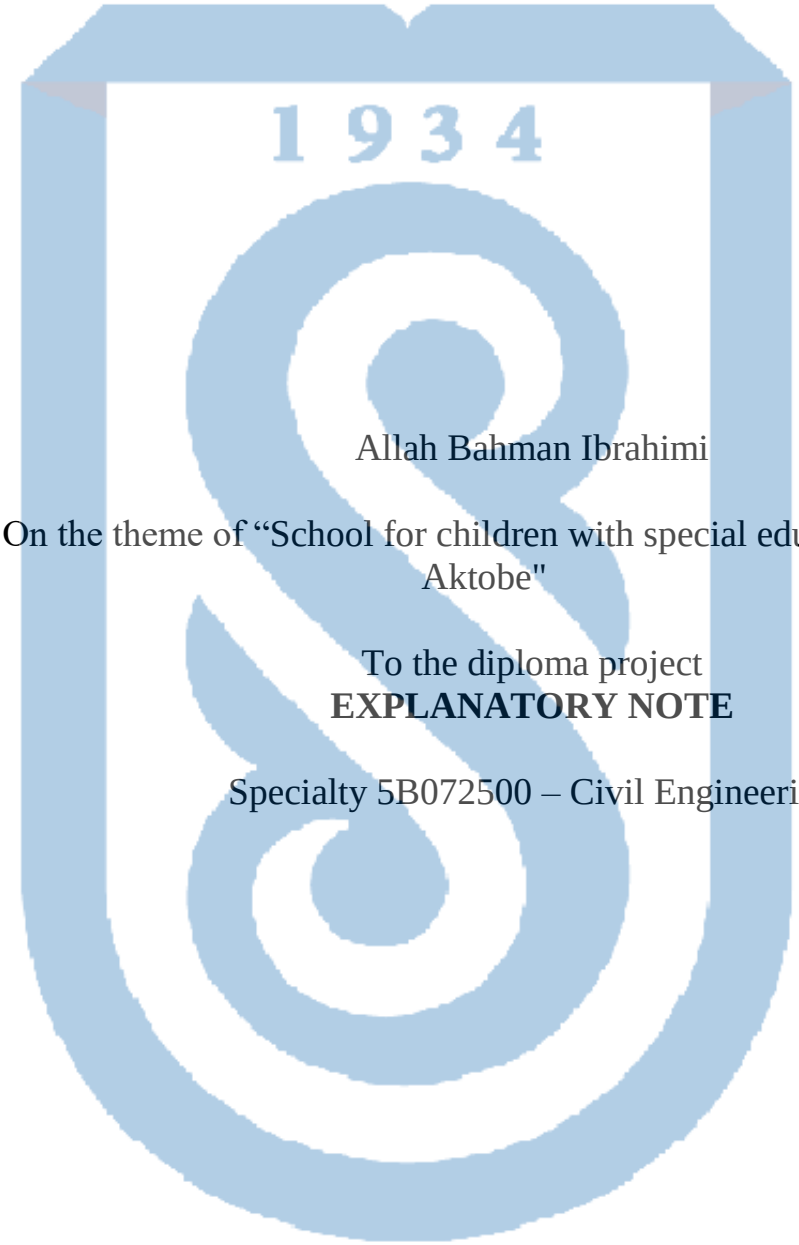
MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
Kazakh National Research Technical University named after K.I. Satpayev
Institute of Architecture, Construction and Energy named after T. Basenov
Department of «Construction and Building Materials»



Allah Bahman Ibrahimi

On the theme of “School for children with special educational needs in Aktobe"

To the diploma project
EXPLANATORY NOTE

Specialty 5B072500 – Civil Engineering

Almaty 2020

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ALLOWED TO PROTECT

Head of Department

_____K.Akmalayuli

« 25 » 05 2020 y.

EXPLANATORY NOTE

To the diploma project

On the theme of " School for children with special educational needs in Aktobe"

Specialty 5B072500 – Civil Engineering

Prepared by A.Bahman Ibrahimi

Supervisor M.Paktin

« 25 »_05 _2020 y.

Almaty 2020

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APPROVED

Head of Department

_____K.Akmalayuli

«27»___01___ 2020 y.

ASSIGNMENT

Complete a diploma project

Student __ A.Bahman Ibrahimi_____

Topic " School for children with special educational needs in Aktobe"

№ _1222 b - endorsed by the request.

Approved by the Order of the Rector of the University No. 762-b of January 27, 2020.

The deadline for completion is May 18, 2020.

Beginning entries of the certificate venture: construction locale – Petropavlovsk.

Rundown of issues to be considered in the recognition venture:

Architectural and development division: qualities of the development region; three-dimensional arranging choices; structural and plan arrangements; external divider warm designing bookkeeping; building hardware of the structure;

Computational and valuable segment: count of burdens and making of the computation conspire, figuring of the board and its estimation of fortified solid components dependent on the outcomes and their motivation Technology and association of development creation and work security: land assurance of the volume of underground and surface works; assurance of the quantity of solid trucks; surface strengthened cement of the structure development of innovative guide of structures establishment; object plan of development end-all strategy;

Schedule. 4. Division of Construction Economics: neighborhood and article planning of assessments, List of drawing materials (compulsory drawings must be indicated):

Facade of the structure, segments, joints, determinations, plans - 4 sheets;

Drawing, detail of the section - 2 sheets; Calendar arrangement of development creation, general development plan, 2 Sheets 11 slides of the presentation of work are provided.

Recommended basic literature: SP RK 2.04-01-2017 Construction Climatology, SN RK 2.04-04-2013 Construction Heat Engineering, SN RK 2.03-30-2017 Construction in Seismic Zones.

SCHEDULE

preparation of thesis (project)

№	Sections	33%	66%	100%	Примечание
1	Predesign analysis Architectural and construction	18.02.2019г.-01.03.2019г.			
2	Settlement constructive		18.03.2019г.-29.03.2019г.		
3	Technology and organization of construction production and labor protection Economic			03.04.2020г.-19.04.2020г.	
4	Anti-plagiarism, norm control, pre-defense	18.05.2020y.-22.05.2020y.			
5	Defence	01.06.2020-05.06.2020y.			

Signatures

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

Name of sections	Consultants, I.O.F. (academic degree, rank)	date of signing	Signature
Architectural building	M.Paktin, master of technical science	25.05.2020	
Settlement and constructive	Zh.T.Nashiraliev, master of technical science	25.05.2020	
Technology and organization of construction production	I.Z. Kashkinbaev, doctor of technical science	25.05.2020	
Economic section	M.Paktin, master of technical science	25.05.2020	
Norm controller	N.V. Kozyukova, master of technical science	25.05.2020	

Supervisor M.Paktin

The student accepted

The task A.Bahman Ibrahimi

Date «_ » _2020

АҢДАТПА

АҚТӨБЕ қаласында орналасқан мектепке арналған инженерлік диссертациялық жоба. Бас жоспар бойынша СБО-ны оқытатын техникалық көрсеткіштер:

1. Учаскенің жалпы ауданы 36789,6 м;
2. Құрылыс алаңы - 3000,6 м.

Бұл жобада сәулет, құрылыс, жобалау-өндірістік Жобаның жалпы техникалық-экономикалық көрсеткіштері анықталды, сонымен қатар қоршаған ортаны қорғау және өмір қауіпсіздігі туралы шешімдер қабылданды.

АННОТАЦИЯ

Дипломный проект с проектированием школы для школы, расположенной в городе АКТОБЕ. Технические показатели обучения ТСА по генеральному плану: 1. Общая площадь участка составляет 36789,6 м; 2. Строительная площадка - 3000,6 м. В рамках этого проекта были приняты инженерные решения в Были определены общие технико-экономические показатели проекта, а также приняты решения по защите окружающей среды и безопасности жизнедеятельности.

ANNOTATION

The thesis project with engineered a school for school located in the city of AKTOBE . Technical indicators teaching TCA on the general plan:

1. The total area of the plot is 36789.6 m ;
2. Construction site - 3000.6 m .

In this project, engineering decisions were made in the architectural, construction, design and manufacturing and production units. The general technical and economic indicators of the project were identified, as well as decisions were taken on the protection of the environment and life safety.

CONTENT

INTRODUCTION

Most Kazakh children Reduced health inaccessible quality education. This conclusion was reached by an international human rights organization, having studied the educational system in the country. Parents of children with disabilities say educational institutions do not want to accept them. Meanwhile, authorities believe that "the situation is gradually improving."

The project "School in Aktobe" is designed to provide the knowledge, skills and abilities that children with disabilities can often not be obtained in either a regular or a correctional school. First, these are individual classes with a dialectologist, speech therapist, psychologist, as well as lessons in an art studio.

The aim of the project "School of Special Children in Aktobe" is to design and build a school building with all amenities for both children and teachers.

In order to achieve this goal it is necessary to set the following tasks:

- To study all the necessary requirements for schools of gifted children;
- Consider alternative solutions to possible issues;

To provide for comfortable conditions, both for children and for teachers;- Consider a design option with accommodation. It is from this need that Agape Love Education Centre builds its foundation to explore this opportunity by coming up with a vision of setting up the Centre for early childhood to access which will help to prevent stunted cognitive development of child and is reputed for facilitating better future performance in school.

Education Centre will offer pre-primary education, primary education and secondary education. Secondary education will consist of ordinary level and high school level. It is estimated that first phase of its construction will be done in the first five years

-

1 Architectural section

1.1 Basic information about the construction site

- Class of functional fire hazard of the building - F1.3.
- The degree of fire resistance of building I (SP RK 2.02-101-2014)
- Class of constructive fire hazard of buildings - C0
- Class of constructive fire hazard of building structures - K0
- Storeys - 3 above ground floors
- Technically complex object of the II (normal) level of responsibility (RDS RK 1.02-04-2013)

The building is complex in shape with projections of the facade plane. In plan with dimensions in the extreme axes 83, 750x48, 500 m.

W Denmark starts with a mark of 0,000 accepted level of the finished floor.

1.2 Natural and climatic and engineering-geological conditions

The climate of Aktobe is close to arid. During the year, there is virtually no rainfall in Aktobe. According to Keppen and Geiger, this climate is classified as BWK . The average temperature in Aktobe is 12.3 ° C. About 150 mm of precipitation falls annually.

Table 1. Climate characteristic

	Январь	Февраль	март	Апрель	Май	Июнь	Июль	Август	Сентябрь	Октябрь	Ноябрь	Декабрь
Средний температура (°C)	-1.2	-1.2	3.5	11.6	18.5	23.2	26.2	25.8	20	12.9	6.5	1.8
минимум температура (°C)	-4.7	-4.8	-0.5	6.4	13.1	17.7	20.8	18.9	14.5	8.2	2.9	-1.1
максимум температура (°C)	2.3	2.5	7.5	16.9	23.9	28.8	31.7	32.8	25.5	17.6	10.1	4.8
Норма осадков (мм)	8	9	13	16	17	11	10	9	13	14	16	14

The coldest month - February is characterized by negative temperatures minus 4-4.8 ° C (for plains and foothills). The hottest month is July. The average temperature for the plains is plus 24 - 26 , 2 ˚C. Basic data on snow cover are given in table 2.

Table 2 - Snow cover

Weather Station	Months									Highest values		Winter
	9	10	11	12	1	2	3	4	5	Avg.	Max.	Min
The average monthly snow depth, cm												
Aktobe			4	10	19	21	nine			28	55	7

The wind regime of the study area is quite heterogeneous and changes with distance from the mountains. The average annual wind speed is 2.3 m / s. Wind breakthrough reaches 28 m / s. The lowest monthly average wind speeds throughout the territory are observed in the winter period (in December, January), and the highest - in the summer.

Table 3 – Wind

Weather station months per year	months												years
	1	2	3	4	5	6	7	8	9	10	11	12	
Monthly and annual average wind speed, m / s													
Aktobe	1,5	1,7	2,0	2,0	2,5	2,5	2,8	2,5	2,0	2,3	2,0	1,5	2,3
Maximum wind speed and wind breakthrough on the weather vane, m/s													
Aktobe	12	11	20	>20	>20	18	20	18	12	15	12	12	>20

Table 4 - Repeatability of wind and calm directions,%

Weather Station Direction Calm	Direction								Calm
	NE	SE	E	N	S	SW	W	NW	
Aktobe	18,2	13,1	10,6	5,1	8,1	11,9	14,8	18,2	18,2

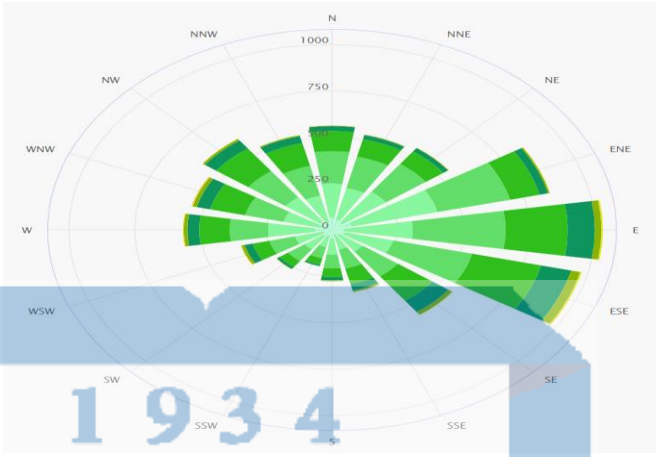


Figure 1 - Wind rose according to the weather station in Aktobe

1.3 General plan Landscaping

The general plan was developed in accordance with the urban planning situation and the required orientation of the premises, the master plan for the development of industrial areas, taking into account the landscaping and landscaping in accordance with the requirements of SN RK 3.02-07.2014 " Public buildings and structures" and SP RK 3.01-101-2013 "Urban planning . Improvement and greening of the site envisaged by the project reduces the general dust content and eliminates local foci of dust.

Table 5 - Technical and economic indicators for the master plan

Name	Indicator
Land area	36.789
Built-up area	3000.6 m^2
Building factor	0.08
Landscaping area	13789 m^2
Gardening rate	0.3748
Hard surface	20,000 m^2
The utilization of the territory	0.54

The area around the building is landscaped and landscaped. Paved roads are provided for the building.

1.4 Space-planning solution

The height of the first floor is 4.5 m. The building has a frame-wall constructive solution in the form of a monolithic frame with monolithic walls.

The foundation - a solid monolithic beamless JB plate

External walls - masonry from a gas block D600, thickness - 200 mm, monolithic reinforced concrete walls - thickness 200 mm. Reinforce the brickwork with reinforcing nets over the entire length with a step of 500 mm in height and reinforce it with monolithic inclusions with a pitch of no more than 2000 mm. Partition walls - masonry from a gas block D600, thickness - 100 mm according to GOST 31360-2007, partitions dignity.to processing water-repellent. Overlapping's monolithic beam-free reinforced concrete slab b = 200mm.

Roof - built-up ventilated, drain organized.

Wall insulation (vent. Facade) - heat-insulating hard slabs of stone wool Y = 80kg / m3; $\lambda = 0.043$, b = 100mm based on basalt rocks.

Roof insulation - heat-insulating rigid slabs of stone wool $\lambda \leq 0{,}042$, b = 50mm, in three layers. Each layer with overlapping seams.

Floors - insulated by cold rooms.

Facade decoration – Funder max. All overhead decoration of the building provides for an aluminum facade subsystem (НФсВ3).

The blind area of the building is 1 m wide with cobblestones. For the Facade of the НФСВ3 adjacent to the unwinding, an air gap of 20-50 mm is provided.

Windows - metal-plastic with two-chamber double-glazed windows, inner glass with an energy saving coating. On windows, provide protection against children (flexible lock).

Stained-glass windows - an aluminum profile of a warm series with a two-chamber double-glazed window, the opening type is complex. The lower part (up to a height of 1.0 m) of the stained-glass window using red-hot glass.

Stained-glass windows of the entrance to the entrance (building) - aluminum profile with single chamber double-glazed window, the type of opening is complex. The lower part (up to a height of 1.0 m) of the stained-glass window using red-hot glass.

Stained-glass windows of the balcony and loggia (to the room) - aluminum profile with a two chamber double-glazed window.

Stained-glass windows of a balcony and a loggia (from outside) - an aluminum shape with a two chamber double-glazed window, the opening type is complex. The lower part (up to a height of 1.0 m) of a stained-glass window using red-hot glass (armored with a film).

Ladder type L1 - monolithic, unheated, railing with stainless steel railing.

Elevators - two elevators with a loading capacity of 1000 kg, without mash. Premises with a pit. All elevators have a fire resistance limit for EI-60 elevator car doors. Elevator shaft - monolithic reinforced concrete.

1.5 Constructive solutions of the object

The graduation project of the school for special children was developed in accordance with SN RK 5.01.-02-2013, SNiP 2.01.19-2004, SNiP RK 2.03-3 0-2017.

In the drawings of the КЖ brand, reinforced concrete structures of a monolithic foundation such as “foundation slab”, floor slabs and floor slabs, as well as stiffness diaphragms, are developed.

Base plate with a thickness of 5 00 mm, reinforced with reinforcement with a diameter of 14 mm, class A500C.

Slab and cover 220mm thick.

Monolithic reinforced concrete columns 400x400 mm thick.

Walls and partitions monolithic and reinforced concrete 200mm.

Monolithic reinforced concrete stairs 200 mm thick.

Monolithic reinforced concrete parapet 150 mm thick.

To reinforce all reinforced concrete structures, A500C class reinforcement was used.

For a conditional mark of 0.000, the floor of the first floor is taken.

Installation of monolithic structures is carried out in accordance with SNiP 5.03.37-2005.

Apply anti-corrosion coating to all embedded parts and connecting elements of reinforced concrete structures by galvanizing with zinc plating.

Work on anticorrosion protection shall be carried out in accordance with SNiP RK 2.01-19-2004

“Protection of building structures from corrosion. Rules for the production and acceptance of work " Perform welding work in accordance with the instructions of SN 393-78 and GOST 5264-80.

Welding of embedded parts is carried out with electrodes E-42, satisfying the requirements of GOST 9467-75.

In the process of construction and installation work, it is necessary to develop measures for fire protection and for monitoring the implementation of fire safety rules.

Horizontal waterproofing is made of cement mortar M100 with sealing additives.

1.6 Thermo mechanical calculation of the outer wall

According to the joint venture of the Republic of Kazakhstan 2.04-01-2017 “Construction Climatology” [p. 7-10] and the joint venture of the Republic of Kazakhstan 2.04-107-2013 “Construction Heat Engineering”. [p.14-16] "Construction heat engineering" it is necessary to determine the thickness of the insulation for the outer wall.

We determine the value of the degree-days of the heating period:

$$ГСОП= (t_в-t_{отпер})*z_{отпер} \quad (1)$$

where $t_в$ = 21 ℃ - temperature of internal air, ℃;
$t_{отпер}$ = 1.7 ℃ - average temperature of the heating period;
$z_{отпер}$ = 160 days . - the duration of the heating period ;
ГСОП = (21-1.9) * 145 = 2769.5 ° C * day

The required heat transfer resistance of enclosing structures that meet sanitary-hygienic and comfortable conditions is:

$$R_0^{тр} = 2{,}45 * ℃/Вт \quad (2)$$

Table 6 - the composition of the outer wall [11]

№	Material name	Υ_0 ,kg/m^3	λ, w/m^2*℃s	δ,m	R_n=δ/λ , m^2 * ℃/w
1	Plaster on a cement-sand mortar	1800	0,76	0,03	0,039
2	Stone min. cotton wool	60	0,038	0,1	2,63
3	Monolithic concrete	2500	1,69	0,20	0,12
4	Cement-sand mortar plaster	1800	0,76	0,03	0,039

The heat transfer resistance of the building envelope should be determined by the formula 2.2:

$$R_0 = \frac{1}{\alpha_в} + \frac{\delta_1}{\gamma_1} + \frac{\delta_2}{\gamma_2} + \frac{\delta_3}{\gamma_3} + \frac{\delta_4}{\gamma_4} + \frac{1}{\alpha_н} \quad (3)$$

$$R_0 = 2{,}84\ m^2 * °\frac{C}{w} \geq R_0^{тр} = 2{,}45\ m^2 * ℃/w$$

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

2 Design section

2.1 Collection of loads

Table 7 - the collection of loads on the 1st floor (floor)

Name of materials	unit	Normatives	γ_f	estimated
Ceramic plate δ = 8mm, ρ = 1800 kg / m3	kg/m^2	14,4	1,1	15,84
Tsem. Sand screed δ = 40mm, ρ = 1800 kg / m ^ 3	kg/m^2	72	1,3	93,6
Extrude. Pen. δ = 60mm, ρ = 400 kg / m ^ 3	kg/m^2	2,4	1,3	3,12
Waterproofing + Geo-style Δ = 10 kg / m ^ 2	kg/m^2	10	1,3	13
Reinforced concrete slab δ = 200 mm, ρ = 2500 kg / m ^ 3	kg/m^2	500	1,1	550
Total	kg/m^2	598,8		675,56

Table 8 - Collection of loads on typical floors (floor)

Name of materials	unit	Normative	γ_f	estimated
Parquet δ = 15mm, ρ = 700 kg / m ^ 3	kg/m^2	10,5	1,2	12,6
Tsem. Sand screed (in	kg/m^2	90	1,3	117

Armenian) δ = 50mm, ρ = 1800 kg / m ^ 3				

Continuation of table 8

Technolast Acoustic Δ = 4 kg / m ^ 2	kg/m^2	4	1,3	5,2
Equal. c / p solution δ = 10mm, ρ = 1800 kg / m ^ 3	kg/m^2	18	1,3	23,4
Reinforced concrete slab δ = 200 mm, ρ = 2500 kg / m ^ 3	kg/m^2	500	1,1	550
Total	kg/m^2	622,5		708,2

Table 9 - the collection of loads on the roof

Name of materials	unit	Normative	γ_f	Estimated
Tekhnolast EKP Δ = 5.25 kg / m ^ 2	kg/m^2	5,25	1,2	6,825
Uniflex Vent EPV Δ = 4.3 kg / m ^ 2	kg/m^2	90	1,3	117
Tsem. Sand screed (in Armenian) δ = 40mm, ρ = 1800 kg / m ^ 3	kg/m^2	72	1,3	93,6
Expanded clay (prone.)	kg/m^2	24	1,3	31,2

δ = 40mm, ρ = 600 kg / m ^ 3				
Extrud. Pen. δ = 60mm, ρ = 40 kg / m ^ 3	kg/m^2	2,4	1,3	3,12
Reinforced concrete slab δ = 200 mm, ρ = 2500 kg / m ^ 3	kg/m^2	500	1,1	550
total	kg/m^2	607,95		690,3

Table 10 - Collection of wall loads

Name of materials	unit	Normative	γ_f	estimated
Plaster δ = 40 mm, ρ = 1800 kg / m ^ 3 H = 3.0m (3.7 m)	kg/m	216 (266,4)	1,3	280,8 (346,32)
Vyrav. c / p solution δ = 10 mm, ρ = 1800 kg / m ^ 3 H = 3.0m (3.7 m)	kg/m	54 (66,6)	1,3	70,2 (86,58)
Extrud. foam. δ = 60 mm, ρ = 40 kg / m ^ 3 H = 3.0m (3.7 m)	kg/m	7,2 (8,88)	1,3	9,36 (11,54)
Heat block δ = 300mm, ρ = 600 kg / m ^ 3	kg/m	540 (666)	1,2	648 (799,2)

H = 3.0m (3.7 m)				
Total	Kg/m	817,2 (1007,88)		1008,36 (1243,64)

2.2 Calculation of the crossbar [12]

For the calculation, a structural element was chosen - the crossbar at the mark of +7,500 along the 1 / AB axis .

Initial data:

Rectangular section with dimensions b = 400 mm, h = 400 mm; $c1$ = 20 mm. Normal concrete of class C30/37 (= 30MPa, γc = 1.5, $fcd = \alpha cc \cdot fck / \gamma c$ = 0.85 · 30 / 1.5 = 17.0 MPa, α ss = 0.85). S500 class valves (= 500MPa, $fyd = fyk / \gamma s$ = 500 / 1.15 = 435 MPa, Es = NTP RK 02-01-1.1-2011

45 20·104MPa).

A) Determination of the cross-sectional area of the reinforcement [3, p .45]

Bending moment MEd = 224 KN · m and longitudinal force NEd = 732 KN Required: determine the cross-sectional area of the longitudinal reinforcement.

Payment. $d = h$ - c 1 = 400-20 = 380mm = 38cm.

ed / h = / $NEd \cdot h$ = 224 / (732) · 0.40 = 1.22 <3.5 → the calculation is performed using the iterative diagram a - .

We find the value of $aEds$ and vEd by the formulas:

$$aEds = MEd / fcd \cdot b \cdot \quad (5)$$

$aEds$ = 0.226, and:

$$vEd = NEd / fcd \cdot b \cdot d \quad (6)$$

vEd = -0.235

The required area of longitudinal reinforcement is determined according to Fig. B.2 as a function of c 1 / h = 30/400 = 0.075 (Appendix B) → ωto.

$A, tot = \omega tot \cdot b \cdot h / fyd / fcd$ = 0.40 · 400 · 400/435 / 17.0 = 2501 mm2 As 1 = As 2 = , tot / 2 = 2501/2 = 1250.5 mm2.

Accepted: 4 Ø 20 + 4 Ø 20 S 500 ($s1$ + As 2 = 1256 + 1256 = 2512 mm2).

B) Calculation of checking the width of the opening of cracks normal to the longitudinal axis of the element [3, p .126-127] Working section height d = h - Ø 12 = 400 - 20 - 8 - 20/2 = 362 mm. ρ = A s1 / bd = 1256/400 · 362 = 0.0086 (0.9%).

Check the width of the crack opening by a simplified method, using the data in table. 8.3 for rectangular sections reinforced with reinforcement of class St500 with $0.5\% \leq \rho \leq 1.0\%$, the shoulder of an internal force pair is determined:

$z = 0.85\ d = 0.85 \cdot 362 = 307.7$ mm.

Stresses in stretched reinforcement are determined by the formula;

σ s = Med / As1 · z = 246 (N· mm) / 1256 · 307.7 = 636.5 N / mm 2.

According to Table. 8.4 d m a x = 12 mm at σs = 636.5 MPa and , lim = 0.4 mm .

The accepted diameter $\emptyset$ = 20 mm> $\emptyset max$ = 6 mm, i.e. it is necessary by calculation to check the crack opening width.

Considering the fact that the moment M Ed is designed for a quasi-constant combination of loads, when checking the crack opening width, we use the effective elastic modulus:

$$Ec,\text{eff} = \text{Ecm} / 1 + \varphi(\infty, tn) \quad (7)$$

The limiting value of the creep coefficient φ (∞, t 0) is determined from the nomogram shown in Fig. 6.1a. At h0 = 2Ac / u = 2 · 400 · 400/2 (400 + 400) = 200 mm and RH = 50% for t 0 = 30 days . → φ (∞, t 0) = 2.8.Ec , eff = 30 · / 1 +2.8 = 7.9 ·10^3

The reduction coefficient a e = Es Ec, eff = 20 · 10 ^ 4 / 7.9 · 10 ^ 3 = 25.3.

For a cross section with a crack using a two-line deformation diagram, the height of the compressed zone x in the general case can be found from the condition that the static moments of the compressed and stretched zones of the section are equal with respect to the neutral axis:

$$bx \wedge 2/2 + a\ \text{e}\ \rho\ 2\ bd\ (- c\ 1) - a\ \text{e}\ \rho\ 1\ bd\ (\ - x\ ) = 0 \quad (8)$$

$$\text{x} = \text{d}\ (\alpha\text{e}\ 2\ (\rho\text{l} + \rho 2)\ 2 + 2\ a\ \text{e}\ (\rho\text{l} + (\text{c1} / \text{d})\ \rho 2) - a\ \text{e}\ (\rho\text{l} + \rho 2\ )) \quad (9)$$

Substituting the values, we get:

x≈ 160 mm.

Armature stresses:

σs = MEd / As 1 (d - x / 3) = 246 · 10^6/ 1256 (352 - 160/3) = 655.7 MPa.

The estimated crack opening width is determined by the formula:

$$wk = s, max\ (- \varepsilon cm) \quad (10)$$

where s r, max is the maximum distance between cracks, determined by the formula:

sr, max = 3.4 · c +0.425 k 1 · k 2 · ∅ / ρeff = 3.4 · 20 + 0.425 · 0.8 · 0.5 · 20 / 0.0341 = 176 mm at :

k 1 = 0.8 - for rods of a periodic profile;

k 2 = 0.5 - in bending;

kt = 0.4 - for a quasi-constant combination of loads. ρ eff = As1 / bhc, eff = 1256/400 · 120 = 0.0315.

The value εsm - εcm

$\varepsilon sm - \varepsilon cm = \sigma s - kt\ (fct,eff/\ \rho eff)\ (1+\alpha e\rho eff)/\ Es$ = 655.7−0,4(2,2/ 0,0261)(1+25,3·0,0261) $20 \cdot 10^4 = 200 * 10^{-5} \geq 0{,}6 \cdot \sigma s\ Es = 0{,}6 \cdot 327.85 \cdot 10^{-5} = 196 \cdot 10^{-5}$,

The condition meets

then

$wk = sr,(\varepsilon sm - \varepsilon cm) = 176 \cdot 200 \cdot 10^{-5} = 0{,}35 < wlim$ = 0,4mm.

Check for the width of the crack opening is performed.

2.3 The calculation of the slab [12]

For the calculation, a structural element was chosen - a plate at the level of +7,500 along the axis 1-2 / AB.

Reinforced concrete slab in bottom with the area of b = 1000 mm, h = 200mm; $c_1 = 20$ mm ; the is class C25/30 ($f_{ck} = 25$ МПа, $\gamma_c = 1{,}5$, $f_{cd} = 14{,}2$ mПа, $\alpha_{cc} = 0{,}85$) . the steel class is S500 ($f_{yк} = 500$ МПа, $f_{yd} = 435$mПа , $E_s = 20 * 10^4$ mПа, $\alpha_{cc} = 0{,}85$) . the moment on the slab is M_{ed}= 22,1 кН*m.

A) Determination of the cross-sectional area of the reinforcement

Bending moment acting in section:

$M_{eds} = M_{ed} - N_{ed} * z_{s1}$ = 22,1 кН*m. (N_{ed}=0), d=h- c_1 = 200 – 20= 180mm.

The required area of longitudinal reinforcement is determined according to:

$$k_d = \frac{d}{\sqrt{M_{ed}/b}} \qquad (11)$$

$k_d = 3{,}0$

Determine ks according to table B.3 for normal concrete ≤C 25/30 → k_s = 2,4

$$A_{s1} = k_{s1} * \frac{M_{eds}}{d} + \frac{N_{ed}}{\sigma_{s1d}} = 2{,}4 * 22{,}1/14 + 0/435 = 3{,}78\ cm^2$$

We accept: 5Ø 12 (A_{s1}= 5,65 cm^2)

b) The selection of longitudinal reinforcement (see example 3) is carried out according to table B.1 of Appendix B to determine the bearing capacity of bent rectangular elements with a single reinforcement using dimensionless coefficients

We determine the value of the coefficient

$$\alpha_{eds} = \frac{M_{eds}}{f_{cd} * b * d^2} \quad (12)$$

$\alpha_{eds} = 0{,}075$

$\alpha_{eds} \leq \alpha_{eds,lim} = 0.372$

$0.075 \leq 0.372$

Compressed fittings are required by design. We put it constructively.

5Ø 16 ($A_{s2} = 10{,}05\ cm^2$)

B) Calculation of checking the width of the opening of cracks normal to the longitudinal axis of the element [12]

Working section height$d = h - ccov - dsw - Ø12/2 = 200 - 20 - 12/2 = 174$ mm.

$$\rho = As1/bd = 1005/\ 1000 \cdot 174 = 0{,}0058\ (0{,}57\%).$$

Check the width of the crack opening by a simplified method, using the data in table. 8.3 for rectangular sections reinforced with reinforcement of class St500 with $0.5\% \leq \rho \leq 1.0\%$, the shoulder of an internal force pair is determined

$$z = 0{,}85d = 0{,}85 \cdot 172 = 147{,}05\text{mm}.$$

Stresses in tensile reinforcement are determined by the formula;

$$\sigma s = Med/As1 \cdot z \quad (13)$$

σ s = 236.15 N / mm 2

According to Table . 8.4 d m a x = 20 mm at σs = 236.15 MPa and , lim = 0.4 mm

The accepted diameter $Ø$ = 16 mm ≤ $Ø max$ = 20 mm, i.e. it is not necessary to check the crack opening width by calculation.

2.4 Calculation on Lira CAD

Create 6 loadings, thereby applying a load on the skeleton of the building:

-Net weight of the building;

-Floors;

-Walls;

-Long-term load on the joint venture;

-Short-term load in the joint venture;

-Snow load;

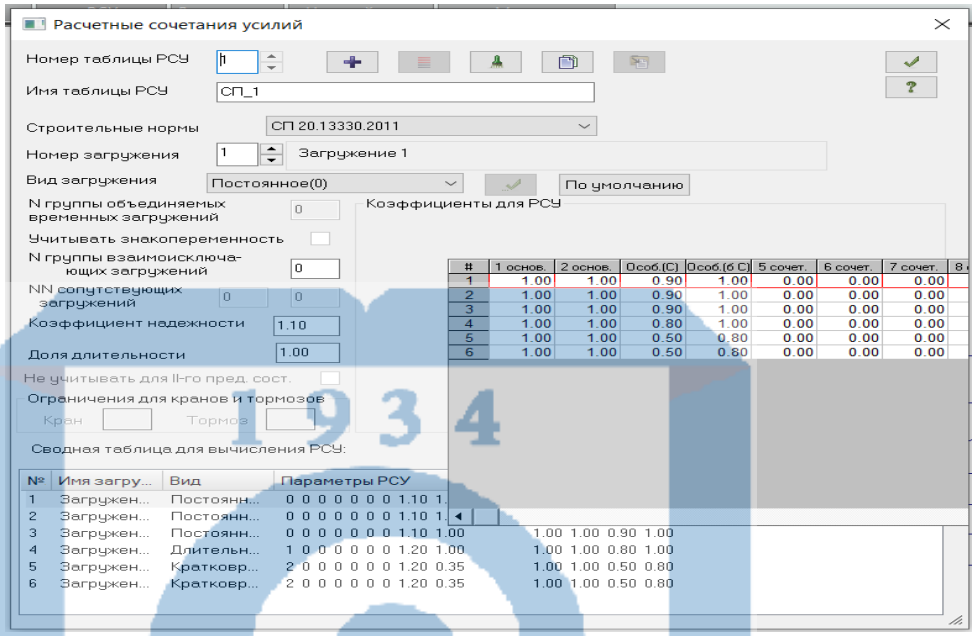


Figure 4 - Design combinations of efforts

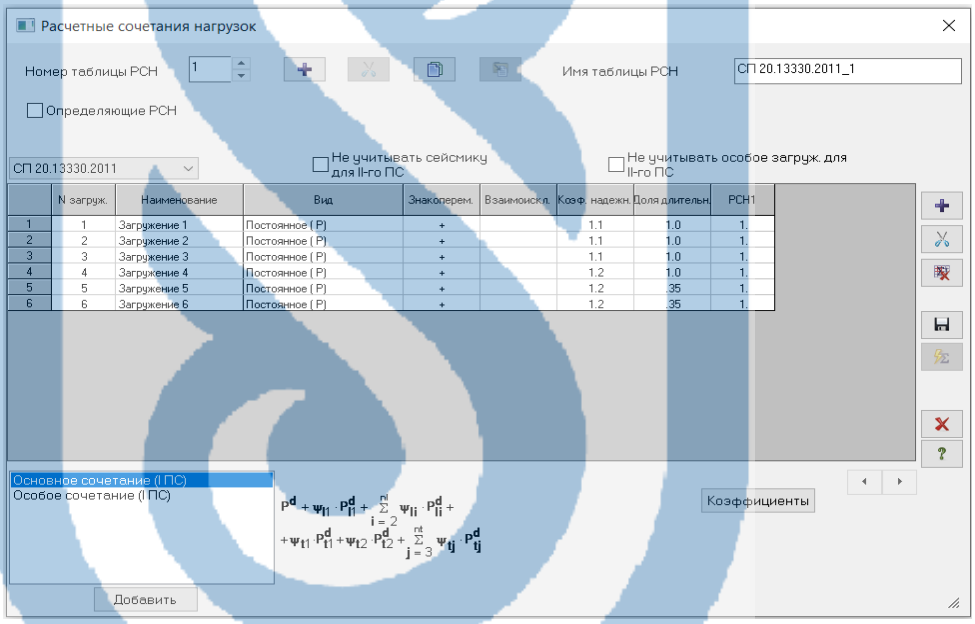


Figure 5 - Estimated combination of loads

This building model is designed in accordance with the design features of the designed building. The stiffness and overlap diaphragms were modeled by finite elements of a flat shell. The design model of the building is adopted in the form of a spatial multi- mass discrete system with masses concentrated in nodes. Each node has 6 degrees of freedom.

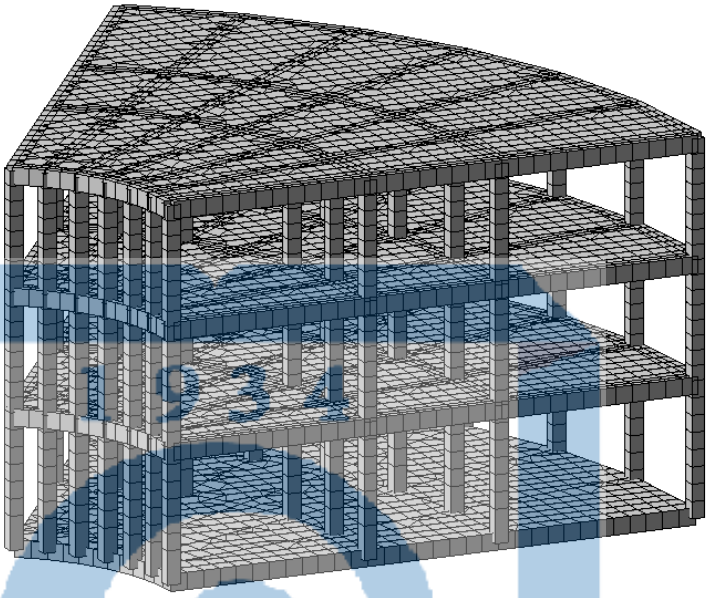


Figure 6 - The initial spatial model of the building

Various calculation files are created to meet the norms of SNiP and the design features of the designed building.

We create 5 calculation files:

The main combination with the coefficient of bed (for statics).

The main combination with c $E_{гор}=0,3*E_0$, $E_{вер}=0,6*E_0$.

A special combination with the coefficient of bed $C_1*10*1,5$.

A special combination with the coefficient of bed $C_1*10*0,667$.

A special combination with c $E_{гор}=0,5*E_0$.

The first calculation file is needed to detect sediment near the foundation slab. The second calculation file is needed to identify deflections in horizontal elements. The third, fourth and fifth calculation file is required to verify compliance with the conditions of SP 2.03-30-2017 “Construction in seismic regions of the Republic of Kazakhstan”. Since our projected object is located in a non-seismic hazardous area, there is no need to calculate the seismic load . A complete calculation on the Lira CAD software is given in Appendix A.

3 Technological section

3.1 Soil and its characteristics

Loam, heavy without impurities, and with an admixture of crushed stone, gravel, pebbles or construction debris up to 10% by volume heavy with an admixture - soil category II

Table 11 - the Source data [14]

	Unit of measure	Numerical data	Note
Soil group		II	ЕНиР 2, issue 1
Average soil density	Kg/m^3	1850	ЕНиР 2, issue 1
The coefficient of initial loosening	%	24-30	ЕНиР 2, issue1 p 206
The coefficient of residual loosening	%	5-8	ЕНиР 2, issue 1 p 206
Slope steepness coefficient	%	0,75	Khamzin, Karasev “Technology of building processes”, p. 35

Range of transportation of soil: 6 km
Average winter temperature of external influence: -12.8 ° C
Basement elevation: -0.600 m
UGV: -2,500 m

3.2 Determination of the scope of work

The definition of the volume of work is carried out according to the working drawings of the building. The list of volumes of work is taken from the complex technological process in the production of zero-cycle work. The volume of earthwork is determined in the design of earthworks, in the preparation of projects for the organization of construction and work projects. [15]

1. Determination of the volume of the pit:

$$V_к = \text{H}/6 \cdot (\text{a} \cdot b + c \cdot d + (a + c) \cdot (b + d)), m^3 \quad (14)$$

where a, b - the width and length of the pit on the bottom
c, d - width and length of the pit on top

$$V_к = 0.5 * 7620 = 3810\ m^3$$

2. Determination of the volume of backfill:

$$V_{\text{обр.з.}} = \frac{V_к - V_ф - V_{\text{подв}}}{1+К_{\text{о.р.}}}, m^3 \quad (15)$$

$$V_{\text{обр.з}} = \frac{3810 - 2512}{1 + 0{,}06} = 1224{,}5\ m^3$$

where $V_{\text{подв}}$ –is the basement volume
$V_ф$- volume of foundation elements
$К_{\text{о.р.}}$- the coefficient of residual loosening

3. Determination of the amount of excess soil

$$V_{\text{изл.г}} = V_к - V_{\text{обр.з}}\ , m^3 \quad (16)$$

$V_{\text{изл.г}}$=3810 − 1224,5= 2585,5m^3

4. Determination of the volume of soil shortage

$$V_{\text{н.г}} = a \cdot b \cdot h_{\text{нед}}, m^3 \quad (17)$$

where $h_{\text{нед}}$=0,1÷0,4m
$V_{\text{н.г}}$==762m^3

5. Determination of the cutting area of the plant layer:

$$F_{\text{срез}} = (10+c+10)(10+d+10),\ \text{m2} \quad (18)$$

$F_{\text{срез}}$=9489,5 m2

6. The total amount of cut of plant soil:

$$V = S * h_{\text{рг}} = 9489{,}5 * 0{,}2 = 1897{,}9\text{m3}$$

7. Soil compaction area:

$$F_{\text{упл}} = V_{\text{о.з.}} / h_y \quad (19)$$

где h_y - is the thickness of the sealing layer

$$F_{\text{упл}} = 1224{,}5/0{,}2 = 6122{,}5\ \text{m2}$$

8. The waterproofing area of the base plate:

$$S=V_{фунд}/h = 2512/0,5= 5024 \text{ m2}$$

Table 12 - a list of the volume of earthwork

№	Name of work	unit	quantity	note
Excavation				
1	Cutting of the plant layer	1000 m^2	9,489	
2	Excavation			
А)	In the dump	100 m^3	12,24	
Б)	In vehicles	100 m^3	25,85	
3.	Development of soil shortage	1 m^3	762	
4.	Backfilling of soil	100 m^3	12,24	
5.	Soil compaction	100 m2	60,12	
6.	Waterproofing device	1 m2	6122,5	

3.3 The selection of a set of machines for excavation

Today in construction and at present 4 methods of soil development are used: mechanical, hydro mechanical , explosive and combined . [15]

Of the total volume of earthwork, about 90% are carried out mechanically, i.e. using various kinds of machines. The technological process of the excavation device includes the development of soil with unloading in vehicles or on the edge of the excavation; fastening of vertical grids; soil transportation; slope cut and bottom layout; backfill and soil compaction. Soil development, according to the existing classification, is divided into 3 groups:

- earth moving
- soil compaction machines
- machines for auxiliary works

3. 3.1 The choice of the bulldozer

Initial data:

T-130 basic tractor, DZ-28 bulldozer, soil - loam, cutting path length - 15 m, soil transport path length - 50 m. [18]

Cycle time:

$$T = t1 + t2 + t3 + t4 \quad (20)$$

where t1 - soil cutting time:

$$t1 = l1 / v1 = 3.6 * 15 / 3.2 = 16.875 \text{ s};$$

3.6 - conversion factor km/ h to m/ s;

l1 is the length of the cutting path, l1=15 m;

v1 is the speed of the bulldozer in 1st gear when cutting soil;

t2 - time of soil movement with the blade:

$$t2 = l2 / v2 = 3.6 * 50 / 3.8 = 47.368 \text{ s};$$

l2 is the length of the soil transportation path, l2 = 50 m;

v2 is the speed of the loaded bulldozer, v2 = 3.8 km / h;

t3 - time of the return (idle) stroke:

$$t3 = (l1 + l2) / v3 = 3.6 * (15 + 50) / 5.2 = 45 \text{ s}$$

v3 is the speed of movement during the reverse stroke, v3 = 5.2 km / h;

t4 - additional time spent on lifting, lowering the blade, switching speeds, turning the bulldozer, t4 = 25 s.

$$T = t1 + t2 + t3 + t4 = 16.875 + 47.368 + 45 + 25 = 134.243 \text{ s}$$

The technical performance of the bulldozer is determined by the formula:

$$Fri = qpr * n * kn / kr \quad (21)$$

where qpr - the volume of the prism of soil drawing, m:

$$qpr = L * H2 / 2 * m = 3.94 * 0.8152 / 2 * 0.7 = 1.9 \text{ m3};$$

L is the length of the blade, L = 3.94 m;

H - blade height, H = 0.815 m;

m = 0.7 is a coefficient depending on the ratio H / L;

n is the number of cycles per 1 hour of operation:

$$n = 3600 / T = 3600 / 134.243 = 26.8;$$

kн = 1,1 - coefficient of filling the geometric volume of the prism with soil;

kp = 1.27 - coefficient of soil loosening;

$$Fri = qpr * n * kn / kr = 1.9 * 26.8 * 1.1 / 1.27 = 44.1 \text{ m3 / h}$$

Bulldozer operational performance:

$$Pe = Fri * kv = 44.1 * 0.8 = 35.28 \text{ m3 / h}.$$

where kв - coefficient of bulldozer utilization in time, kв = 0,8

Interchangeable bulldozer performance:

$$Ps = 8 * Pe = 8 * 35.28 = 282.24 \text{ m3 / h}.$$

where 8 is the number of working hours per shift.

3.3.2 Excavator selection

Excavation of the pit is carried out by an excavator equipped with a straight shovel with loading of soil into dump trucks and with partial dumping into a dump.

We select 2 excavators with a direct shovel with a bucket with teeth with a bucket volume of 1m3 and 1.25 m3 and perform a comparison [15]

Table 13 – Technical characteristics

	Э-1252Б	ЭО-4121А
1. Drive	Hydraulic	Hydraulic
Bucket volume	1,25m^3	1m^3
The greatest digging depth of	9,3m	6,85m
The largest cutting radius of	9,9m	7,25m
The height of unloading in vehicles	6,6m	4,7m
Power	90 кw	59 кw
weight	39,5 т	27,6т
$H_{вр1}$	1,64	2,2
$H_{вр2}$	2,2	2,6
$C_{т.с.}$	37,90 у.е.	31,08 у.е.
$C_{и.р.}$	25,58 tou. у.е.	23,47tou. у.е.

Excavator Э-1252Б [15]

1. Determine the cost of developing 1 m of soil in the pit for this type of excavator (tg):

$$C = \frac{1{,}08 \cdot C_{маш.смен}}{П_{см.выр}} \quad (22)$$

C = 104,755 тг

where 1,08 - coefficient taking into account overhead costs

Smash. man - the cost of an excavator machine shift

2. Interchangeable excavator excavation, taking into account the development of the soil, will be swallowed, and with loading into transport:

$$П_{см.выр} = \frac{V_к}{\sum n_{маш.смен}} \quad (23)$$

$П_{ст.выр} = 390{,}74\ м^3/стен$

3. The total number of machine operators of the excavator during operation will be sweeping and loaded onto vehicles

$$\sum n_{маш.стен} = \frac{V_{обр.з} \cdot Н^1_{вр} + V_{изл} \cdot Н^2_{вр}}{8{,}2 \cdot 100} \quad (24)$$

$\sum n_{маш.стен} = 38{,}27 = 39$

where $Н^1_{вр}$=1,64 – the rate of time of the mechanism during operation will sweep (mash-hour).

Н2вр=2,2 – the rate of time of the mechanism when loading soil into vehicles.

4. Determination of capital specific investment for the development of 1 m3 of soil for each given type of excavator (tg / m3)

$$К_{уд} = \frac{1{,}07 \cdot С_{ир}}{П_{ст.выр} \cdot t_{год}} \quad (25)$$

$К_{уд} = 0{,}23\ тг/м^3$

5. Determination of reduced costs for the development of 1 m3 of soil for this type of excavator

$П_д = С + Е_н \cdot К_{уд}$=104,755+0,15·0,23=104,7895 тг/m3

where $Е_н$ – is the normative coefficient of capital investment efficiency = 0,15.

Excavator ЭО-4121А

1. Determine the cost of developing 1 m of soil in the pit for this type of excavator (tg)

$$С = \frac{1{,}08 \cdot С_{маш.стен}}{П_{ст.выр}} = \frac{1{,}08 \cdot 31080}{326{,}15} = 102{,}92\ тг$$

where 1,08 - coefficient taking into account overhead costs

Smash. Men - the cost of an excavator machine shift

2. Interchangeable excavator excavation, taking into account the development of soil, will be swallowed, and with loading into vehicles

$$П_{ст.выр} = \frac{V_к}{\sum n_{маш.стен}} = \frac{15239}{47} = 326{,}15\ м^3/стен$$

3.The total number of machine operators of the excavator during operation will be sweeping and loaded onto vehicles

$$\sum n_{маш.стен} = \frac{V_{обр.з} \cdot Н^1_{вр} + V_{изл} \cdot Н^2_{вр}}{8{,}2 \cdot 100} = \frac{3789 \cdot 2{,}2 + 11441 * 2{,}6}{820} = 46{,}44 = 47$$

where $Н^1_{вр}$=2,2 – the rate of time of the mechanism during operation will sweep (mash-hour).

Н2вр=2,6 – the rate of time of the mechanism when loading soil into vehicles.

4. Determination of capital specific investment for the development of 1 m3 of soil for each given type of excavator (tg / m3)

$$К_{уд} = \frac{1{,}07 \cdot С_{ир}}{П_{см.выр} \cdot t_{год}} = \frac{1{,}07 \cdot 23470}{326{,}15 \cdot 300} = 0{,}256 \text{ тг}/m^3$$

Determination of reduced costs for the development of 1 m3 of soil for this type of excavator

$$П_д = С + Е_н \cdot К_{уд}=102{,}92+0{,}15\cdot 0{,}256=102{,}958 \text{ тг/m3}$$

where $Е_н$ – is the normative coefficient of capital investment efficiency-0.15

As a result of comparing two excavators, the ЭО-4121А excavator has a low reduced cost compared to the Э-1252Б, as a result of which we select the ЭО-4121А.

3.3.3 Determining the number of dump trucks

The role of component machines for the removal of excess soil and ensuring collaboration with the excavator is to choose dump trucks. The carrying capacity and brand are assigned depending on the volume of the excavator and the range of soil transportation. [15]

We select the МАЗ-525 dump truck

1. The volume of soil in a dense body in the bucket of an excavator МАЗ-525

$$V_{гр} = \frac{V_{ков} \cdot К_{нап}}{К_{пр}+1} \quad (26)$$

$V_{гр} = 0{,}945\ m^3$

where$V_{ков}$- accepted bucket volume

$К_{нап}$- bucket filling ratio:

for a direct shovel - from 1-1.25

for backhoe - from 0.8-1.0

$К_{пр}$ - coefficient of primary loosening

$К_{пр}$=0,27

2. Determination of the mass of soil in the bucket of the excavator

$$Q=Vгр\cdot\rho_{гр}=0{,}945\cdot 1{,}85=1{,}74 \text{ т}$$

where $\rho_{гр}$=1,85 т/m^3- is the average density of the soil

3. Determining the number of soil buckets loaded into the dump truck body

$$n = \frac{П}{Q} = \frac{25}{1{,}74} = 14 \text{ шт}$$

4.Determination of the volume of soil in a dense body loaded into the body of a truck

$V=V_{гр}\cdot n=0{,}945\cdot 14=13{,}23\ m^3$

5. Determining the duration of one cycle of the truck

$$T_ц = t_ц + \frac{60\cdot L}{V_г} + t_р + \frac{60\cdot L}{V_П} + t_m \quad (27)$$

$T_ц = 57{,}56\ min$

where L is the distance of soil transportation

$t_п$ - soil loading time

tp- time of unloading of soil - from 1-2 min

tm -time of maneuvering before loading and unloading - from 2-3 min

$V_г$ - the average speed of the truck in a loaded state.

$V_г$=19 км/h

$V_п$-от 25-30 км/h

$$t_п = \frac{V\cdot H_{вр}^2\cdot 60}{100} \quad (28)$$

$t_п = 17{,}46\ min$

6. Determination of the required number of dump trucks

$$N = \frac{T_ц}{t_п} = \frac{57{,}56}{17{,}46} = 3{,}29 \approx 3$$

3.3.4 Selection of soil compaction machines

Suglin is bound soil, therefore, we choose the compaction method by rolling ДУ-31А and for the length of the compaction strip more than 50 m, we choose a roller on static pneumatic tires - self-propelled with a sealing strip width of 2.2 m

We pack the soil with self-propelled rollers on pneumatic tires of the ДУ-31А type with a thickness of the rolled layer of 25 cm. [eighteen]

3.3.5 Calculation of operating parameters of sinking

The ЭО-4121 excavator has the largest cutting radius of 7.25 m

For the pit, we choose frontal driving with moving in a straight line, with one-sided loading of soil into vehicles.

Excavator moving step lp = 4.9m

1. We determine naib. Width of 1st frontal penetration on

$$B_п=2*b=2\sqrt{(0.9*R_{max})^2-L_n} \quad (29)$$

$B_п$ = 8,6 m

2.We determine naib. Width of the first penetration at the excavator parking level

$$B_n=2*b_1=2*0,9*7,2=12,96 \text{ m}$$

Determine the width of the 2nd side penetration

$B=B_1+B= 4,3+6,48= 10,78$ m

Table 14 - a sheet of the volume of work on the construction of foundations

Name	V work		formula
	unit	measure	
The device of monolithic structures			
For foundation			
Formwork device	$1m^2$	180	(a*0,5)+(b*0,5)
Reinforcing works	1 т	255	1m3=170кг
Concrete laying	$1m^3$	1500	(a*h*0,5)
Concrete care	$1m^2$	3000,5	A*b
Formwork	$1m^2$	180	
For the column			
Formwork device	$1m^2$	2006,4	L*h*0.4*n
Reinforcing works	1 т	24,07	1m3=120кг
Concrete laying	$1m^3$	200,64	0.4*0.4*h*2.5
Concrete maintenance	$1m^2$	2006,4	
Formwork	$1m^2$	2006,4	
For floor slab			
Formwork device	$1m^2$	3001,5*3=9004,5	(a*0,2)+(b*0,2)+(a*b)
Reinforcing works	1 т	84*3=252,2	1m3=140кг
Concrete laying	$1m^3$	600,3*3=1800,9	(a*h*0,2)
Concrete care	$1m^2$	3001,5*3	A*b

Labor costing is attached in Appendix B.

3.4 Construction master plan [18]

The basic data needed to develop a construction master plan are:

General plan of the territory with existing and under construction buildings, as well as underground communication networks;

Schedule for work with a schedule of labor requirements;

Necessary building machines and mechanisms;

The required amount of need for general structural elements, products, and loose and non-flowing resources;

The number, list and dimensions of structures and buildings, as well as temporary warehouses at the construction site;

Standard information on the development of building master plans. In general, building master plans can be dredged at various stages of the construction business.

The explanatory notes show the function of the general building plan, its purpose and for what period (for example, the installation of foundation blocks, the installation of roofing sludge elements and the installation of structures in general) was developed. Required to clarify the requirements enshrined in the base of its implementation. After that, we give the necessary calculations and give an explanatory note.

In the explanatory notes, it is necessary to show the installation drawings of structural elements, materials and parts , show the design location , its geometric indicators and installation methods.

3.4.1 Calculation of temporary power supply [18]

Electricity is the main source of energy used in the construction of buildings and structures. Power electricity is used to power machines and mechanisms.

From existing systems or mobile inventory of power plants, construction is supplied with electricity.

Therefore, when developing theses, it is necessary to solve the issue of power .

The maximum electricity consumption is set on the basis of a schedule or network schedule of work. The power of the outdoor lighting network is found by the formula:

$$W_{н.о} = k_c \sum P_{н.о} . \quad (30)$$

$$W_{H.O} = 1*13{,}69 = 13{,}69 \text{ кw}$$

Mains power for indoor lighting:

$$W_{H.O} = 0{,}8 * 2{,}4 = 2 \text{ кw}$$

Total power consumption for lighting:

$$W_{общ} = 13{,}69 + 2 = 15{,}69 \text{ кw} .$$

3.5 Labor protection and safety in construction

3.5.1 Organization of production territories, work sites and jobs [20, p. 11]

Industrial territories (sites of construction and industrial enterprises with construction objects located on them, industrial and sanitary buildings and structures), work sites and workplaces should be prepared to ensure safe work performance.

Preparatory activities must be completed before the start of work. Compliance with the requirements of labor protection and labor safety of industrial territories, buildings and structures, work sites and workplaces of newly constructed or reconstructed industrial facilities is determined upon acceptance into operation.

The completion of preparatory work at the construction site should be adopted by the act on the implementation of measures for labor safety.

Production equipment, devices and tools used to organize the workplace must meet the requirements of labor safety and SanPiN 1.01.002-94.

Production areas, work areas and workplaces should be provided with the necessary collective or individual protective equipment for workers, primary fire extinguishing means, as well as communication, signaling and other technical means to ensure safe working conditions in accordance with the requirements of existing regulatory enactments.

Places of temporary or permanent residence of workers (sanitary facilities, places of rest and walkways for people), when arranging and maintaining production areas, work areas, should be located outside the hazardous areas.

Hazardous areas must be marked with safety signs and inscriptions of the established form.

The movement of goods over ceilings, when industrial, residential or office premises where people may be in hazardous areas, is not allowed.

Admission to the production territory of unauthorized persons, as well as drunk or not employed workers in the territory, is prohibited.

While on the territory of a construction or production site, in industrial and domestic premises, at work sites and workplaces, employees, as well as representatives of other organizations, are required to comply with the internal labor regulations regarding labor protection adopted by this organization.

Geographically separate premises, platforms, work sites, workplaces must be provided with telephone or radio communications.

Workers, managers, specialists and employees should be provided with overalls, safety shoes and other personal protective equipment, in accordance with the Rules for providing workers with special clothing, special footwear and other personal and collective protective equipment, sanitary facilities and devices at the expense of the employer.

3.5.2 Basic requirements [20, p.6]

Organization and execution of work in the construction industry, the construction materials industry and the construction industry should be carried out subject to the requirements of the "Labor Code of the Republic of Kazakhstan", as well as other regulatory legal acts containing state regulatory requirements for labor protection and safety ":

1) building codes and codes of practice for design and construction;

2) interpectoral and industry rules and standard instructions for labor protection and safety, approved in the prescribed manner;

3) state standards of the system of labor safety standards in force in the Republic of Kazakhstan;

4) requirements and rules of labor protection and safety, rules for construction and safe operation, safety instructions;

5) state sanitary and epidemiological standards, hygiene standards, sanitary rules and standards in force in the Republic of Kazakhstan.

Participants in the construction of facilities (customers, designers, contractors, suppliers, as well as manufacturers of building materials and structures, manufacturers of construction equipment and production equipment) bear the responsibility established by law for violations of the requirements of regulatory documents specified in clause 5.1.1. and clause 5.1.2.

Responsibility for compliance with safety and labor protection requirements when operating machines, manual electric and pneumatic machines, and technological equipment is assigned to:

- for the technical condition of construction machines, mechanisms, production equipment,tools, technological equipment, including protective equipment, to the organization on whose balance they are located, and when transferring them for temporary use (rent) to the organization (person) specified in the agreement;
- for ensuring the requirements of safe work performance - for organizations performing work.

The general contractor or landlord is obliged when performing work on construction sites with the involvement of subcontractors or tenants:

- develop together with them measures that ensure safe working conditions, mandatory forall organizations and persons involved in construction;
- ensure the implementation of planned activities and coordination of actions of subcontractors andtenants in terms of the implementation of labor safety measures in the work areas assigned to them.

When performing work on the territory of the construction site and work sites with the involvement of contractors (including citizens engaged in self-employment), the person carrying out the construction is required to:

develop, together with the contractors involved, an action plan that provides safe working conditions, mandatory for all organizations and persons involved in the construction;

- ensure the implementation of planned activities and the coordination of actions of subcontractors and tenants regarding the implementation of safety and labor protection measures in the work areas assigned to them;

when concluding contracts, provide for mutual responsibility of the parties for the implementation of measures to ensure safe working conditions on the construction site and work sites.

Before starting construction and installation work on the territory of the organization, the customer and the general contractor with the participation of subcontractors and the administration of the existing organization are required to issue an approval certificate in the prescribed form. Responsibility for the implementation of measures provided for by the act of admission is borne by the heads of construction organizations and the current organization.

Before starting work in the conditions of production risk, it is necessary to identify hazardous areas for people within which hazardous production factors, whether or not related to the nature of the work performed , are constantly operating or may act .

4 Economic section

4 .1 Calculation of the estimated cost of construction

The estimated construction cost is the necessary material resources, which is determined on the basis of design materials and standards in accordance with the legislation of the Republic of Kazakhstan.

The basis of construction is the estimated cost necessary to determine the indicator of investment funds for construction, to set the price for construction, serves as a guide for customers when purchasing and concluding an agreement, payments for work performed by a contract in accordance with the current legislation of the Republic of Kazakhstan.

The cost of production in the design stage is determined by the integrated resource estimates.

In this pa rear e l e shows zatpaty. ie the capital required for the construction.

The composition of the above consists of: construction cost, having design and construction work, the price of p- doubling, the price of installation and equipment, etc.

By drawing up a consolidated estimate, capital investments are determined.

In the estimated consolidated calculation of construction, the following chapters are allocated funds: Chapter a 1. The costs of preparatory work for the territory.

Chapter 2. The main elements of the object.

Chapter 3. Elements of the service and auxiliary character.

Chapter 4. Elements of the energy economy.

Chapter 5. Objects of transport and communications.

Chapter 6. External networks and constructions of water supply, sewerage, heat supply and gas supply.

Chapter 7. Land improvement and greening.

Chapter 8. Temporary buildings and structures.

Chapter 9. The costs are secondary.

Chapter 10. Directorates of the enterprise.

Chapter 11. Training.

Chapter 12. Survey work and design work.

The cost of building buildings and structures of the main and additional purpose is calculated on the basis of SN RK 8.02-01-2002. Stage of calculating the cost of construction.

The construction cost of the structures and buildings of the main and secondary nature is found using the general estimated norms in the prices of 2019.

For civil construction, chapter 3 includes the estimated cost of such facilities as: utility buildings; checkpoints, greenhouses in hospital and scientific towns; waste bins, etc .; buildings and constructions of cultural and domestic purposes intended for

servicing workers and located within the territory allotted for the construction of enterprises; environmental work, work to protect cultural monuments, etc. The list of construction objects, the length of engineering networks and communications, railways, the area of roads, driveways and sites is determined on the basis of the general plan.

The cost of a unit of measurement is taken according to the data of design and construction organizations or according to aggregated indicators, taking into account the correction factor adopted in accordance with the construction area.

The cost of preparing the construction site includes the cost of land allotment, determined on the basis of the price list for the payment of land allotment work; funds for the breakdown of the main axes of a building and structures, determined by calculation on the basis of a collection of prices for design and survey works; funds associated with the demolition of buildings and structures in the amount of the carrying amount of demolished buildings and structures. In the absence of updated data, these costs could be taken as a percentage of the total of chapters 2 and 3 in the amount of 1.8-3% for developed areas.

Chapter 7 reflects the costs of landscaping: landscaping, sidewalk construction, architectural design, etc. These costs can be taken as a percentage of the total of chapters 2 and 3 in the amount of 3% for developed areas.

Chapter 8 “Temporary buildings and structures” includes the costs of the construction and dismantling of temporary buildings and structures, which are determined by SN RK 8.02-09-2002.

Chapter 9 includes the additional costs of contractors and customers associated with the implementation of construction, which are not included in object estimates, unit prices, transportation schemes, tariffs and prices for resources, etc. These costs include: the cost of performing work in the winter, funds for research and experimental work, the costs associated with the benefits established by the government and additional payments to construction workers, etc.

The costs of construction and installation work in the winter are determined by the corresponding collection of estimated norms and shown in columns 4 and 7 of the estimated calculation.

The estimated cost of building the underground work of the school for gifted children is compiled in prices of 20 to 20 as of 2020.

4 .2 Calculation of investment costs for construction

Investment costs for construction include all the costs of the customer for the project and are compiled in the form of a consolidated estimate of the cost of construction.

The following cost items are additionally included in the consolidated estimated cost of construction:

- the cost of engineer services;
- training of operational personnel;
- the cost of design and survey work;
- the cost of the examination of design estimates;

costs of the implementation of supervision by SNiP RK 1.03-03-2002.

The cost of design and survey work is determined in accordance with the general provisions on determining the cost of design work for construction in the Republic of Kazakhstan (RDS RK 08.02-032002, subject to changes from 02.7.2004)

4 .3 Technical and economic indicators of the project

For the implementation of the investment project it is supposed to use borrowed funds. But at the same time, according to the legislation of the Republic of Kazakhstan, 15% of the total amount of investments should be financed from own funds.

The required capital investments for the construction of the facility are 481, 385 million tenge.

At the same time, own funds amount to 72.15 million tenge.

Design and survey works, as well as on-site preparatory work are carried out at our own expense.

The full estimated construction cost (estimated cost, local, summary resource) is attached to Appendix C, D, D, respectively.

CONCLUSION

After analyzing the designed building, I made several conclusions. Firstly, the construction of a school for gifted children would make life easier for many of our children and youths, both for learning and for achieving their goals. The advantage of the school is, that the projected building has a room for a temporary stay of people until they obustroyut in dormitories. Secondly, the building is not located in the city center, that is, it is removed from everyday noisy everyday life. Thirdly, construction of schools will last less than a year, which will entail additional investments for a ready-made business platform.

This project is designed for the convenience and comfort of our children and youths. An effective school facility is responsive to the changing programs of educational delivery, and at a minimum should provide a physical environment that is comfortable, safe, secure, accessible, well illuminated, well ventilated, and aesthetically pleasing. The school facility consists of not only the physical structure and the variety of building systems, such as mechanical, plumbing, electrical and power, telecommunications, security, and fire suppression systems. The facility also includes furnishings, materials and supplies, equipment and information technology, as well as various aspects of the building grounds, namely, athletic fields, playgrounds, areas for outdoor learning, and vehicular access and parking.

The facility planning process at its best involves an assessment of functional needs in light of the educational program developed during educational planning. There are several names for this process: Educators refer to the development of *educational specifications*, while architects refer to it as *facility programming*. Facility planning includes any or all of the following activities: feasibility studies, district master planning, site selection, needs assessment, and project cost analysis. Spatial requirements and relationships between various program elements are established.

LIST OF USED LITERATURE

1 SN RK 3.02-07.2014 "Public buildings and structures."

2 SP RK 3.01-101-2013 "Urban planning. Planning and development of urban and rural settlements."

3 SN RK 2.02-01-2014 "Fire safety of buildings and structures." 4 SN RK 2.04-02-2011 "Protection against noise".

5 SN RK 2.04-01-2011 "Natural and artificial lighting."

6 SP RK 5.01-102-2013 "Foundations of buildings and structures".

7 CH RK 3.01-01-2013 "Urban planning. Planning and development of urban and rural settlements."

8 SP RK 2.03-30-2017 "Construction in seismic zones."

9 NTP RK 08-01.1-2012 "Design of earthquake-resistant buildings and structures. Part. General

Provisions Seismic effects. "

10 SP RK 2.04-01-2017 "Construction climatology".

11 SP RK 2.04-107-2013 "Construction heat engineering".

12 NTP RK 02-01-1.1-2011 "Design of concrete and reinforced concrete structures made of heavy concrete without prestressing reinforcement".

13 NTP RK 02-01-1.4-2011 "Designing of prefabricated, precast-monolithic and monolithic reinforced concrete structures".

14 Lyashenko T.A. Guidelines for the implementation of the course project - Tikhoretsk: FSBEI HPE RGUPS, 2016 - 52 p.

15 Dzhumagaliev T.K., Kalpenova Z.D. The technology of construction of the underground part of buildings and structures. The task and guidelines for the implementation of the course project in the discipline "Technology of building production-1" for full-time and part-time students of specialties 5B072900 - "Construction" and 5B042000 - "Architecture". - Almaty: KazGASA , 2013 - 45 p.

16 ENiR E2-1 "Earthworks".

17 ENiR E4-1 "Installation of prefabricated and installation of monolithic reinforced concrete structures".

18 Technology of building production: a manual for students of specialties 1-70 02 01 "Industrial and civil construction", 1-70 02 02 "Expertise and property management" specialties 1-27 01 01-17 "Economics and organization of production (construction)" / S.N. Leonovich , V.N. Chernoivan . - Minks :

BNTU, 2015 .-- 505 s.

19 NTP RK 01-01-3.1 (4.1) -2012 "Loads and impacts on buildings. Snow load. Wind impacts. " 20 SN RK 1.03-05-2011 "Labor protection and safety measures in construction".

20 NTP RK 02-01-1.1-2011 “Design of concrete and reinforced concrete structures made of heavy concrete without prestressing reinforcement”.

Appendix A

The calculation was performed by the LIRA-SAPR 2016 R5 software package (non-commercial).

The calculation is based on the finite element method in movements. The main unknowns are taken the following node movements:

X linear along the x axis

Y linear along the y axis Z linear along the Z axis

UX angular around the X axis

UY angular around the y axis UZ angular around the Z axis

In the PC "LIRA-SAPR 2016 R5 (non-profit)" the provisions are implemented the following regulatory and regulatory documents:

SP 14.13330 2011. Construction in seismic areas. Updated edition of SNiP II-7-81 *.

SP 16.13330 2011. Steel structures. Updated edition of SNiP II-23-81 *.

SP 20.13330 2011. Loads and impacts. Updated edition of SNiP 2.01.07-85 *.

SP 22.13330 2011. Foundations of buildings and structures. Updated edition of SNiP 2.02.01-83 *.

SP 24.13330 2011. Pile foundations. Updated edition of SNiP 2.02.03-85.

SP 35.13330 2011. Bridges and pipes. Updated edition of SNiP 2.05.03–84.

SP 63.13330.2012. Concrete and reinforced concrete structures. The main provisions.

Updated edition of SNiP 52-01-2003.

SNiP 2.01.07–85 *. Loads and impacts.

SNiP 2.03.01–84 *. Concrete and reinforced concrete structures.

SNiP II – 7–81 *. Construction in seismic areas.

SNiP II – 23–81 *. Steel structures.

SNiP 2.02.01–83 *. Foundations of buildings and structures.

SNiP II – 21–75. Concrete and reinforced concrete structures.

SNiP 2.05.03–84 *. Bridges and pipes.

SP 50-101-2004. Code of rules for design and construction. Design and arrangement of foundations and foundations of buildings and structures. MGSN 4.19-05. Moscow city building codes. Multifunctional high-rise buildings and complexes.

SNiP 52–01–2003. Concrete and reinforced concrete structures.

NP-031-01. Design standards for earthquake-resistant nuclear power plants.

DBN B.2.3-14: 2006. Transport facilities. Bridges and pipes. Design Standards.

DBN B.1.2-2: 2006. Loads and impacts. Design Standards.

DBN B.1.1-12: 2006. Construction in seismic regions of Ukraine.

DBN B.2.2-24: 2009. Design of high-rise residential and civil structures.

DBN B.2.1-10: 2009. Foundations and foundations of structures.

DBN B.2.6-98: 2009. Concrete and reinforced concrete structures.

DSTU B.V.2.6-156: 2010. Concrete and reinforced concrete structures made of heavy concrete.

DSTU 3760: 2006. Reinforcing steel for reinforced concrete structures. SNRA II-2.02-94. Earthquake-resistant construction. Armenia. KMK 2.01.03-96 *. Construction in seismic areas. Uzbekistan SNT 2.01.08-99 *. Construction in seismic areas. Turkmenistan.

PN 01.0.1-09. Construction in seismic areas. Georgia.

AzDTN 2.3-1-2010. Construction in seismic areas. Azerbaijan.

SNiP RK 2.03-30-2006. Construction in seismic areas. Kazakhstan.

ISS Thu 07/22/2007. Earthquake-resistant construction. Tajikistan.

The types of finite elements used are indicated in document 1.

In this document, except for the numbers of nodes belonging to respectively to the existing element, the types of stiffnesses are also indicated.

The following types of elements are included in the design scheme:

Type 10. Universal spatial core FE.

Type 42. Universal triangular CE shell.

Type 44. Universal quadrangular FE shell.

Coordinates of nodes and loads given in expanded documents 4,6,7 described in the right Cartesian system coordinates.

The calculation is made for the following downloads :

load 1 - static load

load 2 - static load

load 3 - static load

load 4 - static boot

load 5 - static load

load 6 - static load

Design combinations of forces for the rods are selected

criterion of extreme normal and shear stresses in the peripheral zones of the section.

Design stress combinations for plate elements are selected according to the criterion of extreme stresses taking into account the direction of the main sites.

When choosing design combinations of efforts, The following download characteristics :

load 1 - static load

This load is considered as a constant load.

Continuation of Appendix A

load 2 - static load
This load is considered as a constant load.
load 3 - static load
This load is considered as a constant load.
load 4 - static boot
This load is counted as a long-term load.
load 5 - static load
This load is considered as short-term load.
load 6 - static load
This load is considered as short-term load.
Account results are divided into the following sections:
Section 1. The protocol of the processor.
Section 2. Initial data.
Section 3. Diagnostic messages.
Section 5. Moving nodes.
Section 6. Effort (stress) in the elements.
Section 7. Reactions in nodes.
Section 8. Estimated Combination of Forces (DCS).

In section 5, the tabular displacement nodes of the calculated task. Dimension of movements indicated in the header of the table.

The first column contains the load number and indexing displacements.

In the remaining columns, the numbers of nodes in ascending order and values of displacements corresponding to them. Linear displacements are considered positive if they directed along the coordinate axes. Positive angular movements correspond to counterclockwise rotation when viewed from the end of the corresponding axis.

Displacements have the following indexation:

X linear along the x axis
Y linear along the y axis Z linear along the Z axis
UX angular around the X axis
UY angular around the y axis UZ angular around the Z axis

Section 6 prints out the tabular form in elements of the calculated task. Dimension of efforts indicated in the header of the table.

The first column indicates the type of CE from the library finite elements, load number and indexing efforts.

The following columns indicate: in the first line of the header - the number of the element and the number of the section in this element, for which efforts are printed; the second line contains the numbers of the first two nodes.

In section 8, the calculated

Combination of efforts (DCS) in the elements for each section and additional information on combinations of efforts.

The following DCS groups are calculated:

Group A1 - includes only those downloads that have a duration actions; this group includes permanent, long-term and short-term

Group B1 - includes all specified downloads, regardless of duration except seismic and other special.

Group C1 - includes group B1 plus seismic loading.

Group D1 - includes group B1 plus special (non-seismic) loading. Group A2 - includes only constant and long loads; types of downloads -0, 1.

Group B2 - includes permanent, long and short-term downloads (except instant); types of downloads - 0, 1, 2.

Group C2 - includes all specified downloads, regardless of the duration of the action except seismic and other special.

Group D2 - includes group C2 plus seismic loading.

The calculated combinations form 4 result tables:

Table 1 - DCS calculated, calculated by the calculated values of efforts. Table2 - DCS estimated long-term obtained by multiplying the calculated effort on appropriate duration factors.

Table3 - regulatory DCS obtained by dividing the estimated effort by appropriate load safety factors.

Table4 - DCS regulatory long-term obtained by multiplication regulatory efforts at appropriate duration factors.

The headings of the DCS tables contain the following indices:

ELM - element number in the circuit;

NS - number of the calculated cross-section in the element (all FE except the rod have one design section);

CRT - the number of criteria by which this combination of efforts in accordance with the type of FE;

ST - column number of combination coefficients from the DCS source data table; KS - a sign of the presence in the combinations of crane (K) and / or seismic (C)

G is the index of the internal group - A1, B1, C1, D1, A2, B2, C2, D2. The following are the stress / stress identifiers according to the type of FE, and then a list of the download numbers that made up the current combination. Alternating loading included in the DCS with the opposite sign marked with a '-'.

Tables of results for unified DCSs are formed for each design options with the option number.

The headings of the unified DCS tables contain the following indices:

PE - sign of membership of the element;

Continuation of Appendix A

ELM - serial number of an element in a circuit or in a superelement; NS - number of the calculated cross-section in the element (all FE except the rod have one design section);

KPT - criterion number in accordance with the type of FE;

ST - column number of combination coefficients from the DCS source data table; KS - a sign of the presence in the combinations of crane (K) and / or seismic (C)

G is the index of the internal group - A1, B1, C1, D1, A2, B2, C2, D2

Type 10 . Universal spatial core FE.

The finite element perceives the following types of efforts: N axial force; positive sign respectively resists stretching.

MK torque about the axis X1;

a positive sign corresponds to the action of the moment counterclockwise when viewed from the end of the axis X1, to a section belonging to the end of the rod.

MY bending moment about axis Y1

positive sign corresponds to action torque counterclockwise when viewed from the end of the axis Y1, to the section belonging to the end of the reaping .

MZ bending moment about the axis Z1; a positive sign corresponds to the action of mo counterclockwise when viewed from a axis Z1, to a section belonging to the end of the rod.

QY cutting force along the Y1 axis; put The solid sign matches the direction forces with the Y1 axis for a section belonging to the end the rod.

QZ cutting force along the Z1 axis; put The solid sign matches the direction forces with the Z1 axis for a section belonging to the end the rod.

Type 42. Universal triangular CE shell.

The finite element perceives the following types of efforts, stresses and reactions: NX normal stress along the X1 axis; a positive sign corresponds to a stretch. NY normal stress along the Y1 axis; a positive sign corresponds to a stretch.

NZ normal stress along the Z1 axis (for the case flat deformation); positive sign respectively resists stretching.

TXY shear stress,

parallel to the X1 axis and lying in the plane, parallel X10Z1; accepted as positive direction coinciding with the direction of the X1 axis, if NY is aligned with the Y1 axis.

MX moment in force

on a section orthogonal to the axis X1; positive sign corresponds to the stretching of the lower fiber (relative axis Z

MY moment in force

on a section orthogonal to the axis Y1; positive sign corresponds to the stretching of the lower fiber (relative axis Z 1) . MXY torque ;

a positive sign corresponds to the curvature of the media us coming out of the node 1, directed bulge down (relative to the Z1 axis).

QX shear force in a section orthogonal to the axis X1; a positive sign matches

direction of force with the direction of the axis Z1 on that part element in which node 1 is missing.

QY cutting force in a section orthogonal to the axis Y1; a positive sign matches

direction of force with the direction of the axis Z1 on that part element in which node 1 is missing.

RZ soil response (when calculating shells on an elastic base); positive effort acts in the direction of the Z1 axis (soil is stretched).

Type 44. Universal quadrangular FE shell.

The finite element perceives the following types of efforts, stresses and reactions:

NX normal stress along the X1 axis; a positive sign corresponds to a stretch. NY normal stress along the Y1 axis; a positive sign corresponds to a stretch. NZ normal stress along the Z1 axis (for the case flat deformation); positive sign respectively resists stretching. TXY shear stress,

parallel to the X1 axis and lying in the plane, parallel X10Z1; accepted as positive direction coinciding with the direction of the X1 axis, if NY is aligned with the Y1 axis.

MX moment acting on the cross section orthogonal to axis X1;

a positive sign corresponds to stretching lower fiber (relative to the Z1 axis).

MY moment acting on the section orthogonal to axis Y1;

a positive sign corresponds to stretching lower fiber (relative to the Z1 axis). MXY torque ;

a positive sign corresponds to the curvature of the diagonal whether 1-4 directed downward bulge (relatively Z axis 1) .

QX shear force in a section orthogonal to the axis X1; a positive sign matches

direction of force with the direction of the axis Z1 on that part element in which node 1 is missing.

QY cutting force in a section orthogonal to the axis Y1; a positive sign matches

direction of force with the direction of the axis Z1 on that part element in which node 1 is missing.

Continuation of Appendix A

1. Decision protocol

Calculation Protocol
Date: 04/06/2020
GenuineIntel Intel (R) Core (TM) i5-8250U CPU @ 1.60GHz 8 threads
Microsoft Windows 10 RUS 64-bit. Build 17763
14:30 Reading the source data from the file C: \ Users \ Public \ Documents \ LIRA SAPR \ LIRA SAPR 2016 NonCommercial \ Data \ Bahman Lira · .txt 14:30 Control of the source data of the main scheme
Number of nodes = 4203 (of which the number of undeleted = 4203)
Number of elements = 5728 (of which the number of undeleted = 5728)
MAIN DIAGRAM
14:30 Optimization of the order of the unknown
The number of unknowns = 22372
STATIC LOADING CALCULATION
14:30 Formation of the stiffness matrix
14:30 Formation of load vectors
14:30 Decomposition of the stiffness matrix
14:31 Calculation of the unknown
14:31 Decision control
Results Formation
14:31 Formation of the topology
14:31 Formation of displacements
14:31 Calculation and formation of efforts in the elements
14:31 Calculation and formation of reactions in elements
14:31 Calculation and formation of diagrams of efforts in the rods 14:31 Calculation and formation of plots of deflections in the rods Total nodal loads on the main circuit:
Load 1 PX = 0 PY = 0 PZ = 875.122 PUX = 0.00962674 PUY = -0.00707879 PUZ = 0
Load 2 PX = 0 PY = 0 PZ = 1027.72 PUX = 0.0210038 PUY = -0.0154446 PUZ = 0
Load 3 PX = 0 PY = 0 PZ = 397.677 PUX = 1.23394e-015 PUY = -1.0905e-015 PUZ = 0
Load 4 PX = 0 PY = 0 PZ = 513.86 PUX = 0.0105019 PUY = -0.00772231 PUZ = 0
Load 5 PX = 0 PY = 0 PZ = 685.147 PUX = 0.0140025 PUY = -0.0102964 PUZ = 0
Load 6 PX = 0 PY = 0 PZ = 214.108 PUX = 0.00437579 PUY = -0.00321763 PUZ = 0
Calculation completed successfully Elapsed time = 0 min

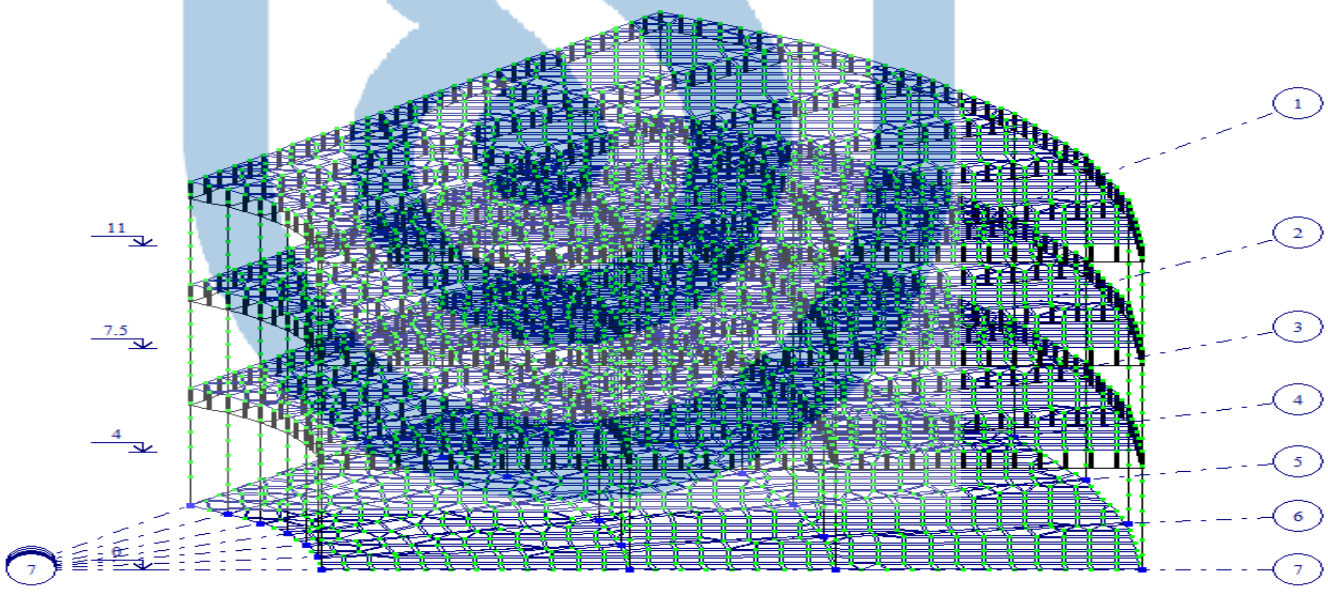


Figure A.1- Cheme

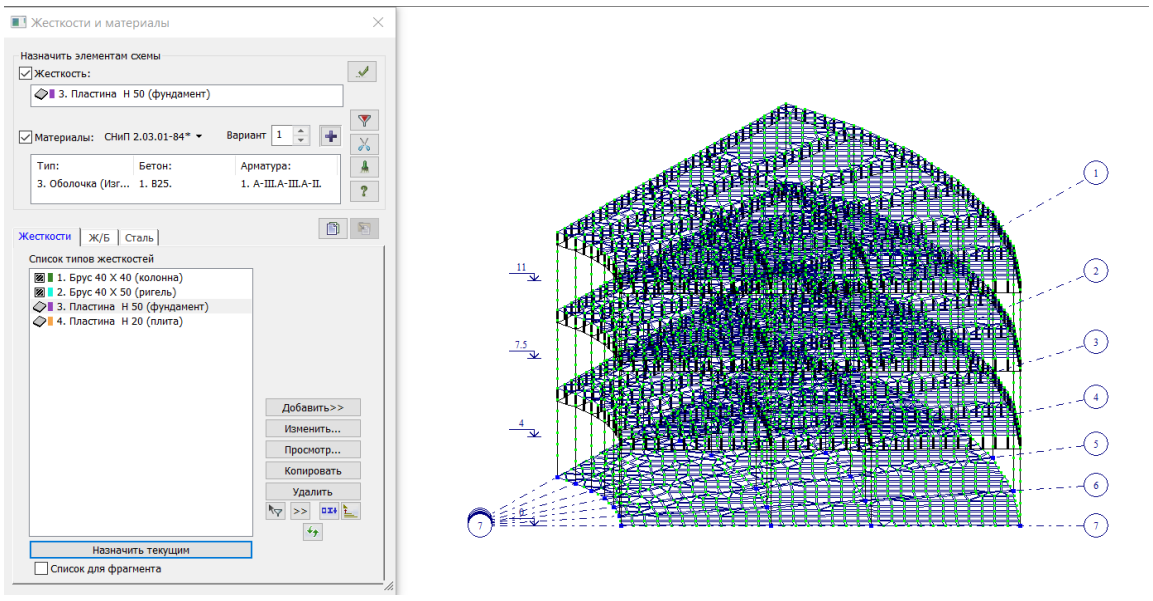


Figure A.2- Stiffness

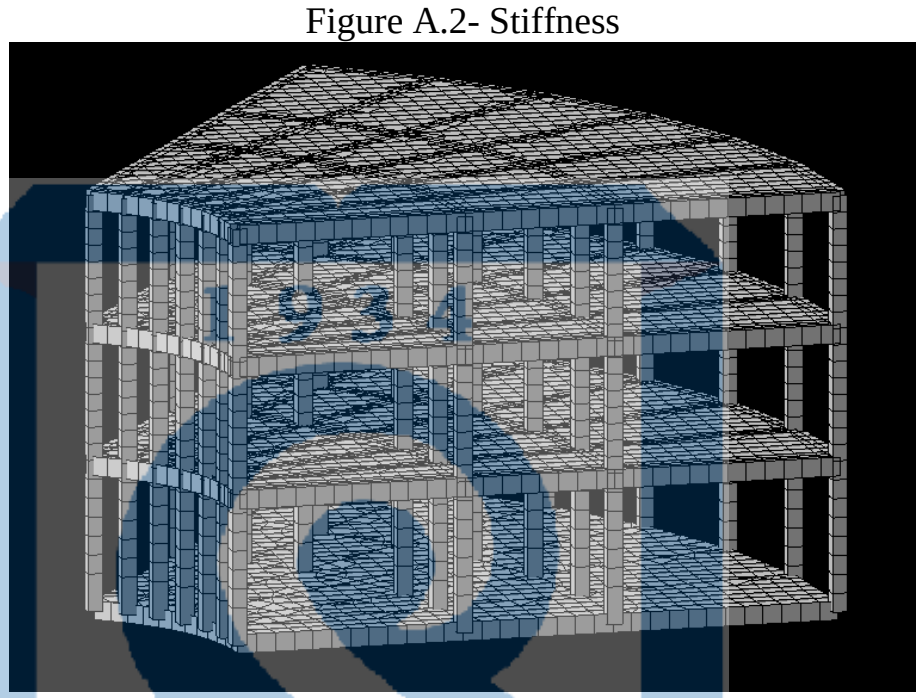


Figure A.3- Spatial model

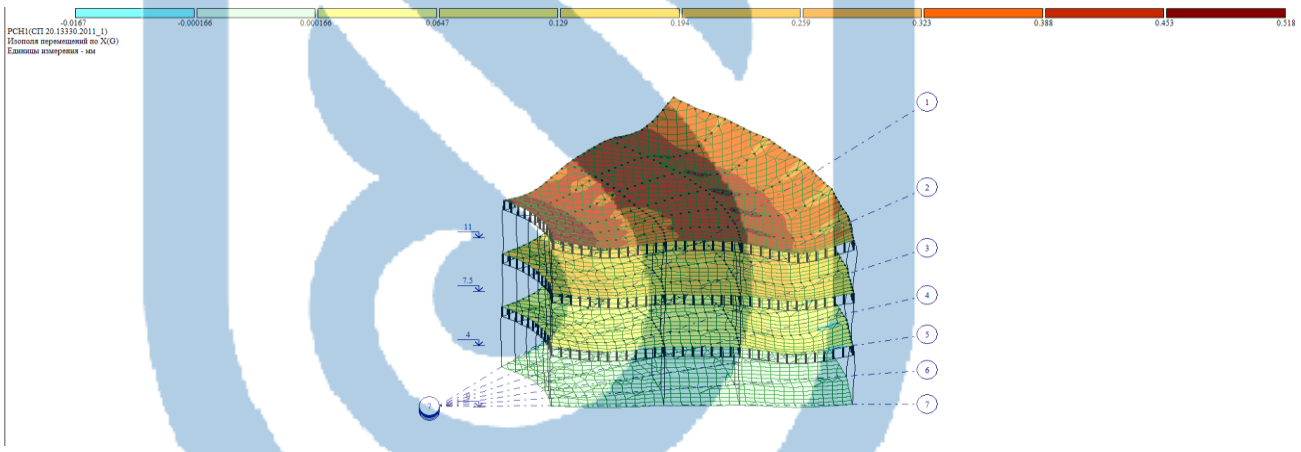


Figure A.4 - Moz cardiopulmonary bypass displacement from the X-axis PCH

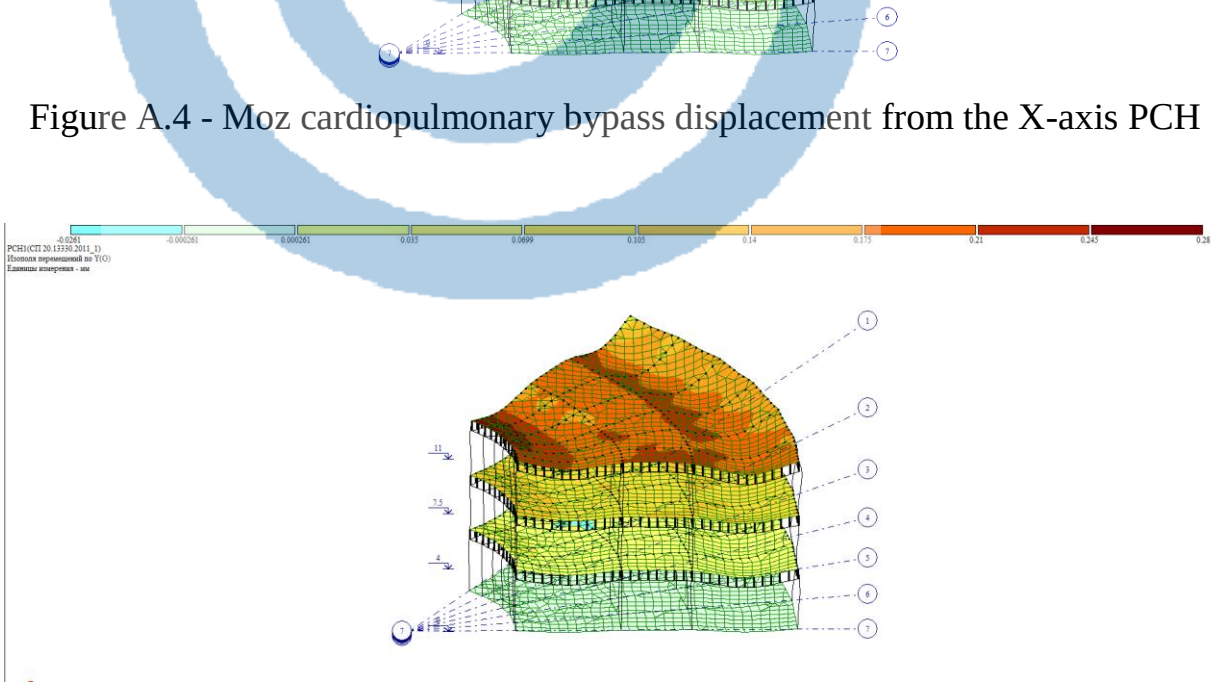


Figure A.5 - Mosaic of displacement from RSN along the Y axis

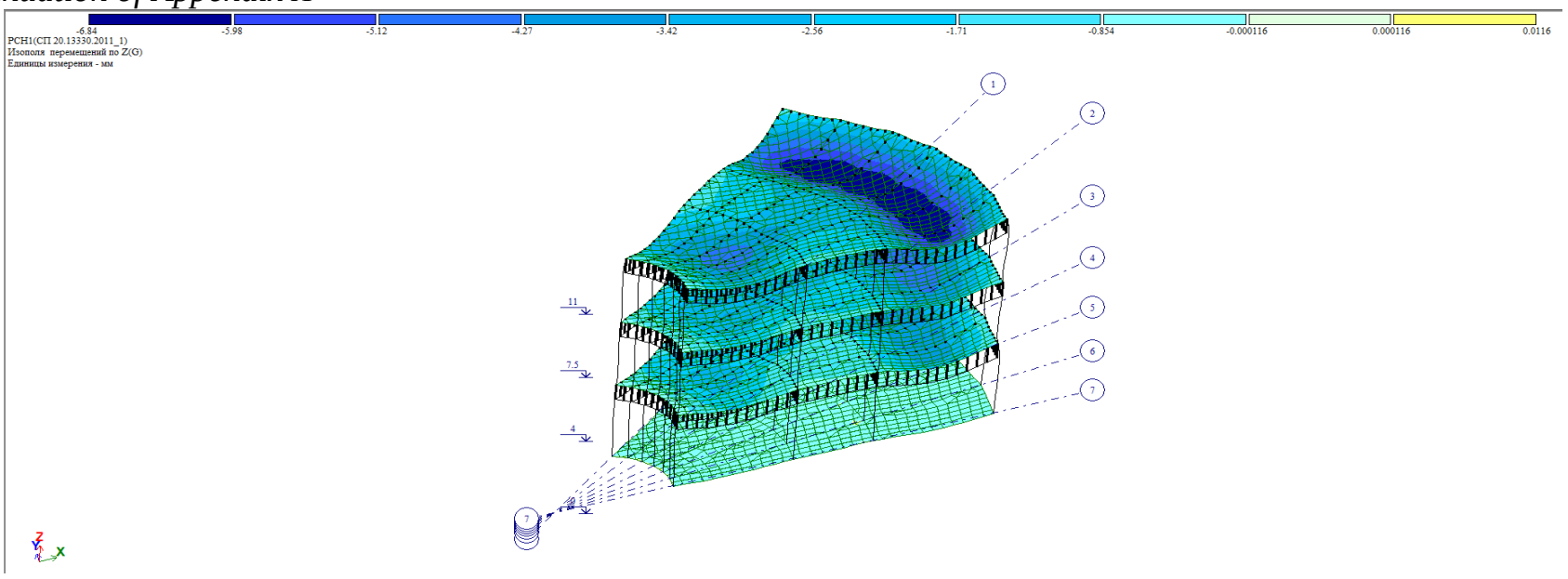


Figure A.6 - Mosaic of displacement from RSN along the Z axis

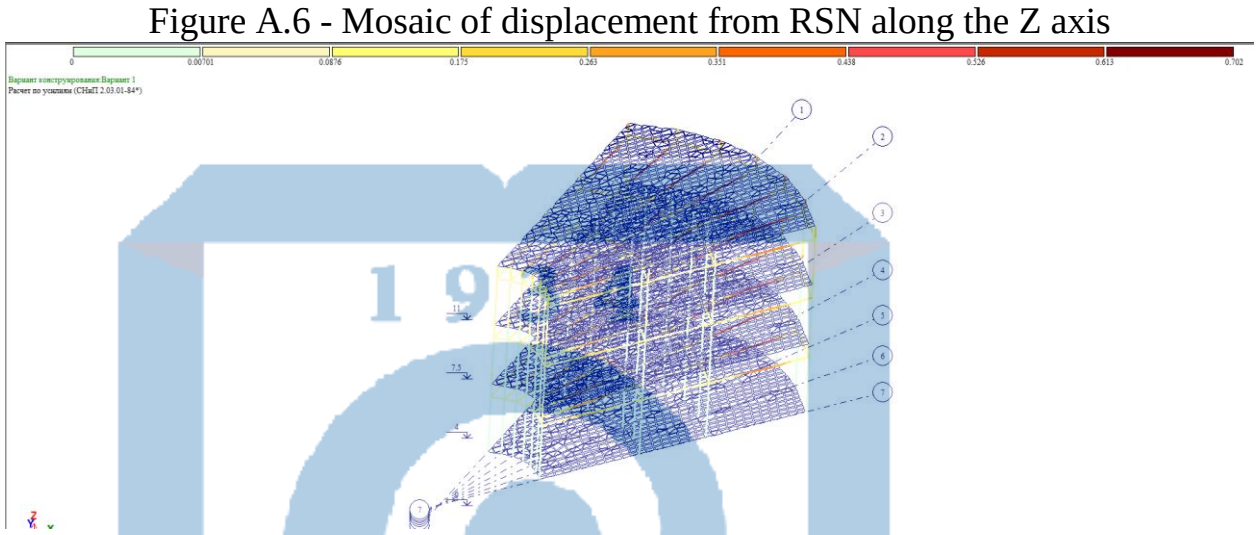


Figure A.7 - Design. Percentage of reinforcing columns and crossbars

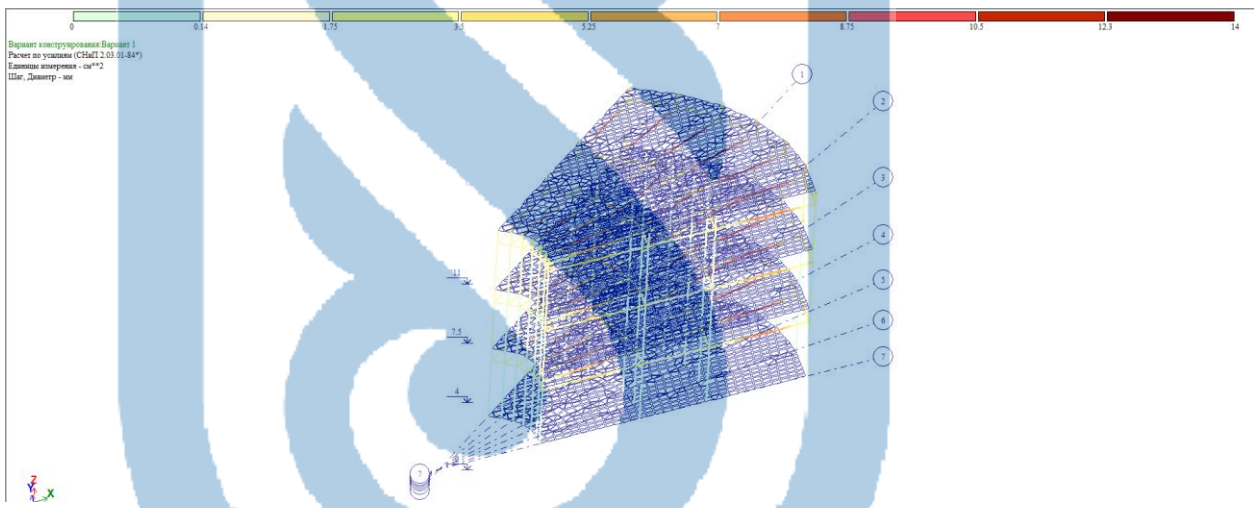


Figure A.8 - Design. Column and crossbar

Appendix B

Table B 1 – Determination of the complexity and preparation of costing of labor

No.	Name of works	ENiR	UNIT.	amount	Rate of time Mechanism, m / hour	Cost mash. time		Link composition			Norm of time of workers, h / hour	Labor costs		Rate cu		Dawn Pay cu	
						MAl / hour	MAl / shift	Profession	Discharge	amount		Hours	Days	Cars.	Working	Cars.	Working
1	2	3	4	5	6	7	8	9	10	11	12	1 3	14	15	16	17	18
1	Device temporary ogre.	9-233	m	770	-	-	-	a carpenter	3	1	0.25	192.5	24	-	0.175	-	134.75
2	Cut Rast. layer	2-1-5	1000 M^2	9.5	1.4	13.3	1.7	Driver	6	1	-	-	-	-	1.48		14.06
3	Excavation																
AND)	With loading in t.s.	2-1-8	100 m^3	25.85	2.6	67.21	8.4	Driver	65	11	-	-	-	-	2,55	65.92	-
B)	To the dump	2-1-8	100 m^3	12.24	2.2	26.9	3.4	Driver	65	11	-	-	-	-	2.17	26.6	-
4	Manual cleaning of the bottom of the pit	2-147	m^3	762	-	-	-	Digger	2	1	1.3	990.6	123.8	-	0.83	-	632.46
5	The device is equal. layer	2-157	m^3	381	-	-	-	Digger	1	1	0.09	34.3	4.28	-	0,053		20,2
6	Monolithic device (foundation)																
AND)	Formwork device	4-137	21 m	180	-	-	-	Locksmith	43	11	0.39	70,2	8,775	-	0.29	-	54
B)	Reinforcement work	4-146	1 t	255	-	-	-	Reinforcer	42	11	5,6	1428	178.5	-	4	-	1020
AT)	Concrete laying	4-149	31 m	1500	-	-	-	Concrete worker	42	11	0.22	330	41.25	-	0.157	-	235.5
D)	Curing	4-154	100 M^2	30.05	-	-	-	Concrete worker	2	1	0.14	4.2	0.525	-	0.09	-	2.7
D)	Formwork	4-137	M^2	180	-	-	-	Locksmith	32	11	0.21	37.8	4.725	-	0.141	-	25,4
7	Monolithic device (Column)																
AND)	Formwork device	4-137	21 m	2006,4	-	-	-	Locksmith	43	12	0.12	240.77	30.1	-	0,088	-	176.56
B)	Reinforcement work	4-146	1 t	24.7	-	-	-	Reinforcer	52	11	8.7	214.9	26.86	-	7.74	-	191.2
AT)	Concrete laying	4-149	31 m	200.64	-	-	-	Concrete worker	42	11	0.22	44,2	5.5	-	0.157	-	31.5
D)	Curing	4-154	1002 m	20,064	-	-	-	Concrete worker	2	1	0.14	2.81	0.4	-	0.09	-	2

Continuation of Appendix A

Table continuation

D)	Formwork	4-137	1 m 2	2006,4	-	-	-	Locksmith	32	12	0.09	180.57	22.5	-	0.059	-	118.4
9	Monolithic device (Plate perek.)																
AND)	Formwork device	4-134	1 m 2	3001.5	-	-	-	A carpenter	42	11	0.22	660.33	82.54	-	0.157	-	471.23
B)	Reinforcement work	4-146	1 t	84	-	-	-	Reinforcer	42	11	thirteen	1092	136.5	-	9.3	-	781.2
AT)	Concrete laying	4-149	1 m 3	600.3	-	-	-	Concrete worker	42	11	0.81	486.24	60.8	-	0.579	-	347.6
D)	Curing	4-154	1002 m	thirty	-	-	-	Concrete worker	2	1	0.14	4.2	0.525	-	0.09	-	2.7
D)	Formwork	4-137	1 M^2	3001.5	-	-	-	Locksmith	32	11	0.09	270.1	33.7	-	0.06	-	180.1
10	Foundation waterproofing	4-3185	1 M^2	6122.5	-	-	-	Insulator	432	111	0.41	2510.2	313.8	-	0.291	-	1781.6
eleven	backfilling	2-134	1003 m	12.24	0.62	7.6	0.95	Driver	6	1	-	-	-	0.657	-	8	-
12	Soil compaction	2-131	1003 m	30.25	0.41	12,4	1,6	Driver	6	1	-	-	-	0.435	-	13,2	-
13	(scaffolding)																
A)	Racks (scaffolding)	4-1-33	100 м	1,98	-	-	-	A carpenter	43	12	6	12,36	1,545	-	4,38	-	9,02

Appendix C

estimated cost of construction in the Republic of Kazakhstan

Form 2

Customer KazNITU

(name of company)

Approved / Approved

Estimated construction cost in the amount of **481385.608 thousand tenge**

including:
value added tax **51577.029 thousand tenge**

(link to approval / approval document)

"____" _____ 20 ____ g.

Estimated cost of construction

School in Aktobe (name of construction site) Compiled at current prices as of 2020.

o. p / p	No. of estimates and calculations, other documents	Names of chapters, objects, works and costs	Estimated cost, thousand tenge			In total, thousands of tenge
			construction and mounting works	equipment, furniture and inventory	other expenses	
	2	3	4	5	6	7
		Chapter 2. The main objects of construction				
	02-001	Special Children School	429808.579			429808.579
		Total Chapter 2	429808.579			429808.579
		Total chapters 1 - 7	429808.579			429808.579
		Total chapters 1 - 9	429808.579			429808.579
		Total estimated cost	429808.579			429808.579
	Code of the Republic of Kazakhstan dated 10.12.2008 No. 99-IV, Article 268	Value Added Tax (VAT) - 12%			51577.029	51577.029
		Total Estimated	429808.579		51577.029	481385.608

Project Manager

signature (initials, surname)

Chief Project Engineer

signature (initials, surname)

Chief department

(name) signature (initials, surname)

Appendix D

To the Normative document estimated cost of construction in the Republic of Kazakhstan

Object name School in Aktobe

Local estimate No. 02-001-001 (Local estimate)

On the:

General construction work (name of work and costs)

Base:

Estimated cost 429808.579 thousand tenge
Estimated salary 62489.658 thousand tenge
Normative labor input 54.69373 thousands of people

Compiled at current prices as of 2020.

No. p / p	Code of codes, resource code	Name of work and costs	unit of measurement	amount	Unit cost, tenge		Total cost, tenge			Overhead, tenge	Total cost with NR and SP, tenge	Labor costs of construction workers, total
					Total	machine operation	Total	machine operation	materials			
					salary of construction workers	in incl . salary of drivers	salary of construction workers	in incl . salary of drivers	equipment, furniture, inventory	Estimated profit, tenge		Labor costs of drivers, total
1	2	3	4	5	6	7	8	9	10	eleven	12	thirteen
		Coef . to take into account the influence of the conditions of construction and special construction works: 1.15 - Construction of engineering networks and structures, as well as housing and civil facilities in cramped conditions of the built-up part of cities										
		Section No. 1 Earthwork										
1	1101-0201-1001	Ground pillows on subsiding soils. Apparatus method lamellar rolling	m3 soil cushion	381.0	515.79 1.64	513.81 155.82	196517 623	195763 59366	131 -	43192 19177	258886	0.79 37.16

Continuation of Appendix D

QUESTION PK Trial - 53 - 14_ls 02-001-001

1	2	3	4	5	6	7	8	9	10	11	12	13
2	1101-02050202t. 11. Sec. 3.179K = 1.2	Soils of 2 groups. Manual development with fastenings in trenches with a width of more than 2 m and pits with a cross-sectional area of up to 5 m2 and a depth of 2 m [Manual refinement, cleaning of the bottom and walls with soil dumping in pits and trenches designed by a mechanized method]	m3 of soil	762.0	3244.34	-	2472186	-	-	1779974	4592333	2450.13
					3244.34	-	2472186	-	-	340173		-
3	1101-01020320	Soils of 2 groups. Development with loading on dump trucks by excavators of the type " HITACHI " with a bucket with a capacity of 1 m3	m3 of soil	2585.0	204.32	199.04	528179	514523	717	63011	638485	14.80
					5.01	28.85	12939	74576	-	47295		73.75
4		Trenches and pits. Filling with bulldozers with a capacity of 79 kW (108 l s) when moving soil up to 5 m. Group of soils 2	m3 of soil	1224.0	20.57	20.57	25177	25177	-	6867		-
					-	7.79	-	9537	-	2564		5.35
		Priming. Sealing with trailed rollers on a pneumatic wheel 25 tons. First pass along one track with a layer thickness of 30 cm	m3 compacted soil	3025.0	76.42	76.42	231162	231162	-	61566		-
					-	28.27	-	85509	-	23418		48.67
5	1101-01040405	Soils of 2 groups. Development into a dump with HITACHI excavators with a bucket with a capacity of 1 m3	m3 of soil	1224.0	155.98	151.69	190921	185668	-	20046	34608	6.01
					4.29	18.45	5253	22588	-	16877	316146	25.34
6	1101-02010102	Fences are deaf. Pole Mounting Device	m2 fence	2310.0	5749.87	324.51	13282189	749621	6499125	5705797		4516.05
					2611.88	132.61	6033443	306331	-	1519039	227844	150.09
7	1101-01010320	Shrubs and dense forests are dense. Cutting in soil of natural occurrence with brush cutters on a tractor 79 kW (108 l s)	ha	0.95	24456.22	24456.22	23233	23233	-	5355		-
					-	7828.95	-	7437	-	2287		4.13
8		Total section number 1					16949564	1925147	6499973	7685808	20507025	6987.78
							8524444	565344	-	1970830	30875	344.49
	1110-01130101	Section No. 2 Foundations									26606202	

1	2	3	4	5	6	7	8	9	10	11	12	13
	1101-0207-1301											
9	1108-0101-0307	Walls, foundations. Side waterproofing bituminous waterproofing in 2 layers on the leveled surface of rubble masonry, brick, concrete	м2 surface	6122.5	895.51	22.94	5482748	140448	3507814	1722416	7781577	1492.67
					299.63	2.87	1834486	17574	-	576413		14.08
10	2105-0301-3202	Hot-rolled reinforcing steel of a periodic profile of class A-III (A400) with a diameter of 14 to 32 mm ST RK 2591-2014	т	255.0	209067.00	-	53312085		53312085	-	57577052	
					-	-		-	-	4264967		-
11	1137-0104-0204	Stationary wooden stationary simple massive blocks. Installation and disassembly when 10-25 t concrete tower cranes are supplied	м2 sealed surface	180.0	3648.10	249.90	656656	44981	329493	268829	999524	264.96
					1567.68	73.53	282182	13235	-	74039		8.59
12	1106-0101-0115	Reinforced concrete foundation slabs flat. Device	м3	1500.0	21508.74	1906.13	32263113	2859191	26177223	3508341	38633170	3087.75
					2151.13	419.08	3226699	628621	-	2861716		496.46
13	1106-0101-0101	Concrete preparation. Device	м3	300.0	15994.07	1241.59	4798223	372476	4018681	441466	5658864	465.75
					1356.88	260.20	407066	78061	-	419175		62.55
		Total section number 2					96512825	3417096	87345296	5941052	110650187	5311.13
							5750433	737491	-	8196310		581.68
		Section No. 3 Frame										
14	1106-0501-0201	Columns of civil buildings in metal formwork. Device	м3	200.64	66542.93	31647.41	13351173	6349736	3711785	4215757	18972284	2868.05
					16395.79	6693.82	3289652	1343048	-	1405354		1073.29
15	2105-0301-3202	Metal mesh formwork.	т	24.7	209067.00	-	5163955		5163955	-	5577071	
					-	-		-	-	413116		-

16	1137-0104-0601	Metal mesh formwork. Installation and disassembly when 10-25 t concrete tower cranes are supplied	м2 sealed surface	2006.4	7644.45	226.67	15337823	454789	10168890	4355722	21269029	4360.91
					2349.55	36.07	4714144	72364	-	1575484		48.22
		Total section number 3					33852951	6804525	19044630	8571479	45818384	7228.96
							8003796	1415412	-	3393954		1121.51

1	2	3	4	5	6	7	8	9	10	11	12	13
		Section No. 4 Overlap										
17	1106-0801-0101	Bezel-less overlappings up to 200 mm thick. The device at a height of from the reference area to 6 m	м3	1800.9	36752.46	2067.30	66187500	3722994	44686949	16920184	89756299	16692.54
					9871.48	453.14	17777557	816052	-	6648615		645.54
18	2107-0510-1003	The formwork is collapsible and permutable panel board, ShchD brand 1,5x0,4, size 1500x400x417 mm GOST 23477-79	м2	3001.5	15707.00	-	47144560		47144560	-	50916125	
					-	-		-	-	3771565		-
19	2105-0301-3202	Hot-rolled reinforcing steel of a periodic profile of class A-III (A400) with a diameter of 14 to 32 mm ST RK 2591-2014	т	252.0	209067.00	-	52684884		52684884	-	56899675	
					-	-		-	-	4214791		-
		Total section number 4					166016944	3722994	144516393	16920184	197572099	16692.54
							17777557	816052	-	14634971		645.54
		Section 5 Walls										
20	1108-0701-0101	Outdoor inventory woods up to 16 m high, tubular for masonry and cladding. Installation and disassembly	м2 vertical projection	2763.2	736.39	2.12	2034802	5855	560192	1368524	3675592	1379.11
					531.54	1.00	1468755	2776	-	272266		2.22
21	1108-0301-0101	Walls of light concrete stones. Masonry without cladding with a floor height of up to 4 m	м3 masonry	552.64	9050.69	3005.13	5001774	1660757	823150	2666173	8281383	2364.19
					4556.07	631.49	2517867	348986	-	613436		279.64
		Total section number 5					7036576	1666612	1383342	4034697	11956975	3743.30
							3986622	351762	-	885702		281.86
		P Section No. 6 Roofing										
22	1112-0101-0201	Four-layer flat roofs of rolled roofing materials on bitumen mastic with a protective layer of gravel on antiseptic bitumen mastic. Device	м2 the roof	2512.0	3339.91	150.58	8389863	378266	7093054	887753	10019825	759.75
					365.66	18.47	918543	46406	-	742209		34.09
		Total for section No. 6					8389863	378266	7093054	887753	10019825	759.75
							918543	46406	-	742209		34.09
		Section No. 7 Narueno finish										

1	2	3	4	5	6	7	8	9	10	11	12	13
23	1115-0109-0101	Facades ventilated on a metal frame. Fiber cement cladding device with cradles	м2 cladding surfaces	1381.6	9491.06	52.43	13112844	72438	363903	10153146	25127269	10157.45
					9175.23	10.81	12676503	14929	-	1861279		9.85
24	2103-0499-9903	Straight stone facing	м2	1381.6	-	-	-		-	-	-	
		Total section number 7					13112844	72438	363903	10153146	25127269	10157.45
							12676503	14929	-	1861279		9.85
		Section No. 8 Interior										
25	1115-0203-0201	Walls inside buildings. Plastering with cement-lime or cement mortar on stone and concrete is simple	м2 plastered surface	981.6	1203.88	80.31	1181729	78830	261292	723491	2057638	733.75
					857.38	63.93	841607	62757	-	152418		60.05
		Total section number 8					1181729	78830	261292	723491	2057638	733.75
							841607	62757	-	152418		60.05
		Total estimate					343053296	18065908	266507883	54917610	429808579	51614.66
							58479505	4010153	-	31837673		3079.07
		Total estimate:	т				429808579					
		including:										
		- salary of construction workers	т				58479505					
		- the cost of operating the machines	т				18065908					
		- including the salary of drivers	т				4010153					
		- materials, products and structures	т				266507883					
		- overhead	т				54917610					

1	2	3	4	5	6	7	8	9	10	11	12	13
		- estimated profit	т				31837673					

check _____
position, signature (initials, last name)

compiled _____
position, signature (initials, last name)

Appendix E

Appendix 11
to the State standard for determining
the estimated cost of construction in
the Republic of Kazakhstan
form

Construction Name: School in Aktobe

Object name:

Consolidated resource sheet No. _____
for a building, structure, facility, construction

School in Aktobe
(name of the building, structure, object, construction site)

Ground of decision:
Local resource lists (estimates)

No. p / p	Resource Codes	Name of resources	unit of measurement	amount	Cost, thousand tenge	
					per unit of measure	common
1	2	3	4	5	6	7
		Labor costs				
1	0101-0101-0131	Labor costs of construction workers (average grade 3.1)	person-h	20700.8091	1.06500	22046.362
2	0101-0101-0140	Labor costs of construction workers (average rank 4)	person-h	10157.4541	1.24800	12676.503
3	0101-0101-0133	Labor costs of construction workers (average grade 3.3)	person-h	4516.05	1.33600	6033.443
4	0101-0101-0132	Labor costs of construction workers (average grade 3.2)	person-h	4360.9104	1.08100	4714.144
5	0101-0101-0135	Labor costs of construction workers (average grade 3.5)	person-h	3601.7945	1.14700	4131.258
6	0101-0101-0130	Labor costs of construction workers (average rank 3)	person-h	3087.75	1.04500	3226.699
7	0101-0101-0128	Labor costs of construction workers (average grade 2.8)	person-h	2450.1348	1.00900	2472.186
8	0101-0101-0139	Labor costs of construction workers (average grade 3.9)	person-h	1492.6655	1.22900	1834.486
9	0101-0101-0138	Labor costs of construction workers (average grade 3.8)	person-h	759.7544	1.20900	918.543
10	0101-0101-0120	Labor costs of construction workers (average rank 2)	person-h	486.5647	0.87400	425.258
eleven	0101-0101-0114	Labor costs of construction workers (average grade 1.4)	person-h	0.7887	0.79000	0.623
12	0101-0102-0100	Labor costs of drivers	person-h	3079.0746		
		Weighted average job category 3.3				
		Total PHOT:				58479.505
		Machines and mechanism by type				
		Bulldozers				
1	3101-0101-0103	Bulldozers, 79 kW (108 h.p.)	mach -h	64.912842	4.70700	305.545
		Scrapers				
2	3101-0102-0104	Trailed scrapers with caterpillar tractor, 8 m3	mach -h	8.58774	8.62400	74.061

QUESTION PK Trial - 59 - 14 SRV

1	2	3	4	5	6	7
		Crawler Excavators				
3	3101-0201-0906	Imported crawler excavators of the type " HITACHI ", 1 m3	mach -h	44.595735	14.65600	653.595
		Mortar Pumps				
4	3103-0205-0201	Mortar pumps , 1 m3 / h	mach -h	53.05548	1.21300	64.356
		Vibrators				
5	3104-0101-0201	Surface vibrator	mach -h	1158.868386	0.01500	17.383
6	3104-0101-0101	Deep vibrator	mach -h	186.708756	0.03900	7.282
		Mobile and stationary tower cranes				
7	3105-0101-0102	Tower cranes, 8 t	mach -h	2456.854756	5.93900	14591.260
8	3105-0101-0401	Concrete laying tower cranes for hydropower construction, 10-25 t	mach -h	19.843296	6.96900	138.288
9	3105-0101-0401	Concrete laying tower cranes for hydropower construction, 10-25 t	mach -h	4.4091	6.95500	30.665
		Jib cranes on the road				
10	3105-0102-0102	Truck-mounted cranes, 10 t	mach -h	124.05855	5.20700	645.973
11	3105-0102-0102	Truck-mounted cranes, 10 t	mach -h	55.211477	4.83700	267.058

3105-0102-0202Cranes on the road while working on hydropower construction, 10 t mach -h 3.46104 4.83100 16.720

3105-0102-0202Cranes on the road while working on hydropower construction, 10 t mach -h 0.2898 4.82800 1.399

Forklift trucks

143105-0501-0101Forklift trucks, 5 tmach -h14.004735 4.43000 62.041

Lifts, towers, cradles, scaffolds, etc.

3105-0602-0401Mast hoists, lifting height 50 m mach -h 6.998808 2.06800 14.474

Other electrical equipment

3106-0103-0301Welding transformers with a rated welding current of 315-500 A mach -h 1661.2992 0.13600 225.937 173106-0103-0501Direct current installations for manual arc welding mach -h 74.175 0.17600 13.055

3106-0103-0301Welding transformers with a rated welding current of 315-500 A mach -h 14.7798 0.12500 1.847

Other equipment for welding and cutting

3106-0202-0501Apparatus for gas welding and cutting mach -h 39.22512 0.02600 1.020

Self-propelled road rollers

3201-0101-0102Smooth road rollers , 8 tmach -h 11.348085 3.75200 42.578

Trailed road rollers

213201-0102-0301Pneumatic trailed road rollers, 25 tmach -h 4.348438 0.73600 3.200

223201-0102-0201Trailed cam rollers, 8 tmach -h 11.348085 0.11500 1.305

Bitumen boilers

233201-0201-0101Mobile bitumen boilers, 400 lmach -h 434.554582 0.75300 327.220

243201-0201-0101Mobile bitumen boilers, 400 lmach -h 26.0337 0.72300 18.822

Road marking, marking, water-washing machines

253201-0211-0201Water-jetting machines, 6000 lmach -h 0.048196 5.58700 0.269

1	2	3	4	5	6	7
			Machines for pl anting plants and others			
26	3206-0102-0701	Mounted brush cutters on a tractor, 79 kW (108 hp) with hydraulic control	mach -h	4.12965	5.62600	23.233
			Dump Trucks			
27	3301-0101-0101	Dump trucks, 7 t	mach -h	11.5368	3.26500	37.668
28	3301-0101-0101	Dump trucks, 7 t	mach -h	1.3041	3.26700	4.260
			On - board cars			
29th	3301-0201-0101	Automobiles, up to 5 t	mach -h	94.233834	2.63200	248.023
thirty	3301-0201-0101	Automobiles, up to 5 t	mach -h	26.0337	2.89100	75.263
31	3301-0201-0101	Automobiles, up to 5 t	mach -h	13.382688	2.62700	35.156
			Crawler tractors			
32	3304-0101-0102	Tracked tractors, 79 kW (108 h.p.)	mach -h	15.696522	4.45000	69.850
33	3304-0101-0101	Crawler tractors, 59 kW (80 h.p.)	mach -h	0.481965	3.92200	1.890
			Cutting tool			
34	3403-0102-0201	Electric chain saws	mach -h	22.58025	0.07500	1.694
35	3403-0102-0102	Electric submersible saw, 1.4 kW	mach -h	33.36564	0.04000	1.335
			Planers			
36	3403-0201-0101	Electric Planers	mach -h	42.504	0.12200	5.185
			Hammers, drills, screwdrivers , wrenches, construction guns			
37	3403-0302-0101	Electric rotary hammer	mach -h	374.96624	0.01800	6.749
38	3403-0302-0301	Electric drills	mach -h	223.6773	0.01200	2.684
39	3403-0302-0301	Electric drills	mach -h	174.7724	0.01300	2.272
40	3403-0302-0701	Electric wrench	mach -h	50.84288	0.03600	1.830
41	3403-0302-0501	Construction screwdrivers	mach -h	108.04112	0.01600	1.729
			Hammers			
42	3403-0401-0101	Riveting hammers	mach -h	362.25552	0.06000	21.735
		Total for construction machines and mechanisms:				18065.909
		including pay for drivers	tenge			4010.151
			Contractor Supply Materials			
			Dense rock crushed stone for construction work			
1	2101-0201-0604	Crushed stone from dense rocks for construction works M1000, fraction 40-70 mm ST RK 1284-2004	m3	0.3102	2.31200	0.717

			Dense rock gravel for construction work				
2	2101-0301-0101	Gravel for construction work M1000, fraction of 5-10 mm ST RK 12842004	m3	26.376	3.84200	101.337
			General purpose concrete				
4							
5							
3	2102-0101-0601	Heavy concrete class B15 GOST 7473-2010	m3	3554.0631	16.89700	60053.004

2102-0101-0101 Heavy concrete class B3.5 GOST 7473-2010 m3306.0 11.43400 3498.804

Mortar solutions

2102-0401-2808 The solution is ready masonry heavy cement-lime grade M25 GOST m360.7904 13.43700 816.841

28013-98

Finishing solutions

QUESTION PK 2018 Trial - 61 - 14 SRV

1	2	3	4	5	6	7
6	2102-0402-0206	The solution is finished finishing heavy, cement-lime 1: 1: 6 GOST 28013-98	m3	14.82216	17.52300	259.729
		Ceramic brick				
7	2103-0101-0103	Brick ceramic unary ordinary corpulent brand M100, dimensions 250 mm x 120 mm x 65 mm GOST 530-2012	1000 pcs	1.155	25.99600	30.025
		Stones and blocks made of natural stone				
8	2103-0499-9903	Straight stone facing	m2	1381.6	-	-
		Fittings				
9	2105-0301-3202	Hot-rolled reinforcing steel of a periodic profile of class A-III (A400) with a diameter of 14 to 32 mm ST RK 2591-2014	t	531.7	209.06700	111160.924
10	2105-0301-3002	Hot-rolled smooth reinforcing steel, class AI (A240) with a diameter of 14 to 25 mm ST RK 2591-2014	t	30.89856	219.31500	6776.518
		Wire				
11	2105-0307-1007	Wire of low carbon light steel, general purpose, superior quality, heat treated, diameter 1.1 mm GOST 3282-74	kg	943.008	0.11200	105.617
12	2105-0307-1007	Wire of low carbon light steel, general purpose, superior quality, heat treated, diameter 1.1 mm GOST 3282-74	kg	09/26/09	0.11200	30.139
13	2105-0307-1013	Hot-rolled wire of normal accuracy in coils of steel SV-08A with a diameter of 6.3 mm to 6.5 mm GOST 10543-98	kg	153.0	0.07000	10.710
		Mesh steel wicker, woven, twisted				
14	2105-0308-1202	Grid woven with square cells of group 2 without coating of low carbon wire GOST 3826-82	m2	2207.04	1.34800	2975.090
15	2105-0308-0360	Woven wire mesh with square cells 5 mm x 5 mm, carbon steel of ordinary quality, uncoated, 1.6 mm in diameter GOST 3826-82	m2	27.19032	-	-

		Other constructions, m	aterials, products and details			
16	2106-0510-5501	Steel Scaffolding Parts	t	1.022384	435.70900	445.462
17	2106-0510-2602	Rods and Anchors	t	0.828	-	-
		Separate structural elements of buildings and structures (columns, beams, trusses, communications, crossbars, racks, etc.)				
18	2106-0801-0101	Separate structural elements of buildings and structures with a predominance of hot-rolled profiles, the average weight of the assembly unit is up to 0.1 t	t	9.0045	463.20300	4170.911
		Round timber (logs)				
19	2107-0101-9901	Round softwood for construction with a thickness of 140 mm to 240 mm, length from 3 m to 6.5 m GOST 9463-88	m3	40.887	31.57200	1290.884
			Edged bars and bars			

QUESTION PK Trial - 62 - 14 SRV

1	2	3	4	5	6	7
20	2107-0201-0301	Coniferous edged trunks with a length of 4 m to 6.5 m, a width of 75 mm to 150 mm, a thickness of 40 mm to 75 mm, 3 grades GOST 8486-86	m3	113.81598	25.44300	2895.820
21	2107-0201-0201	Bars softwood length of from 4 m to 6.5 m, a width of 75 mm to 150 mm, a thickness of from 40 mm to 75 mm 2 grade GOST 8486-86	m3	23.331	47.24500	1102.273
22	2107-0201-0203	Coniferous edged boards from 4 m to 6.5 m long, from 75 mm to 150 mm wide, 150 mm and more thick, 2 grades GOST 8486-86	m3	17.82891	56.99700	1016.194
23	2107-0201-0401	Coniferous edged trunks with a length of 4 m to 6.5 m, a width of 75 mm to 150 mm, a thickness of 40 mm to 75 mm, 4 grades GOST 8486-86	m3	0.27632	18.35800	5.073
		Ed ged boards				
24	2107-0203-0302	Coniferous edged boards up to 6.5 m long, from 75 mm to 150 wide, mm from 19 mm to 22 mm thick, 3 grades GOST 8486-86	m3	59.829	47.48400	2840.920
25	2107-0203-44	0305Coniferous edged boards up to 6.5 m long, from 75 mm to 150 mm thick or more, 3 grades GOST 8486-86	mm wide, m3 52.73349 47.43400 2501.360			
26	2107-0203-8486-	0304Coniferous edged boards up to 6.5 m long, from 75 mm to 150	mm wide, m3 18.48 47.48400 877.504 from 32	mm to 40	mm thick, 3	grades GOST
		86				
27	2107-0203-25	0303Coniferous edged boards up to 6.5 m long, from 75 mm to 150 mm thick, 3 grades GOST 8486-86	mm wide, m3 9.54477 47.43400 452.747			
28	2107-0203-8486-	0204Coniferous edged boards up to 6.5 m long, from 75 mm to 150	mm wide, m3 4.0128 52.85300 212.089 from	32 mm to 40	mm thick, 2	grades GOST
		86				
		Other products				
29	2107-0510-1 ,5x0,4,	1003The formwork is collapsible and permutable panel board, ShchD size 1500x400x417 mm GOST 23477-79	brand m23001.5 15.70700 47144.561			
30	2107-0510-	0701Inventory racks wood-metal sliding PC.50.4252 20.70200	1043.902			
31	2107-0510-	0201Wooden scaffolding parts GOST 8242-88 m30.165792 31.41500	5.208			
		Ruberoid, glassruberoid , roofing, glassine				
32	2110-0401-	0101Roofing felt roofing Coarse-grained RCM-350B GOST 10923-93	m2 11555.2 0.24100 2784.803			
		Waterproofing mastics				
33	2110-0501-	0701Roofing mastic for hot application MBK-G GOST 2889-80 kg	31651.2 0.13200 4177.958			
34	2110-0501-1404Mastic frost-resistant bituminous oil MB-50 GOST 30693-2000 kg 14694.0 0.22400 3291.456					
		Lime				

QUESTION PK Trial - 63 - 14 SRV

1	2	3	4	5	6	7

35	2113-0102-0801	Building quicklime lump, grade 1, GOST 9179-77		t	1.698774	31.76800	53.967
			Gypsum				
36	2113-0103-0102	Plaster binders GOST 125-79 brand G-3		t	0.058896	22.19400	1.307
			Bitumen				
37	2113-0104-0103	Bitumen oil construction GOST 6617-76 brand BN 90/10		t	0.9796	140.31300	137.451
			Bolts				
38	2113-0201-0902	Bolts GOST 1759.0-87, building with nuts with a hexagonal head		t	0.16863	456.85200	77.039
			Nails				
39	2113-0209-0104	Construction nails GOST 283-75		kg	1557.67332	0.37200	579.454
40	2113-0209-0104	Construction nails GOST 283-75		kg	295.68	0.27800	82.199
			Technical gases				
41	2113-0701-0401	Technical gaseous oxygen GOST 5583-78		m3	31.0992	0.26600	8.272
42	2113-0701-1002	Propane-butane, mixture technical GOST R 52087-2003		kg	10.032	0.14400	1.445
			Oils				
43	2113-0702-0101	Anthracene oil GOST 11126-88		t	0.441408	44.84000	19.793
44	2113-0702-0201	Diesel engine oil M-10DM GOST 12337-84		t	0.0378	408.08400	15.426
			Tec hnical fluids				
45	2113-0703-0201	Kerosene for technical purposes, grades KT-1, KT-2		t	1.4694	53.70000	78.907
46	2113-0703-1405	Technical water		m3	32.070953	0.08600	2.758
			Fabrics				
47	2113-0803-1101	Fabric bag GOST 30090-93		10 m2	127.725861	6.93100	885.268
			Components, consumables for tools				
48	2113-0812-1035	Electrodes, d = 4 mm, E42 GOST 9466-75		t	0.40128	211.19100	84.747
49	2113-0812-1035	Electrodes, d = 4 mm, E42 GOST 9466-75		t	0.0876	211.19200	18.500
			Other materials				
fifty	2113-0816-2808	Polypropylene plate holder for thermal insulation with a plastic core of 10 x200 mm polyamide		PC.	11536.36	0.02100	242.264
51	2113-0816-9902	Antiseptic paste		t	0.246015	605.54700	148.974
52	2113-0816-2806	Polypropylene plate-shaped holder of thermal insulation with a plastic core made of polyamide 10x160 mm		PC.	4614.544	0.01700	78.447
53	2113-0816-2701	Coal tar		t	0.61446	80.24400	49.307

2113-0816-3526Simazine 50% - powder Wet table GOST 15123-78t0.025121152.6960028.956

Paronite gaskets

2302-1101-1401Gaskets paronite GOST 481-80kg30.39521.4210043.192

Petrol

2601-0101-0102AI-92 gasolinekg6.01920.192001.156

Shields of formwork, flooring

2701-0101-0104Boards from boards, thickness 25 mm21550.57490.891001381.562

2701-0101-0102 Flooring shieldsm265.408643.30300216.045

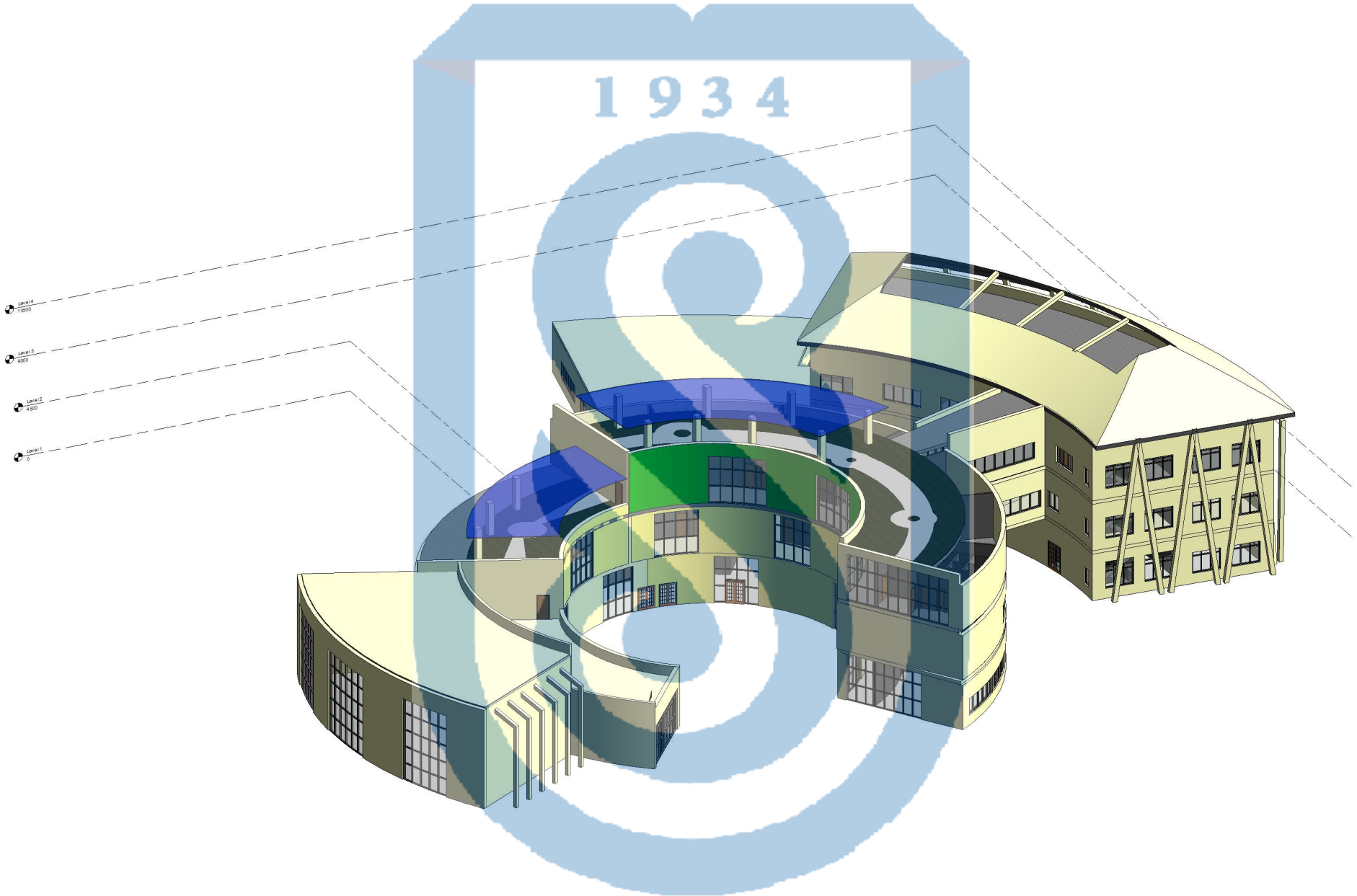
1	2	3	4	5	6	7
59	2701-0101-0102	Flooring shields	m2	37.8744	3.30300	125.099
60	2701-0101-0105	Boards from boards, thickness 40 mm	m2	54.0	1.25500	67.770
		Total contractor supply materials:				266507.884
		Total:				343053.298

Compiled _____

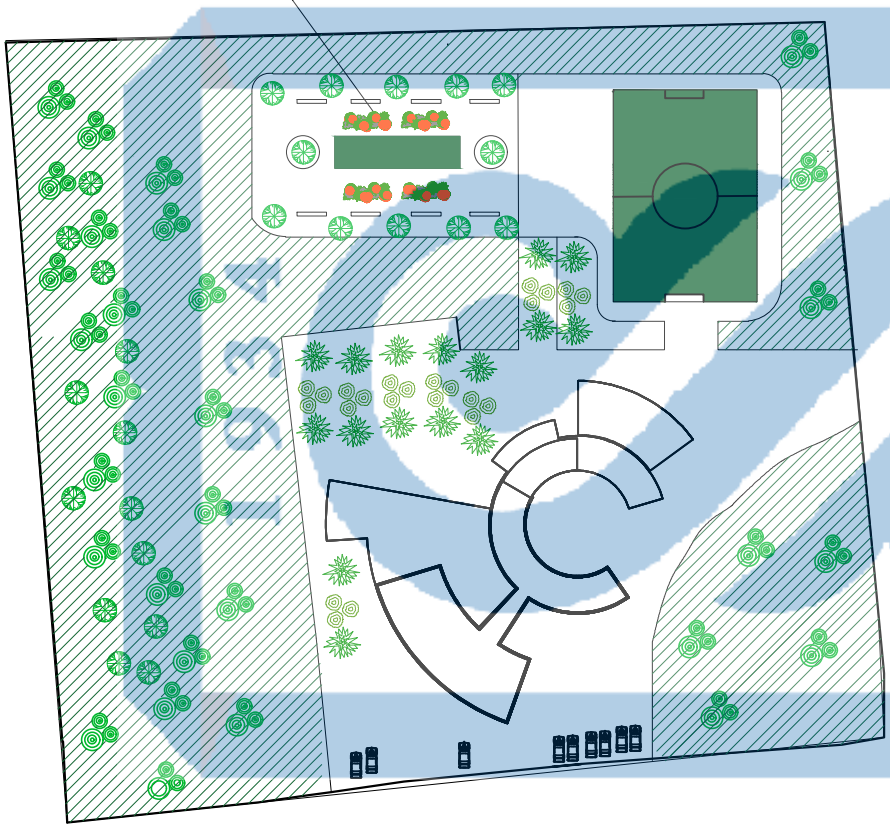
position, signature (initials, surname)

Checked _____

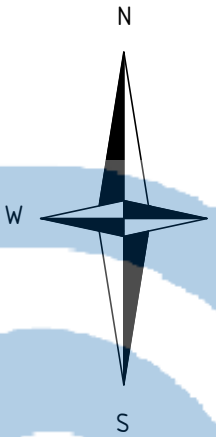
position, signature (initials, surname)

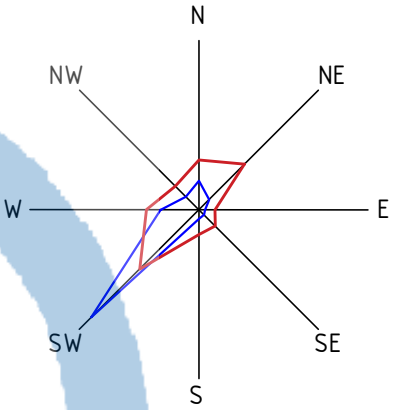

Level 4
13500
Level 3
9000
Level 2
4500
Level 1
0

General plan



wind direction



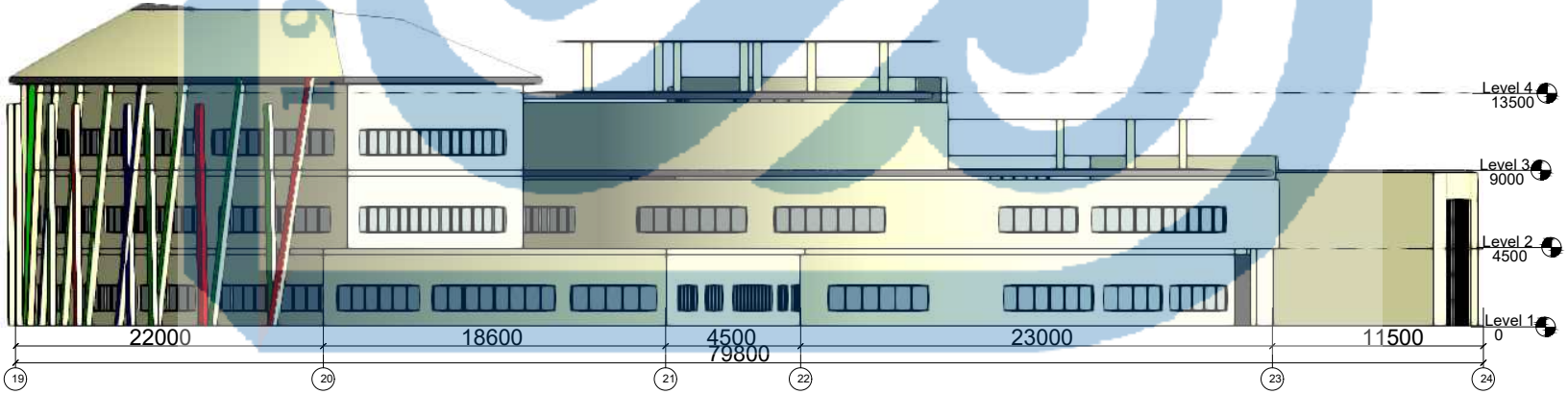


№ n/n	Names	unit.	quantity
1	Construction volume	м3	17408,81
2	Land area	м2	36769
3	Construction site total area	м2	13789
4	working area of construction site	м2	3000.6

				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			architecture
Superviser	Paktin Manizha			Level: DP; Sheet: ; scale: 1:200
Consultant	Paktin Manizha			
Controller	Kozyukova.N.V			General plan
Prepared by	A.B.Ibrahimi			Department of Construction and Building Materials

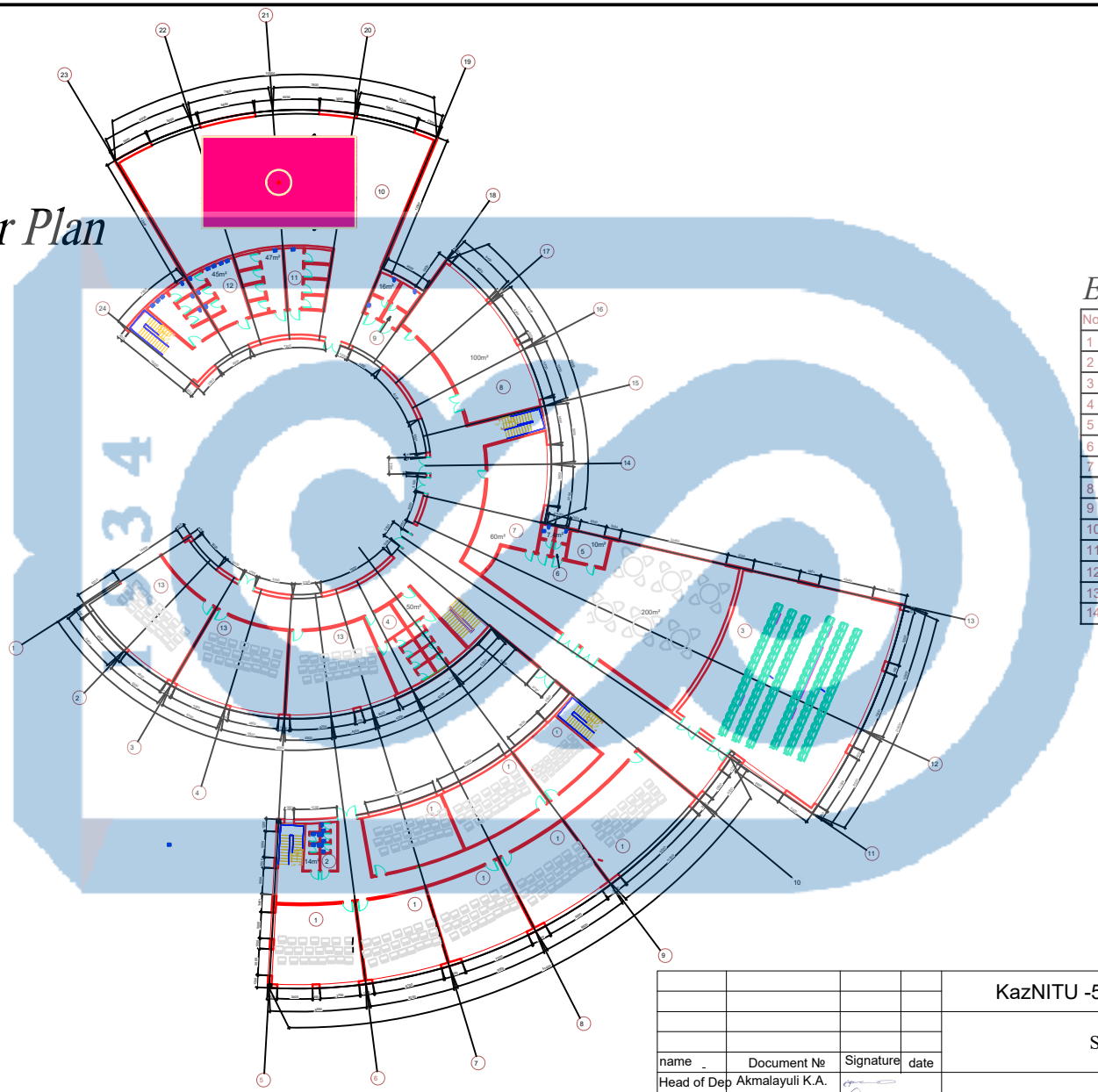
1-Elevation

2-Elevation



				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			architecture
Superviser	Paktin Manizha			Level: DP; Sheet: ; scale: 1:200
Consultant	Paktin Manizha			
Controller	Kozyukova.N.V			Elevation
Prepared by	A.B.Ibrahimi			Department of Construction and Building Materials

1rst Floor Plan



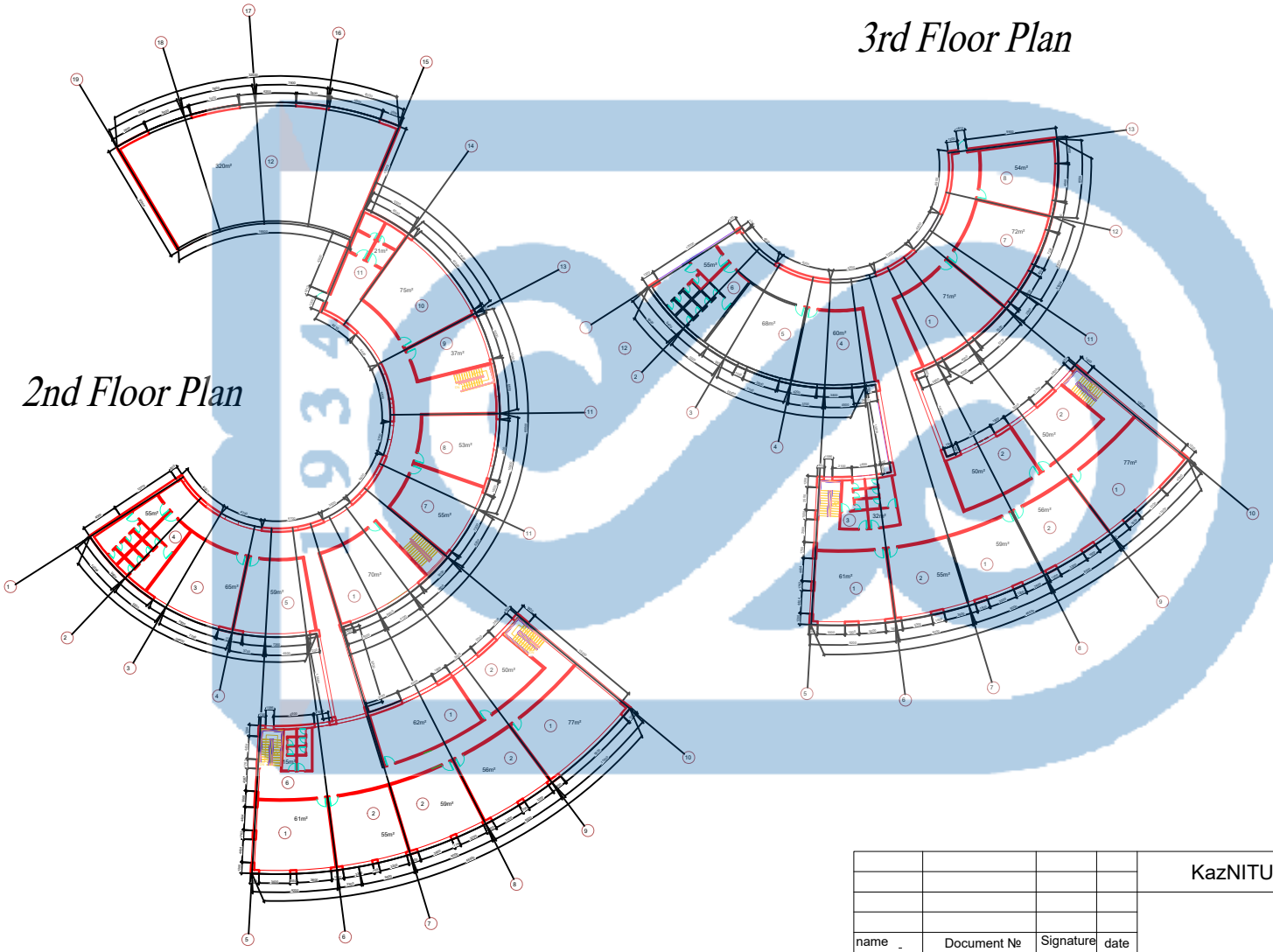
Explanation 1rst Floor Plan

No	Name of Rooms	Area(m²)
1	Class from 1-4	50-77 m²
2	W/C	14m²
3	Activity hall	280m²
4	Buffet	200m²
5	Cash Room	10m²
6	W/C for staffs	7.4m²
7	Kitchen and store room	60m²
8	Library	100m²
9	W/C	16m²
10	Sport hall	320m²
11	Wardrobe	47m²
12	W/C	45m²
13	Class Room	72m²
14	W/C	50m²

				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			architecture
Superviser	Paktin Manizha			
Consultant	Paktin Manizha			
Controller	Kozyukova.N.V			
Prepared by	A.B.Ibrahimi			first floor

Level	Sheet	scale
DP		1:200

Department of Construction and Building Materials



Explanation 2nd Floor Plan

No	Name of Rooms	Area(m²)
1	Class of experimental science from 5-8	61-77 m²
2	Class of social science 5-8	50-59 m²
3	Laboratory	65m²
4	W/C	55m²
5	Class of	59m²
6	W/C	15m²
7	Room of Crew	55m²
8	Room for Parents and care take room	53m²
9	Administration	37m²
10	Room of Staffs	75m²
11	W/C for staffs	21m²
12	Sport hall	320m²

Explanation 3rd Floor Plan

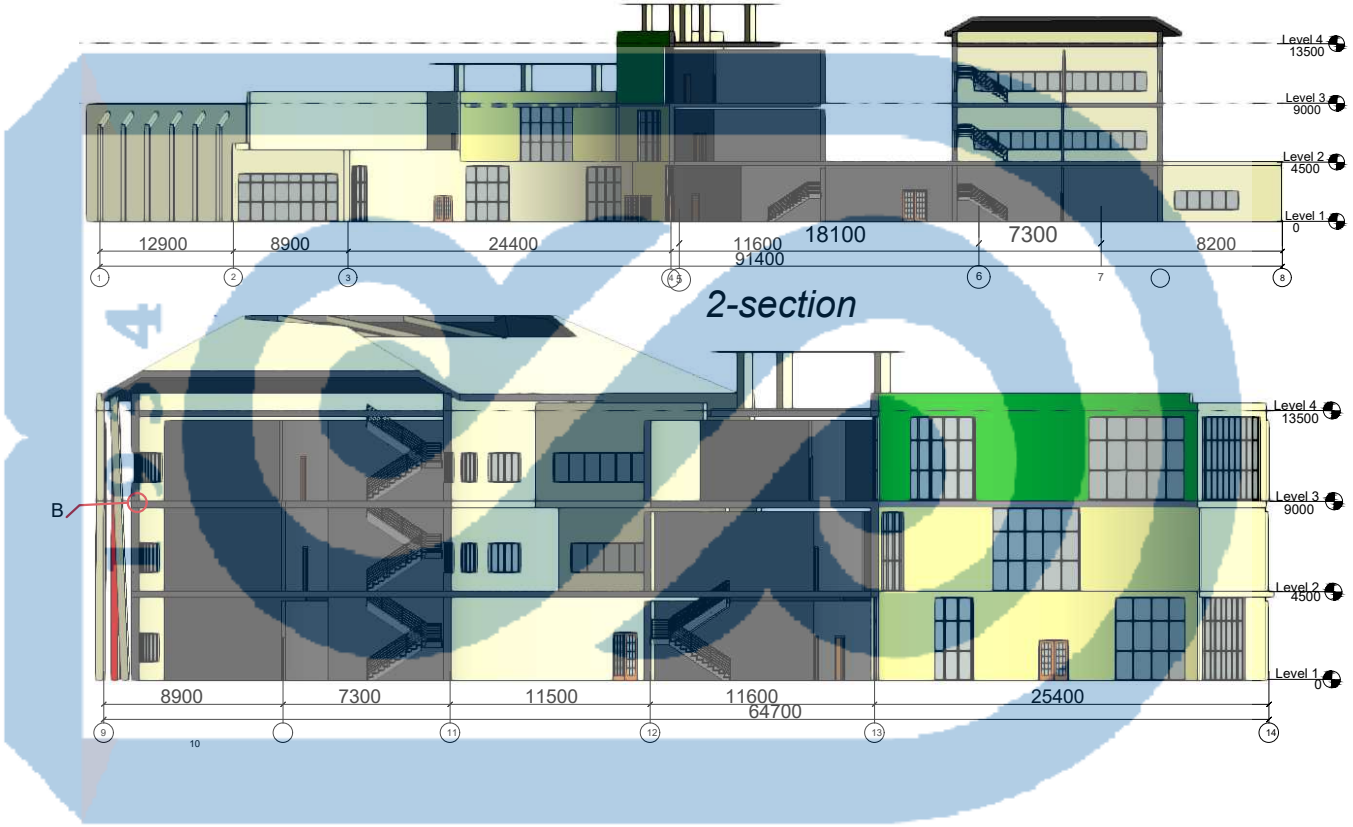
No	Name of Rooms	Area(m²)
1	Class of experimental science from 9-11	61-77 m²
2	Class of social science 9-11	50-55 m²
3	W/C	32m²
4	Drawing Studio	60m²
5	Laboratory	68m²
6	W/C	55m²
7	Library	72m²
8	Preparation room for Physic and Chymistry	54m²

				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			architecture
Superviser	Paktin Manizha			
Consultant	Paktin Manizha			
Controller	Kozyukova.N.V			second and third plan
Prepared by	A.B.Ibrahimi			

Level	Sheet	scale
DP		1:200

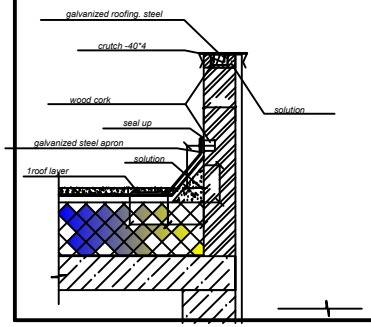
Department of Construction and Building Materials

1-section



2-section

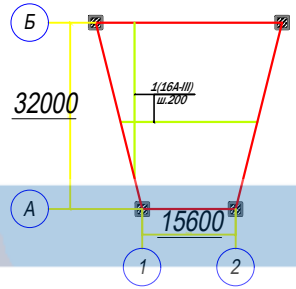
joint "b"



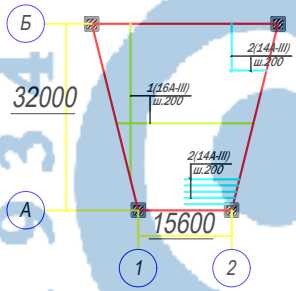
				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			architecture
Superviser	Paktin Manizha			Level: DP; Sheet: ; scale: 1:200
Consultant	Paktin Manizha			
Controller	Kozyukova.N.V			section
Prepared by	A.B.Ibrahimi			Department of Construction and Building Materials

D36
D32
D28
D25
D22
D20
D18
D16
D14
D12
D10
D8

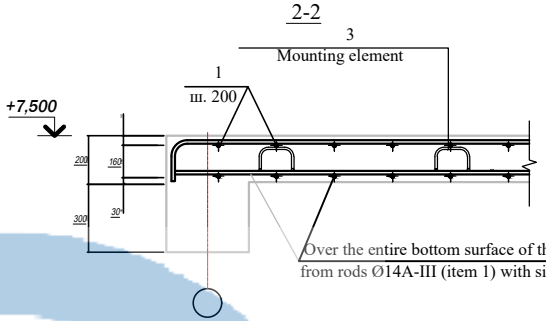
Scheme of reinforcement of floor slab at elev. + 7,500 on the lower edge



Scheme of reinforcement of floor slab at elev. + 7,500 on the upper edge

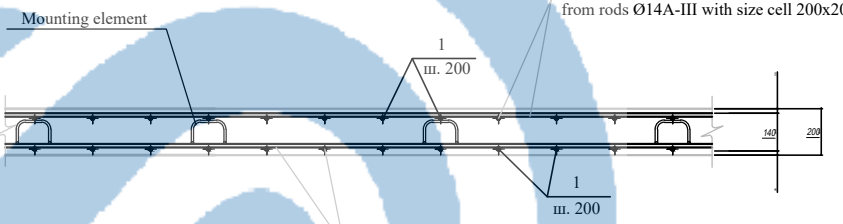


2-2



Over the entire bottom surface of the grid plate from rods Ø14A-III (item 1) with size cell 200x200 mm

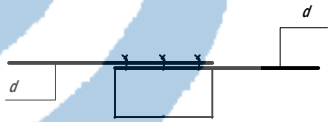
1 - 1



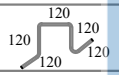
Over the entire top surface of the grid plate from rods Ø14A-III with size cell 200x200 mm

Over the entire bottom surface of the grid plate from rods Ø14A-III with size cell 200x200 mm

Rebar Connection Detail



Parts List

pos.	sketch
3	

Specification of floor slab at +7,500

pos.	Designation	Name			Кол.	wieght ед.,кг	unit	
		Plate on the mark. +7,500				1634.4		кг
1	ГОСТ Р 5781-82*	Ø 12	A-III	L= 910.8	пм	1.578	1437.24	кг
2	ГОСТ Р 5781-82*	Ø 14	A-III	L= 113.85	пм	1.208	137.5	кг
3	ГОСТ Р 5781-82*	Ø 16	A-I	L= 600	252	0.237	59.7	кг
		concrete B25			7.2	м3		

Statement of steel consumption, kg

Item brand	Reinforcing products											
	Class armature											
	A-I				A-III							
	ГОСТ 5781-82*				ГОСТ 5781-82*							
	Ø6	Ø8	Ø10	TOTAL	Ø12	Ø14	Ø16	Ø20	Ø22	Ø25	Ø32	TOTAL	TOTAL
stove lane on mark +7,500	0	59.7	0	59.7	0	137.5	1437.2	0	0	0	0	1574.7	1634.4

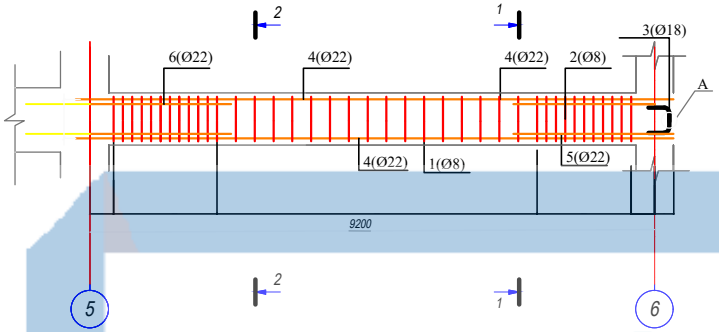
1. To install the upper mesh, provide "frogs" (pos. 3) with a pitch of 400x400 mm.
2. The joints of the rods to carry out an overlap of length (40d) at a distance of 1500 mm from the axis.
3. Fittings knit with wire at the intersections

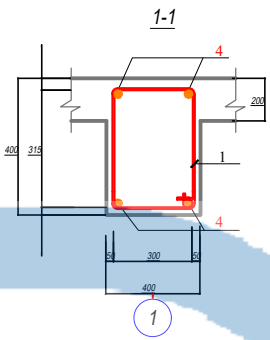
agreed:

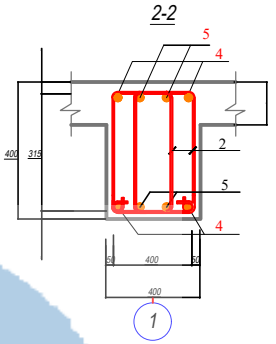
Inv. N v. | Signature and Date | In retum. inv. N

				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			Constructive part
Superviser	Paktin Manizha			Level: DP; Sheet: ; scale: 1:200
Consultant	Nashiraliev Z.T			
Controller	Kozyukova.N.V			slab
Prepared by	A.B.Ibrahimi			Department of Construction and Building Materials

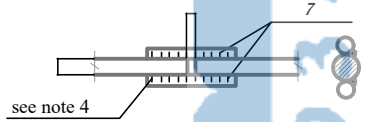
D36
D32
D28
D25
D22
D20
D18
D16
D14
D12
D10
D8







joint of steel

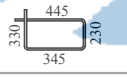
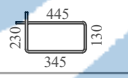


(Detail of reinforcement anchoring)

Statement of steel consumption, kg

Item brand	Reinforcing products									
	Class armature									
	A-I				A-III					
	ГОСТ 5781-82*				ГОСТ 5781-82*					
	Ø6	Ø8	Ø10	total	Ø18	Ø22	Ø25	Ø28	total	total kg
Crossbar P1	0	29.8	0	29.8	3.3	122.6	0	0	125.9	155.6

Parts List

pos.	sketch	pos.	sketch	Pos.	Sketch
1		2		3	

Specification of crossbars R-1

pos.	Designation	Name			Кол.	Weight ед.,кг	Note	
		Crossbar P-1				155.6		кг
1	ГОСТ Р 5781-82*	Ф 8	A-I	L= 1350	15	0.533	8	кг
2	ГОСТ Р 5781-82*	Ф 8	A-I	L= 1150	48	0.454	21.8	кг
3	ГОСТ Р 5781-82*	Ф 18	A-III	L= 815	2	1.628	3.26	кг
4	ГОСТ Р 5781-82*	Ф 22	A-III	L= 6300	4	18,799	75.2	кг
5	ГОСТ Р 5781-82*	Ф 22	A-III	L= 1500	4	4,476	17.9	кг
6	ГОСТ Р 5781-82*	Ф 22	A-III	L= 2250	4	6.714	26.9	кг
7	ГОСТ Р 5781-82*	Ф 22	A-III	L= 220	4	0,656	2.6	кг
		Concrete B25			0.96	м3		

1. Concrete and reinforcement work shall be carried out in accordance with the instructions SNiP RK 5.03-37-2005. "Bearing and enclosing structures."
2. Knit the fittings with knitting wire at all intersections.
3. Place joints of adjacent rods apart. Joint spacing 1.5 x L overlap
4. Dock the upper longitudinal reinforcement of the crossbars in the span, the lower one at the supports
5. The joining of the rods to each other is performed on welding with overlays according to the type C21-PN, GOST 14098-91, electrodes E50A-UONI 13/55-UD.
6. The height of the weld should be equal to 0.25d, but not less than 4 mm: the width of the weld should be equal to 0.5d, but not less than 10 mm.
7. Formwork should be removed after concrete reaches 70% of design strength.

name	Document №	Signature	date
Head of Dep	Akmalayuli K.A.		
Superviser	Paktin Manizha		
Consultant	Nashiraliev Z.T		
Controller	Kozyukova.N.V		
Prepared by	A.B.Ibrahimi		

KazNITU -5B072900 .29-03/2020 DP

Special School in Aktobe

Constructive part

Level	Sheet	scale
DP		1:200

Beam

Department of Construction and Building Materials

Agreed:

Inv. N v. Signature and Date Inv. N

section 1-1

Ø12AIII

0
ш.150

0
ш.150

0
ш.150

0
ш.150

13
30
60
особый

09
13
30
60

A

0,000

0,000

min 180

1
1

1 1

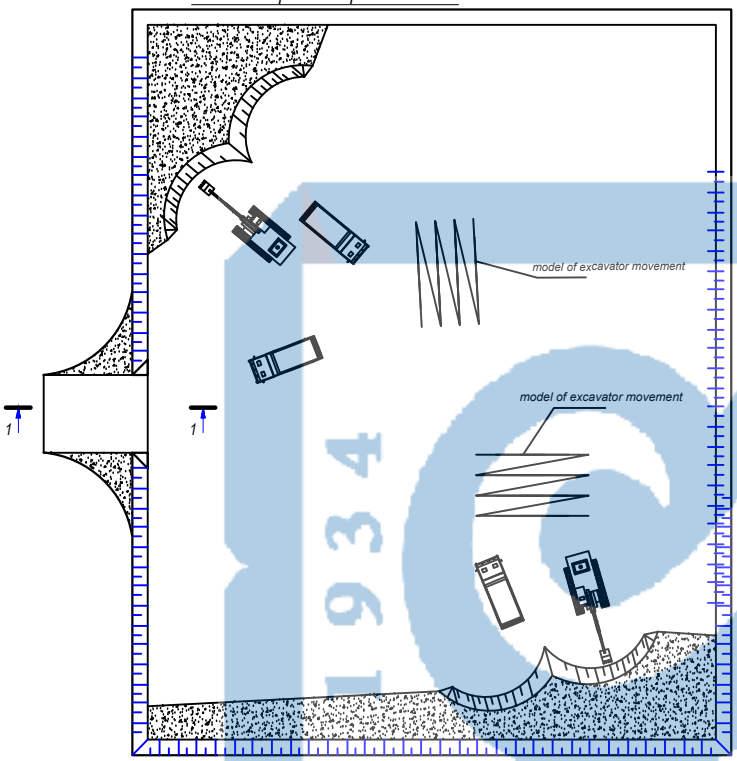
steel

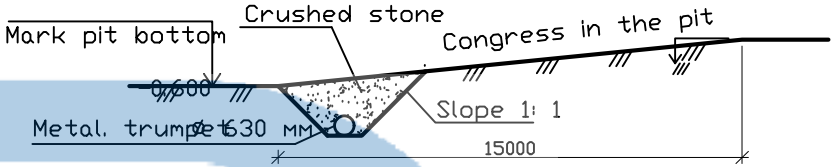
concrete

concrete кл.B7,5

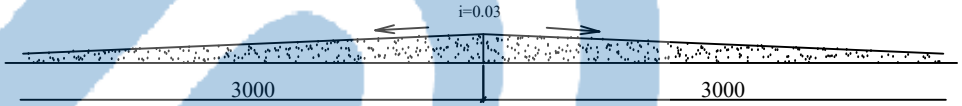
ground

Excavation pit development scheme

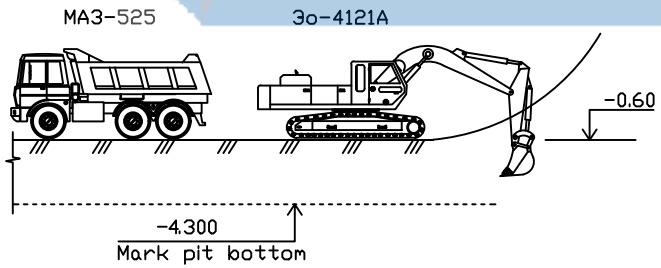




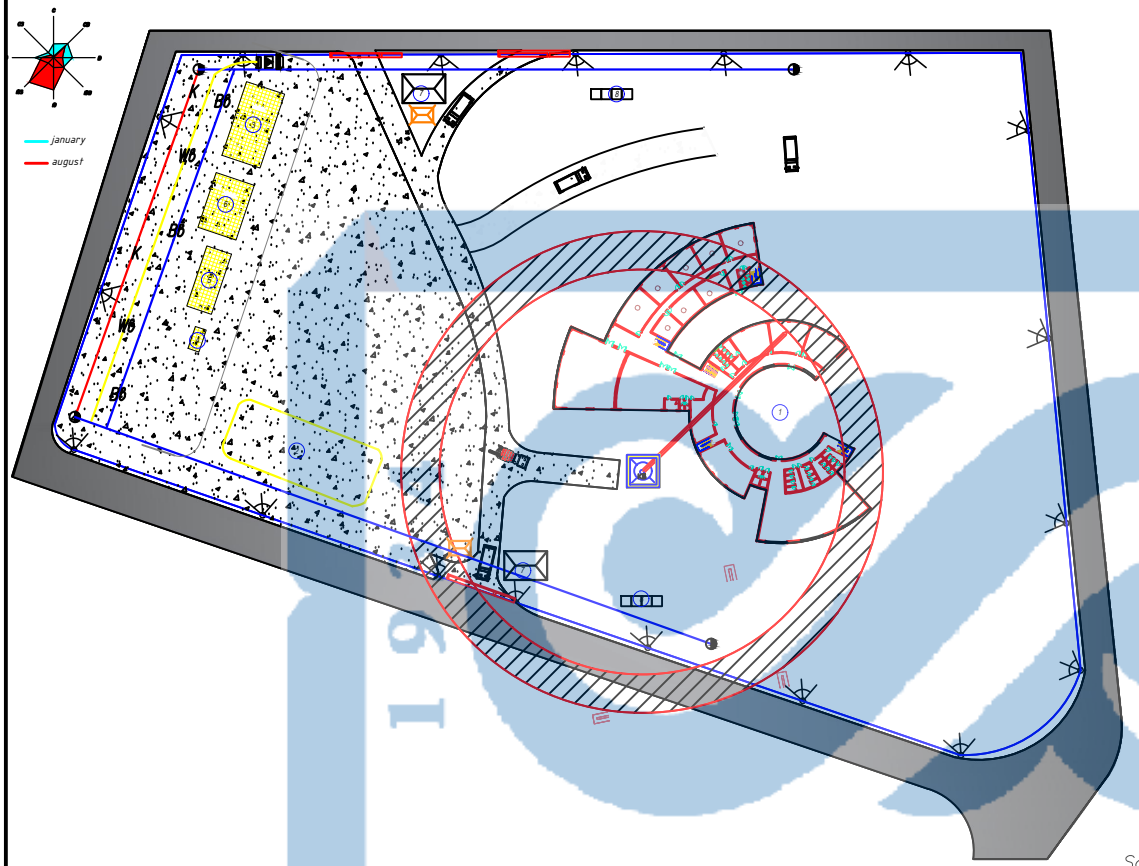
Temporary road profile
Gravel and sand mixture



section 2-2



				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			technological part
Superviser	Paktin Manizha			Level: DP; Sheet: ; scale: 1:200
Consultant	Kashkinbaev.I.Z			
Controller	Kozyukova.N.V			underground work
Prepared by	A.B.Ibrahimi			Department of Construction and Building Materials



Legend СГП

- Temporary fence
- Goal
- W — Power line constant
- WB — Power line temporary
- B — Permanent water supply
- BB — Water supply temporary
- K — Permanent sewage
- KB — Sewerage is temporary
- Floodlight
- Fire hydrant
- Distribution cabinet
- Transformer substation
- Fire extinguishing shield
- Water barrel
- Sand box
- Car wash

Explication СГП

1. Permanent building under construction
2. Open storage areas and awnings
3. Closed warehouse
4. Office and control room
5. The foreman
6. Dining room
7. Checkpoint
8. Toilet

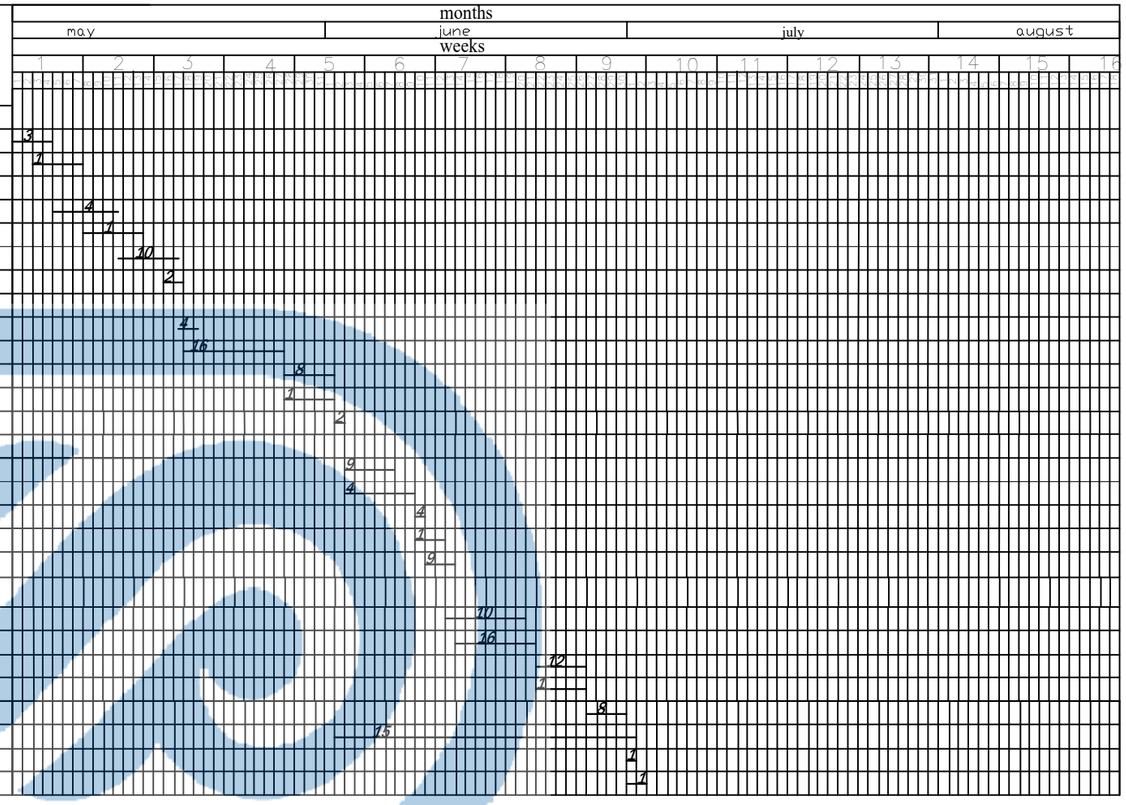
Safety precautions on construction site

1. The fence of the site with a fence at a distance of 2.0m. from the danger zone cranes
2. Surface water drainage
3. The device of access roads, and on–site roads and driveways
4. Aisles between stored materials and 1.0 m.
5. Crane ways surrounded by a guard rail, at a distance of 0.8m. from maximum counterweight
6. Indoor galleries are provided for safe passage. Height 2.0m. width 1.5m.
7. Around the perimeter mounted spotlights on the masts

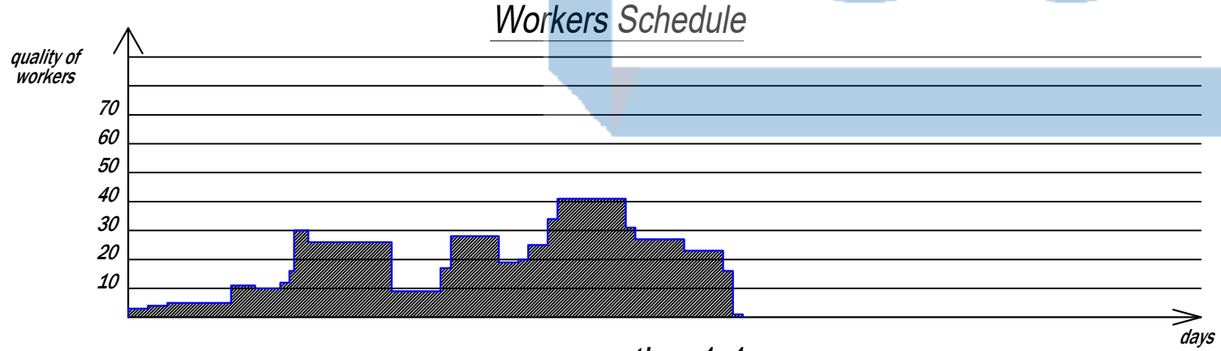
				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			technological part — Level: DP; Sheet: ; scale: 1:200
Superviser	Paktin Manizha			
Consultant	Kashkinbaev.I.Z			
Controller	Kozyukova.N.V			master plan — Department of Construction and Building Materials
Prepared by	A.B.Ibrahimi			

Work schedule

№	name	Scope of work		Cost work person-days	Required Mach		Will continue. days	Number workers	Number of shifts
		unit	cod.no		Name	date			
1	2	3	4	5	6	7	8	9	10
1	Device time. fencing	м	770	24	-	-	4	3	2
2	Cut Rast. layer	1000 м2	9.5		ДЗ-28	1	5	1	2
3	Excavation								
3.1	With loading in t.	100 м3	25.85		ЭО-4121	2	6.5	4	2
3.2	To the dump	100 м3	12.24		ЭО-4121	1	6	1	2
4	Manual bottom cleaning	1 м3	762	124	-	-	6	10	2
5	The device is equal. layer	1 м3	381		ДЗ-28	1	2	2	1
6	The device of a monolithic con-tion (Foundation)								
6.1	Formwork device	1 м2	180	8.75	-	-	2	4	2
6.2	Reinforcement work	1 т	225	178.5	-	-	11	16	2
6.3	Concrete laying	1 м3	1500	41.25	-	-	5	8	2
6.4	Curing	100 м2	30.05	0.525	-	-	1	1	1
6.5	Formwork	1 м2	180	4.725	-	-	2	2	1
7	The device of a monolithic con-tion (Column)								
7.1	Formwork device	1 м2	2006.4	30.1	-	-	5	9	2
7.2	Reinforcement work	1 т	24.7	26.86	-	-	7	4	2
7.3	Concrete laying	1 м3	200.64	5.5	-	-	1	4	2
7.4	Curing	100 м2	20.064	0.4	-	-	1	1	1
7.5	Formwork	1 м2	2006.4	22.5	-	-	3	9	2
9	The device of monolithic con-tion (Plate per-tiya)								
9.1	Formwork device	1 м2	3001.5	82.54	-	-	8	10	2
9.2	Reinforcement work	1 т	84	136.5	-	-	8	16	2
9.3	Concrete laying	1 м3	600.3	60.8	-	-	5	12	2
9.4	Curing	100 м2	30	0.525	-	-	1	1	1
9.5	Formwork	1 м2	3001.5	33.7	-	-	4	8	2
10	Waterproofing	1 м2	6122.5	313.8	-	-	30	15	2
11	backfilling	100 м3	12.24	0.95	-	-	1	1	1
12	Soil compaction	100 м3	30.25		ДУ-31А	1	2	1	2



Workers Schedule



section 1-1

name	unit	estimated
total work	day	63
The total complexity of work	h-day	1100

0.40

Q = 1100 per/days

T = 63 days

Ncp=ΣQ/T=1082/63=17.1 workers

Nmax=41 workers

				KazNITU -5B072900 .29-03/2020 DP
				Special School in Aktobe
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			technological part
Superviser	Paktin Manizha			
Consultant	Kashkinbaev.I.Z			
Controller	Kozyukova.N.V			calendar plan
Prepared by	A.B.Ibrahimi			

Level	Sheet	scale
DP		1:200

Department of Construction and Building Materials

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: Ибрахими Алла Бахман

Название: School for children with special educational needs in Aktobe

Координатор:Манижа Пактин

Коэффициент подобия 1:1,8

Коэффициент подобия 2:0

Замена букв:51

Интервалы:0

Микропробелы:0

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:

Обнаруженные в работе заимствования являются добросовестными,и не обладают признаками плагиата. В связи с чем,признаю работу самлстоятельной и допускаю ее к защите.

…… ……

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: Ибрахими Алла Бахман

Название: School for children with special educational needs in Aktobe

Координатор: Манижа Пактин

Коэффициент подобия 1:1,8

Коэффициент подобия 2:0

Замена букв:51

Интервалы:0

Микропробелы:0

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:

Обнаруженные в работе заимствования являются добросовестными и не обладают признаками плагиата. В связи с чем, работа признается самостоятельной и допускается к защите;

....

Дата *Подпись заведующего кафедрой /*

начальника структурного подразделения

Окончательное решение в отношении допуска к защите, включая обоснование:

Работа признается самостоятельной и допускается к защите.

Обнаруженные в работе заимствования являются добросовестными и не обладают признаками плагиата.

…… …… ……

Дата *Подпись заведующего кафедрой /*

начальника структурного подразделения

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РЕСПУБЛИКИ КАЗАХСТАН
СӘТБАЕВ УНИВЕРСИТЕТІ

RESPONSE

OF THE SUPERVISOR
For the graduation project
Bahman Ibrahimi, 5B072900-Civil Engineering

Topic: “School For Sensitive Children, Aktobe City ”

The following tasks were solved in the work: a space-planning decision was made, the thermomechanical calculation of the enclosing structures was performed, the calculation and design of building structures, technological maps, and a construction plan were developed, and the cost of construction was also calculated.

The student successfully completed all the tasks. Bahman Ibrahimi conducted an initial study of the assignment at a good level, competently conducted analysis of data from literary sources, applied many years of experience in designing this type of building, based on various design guidelines in the design and construction and technological sections. According to the calculations, the cost of construction was calculated. The design assignment was completed in full and on time.

In the process, the student showed responsibility, creative and analytical thinking, independence and showed good knowledge on completed professional disciplines during the educational process.

The project was carried out at a good level and the work fully meets the requirements for graduation projects of the "bachelor" level, the student is allowed to defend.

Supervisor
PhD Researcher, Senior lecturer
_____ Paktin.M
«25» 05 2020y,