MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN

Satbayev University

Institute of Architecture and civil engineering named after T. Basenov

Department of Civil engineering and building materials

Nazifullah Khanjary

« Hotel with in-built underground parking in Semey »

To the diploma project
EXPLANATORY NOTE

Specialty 5B072900 – Civil Engineering

Almaty 2021

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ALLOWED TO PROTECT
Head of Department
Master of technical science,
lecturer
_____N.V. Kozyukova
«___» _____2021 yr.

EXPLANATORY NOTE

to the diploma project

On the theme of « Hotel with in-built underground parking in Semey »

5B072900 - "Civil Engeneering"

Prepared by — Nazifullah Khanjary

Scientific adviser — Dostanova S.Kh.
Doctor of technical science,
Associate professor
«_____»___2021 yr.

Almaty 2021

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Specialty 5B072900 – Civil Engineering

I APPROVE
Head of Department
_____N.V. Kozyukova
Master of technical science, lecturer
«___»_____20__ yr.

ASSIGNMENT
Complete a diploma project

Student: Nazifullah Khanjary
Topic: «Hotel with in-built underground parking in Semey »
Approved by the Order of the Rector of the University No. 2131-b dated November 24, 2020.
The deadline for the completed work is May 10, 2020.
Initial data for the diploma project: Ust-Kamenogorsk
Structural schemes of the building - frame-wall with cross-beams, structures are made of monolithic reinforced concrete, architectural solution.
List of questions to be developed:
a) Architectural and analytical part: basic initial data, space-planning solutions, heat engineering calculation of enclosing structures (outer wall), lighting calculation, calculation of the foundation option and depth of laying, justification of energy efficiency measures;
b) Calculation and design part: calculation and design of a column and crossbar;
c) Organizational and technological part: development of technological maps, construction schedule and construction plan;
d) Economic part: local estimate, object estimate, summary estimate;
List of graphic material (with exact indication of required drawings):
1 Facade, standard floor plans, parts 1-1 and 2-2 - 4 sheets;
2 KZh columns, specifications - 1 sheet;
3 Technical maps of concrete works, calendar plan, construction site plan - 4 sheets.
11 slides of work presentation are provided.
Recommended main literature:

1 SP RK 2.04-01-2017 "Construction climatology", SN RK;
2 2.04-04-2013 "Construction heat engineering", SN RK 2.03-30-2017 "Construction in seismic zones".

SCHEDULE

preparation of thesis (project)

Part	30%	60%	90%	100%	Note
Architectural and analytical	11.01.2021г.-14.02.2021г.				
Calculation and design		15.02.2021г.-23.03.2021г.			
Organizational and technological			24.03.2021г.-01.05.2021г.		
Economic				01.05.2021г.-09.05.2021г.	
Pre-defense	10.05.2021г.-14.05.2021г.				
Anti-plagiarism, norm control	17.05.2021г.-31.05.2021г				
Quality control	26.05.2021г.-31.05.2021г.				
Defense	01.06.2021г.-11.06.2021г.				

Signatures

consultants and the normative controller for the completed diploma work (project) with an indication of the parts of work (project) related to them

Name parts	Consultants, I.O.F. (academic degree, rank)	the date signing	Signature
Architectural and analytical	Dostanova S.Kh., Doctor of technical sciences, associate professor		
Calculation and design	Kozyukova N.V., Master of technical science, lecturer		
Organizational and technological	Mukhanbetzhanova Zh.S., Master of technical science, lecturer		
Economic	Dostanova S.Kh., Doctor of technical sciences, associate professor		
Norm controller	Bek A.A., Master of technical science, assistant		
Quality control	Kozyukova N.V., Master of technical science, lecturer		

Scientific adviser _____ Dostanova S.Kh.

The task was accepted
for execution student _____ Nazifullah Khanjary

Date "___" _____ 2021 y.

АҢДАТПА

Бұл дипломдық жұмыстың тақырыбы «Семей қаласындағы қонақ үйның дизайны».Бұл ғимараттың сыртқы қабырғалары темірбетон бағанасымен жобаланған Семей провинциясында орналасқан ғимарат.

Менің жоба тезисім келесі бөлімдерден тұрады:

1. Архитектуралық-аналитикалық бөлім.

2. Есептеу және жобалау бөлігі: ғимараттың темірбетонды монолитті қаңқасын ETBAS 19 бағдарламасында есептеу.

3. Ұйымдастырушылық-технологиялық бөлім: технологиялық карталарды, құрылыс кестесін және құрылыс жоспарын жасау;

4. Экономикалық бөлім: жергілікті смета, объектілік смета, жиынтық смета;

АННОТАЦИЯ

Тема дипломной работы - «Дизайн общежития в городе Семей».

Местоположение данного проекта в Семейском велаяте спроектировано железобетонной колонной, а внешние стены этого здания представляют собой навесную стену.Моя проектная работа состоит из следующих частей:

1. Архитектурно-аналитическая часть.

2. Расчетно-конструкторская часть: расчет железобетонного монолитного каркаса здания в программе ETBAS 19.

3. Организационно-технологическая часть: разработка технологических карт, графика строительства и плана строительства;

4. Организационно-технологическая часть: разработка технологических карт, графика строительства и плана строительства;

ANNOTATION

The topic of this thesis is “design of a Hotel with built-in underground parking in Semey city”.This project location located in Semey province, designed by reinforced concrete column, and exterior walls of this building is curtain wall.

My project thesis includes the following parts:

1. Architectural and analytical part.

2. Calculation and design part: the calculation of the reinforced concrete monolithic frame of the building in the program ETBAS 19.

3. Organizational and technological part: development of technological maps, construction schedule and construction plan;

4. Economic part: local estimate, object estimate, summary estimate;

CONTENT

INTRODUCTION

The project object is a 4-storey volume with ground floor and underground parking with dimensions in axles 144000mmx102000mm. Parking is for everyone to the Hotel. Underground parking at -7,000 is intended for all people of hotel. There are two entrances and exits. And also, there is a separate parking for disabled people. Elevators and stairs lead to higher levels.

The height of underground parking is 2,8 m, ground floor is 3,8 m and the height top floors are 3,2m.

On the 1st floor on the mark 1.00m are placed:

- entrance zone: tambour, hall, reception, security and waiting area;
- administrative zone: office of administration, accounting;
- dining area: coffee shop and dining room with companions' premises, internet cafes and boutiques;
- Technical zone: staff room, number / nodes, shower s

locker room, warehouse, technical premises, service elevator and staircase.

The drawing part of this project made by Autodesk Revit 2020 engineering software.

Autodesk Revit creates information modeling software for architects, gardeners, structural engineers, mechanical, electrical and plumbing (MEP) engineers, designers and contractors.

the calculation of the reinforced concrete monolithic frame of the building in the program ETBAS 19.02

Technological progress has introduced many inventions in field of housing industry. there's huge difference between new and old construction methods. Use of latest machinery has made its way through the technology. Most of the building parts like pillars, roofs, and concrete blocks are available in prepared forms that increase the speed of construction process greatly. Use of pre-stressed concrete tendons and beams strengthen the buildings together with speedy construction.

1 Architectural part

1.1 Architectural planning solution

In each building, depending on its type and style of use (residential - office - commercial), 3 sections must be designed.

The first part of the architectural design of the building, which includes plans and three-dimensional design of the interior and facade of the building.

The second part of building structure design is based on the internal regulations of a country, from which the design of executive plans is drawn and the building (structure) is executed.

The third part of building installation design, which deals with the design of mechanical and electrical installations.

Each of the above is the responsibility of one person, the first part is the responsibility of architectural engineers, the second part is the responsibility of civil engineers and finally the third part is the responsibility of mechanical engineers.

The project object is a 4-storey volume with ground floor and underground parking with dimensions in axles 144000mm x102000mm. Parking is for everyone to the Hotel. Underground parking at -7,000 is intended for all people of hotel. There are two entrances and exits. And also, there is a separate parking for disabled people. Elevators and stairs lead to higher levels.

The height of underground parking is 2,8 m, ground floor is 3,8 m and the height top floors are 3,2m.

The space-planning decision around the building is.

- Car Parking
- Smoking area
- Accessibility of buildings and structures for people with limited Mobility
- Entertainment
- Waterfall
- Roads for cars around the building
- Open area for walking
- Bus station

First basement:

The parking of construction located in the 1st basement with area of 6369m2.

The car parking has two entrance and two exit, in this parking 140 cars can take place and the parking has the best security because there are two security rooms with skilled guards. The residents of the hotel can use from lifts and stairs from parking up to top floor.

Well thought out, organized and convenient parking for a hotel (hotel) is an important component of hotel service. Modern equipment and automation tools make it possible to simplify the solution of many tasks, to make parking not only convenient and safe, but also commercially profitable.

Depending on the specifics of the hotel (hotel) operation, the parking organized on its territory should provide a sufficient number of parking spaces and convenient use of parking for guests, their guests, employees, visitors to trade and service facilities located in the hotel, participants in events held in conference halls.

First basement:

In the 2nd basement located Gym for residents, with toilets, changing rooms and sport shop, ware houses and a big conference hall, cooking room with difference foods around the world but the main foods are Kazakh national foods like: Besbarmak, Kazy, Shuzhyk, Map, Sorpa, Kuyrdak, Manty, Lagman, Baursaki. ware houses and a big conference hall.

2 Constructive solution

2.1 Climate Characteristic of Semey City

Climate characteristics of the construction according to the Semey city Climatic characteristics of the construction area:

-Outside air temperature:

-The average temperature in the coldest five days - 40 degree celsius (reliability 0.98)

- Average temperature on the coldest days – 41 degree celsius (reliability 0.92
- Wind speed pressure - 0.56 KPa (district III)
- Weight of snow layer - 0,8 KPa (III area)
- Seismic properties of the construction site - 6 points

Table 1 - Climatic characteristics

Characteristic	Value
Construction area	Semey
Wind region	III
Average wind speed	30 m/sec
Snow region	III
Average annual rainfall	191mm
The depth of soil freezing	1.43 - 2.03 m
The average temperature in the coldest five	- 40 o C

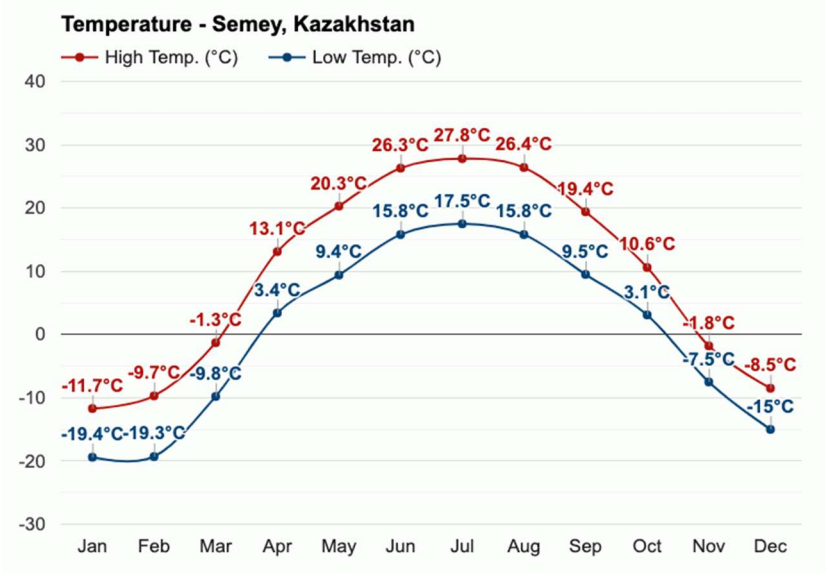

Figure 1- Climate graph of Semey city

2.2 Heat engineering calculation

In areas with such climatic conditions as a sufficiently high level of humidity and low air temperatures, according to [3],

as wall enclosures, structures with several layers with a very effective thermal insulation layer are used. Such a layer must necessarily be placed inside the system, which guarantees its greatest efficiency.

Heat engineering calculation of the bearing wall.

- tB = 22 degree celsius - design temperature of the internal air;
- tH = mines degree celsius - design winter outdoor temperature;
- $\Delta t_H = 4$ ° C - standard temperature difference between the temperature of the internal air and the temperature of the internal surface of the enclosing structure;
- mp = 0.63 coefficient taking into account the peculiarities of the construction region;
- $\alpha w = 7.5$ W / (m2 · ° C) - coefficient of heat transfer to the inner surface;
- $\alpha_H = 23$ W / (m2 · ° C) - heat transfer coefficient (for winter conditions) to the outer surface of the enclosing structure;

The thicknesses of the outer wall layers are given in table 2

$$R_0^{TP} = 3.2\ ^0C/B_T$$

Table 2- Characteristics of the overlap layer

Material name	Υ_0 ,kg/m^3	λ, w/m^2* s	δ,m	R_n=δ/λ , m^2 * C/w
Plaster on a cement-sand mortar	1800	0,76	0,03	0,039
Stone min. cotton wool	60	0,038	0,1	2,63
Monolithic concrete	2500	1,69	0,20	0,12
Cement-sand mortar plaster	1800	0,76	0,03	0,039

$$R0 = \frac{1}{an} + \frac{\delta 1}{\Upsilon 1} + \frac{\delta 2}{\Upsilon 2} + \frac{\delta 3}{\Upsilon 3} + \frac{\delta 4}{\Upsilon 4} + \frac{1}{ah} = \frac{1}{0.75} + \frac{0.03}{0.039} + \frac{0.1}{2.63} + \frac{0.2}{0.12} + \frac{0.03}{0.039} + \frac{1}{0.23} = 2.32$$

$$R_0^{TP} = 3.2 \cdot\ ^0C/B_T = 3.2 \cdot 0.8 = 2.56$$

$$_0^{TP} = 2.56 > Ro = 2.32$$

The condition is satisfied. We take the thickness of the insulation 100mm.

2.3 Ventilation system

Ventilation system is one of the most important part of MEP, that can make us a great facility inside of our construction, for the entire project we divided our ventilation system by four blacks where every blacks. Every black has return diffuser, supply diffuser, Ducts and Air handing unit.

The composition of the indoor air is not constant but changes all the time. The breathing of people is accompanied by the consumption of oxygen and the release of carbon dioxide. In addition, in industrial and commercial facilities, oxygen can be consumed during certain technological processes, which are also often accompanied by the release of various gases, dust and other pollutants. As a result, the concentration of oxygen in the air decreases, which makes it poorly breathable. Finding people in such an atmosphere leads to a deterioration in well-being and can negatively affect health. The presence of various pollutants in the air can be directly hazardous to health, create a fire or explosion hazard. Therefore, a mandatory requirement is to equip any building with a ventilation system. It provides air exchange in the interior of the building, removing exhaust air from them, which is replaced by fresh air supplied from the street. Thanks to this, the rooms remain in the optimal amount of oxygen for breathing, there are no harmful gases and suspensions. Also, ventilation should maintain optimal values of temperature, humidity, air velocity. This allows you to maintain a safe and comfortable indoor environment, prevent dampness, mold and mildew on surfaces. For some rooms, natural ventilation is sufficient, which does not involve the use of ventilation equipment. However, at many facilities, it does not allow achieving the required air exchange parameters. In such cases, you must mount the system forcibly.

2.4 Calculation of reinforcement Beams

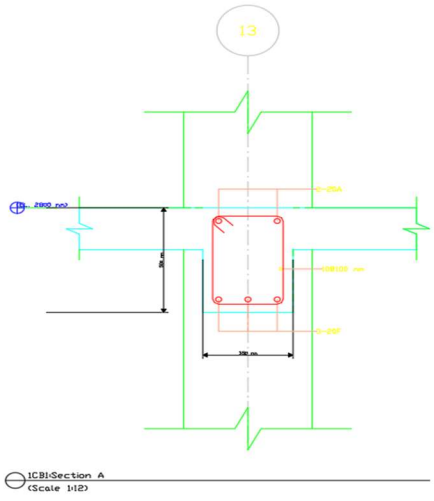

Figure 2- column section

Table 3 - Beam Element Details Type: DC High

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF
Story3	B59	4745	beam500*350	DConS10	5750	6000	1

Table 4- Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
350	500	350	0	40	40

Table 5 - Material Properties

E_c (Mpa)	f_{ck} (Mpa)	Lt.Wt Factor (Unitless)	E_s (Mpa)	f_{yk} (Mpa)	f_{ywk} (Mpa)
32999.96	30	1	200000	440.02	275

Table 6 - Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Table 7 - Design Moment and Flexural Reinforcement for Moment, M_{Ed3}

	Design -Moment tonf-m	Design +Moment tonf-m	-Moment Rebar mm²	+Moment Rebar mm²	Minimum Rebar mm²	Required Rebar mm²
Top (+2 Axis)	-3.3723		194	0	530	530
Bottom (-2 Axis)		1.6861	0	99	530	530

Table 8 - Shear Force and Reinforcement for Shear, V_{Ed2}

Shear V_{Ed} tonf	θ deg	Shear V_{Rdc} tonf	Shear V_{Rds} tonf	Rebar A_{sw} /S mm²/m
3.5199	0	7.0134	8.7955	348.53

Table 9 - Torsion Force and Torsion Reinforcement for Torsion, T_{Ed}

Torsion T_{Ed} tonf-m	T_{cr} tonf-m	Area A_k mm²	Perimeter, u_K mm	Rebar A_t /s mm²/m	Rebar A_{sl} mm²
1.0872	2.7837	98096.9	1288.2	0	0

Longitudinal reinforcement calculation:

Rectangular beam (35 x 50 cm) class of concrete C30 / 37 (fck =30kgf/mm2, ϒc = 1.5, fcd = acc · fcc / ϒc = 1 · 30 / 1.5 = 20 MPa). Reinforcement class S500 (f_yk = 440 MPa, fyd383 = f_yk / ϒ_s = 440 / 1.15 = 383 MPa).

$$M_{ED} = 1.6861 \text{ т} \cdot \text{м} = 16.53 \text{ кН} \cdot \text{м}$$

The values are taken from the Etabs 19.02 program

$$\alpha E\ d\ s = \frac{Meds}{fcd \cdot b \cdot d^2} \quad (1)$$

$$\alpha E\ d\ s = \frac{16.53}{20 \cdot 10^3 \cdot 0.35 \cdot 0.50^2} = 0.0094$$

Since αE d s = 0.008 ≤ αE d s, i m = 0.37 (see Fig. B.1. Appendix B), for the given section dimensions and concrete class, compressed reinforcement is required. Taking.

Assuming C2 = 40 mm, αE d s, i m = 0.37, $\xi = \frac{Z}{d}$ => Z = 0.66 X 500 = 330 mm.

(see Figure B.1.), by formulas (7.9) and (7.10) we determine the required cross-sectional area

compressed and stretched reinforcement;

$$\Delta Meds = Meds - Meds, \text{ i m} = -\alpha E\ d\ s\ , \text{i m} \cdot fcd \cdot b \cdot d^2 \quad (2)$$

$Meds$, i m $= \alpha E\ d\ s$, i m $\cdot fcd \cdot b \cdot d^2 = 0.37 \cdot 20 \cdot 10^3 \cdot 0.35 \cdot 0.5^2$

$Meds$, i m = 647.5 KH · м

$$\Delta Meds = 16.53 - 647.5 = 630.97 \text{ KH} \cdot \text{м} \quad (3)$$

$$A_{s1} = \frac{1}{\sigma_{s1d}}\left(\frac{M_{E\ d\ s\ i\ m}}{z} + \frac{\Delta M_{E\ d\ s}}{d - c_2} + N_{E\ d}\right)$$

$$As1 = \frac{1}{383}\left(\frac{647.5}{330} + \frac{630.97}{(460-4\ )} + 34\right) = 9.78\ CM^2$$

$$d = h - c2 = 500 - 40 = 460mm$$

acceped; kl (5Ø20) S500 (As1 = 12.7 CM^2)

Calculation of transverse reinforcement

Beam with rectangular section(35 x 500 см)

Class of concrete C30 / 37 (fck =30, ϒc = 1.5, fcd = acc · fcc / ϒc = 0.85 · 25 / 1.5 = 14.1 MPa). Reinforcement class S500 (f_yk = 440 MPa, f_v = f_yk / ϒ_s = 440 / 1.15 = 393 MPa).Bending moment acts on the beamM_{ED} =35 кН·м.

Sectional area stretched reinforcement $A_s = 9.78\ cm2; 5Ø20\ S500$,

Constant floor loads

$$(g_k = 7.179 \frac{\text{кН}}{\text{м}})$$

and Self-weight of the balck:

$(0.35 \cdot 0.45 \cdot 25 = 3.375 \frac{\text{кН}}{\text{м}})$

The values are taken from the Etabs 19.02 program

Then:

$$(g_k = 8.2 + 3.375 = 11.2 \frac{\text{кН}}{\text{м}}).$$

Variable load (q_k=13.34 кН/м; $\gamma_q = 1.5$), and constant load

$$q_k = 13.34 \cdot 1.5 = 21.1 \text{ кН/м}$$

$$Q_{max} = q_k + g_k = 31.14 \text{ кН/м}$$

$$V_{Ed;}=(q_k + g_k) \cdot L/2=30.564 \cdot 5.3/2=120.99 \text{ кН}$$

The length of the section on which the transverse reinforcement must be installed according to the calculation is determined from the diagram of the shear forces. To do this, we determine the lateral force that concrete can perceive by the formula:

$$V_{Rd;c}= [\frac{0.18}{\gamma_c} \cdot K \cdot \left(100 p_l \cdot f_{ck}\right)^{\frac{1}{3}}] \cdot b_w \cdot d \quad (4)$$

$$k=1+\sqrt{\frac{200}{d}}=1+\sqrt{\frac{200}{460}}=1.66 \leq 2$$

$$d = h - c2 = 500 - 40 = 460mm$$

$$p_l=\frac{A_{s1}}{b_w * d}=\frac{348\ mm^2}{300\text{mm} * 460\text{mm}}=0.0025<0.02$$

$$V_{Rd;c,max}= [\frac{0.18}{1.5} \cdot 1.66 \cdot \left(100 \cdot 0.0025 \cdot 30\right)^{\frac{1}{3}}] \cdot 300 \cdot 460=838 \text{ кН}$$

But not less $V_{Rd;c,min}$ according to the formula:

$$V_{Rd;c,min}= [0.035 \cdot k^{3/2} \cdot {f_{ck}}^{1/2}] b_w \cdot d \quad (5)$$

$$V_{Rd;c,min}= [0.035 \cdot 1.66^{3/2} \cdot 30^{1/2}] 300 \cdot 460=565 \text{ кН}$$

So far as

$$V_{Rd;c,min} < \text{V}_{\text{Ed;max}} < \text{V}_{\text{Rd;c}}, max= ; 541 \text{ кН} < 550\text{кН} < 838 \text{ кН}$$

we install transverse reinforcement based on design considerations.

$$\text{V}_{\text{Ed;}max} = \text{V}_{\text{Ed;}} \cdot L = 91.7 \cdot 6 = 550 \text{ кН/м}$$

$$V_{Ed;}=(q_k + g_k) \cdot L/2=30.564 \cdot 6/2=91.7 \text{ кН}$$

Thus, the calculated site is:

$$\alpha_w = \frac{\text{V}_{\text{Ed;max}} - \text{V}_{\text{Rd;c,min}}}{\text{q+g}} \quad (6)$$

$$\alpha_w=\frac{429.25-3 \quad .9}{30.564} = 1.38 \text{ m}$$

The step of the transverse reinforcement is determined by the formula:

$$s \leq 0.75d$$

$$s \leq 0.75 \cdot 460=345 \text{ mm}$$

Принимаем шаг поперечной арматуры s=345mm

$$A_{sw} = \frac{V_{Ed;max} \cdot s}{d_z \, f_{sw} \cos \Upsilon} \quad (7)$$

$$A_{sw} = \frac{55 \cdot 10^3 \cdot 34}{490 \cdot 27 \cdot \cos 40^\circ} = 1838.2 \text{ мм}^2 = 18.38 \text{ см}^2$$

Where ($d_z = 490\ mm$) The first design section is assigned at a distance.
We set the angle of inclination of the cracks to the Gorontalo

$$\Upsilon = 40^\circ$$

We accept 16 Ø 10 , $A_{sw} = 20.1$ см^2 , s=310 mm.
In this case, the following conditions must be met:

$$\frac{A_{sw} \cdot f_{sw}}{b_w \cdot s} \leq 0.5 \cdot v \cdot f_{cd} \quad (8)$$

$$\frac{18.38 \cdot 435}{300 \cdot 310} \leq 0.5 \cdot 0.038 \cdot 9.067$$

$$0.086 \text{ Mpa} \leq 0.17 \text{ Mpa}$$

where v is the coefficient that takes into account the reduction in the strength of concrete under compression and tensile conditions and is equal for heavy concrete:

$$V = 0.6\left(\frac{f_{ck(\text{Мпа})}}{250}\right) = 0.6\left(\frac{30}{250}\right) = 0.072$$

$V_{Ed;max} < V_{Rd;c}, max = \frac{v \cdot f_{cd} \cdot b_w \cdot d_z}{\cot 40 + \tan 40} = \frac{0.07 \cdot 30 \cdot 300 \cdot 490}{\cot 40 + \tan 4} = 563480.7$ H=563.5 кН.
$V_{Ed;max}$ =550 кН $< V_{Rd;c}, max = 563.5$ кН, the condition is met.
Other sections are calculated in the same way.

2.5 Calculation of reinforcement columns

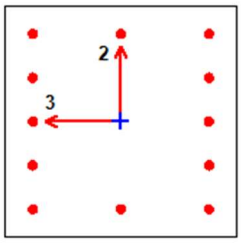

Figure 3 – column section

Table 10 - Column Element Details Type: DC High

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	SOM	LLRF
Story 6	C125	3739	colum 500*500	DConS3	0	3200	Nominal Stiffness	1

Table 11 - Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
500	500	60	30

Table 12 - Material Properties

E_c (Mpa)	f_{ck} (Mpa)	Lt.Wt Factor (Unitless)	E_s (Mpa)	f_{yk} (Mpa)	f_{ywk} (Mpa)
32999.38	30.0083	1	200000	440	275

Table 13 - Design Code Parameters

γ_C	γ_S	α_{CC}	α_{CT}	α_{LCC}	α_{LCT}
1.5	1.15	1	1	0.85	0.85

Table 14- Axial Force and Biaxial Moment Design For N_{Ed} , M_{Ed2} , M_{Ed3}

Design N_{Ed} tonf	Design M_{Ed2} tonf-m	Design M_{Ed3} tonf-m	Minimum M2 tonf-m	Minimum M3 tonf-m	Rebar Area mm²	Rebar % %
33.9686	1.1214	0.6794	0.6794	0.6794	2500	1

Table 15 - Axial Force and Biaxial Moment Factors

	M_{0Ed} Moment tonf-m	M_{add} Moment tonf-m	Minimum Ecc mm	β Factor Unitless	Length mm
Major Bend(M3)	-0.2275	0.2991	0	1	2700
Minor Bend(M2)	0.3542	0.2991	0	1	2700

Table 16 - Axial Compression Ratio

Conc Capacity (α_{CC} .A.f_{cd}) tonf	Compressive Ratio N_{Ed} /(α_{cc} .A.f_{cd})	Comp Ratio Limit	Seismic Load?	Ratio OKay ?
509.8581	0.067	0.55	No	Yes

Table 17 - Shear Design for V_{Ed2} , V_{Ed3}

	Shear V_{Ed} tonf	Shear V_{Rdc} tonf	Shear V_{Rds} tonf	tan(θ) Unitless	Rebar A_{sw} /s mm²/m
Major, V_{Ed2}	0.1799	16.0831	0	0.4	0
Minor, V_{Ed3}	0.5199	16.0831	0	0.4	0

Rules: Joint shear stress ratio is only determined for a station
a) if the station has a beam-column joint (top of the column),
b) if the frame is a DCHe or DCM moment resisting frame,
c) if the column above is a concrete column when it exists,
d) if all the beams framing into the column are concrete beams
e) if the connecting member design results are available, and
f) if the load combo involves seismic load.

Calculation of longitudinal reinforcement:
columns with square section(50 x 50см)
class of concrete C25 / 30 (fck =30kgf/mm2, ϒc = 1.5, fcd = acc · fcc / ϒc = 1 · 30 / 1.5 = 20 MPa). Reinforcement class S500 (f_yk = 440 MPa, fyd383 = f_yk / ϒ_s = 440 / 1.15 = 383 MPa).

$$\frac{c_1}{h} = \frac{c_2}{h} = \frac{50}{500} = 0.1$$

N_{ed} = 33.96 T=333.03 кН; M_{ED} =1.12 т·м = 10.98 кН·м.
(efforts from RSN1 in column 3739) The values are taken from the Etabs 19 software

$$\alpha_{Eds} = \frac{N_{ed}}{b \cdot h \cdot f_{cd}} \quad (9)$$

$$\alpha_{Eds} = \frac{333.03 \cdot 10^3}{500 \cdot 500 \cdot 20} = 0.22 \rightarrow \omega_{tot} = 0.25$$

$$A_{s,tot} = \omega_{tot} bh/(\frac{f_{yd}}{f_{cd}}) \quad (10)$$

$$A_{s,tot} = \frac{0.25 \cdot 500 \cdot 500}{(\frac{383}{20})} = 3262.7 \text{мм}^2 = 32.627 \text{ см}^2$$

$A_{s1} = A_{s2}$ = 32.627 см^{2}accept 12Ø 18 S600 (A_s = 30.48 см^2).
We accept transverse reinforcement constructively proceeding from the following condition that the diameter should be:

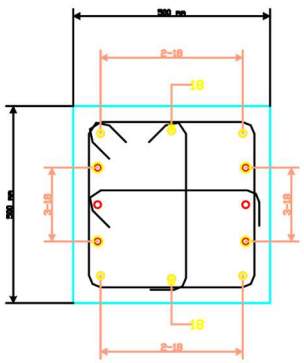

Figure 4 – section of column

3 Structural part of the project

Dead load, own weight of floor, weight from wall, soil pressure, Supper dead load, temporary load, live load, wind and snow load. so, for the own weight of the structure and Constant loads we have

1 In combination of loads, constant loads from bearing and non-bearing Structures should be considered as a whole, as one impact.

2 Loads from added or moved carriers or non-bearing.

3 Structures should be considered for the most unfavorable design. combinations.

4 The design should consider permanent loads from new pavements. Of communications laid after the end of the work.

6 P In the basic design situation, the water level should be considered. But mostly we take one when the height of floor is more than 10 floors if it was less than 10 floors, we take 0.9 so four project we ought to take 0.9 according to the EN1990, 4.1.2

3.1 Dead loads

Dead load of construction is the own weight of materials and elements. We can find it from specific materials density and their thickness.

Table 18 - Materials own weight according to the EN1990, 4.1.2

Own weight of floors	Layer thickness, m density, kg/m^3	Characteristic load, kg/m2
For foundation floor		
flooring	0.08 1000	80
Expanded polystyrene	0.05 1400	70
Roofing materials 2 layers (insulation)	0.15 200	60
Reinforced cement-sand screeds	0.05 1800	90
Total for foundation floors		300=0.30KN/m^2
For the floors		
Insulation	0.08 200	16
Plastering	0.005 2040	10.2
Reinforced cement-sand screeds (PCC)	0.21 2400	504
Glue		1.2

Parquet board(flooring)	0.015 780	11.7
Total for first floor		543.1=5.4KN/m^2
Own weight of roof floor		
Roof cladding	0.0012 7850	9.42
Vapor barrier		0.015
Insulation foam concrete	0.088 200	17.6
Reinforced cement-sand screeds (PCC)	0.3 2400	720
Plastering	0.01 2040	20.4
Bituminous waterproofing bottom layer	0.001 100	0.1
Bituminous waterproofing top layer	0.001 100	0.1
Total for a flat roof		7.6735 KN/m^2

For wall materials we have the following properties
-Shear wall 25cm by the height of 2.8m and 3.8 m in two floors underground.
-External self-supporting wall 28cm made of brick, 0.05m glass.
-Internal self-supporting walls 15cm made of blocks by the height of 3.2m.

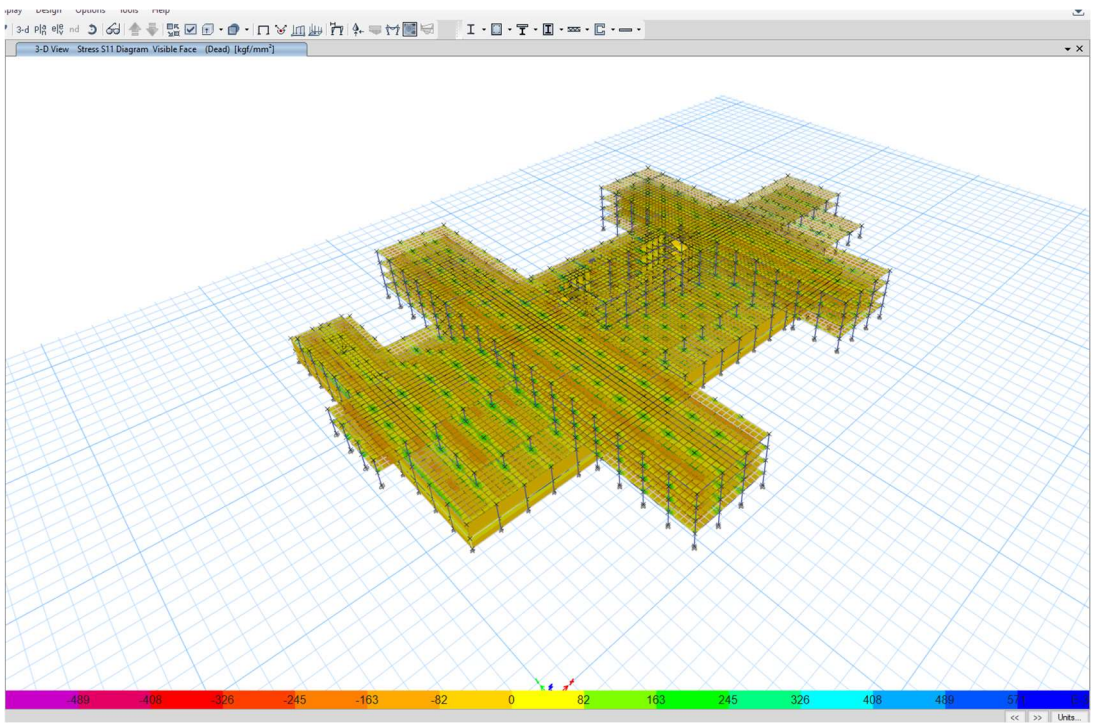

Figure 5 - shell forces of dead load

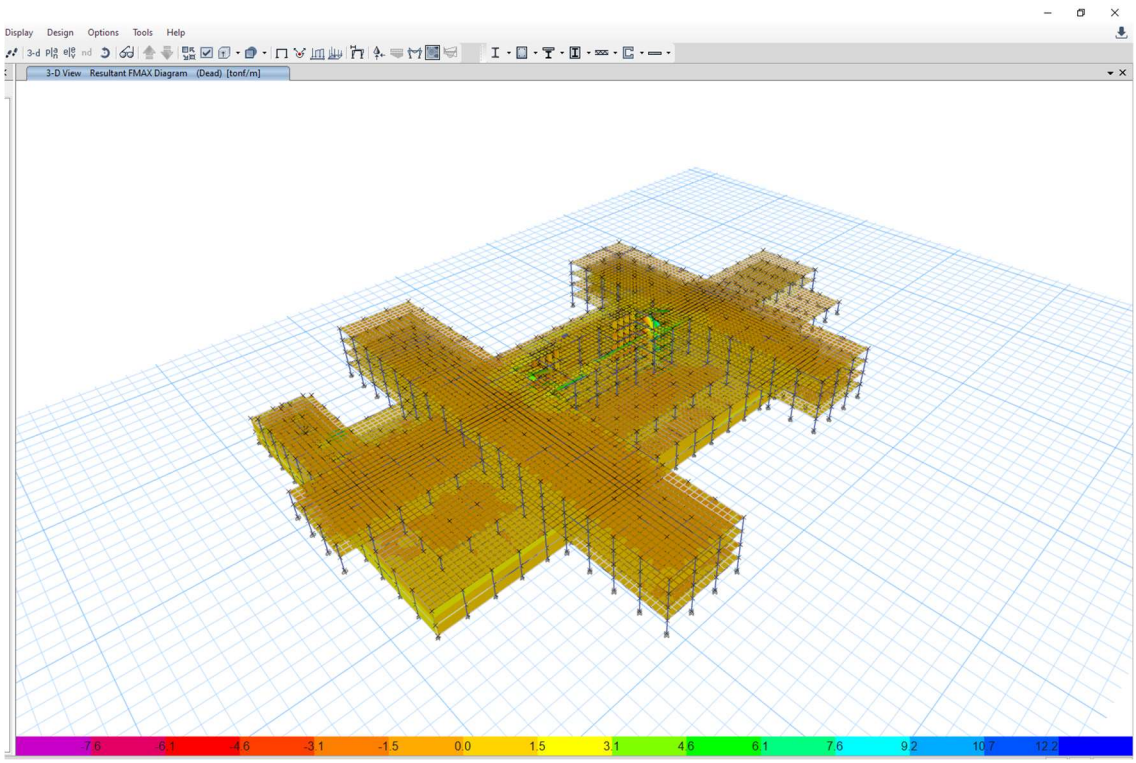

Figure 6 - Fmax diagram of dead load

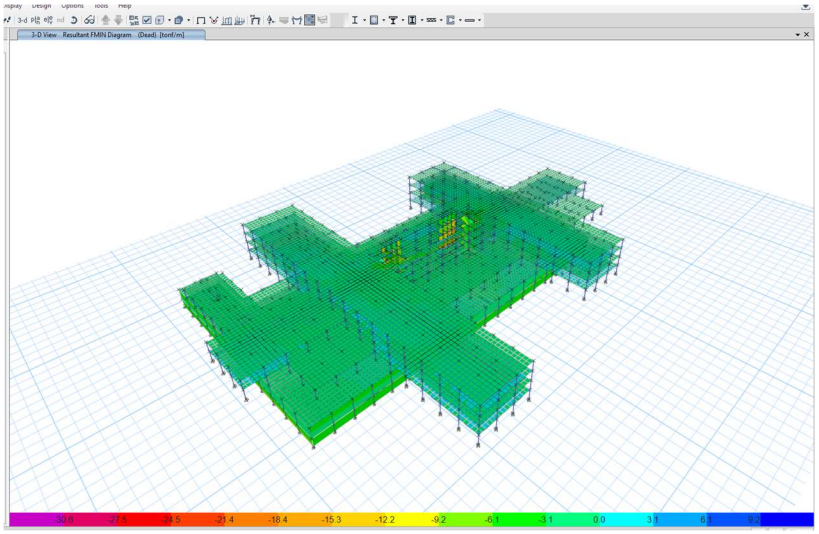

Figure 7 - Mmax diagram of dead load

Table 19 – Materials of wall

Wall construction	Layer thickness, m density, kg / m3	Characteristic load, kg / m
External self-supporting walls (wall height 3.2 m):		
Plaster based putty.	0.05	4.75
	95	
Aerated concrete	0.015	9
	600	
Glassing	0.05	104
	2600	
Air gap	0.001	0
Brick as main material	0.3	540
	1800	
Total for self-supporting walls:		657.75 kg/m
External supporting (shear) walls by height 5m		
RCC concrete	0.25	600
	2400	
Plastering	0.05	4.75
	95	
Insulation materials	0.12	216
	1800	
Total for parapet:		820.75 kg/m
Partitions (height 4 and 5m)		
Drywall	0.125	33
	600	
Sound insulation Isover	0.075	4.62
	14	
Drywall	0.0125	33
	600	
Total for partitions:		70.62 kg/m

3.2 Temporary Load

To find out temporary loads we should check the CH-PK EN 1991-1:2000/2011 table 6.1 to 6.2 there we will take according to the given region Semey and we will also see the category of our building which are divided into four (A, B,C&D) so here I chosen category C3 First for slab equal to 5kN/m^2or 0.5t/m^2, for stairs 5kN/m^2or 0.5t/m^2 and for Non-operational roof 1.2kN/m^2.

3.3 Live load

For the live load of our construction, we have a category C3 public library, where the loads are considered by the following.

Table 20 - Live loads on floors, balconies and stairs of buildings

Usage categories	qk, kN / m 2	Qk, kN/m2
C3	5	5

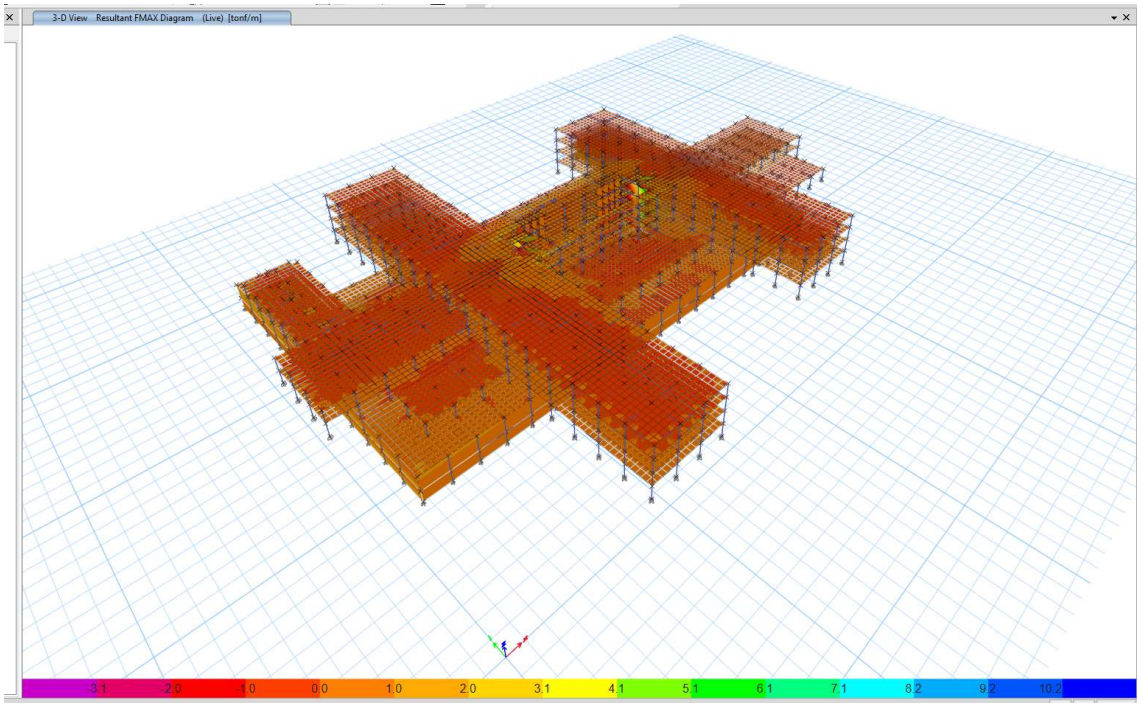

Figure 8– Fmax diagram live load

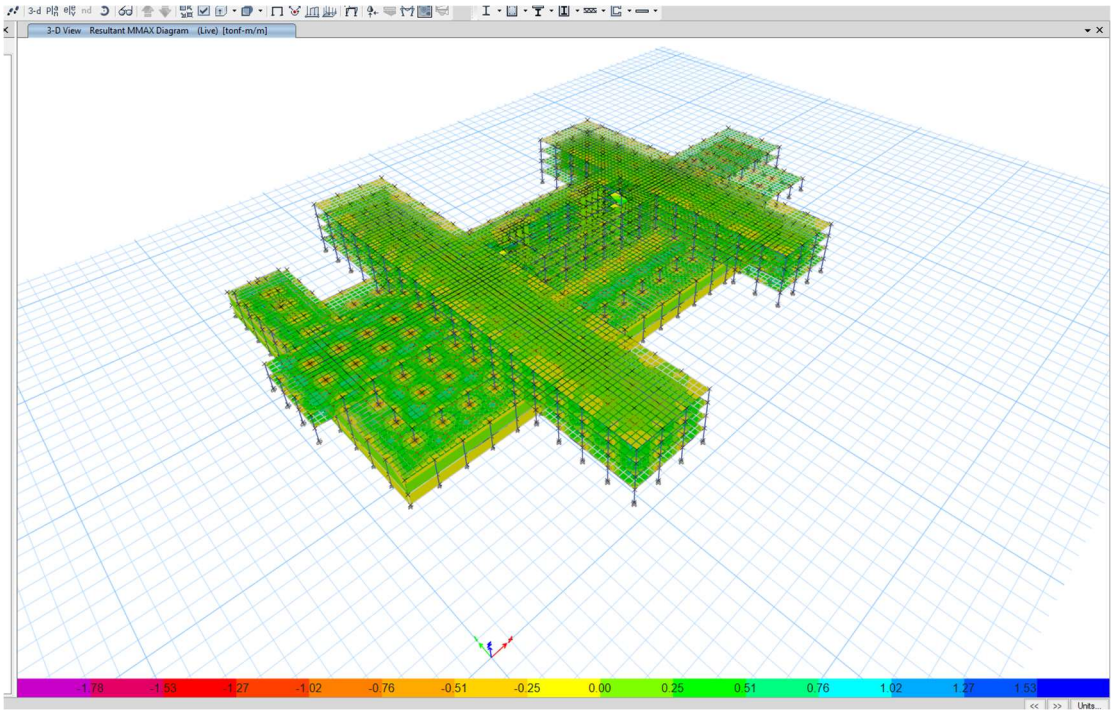

Figure 9 - Mmax diagram live load

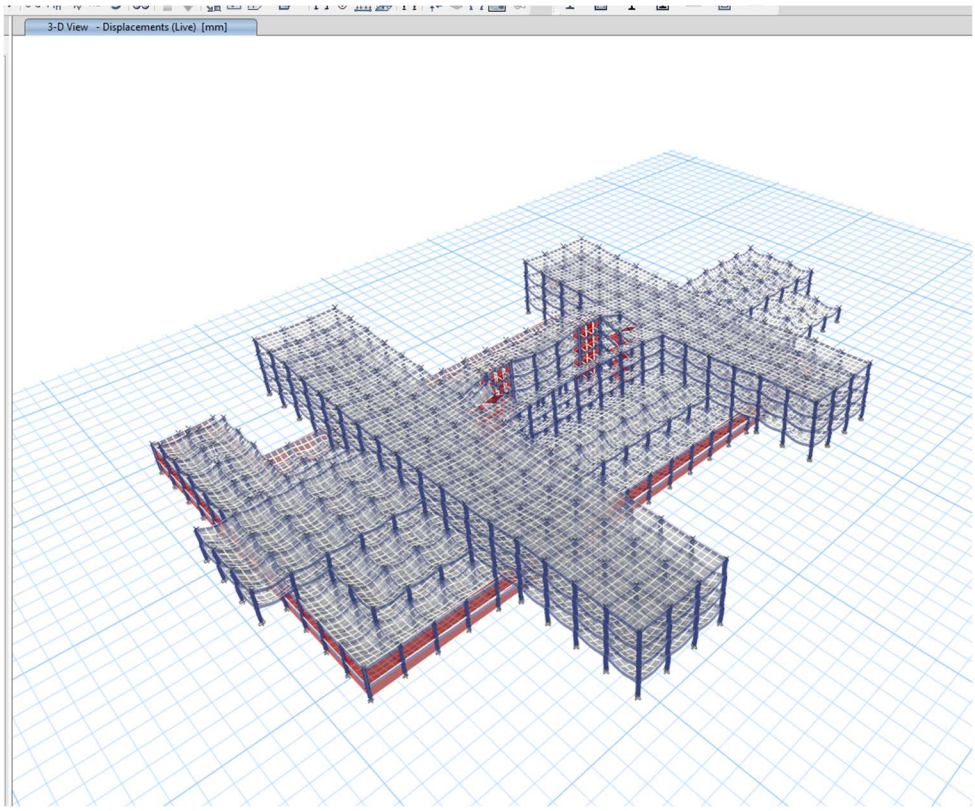

Figure 10 - displacement of live load

3.4 Calculation of Snow Load

Snow loads on the building should be determined from the following formula. For coefficient of snow load i have the I region Atyrau city.

$$S = \mu_i \cdot C_e \cdot C_t \cdot S_k \qquad (11)$$

where S_K- calculation value of the extreme snow load on the ground for specific area=1.5kpa

Ce is the environmental coefficient or exposure factor if protected =1

Ct is the temperature coefficient if heated = 1

μ_i is coefficient of snow load form for general buildings=0.8

$$S = 0.8 \cdot 1 \cdot 1 \cdot 1.5 = 1.2\text{kpa} = 102\ \text{kgf/m}^2$$

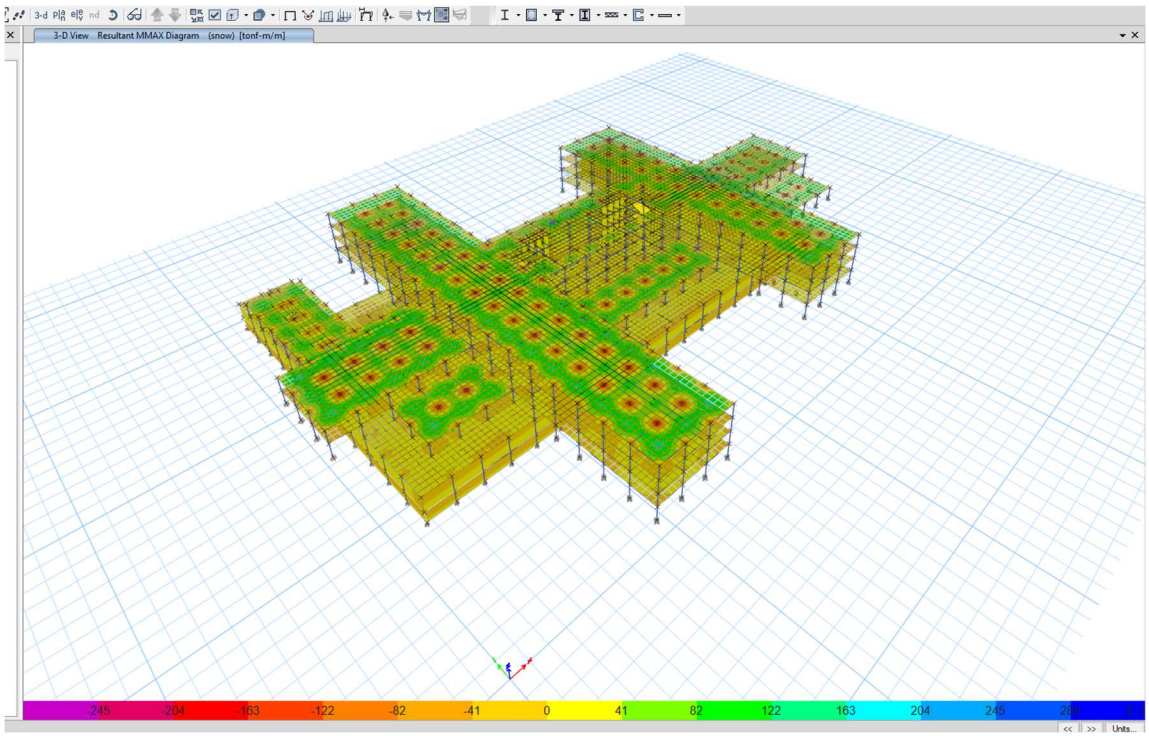

Figure 11 - Snow load

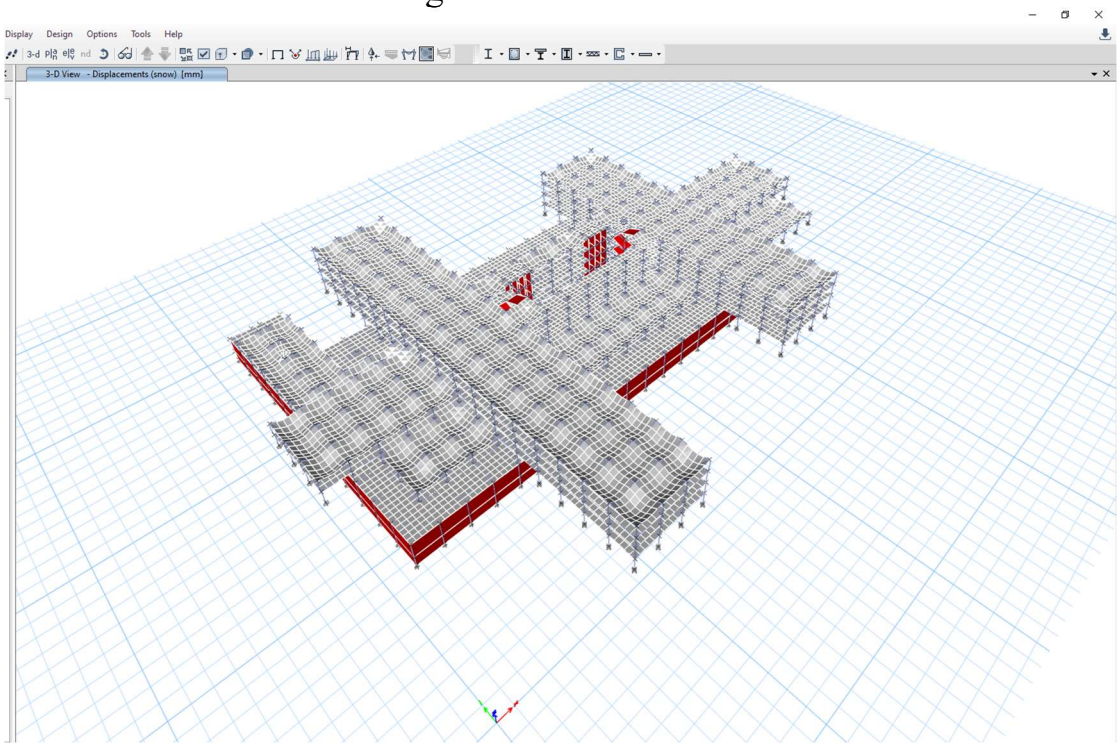

Figure 12 - displacement of snow load

3.5 Calculation of Wind load

The wind load acts on the building from the windward (active pressure) and the windward side (suction). Calculated intensity value of wind load. And we have 3 floors which have difference height and position, while two floors are underground which are do not affected by wind load and one floor is above the ground by the height of 3.2m. Span between two columns is 6 for 17 span we have 102m, the load will affect 15.5%from the East and by the other side

The wind load is taken from Eurocode EN 1991.1-1 2002/2011 is V region, in Semey city.

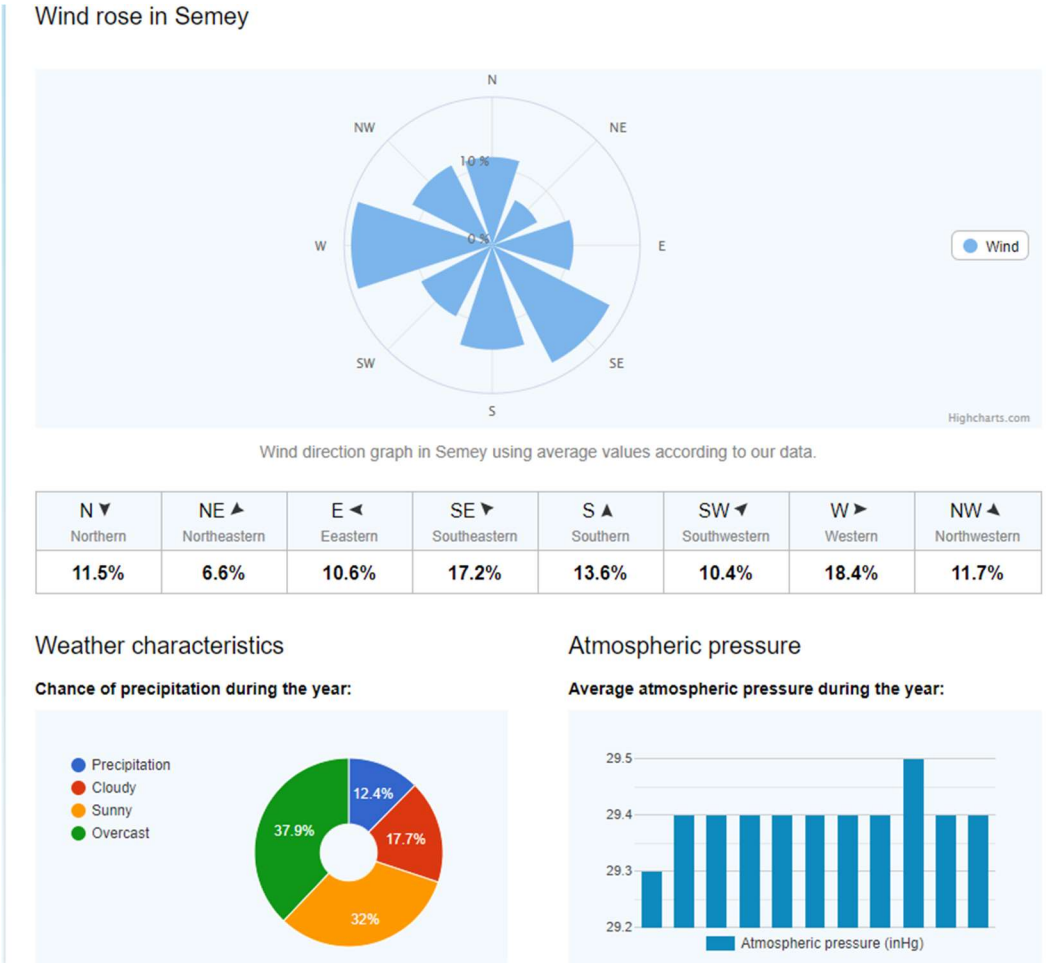

Figure 13 - Wind rose in Semey

1. External pressure on the windward side (zone D): Separation of the building in height into zones corresponding to the base height for external pressure *ze* according to method 7.2.2 (1) at $b = 60$ m $< h = 11 < 2b = 120$ m

In this we only need to calculate only one zone of the construction because the height is lees than b

Wind pressure according to formula w_e:

$$W_e=q_p(z_e)\cdot c_{pe} \quad (12)$$

where $q_p(ze)$ is the peak value of the velocity wind pressure

Z_e is the base height for external pressure according to section 7 [5].

C_{pe}-aerodynamic coefficient of external pressure

$$q_p(ze)=c_e(z)\cdot q_b \quad (13)$$

Where h/d=V and c_{pe} =0.56 by the speed of 30m/sec

Basic speed wind pressure for wind region q_b=1kpa.

Table 21 - Wind pressure

w_e= 102м	c_e102: = 1.43	w_e = 1.43 · 560 · 1 = 800.8pa = 80.1 kg/м
w_e = 144м	c_e144: = 1.9	w_e= 1.9 · 560 · 1 = 1064 pa = 106 kg/м

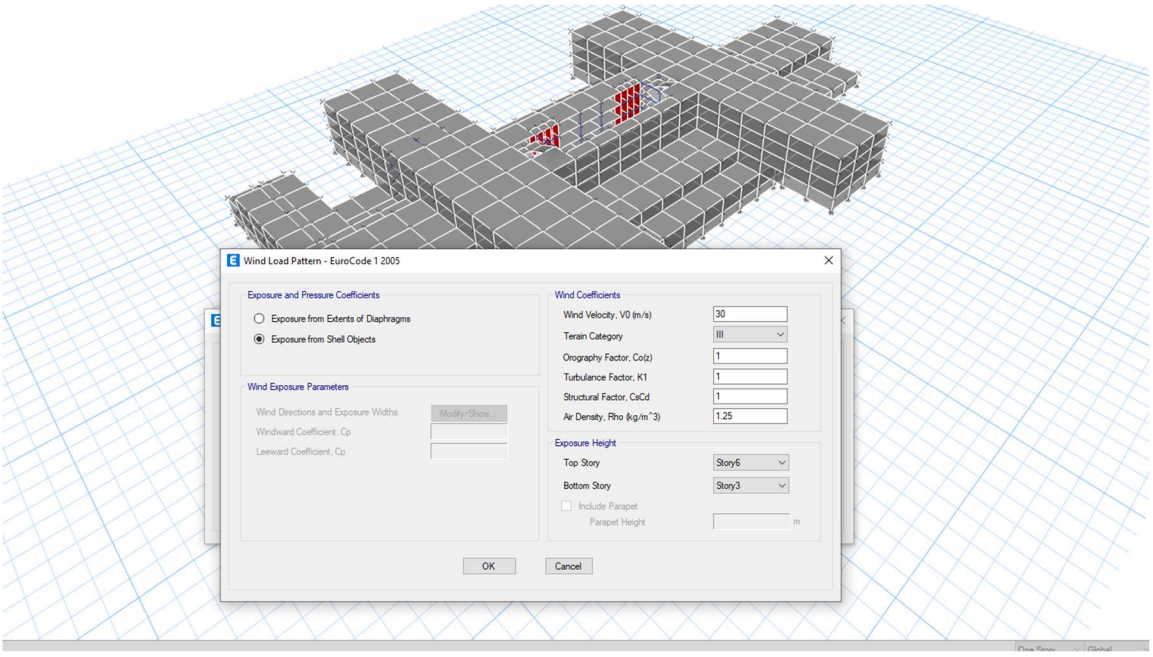

Figure 14 - Wind pressure in zones

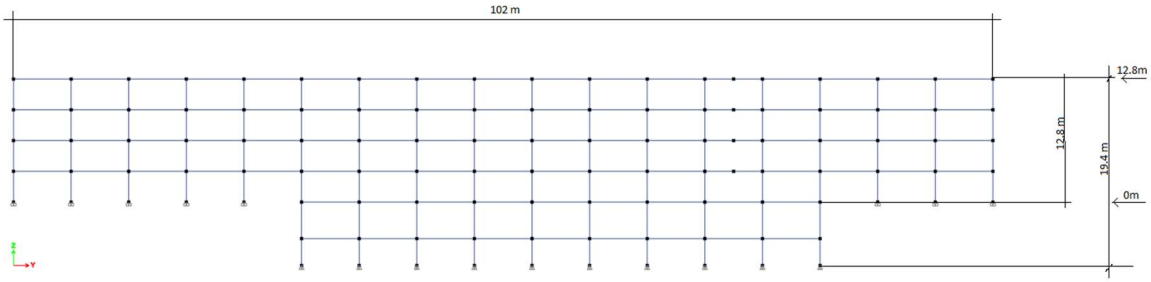

Figure 15 - Wind pressure in zones

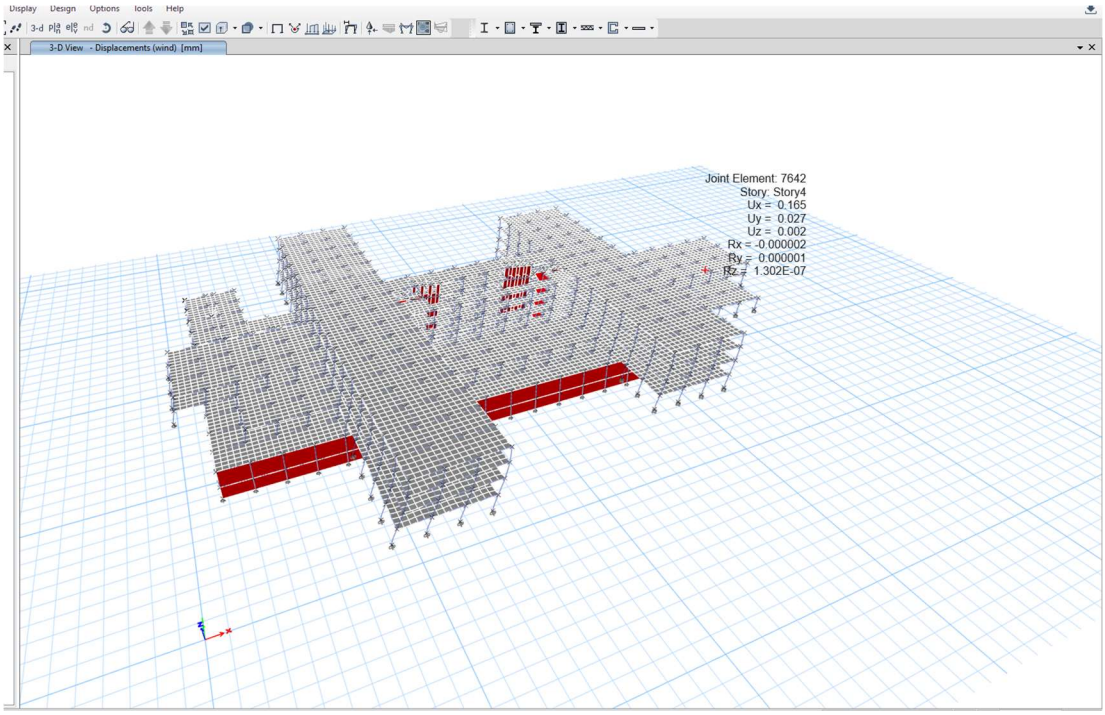

Figure 16 - Wind load

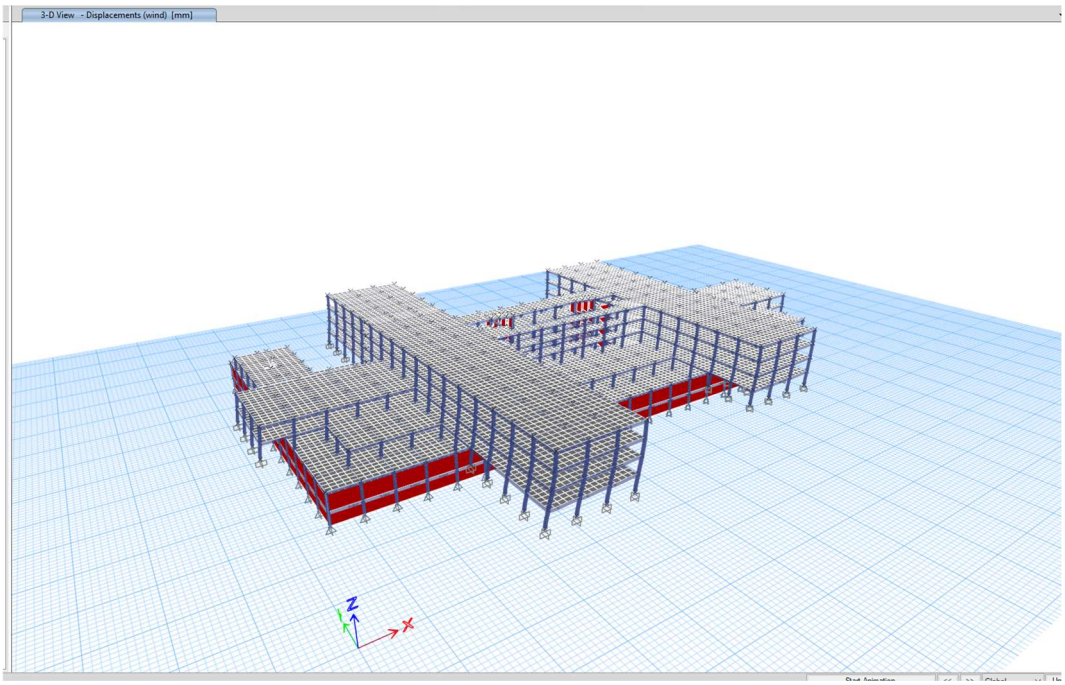

Figure 17– Wind load

3.6 Settlement Analysis

Settlement is that the term wont to describe the action by which a grip pushes into the bottom in response to the load to which it's subjected. The quantity of settlement may be a function of the dimensions of the footing, the load to which the footing is subjected, and also the characteristics of the soil directly beneath and, for a few distance, below and beyond the footing. There are procedures by which the number of settlement may be approximated for any given condition of footing size, loading, and soil characteristics. The experience gained by observation of the time-related performance of countless buildings has given the architect and engineer insight on what quantity settlement can safely be permitted under a given set of circumstances. Settlement can never be eliminated, unless referring to solid rock. It will be controlled, however, by selecting the sort of foundation best suited to the kind of soil found at the location, and so by establishing an allowable soil bearing pressure as a function of allowable settlement

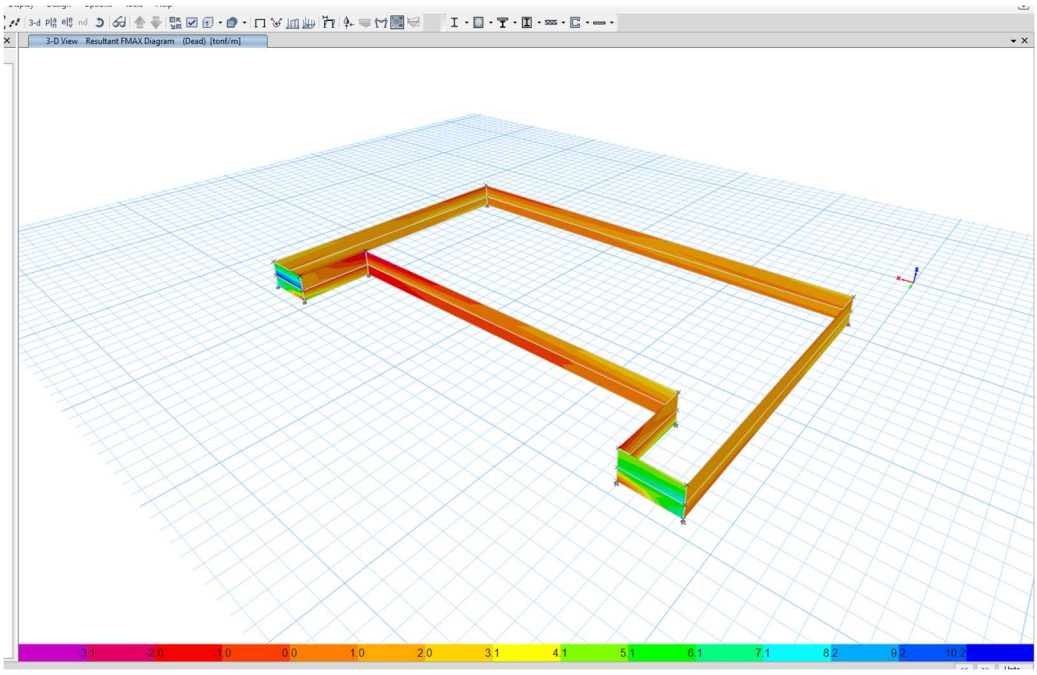

Figure 18 - Soil pressure

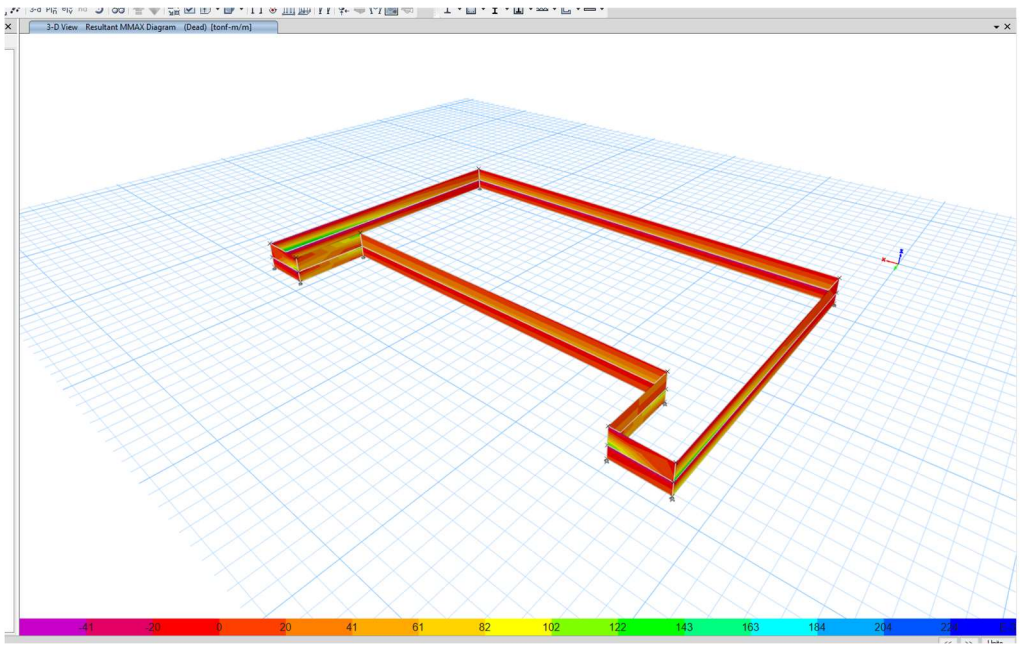

Figure 19 - Soil pressure

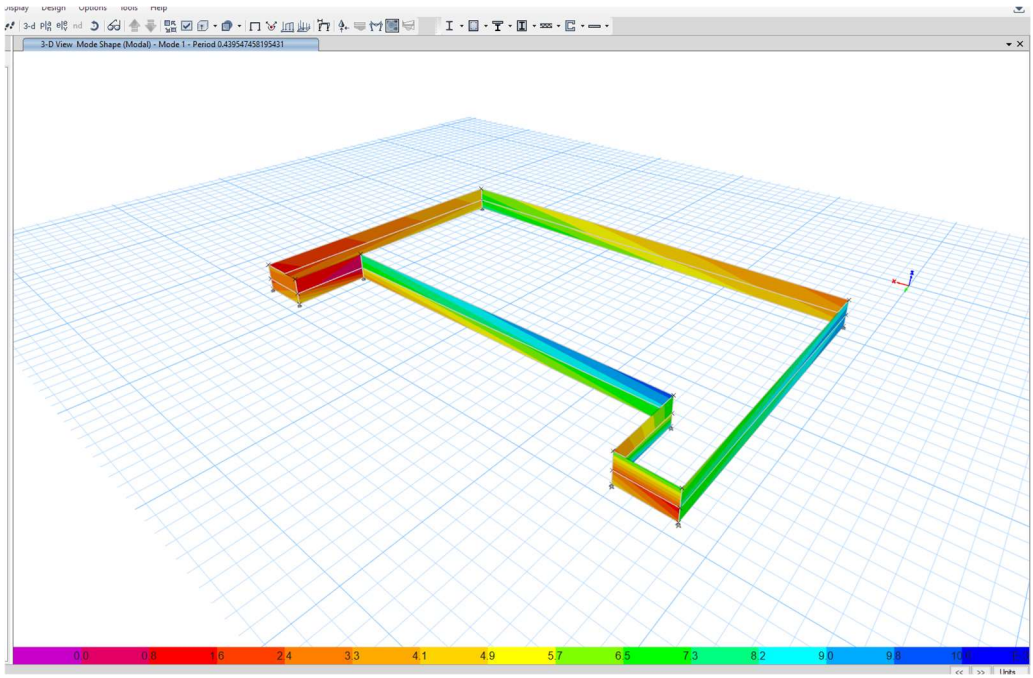

Figure 20 - Soil pressure

4 Technological and organizational part

4.1 Concreting

Concreting is one of the most important, challenging and attractive stages of construction in the world, which is performed on concrete and metal structures.

Prior to the early eighteenth century, concreting was an unfamiliar word. In 18322, it was the Egyptians who initiated the concreting industry and the construction of strong structures using a combination of gypsum and lime.

In general, pouring concrete at very high and low temperatures leads to lack of concrete resistance, so it is better to do the formwork at the right temperature.

Pouring concrete at very low temperatures is a problem due to the freezing of water inside the concrete. When water freezes, cement and sand particles shrink. By reducing the adhesion between the concrete components, its strength decreases.

If you have to make concrete at low temperatures, use a chlorine-nitrate solution to prevent water from freezing for concreting. Of course, using hot water to prepare concrete can reduce the difficulty of pouring concrete in cold weather to some extent.

Pouring concrete at high temperatures reduces the strength of concrete due to increased long-term productivity, thermal cracking and the tendency to shrink due to drying, reduced concrete strength, increased corrosion rate of reinforcing steel and reduced concrete surface uniformity.

When stopping pouring concrete, it is best to use iron to seal the sides of the concrete. It goes without saying that the concrete cut should be vertical, not horizontal. Because it significantly reduces the strength of the structure.

4.2 Main points regarding concreting

The concrete must have a pasty state so that it can easily go into the space inside the rebars and flow.

Concrete that is re-added to make it smoother may lose its original setting and can be reused if approved by the supervising engineer.

The distance between the concreting site and the concrete pouring point should be as small as possible.

If you are concreting on the ground, the area should be clean.

If you do concreting at height, for example columns, be sure to use a fall shot.

What equipment do we need to do concreting at height?

If you want to do concreting at height, one of the oldest methods is to use a lift. In this method, we pour the concrete into a special container. This method reduces the work speed. This old method is not recommended for large projects and also reduces the quality of concrete.

4.3 Classification and types of concrete

Concrete is obtained by mixing a binder (usually cement), fine (sand) and coarse (crushed stone or gravel) aggregate, water and, if necessary, special additives. The density of concrete in the hardened state ranges from 2200 kg / m3 to 2500 kg / m3. When choosing the type, brand, class of concrete for structures, the engineer is guided by calculations, norms and recommendations. The full cycle of concrete curing is 28 days, under normal conditions the temperature is up to 20 degrees and the humidity is at least 80-90 percent. In order to understand these designations, consider the main characteristics of concrete mixes:

Heavy (regular) or lightweight concrete. The main difference between such concretes is in the aggregate. Heavy concrete contains coarse aggregate - gravel or pebbles. In the composition of lightweight concrete (types: aerated concrete, perlite concrete, foam concrete), blast-furnace slag (slag concrete) is filled with relatively light materials - expanded clay, perlite, foamed powder. Heavy concretes are applicable for structural elements (foundations, beams, floors), light ones are used for structural and heat-insulating elements (wall blocks, lightweight ceilings). Types of fractions (sizes) of coarse aggregate. Coarse-grained concrete - with aggregate greater than 10 mm, fine-grained concrete in which aggregate less than 10 mm is used.

4.4 Concreting steps

4.4.1 Batching

To the process of measuring various materials used in concrete, including cement, coarse, sand, water and… to make the desired concrete; Say categories. Classification can be done in two ways: volumetric classification, weight classification

In volumetric classification, the quantity of concrete materials is volume, and in weight classification, this quantity is weight.

4.4.2 Concrete mixing

In this process, all concrete materials are classified in the required proportions; They are mixed together until they reach a uniform color and texture. Mixing by hand and mixing machines are two different methods for this step.

Note: To achieve the best quality, the ingredients must first be mixed together in dry conditions and then in wet conditions.

4.4.3 Carrying concrete

When the concrete mixing step is done correctly; Fresh concrete must be taken

to the construction site. This stage is called transportation. The concrete is then poured onto the formwork in its proper place. Two methods of concrete transfer:

1) Manual transfer;
2) Mechanical transfer.

4.4.4 Reinforcement

Rebars and braces and… should be installed according to the design drawings of the beams and columns of the building and cleaned of any contamination such as oil. It should be noted that incorrect rebar can cause structural damage and make the whole costly concreting process inefficient.

4.4.5 Construction and installation of molds

Formwork must be designed to withstand the construction loads that are applied to it during the concreting process; Include the weight of fresh concrete, the weight of workers and operators and the weight of machinery used to resist. Various materials such as wood, steel and aluminum can be used for molds.

4.4.6 Pouring concrete

This step is very important and several points must be observed during the concreting process:

Concrete should be poured as close as possible to its final position to prevent it from separating.

Spreading and moving the concrete horizontally should be prevented.

Concrete should be poured in uniform layers and its accumulation should be avoided in large mounds or sloping layers.

4.4.7 vibration and consolidation and surface polishing

During the compaction stage, air bubbles are removed from the fresh and poured concrete. The reason for this is to increase the final strength of the concrete by strengthening the adhesion between the concrete and the rebars. Different internal and external vibrators are used for this stage. Each concreted layer must be thoroughly compacted before pouring the next layer, and the subsequent layers must be poured while the underlying layers are still plastic, so that a uniform construction is achieved.

Concrete poured must be compacted so that it gives the structure of the desired strength and durability. The method of complexion is visually demonstrated here: Freshly placed concrete is to be compacted well to make concrete dance and impervious

Compaction can either be done manually or mechanically. Manual compaction is done either by rodding with steel rods or tamping using wooden cross beams, this method is usually employed for small jobs. Mechanical compaction is done by using vibrators, these are very effective in compacting stiffer concrete resulting in highly dense, and how much in this country which Bones well with the reinforcement, effective compaction and haunts us the strength and durability. In most of the RCC Works need vibrators are used for compaction in most of the RCC Works need vibrators are used for compaction, the needle of the vibrator should be immersed vertically into concrete and should remain vertical throughout the operation. Concrete at a location mustn't be vibrated for quite 15 seconds. The needle needs to be withdrawn when the air bubbles cease to look. Vibrator mustn't be held touching the reinforcement, tube of the vibrator shouldn't be bent at sharp angles to avoid breaking. the spacing of the vibrator insertion Shall be 15cm for 20 mm needle and 30 cm for 40 mm needle effective compaction makes the concrete dense and impervious over compaction results in segregation. Compacting concrete using vibrators is more practical than manual compaction.

4.4.8 Concrete maintenance

Maintenance is the stage at which the concrete must retain its moisture for a certain period of time to complete its hydration reaction. This period is different for different concretes with different properties; But for ordinary concrete it takes about 8 days.

4.5 Determination of labor volume and cost of exposure

The assignment of specific ways and means to carry out the

The bot allows you to specify the composition and scope of work and go to their specific labor intensity on the projected facility. The

The labor intensity is calculated using the data in Table. 1 to 4 and norms of time for work in accordance with ENIR [3, 4].

The calculation is carried out in the form of "Statement of labor costs, machine time-costs and labor costs "(Table 8); when compiling a statement the composition of the workers' links according to the ENIR is determined,

The total costs of labor, computer time and labor costs are

Diastral on the amount of performance of the whole complex of works on erection above the top of the building (the sum of the values in columns (8), (9), (13)).

Table 22 - The cost of labor time machine time and labor costs

Process name	Unit	Volume of work	justification	Rate of time	
				Working	drive
Steel work (bar bending)	Ton	456.0886	Column, slab	2057	
Form working	m^2	8379.2	-	2095	
Concrete purring	m^3	1630.6	-		6
Brick masonry	m^3	710.78	Walls	1067	
Opening	m^3	162	Windows, doors	32	
Heat insulation work	m^2	1870	Walls	187	
Moisture insulation work	m^2	7776	-	778	
Plastering	m^2	3740	-	300	
painting	m^2	3740	-	159	
Screed	m^2	7776	floor	162	
Roofing work	m^3	6540		231	

Table 23 - List of mechanisms, equipment and devices for transportation, laying and compaction of concrete mixture

Name of (Mark)	Designated	Main parameters	Required Number
Crane	letting and operating of own or leased real estate	for lifting heavy loads	4
Concrete mixer	consists of tank system, mixing system, driving system	homogeneously combines cement	6
Vibrating Fresno	The frequency of vibration varies up to 15000 rpm	Strickling and vibrating	6
Screed ruler machine	scraping of concrete ground surface, improve the density of concrete	Basic Info Model NO. ZPC-25 Certification	4

4.6 Calculation of concrete volume

Columns: 500 x 500

First basement:

$$V = 0.5 \cdot 0.5 \cdot 2.8 = 0.7 \text{ m}^3$$

Total concrete volume in First basement:

$$V_{total} = 0.7 \cdot 224 = 156.8 \text{ m}^3$$

Second basement :

$$V = 0.5 \cdot 0.5 \cdot 3.8 = 0.95 \text{ m}^3$$

Total concrete volume in second basement:

$$V_{total} = 0.95 \cdot 224 = 212.8 \text{ m}^3$$

First floor :

$$V = 0.5 \cdot 0.5 \cdot 3.2 = 0.8 \text{ m3}$$

Total concrete volume in second floor:

$$V_{total} = 0.8 \cdot 181 = 144.8 \text{ m3}$$

Second floor :

$$V = 0.5 \cdot 0.5 \cdot 3.2 = 0.8 \text{ m}^3$$

Total concrete volume in second floor:

$$V_{total} = 0.8 \cdot 196 = 156.8 \text{ m}^3$$

Third floor :

$$V = 0.5 \cdot 0.5 \cdot 3.2 = 0.8 \text{ m}^3$$

Total concrete volume in third floor:

$$V_{total} = 0.8 \cdot 196 = 156.8 \text{ m}^3$$

Fourth floor:

$$V_{total} = 0.8 \cdot 152 = 121.6$$

Beams : 500x350

First basement

$$V = 0.5 \cdot 0.35 \cdot 6 = 1.05 \text{ m}^3$$

Total concrete volume in first basement:

$$V_{total} = 1.05 \cdot 214 = 224.7 \text{ m}^3$$

Second basement :

$$V = 0.5 \cdot 0.35 \cdot 6 = 1.05 \text{ m}^3$$

Total concrete volume in second basement:

$$V_{total} = 1.05 \cdot 214 = 224.7 \text{ m}^3$$

First floor :

$$V = 0.5 \cdot 0.35 \cdot 6 = 1.05 \text{ m}^3$$

Total concrete volume in first floor:

$$V_{total} = 1.05 \cdot 170 = 178.5 \text{ m}^3$$

Second floor :

$$V = 0.5 \cdot 0.35 \cdot 6 = 1.05 \text{ m}^3$$

Total concrete volume in second floor:

$$V_{total} = 1.05 \cdot 160 = 168 \text{ m}^3$$

Third floor :

$$V = 0.5v0.35 \cdot 6 = 1.05 \text{ m}^3$$

Total concrete volume in third floor:

$$V_{total} = 1.05 \cdot 160 = 168 \text{ m}^3$$

Fourth floor:

$$V = 0.5 \cdot 0.35 \cdot 6 = 1.05 \text{ m}^3$$

Total concrete volume in fourth floor:

$$V_{total} = 1.05 \cdot 114 = 120 \text{ m}^3$$

Slabs:

First basement

$$V = 0.2 \cdot 72 \cdot 114 - (324) = 1318 \text{ m}^3$$

Second basement:

$$V = 0.2 \cdot 72 \cdot 114 - (324) = 1318 \text{ m}^3$$

First floor:

$$V = 0.2 \cdot 6 \cdot 6 = 7.2 \text{ m3}$$

$$V_{total} = 7.2 \cdot 144 = 1036.8 \text{ m}^3$$

Second floor:

$$V = 0.2 \cdot 6 \cdot 6 = 7.2 \text{ m}^3$$

$$V_{total} = 7.2 \cdot 120 = 864 \text{ m}^3$$

Third floor:

$$V = 0.2 \cdot 6 \cdot 6 = 7.2 \text{ m}^3$$

$$V_{total} = 7.2 \cdot 120 = 864 \text{ m}^3$$

Fourth floor:

$$V = 0.2 \cdot 6 \cdot 6 = 7.2 \text{ m3}$$

$$V_{total} = 7.2 \cdot 87 = 626.4 \text{ m}^3$$

4.7 Set of machines and equipment for concrete works

The number of machines and vehicles included in the set must provide the required intensity of the concrete work. Hours or shift intensity of concrete mix laying

can be given by the head of the Course Project. If neither the intensity nor the duration of the concrete works are not set, then as the intensity of the concrete should be accepted a performance of leading concrete paver. The operational performance of the crane for the supply of concrete in bins is determined from the condition of performing by the crane an 8 – 10 cycles per hour.

To installation of the formwork and reinforcement, feeding of concrete mix into the bins to be used self–propelled jib cranes – automobile, at a special chassis of motor type, pneumatic and caterpillar–mounted. When choosing a brand, it is necessary to state the required crane cargo characteristics – capacity, radius and hook height.

The required load capacity of the crane is the heaviest weight of the lifted load (formwork block–form, reinforcing mesh or frame, bin with concrete mix). Weight of bin with concrete mix M:

$$M=Me+\mathrm{E}\cdot\gamma dc,t, \quad (4.1)$$

where Me – mass of the empty bunker, (annex.1 , table. 18) t;

E – hopper capacity, (annex.1 , table 18) $m3$;

γdc – 2,4 t/$m3$ – density of concrete mix.

Technical characteristics of bunkers for supply of concrete mix cranes:

(BP–1,6)

Capacity, $m3$) = 1.6 m^3

Loading capacity, t) = 4,0

Weight, kg) = 435 kg

Length = 3970 mm

Width = 1472mm

Heigh = 940mm

Me = 435kg

E = 4

γdc = 2,4 t/m^3

$$M=435+4\cdot2.4=444.5$$

Features of rotated bins and not rotated bins for feeding the concrete mix by valves are given in (annex №1. tab. 18).

The required radius and height of crane hook lifting is determined graphically through the drawn works schemes on a scale.

Selection of crane brand is made by comparing the required parameters of the crane with cargo characteristics of self–propelled jib cranes. Generally, to perform formwork and reinforcement works, supply concrete mix is used one crane.

Choosing a concrete pump as a paving machine, should take into account the relative placement of the concrete pump and concreted foundations – the desired range. Specifications for the concrete truck are given in (annex №1 tab. 19). The (ABN 75/32) concrete pump with the following characteristics was selected:

Technical productivity, $m3$/h: 75

Quantity of sections of an arrow, piece: 3

Inner diameter of a concrete delivery, mm: 125
The greatest range of giving of a concrete mixture: 28
(Basic car: (KaMAZ 53212))
The car sizes in transport situation, m
Length: 10,3
Width: 2,5
Height: 3,8

For transportation of concrete mix should select the brand of mixer truck (annex №1 tab. 20). The amount of concrete mix, hauled in mixer trucks must comply with concreting intensity.

Technical characteristics of auto concrete mixer:
(SB–159Б)
Geometrical volume of a mixing drum, m3: 75
Capacity of a mixing drum on a concrete mixture, m3): 3
Basic car : (KaMAZ 54111)
(The car sizes in transport situation, m):
(length = 7,6
Width = 2,5
Heigh = 3,6

With a relatively low intensity of concreting by the crane to be adopted a mixer truck 4÷5, m during the concreting by concrete pump – 5÷7, m.

4.8 Life safety and labor protection

General requirements

Life safety and labor protection is a complex of legal, technical and sanitary measures aimed at creating safe and healthy working conditions. They are carried out in strict compliance with the law.

During the installation of finishing works, such activities were provided as:

in order to dry the premises in production, air heaters are used that operate only on liquid fuel;

during the manufacture of paint substances at the construction site, it is necessary to use premises equipped with ventilation, which do not allow exceeding the maximum permissible concentration of harmful substances in the air;

it is forbidden to prepare paint compositions in violation of the instructions of the paint manufacturer, as well as to use solvents without a special certificate indicating the nature of the harmful substances.

Violation of the set of rules for the operation of electrical installations, touching unprepared to live wires, contact with non-live parts that are energized due to erroneously designed insulation or grounding devices, leads to the following:

The provision and guarantee of fire safety at the construction site is carried out in accordance with safety regulations. Fire prevention measures, carried out as after briefing for employees, are developed in conjunction with the construction

organization project and the work organization project. These measures are aimed at preventing the occurrence of a fire, limiting its spread, creating conditions for the successful evacuation of people and material assets from the danger zone, providing conditions for localizing and extinguishing a fire.

Safety Measures During Concrete Construction:

1 Wear Protective Clothing

Fresh concrete poses a risk and then, it's important to wear protective gear while working. Proper Eye Protection, Long Sleeved Shirt, Waterproof Gloves &Full Length Trousers are essential gears for the task site. Don't forget to clean off the cement and flunk with clean water immediately after work.

2. Use Construction Machinery Properly

Rotating machinery is that the major explanation for the accidents at construction site. If not employed in the right manner, then it can pose risky hazards. confirm that experts are present to handle the equipments like hydraulic concrete pumps, belt conveyors and then on.

3. Follow Correct Construction Practices

Concrete Installation and Finishes are straightforward construction process. However some practices contribute to different risks. a number of the tasks require cranes to lift up concrete buckets, concrete panels and precast concrete. Reinforcement construction requires use of heavy materials then, it's essential to follow safety measures all the days.

4. Consider Jobsite Conditions

Confined or Cramped Areas at Jobsite can affect the operations and safety. It includes various locations that are confined to hazardous material, utility wires, traffic so on. So, it's better to grasp proper site conditions and alert workers to be more careful.

Prevention is that the true precaution when engaged on concrete construction sites. Identifying potential hazards and fixing proper preventive measures reduces work related injuries. Knowledge of the Hazard is that the initiative of defense against injury. So, it's essential to rent a reputable company for your construction projects.

Maple Concrete Pumping Company offer, top quality and well equipped concrete business, serving in Toronto, Ontario since a few years. Our experts take all the responsibility of the project and provide you with exceptional outcomes.

5 Economic part

The construction industry is no exception in the financial component of the macroeconomics of both the Republic of Kazakhstan and absolutely any state. All processes and stages of construction are accompanied by costs that need to be predicted, planned, calculated and recorded. In this regard, the preparation of an estimate calculation takes an important position in the design of construction projects. The question of profitability is undoubtedly an acute issue for each structure and structure being erected, but it is important to take into account the purpose of the building. This project is an Hostel building, that is, an Hotel with built-in underground parking in Semey city of the project the issue of profitability will not be considered. The initial data for the estimated calculation are taken on the basis of the calculations performed. The estimate was calculated on the modern and accessible resource Estimates of the Republic of Kazakhstan. All prices for work and material costs, as well as for machines and mechanisms are current for 2020. Direct costs include the labor costs of contractors, the operation of special equipment and the supply of materials, overhead costs are added depending on the type of work performed, the estimated profit is also reflected in an amount of not more than 6% and value added tax of 12%. The total building area is 10368 m^2, based on which we will determine the cost per square meter of future construction products. The main sections of the project are reflected in local estimates according to the type of work. The local estimate for earthwork includes the development of a trench with subsequent compaction of the base, after the erection of the basement floors, the sinuses of the pit are backfilled with soil. The local estimate for Foundations includes work on the arrangement of concrete preparation for the foundation). The local estimate for the building frame consists of such works as the installation of monolithic reinforced concrete structures of columns, walls, diaphragms and stiffening cores, floor slabs and coverings. The local estimate for filling openings reflects window glazing and the installation of window sills, the device of doorways. Interior decoration and flooring reflects the work on the decoration of walls and ceilings with gypsum-based plaster compounds and their coloring, as well as work on the installation of floors from concrete screeds, followed by coating with decorative tiles or linoleum. The local estimate for the roofing was made according to the roofing pie according to the project in the form of a vapor barrier made of a vapor barrier film, insulation with Euro plex plates, a waterproofing device made of needle-punched textiles. The local estimate for Elevators and lifting equipment includes the costs for the device of lift shafts and for the installation and commissioning of lift equipment with a different number of stops. The total cost of general construction and installation works is 850,293,601.56 thousand tenge, including VAT. This amount does not include the cost of laying 37 utilities. The cost per 1 m 2 of construction products is 196.6 thousand tenge. All types of estimate calculations are presented in Appendix B

CONCLUSION

In this work, a project was created for the building of a hostel in Semey. Modern materials were selected for the architectural and constructive solution, the foundation, walls and floor structures. The master plan has been developed taking into account the amenities and all safety measures.

Each section of the work has its own solution.

In the architectural and construction section, solutions are substantiated for the general plan of the object, for the space-planning and design solutions, for engineering equipment. In this section, the heat engineering calculation of the outer walls and the covering slab was made.

In the design and design section, the design scheme of one block was determined, the collection of loads was compiled and the forces in the supporting structures were determined using the PC "Etabs 19.02".

In the section of construction production technology, methods of construction production are determined, a construction plan has been developed, as well as a calendar schedule. The accepted methods of production of work provide for comprehensive mechanization and the use of high-performance construction machines that ensure high quality of work and labor safety, flow and continuity of the construction process.

The rationality of the choice of production methods, complex mechanization, technological sequence and the relationship of certain types of work is reflected in technical and economic indicators.

The section of the economy includes the data of the consolidated estimate of the cost of construction.

Life safety and labor protection is a complex of legal, technical and sanitary measures aimed at creating safe and healthy working conditions. They are carried out in strict compliance with the law.

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Appendixes

Appendix A

Table A.1 - Explanation of building areas

No	Name of area	Area (m^2)
1	Living room	32
2	Living room	20
3	Living room	41
4	WC	4
5	Corridor	1440
6	Stairs	36
7	Lift	4
8	Reception for residents	20
9	Cafeteria	288
10	Changing room (gym)	60
11	Mini market	120
12	Gym	1010
13	Warehouse	1000
14	Conference hall	324
15	Cooking room	380
16	Warehouse	500
17	Top roof cafeteria	648
18	Top roof cafeteria	540
19	corridor	35

Table A.2 – Doors and windows dimensions

Name	No	Width, m	Height, m
Doors	a	900	2200
	b	800	2100
	c	2200	2200
	d	3000	2800
	e	800	2000
	f	2800	2200
Windows	w1	3000	2500
	w2	2000	2000

Application B

B.1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

B.1.1 Story Data

Table B.1 - Story Definitions

Tower	Name	Height m	Master Story	Similar To	Splice Story	Color
T1	Story6	3.2	No	None	No	Green
T1	Story5	3.2	Yes	None	No	Cyan
T1	Story4	3.2	No	Story5	No	Red
T1	Story3	3.2	No	Story5	No	Magenta
T1	Story2	3.8	Yes	None	No	Yellow
T1	Story1	2.8	No	Story2	No	Gray8Dark

Table B.2 - Grid Definitions - General

Tower	Name	Type	Ux m	Uy m	Rz deg	Story Range	Bubble Size mm	Color
T1	G1	Cartesian	0	0	0	Default	1250	Gray6

Table B.2 - Grid Definitions - Grid Lines

Name	Grid Line Type	ID	Ordinate m	Bubble Location	Visible
G1	X (Cartesian)	1	0	End	Yes
G1	X (Cartesian)	2	6	End	Yes
G1	X (Cartesian)	3	10	End	Yes
G1	X (Cartesian)	4	11	End	Yes
G1	X (Cartesian)	5	12	End	Yes
G1	X (Cartesian)	6	13	End	Yes
G1	X (Cartesian)	7	18	End	Yes
G1	X (Cartesian)	8	24	End	Yes
G1	X (Cartesian)	9	30	End	Yes
G1	X (Cartesian)	10	36	End	Yes
G1	X (Cartesian)	11	42	End	Yes
G1	X (Cartesian)	12	43.5	End	Yes
G1	X (Cartesian)	13	48	End	Yes
G1	X (Cartesian)	14	54	End	Yes
G1	X (Cartesian)	15	60	End	Yes
G1	X (Cartesian)	16	66	End	Yes
G1	X (Cartesian)	17	72	End	Yes
G1	X (Cartesian)	18	78	End	Yes
G1	X (Cartesian)	19	84	End	Yes
G1	X (Cartesian)	20	90	End	Yes
G1	X (Cartesian)	21	96	End	Yes
G1	X (Cartesian)	22	102	End	Yes
G1	X (Cartesian)	23	108	End	Yes
G1	X (Cartesian)	24	114	End	Yes
G1	X (Cartesian)	25	120	End	Yes

Name	Grid Line Type	ID	Ordinate m	Bubble Location	Visible
G1	X (Cartesian)	26	126	End	Yes
G1	X (Cartesian)	27	129	End	Yes
G1	X (Cartesian)	28	132	End	Yes
G1	X (Cartesian)	29	138	End	Yes
G1	X (Cartesian)	30	144	End	Yes
G1	Y (Cartesian)	A	0	Start	Yes
G1	Y (Cartesian)	B	6	Start	Yes
G1	Y (Cartesian)	C	12	Start	Yes
G1	Y (Cartesian)	D	18	Start	Yes
G1	Y (Cartesian)	E	24	Start	Yes
G1	Y (Cartesian)	F	30	Start	Yes
G1	Y (Cartesian)	G	36	Start	Yes
G1	Y (Cartesian)	H	42	Start	Yes
G1	Y (Cartesian)	I	48	Start	Yes
G1	Y (Cartesian)	J	50.925	Start	Yes
G1	Y (Cartesian)	K	54	Start	Yes
G1	Y (Cartesian)	L	56	Start	Yes
G1	Y (Cartesian)	M	58	Start	Yes
G1	Y (Cartesian)	N	60	Start	Yes
G1	Y (Cartesian)	O	66	Start	Yes
G1	Y (Cartesian)	P	72	Start	Yes
G1	Y (Cartesian)	Q	75	Start	Yes
G1	Y (Cartesian)	R	78	Start	Yes
G1	Y (Cartesian)	S	84	Start	Yes
G1	Y (Cartesian)	T	90	Start	Yes
G1	Y (Cartesian)	U	96	Start	Yes
G1	Y (Cartesian)	W	102	Start	Yes

B.2 Loads

This chapter provides loading information as applied to the model.

B.2.1 Load Patterns

Table B.3 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
~ChineseX	Yes	Other	0	
~ChineseY	Yes	Other	0	
~LLRF	Yes	Other	0	
Dead	No	Dead	1	
Live	No	Live	0	
snow	No	Snow	0	
wind	No	Wind	0	EUROCODE1 2005

Appendix C

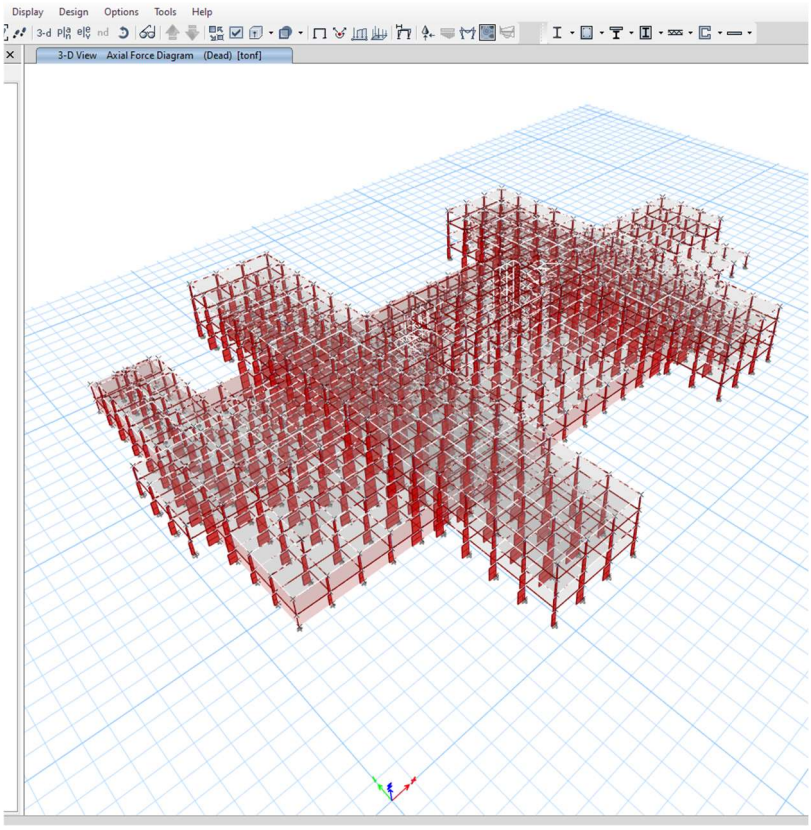


Figure C.1 – Axial force (dead load0

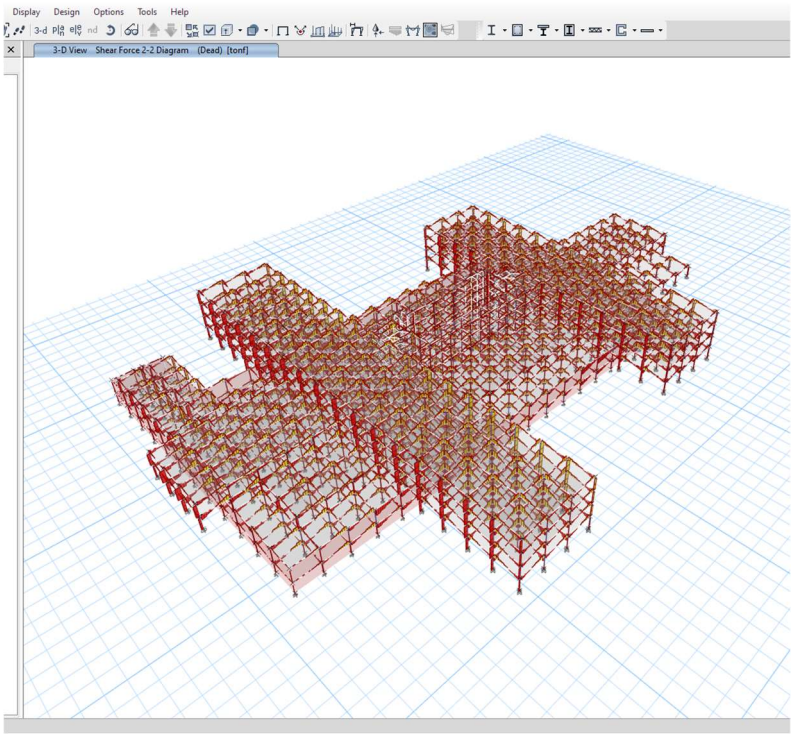


Figure C.2 – shear force diagram (dead load)

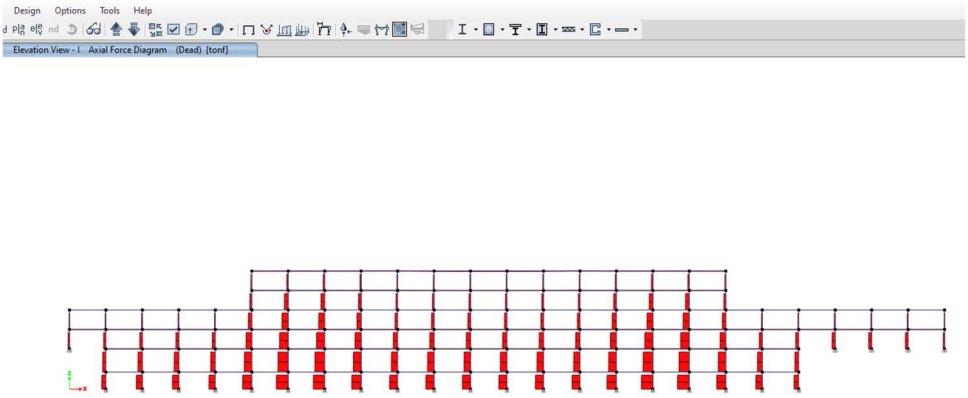


Figure C.3 – axial force diagram (dead load)

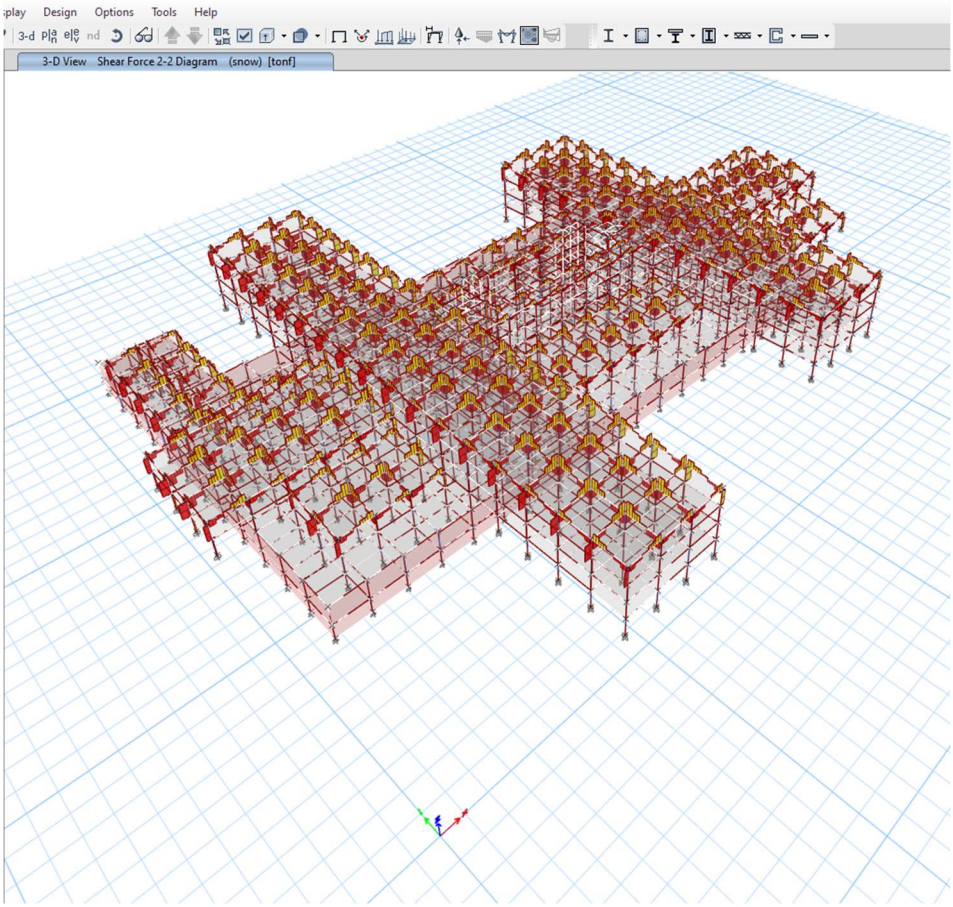


Figure C.4 – shear force diagram (snow load)

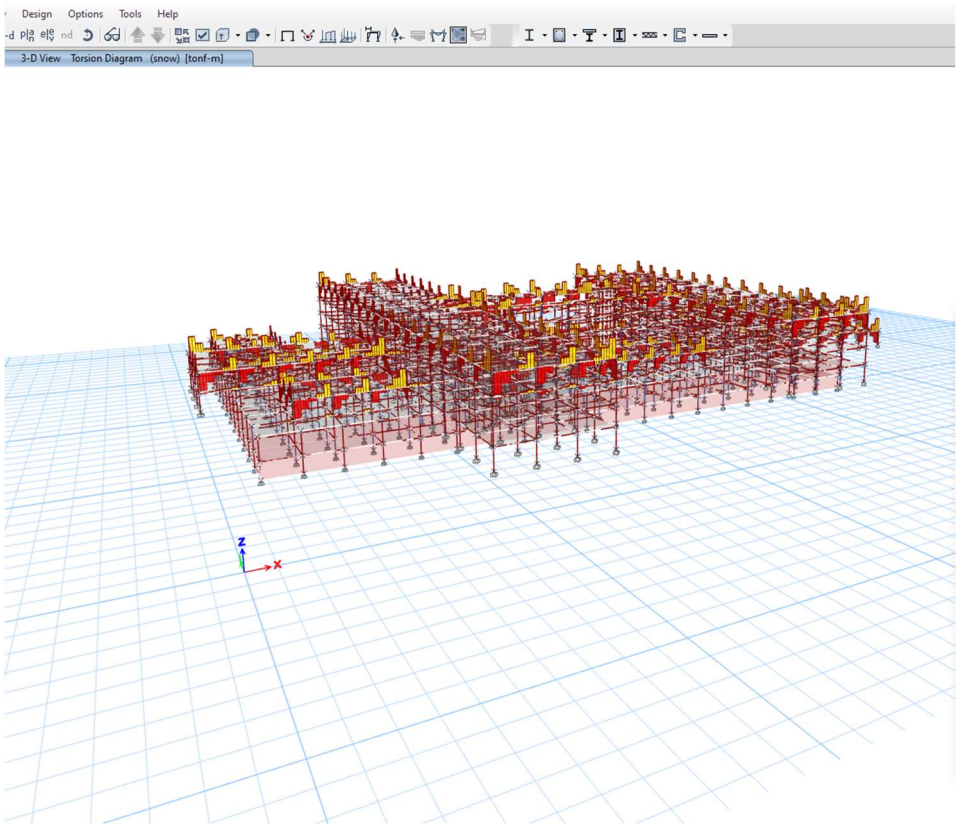


Figure C.5 – torsion diagram (snow loads)

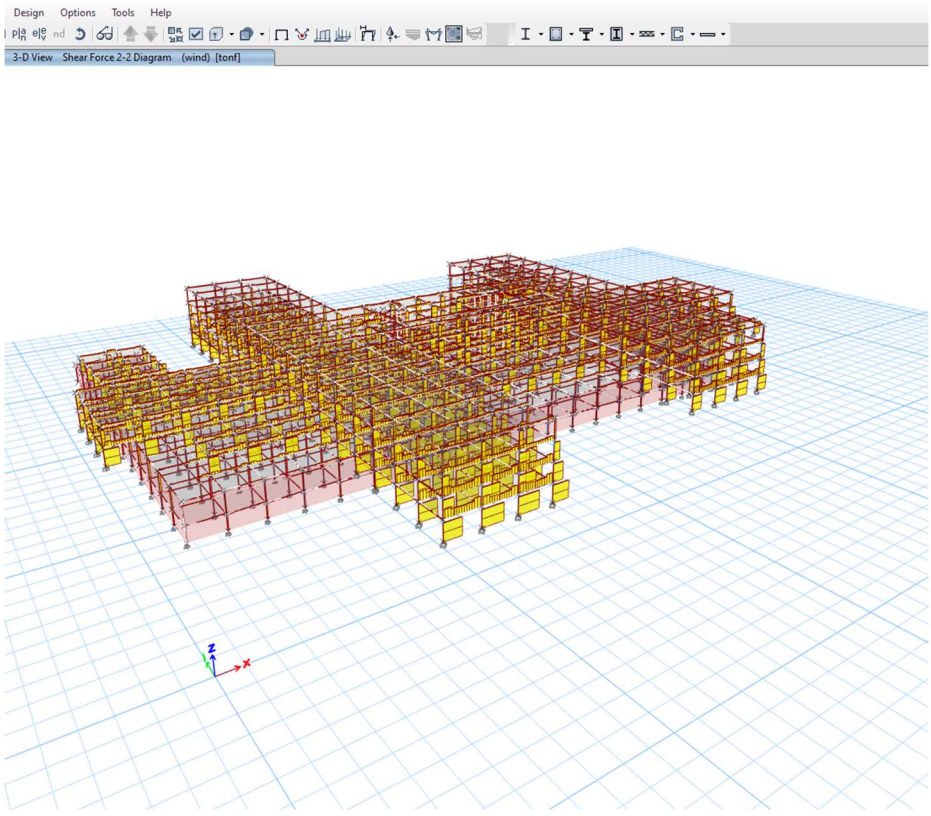


Figure C.6 – shear force (wind load)

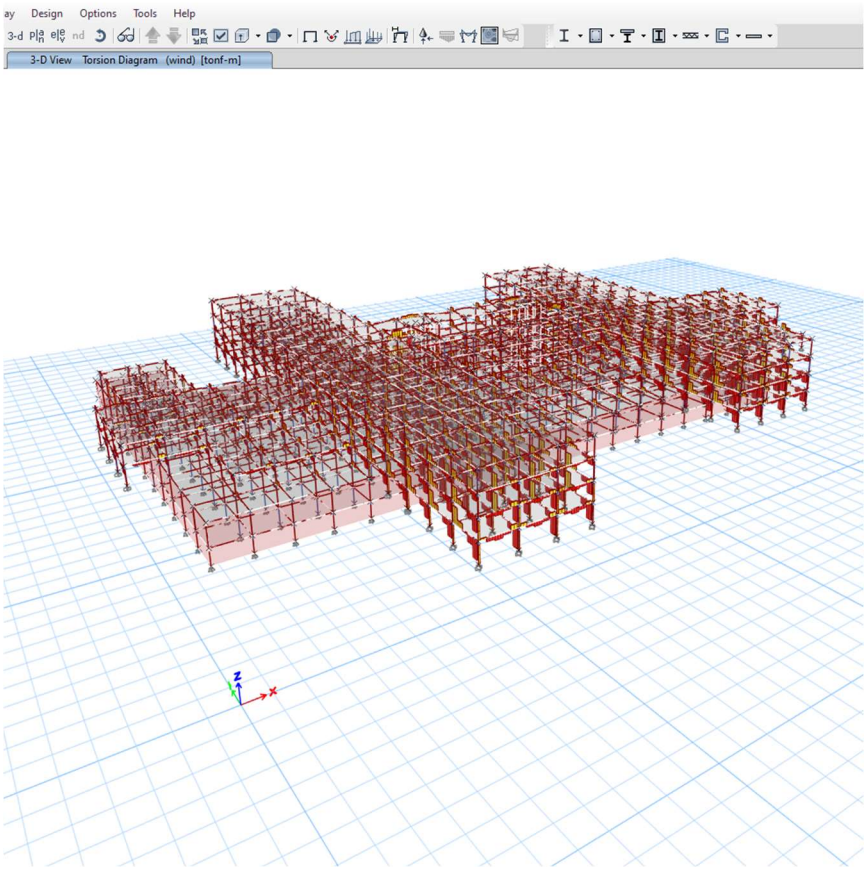


Figure C.7 – torsion diagram (wind load)

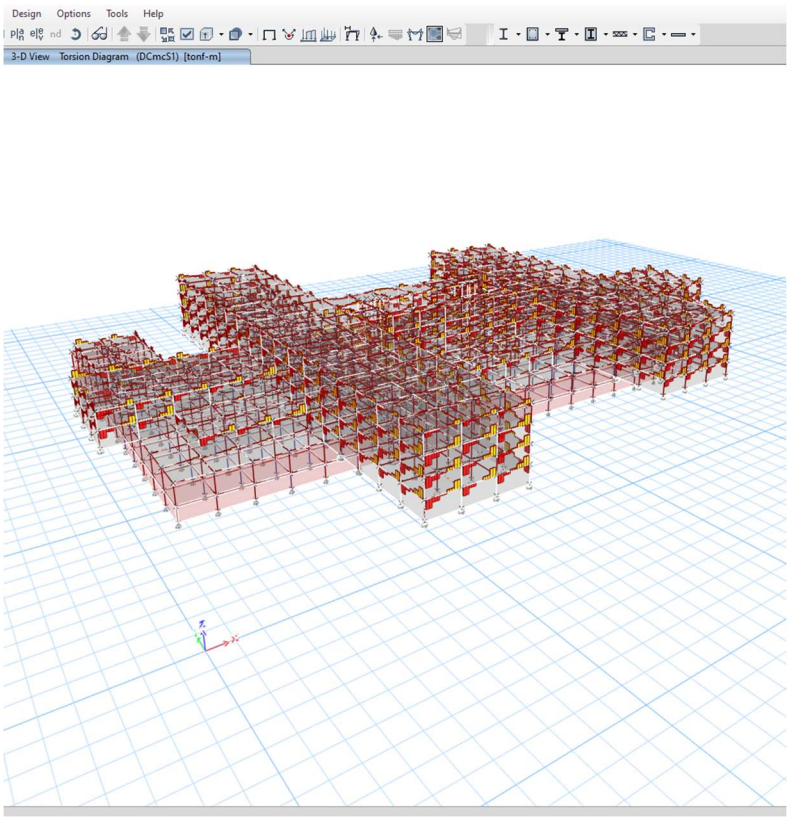


Figure C.8 – torsion

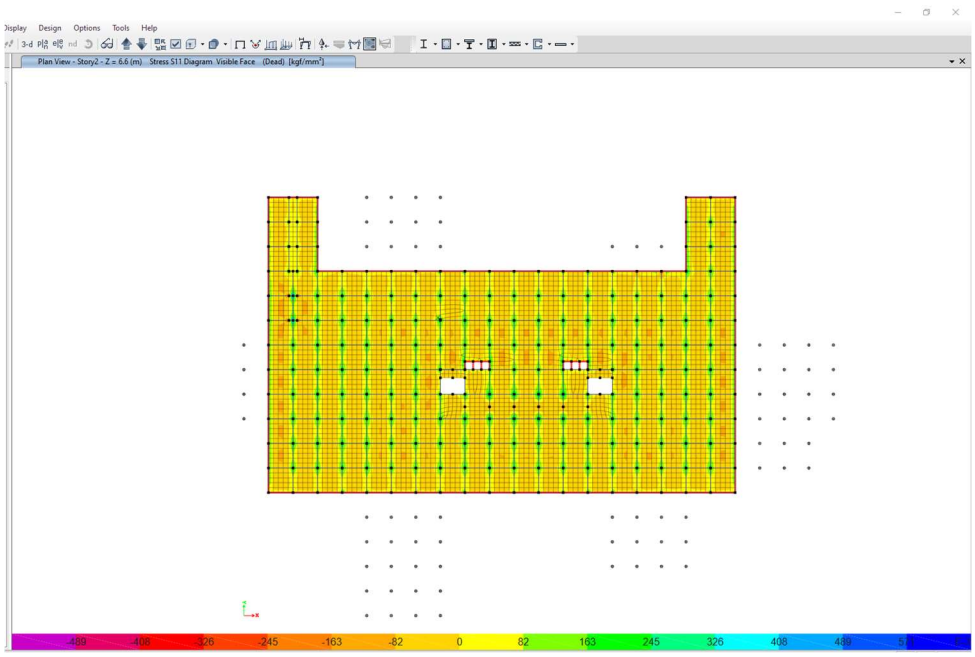


Figure C.9 – diagram of stress in 2 story

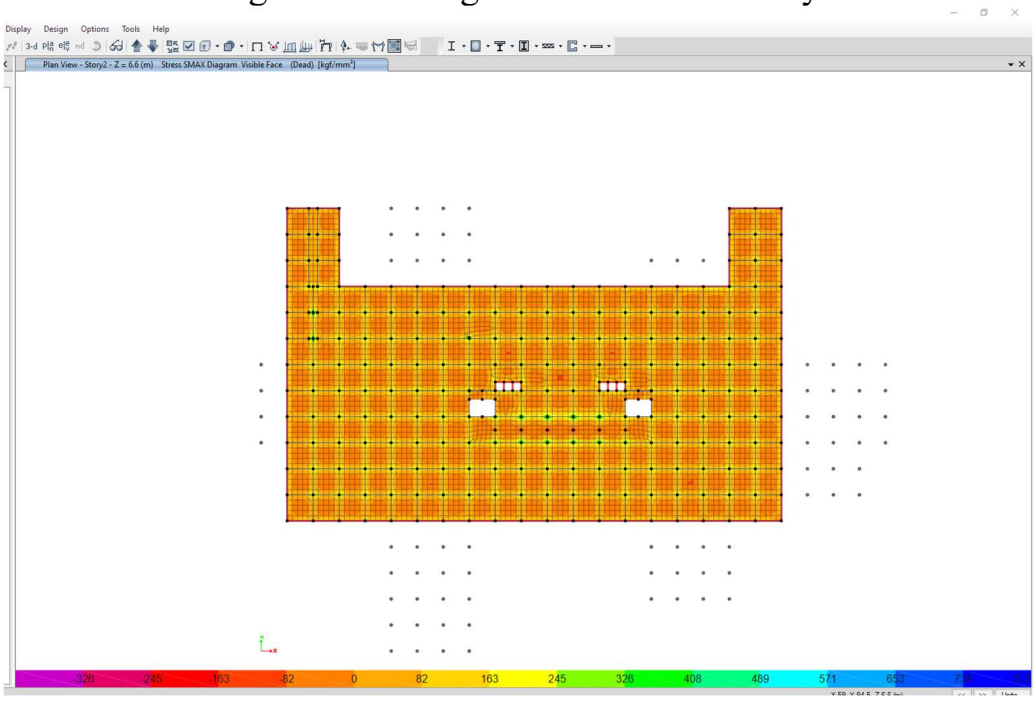


Figure C.10 - diagram of stress in 2 story

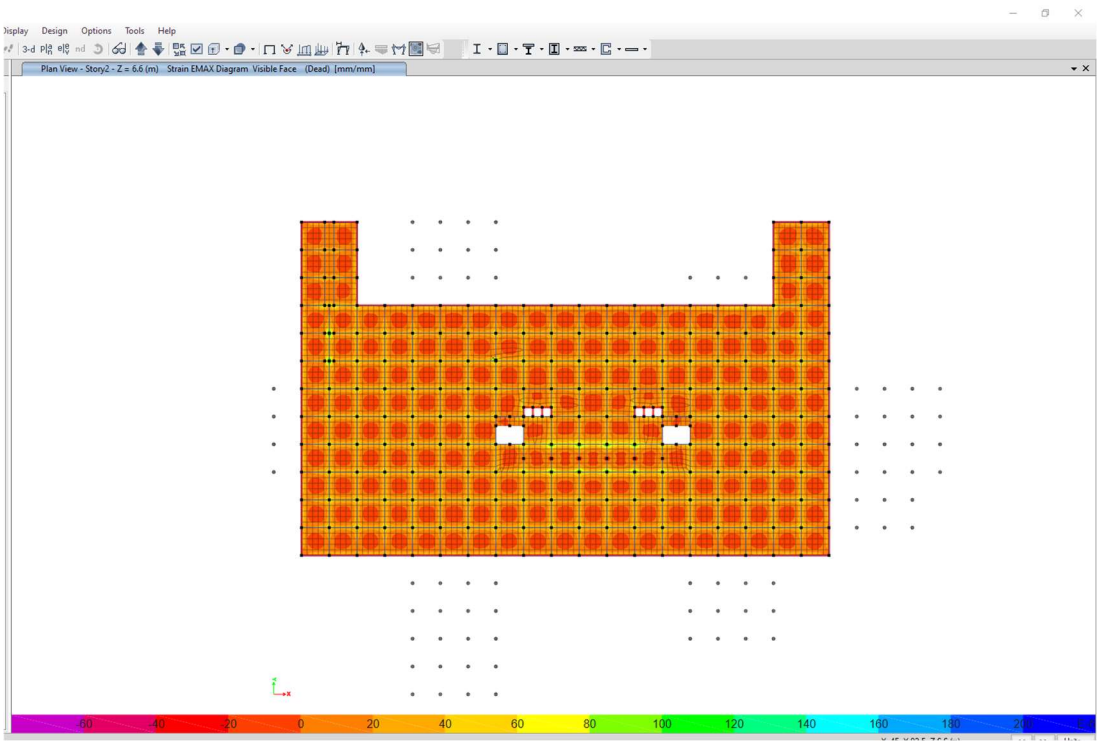


Figure C.11 -strain diagram

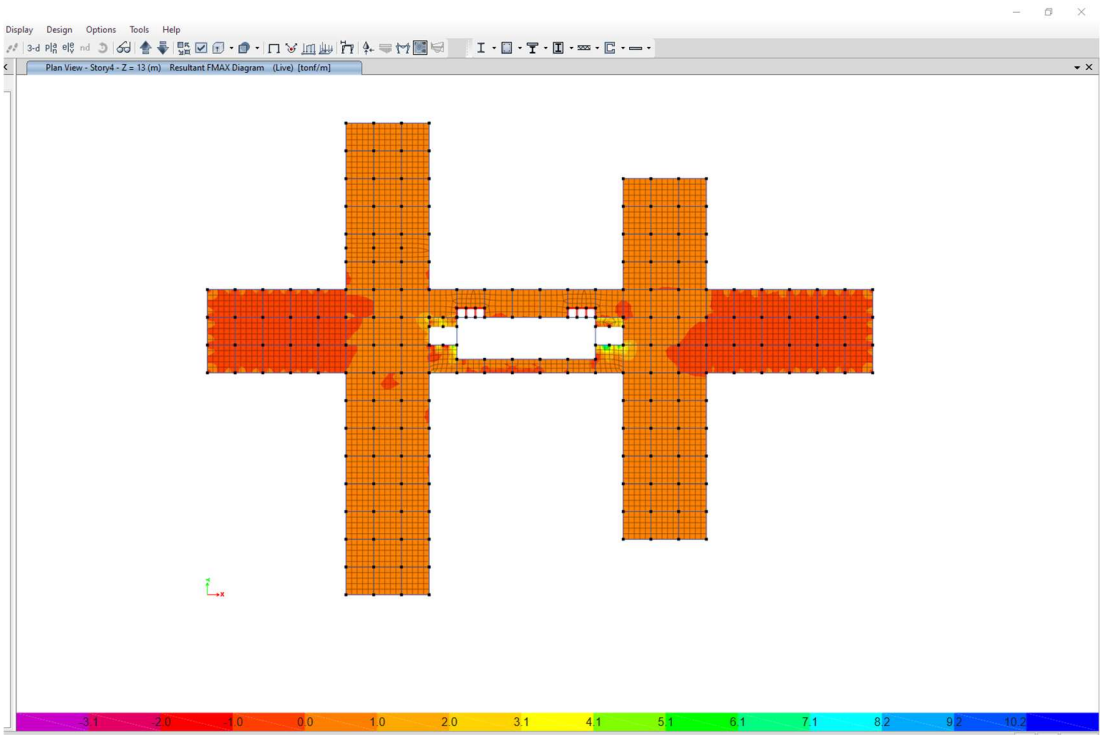


Figure C.12 – max force diagram

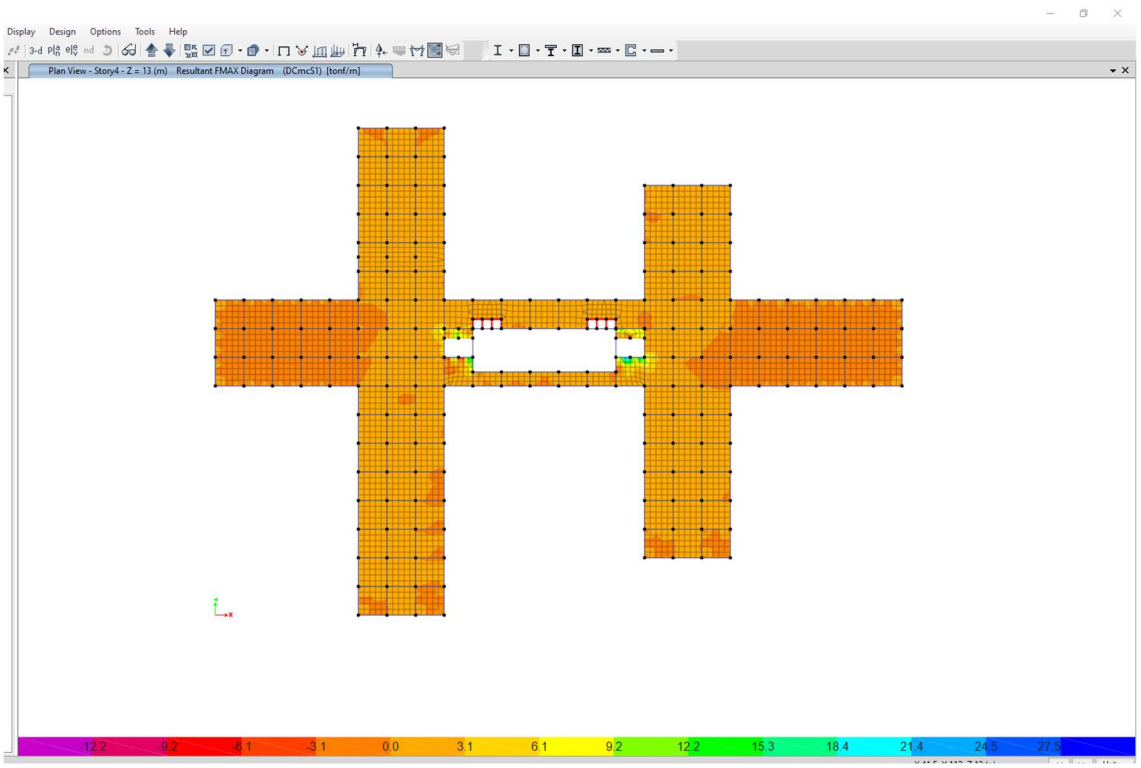


Figure C.13 – max force diagram

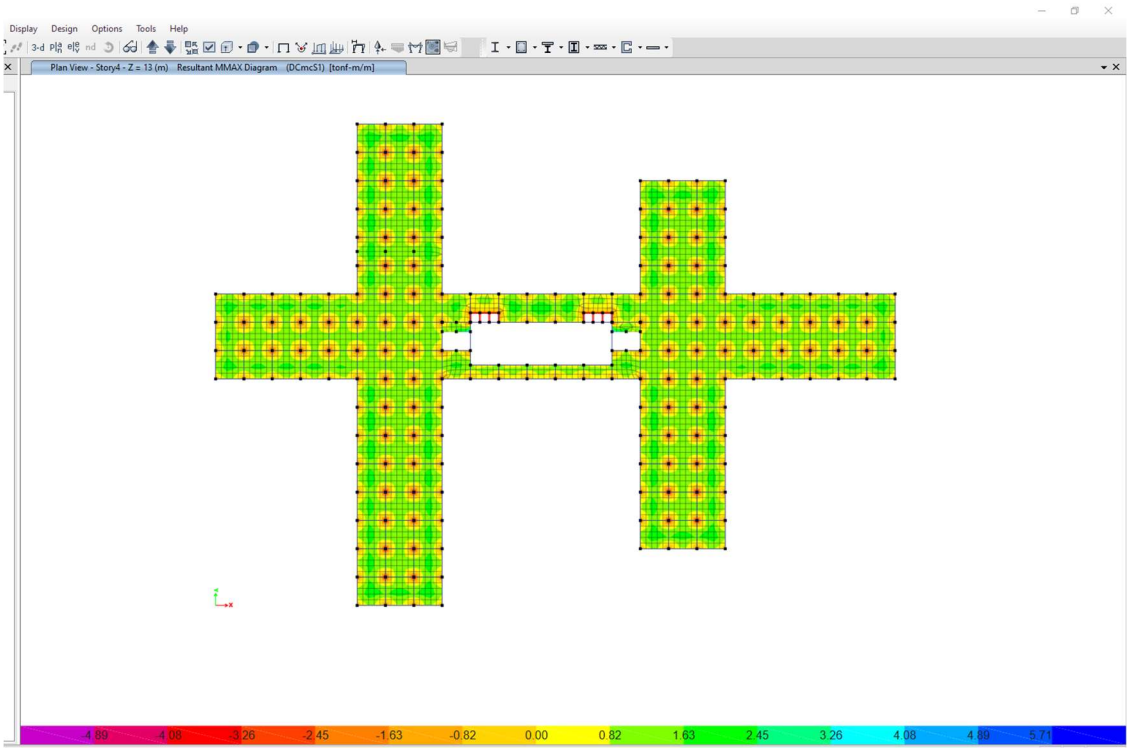


Figure C.14 – max moment diagram

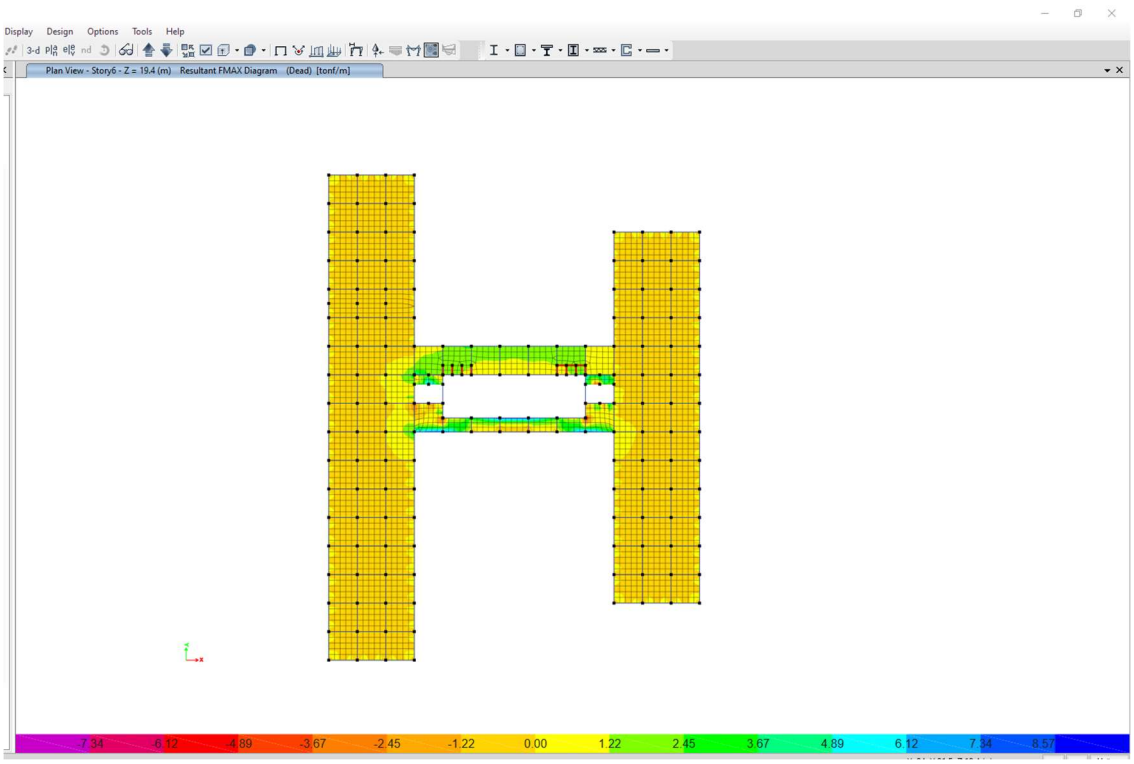


Figure C.15 – max force (snow load)

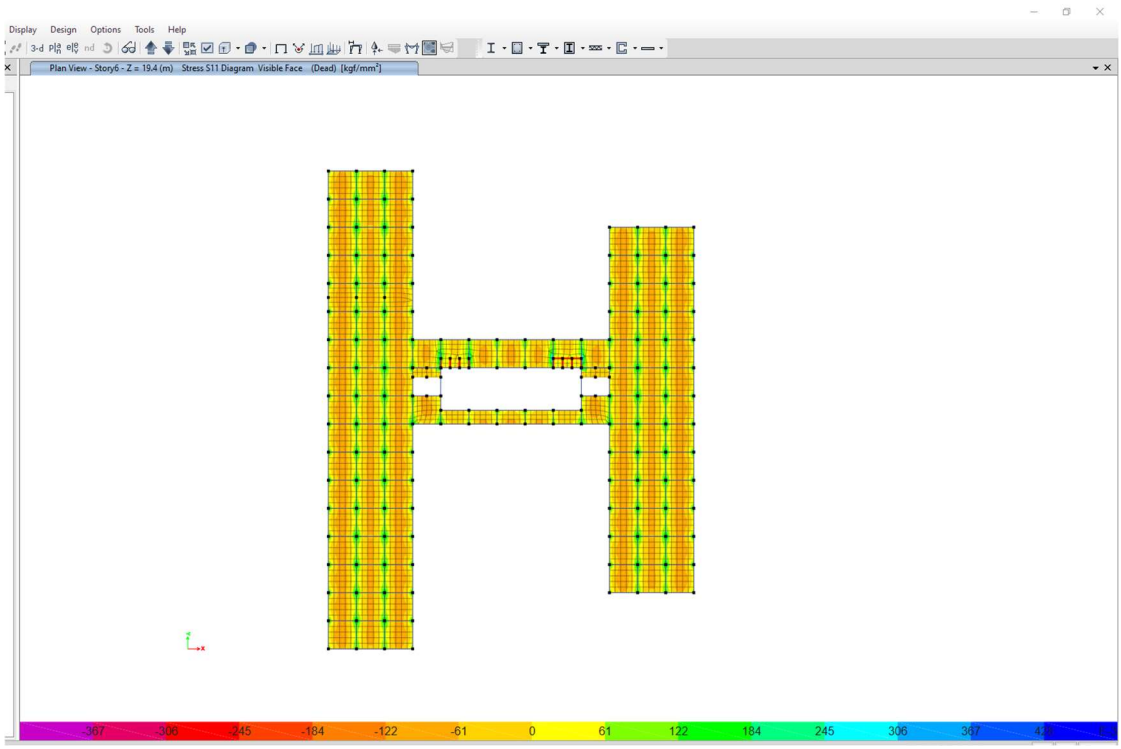


Figure C.16 – stress (snow load)

Construction site name - Hotel with built-in underground parking in Semey city

Local Estimate

(Local estimate calculation)

Estimated cost	214628.137	thousand tenge
Standard labor intensity	200388.99	person-h
Estimated wages	48157.238	thousand tenge

Compiled in 2001

N p / p	Code and item number of the standard	Name of works and costs, unit of measure	Number	Unit cost, tenge		Total cost, tenge		Overheads	Labor costs, man-hours, construction workers	
				Total	Expl. machines	Total	Expl. machines			
				Salary of construction workers	incl. Salary of drivers	Salary of construction workers	incl. Salary of drivers	tenge	workers serving machines	
								%	for one.	Total
1	2	3	4	5	6	7	8	9	10	11
SECTION 1. Earthworks										
1	**E11-01-03-072-02**	**Layout with 340 kW (450 hp) bulldozers**	**23,452.12**	**7.38**	**7.38**	**173,076.65**	**173,076.65**	**12,461.52**	**-**	**-**
		m2		**-**	**0.74**	**-**	**17,307.66**	**72.00**	**0.41**	**9,615.37**
2	**E11-01-01-001-04**	**Excavation of the soil of the 2nd group into the dump by "Dragline" single-bucket electric walking excavators when working on hydropower construction, with a bucket with a capacity of 15 m3**	**19,862.00**	**205.32**	**204.18**	**4,078,065.84**	**4,055,423.16**	**102,392.58**	**1.36**	**27,012.32**
		m3		**3.64**	**3.52**	**72,297.68**	**69,914.24**	**72.00**	**0.94**	**18,670.28**
3	**E11-010104-0603**	**Backfilling of trenches and pits with bulldozers with a capacity of 79 (108) kW (hp), when moving soils of the 1st group up to 5 m**	**1,230.00**	**56.43**	**56.43**	**69,408.90**	**69,408.90**	**3,701.81**	**-**	**-**
		m3		**-**	**4.18**	**-**	**5,141.40**	**72.00**	**0.66**	**811.80**
		TOTAL SECTION 1 DIRECT COSTS	**Tenge**			**4,320,551.39**	**4,297,908.71**			**27,012.32**
			Tenge			**72,297.68**	**92,363.30**			**29,097.45**
		The cost of general construction works -	Tenge			**4,320,551.39**				
		Materials -	Tenge							
		Total salary -	Tenge			**164,660.98**				
		The cost of materials and structures -	Tenge							
		Overhead costs -	Tenge					**118,555.91**		
		Normative labor intensity in N.R. -	person-h							**2,805.49**
		Estimated wages in N.R. -	Tenge			**17,783.39**				
		Irregular and unforeseen costs -	Tenge			**266,346.44**				
		TOTAL, The cost of general construction works -	Tenge			**4,705,453.73**				
		Standard labor intensity -	person-h							**56,109.77**
		Estimated salary -	Tenge			**182,444.37**				
		TOTAL SECTION 1	Tenge			**4,705,453.73**				

		Standard labor intensity -	person-h							56,109.77
		Estimated salary -	Tenge			182,444.37				

SECTION 2. Foundations

5	E11-060101-0101	Concrete preparation device, concrete class B30	155.50	7,006.11	1,346.00	1,089,450.11	209,303.00	98,736.53	1.43	222.37
		m3		685.20	12.56	106,548.60	1,953.08	91.00	0.19	29.55
	E11-060101-0113	Installation of flat reinforced concrete foundation slabs, class B30 concrete	10,850.20	4,480.31	3,408.30	48,612,259.56	36,980,736.66	2,448,376.93	4.17	45,245.33
		m3		220.66	27.31	2,394,205.13	296,318.96	91.00	0.17	1,844.53
6	E11-080101-0307	Side coating bituminous waterproofing in 2 layers on the leveled surface of rubble masonry brick, concrete walls, foundations	41,210.00	365.30	27.01	15,054,013.00	1,113,082.10	825,910.22	0.19	7,829.90
		m2		21.20	0.35	873,652.00	14,423.50	93.00	0.00	26.29
7	S121-050301-3202	Reinforcing blanks, not assembled into frames and meshes: steel of periodic profile of class A-III, d 12 mm	14.20	67,412.88	-	957,262.94	-	-	-	-
		t		-	-	-	-	-	-	-
8	S121-050301-3001	Reinforcement blanks not assembled into frames and meshes: smooth steel of class A-I, d 6 mm	6.73	65,745.09	-	442,300.09	-	-	-	-
		t		-	-	-	-	-	-	-
		TOTAL SECTION 2 DIRECT COSTS	Tenge			66,155,285.70	38,303,121.76			53,297.60
			Tenge			3,374,405.73	312,695.54			1,900.37
	The cost of general construction works -		Tenge			64,755,722.67				
	Materials -		Tenge			1,399,563.03				
	Total salary -		Tenge			3,687,101.27				
		Overhead costs -	Tenge					3,373,023.67		
		Normative labor intensity in N.R. -	person-h							2,759.90
		Estimated wages in N.R. -	Tenge			505,953.55				
		Irregular and unforeseen costs -	Tenge			4,171,698.56				
	TOTAL, The cost of general construction works -		Tenge			73,700,007.93				
		Standard labor intensity -	person-h							55,197.97
		Estimated salary -	Tenge			4,193,054.82				
		TOTAL SECTION 2	Tenge			73,700,007.93				
		Standard labor intensity -	person-h							55,197.97
		Estimated salary -	Tenge			4,193,054.82				

SECTION 3. Columns

9	E11-060501-0201	Arrangement of columns of civil buildings in metal formwork, concrete class B25	210.24	23,012.14	13,416.07	4,837,957.40	2,820,527.48	1,705,639.50	13.55	2,848.68
		metal formwork, concrete class B30, m3		7,436.23	1,479.17	1,563,355.81	310,973.30	91.00	5.07	1,065.89
10	S121-050301-3203	Reinforcement blanks not assembled into frames and meshes: steel of periodic profile of class A-III, d 25-28 mm	25.24	56,070.27	-	1,415,213.53	-	-	-	-
		t		-	-	-	-	-	-	-
11	S121-050301-3202	Reinforcing blanks, not assembled into frames and meshes: steel of a periodic profile of class A-III, d 16-18 mm	8.79	67,412.88	-	592,235.66	-	-	-	-
		t		-	-	-	-	-	-	-
12	S121-050301-3001	Reinforcement blanks not assembled into frames and meshes: smooth steel of class A-I, d 8 mm	5.36	65,745.09	-	352,640.23	-	-	-	-

		t		-	-	-	-	-	-	-
		TOTAL SECTION 3 DIRECT COSTS	**Tenge**			**7,198,046.82**	**2,820,527.48**			**2,848.68**
			Tenge			**1,563,355.81**	**310,973.30**			**1,065.89**
	The cost of general construction works -		Tenge			**4,837,957.40**				
	Materials -		Tenge			**2,360,089.41**				
	Total salary -		Tenge			**1,874,329.12**				
		Overhead costs -	Tenge					**1,705,639.50**		
		Normative labor intensity in N.R. -	person-h							**195.73**
		Estimated wages in N.R. -	Tenge			**255,845.92**				
		Irregular and unforeseen costs -	Tenge			**534,221.18**				
	TOTAL, The cost of general construction works -		Tenge			**9,437,907.49**				
		Standard labor intensity -	person-h							**3,914.58**
		Estimated salary -	Tenge			**2,130,175.04**				
		TOTAL SECTION 3	Tenge			**9,437,907.49**				
		Standard labor intensity -	person-h							**3,914.58**
		Estimated salary -	Tenge			**2,130,175.04**				
		SECTION 4. Walls								
13	**E11-080201-0103**	**Laying of brick exterior simple walls with a floor height of up to 4 m**	**7,100.23**	**4,875.72**	**812.62**	**34,618,733.42**	**5,769,788.90**	**13,384,259.86**	**4.90**	**34,791.13**
		m3		**1,820.44**	**206.49**	**12,925,522.29**	**1,466,154.98**	**93.00**	**0.41**	**2,911.09**
14	**E11-080201-0107**	**Laying of internal brick walls with a floor height of up to 4 m**	**1,550.00**	**3,745.55**	**259.44**	**5,805,603.89**	**402,132.00**	**2,525,802.17**	**4.25**	**6,587.50**
		m3		**1,556.64**	**195.56**	**2,412,792.00**	**303,124.31**	**93.00**	**0.39**	**604.50**
15	**E11-080401-0301**	**Laying of partitions made of reinforced brick with a thickness of 1/4 brick at a floor height of up to 4 m**	**25,410.23**	**1,248.11**	**181.80**	**31,714,762.17**	**4,619,579.81**	**15,791,050.22**	**1.39**	**35,320.22**
		m2		**637.92**	**30.30**	**16,209,693.92**	**769,929.97**	**93.00**	**0.03**	**762.31**
		TOTAL SECTION 4 DIRECT COSTS	**Tenge**			**72,139,099.47**	**10,791,500.72**			**76,698.85**
			Tenge			**31,548,008.21**	**2,539,209.26**			**4,277.90**
	The cost of general construction works -		Tenge			**72,139,099.47**				
	Materials -		Tenge							
	Total salary -		Tenge			**34,087,217.47**				
		Overhead costs -	Tenge					**31,701,112.25**		
		Normative labor intensity in N.R. -	person-h							**4,048.84**
		Estimated wages in N.R. -	Tenge			**4,755,166.84**				
		Irregular and unforeseen costs -	Tenge			**6,230,412.70**				
	TOTAL, The cost of general construction works -		Tenge			**110,070,624.43**				
		Standard labor intensity -	person-h							**80,976.75**
		Estimated salary -	Tenge			**38,842,384.31**				
		TOTAL SECTION 4	Tenge			**110,070,624.43**				
		Standard labor intensity -	person-h							**80,976.75**
		Estimated salary -	Tenge			**38,842,384.31**				
		SECTION 5. Overlap								
16	**E11-060801-0105**	**Arrangement of ribbed slabs at a height of more than 6 m from the support area, concrete class B30**	**341.32**	**23,999.10**	**1,534.00**	**8,191,372.81**	**523,584.88**	**2,077,676.65**	**11.05**	**3,771.59**
		m3		**6,568.91**	**120.30**	**2,242,100.36**	**41,060.80**	**91.00**	**0.36**	**122.88**
17	**S121-050301-3202**	**Reinforcement blanks not assembled into frames and meshes: steel of periodic profile of class A-III, d 16 mm**	**66.21**	**67,412.88**	**-**	**4,463,676.65**	**-**	**-**	**-**	**-**
		t		**-**	**-**	**-**	**-**	**-**	**-**	**-**
18	**S121-050301-**	**Reinforcement blanks not assembled into**	**5.33**	**65,745.09**	**-**	**350,092.60**	**-**	**-**	**-**	**-**

	3001	**frames and meshes: smooth steel of class A-I, d 6 mm**								
		t		-	-	-	-	-	-	-
		TOTAL SECTION 5 DIRECT COSTS	**Tenge**			**13,005,142.07**	**523,584.88**			**3,771.59**
			Tenge			**2,242,100.36**	**41,060.80**			**122.88**
	The cost of general construction works -		Tenge			**8,191,372.81**				
	Materials -		Tenge			**4,813,769.25**				
	Total salary -		Tenge			**2,283,161.16**				
		Overhead costs -	Tenge					**2,077,676.65**		
		Normative labor intensity in N.R. -	person-h							**194.72**
		Estimated wages in N.R. -	Tenge			**311,651.50**				
		Irregular and unforeseen costs -	Tenge			**904,969.12**				
	TOTAL, The cost of general construction works -		Tenge			**15,987,787.84**				
		Standard labor intensity -	person-h							**3,894.46**
		Estimated salary -	Tenge			**2,594,812.66**				
		TOTAL SECTION 5	Tenge			**15,987,787.84**				
		Standard labor intensity -	person-h							**3,894.46**
		Estimated salary -	Tenge			**2,594,812.66**				
		SECTION 6. Roof								
19	**E11-120101-0701**	**Roofing made of corrugated asbestos-cement sheets, ordinary profile on a wooden lathing with its device**	**587.13**	**749.54**	**47.91**	**440,075.17**	**28,129.25**	**141,392.04**	**0.42**	**246.59**
		m2		**252.80**	**8.96**	**148,425.71**	**5,261.29**	**92.00**	**0.02**	**11.74**
20	**E11-120101-0102**	**Installation of pitched roofs from three layers of roofing roll materials on bitumen mastic with a protective layer of gravel on bitumen mastic**	**154.73**	**464.44**	**41.39**	**71,863.73**	**6,404.24**	**31,910.02**	**0.23**	**35.59**
		m2		**216.93**	**7.23**	**33,566.01**	**1,118.80**	**92.00**	**0.01**	**1.55**
		TOTAL SECTION 6 DIRECT COSTS	**Tenge**			**511,938.90**	**34,533.49**			**282.18**
			Tenge			**181,991.72**	**6,380.09**			**13.29**
	The cost of general construction works -		Tenge			**511,938.90**				
	Materials -		Tenge							
	Total salary -		Tenge			**188,371.80**				
		Overhead costs -	Tenge					**173,302.06**		
		Normative labor intensity in N.R. -	person-h							**14.77**
		Estimated wages in N.R. -	Tenge			**25,995.31**				
		Irregular and unforeseen costs -	Tenge			**41,114.46**				
	TOTAL, The cost of general construction works -		Tenge			**726,355.42**				
		Standard labor intensity -	person-h							**295.47**
		Estimated salary -	Tenge			**214,367.11**				
		TOTAL SECTION 6	Tenge			**726,355.42**				
		Standard labor intensity -	person-h							**295.47**
		Estimated salary -	Tenge			**214,367.11**				
		TOTAL DIRECT COSTS BY ESTIMATE:	**Tenge**			**163,330,064.34**	**56,771,177.03**			**163,911.22**
			Tenge			**38,982,159.52**	**3,302,682.29**			**36,477.78**
	The cost of general construction works -		Tenge			**154,756,642.64**				
	Materials -		Tenge			**8,573,421.70**				
	Total salary -		Tenge			**42,284,841.81**				
		Overhead costs -	Tenge					**39,149,310.04**		
		Normative labor intensity in N.R. -	person-h							**10,019.45**
		Estimated wages in N.R. -	Tenge			**5,872,396.51**				
		Irregular and unforeseen costs -	Tenge			**12,148,762.46**				
	TOTAL, The cost of general construction works -		Tenge			**214,628,136.85**				

		Standard labor intensity -	person-h							**200,388.99**
		Estimated salary -	Tenge			**48,157,238.32**				
		TOTAL BY AN ESTIMATE:	Tenge			**214,628,136.85**				
		Standard labor intensity -	person-h							**200,388.99**
		Estimated salary -	Tenge			**48,157,238.32**				
	Recalculation of totals into prices as of 04/26/2020									
	Total direct costs					**163,330,064.34**				
	Overheads					**39,149,310.04**				
	Irregular and unforeseen costs					**12,148,762.46**				
	TOTAL in prices as of 01.01.2001					**214,628,136.85**				
	Total with the cost of seniority					**216,774,418.22**				
	Total with the cost of additional. leave					**217,632,930.76**				
	Total in current prices as of 03.24.					**744,304,623.21**				
	Total with taxes, fees and obligations. payments					**759,190,715.68**				
	Value Added Tax (VAT)		**12%**			**91,102,885.88**				
	Total with value added tax (VAT)					**850,293,601.56**				

Construction site name - Hotel with built-in underground parking in Semey city

Object name Hotel with built-in underground parking in Semey city

Local estimate calculation

Estimated cost	1429.92	thousand tenge
Standard labor intensity	1211	person-h
Estimated wages	30.04	thousand tenge

Compiled in 2001

N p / p	Code and item number of the standard	Name of works and costs, unit of measure	Number	Unit cost, tenge		Total cost, tenge		Overheads	Labor costs, man-hours, construction workers	
				Total	Expl. machines	Total	Expl. machines			
				Salary of construction workers	incl. Salary of drivers	Salary of construction workers	incl. Salary of drivers	tenge	workers serving machines	
								%	for one.	Total
1	2	3	4		6	7	8	9	10	11
SECTION 1 Equipment										
1	Ts0110-350-23	Video control device	2	480.00	9.20	960	eighteen		2.00	four
		PC		425.00	4.50	850	nine	101	0.03	0.06
2	SPRICE	Video recorder NVR MS-N8032 Hikvision	one	65452.21	-	65452	-	-	-	-
		PC		-	-	-	-	-	-	-
3	SPRICE	Monitor 24 for video surveillance systems 243V5LSB5 / -01	one	15468.51	-	15469	-	-	-	-
		PC		-	-	-	-	-	-	-
4	SPRICE	Day / Night IP Dome Camera DS-2CD2312-I Hikvision	eleven	28254.58	-	310800	-	-	-	-
		PC		-	-	-	-	-	-	-
5	SPRICE	Outdoor, waterproof (IP-67) video camera day / night DS-2CD2T35FWD-I5 Hikvision	12	18254.25	-	219051	-	-	-	-
		PC		-	-	-	-	-	-	-
6	Ts0110-669-3	Facility signaling devices and devices; ultrasonic devices: power supply and control unit	23	3021.50	1.60	69495	37		5.00	115
		PC		936.00	-	21528	-	90	-	-
7	SPRICE	Redundant power supply 12V-3A-17Ah Quant 50	eleven	2510.25	-	27613	-	-	-	-
		PC		-	-	-	-	-	-	-
8	SPRICE	Accumulator battery 7A / h	eleven	932.83	-	10261	-	-	-	-
		PC		-	-	-	-	-	-	-
9	SPRICE	Uninterruptible Power Supply UPS SVC RTO-1.5K-LCD)	one	2541.25	-	2541	-	-	-	-

		PC		-	-	-	-	-	-	-	
10	Ts0110-345-4	Control cabinet	one	7207.00	148.00	7207	148		38.00		
		PC		6570.00	38.30	6570	38	101	0.22	-	
11	SPRICE	ITK Network cabinet 19 "N 6U 600x800 mm glass front door black	one	2000.50	-	2001	-	-	-	-	
		PC		-	-	-	-	-	-	-	
12	SPRICE	Fan module 19 "	one	4685.25	-	4685	-	-	-	-	
		PC		-	-	-	-	-	-	-	
13	SPRICE	Power supply panel (8 sockets-220V)	one	3520.98	-	3521	-	-	-	-	
		PC		-	-	-	-	-	-	-	
14	SPRICE	Hard drive, 6000 Gb HDWE160EZSTA Toshiba	one	2578.00	-	2578	-	-	-	-	
		PC		-	-	-	-	-	-	-	
15	SPRICE	DGS-1510-28P / A1A D-Link switch	one	45214.20	-	45214	-	-	-	-	
		PC		-	-	-	-	-	-	-	
		TOTAL SECTION 1 DIRECT COSTS	Tenge			786847.66	203	ke	ke	119	
			Tenge			28948.00	47			0.06	
2	The cost of installation work -		Tenge			786848					
3	Materials -		Tenge			RC					
4	Total salary -		Tenge								
5	The cost of materials and structures -		Tenge			RC	28948				
6		Overhead costs -	Tenge					292			
7		Normative labor intensity in N.R. -	person-h							5.95	
8		Estimated wages in N.R. -	Tenge				44				
9		Irregular and unforeseen costs -	Tenge				118071				
10	TOTAL, the cost of installation work -		Tenge				905211				
11		Standard labor intensity -	person-h							125	
12		Estimated salary -	Tenge							336	
13		TOTAL SECTION 1	Tenge				905211				
14		Standard labor intensity -	person-h				125				
15		Estimated salary -	Tenge				336				

SECTION 2 Materials

16	Ts0108-148-1	Cables up to 35 kV in laid pipes, blocks and boxes, weight 1 m up to 1 kg	106	32.20	2.10	3413	223		0.10	eleven
		m		25.00	0.50	2650	53	95	-	-
17	SPRICE	Power cable ШВВП 2x0.75	86	52.62	-	4525	-	-	-	-
		m		-	-	-	-	-	-	-
18	SPRICE	Power cable VVG 3x1.5	twenty	47.24	-	945	-	-	-	-
		m		-	-	-	-	-	-	-
19	SPRICE	Patch cord UTP 5e category, (0,5m) RJ45- RJ-45 IT Telecom	2	50.53	-	101	-	-	-	-
		PC		-	-	-	-	-	-	-
20	SPRICE	Rj-45 connector	36	5.58	-	201	-	-	-	-
		PC		-	-	-	-	-	-	-
21	Ts0111-108-7	Prefabricated multicore cable with screen braiding, inner diameter up to 20 mm	1200	135.58	-	162696	-		0.59	708
		m		105.75	-	126900	-	90	-	-
22	SPRICE	Cable duct 20x16 RUVINYL	1200	61.20	-	73440	-	-	-	-

		m		-	-	-	-	-	-	-
23	Ts0111-108-9	Prefabricated multicore cable with screen braiding, inner diameter up to 40 mm	twenty	399.77	-	7995	-		1.90	38
		m		344.25	-	6885	-	90	-	-
24	SPRICE	Cable duct 60x40 RUVINIL	twenty	103.15	-	2063	-	-	-	-
		m		-	-	-	-	-	-	-
25	SPRICE	Nagel-dowel 60x40	2400	1.49	-	3576	-	-	-	-
		PC		-	-	-	-	-	-	-
26	Ts0108-148-1	Cables up to 35 kV in laid pipes, blocks and boxes, weight 1 m up to 1 kg	1700	27.70	2.10	47090	3570		0.10	170
		m		19.70	0.50	33490	850	95	-	
27	SPRICE	UTP cable, 100 Ohm, cat6, PVC UTP 2x4x0.53	1700	41.56	-	70652	-	-	-	-
		m		-	-	-	-	-	-	-
28	Ts0108-409-1	Vinyl plastic pipes for installed structures on walls and columns with brackets, diameter up to 25 mm	490	108.60	48.90	53214	23961		0.22	108
		m		39.60	12.20	19404	5978	95	0.07	34
29	SPRICE	Corrugated PVC pipe d 16 mm	400	10.25	-	4100	-	-	-	-
		m		-	-	-	-	-	-	-
30	SPRICE	PVC pipe d 16 mm	90	18.54	-	1669	-	-	-	-
		m		-	-	-	-	-	-	-
31	SPRICE	Camera stand AVL 350	7	8429.18	-	59004	-	-	-	-
		PC		-	-	-	-	-	-	-
32	S143001-1	Concrete	0.875	-	-	-	-	-	-	-
		m3		-	-	-	-	-	-	-
33	E0101-14-1	Development of soil of the 1st group with trench rotary excavators, with a trench width of 1.2 m, a depth of up to 1.4 m	22.5	14.25	12.48	321	281		-	-
		m3		-	3.24		73	97	0.01	0.23
1		TOTAL SECTION 2 DIRECT COSTS	Tenge			495005	28034	ke	ke	1034
			Tenge			189329	6954			35
2	The cost of installation work -		Tenge			495005				
3	Materials -		Tenge			RC				
4	Total salary -		Tenge				189329			
5	The cost of materials and structures -		Tenge			RC				
6		Overhead costs -	Tenge					-		
7		Normative labor intensity in N.R. -	person-h							52
8		Estimated wages in N.R. -	Tenge				-			
9		Irregular and unforeseen costs -	Tenge				29700			
10	TOTAL, the cost of installation work -		Tenge				524705			
11		Standard labor intensity -	person-h							1086
12		Estimated salary -	Tenge							29700
13		TOTAL SECTION 2	Tenge				524705			
14		Standard labor intensity -	person-h				1086			
15		Estimated salary -	Tenge				29700			
16	Recalculation of totals into prices as of June 14, 2018									
17	Total direct costs		495005							
18	Overheads		-							
19	Irregular and unforeseen costs		29700							
20	TOTAL in prices as of 01.01.2001					524705				

21	**Total with the cost of seniority**		**5247.05**	**529952.51**					
22	**Total with the cost of additional. leave**		**209882.18**	**739834.69**					
23	**Total at current prices as of 06/14/2018**		**2530234.64**						
24	**Total with taxes, fees and obligations. payments**		**50604.69**	**2580839.33**					
25	**Value Added Tax (VAT)**	**12 %**	**309700.72**						
26	**Total with value added tax (VAT)**				**2890540**				

Construction site name : Hotel with built-in underground parking in Semey city

RESOURCE ESTIMATE

on the video surveillance system

Object name - Hotel with built-in underground parking in Semey city

Compiled in 2001 Tenge

P / p No.	ABC resource code and attribute	Resource cipher	Name of resources, equipment, structures, products and parts	unit of measurement	Number of units	Estimated unit price	Sale price per unit	Transport costs per unit	Cost (Total)
						justification	justification	Total	
1	2	3	4	5	6	7	8	9	10
			LABOR RESOURCES						
1	1		Labor costs of construction workers	man-h	420	8000	-	-	3360000
						-	-	-	
2	3		Labor costs of machinists	man-h	25	10000	-	-	250,000
						-	-	-	
			TOTAL	**Tenge**				**-**	**3610000**
			CONSTRUCTION MACHINES AND MECHANISMS						
						OPERATION OF MACHINES		**Salary of the Engineers**	
3			Construction machines and mechanisms	machine-h		12000	-	10000	22000
						-	-		
			TOTAL	**Tenge**					
			BUILDING MATERIALS AND CONSTRUCTIONS						
4	6300 M	S143001-1	Concrete	m3	7903	-	-	-	-
						-	-	-	
5		SPRICE	Video recorder NVR MS-N8032 Hikvision	PC	2	63564	-	-	63564
						-	-	-	
6		SPRICE	Camera stand AVL 350	PC	five	8429.18	-	-	42145.9
						-	-	-	
7		SPRICE	PVC pipe d 16 mm	m	90	17.34	-	-	1560.6
						-	-	-	
8		SPRICE	Corrugated PVC pipe d 16 mm	m	900	41.56	-	-	37404
							-	-	
9		SPRICE	UTP cable, 100 Ohm, cat6, PVC UTP 2x4x0.53	m	600	41.56	-	-	24936
						-	-	-	
10		SPRICE	Nagel-dowel 60x40	PC	1620	1.49	-	-	2413.8
						-	-	-	
11		SPRICE	Cable duct 60x40 RUVINIL	m	twenty	103.15	-	-	2063
							-	-	
12		SPRICE	Cable duct 20x16 RUVINYL	m	560	50.23	-	-	28128.8
						-	-	-	
13		SPRICE	Rj-45 connector	PC	36	4.48	-	-	161.28
						-	-	-	
14		SPRICE	Patch cord UTP 5e category, (0,5m) RJ45-RJ-45 IT Telecom	PC	2	50.53	-	-	101.06
						-	-	-	
15		SPRICE	Power cable VVG 3x1.5	m	twenty	47.24	-	-	944.8

						-	-	-	
16		SPRICE	Power cable ШВВП 2x0.75	m	80	52.62	-	-	4209.6
						-	-	-	
17		SPRICE	DGS-1510-28P / A1A D-Link switch	PC	one	37034.64	-	-	37034.64
						-	-	-	
18		SPRICE	Hard drive, 6000 Gb HDWE160EZSTA Toshiba	PC	one	20830.27	-	-	20830.27
						-	-	-	
19		SPRICE	Power supply panel (8 sockets-220V)	PC	one	2538.38	-	-	2538.38
						-	-	-	
20		SPRICE	Fan module 19 "	PC	one	2882.21	-	-	2882.21
						-	-	-	
21		SPRICE	ITK Network cabinet 19 "N 6U 600x800 mm glass front door black	PC	one	10817.27	-	-	10817.27
						-	-	-	
22		SPRICE	Uninterruptible Power Supply UPS SVC RTO-1.5K-LCD)	PC	one	14850.57	-	-	14850.57
						-	-	-	
23		SPRICE	Accumulator battery 7A / h	PC	eleven	932.83	-	-	10261.13
						-	-	-	
24		SPRICE	Redundant power supply 12V-3A-17Ah Quant 50	PC	eleven	1835.77	-	-	20193.47
						-	-	-	
25		SPRICE	Outdoor, waterproof (IP-67) video camera day / night DS-2CD2T35FWD-I5 Hikvision	PC	12	13634.3	-	-	163611.6
						-	-	-	
26		SPRICE	Day / Night IP Dome Camera DS-2CD2312-I Hikvision	PC	eleven	11202.96	-	-	123232.56
						-	-	-	
27		SPRICE	Monitor 24 for video surveillance systems 243V5LSB5 / -01	PC	eleven	13451.32	-	-	147964.52
						-	-	-	
			TOTAL	**Tenge**				**-**	**761849.46**

RESOURCE ESTIMATE

Estimated calculation of the cost of construction in the amount of 19s 7k **6112.29959182137** thousand tenge

including refundable amounts: 15s7k **8.51082903** thousand tenge

value added tax 18s7k **654.889241980861** thousand tenge

ESTIMATE CALCULATION OF THE COST OF CONSTRUCTION

Compiled in 2001

P / p No.	No. of estimates and calculations	Name of chapters, objects, works and costs	Estimated cost, thousand tenge			Total, thousand tenge
			construction and installation works	equipment, furniture and inventory	other costs	
one	2	3	4	5	6	7
one	one	Hotel with Westron underground parking in Semey	1508.21	-	-	1508.21
2		**Total = 1 line**	1508.21	-	-	**1508.21**
3		Temporary buildings and structures 1.1% * 2 line 7 column	16.59031	-	-	16.59031
four		Return of materials from temporary buildings and structures 15% * 3s7k	2.4885465	-	-	2.4885465
five		**Total = 3 lines**	16.59031	-	-	**16.59031**
6		**Total 2s + 5s**	1524.80031	-	-	**1524.80031**
7		Additional costs during the performance of work in the winter 1.2% * 6s7k	18.29760372	-	-	18.29760372
eight		Seniority costs 1% * 6s7k			15.2480031	15.2480031
nine		Costs for additional vacations 0.4% * 6s7k			6.09920124	6.09920124
10		**Total 7s + 8s + 9s**	**18.29760372**		**21.34720434**	**39.64480806**
eleven		**Total 6s + 10s**	1543.09791372		21.34720434	1564.44511806
12		Including refundable amounts = 4s	2.4885465		-	2.4885465
13		**Total according to the estimated calculation in base prices 2001 = 11s**	1543.09791372		21.34720434	1564.44511806
fourteen		Total estimated at current prices in 2020. 13s * 3.42	5277.3948649224		73.0074388428	5350.4023037652
fifteen		Including refundable amounts in current prices 12s7k * 3.42	8.51082903			8.51082903
sixteen		Taxes, fees, mandatory payments, 2% * 14s7k			107.008046075304	107.008046075304
17		Estimated cost at the current price level 14s + 16s	5277.3948649224		180.015484918104	5457.4103498405
eighteen		VAT (12%) * 17s7k			654.889241980861	654.889241980861
nineteen		Construction cost 17s + 18s	5277.3948649224		834.904726898965	6112.29959182137

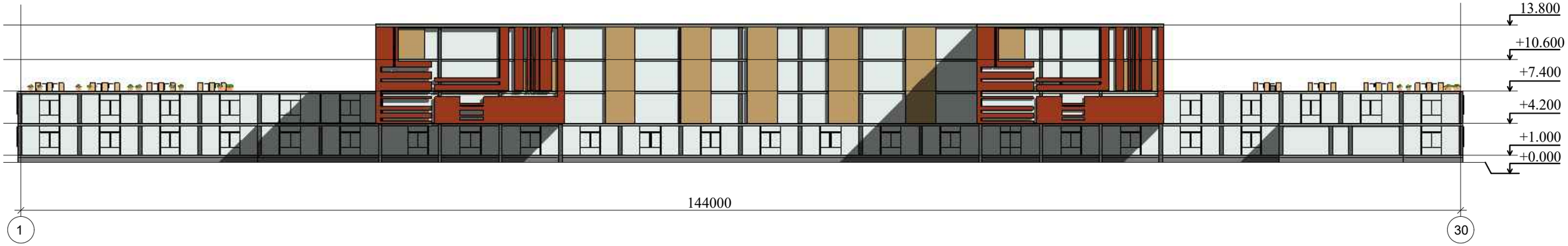
Construction site name : Hotel with built-in underground parking in Semey city

Estimated cost	**1508.21**	thousand tenge
Standard labor intensity	**1.211**	thousand people hour
Estimated salary	**29**	thousand tenge

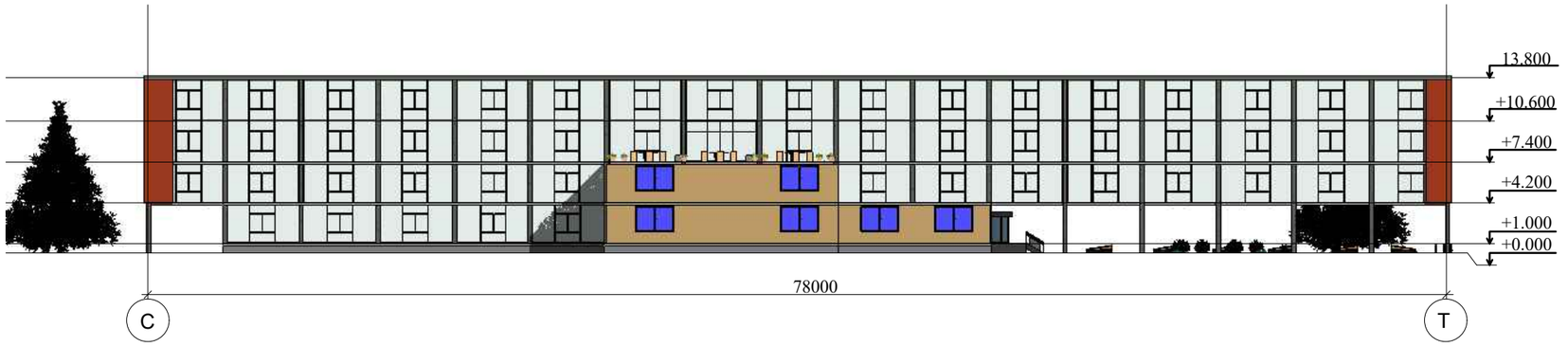
Compiled in 2001

P / p No.	No. of estimates and calculations	Name of works and costs	Estimated cost, thousand tenge				Normative labor intensity, thousand people hour	Estimated salary, thousand tenge	Indicators of a unit cost, thousand tenge
			construction and installation works	equipment, furniture and inventory	other costs	Total			
one	2	3	four	five	6	7	eight	nine	10
	one	Installation work	1508.21			1508.21	1.211	29	
		Total	1098.193			1508.21	1.211	29	

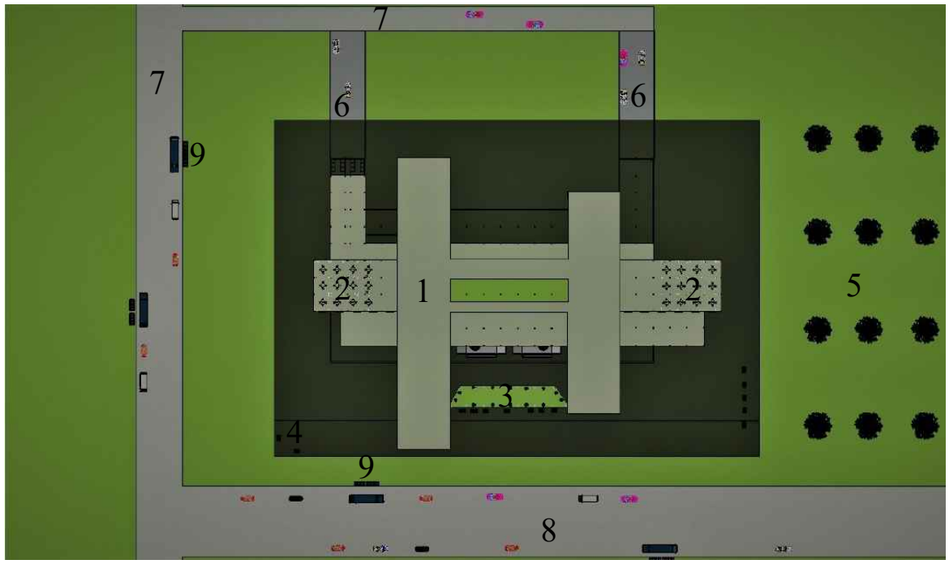
Facade 1-30



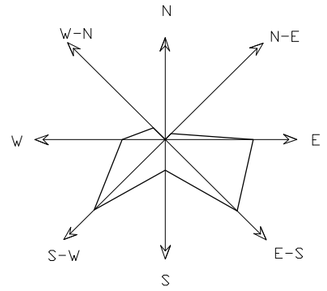
Facade C-T



General plan



Wind rose

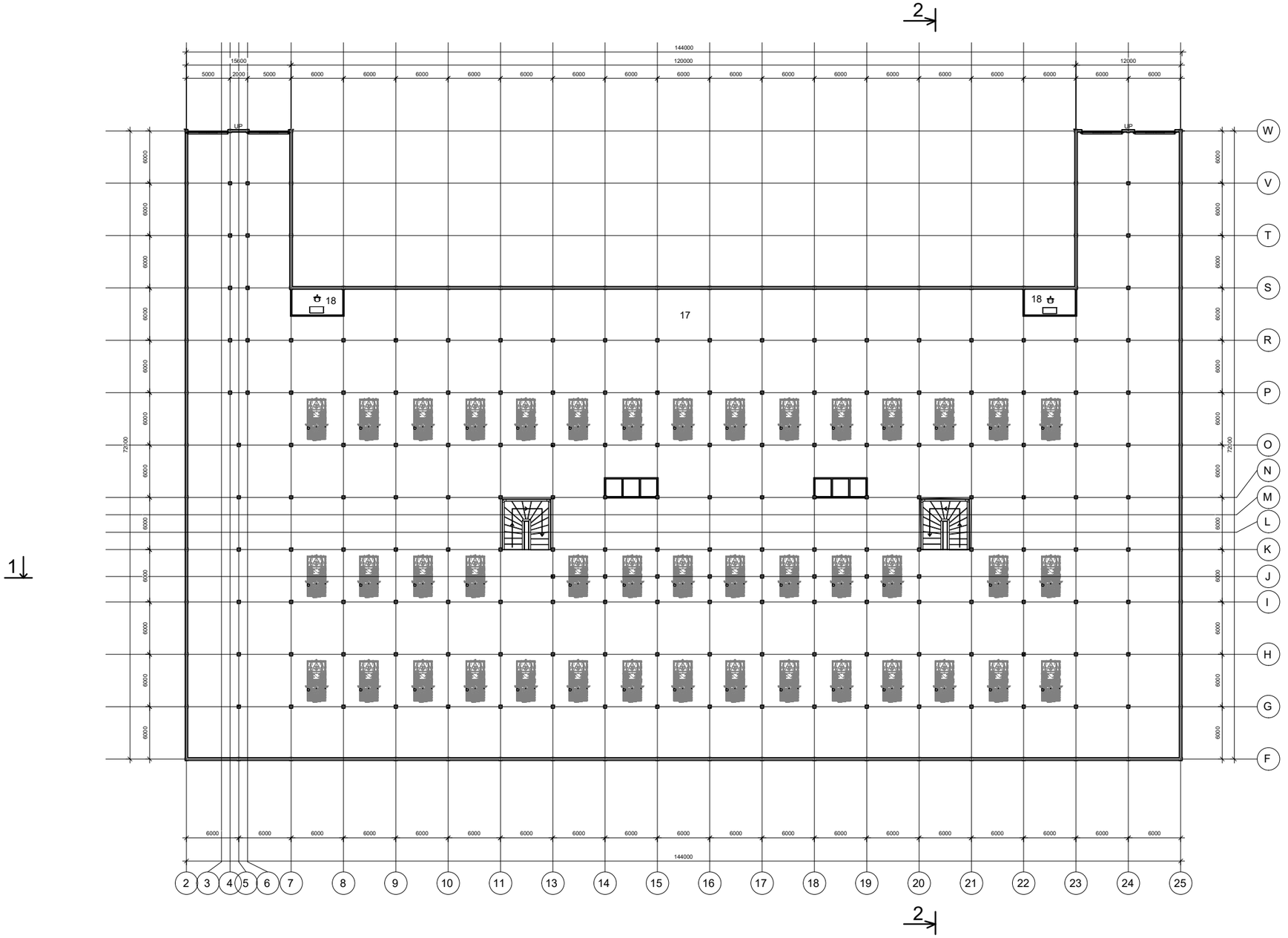


Explanation of the general plan

No	Name
1	Building
2	rooftop cafeteria
3	Waterfall
4	smoking area
5	garden
6	parking way
7	subway
8	street
9	bus station
10	building area

					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP		
					Hotel with built-in underground parking in Semey city		
Chan	Sheet	Nedoc	Sign	Date			
Head of Dep		Kozyukova .N.V			*Architectural and analytical part*	stage / Sheet / Sheets	
Supervisor		Dostanova .S.H				DP / 1 / 12	
Consultant		Kozyukova .N.V					
Controller		Bek .A.A			*Facade*	Civil engineering and building materials department	
Created		Khanjary .N					

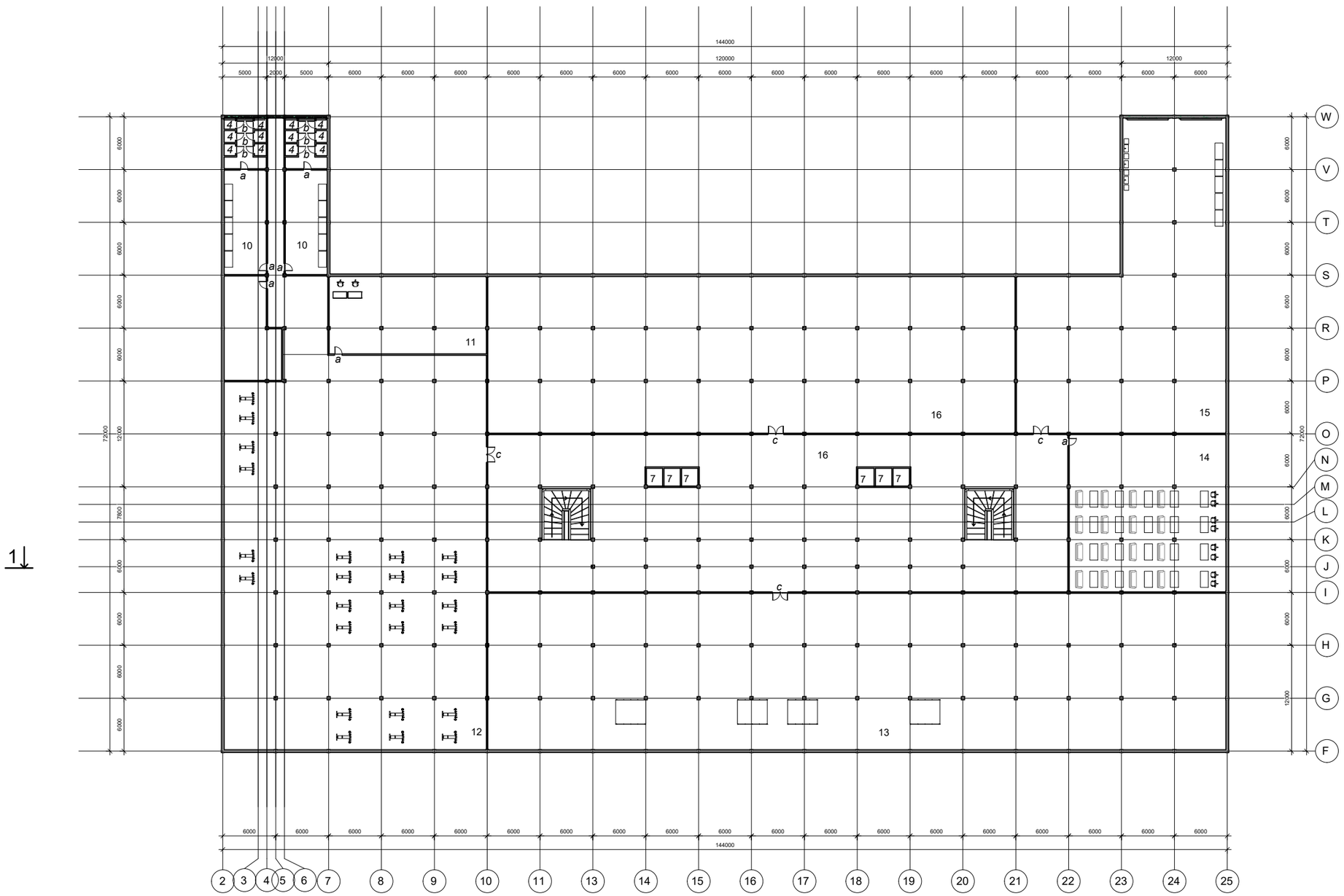
1st basement



Note: explanation of the premises is located in Appendix A

					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP			
					Hotel with built-in underground parking in Semey city			
Chan	Sheet	Nedoc	Sign	Date				
Head of Dep		Kozyukova .N.V			Architectural and analytical part	stage	Sheet	Sheets
Supervisor		Dostanova .S.H				DP	2	12
Consultant		Kozyukova .N.V						
Controller		Bek .A.A			floor scheme	Construction and building materials departmen		
Created		Khanjary.N						

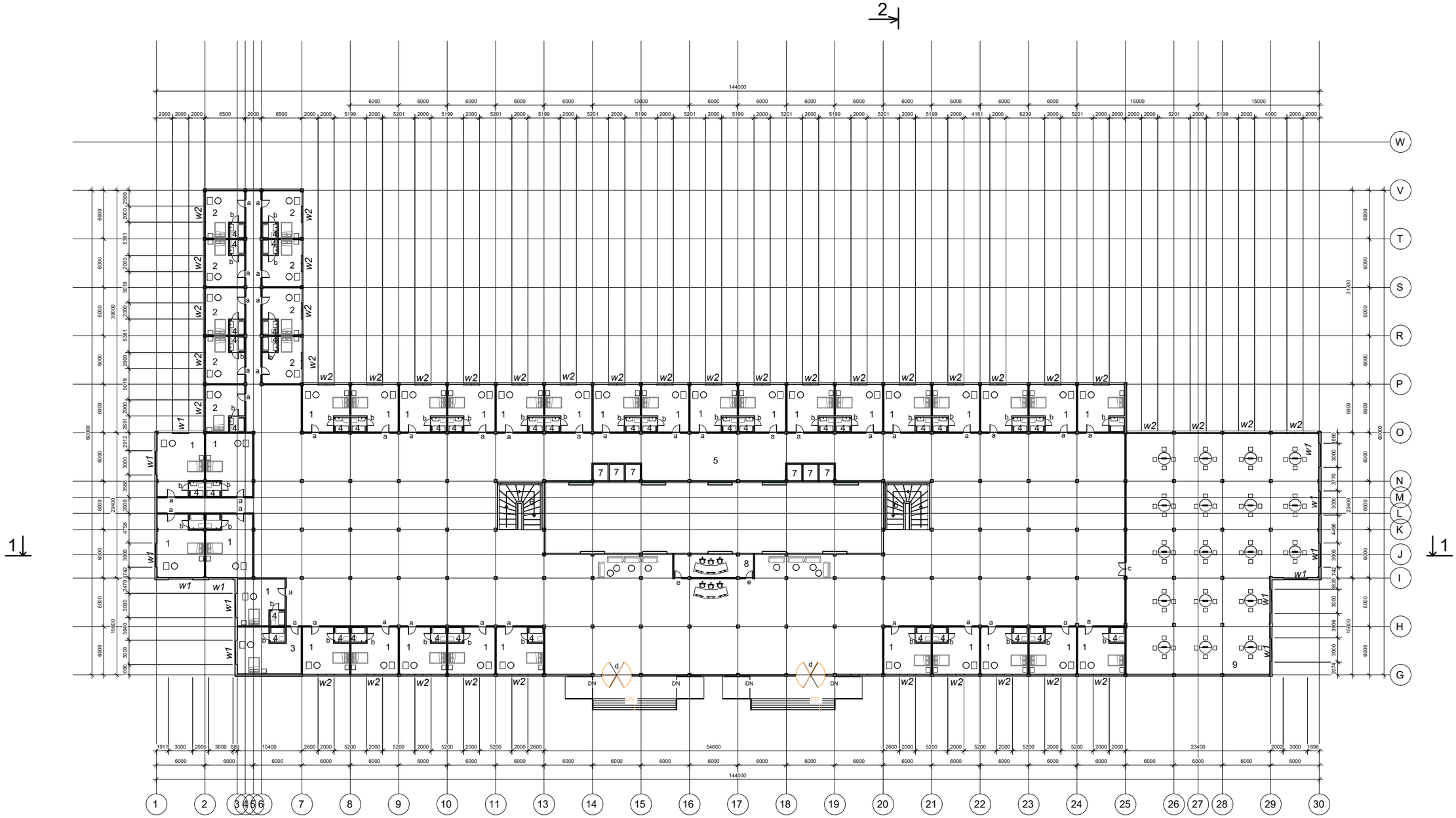
2nd basement



Note: explanation of the premises is located in Appendix A

					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP		
					Hotel with built-in underground parking in Semey city		
Chan	Sheet	Nedoc	Sign	Date			
Head of Dep		Kozyukova .N.V			*Architectural and analytical part*	stage	list	scale
Supervisor		Dostanova .S.H				DP	3	12
Consultant		Kozyukova .N.V						
Controller		Bek .A.A			*floor scheme*	Civil engineering and building materials department		
Created		Khanjary.N						

1st floor

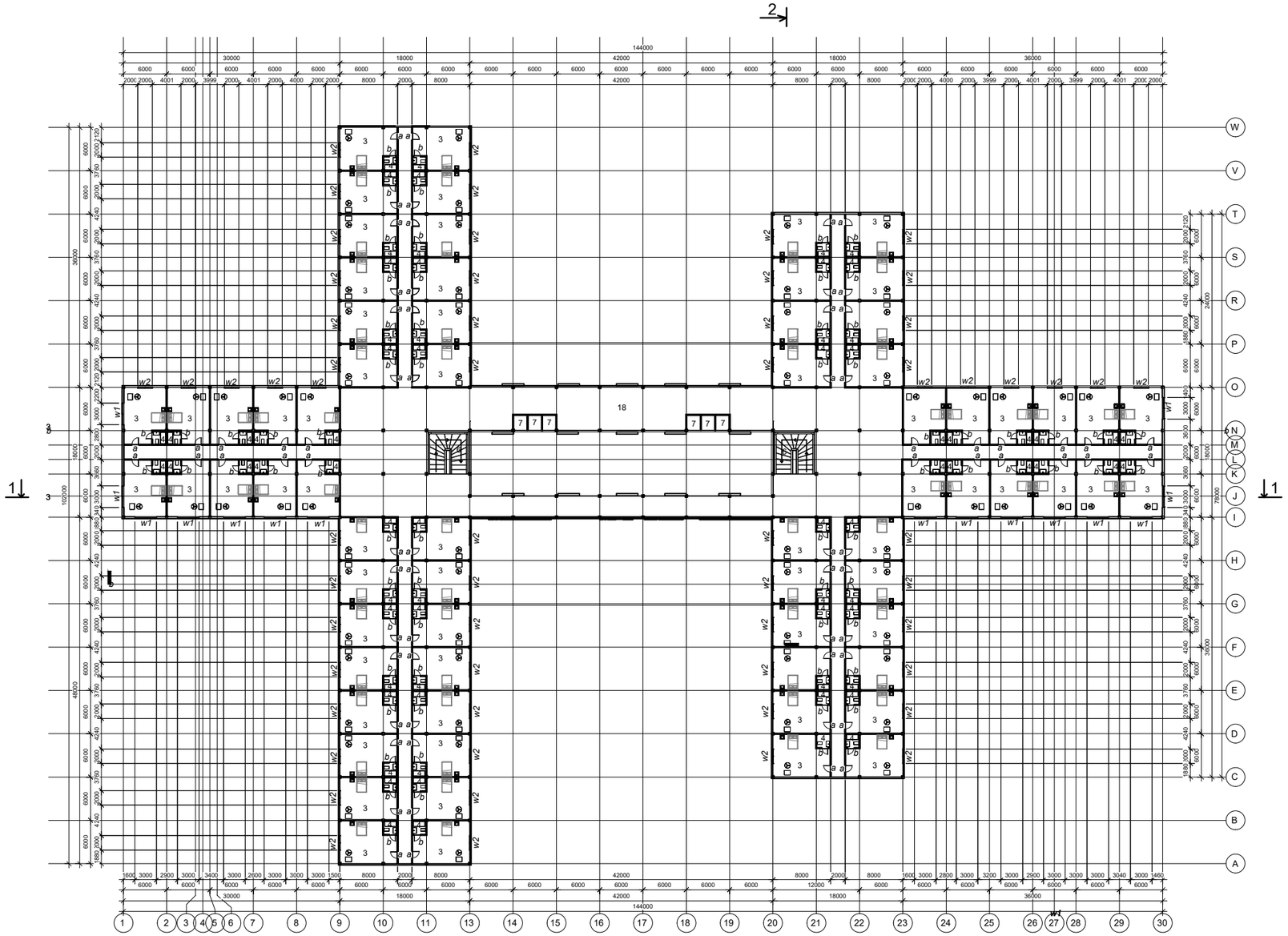


Note: explanation of the premises is located in Appendix A

2

					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP	
					Hotel with built-in underground parking in Semey city	
Chan	Sheet	№doc	Sign	Date		
Head of Dep		Kozyukova .N.V			*Architectural and analytical part*	stage: DP; list: 4; scale: 12
Supervisor		Dostanova .S.H				
Consultant		Kozyukova .N.V				
Controller		Bek .A.A			*floor scheme*	Civil engineering and building materials department
Created		Khanjary.N				

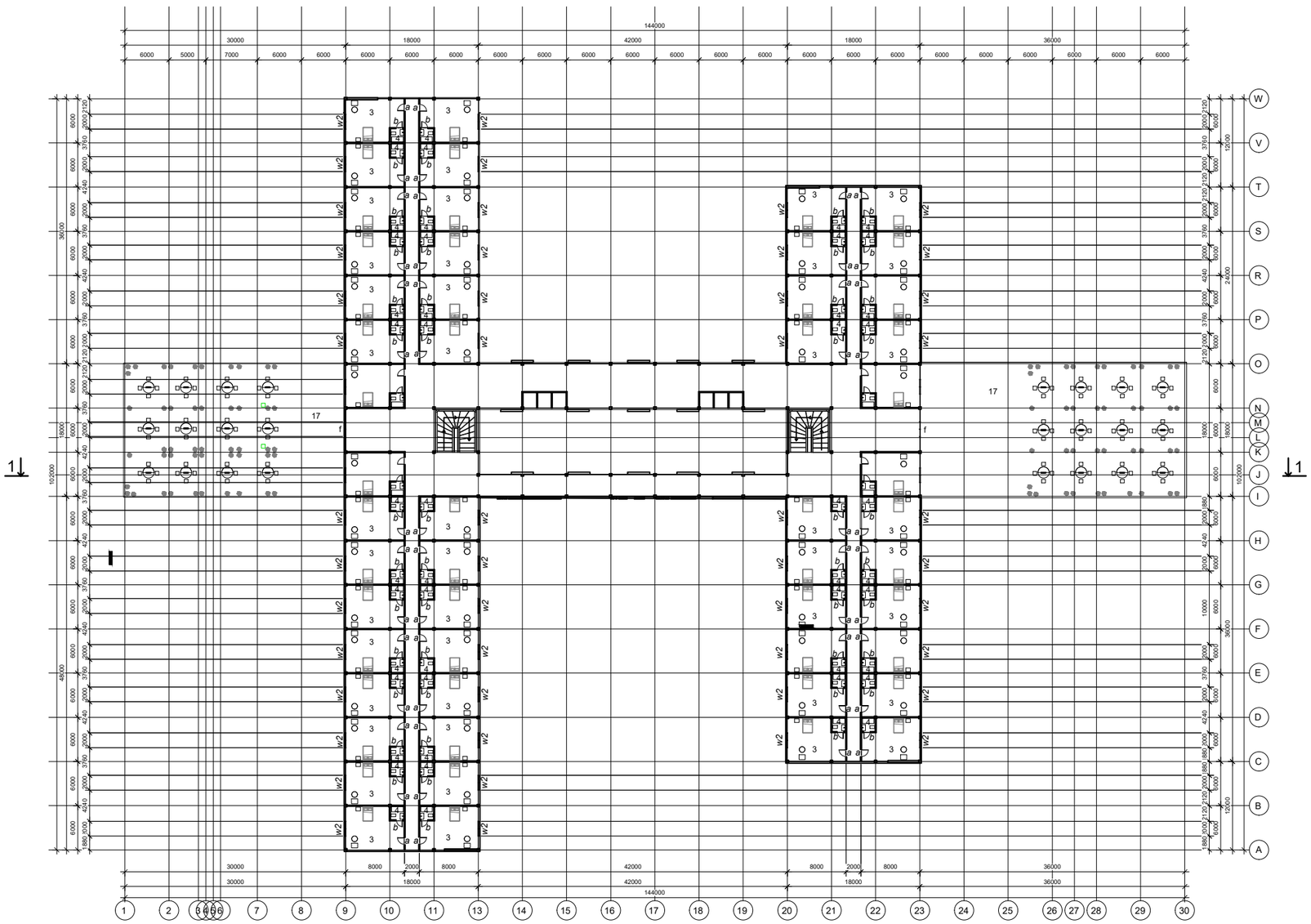
2nd floor



Note: explanation of the premises is located in Appendix A

					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP		
					Hotel with built-in underground parking in Semey city		
Chan	Sheet	№doc	Sign	Date			
Head of Dep		Kozyukova .N.V			Architectural and analytical part	stage: DP	Sheet: 5 / Sheets: 12
Supervisor		Dostanova .S.H					
Consultant		Kozyukova .N.V					
Controller		Bek .A.A			*floor scheme*	Civil engineering and building materials department	
Created		Khanjary.N					

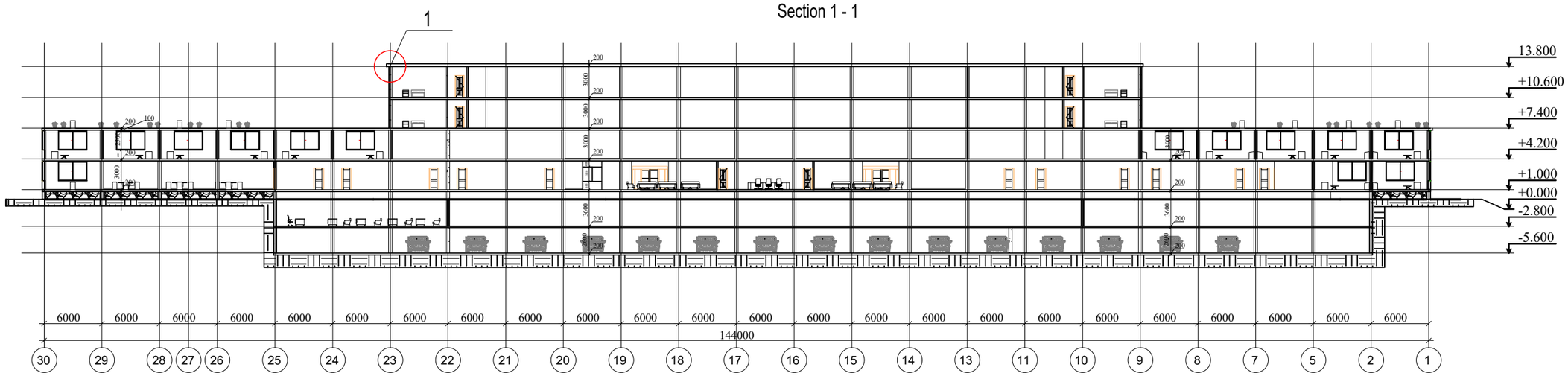
3rd floor



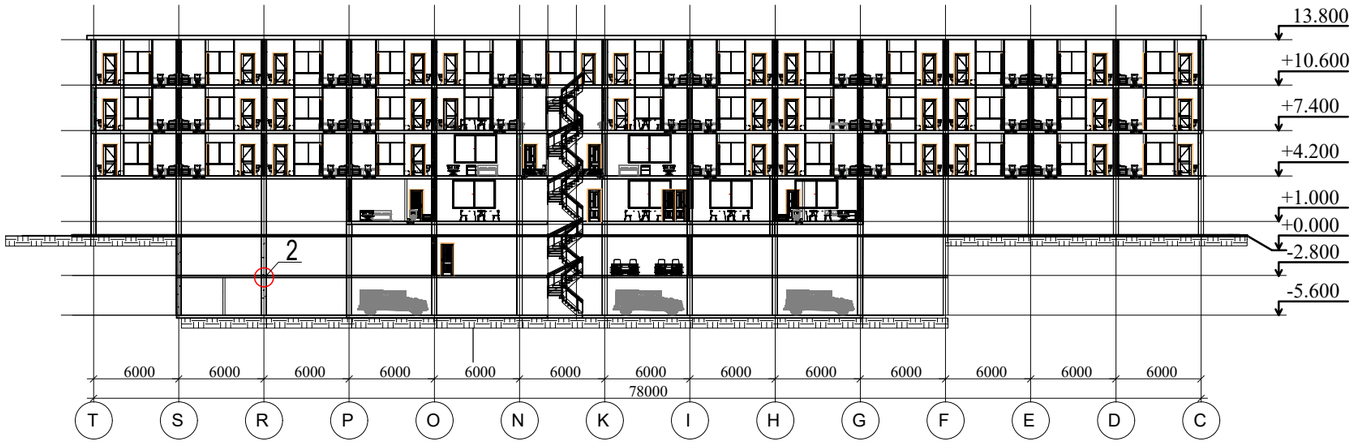
Note: explanation of the premises is located in Appendix A

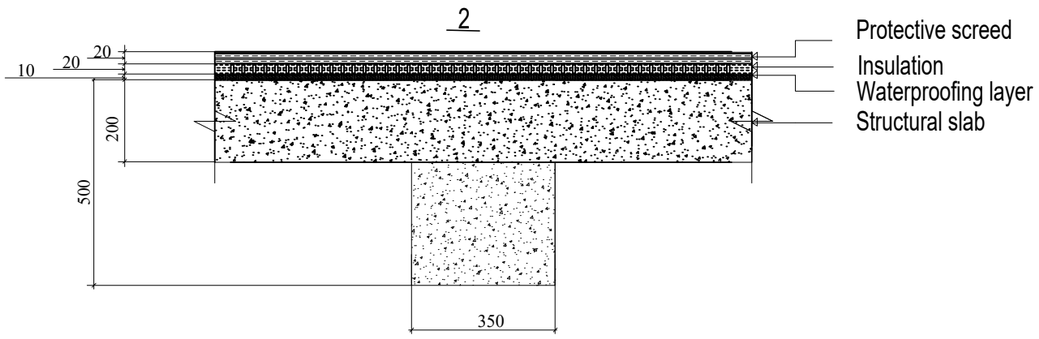
					KazNITU-5B072900-Civil Engeneering-Stb-08.03.2021-DP			
					Hotel with built-in underground parking in Semey city			
Chan	Sheet	№doc	Sign	Date				
Head of Dep		Kozyukova .N.V			Architectural and analytical part	stage	Sheet	Sheets
Supervisor		Dostanova .S.H				DP	6	12
Consultant		Kozyukova .N.V						
Controller		Bek .A.A			floor scheme	Civil engineering and building materials department		
Created		Khanjary.N						

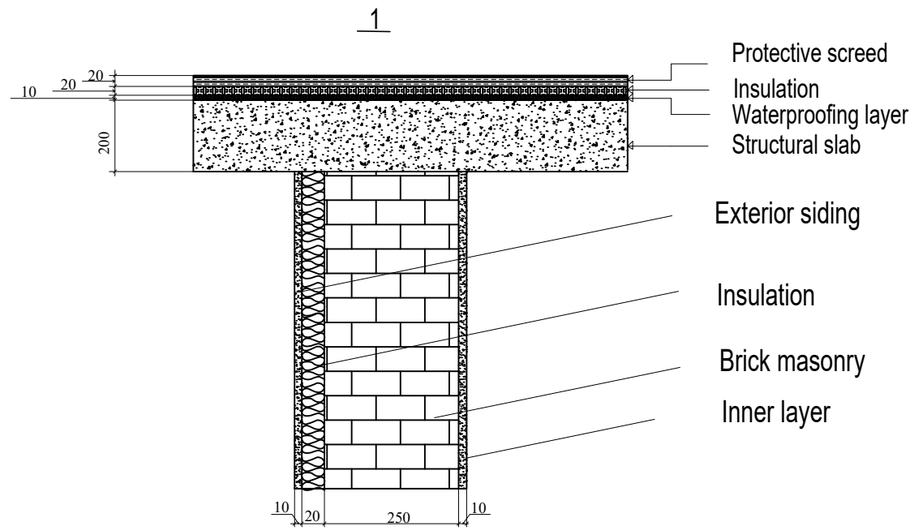
Section 1 - 1



Section 2 - 2

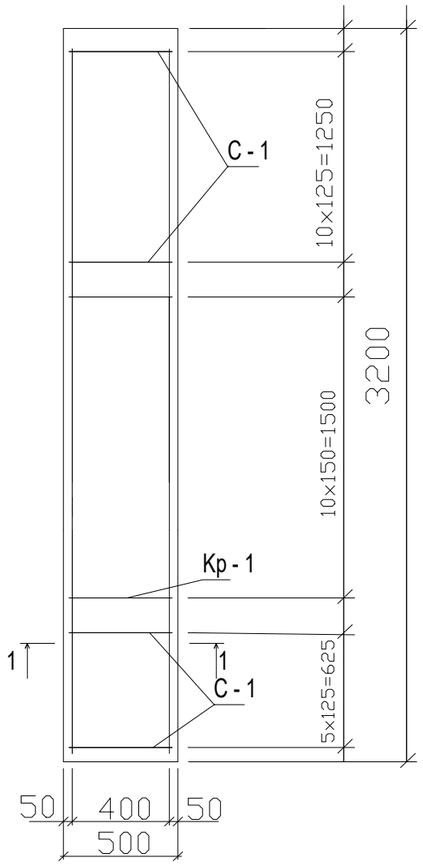




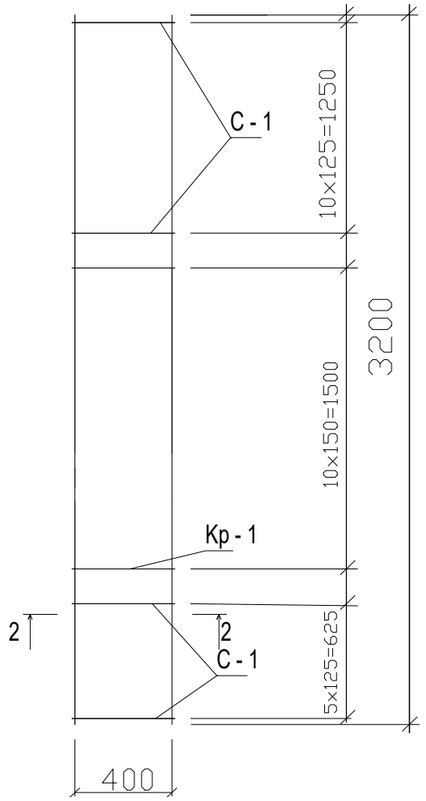


					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP		
					Hotel with built-in underground parking in Semey city		
Chan	Sheet	Nedoc	Sign	Date			
Head of Dep		Kozyukova .N.V			Architectural and analytical part	stage	list	scale
Supervisor		Dostanova .S.H				DP	7	12
Consultant		Kozyukova .N.V						
Controller		Bek .A.A			Section scheme	Civil engineering and building materials department		
Created		Khanjary .N						

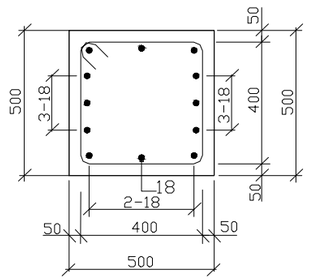
Middle column



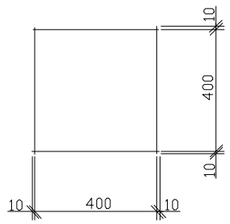
Frame K-1



1-1



2-2



Column reinforcement specification

position	Design C	Diameter, steel grade	Length мм	NO.	Mass per. kg/m.	Note
1	EU 2-2004	Ø18S500	3200	12	2	
2	EU 2-2004	Ø10S275	400	25	0.62	
			Material			
			C30/37			37

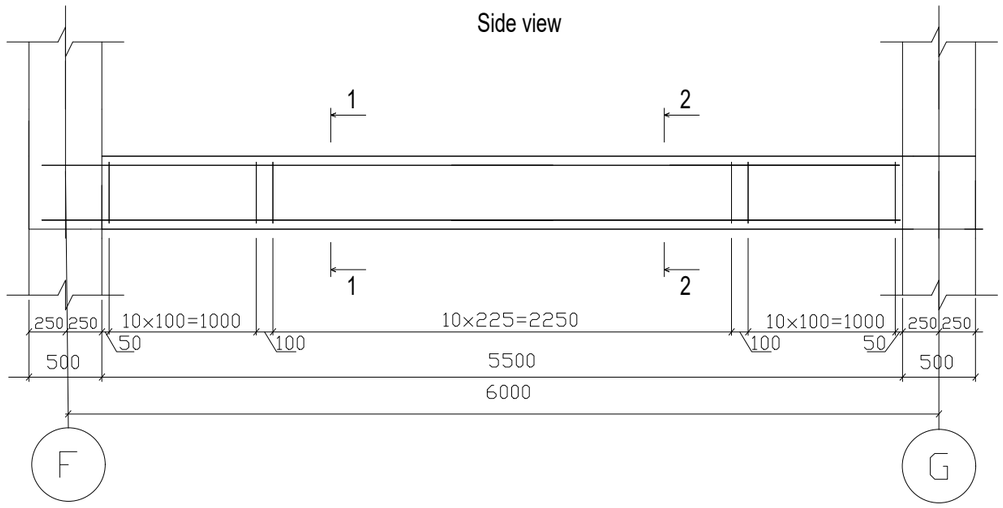
Column steel consumption

Brand	Reinforcement products		
	reinforcement class		
	S500	S275	Total
	EU 2-2004		
	Ø18	Ø10	
K-1	151.03	9.8	160.83

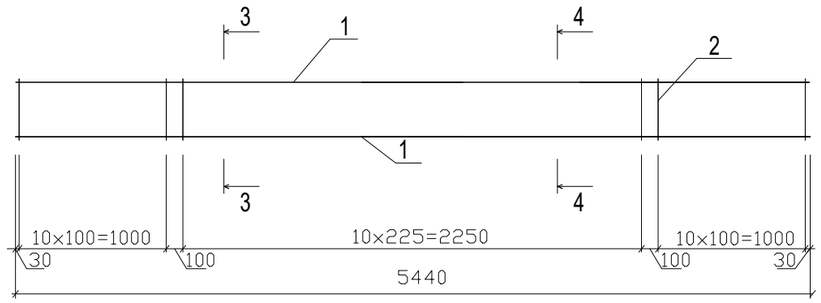
					KazNITU-5B072900-Civil Engineering-02.08.02-2021-DP
					Hotel with built-in underground parking in Semey city
Chan	Sheet	Nedoc	Sign	Date	
Head of Dep		Kozyukova .N.V			Calculation and design part
Supervisor		Dostanova .S.H			
Consultant		Kozyukova .N.V			
Controller		Bek .A.A			CC4 Column
Created		Khanjary . N			Civil engineering and building materials department

stage	Sheet	Sheets
DP	8	12

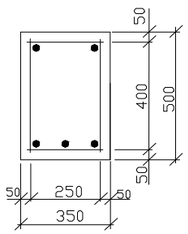
Side view



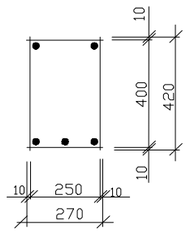
Frame K-1



1-1

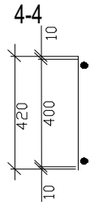


2-2



3-3

4-4



Column reinforcement specification

position	Design C	Diameter, steel grade	Length мм	NO.	Mass per. kg/m.	Note
1	EU 2-2004	Ø20S500	6000	5	2.466	
2	EU 2-2004	Ø10S275	1000	30	0.62	
			Material			
			C30/37			37

Column steel consumption

Brand	Reinforcement products		
	reinforcement class		
	S500	S275	Total
	EU 2-2004		
	Ø20	Ø10	
K-1	200	9.8	160.83

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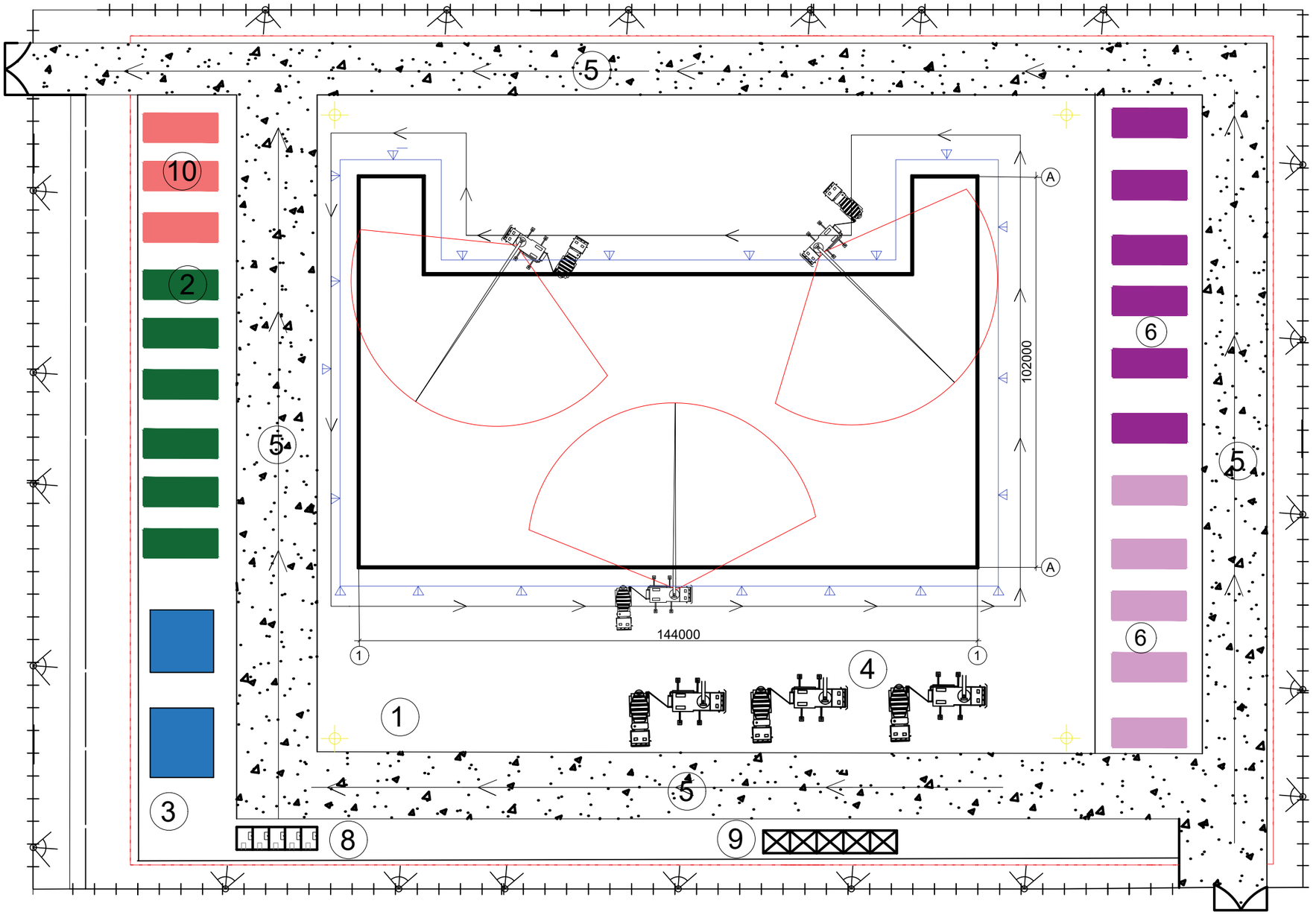
Chan	Sheet	Nedoc	Sign	Date	
Head of Dep		Kozyukova .N.V			Calculation and design part
Supervisor		Dostanova .S.H			
Consultant		Kozyukova .N.V			
Controller		Bek .A.A			1CB1 Beam
Created		Khanjary . N			

stage	list	scale
DP	9	12

Civil engineering and building materials department

Construction Master plan 1/200



General site plan

A general site plan or a plot plan could be a style of drawing employed by architects, landscape architects, urban planners, and engineers which shows existing and proposed conditions for a given area, typically a parcel of land which is to be modified. Sites plan typically show buildings, roads, sidewalks and paths/trails, parking, drainage facilities, sanitary sewer lines, water lines, lighting, and landscaping and garden elements.

Such an inspiration of a site could be a "graphic representation of the arrangement of buildings, parking, drives, landscaping and the other structure that's a part of a development project".

A site plan may be a "set of construction drawings that a builder or contractor uses to form improvements to a property. Counties can use the location attempt to verify that development codes are being met and as a historical resource. Site plans are often prepared by a design consultant who must be either a licensed engineer, architect, designer or land surveyor"

Site plans includes site analysis, building elements, and planning of varied types including transportation and concrete. An example of a site plan is that the plan for Indianapolis[4] by Alexander Ralston in 1821.

The specific objects and relations are shown are obsessed with the aim for creating the plot plan, but typically contain: retained and proposed buildings, landscape elements, above-ground features and obstructions, major infrastructure routes, and important legal considerations like property boundaries, setbacks, and rights of way.

Master plan areas

NO	Name of construction	Area
1	construction area	8220m²
2	Temporary houses for Labors	1200m²
3	Water Tang	70m²
4	Parking Area for large cars	120m²
5	Temporary road forTransportation	
6	Temporary house for materials	1400m²
7	gate of construction	7m²
8	Toilets for worker	150m²
9	Construction waste bins	25m²
10	Offices	54m²

Water hydrants

Electric lines

Hazardous work area

Lights

Temporary fencing

roads of working machines

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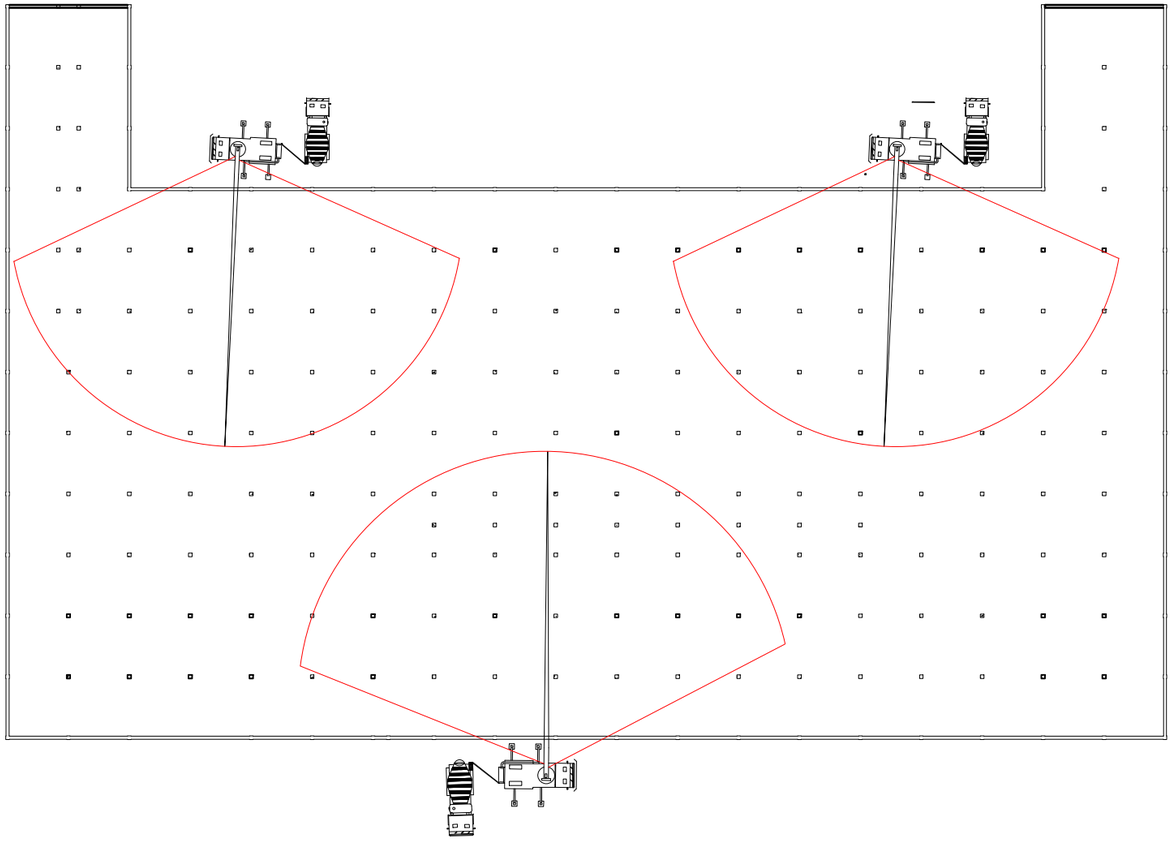
Consultant		Kozyukova .N.V			
Controller		Bek .A.A			Construction master plan
Created		Khanjary .N			Civil engineering and building materials department

Concreting scheme



General information about concreting

Concreting is one of the most important, challenging and attractive stages of construction in the world, which is performed on concrete and metal structures.
Prior to the early eighteenth century, concreting was an unfamiliar word. In 18322, it was the Egyptians who initiated the concreting industry and the construction of strong structures using a combination of gypsum and lime.
In general, pouring concrete at very high and low temperatures leads to lack of concrete resistance, so it is better to do the formwork at the right temperature.

Pouring concrete at very low temperatures is a problem due to the freezing of water inside the concrete. When water freezes, cement and sand particles shrink. By reducing the adhesion between the concrete components, its strength decreases.

If you have to make concrete at low temperatures, use a chlorine-nitrate solution to prevent water from freezing for concreting. Of course, using hot water to prepare concrete can reduce the difficulty of pouring concrete in cold weather to some extent.

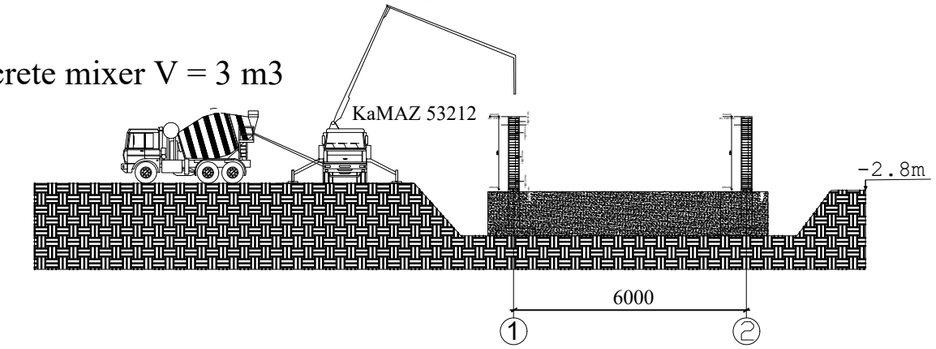
Pouring concrete at high temperatures reduces the strength of concrete due to increased long-term productivity, thermal cracking and the tendency to shrink due to drying, reduced concrete strength, increased corrosion rate of reinforcing steel and reduced concrete surface uniformity.

Concreting steps

1. **Batching**
2. **Concrete mixing**
3. **Carrying concrete**
4. **Reinforcement**
5. **Construction and installation of molds**
6. **Pouring concrete**
7. **vibration and consolidation and surface polishing**
8. **Concrete maintenance**

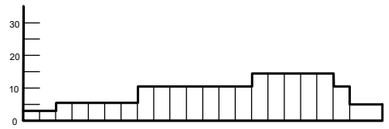
Concrete pump ABN 75/32

Concrete mixer V = 3 m3



Concreting calendar schedule

	Name of work	Scope of work		Labor cost	Necessary machines		shift number	working days	05/09/2021	14/10/2021
		Measure.	Number		Brand	number			2 4 6 8 10 12 14 16 18 20 22 24 26 28 30	2 4 6 8 10 12 14
1	Laying of concret	m^2	2	4,1		3	1	5		
2	Installation of the foundation	pcs	60,5	4,5		3	1	15		
3	Reinforcement of the foundation	pcs	15,16	12,1		-	1	18		
4	Instalation of formwork	pcs	8,62	9,6	Concrete pump ABN 75/32	2	1	8		
5	Concrete purring	m^3	121,6	11,43		3	1	6		
6	Removing of formwork		87,54	16,5		2	1	9		
7	Concrete care		19,08	4,9		4	1	3		



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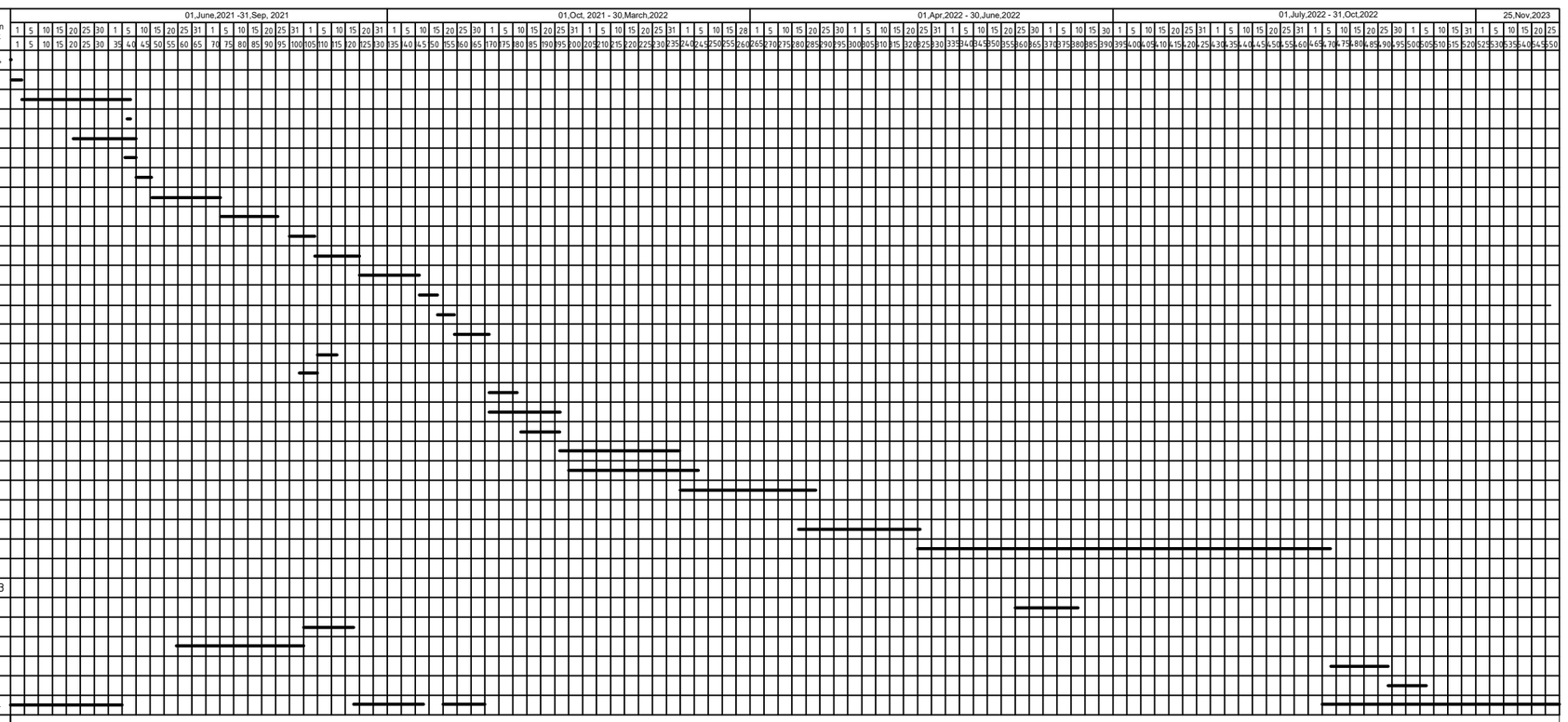
Consultant		Kozyukova .N.V			
Controller		Bek .A.A			Concreting scheme
Created		Khanjary .N			Civil engineering and building materials department

Calendar schedule of works

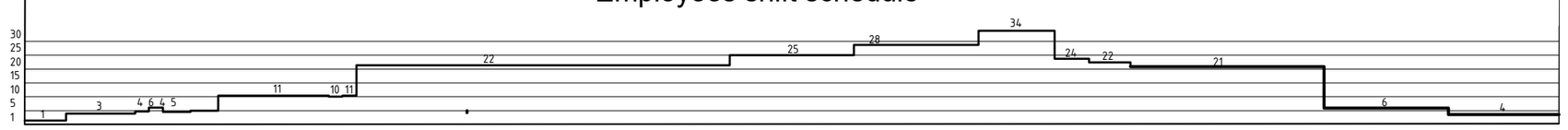
№	Type of works	volume: measure unit.	volume: number	Labor intensity man-day.: normative-	Labor intensity man-day.: accepted	Necessary machines: name	Necessary machines: machine/ shift	number of workers	composition of the brigade: qualification	composition of the brigade: number	duration of work
1	Leveling of the soil	1000м²	1,28	–	–	bulldozer DZ35C	0,054	1	leveller VP-8A	1	0,054
2	Removing of the topsoil	1000м²	0,038	–	–	bulldozer DZ35C	7,75	1	Machinist Bp-1	1	0,76
3	Excavation of a foundation trench	100м³	3,02	24,11	21,96	excavator DZ0551	23,35	3	Machinist Bp-1	1	7,78
4	manual excavation of soil	100м³	6,81	–	–	excavator DZ0551	0,24	1	Machinist Bp-1	1	0,24
5	soil compaction	100м³	0,68	20,31	18,48	-	–	2	compactor VP-8A	2	4,5
6	Laying concrete	100м³	0,10	1,79	1,62	Concrete pump ABN 75/32	0,35	1	concreting 4p-1,3p-1	2	0,8
7	Installation of foundation	100pcs	0,35	9,1	8,27	crane CKG63/100	2,42	2	installer 6p-1,5p-2,4p-1	4	1,1
8	Installation of poles	100pcs	0,82	53,41	48,55	crane CKG63/100	7,53	2	installer 6p-1,5p-2,4p-2	5	4,9
9	Installation of reinforcements	100pcs	0,55	45,1	41	crane CKG63/100	3,86	2	installer 6p-1,5p-2,4p-2	5	4,1
10	Installation of formwork	100pcs	0,22	15,78	14,35	crane CKG63/100	2,38	2	installer 5p-2,4p-2	4	1,8
11	Roofing	100pcs	1,11	28,16	25,6	crane CKG63/100	2,88	2	installer 4p-1,3p-2,2p-1	4	3,2
12	stairs	100pcs	1,2	38,02	34,6	crane CKG63/100	4,77	2	installer 4p-2,3p-2	4	4,3
13	Installation of partition walls	100pcs	0,34	11,85	10,77	crane CKG63/100	1,19	2	installer 4p-2,3p-2	4	1,3
14	Installation of farms	100pcs	0,09	13,61	12,37	crane CKG63/100	20,92	2	installer 5p-1,4p-2,3p-2	5	1,2
15	Installation of wall panels	100pcs	0,39	27,98	25,43	crane CKG63/100	4,10	2	installer 5p-1,4p-2,3p-2	5	2,5
16	Waterproofing of basement walls	100м²	1,45	6,11	5,55	-	–	2	insulator 4p-1,3p-1	2	1,4
17	Re-compaction of soil	100м³	47,86	268,01	–	bulldozer DZ35C	1,3	1	machinist 6p-1	1	1,3
18	Making brick partition walls	1000pcs	1,02	17,46	15,87	crane CKG63/100	–	2	brickmasonry 4p-2,3p-2	4	2
19	Laying of roof structure	100м²	23,45	66,13	60,123	"	–	2	roofer 5p-2,4p-2,3p-2	6	5,1
20	installation curtain walls	100м²	1,49	24,99	22,71	"	–	2	carpenter 6p-1,5p-1,4p-2	4	2,8
21	Installation of doors and windows	100м²	0,79	75,73	68,84	crane CKG63/100	1,54	2	installer 5p-1,4p-1,3p-2	4	8,6
22	Installation of partition walls	100м²	2,05	164	149,1	"	1,05	2	-	8	9,3
23	Facade cladding	100м²	6,42	175,74	159,76	"	–	2	-	8	9,7
24	Plastering the ceiling and walls	100м²	24,78	6,28	571	mixer CO-130A	–	2	-	12	23,8
25	Facade cladding	100м²	7,69	154,76	140,76	"	–	2	-	8	8,7
26	Laying floors	100м²	9,99	78,42	712,29	crane CKG63/100	–	2	-	12	29,6
27	Installation of decorative glasses	100м²	84,48	21,3	19,36	"	–	1	-	4	4,8
28	Total			1348,15	2188,23	"		–	-	–	145,63
29	Ventilation and head control	2,5%		33,7	54,7	"		2	heat tech 5p-2,4p-2,3p-2	6	4,5
30	Plumbing work	2%		26,96	43,76	"		2	santech 5p-2,4p-2,3p-2	6	3,6
31	Electrical work	5%		67,40	109,41	"		2	electrich 5p-2,4p-2,3p-2	6	9,1
32	Landscaping works	1,5%		20,22	32,82	"		2	" 6p-2,5p-2	4	2,73
33	transfer of object	1%		13,48	21,88	"		2	" 6p-2,5p-2	4	4,1
34	Other works	6%		80,88	131,29	"		2	" 6p-2,5p-2,4p-2	6	10,94



$$K_{her} = \frac{nmax}{ncp} . < 1.5 = \frac{20}{20} = 1 < 1.5$$

$$ncp = \frac{Q}{p} = \frac{11000}{550} = 20$$

Employees shift schedule



Technical and economical indicators

№	Name	unit	indicators: accepted
1	Construction duration	day	550
2	Total labor intensity	man - day	11000
3	Average number of labor	man	20
4	Maximum number of labor	man	34

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Supervisor		Dostanova .S.H			stage: DP; Sheet: 12; Sheets: 12
Consultant		Kozyukova .N.V			
Controller		Bek .A.A			Calendar schedule
Created		Khanjary .N			Civil engineering and building materials department

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РЕСПУБЛИКИ КАЗАХСТАН
СӘТБАЕВ УНИВЕРСИТЕТІ

RESPONSE

OF THE SUPERVISOR
for the graduation project

Khanjary Nazifullah
5B072900-Civil Engineering

Topic: «Hotel with built-in underground parking in Semey»

Graduation project of Khanjary Nazifullah made in accordance with the requirements and includes all the necessary sections of the diploma project.

In the Architectural part, facades, sections, floor plans and connection nodes of structures are presented. The thermotechnical calculation of the wall fencing was made.

In the constructive section, the calculation of the column, crossbar on the LIRA CAD program is performed. In the technological part, technological maps for concrete works have been developed.

The economic part of the project is calculated according to the program of ABC. All drawings are made in Autocad.

In general, the graduation project was performed at a good level, the student Khanjary Nazifullah showed good knowledge both during training and during the implementation of the project. The work deserves a good grade.

Supervisor
Doctor of technical sciences, lecturer

_____Dostanova S.Kh

«30» may_ 2021 yr.

Протокол анализа Отчета подобия Научным руководителем

Заявляю, что я ознакомился(-ась) с Полным отчетом подобия, который был сгенерирован Системой выявления и предотвращения плагиата в отношении работы:

Автор: Ханджари Назифуллах

Название: Hotel with built-in underground parking in Semey

Координатор:Сауле Достанова

Коэффициент подобия 1:9.6

Коэффициент подобия 2:7

Замена букв:47

Интервалы:0

Микропробелы:51

Белые знаки: 0

После анализа Отчета подобия констатирую следующее:

☐ обнаруженные в работе заимствования являются добросовестными и не обладают признаками плагиата. В связи с чем, признаю работу самостоятельной и допускаю ее к защите;

☐ обнаруженные в работе заимствования не обладают признаками плагиата, но их чрезмерное количество вызывает сомнения в отношении ценности работы по существу и отсутствием самостоятельности ее автора. В связи с чем, работа должна быть вновь отредактирована с целью ограничения заимствований;

☐ обнаруженные в работе заимствования являются недобросовестными и обладают признаками плагиата, или в ней содержатся преднамеренные искажения текста, указывающие на попытки сокрытия недобросовестных заимствований. В связи с чем, не допускаю работу к защите.

Обоснование:

……

…… ……

Дата *Подпись Научного руководителя*

Протокол анализа Отчета подобия

заведующего кафедрой / начальника структурного подразделения

Заведующий кафедрой / начальник структурного подразделения заявляет, что ознакомился(-ась) с Полным отчетом подобия, который был сгенерирован Системой выявления и предотвращения плагиата в отношении работы:

Автор: Ханджари Назифуллах

Название: Hotel with built-in underground parking in Semey

Координатор: Сауле Достанова

Коэффициент подобия 1:9.6

Коэффициент подобия 2:7

Замена букв:47

Интервалы:0

Микропробелы:51

Белые знаки:0

После анализа отчета подобия заведующий кафедрой / начальник структурного подразделения констатирует следующее:

☐ обнаруженные в работе заимствования являются добросовестными и не обладают признаками плагиата. В связи с чем, работа признается самостоятельной и допускается к защите;
☐ обнаруженные в работе заимствования не обладают признаками плагиата, но их чрезмерное количество вызывает сомнения в отношении ценности работы по существу и отсутствием самостоятельности ее автора. В связи с чем, работа должна быть вновь отредактирована с целью ограничения заимствований;
☐ обнаруженные в работе заимствования являются недобросовестными и обладают признаками плагиата, или в ней содержатся преднамеренные искажения текста, указывающие на попытки сокрытия недобросовестных заимствований. В связи с чем, работа не допускается к защите.

Обоснование:

……
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Дата *Подпись заведующего кафедрой /*

начальника структурного подразделения

Окончательное решение в отношении допуска к защите, включая обоснование:

……
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начальника структурного подразделения