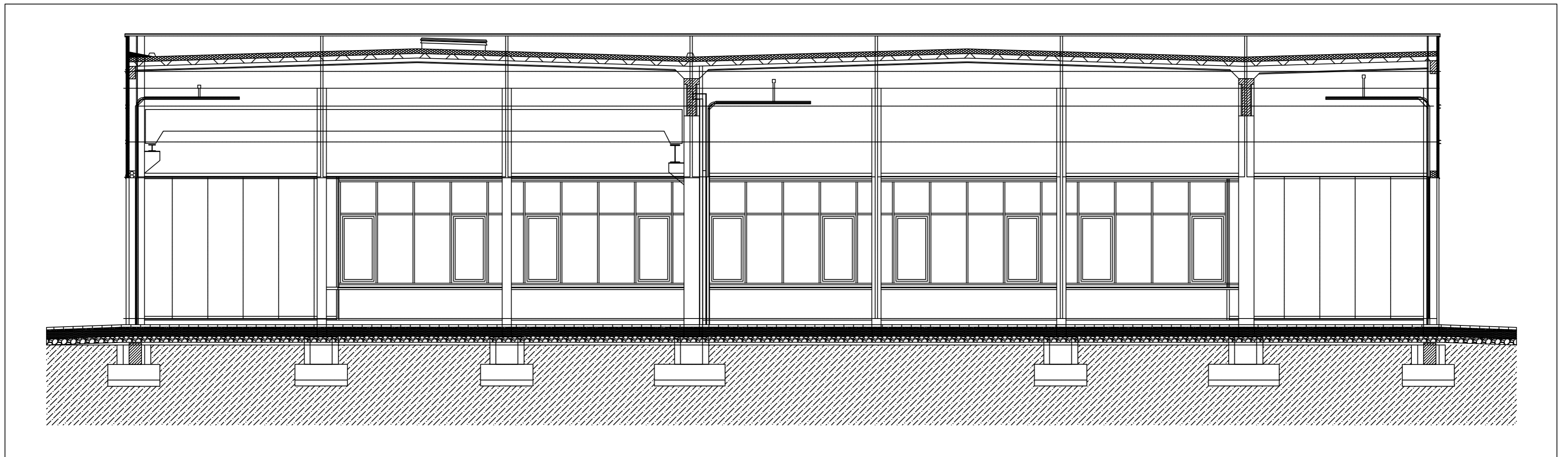
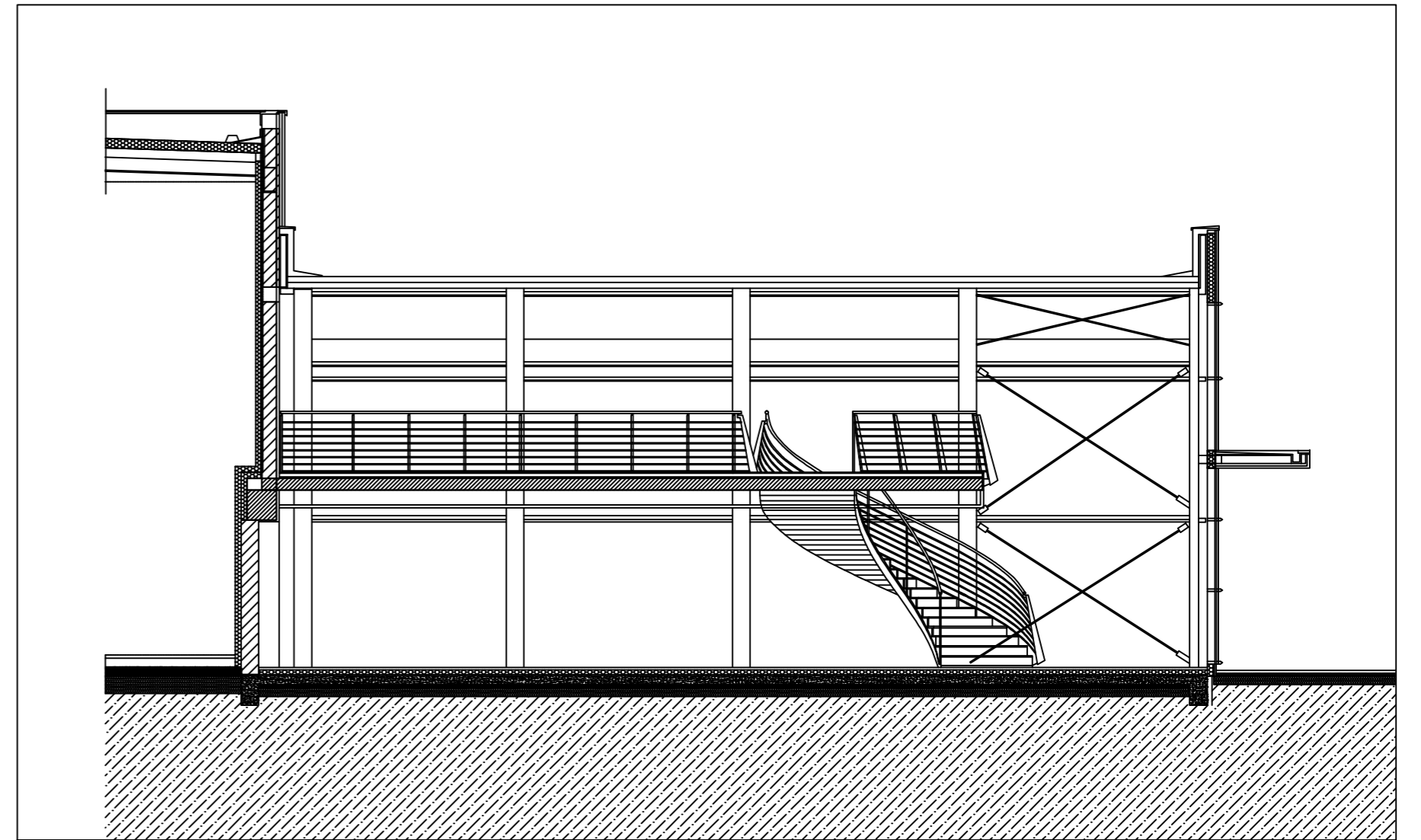
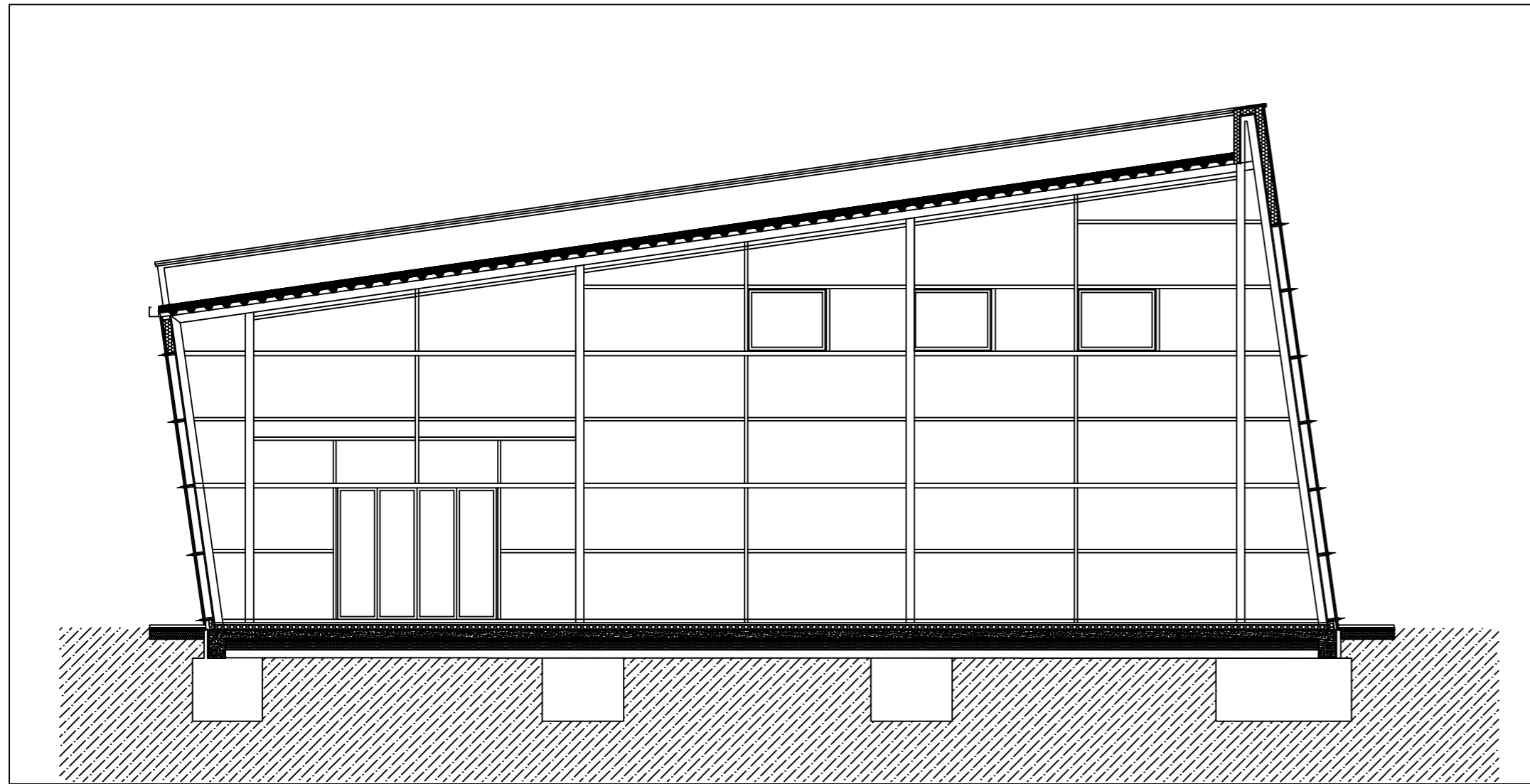
## **Totem pole**

The entrance to the building surface as totem pole is made under a separate plan. It is based on the foundation of the basic structure of concrete blocks, with its own structural design. The ascending hollow structural steel framework is made from Kingspan plate cover, surface 'Roll', 'Novoferm' and 'Westag' logos.

## **5. DRAWINGS: GRAPHICAL DEVELOPMENT.**

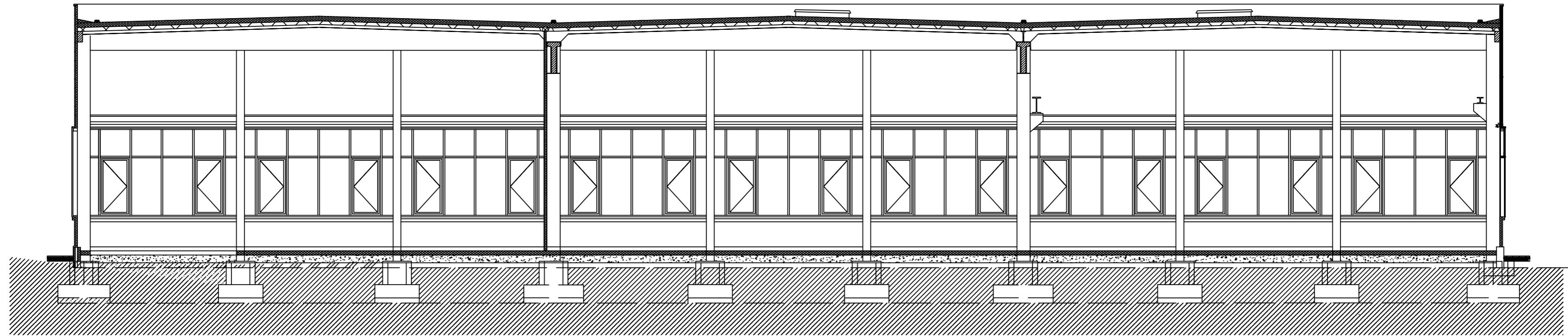
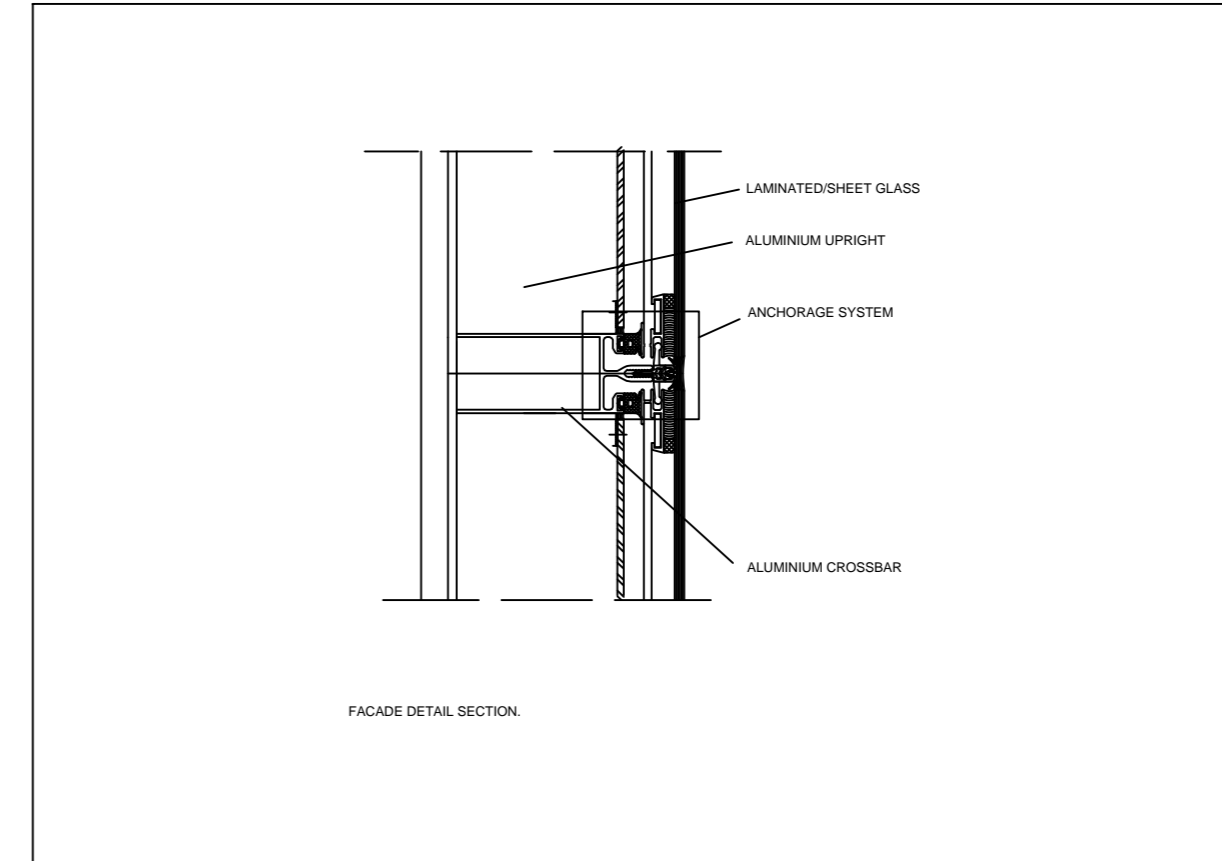
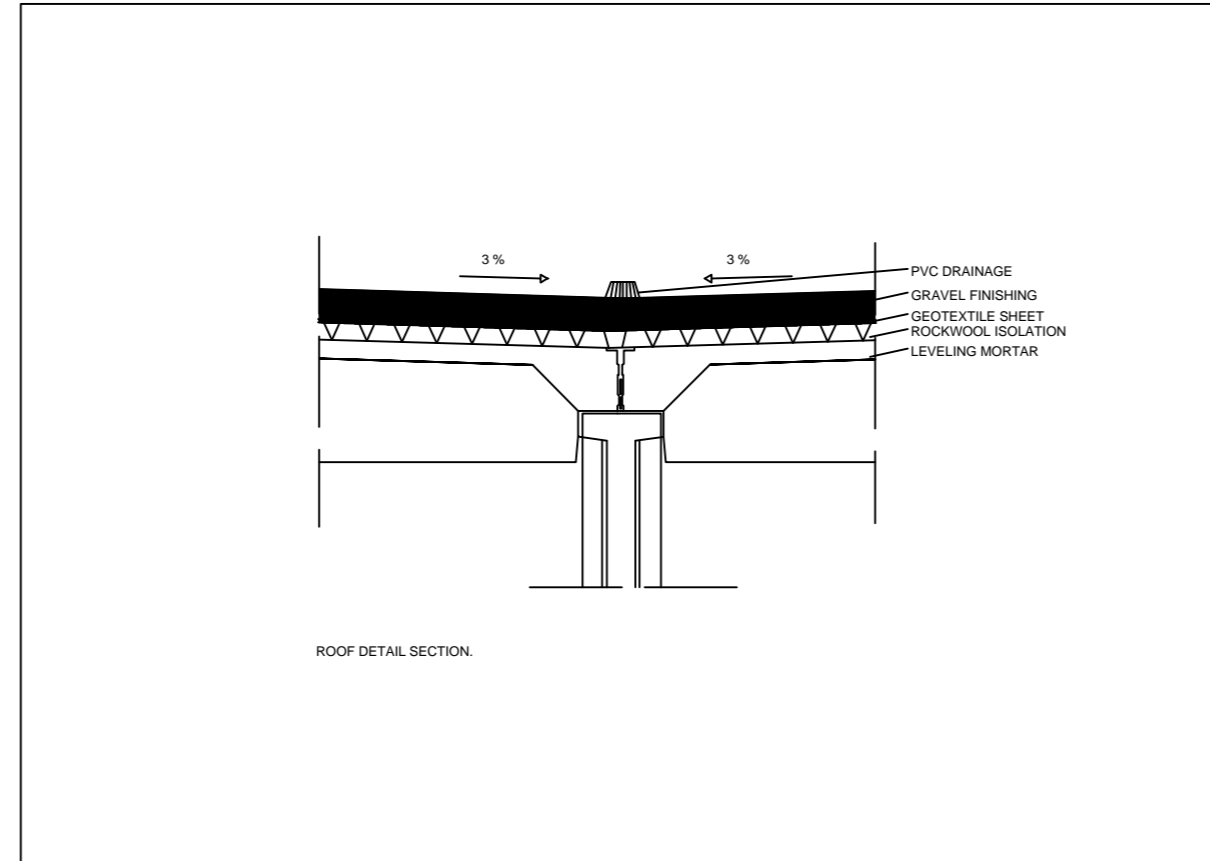


TRANSVERSAL SECTIONS



SECTIONS 1/2	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING, BUDAPEST. HUNGARY
E= 1/100	
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

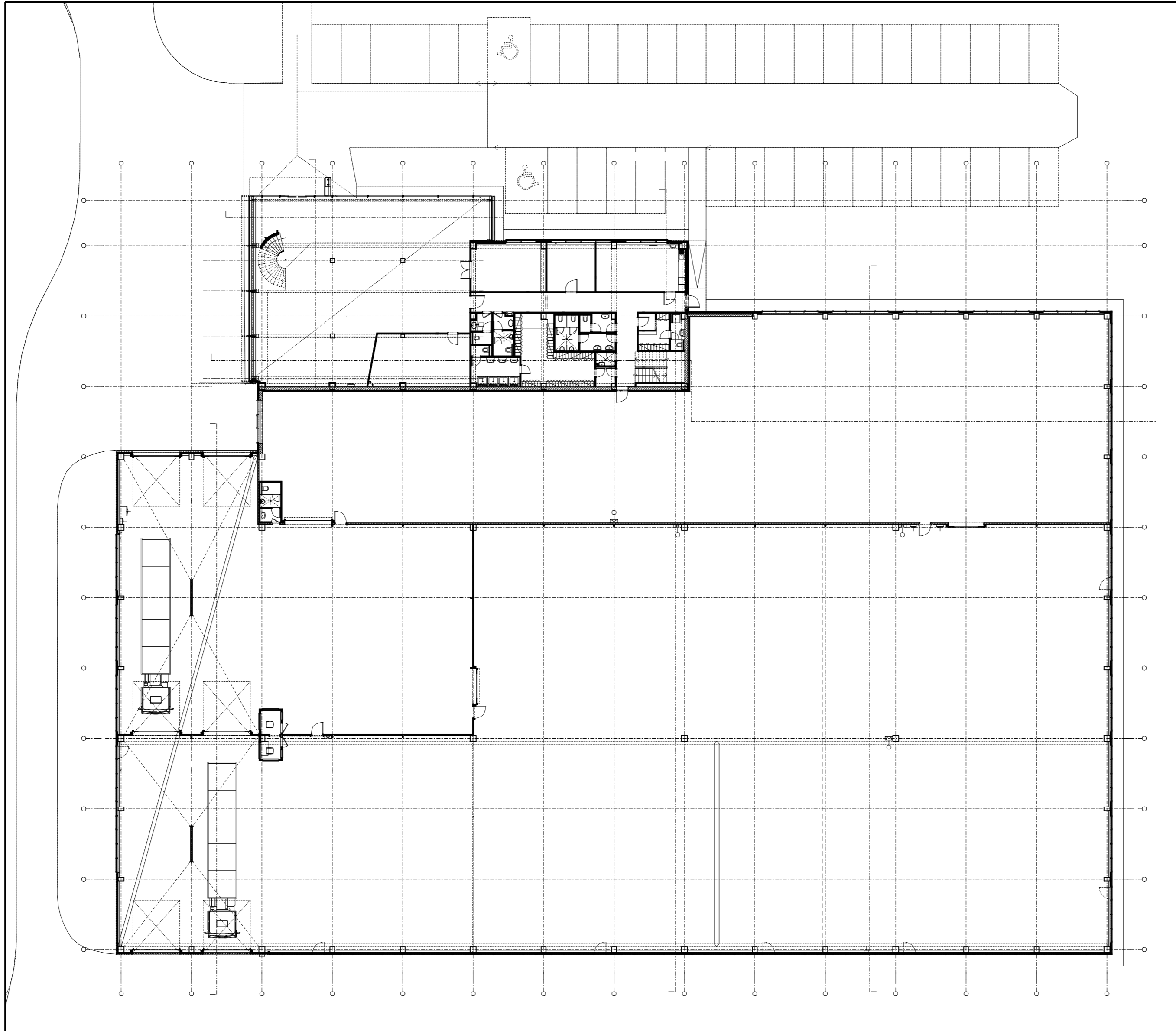
LONGITUDINAL SECTION.  
CONSTRUCTIVE DETAILS.



SECTIONS 2/2	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING. BUDAPEST. HUNGARY
E= 1/125	
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

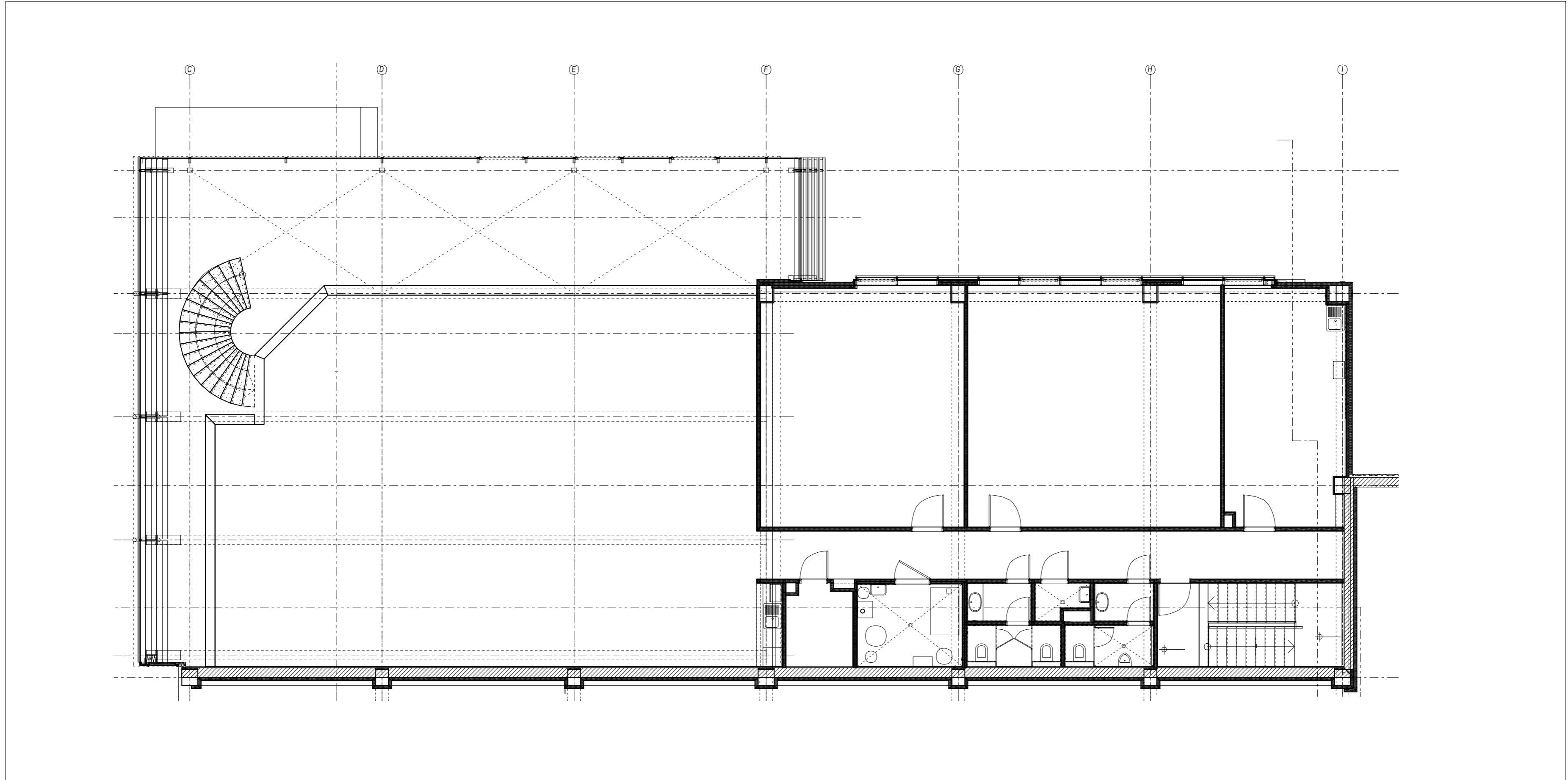


GROUND FLOOR



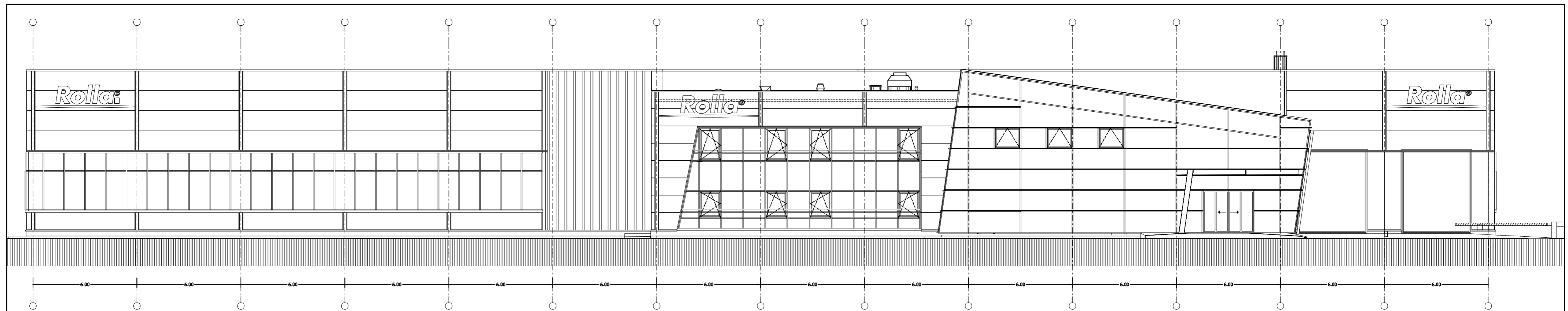
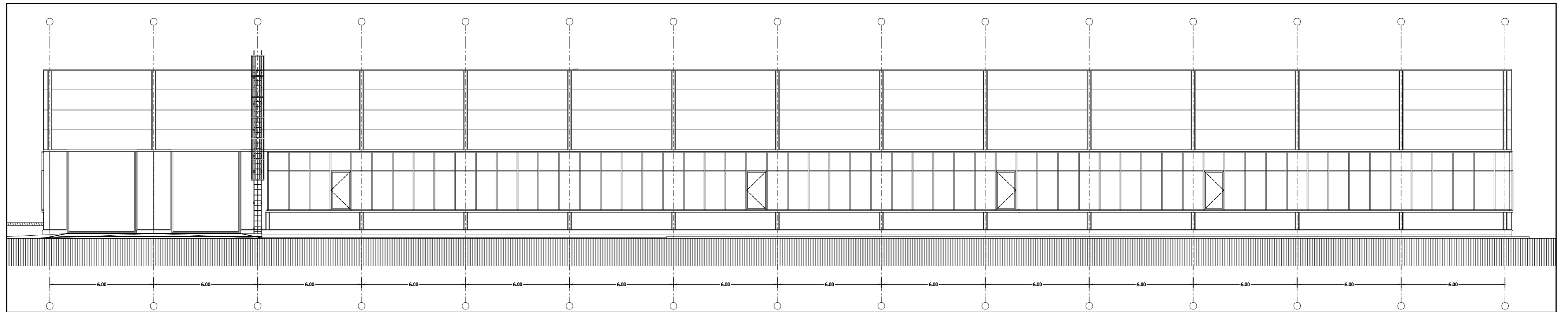
FLOOR PLANS 1/2	YBL MIKLÓS ÉPÍTÉSTUDMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING. BUDAPEST, HUNGARY
E= 1/300	
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

FIRST FLOOR



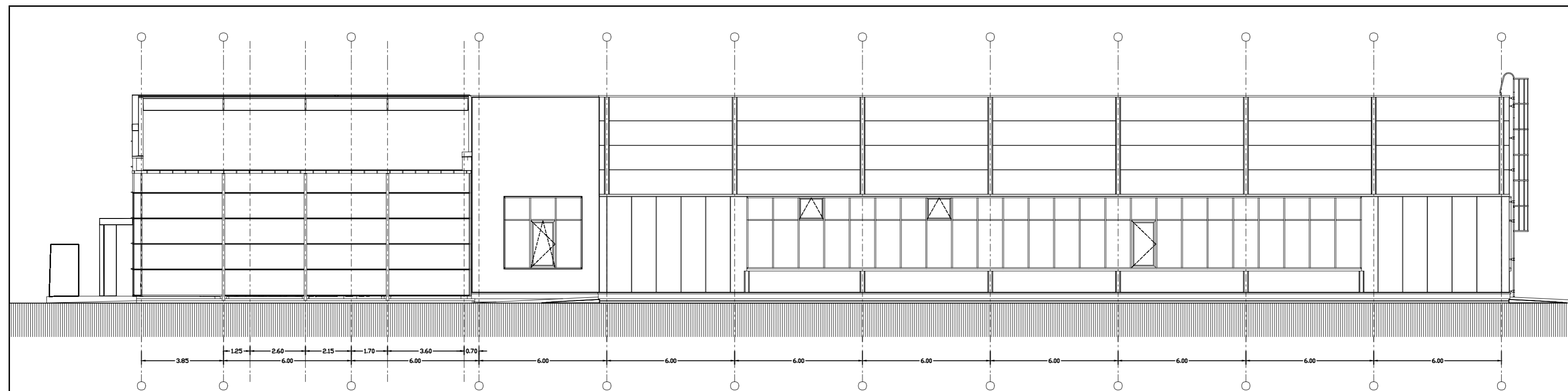
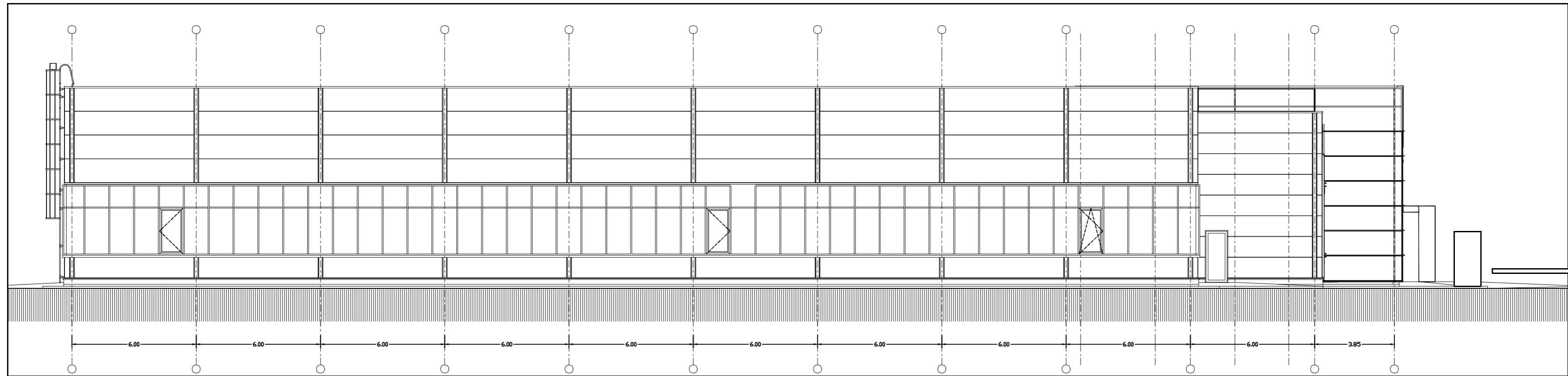
FLOOR PLAN 2/2	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING, BUDAPEST, HUNGARY
E= 1/100	
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

ELEVATIONS



ELEVATIONS 1/2	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING, BUDAPEST, HUNGARY
E= 1/150	
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

ELEVATIONS



ELEVATIONS 2/2 E= 1/160	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING, BUDAPEST, HUNGARY
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

## **7. COST AND QUANTITIES**

**-Gant Diagram.**

**-Curve of Costs.**

		cost			beginning	duration	AUGUST																				SEPTEMBER																			
		material price (Ft)	handwork price (Ft)	total (Ft)			week 1					week 2					week 3					week 4					week 5					week 6					week 7					week 8				
							M	T	W	TH	F	M	T	W	TH	F	M	T	W	TH	F	M	T	W	TH	F	M	T	W	TH	F	M	T	W	TH	F	M	T	W	TH	F	M	T	W	TH	F
<b>1</b>	<b>PREPARATION WORKS</b>				18/08/14	5 days																																								
<b>2</b>	<b>ARQUITECTURE</b>				18/08/14	115 days																																								
2.1	Earth-moving works	13.744.200	10.341.625	24.070.726,00 Ft	18/08/14	64 days																																								
2.2	Reinforced concrete structures	21.747.384	8.549.195	30.296.543,00 Ft	03/09/14	53 days																																								
2.3	Prefab concrete columns and beams	41.887.777	7.437.003	49.324.781,00 Ft	02/09/14	22 days																																								
2.4	Steel structure	71.718.502	18.783.845	90.502.347,00 Ft	23/09/14	53 days																																								
2.5	Fireproof painting	0	3.573.850	3.573.850,00 Ft	02/10/14	9 days																																								
2.6	Insulation against soil moisture and soil water pressure	27.325.598	7.005.402	34.331.000,00 Ft	03/10/14	31 days																																								
2.7	Partitions	8.411.256	6.488.745	14.900.000,00 Ft	23/10/14	64 days																																								
2.8	Installation of doors and windows	4.260.000		4.260.000,00 Ft	03/12/14	90 days																																								
2.9	Ventilation domes and skylights	3.754.100	245.900	4.000.000,00 Ft	02/10/14	35 days																																								
2.10	Organization screed	13.682.308	6.317.693	20.000.000,00 Ft	18/12/14	4 days																																								
2.11	Industrial floor	24.988.320		24.988.320,00 Ft	14/11/14	4 days																																								
2.12	Locksmith services	90.000	0	90.000,00 Ft	18/12/14	6 days																																								
2.13	Cold floor	7.567.900		7.567.900,00 Ft	26/11/14	111 days																																								
2.14	Warm floor	1.038.590		1.039.590,00 Ft	26/11/14	108 days																																								
2.15	Wc partition walls	37.237.435	762.565	38.000.000,00 Ft	06/01/14	1 day																																								
2.16	Security fence	47.554.380	0	47.554.380,00 Ft	10/11/14	7 days																																								
2.17	Urbanism vegetation	65.563,22	0	65.563,22 Ft	10/11/14	14 days																																								
<b>3</b>	<b>UTILITY CONSTRUCTION ROADS</b>																																													
3.1	Public utilities	25.259,10		25.259,10 Ft	18/08/14	28 days																																								
3.2	Road construction	23.058.753,09		23.058.753,09 Ft	25/09/14	32 days																																								
<b>4</b>	<b>ELECTRICAL WORK</b>																																													
4.1	High tension	18.315.254	8.373.941	26.689.195,00 Ft	25/09/14	105 days																																								
4.2	Low tension	7.869.074	4.628.380	12.497.454,00 Ft	25/11/14	47 days																																								
<b>5</b>	<b>INSTALATION</b>																																													
5.1	Water supply, sewerage	6.449.706	2.600.371	9.050.077,00 Ft	23/09/14	81 days																																								
5.2	Gas supply	5.067.731	2.185.164	7.252.895,00 Ft	18/08/14	133 days																																								
<b>5.3</b>	<b>Heating, cooling</b>	<b>11.685.552</b>	<b>3.223.682</b>	<b>14.909.234,00 Ft</b>	<b>21/11/14</b>	<b>56 days</b>																																								
<b>6</b>	<b>BUG FIXES</b>																																													
<b>7</b>	<b>CLEANING</b>				14/05/14	5 days																																								
<b>8</b>	<b>FINAL TECHNICAL DELIVERY RECEIPT</b>																																													
	<b>TOTAL</b>			<b>488.047.867,41 Ft</b>								465.279,35 ft	465.279,35 ft	465.279,35 ft	465.279,35 ft		11.148.320 ft	16.224.238,95 Ft	16.221.532,63 ft																			25.448.353,5 ft								





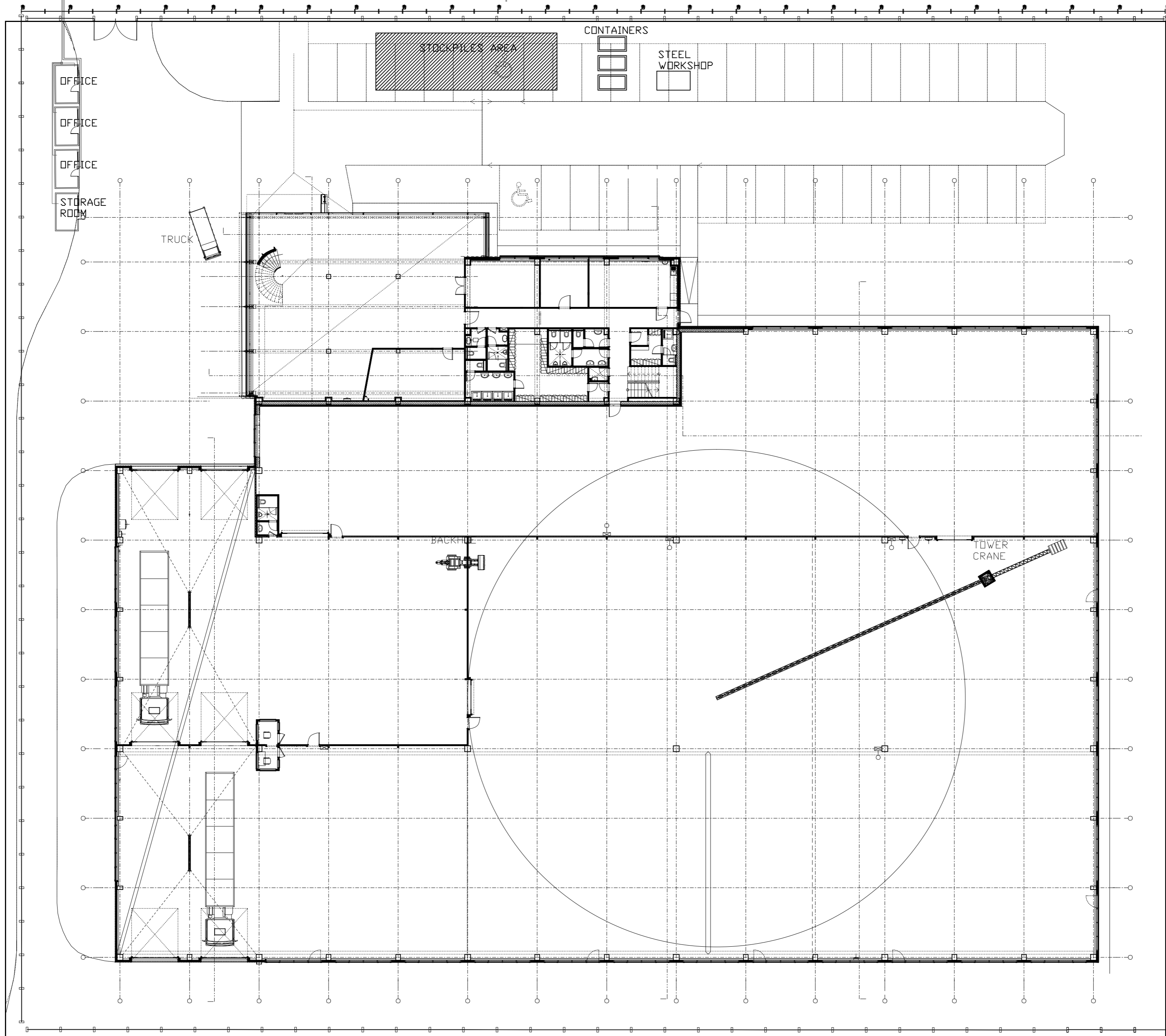






## 8. PLANNING ON SITE

SITE PLAN



SITE PLAN 1/1	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING, BUDAPEST, HUNGARY
E= 1/300	
DIPLOMA PROJECT	TEACHER: DR. ISTVAN CSASZAR
ROLLA PRODUCTION HALL BUILDING	STUDENT: ELENA GIL ANDRÉS

PRODUCIDO POR UN PRODUCTO EDUCATIVO DE AUTODESK

PRODUCIDO POR UN PRODUCTO EDUCATIVO DE AUTODESK

## 9. QUALITY CONTROL SCHEDULING

1. Contract works
2. Commissioning of engineering services.
3. Outstanding works schedule issued.
4. Outstanding works completed.
5. Operating and operations manuals, as built drawings.
6. Maintenance contracts put into place.
7. Building Regulations consent signed off.
8. Occupation certificate issued.
9. Public health consent signed off.
10. Health and safety consent signed off and H and S table available.
11. Planning consent complied with in full, including reserved matters.
12. Equipment test certificates issued (lifts, cleaning cradle, other...).
13. Insurers' certificates issued (lifts, cleaning cradle, sprinklers, others).
14. Means of escape signed off.
15. Fire- lightning system and appliances signed off.
16. Fire alarm system signed off and fire certificate issued.
17. Public utilities way-leaves and lease agreements signed off.
18. Public utilities supplies inspected and signed off.
19. Licenses to store controlled chemicals.
20. Licenses to dispose of controlled chemicals.
21. Licence to store gases.
22. Licence to use artesian well.
23. Adoption of highways, estate roads and walkways by local authorities.
24. Consent to erect and maintain flag-poles.
25. Consent to erect illuminated signs.
26. Cleaning to required standard.

27. Removal of unwanted materials.



28. Tools and spares.



29. Client/ user insurances established.



## 10. HEALTH AND SAFETY.

Related to the health and safety requirements considered in this project, and to be followed during the construction and development of Rolla production hall building, for major construction work there were several of them stated as the main safety guidelines relating to labour laws, as well as regulations or safety codes.

### Initial works: earthworks

First of all, the staff should be trained and should draw attention to the work accident occurring during the hazards and their prevention. When opening underground pits and trenches, for utilities and other facilities, it must be identified the presence of representative companies.

The launch of construction work should be at the same time they are provided the regulation tables by the Road Administration EIA or the Highway to be placed.

Excavations deeper than 1.0 m should count on handrail in its entire perimeter and must be surrounded during night with lightening.

In reference to trench and trench edges to charge only within the established procedure, in the case of tax free if the timbering rated mobilize additional load from it. The edge of the trench 50 inches wide band (padding) also need to be exposed. The depth of 1.00 m at a pit or trench (secured against displacement) should be helped with a ladder or step. - To ensure that traffic over the trench must be installed at least 75 inches wide passage with handrails and foot board. Workers in the carrying out of manual excavation of trenches, the respected distance between them should be of at least 3.0 m.

During earthworks in case of detected changes (groundwater levels rise, resistance of earth layers change or collapse by loads), security measures must be taken immediately.

### Auxiliaries for site labours

Longer scaffolding should be used after heavy rains and before the start of the shift trenches, pits, uploads shores...etc., grading and examing each case and if

exists any threatening slip or collapse situations they must be removed, or they should use other means (such as timbering).

Scissors, not up to 12 mm in diameter, will not be allowed to cut reinforced rods, neither broken or chipped blades will must not be to cut any element used for the construction of the building.

#### Workman on site

Standard workers on site must use rubber boots and gloves in the handling of operations with concrete, mortar mixer by hand, shovel or other means, as it is strictly forbidden to touch it, as well as for the lashing wire that should not be unscrewed by hand.

Specialized ones such as welders must use the prescribed protective equipment.

During the operations with earthmoving works within 2.0m radius, apart from the operator, no one can stay.

#### Facilities elements

Excavation when performing safety distance for the underground cables and overhead lines should be treated with special attention and must be respected.

Cables and other utilities near land only done by manual work can be carried out in the plan, not the perception of the utility lines, which must be notified to the competent operator.

In the case of free installation, the timbering can just be removed after a sufficient hardening of the structure.

Pressure pipelines rehearsal at the head of the work must be present and it is strictly forbidden to stand on a wire under pressure or anything in general under this condition.

#### Equipment

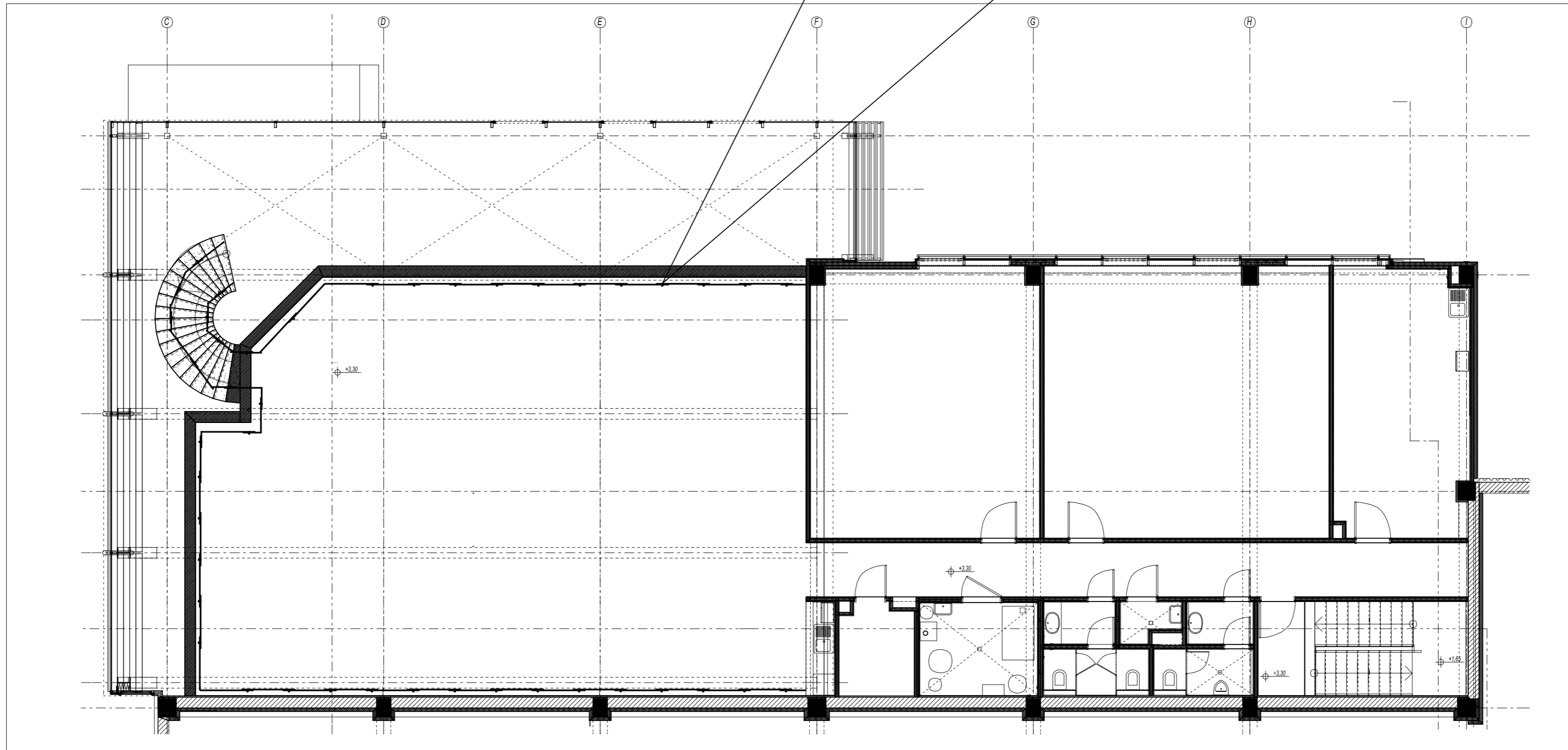
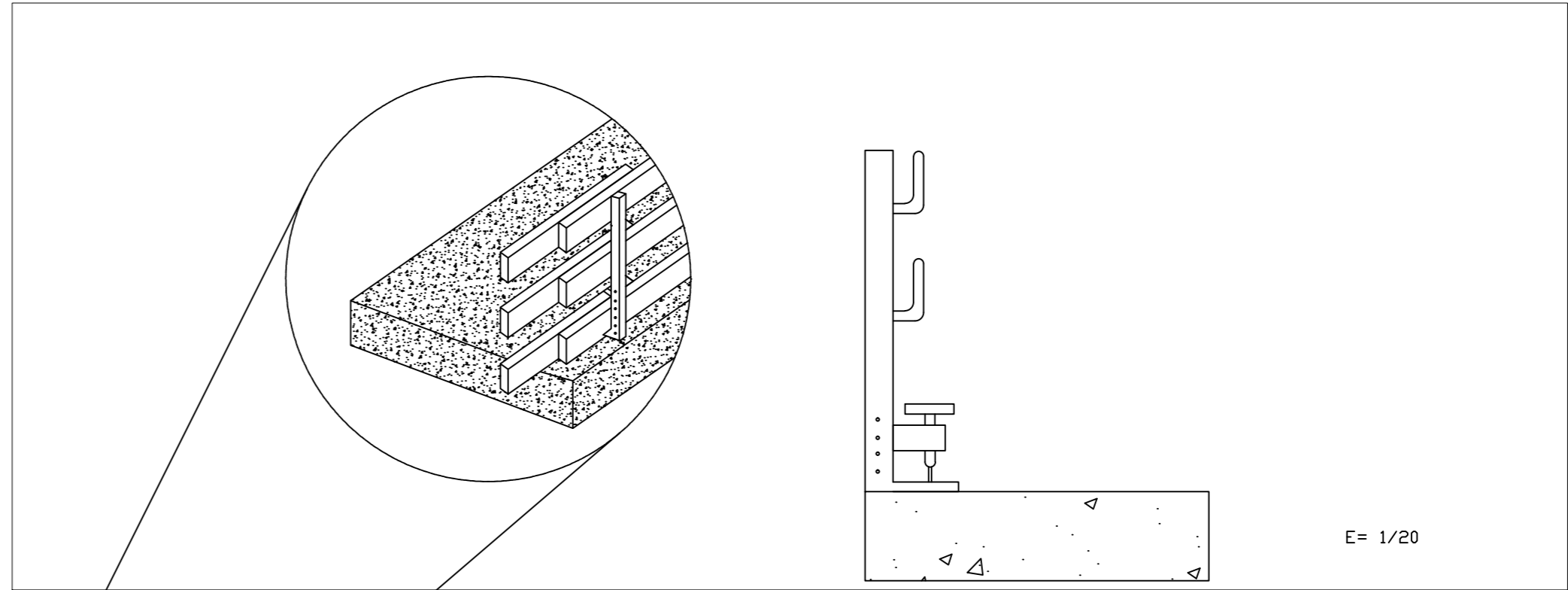
Once the work has been completed, any electric-powered machine should be de-energized. Establishment of electrical equipment must comply with the requirements of the relevant rules.

In any case, machine safety rules for material handling and machinery required for each material has to be observed by an assigned worker. General



requirements for professional and organized storage of equipment, being free the development and maintained material flow paths according to the planned organization on site.

HEALTH AND SAFETY MEASURES.



FLOOR PLAN 2/2 E= 1/100	YBL MIKLÓS ÉPÍTÉSTUDOMÁNYI KAR FACULTY OF ARCHITECTURE AND ENGINEERING, BUDAPEST, HUNGARY
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## 11. PERSONAL CONCLUSIONS

Being able to do a diploma project in a foreign country gives you the opportunity to be able to widen your knowledge about the field you study but applied to a totally different setup. It seems not that much, but if you really want to understand about it, implies knowing about the regulations, the country's constructive features and what precedes it historically in terms of development, means and context.

This is precisely what by itself gives you the tools to develop your constructive mind, by adapting your background concepts into a very different frame. It trains your personal and professional skills by the continuous contrasting based on what you have been teach back home and what gives you your only and unique reference about your field, with the working system from both; the country itself and professionals from the field such as my tutor, Dr. István Czászar or Futureal, the investor from our building under study for the present diploma project.

Overall, it trains you for a future helping you not only to enlarge and diversify your knowledge but to gain in a very positive way a wide range of useful technical vocabulary to be used as part of your professional development.

Personally, very grateful for having lived this experience, for Futureal that helped letting approach to the way they organize and work from a real site case, and to Dr. Czászar for his involvement to the drawing near of Hungary's construction from his doubtless own experience and knowledge in the field.