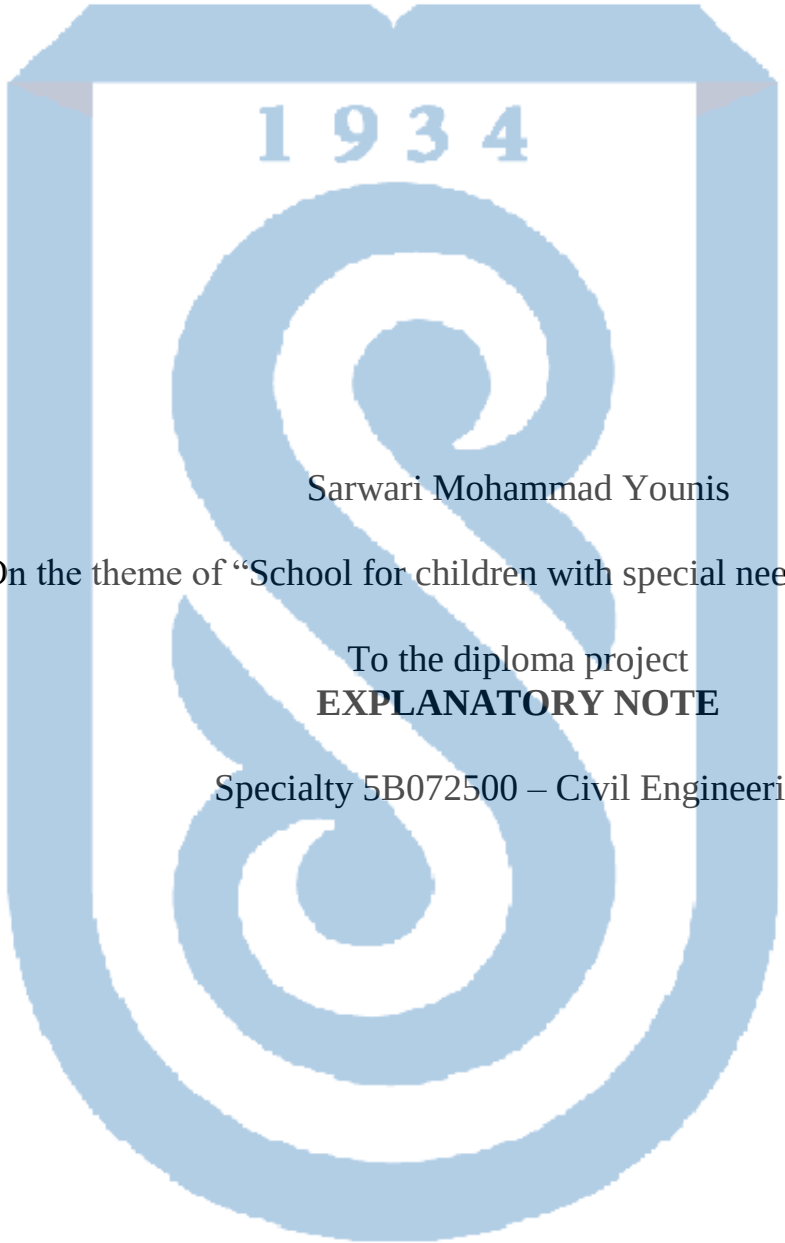
MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
Kazakh National Research Technical University named after K.I. Satpayev
Institute of Architecture, Construction and Energy named after T. Basenov
Department of «Construction and Building Materials»



Sarwari Mohammad Younis

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

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 needs in Karaganda"

Specialty 5B072500 – Civil Engineering

Prepared by M. Y.Sarwari

Supervisor N.V. Kozyukova

« 25 »_05 _2020 y.

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APPROVED
Head of Department
_____K.Akmalayuli
«27» ____01_____ 2020 y.

ASSIGNMENT
Complete a diploma project

Student __ M. Y.Sarwari _____
Topic " School for children with special needs in Karaganda"
№ _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	N.V. Kozyukova, master of technical science	25.05.2020	
Settlement and constructive	A.P.Turganbaev, 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	N.V. Kozyukova, master of technical science	25.05.2020	
Norm controller	N.V. Kozyukova, master of technical science	25.05.2020	

Supervisor N.V. Kozyukova

The student accepted

The task M. Y.Sarwari

Date «_ 25 » 05 _2020

CONTENT

INTRODUCTION

School development is one of the key factors in the nation's advancement will be found.

New school building's development increment in each nation. The significance is to consider the separation factor of existing schools. Development is the most significant thing in the national economy of Kazakhstan. One of the enterprises and the extension of existing fixed resources, reproduction give modernization and reestablishment. Time-saving conditions raising the level of scientific organization of work to perform modern an issue on the agenda. The basic rules and norms of such organization of work unified system, design of work organization, construction planning, and management.

Currently, much attention is paid to school construction in Kazakhstan. School education is the socio-economic basis of the state that is, literate and qualified youth is the future of every country.. That is why the number of school-age children in Kazakhstan is growing every year The need for secondary schools in new areas is also growing I want to. However, in order to fully address this issue in the country for a year At least 30 schools should be built each year. With this project, the design of technological processes and the organization of the district all feasibility studies in the construction of school buildings, the aesthetic must take into account other requirements; all the corresponding issues must be designed in advance. The construction of the school is due to the fact that the development of the city and the increasing population requires the construction of new schools for gifted children

The project school for children with special needs in Karaganda city is designed taking into account current requirements and the condition of the school’s location on the territory.

The planning decisions of the school building are made taking into account technological and functional connections training sections general group of premises, auxiliary premises. A set of training classes, classrooms, industrial training classes, facilities for sports, recreation, meals adopted in accordance with the requirements of school design standards and design assignments.

1 Architectural and construction part

1.1 Climatic characteristic district and sites building

The project is a school with special needs for children in Karaganda.

The building of the educational building is divided into two storey and underground floor. The project of the children school in Karaganda includes the following issues provided:

Climatic area - III A ; [1]

- Building class - II [2] ;
- Degree of fire resistance - II;
- Degree of service - II;
- Designed outdoor temperature:
- The coldest five days - 35 0 C; [1]
- On the coldest day - 39 0 C; [1]
- In the coldest month - 77%
- In the hottest month - 54%
- Standard value of snow load - 120 kgf/ m 2 (1.2 kPa);
- Standard value of wind gusts - 48 kgf / m 2 (0.48 kPa); [2]
- Seismic impact of the construction site - 6 points;
- Groundwater level - less than 7 m;
- Maximum depth of soil compaction at 0 0 C - 74 cm;
- The relief of the construction site is flat, with a slight slope to one side;
- Cold supply - from the central network;
- Hot water and heating supply

The projected facility is located in Karaganda.

The construction area for the joint venture of RK 2.04.01-2017 refers to IIIB climate area. Climate district characterized by swiftly manifested Continental: warm summer season and cool in winter. The humidity zone according to the joint venture of the Republic of Kazakhstan 2.04-01-2017 is dry.

1.2 Architectural and planning decisions

The educational building structurally consists of two floors and with underground. The planning decisions of the school building are made taking into account the technological and multifunctional interconnections of educational sections. In this section I am going to describe my underground and floors details.

A-On the ground floor: active room with dimensions 30 x 10 meters, cafe room, A sports hall has been designed as part of a training with dimensions 12 x 6 meters with height of 7.5 meter, library, lobby, cash register, kitchen facilities, reading room halls,

administration room, lecture rooms, gym room, library room, methodical room, rest rooms and also in this floor located separate bathroom.

B- On the first and second floors: recreation area with diminutions7x 6, director cabinet, math room, English language, clinic room, dress salon, tambour room, class rooms, massage room, dining room,. External some doors open to the outside and some doors open to the inside.

The roads of the economic area are made of asphalt concrete, and so on the rest of the roads are paved with path way, Landscaping of the object, built on non-construction areas decorated to enhance the description. Of the projected area paved roads, small architectural images (garbage cans, chairs) provided.

Water supply and sewerage systems - with water used in the city supply system and city sewerage system. Electrically supply from the city system. Trees in the area vacated by construction works such as planting, flowering. This is the lawn cleaning, fresh air and rest for children.

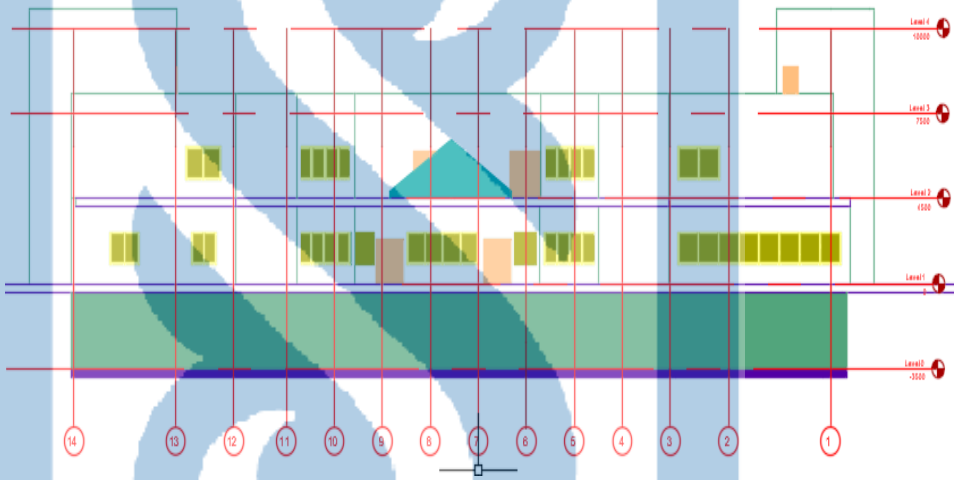


Figure 1.1 - Design scheme of the school in Karaganda

-Windows are made of individual, double-glazed metal-plastic made.
-Doors are made of metal, metal-plastic; the interior is made of wood.
-Stained glass windows are made of aluminum and metal plastic.

Table 1.1 - Construction specifications

Name	Unit measure	Area
Construction area	m 2	3120
Landscaping area	m 2	20662.92
Sport hall	m 2	72
Active room	m 2	300
Dining room	m 2	228
Recreation area	m 2	42
Massage room	m 2	84
Rooms for study	m 2	15
Workshop room	m 2	44

1.3 Architectural and structural solutions

The building of the educational building of the II class, II degree of fire resistance, different floor, functionally divided into two floors and underground. All floors are divided anti-seismic seams. Underground of building with dimensions in the axes of 60x 52 meters with a floor height of 3.5m and underground floor is divided by anti-seismic seams into non-passing training sections of the training and sports hall, the dining room and kitchens reading room halls, administration room, lecture rooms, gym room, library room, methodical room, and also in this floor located separate bathroom.

First floor with dimensions in the axes of 60 x 52 meters is divided by anti-seismic seams with a floor height of 4.5 m.

Here in this floor the premises of the training and director cabinet, math room, English language, clinic room, dress salon, tambour room, class rooms, massage room for technology research and working learning. Second floor of building is provided with dimensions in the axes of 60 x 52 meters with a floor height of 3m.Reinforced concrete columns in wooden formwork up to 4 m high, perimeter up to 2 m. Brick ceramic unary ordinary corpulent brand M100, dimensions 250 мм x 120 мм x ГОСТ 530-2012 Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm СТ РК 2591-2014

Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32мм СТ РК 2591-2014 Sealing with trailed rollers on a pneumatic wheel 25 tons. First pass along one track with a layer thickness of 25 cm Walls, foundations. Horizontal waterproofing in 2 layers

Reinforced concrete columns in wooden formwork up to 4 m high, perimeter up to 2 m.

Reinforced concrete walls and partitions up to 3 m high, up to 500 mm thick.

Bezel-less overlapping up to 200 mm thick. The device at a height of from the reference area to 6 m

Walls. Stucco improved cement-lime mortar for stone

Trusses-crane-girders with a span of more than 30 m. Installation upon delivery in bulk

Steel structures from one profile ГОСТ 23118-2012

Heavy concrete B7, 5 ГОСТ 7473-

Heavy concrete B15 ГОСТ 7473-

Heavy concrete B3, 5 ГОСТ 7473-

Mortar ready masonry heavy cement grade M25 ГОСТ 28013-98

Hot-rolled wire of normal accuracy in steel coils CB-08A diameters from 6.3 mm to 6.5 mm ГОСТ 10543-98

Steel double lay rope, type ТК, design 6x37 (1 + 6 + 12 + 18) +1 galvanized, from grade B wire, marking group 1770 N / mm2, diameter 5 mm ГОСТ 3241-91 (ГОСТ 3071-88)

The roof is protected from atmospheric precipitation, sunlight and cold protective ceiling covering. Therefore, the roof is waterproof, cold and must be heat-resistant and long-lasting.

Type of my building is in category C1

Cl: Areas with tables, etc. e.g. areas in schools, cafes, restaurants, dining halls, reading room, receptions. The columns of the frame are monolithic reinforced concrete with a section of 400x400 mm. All monolithic reinforced concrete structures are made of concrete of class B25

Table 1.2 - Imposed loads on floors, balconies and stairs in buildings.

Categories of loaded areas	qk kg / m 2	qk kg / m 2
Cl	2,0 to 3,0	3,0 to 4,0

Horizontal loads on partition walls and parapets

NOTE 1 for categories A, Band Cl, qk selected within the range 0, 2 to 1,

1.4 Anti-seismic measures

Anti-seismic activities are presented in accordance with the conditions SP RK 2.03-30-2017 "Construction in seismic areas.

"Meets the requirements of clause 7.3 of the norms of the joint venture of the Republic of Kazakhstan 2.03-30-2017. In accordance with the requirements of paragraph 7.3 and table. 7.1 SP RK 2.03-30-2017, length and the width of all building blocks does not exceed the limit values Allowed current regulations. In accordance with the requirements of paragraph 7.3 and table. 7.2 SP RK 2.03-30-2017, block height for the considered structural systems on sites with seismic impact is 6 point.

The brickwork of the outer and inner walls of all blocks corresponds to the requirements of paragraph 7.38.4 SP RK 2.03-30-2017. Also, the requirements of paragraph 7.108 are met regarding the arrangement of cores in brick walls. In accordance with the above all the building blocks, according to their design solutions meet the requirements of SP RK 2.03-30-2017 "Construction in seismic areas." The seismic resistance of the brick walls of the building is increased by reinforcing double-sided reinforcement from grids of bar reinforcement of class BPI with cells 150x150 mm in a cement-sand stretching grade M100 thick 50 mm hard consistency.

1.5 Thermal engineering calculation of fencing structures

Find out the suitability of the planned wall design for climatic conditions of Karaganda. Indoor wet mode - Normal humidity climatic zone of the construction.

Table 1.3 – Thermal engineering characteristics of outer wall layers

Name of material	Bulk density γ0 , kg / m 3	Weight density λ , kg / m 3	δ,M	S ,M * C/BT
Ceramic brick	0.380	1600	0.64	8.48
plaster	0.018	1800	0.76	9.6
Cement-sand stretching	0.02	1200	0.52	7.00
Drywall	0.01	1000	0.21	6.20

We set out from the table the required regulatory data for the calculation:

• Settlement temperature of internal air t_i = 18°C;

• Estimated outdoor temperature for the “small inertia”(temperature of a colder five-day period)

t_n = - 35 °C (security 0.92);

• Coefficient n = 1 for an external wall;

• Standard external differential Δt_n = 4 ° C;

• Coefficient of heat transfer the inner surface of α_i= 8.7 W / (m 2 · ° C);

• Coefficient of heat transfer of the outer surface α_e = 23 W / (m 2 · ° C) 2. Determine the resistance of the intended wall design heat transfer R0:1

$$R0 = \frac{1}{\alpha i} + \frac{\delta 1}{\Upsilon 1} + \frac{\delta 2}{\Upsilon 2} + \frac{\delta 3}{\Upsilon 3} + \frac{\delta 4}{\Upsilon 4} + \frac{\delta 5}{\Upsilon 5} + \frac{1}{\alpha e} \quad (1)$$

$$R0 = \frac{1}{8.7} + \frac{0.380}{0.64} + \frac{0.018}{0.76} + \frac{0.02}{0.52} + \frac{0.01}{0.21} + \frac{1}{23} = 0.86\ m^2°C/Bm$$

We determine the characteristic of thermal inertia of the wall D:

$$D = \frac{\delta 1}{\gamma 1}.S1 + \frac{\delta 2}{\gamma 2}.S2 + \frac{\delta 3}{\gamma 3}.S3 + \frac{\delta 4}{\gamma 4}.S4 \quad (2)$$

$$\frac{0.380}{0.64}.8.48 + \frac{0.018}{0.76}.9.6 + \frac{0.02}{0.52}.7.00 + \frac{0.01}{0.21}.6.20 = 5.826$$

At D = $\mathbf{5.826}$> 5 the fence is of "great inertia".

Determine the required wall resistance to heat transfer $_{R0}{}^{mp}$:

$$\mathbf{R_0^{mp}} = \frac{\mathbf{n(t_i - t_n)}}{\mathbf{\alpha_i . \Delta t_n}} \quad (3)$$

$$\mathbf{1(18— (-35)/8.7 * 4 = 1.52 m^2 °C/Bm}$$

Check the suitability of the intended wall design. Check condition:

$$\mathbf{R_0^{mp} = 1.52\ m^2 °C/Bm > R_{0=}0.86 m^2 °C/Bm}$$

The intended wall design is suitable for climatic conditions.

2 Design section

2.1 Collection of loads

Total nodal loads on the main circuit:
Loading 1 PX=0 PY=0 PZ=3250.18 PUX=2.3731e-014 PUY=-7.85413e-014 PUZ=0
Loading 2 PX=0 PY=0 PZ=3187.2 PUX=1.74409e-014 PUY=-1.13187e-013 PUZ=0
Loading 3 PX=0 PY=0 PZ=931.52 PUX=2.58127e-015 PUY=-1.34337e-014 PUZ=0
Loading 4 PX=0 PY=0 PZ=1912.32 PUX=1.2202e-014 PUY=-6.54893e-014 PUZ=0
Loading 5 PX=0 PY=0 PZ=2549.76 PUX=1.84956e-014 PUY=-8.6299e-014 PUZ=0
Loading 6 PX=0 PY=0 PZ=835.758 PUX=5.40019e-015 PUY=-2.65239e-014 PUZ=0

2.2 Calculation of the slab

For the calculation, a structural element was selected - a plate at +11.500 at the axis 1-2 / Е-Ж.

Initial data:

Plate of rectangular cross section with bottom reinforcement with dimensions b = 1000 мм,

h = 200мм;$c_1 = 20$ мм; has a normal class C25/30 ($f_{ck} = 25$ МПа, $\gamma_c = 1{,}5$, $f_{cd} = 14{,}2$ МПа, $\alpha_{cc} = 0{,}85$) . Class of armature S500 ($f_{yк} = 500$ МПа, $f_{yd} = 435$ МПа , $E_s = 20 * 10^4$ МПа, $\alpha_{cc} = 0{,}85$) . The bending moment acts on the plate M_{ed}= 73,9 кН*м.

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

Bending moment acting in section:

$$M_{eds} = M_{ed} - N_{ed} * z_{s1} = 73{,}9 \text{ кН*м.}$$

(N_{ed}=0),

$$d = h - c_1 = 200 - 20 = 180 \text{ мм.}$$

The required area of longitudinal reinforcement is determined according to:

$$k_d = \frac{d}{\sqrt{M_{ed}/b}} \quad (2)$$

$$k_d = 3{,}0$$

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

$$A_{s1} = k_{s1} * \frac{M_{eds}}{d} + \frac{N_{ed}}{\sigma_{s1d}} = 2,4 * 73,9/14 + 0/435 = 12,67 \text{ см}^2$$

Accept: 5Ø 18 (A_{s1}= 12, 72 см^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

$$\alpha_{eds} = \frac{M_{eds}}{f_{cd} * b * d^2} \quad (2.1)$$

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

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

$$0.075 \leq 0.372$$

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

5Ø 18 (A_{s2}= 12,72 см^2)

A-Calculation of checking the width of the opening of cracks normal to the longitudinal axis of the element [12]

Working section height

$$d = h - ccov - dsw - Ø18/2 = 200 - 20 - 18/2 = 171 \text{ мм.}$$

$$\rho = As1/bd = 1272/ 1000 \cdot 171 = 0,0074 \ (0,74\%).$$

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% ≤ ρ ≤1.0%, the shoulder of an internal force pair is determined:

$$z = 0,85d = 0,85 \cdot 171 = 145,35 \text{ мм.}$$

Stresses in tensile reinforcement are determined by the formula;

$$\sigma s = Med/As1 \cdot z \quad (2.2)$$

$$\sigma s = 389,4 \text{ Н/мм2}$$

According to the table 8.4 dmax = 20 мм at σs = 389,4 МПа и wk,lim = 0,4 мм.

Accepted diameter = 18 мм ≤ $Ømax$ = 20 мм, т.е. it is not necessary to check the crack opening width by calculation.

2.3 Calculation in Lira САПР

Calculating the building in the software package ЛИРА-САПР, , we get the data that are then used in the calculation of structures manually - the forces arising in the elements.

Initially, we set the design parameters in accordance with the architectural section. In the case of large deformations, the cross section can be increased or a different type of structural element can be selected.

The building scheme was built directly in the LIRA program. Loads are set in accordance with the regulations. The loads from the floor, partitions are also set; the snow load is set in accordance with the snow area of construction.

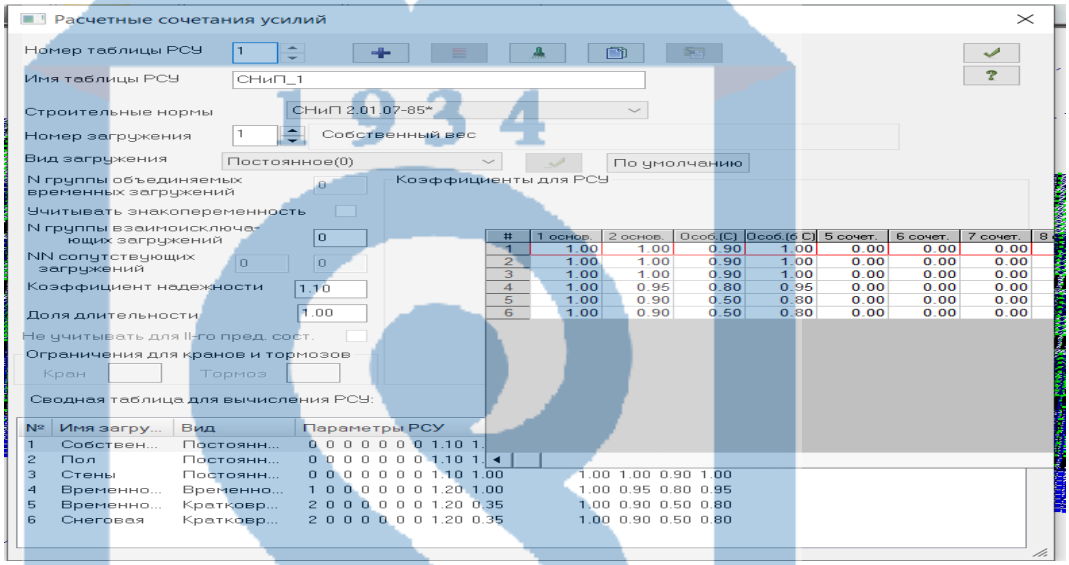


Figure 2.1 - Design combinations of efforts

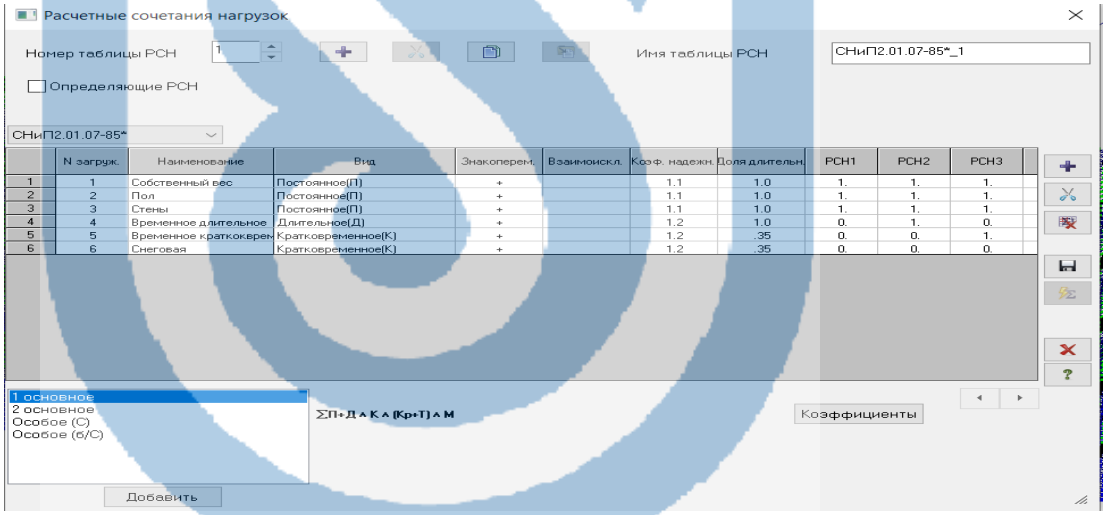


Figure 2.2 - Estimated combination of loads

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.

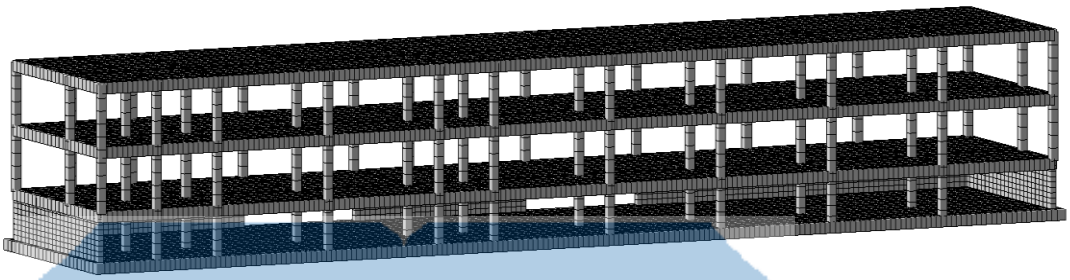


Figure 2.3 - The initial spatial model of the building

A complete calculation on the Lira САПР software is given in Appendix A.

3 Section of technology and organization of construction

3.1 General

The current project of works (PPR) is made for Construction School located at: Karaganda.

Work is recorded using funds mechanization, facilities leading tooling and construction technology production work.

PPR contains instructions:

- Regarding the scope of its application;
- Process characteristics;
- Methods of work;
- Conditions and quality control of work;
- The conditions for the materials used;
- The main and specific rules of labor protection.

General construction activities are carried out by special teams workers - specialists trained, certified and admitted to the implementation of these varieties of work under direct leadership engineering workers certified in a certain order and appointed by orders responsible work managers.

Initial materials and regulatory documents used in development of PPR.

The design of the work is done in accordance with the requirements of the following regulatory documents:

1. SN RK 1.03-00-2011 “Organization of construction of enterprises, buildings and facilities.
2. SN RK 5.03-07-2013 "Bearing and enclosing structures"
3. SN RK 5.01-01-2013 “Earthworks. Grounds and foundations. "
4. The data of the study of the object and the construction site by the developer PPR
5. SN RK 1.03-05-2011 “Labor safety in construction. Are common requirements.
6. Rules for the design and safe operation of hoisting cranes.
7. PPB 01-03 Fire safety regulations.
8. Typical technological maps.
9. Maps of labor processes.

Preparation period

1 Organizational event.

1.1 Provision of work:

- PPR in full, approved for work;
- Order on the appointment of a responsible producer of work;
- Orders on the appointment of responsible persons for:
- Maintenance in good condition of lifting devices and containers; - Responsible for the electrical sector;

- Occupational safety at the facility;
- The safety of cable routes and communications;
- Safe work and handling mechanisms;
- Fire safety at the facility and compliance with sanitary standards;

Copies of orders attached to the PPR, with paintings of performers, with familiarization with orders.

- A set of working drawings issued by the customer for production works;
- General journal of works;
- Journal of field supervision;
- Journal of concrete work;
- Journal of welding;
- The register of introductory briefing on labor protection;
- The logbook of instruction in the workplace;
- Journal of inspection of lifting devices and containers;
- Journal of incoming control of delivered materials;
- A collection of instructions on labor protection by profession and type of work;

1.3 Obtain the necessary permits to conduct construction and installation works.

1.4 Agree on the construction site.

1.5 Run and install the passport board of the object, posters, signs security etc.

2 Perform the following work of the preparatory period:

2.1 Define a temporary fence around the perimeter of the construction site, from profiled iron flooring on wooden racks, corresponding to the requirements of GOST 12.4.059-89 SSBT "Safety fencing, inventory ".

2.2 Place and equip temporary premises and facilities for builders: construction headquarters, changing rooms for workers, workshops and warehouses (containers), premises for meals, containers for collecting household garbage, etc.

2.3 Clean the construction site of construction debris, to carry out the planning;

2.4 Arrange temporary dirt roads and pavements from inventory road plates;

2.5 Provide the construction site with engineering communications:

- Water;
- Sewerage;
- Gutter;
- Heat supply;
- Telephone installation.

2.6 Mount the electrical installation.

2.7 Install washers for car wheels, such as Moydodyr, on main exits from the construction site;

2.8 To carry out the site in order to store structures and materials with a coating that excludes soaking of products;

2.9 Break down the axes of the designed building and transfer elevation;

2.10 Install signs security road movements warning and prohibition posters;

2.11 Install hazardous area signal enclosures;

2.12 Mount the exterior lighting of the construction site;

2.13 Accept the work of the zero cycle of the building;

2.14 Adopt fire safety and protection measures the environment.

According to SN RK 1.03-00-2011, the composition of the PPR for the implementation of certain types of work includes:

- PPR technological maps for the construction of monolithic reinforced concrete structures, for the installation of metal structures and schemes operator quality control, information about the need for basic materials, semi-finished products, structures and products, as well as used machines, devices and equipment;
- A schedule of work;
- Construction master plan of the facility;
- Explanatory note with basic calculations, explanations and technical economic indicators.

In this section, it is required to make a technological map for earthen work, the calculation of the construction master plan and draw up a schedule works during the whole construction period with a traffic schedule workers.

The structure of the technological map includes:

Calculation of the volume of work, calculation costing of labor and machine time, selection of a set necessary machines and graphic part. The structure of the schedule includes: calculation of the volume of work, calculation costing labor and machine time, scheduling, technical and economic indicators and the graphic part. Stroygenplan includes: calculation of water demand, calculation of demand for electricity, calculation of temporary buildings and structures, calculation of warehouse sites, technical and economic indicators of the construction plan and graphic part.

3.2 Design of technological maps

The job identification card is based on a list of jobs is carried out when the work lists the technology of its execution showing a number of exceptions. Plumbing types of electrical work can be divided into stages.

Plumbing the first stage of work is the construction and decoration of pipelines and the creation of the second sanitary ware are carried out after the styling work.

JAC reflecting the technological chain of work carried out in this form since each stage is written there as a separate sentence and in the HAC the written works are recorded in the form of joining teams.

The main essence of the development of the HAC is the work presented in Chapter 1 find a technological relationship between (made before works) completed after completion of Chapter 1

It is checked whether everything is completed or not: but Chapter 1 is still done

unfinished work should not be included. Scale system when structuring a calendar-network schedule creating a template and calculating is mandatory. Dimensional pattern linear net worked, without time and work routes, only Jacques through the technological list of the specified work. (1.2 Chapter) Early or less end of the situation is determined on the basis of calculations. This graph is displayed under the template at the same time scale. The number of employees at the facility is employed at a specified time is deducted from the average number of crews. The last of the drawings at first, it was assumed that all the work will be done early made with thin lines. Then the brigade version continuity of work and use of work at the same level will be checked. Equality factor, the ratio of the maximum number of employees to their average number is 1.5 should not exceed twice. And the average number of employees is the area of the plot in relation to the total duration of the work. If in case of non-fulfillment of conditions of continuous and one-level use of employees, then adjust to perform non-urgent work over time can be entered. (Time to perform the work in a linear scheme is thin indicated by a dash). It is always necessary to use a time reserve failure to draw conclusions. Creating this graph is on the same scale as above, but linear will be in the form. The operation of each machine is indicated by a slice. The line the name and type of the machine are written on it. And the use of construction machinery the drawing must be on paper after the drawing of the use of workers located.

Earthworks will be carried out on all buildings and structures and a significant part of the cost and labor intensity of the building. The bucket of the main building is 0.8 m 3 was dig with an excavator. Moisturize the foundation under the foundation and make it heavy trampled by a roller. The pot is a pot with a slope at one end of the pot The socket is installed by the sump. After building the foundation and basement walls, there are 130 horsepower fills and compacts the pit with a bulldozer. Construction of a skeleton structure KB-100 tower crane, hinge mach length 25 m, load capacity 2.75-22 t and loop length 12.5 m, is carried out with the help of. Uses a universal mold for monolithic casting. Required concrete the solution is delivered to the construction site by a centralized dump truck. Compaction of concrete mortar is carried out with vibrators IV-2, IV-26. Taking into account the geology of the soil, the engineering layer below are given.

1st layer - spilled 0.2 m thick soil.

2nd layer - compacted 0.8-1.2 m thick sand.

The base soil is average for concrete and reinforced concrete structures aggressive. Groundwater is located at a depth of 4 m. freezing of sandy soils depth 0.96 m.

A mixture of fine sand (70%) and pure yellow is sprinkled under the foundation soil (30%) preparation project is created:

Preliminary work before the start of construction work is created.

- Preparation of soil collection site for re-burial;
- Postponement of communication works.

Table 3.1 - Specification of precast concrete

Reinforced concrete constant mark	Dimensions, mm			Weight of one element, Tons	By mark, quantity	Gross weight, Tons
	L	b	h			
2	3	4	5	6	7	8
FL	1180	1000	300	1	237	237
FBS	1180	600	500	0,7	1659	1161,3
PP-1	8860	990	220	2,5	111	277,5

Information required for design

The building is a 2-storey and underground school for children

The level of the foundation is 3,540 m

The level of the bottom of the pit is 3,640 m

The depth of the pit is 3,640 m

Soil type - stone mixed sand

Soil group – II

The distance of soil transportation is 3 km

Perimeter of the building: a = 52 m; b = 60m

The number of elements along the length of the building of the tape foundation

Define:

$$n_1 = \frac{a}{L_{fl}}.3 = \frac{52}{1{,}18}.3 = 132\ seed$$

Determine the number of elements on the width of the building of the strip foundation:

$$n_2 = \frac{b+b}{L_{fl}}.2 = \frac{60+60}{1{,}18}.2 = 203\ seed$$

Determine the total number of tape foundations.

$$n_{fl} = n_1 + n_2 = 132 + 203 = 335 \text{ seed}$$

Foundation wall blocks along the length and width of the building determine the number of elements:

$$n_1 = n_{fl} = 335 \text{ seed}$$

The number of rows in the height of the foundation wall blocks defines:

$$n_2 = \frac{H_k}{h_{fbc}} = \frac{3{,}34}{0{,}5} = 7 \text{ seed}$$

Determine the total number of foundation wall blocks:

$$h_{fbc} = n_1.n_2 = 335.7 = 2345 \text{ seed}$$

Determine the number of elements of the roof slab:

$$n_{nn} = a.b_{nn}.2 = 52.0{,}99.2 = 102 \text{ seed}$$

3.3 Calculation of the volume of earthworks

Determine the size of the boiler pit:

$$v_k = \frac{H}{b}\big((A + C)(B + D) + (AB) + (CD)\big) \quad (3)$$

$$A = b + b + 2M \quad C = A + 2Hm \quad (3.1)$$

$$B = a + 2M \quad D = B + 2Hm \quad (3.2)$$

Where H is the depth of the pit;
m - Slope coefficient, sand - 1;
A - The width of the bottom of the pot;
B - The length of the bottom of the pot;
C - Width of the roof of the boiler;
D - The length of the roof of the pit.

Determine the amount of soil that will level the bottom of the pit:

$$v_{meg.mon} = f_k . \Delta_n \quad (3.3)$$

$$f_k = A . B \quad (3.4)$$

$$\Delta_n = 0{,}15 \div 0{,}2M$$

Determining the amount of soil for re-burial.

$$v_{kk} = \frac{v_k - v_{basement}}{1 + k_f} \quad (3.5)$$

$$v_{op} = 2 \div 5 \quad \text{(for sand)}$$

$$v_{basement} = a . 2b_n \quad (3.6)$$

Determining the amount of soil compaction.

$$v_{nyg} = \frac{v_{kk}}{0{,}2} \ (M^3) \quad (3.7)$$

Determine the amount of soil to be dumped.

$$v_{yu} = v_{kk} \quad (3.8)$$

Determine the amount of soil to be transferred to dump trucks.

$$v_{ab,c} = v_k - v_{kk} \quad (3.9)$$

Determine the size of the leveling layer.

$$v_{meg.k} = h_0 . b_0 . p_{ed} \quad (3.10)$$

Where h0 - smoothing thickness.

$h_0 = 0{,}1M$

$$B_0 = B_{fl} + 2.0{,}2 \quad (3.11)$$

Where p_{ed} -the sum of the four walls.

$$v_k = \frac{3.85}{6}\left((122 + 128,88)(54 + 60,68) + (122.54) + (128,88.60,68)\right)$$

$$= 24408.43\ M^3$$

$$A = 82 + 82 + 2 = 122M,$$

Table 3.2 - Workload statement

Names of works	The unit of measurement is ENiR	Quantity, volume
2	3	4
Cutting the vegetative layer Soil dump with an excavator translation	$\frac{a.2.b}{1000}$	6,24 M^2
October pit at the bottom soil	$\frac{v_{yu}}{100}$	28,026 M^3
bulldozer leveling Soil	$\frac{v_{meg}}{100}$	13,17 M^3
with an excavator auto transfer to a dump truck	$\frac{v_{ab,c}}{100}$	216,05 M^3
Smoothing multi-storey to build		
Tape foundation assembly of plates work	$\frac{v_{meg.k}}{100}$	31,36 M^3
Basement wall foundation blocks	f_l = general	237 Seed

assembly work Coated plates assembly work Soil bulldozer again burial Soil with a roller compaction The foundation waterproofing	f_{bc} = general pp = general $\frac{V_{kk}}{100}$ $\frac{V_{nyg}}{1000}$	1161,7 seed 277,5 seed 28,02 M^3 13.34 M^3 961 M^2

$$B=a+2=52+2=54M$$

$$C=122+2*3,\ 44*1=128,\ 88M$$

$$D=54+2*3,\ 44*1=60,\ 68M$$

$$v_{meg.mon}=f_k.\Delta_n=6588.0{,}2=1317{,}6\ M^3$$

$$f_k=6588\ M^2$$

$$v_{basement}=52*2*60*3{,}44=21465{,}6\ M^3$$

$$v_{kk}=\frac{24408.43\ -21465{,}6}{1+0.05}=2802{,}6\ M^3$$

$$v_{nyg}=\frac{2802{,}6}{0{,}2}=13346.16\ M^3$$

$$v_{yu}=v_{kk}\ v_{yu}=2802{,}6\ M^3$$

$$v_{ab,c}=v_k-v_{kk}=24408.43-2802{,}6=21605{,}83\ M^3$$

$$V_{meg.k}=h_0.b_0.p_{ed}=0.1*1{,}4*224=31{,}36\ M^2$$

$$B_0=1+2*0{,}2=1{,}4M$$

$$p_{ed}=2*52+2*60=224M$$

One for digging a pothole as the main construction machine we use a backhoe shovel.

The capacity of the excavator blade on the size of the pit find out.

$$V_k=24408.43\ M^3\rightarrow V_{0Zh}=1,\ 5\ M^3$$

The excavator selected according to ENiR depends on the capacity of the excavator We choose 2 types of excavators.

1 with mechanical drive

2 with hydraulic drive (ENiR 2-1-11)

Mechanical drive

ÉO 7111 V scoop $v_{0жау}$ = 2,5m 3 machine changes $C_{маш\ ауыс}$ = 42.7

Hydraulic drive

CE-3 V torch $v_{0жау}$ = 3m 3 C mash shift $C_{маш\ ауыс}$ = 80.44

We compare the technical and economic aspects of the two brands. Determine the shift of the excavator.

$$\sum n_{маш\ ауыс}=\frac{(\frac{v_{yu}}{100}.N1+\frac{v_{ab,c}}{100}.N2)}{8,2} \quad (3.12)$$

Where N 1 is the amount of time for the excavator to transfer the soil to the mound N 2 - the amount of time to transfer the soil to the dump truck

(ENiR 2-111 depending on the soil group)

The excavator determines the performance of one shift.

$$p_{оН.ауыс} = \frac{v_k}{\sum n_{маш\ ауыс}} \quad (3.13)$$

Determine the cost of excavation of 1 m 3 of soil.

$$C = \frac{1,08.C_{маш\ ауыс}}{p_{оН.ауыс}} \quad (3.13)$$

Where coefficient is 1.08

$C_{маш\ ауыс}$ Cost of one machine shift.

Mechanical drive Hydraulic drive

N 1 = 1.37 N 1 = 1

N 2 = 1.14 N 2 = 0.836

Mechanical drive

$$\sum n_{маш\ ауыс} = \frac{\frac{2802,6}{100}.1,37 + \frac{21605,83}{100}.1,14}{8,2} = 34.71$$

$$p_{оН.ауыс} = \frac{24408.43}{34.71} = 703,21$$

$$C = \frac{1,08 * 42,7}{703,21} = 0,06$$

Hydraulic drive

$$\sum n_{маш\ ауыс} = \frac{\frac{2802,6}{100}.1 + \frac{21605,83}{100}.0.836}{8,2} = 25,44$$

$$p_{\text{он.ауыс}} = \frac{24408.43}{25,44} = 959.45$$

$$C = \frac{1,08 * 80,44}{959.45} = 0,09$$

The result is a low comparison of the two drives, accept the mechanical drive.

Table 3.3 - Technical characteristics of the excavator EO-7111

Indicator	The essence
2	3
Ojau capacity	2,5 м3
Depth of excavation	10 м
Lifting radius	10,8 м
Drain height	7 м
См см	42,7
Соп	56,07

Soil haul truck for digging pits selection of machines for excavated soil dump trucks remove. The distance of soil transportation is 3 km and the excavator the next lifting of the dump truck;

Depending on the capacity of the truck determine the brand.

3 * 2.5 = 10t

The following brand of dump truck by weight find out.

MAZ-503B

We calculate the required number of dump trucks.

Determine the amount of soil in the back of the excavator.

$$v_{mon} = \frac{v_{0жау.k_m}}{k_{kon}} = \frac{2,5 * 0,9}{0,15} = 14,5\ м^3$$

Where k_t is the filling coefficient's k_t = 0.8-1

k_{kon} - ENiR 2 is obtained, depending on the type of soil k_{kon} = 10-15. Determine the weight of the soil on the back of the excavator.

$$Q = v_{mon} . \gamma . \gamma = 1,6$$

Where γ is the soil density, derived from ENiR to the soil type it depends.

$$Q = 14,5 .1,6 = 23,2m$$

Determine the number of loads to be transferred to the dump trucks.

$$n = \frac{m_a}{Q} = \frac{10}{23,2} = 0,43\ \text{Seed}$$

Where $-m_a$ is the load capacity of dump trucks, m_a= 10t. Determine the amount of soil to be transferred to dump trucks.

$$v = v_{mon} . n = 14,5.0,43 = 6,15\ м^3$$

Where n is the number of nodes?

Time to transfer the soil to the dump trucks with an excavator find out.

$$t_n = \frac{v.H_{bp}.60}{100} = \frac{6,19.1,9.60}{100} = 7\text{min}$$

WhereH_{bp} is the time norm

Determine the braking time of dump trucks

$$T_n = t_n + \frac{60L}{v_r} + t_p + \frac{60L}{v_n} + t_m \quad (3.14)$$

$$7 + \frac{60.3}{15} + 2 + \frac{60.3}{30} + 3 = 30\text{min}$$

Where L is the distance of soil transportation, L = 1.3 km;

v_r −Speed of dump trucks under load,

$v_r = 15 \div 19$;

t_p - Unloading time $t_p = 1 \div 2$min

v_n - Idle speed of dump trucks,

$v_n = 25 \div 30$ Km/hour

t_m - Time of additional operations, $t_m = 2 \div 3$min

Determine the required number of dump trucks.

$$N = \frac{t_C}{t_n} = \frac{30}{7} = 4 \text{ Sseed}$$

3.4 Design of the master plan of object construction

Including basic assembly and lifting mechanisms, construction temporary buildings and structures built and used during the period, general plan of the construction site, indicating the location of equipment construction master plan. It determines the composition of construction facilities and used to accommodate them. Construction in the master plan the most effective use of opportunities and labor protection requirements Ways to ensure this are also carefully considered. It is technical a very important part of the documents and the organization of the site is the main document regulating the volume of temporary construction. The general plan of construction is of two types: general area and object is divided. The first design organization was built at the level of working project organizational documents of the project, and the second working documents of the construction organization as part of a production project.

General plan of object construction General plan of general area construction all buildings and structures under construction included in the plan is made separately. Basic construction of facilities for complex buildings plan for different stages (training, basic, etc.) and types of work (land works, construction of underground buildings or

underground part of the building, roofing works, etc.).

Table 3.4 - Table of results

Name	Measure. unit	Volume	Color per 1m2 of the area. number of materials	Storage method	Warehouse appears , coefficient.	Warehouse area
1	2	3	4	5	6	7
Gravel, pebbles	M^3	12	2	open	2	12
Foundation blocks	M^3	217	2,5	open	2	144
Round and sawn wood	M^3	16,2	2	open	2	16
Dry clay	M^3	8,3	1,6	open	1	10.4
Conclusion:						212
Roofing material	roll	100	22	closed	1,75	88
Window and door blocks	M^2	132	2,5	closed	1,75	9
Window glass	M^2	120	200	closed	1,75	1
Mineral cotton	M^3	7,5	2	closed	1,75	7
Conclusion:						25

The initial used to create a master plan of construction documents:

- Head of construction as part of the construction organization project plan decision;

- Complex grid schedule or periodic plan of work production;

- Technological maps, building and building worker drawing. The master plan of the object construction or its contractor design - technological on behalf of the association or agency organization does.

General construction of the facility as part of the working production project the graphic part of the plan is usually 1: 500, 1: 200, 1: 100 and 1:50 and it is mainly performed in the construction organization project construction, master plan elements.

Construction master plan in the construction organization project clarifies, defines the decisions made in principle and in the project the details necessary for the concrete implementation of the decisions are analyzed in detail contains the most comprehensive information. In the construction master plan directly related to the construction of a specific building or structure and construction site covering the territory adjacent to the object well-thought-out organizational decisions. The general plan of construction includes the boundaries of the construction site types of fences, existing and temporary underground, ground and air systems and communications, permanent and temporary traffic schemes of roads, vehicles and mechanisms, construction and installation sites for trucks and their roads and areas of use, under construction and passages of temporary buildings and structures, with energy location of sources and devices that provide grounding contours, warehouses and areas for stacking materials and structures, location of houses providing sanitary and household services to workers, drinking water facilities, recreation areas, high-risk areas, ways of development of the established construction site. Placement of temporary construction facilities because you have to start with the assembly and lifting mechanisms Execution of all other decisions of the construction master plan - the maximum first of all, it depends on how they are placed. Placement of cranes and hoists on the site tying, braking on construction sites and hazardous areas identification of issues related to each specific work process condition, technical safety requirements, work production should be designed taking into account the map. Pre-assembly work before starting assembly work warehousing of construction materials and parts. The main and auxiliary platforms are fenced, warehouses transitions must be made.

Table 3.5 - List of temporary buildings

Nomenclature	Measure. unit	Normative indicator	The required minimum area	Accepted area
2	3	4	5	6
Sport hall	M^2	12×6	72	
Director cabinet	M^2	5×3,9	19,5	
Active room	M^2	30× 10	300	
Massage room	M^2	12× 7	84	
Clinic room	M^2	4,667 × 3	14	
Tambour	M^2	6×4	24	
Dining room	M^2	22,8× 10	288	

Continue of table 3.5

Dispensing room	M^2	9× 4	36	

Administration room	M^2	5× 3	15	
Transition	M^2		40	
Toilet	M^2	9× 3	27	

Construction The required area of warehouse structures according to the following formula determined by:

$$f_{ckl} = p\frac{k_0}{q} \quad (3.15)$$

Where P is the total mass of structures stored in the warehouse; (t; 1m 3);

q - The amount of material per 1 m 2 of useful area of the warehouse, t / m 2 (m 3 / m 2)

k_0 - Coefficient taking into accounts the size of the operative area, 1.75-2.0 tinge.

The following nomenclature can be accepted for calculation:

Organization of temporary water supply Design of temporary water supply should.

- Determination of water needs;
- determine the need for water by indicators;
- Determination of estimated water consumption for construction;
- Selection of water supply sources; - design of water supply systems and installation of systems;
- Calculation of the diameter of temporary water supply pipes.

Drinking and household needs - bathing, showering and water consumption.

The estimated water consumption is different for each user according to the formulas determined by:

Per second consumption for production and technological needs equal to:

$$Q_{nm} = \frac{A.P.K.K_1}{N.3600} \quad (3.16)$$

Where A is the specific water consumption;

p - Unit of transport and equipment requiring water;

k - Coefficient of hourly inequality of water use, 1.5 equal to;K_1- coefficient of water consumption not taken into account, equal to 1.2;

n is the number of hours of water use per day.

$$Q_{nm} = \frac{4920.1.1,5.1,2}{16,4.3600} = 0,15$$

per second consumption for drinking and household needs is equal to

$$Q_{xn} = \frac{N.q.K_1}{N.3600} + \frac{N_1.q_1}{M.60}$$

Where N is the maximum number of employees in the queue;

q - Water consumption per shift worker, l; k = 1.5-3;

N_1 - The number of employees using the shower (40%);

q_1 - The amount of water consumed by one worker to take a shower, l (30);

m is the number of working minutes in the shower room (45 minutes).

$$Q_{xn} = \frac{12 \times 40.3}{16,4.3600} + \frac{4.30}{45.60} = 0,07$$

Water consumption for firefighting, site measurements, fire depending on the level of durability, the size of the building. Up to 10 hectares Water consumption at construction sites is 10 l / sec, 20 ha - 15 l / sec, more than 20 ha - 25l / sec. makes up.

Then the total water consumption is:

$$Q_{расх} = Q_{пож} + 0.5(Q_{Xp} + Q_{pt}) = 10 + 0,5(0,07 + 0,15) = 10,11 \text{ L/ sec.}$$

The calculation of the diameter of temporary water supply pipes is as follows should be performed according to the maximum calculated flow rate of water with the formula:

Calculation of pipe diameter for temporary water supply is not necessary to produce the maximum calculated consumption of water according to the formula:

$$d = \sqrt{\frac{4\pi.v.1000}{Q_{расх}}} = \sqrt{\frac{4.3,14.1,5.1000}{10,11}} = 43MM$$

Where d is the diameter of the pipe, mm;

v is the velocity of water in the pipes, starting from 1.5-2 m / sec.

The calculation of the number of floodlights is determined by the following formula:

$$N = 2E_p.C.M.\frac{P}{g_L}.K \qquad (3.17)$$

Where E p - design lighting, lm;

C - Area to be equipped, m 2;

M - Distribution coefficient is equal to 1.15-1.5;

G l - luminous flux of the selected type of floodlight;

P - Stock ratio is 1.25-1.5;

K - Efficiency ratio 0.8-0.9.

$$N = 2E_p.C.M.\frac{P}{g_L}.K = \frac{2.60.70.1,15.1,25}{4400.0,9} = 3,2Seed$$

We accept the number of floodlights.

Table 3.6 - Calculation of SES, SGP

Indicators	Unit of measurement	The size of the indicator
Construction site area	unit	2,515
Construction area of the designed building	M^2	3120
Construction of temporary buildings in the area	M^2	422,3
Temporary lengths: -road -water supply - power line -channeling	 M M M M	 1591 141 72 70

Table 3.7 - Calculation of SES, SGP

Names of construction processes	ENiR	Unit of measurement	Scope of work	Mash on time	Machine time consumption		Establishment of a working unit on ENiR			The amount of time	Labor costs		Final cost		Salary	
				Quantities Mash /h white	mash / hour	mash / ауыс	to the car	degree	Number of		Person/hour	Person/hour	machiner	worker	Work	machines
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Bulldozer cutting of vegetation	2-1-5	1000 м2	6,24	1,8	16,92	2	machinist	6	1	-	-	-	-	191		17.9
Excavating the soil to the mound	2-1-11	100 м3	28,026	1,37	82,7	10	machinist	6	2	-	-	-	-	2,33		140

Continue of table 3.7

Bulldozing the soil at the bottom of the boiler pit	2-1-22	100 м3	13,17	0,62	12,3	1,5	Engineer Jer	6	2	-	-	-	-	0.65		12.8
Transfer of soil to the dump truck	2-1-11	100 м3	216,05	1,14	375	45,7	Mont-	6	2	-	-	-	-	2,33		766
Construction of a leveling layer	2-1-56	м3	31,36	-	-	-	Mont-	1	1	0,7	27,37	3,3	1,3	-	46,96	-
Assembly of strip foundation slabs	4-1-1	seed	237	0,21	49.77	6,1	Mon-Tajik	4,3	31	0,63	149	18	0,5	0,22		52
Assemble the foundation blocks of the basement	4-1-3	seed	1161,7	0,22	255	31	Mon-Tajik	2,3,2,6	31	0,66	766	93	0,3	0,32		267

Table 3.8 - Calculation of SES, SGP

Slab contraction joints should intersect at the openings for columns	4-1-7	seed	277,5	0,18	49,86	6	Mon-Tajik Machinist	4,3, 2,6	1,2, 1 1	0,72	199,4	24	0,5	0,19		52,6

Continue of table 3.8

Re-bury the soil with a bulldozer	2-1-34	100 м3	28,02	0,38	22,9	2,8	Machinist	6	1	-	-	-	-	0,33	-	10
Compact the soil with a roller	2-1-31	1000 м2	13,34	0,79	23,8	2,9	Machinist	6	1	-	-	-	-	1,17	-	35.3

4 Economic sections

Determining the cost of school construction in Karaganda today is a topical issue in the economy. It is still estimated in this direction calculation based on norms is widely used. General budget in this form of financing, the calculation is universal committed. And estimates for private construction use of the report are not required. But the budget standards and it's the cost of construction, calculated on the basis of production management, planning and has a special place in the organization. The basis for determining the estimated cost of construction is: - current legislation; - current budget standards; - design documentation. Estimated cost of construction - the amount based on design materials identified cash. Construction costs vary in current practice methods. Its cost in private construction determined on a contractual basis in accordance with market demand. And the budget construction facilities related to the financing of the estimated size determined on the basis of estimate documentation. The procedure for determining the estimated cost of construction in the Republic of Kazakhstan Regulated by the documentary rates 8.02-02-2002. In the diploma project aggregate estimates in determining the target estimated value was used.

Estimated cost - the sum of all cash costs necessary for the implementation of construction on project materials.

The estimated cost is the basis for the dimensional determination of capital investments, financing the construction process, creating contract prices for construction products, settlements for contract work (construction and others).

In the thesis reflects the following types of documentation estimates:

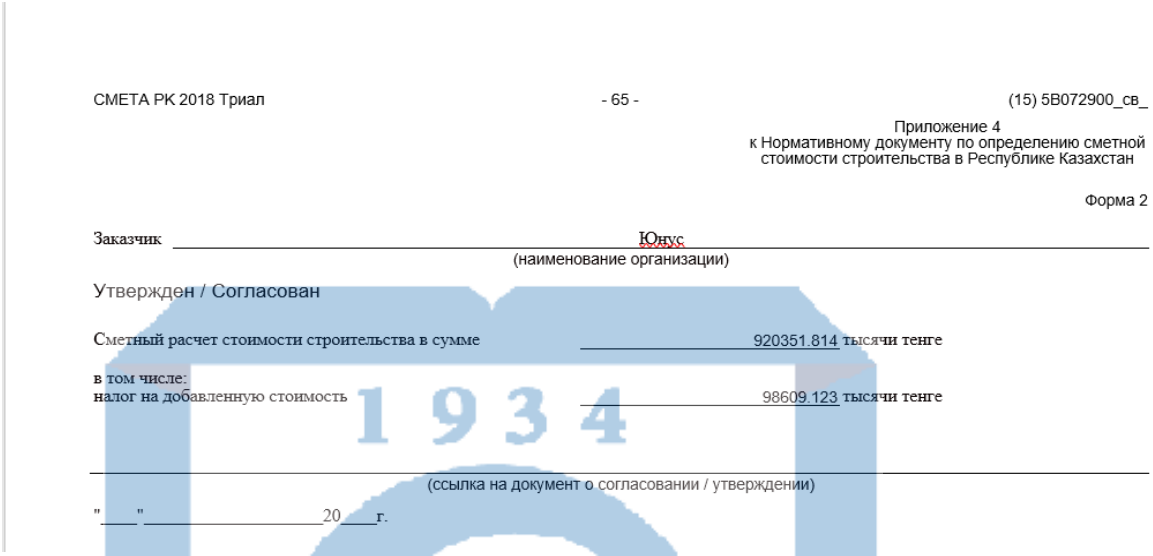
- Local estimate - the primary document in the estimate, which is compiled on the basis of the volumes and costs of the projected building. The local estimate of the diploma project is given in Appendix 3.

- A summary of the volume of construction and the cost of work, reflecting the cash costs for the sections of the estimated calculation. Given below.

- Resource estimates. It is given in Appendix 3.

- Bill of quantities

Estimation was made using the resource method of determining the value.



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Приложение 4
к Нормативному документу по определению сметной стоимости строительства в Республике Казахстан

Форма 2

Заказчик Юнус
(наименование организации)

Утвержден / Согласован

Сметный расчет стоимости строительства в сумме 920351.814 тысячи тенге

в том числе:
налог на добавленную стоимость 98609.123 тысячи тенге

(ссылка на документ о согласовании / утверждении)

"____" _____20___г.

Figure 4.1 - Summary of the volume and cost of work

Local and Resource estimates are given in Appendix B and c.

4.1 Department of labor protect

The Labor Code of the Republic of Kazakhstan is the 23rd in 2015 from November, in case of unsecured employment contract of the employee compensation for the damage caused by the employer or safety compensation. Perimeter of the construction site in accordance with SNiP RK 1.03-05-2001 and the location of all individual work areas appropriate. When assembling any structure or construction machinery specific safety documents have been developed for all workers after a personal presentation, access to special safety logs must be set. This magazine is signed by everyone involved in construction should be set. Familiarize workers with safety conditions is the task of the master. Construction in case of emergency the head of the facility will be held accountable. Therefore, construction work the following conditions must be met:

1) there should be no strangers on the construction site (in some cases) with the permission of the construction site manager).

2) All workers should be familiar with safety.

3) Workers should be provided with special work clothes and equipment (basic work clothes, helmet, goggles, respirator, gloves, storage belts etc.)

4) All work areas and upper on the construction site the boundaries of the floors should be fenced and the fence should look good.

5) Each job must be performed by a worker who specializes in that job.

6) Construction machines were moving around during operation Every worker must be careful.

7) All when slinging structures or materials on a crane it must be determined that the connections are properly established.

8) Putting the structure in the planned place, only it is better allowed only if stability is ensured.

9) Special when the cranes are working, if there is windy weather work measures should be taken.

10) In all major installation works, height works, especially insurance of one employee for another in hazardous work mandatory.

11) Each building material must be stored in its own warehouse. Especially Fire-hazardous materials are stored in a special place.

12) Access to firefighting equipment and facilities appropriate.

13) Construction evacuation routes must be open. Build and safely keep people metals to zero protect against electric shock in other cases. Build in a safe place pre-ground metal parts of the electrical appliance should be entered. Zeroing came from a grounded power source through a neutral conductor through an electrical device. Such providing safe electrical access to safe places metal parts of electrical appliances. Sanitary and household facilities: wardrobe, clothes drying area, bathroom, dining room and toilet. Temporary for this purpose the buildings (mobile) are provided, as they are other construction very necessary in the regions. For first aid at the place of rest, there is also a first aid kit. Mandatory housing with its own inland water supply, pipe, heat and fan. Walls, ceilings and the top floor must comply with the rules of industrial cleanliness necessary. Industrial sanitation and occupational hygiene Construction of an organization for compliance with sanitary and hygienic requirements in production the choice of the area in which to place buildings and structures, their dimensions, landscaping of the territory of the engineering organization and the enterprise begins with the definition. The solution of the specified purposes is the general project of the organization and pre - treated with sanitary doses during processing regulated. Sanitary and household rooms' wardrobe, workers' heating room, laundry room, bathroom room, toilet and kitchen. The project has a temporary inventory for these purpose buildings are provided. Because they are quite economical and other can be used during the construction of facilities. Temporary buildings in the project are included in the construction site and should be located close to crowded places. Such One of the temporary buildings is the first medical equipment and necessary medicines. There are medicines. The rooms comply with the requirements of building codes and regulations internal water supply, sewerage, heating and ventilation need to be equipped with tools.

4.2 Fire safety measures

When performing construction work, the conditions must be observed SN RK 2.02-01-2014 "Fire safety standards." All employees are required to be allowed to work

only after passing fire training in absolutely all production, administrative, warehouse in places in conspicuous places should be hung signs indicating fire department call phone numbers. The territory of the construction site must be cleaned of combustibles in a timely manner waste, garbage, containers, etc. Roads, driveways and walkways to buildings, structures, open warehouses and water sources, approaches to fire ladders, fire equipment must always be independent in good condition, and in winter cleared of snow and ice. Roads on the construction site must be suitable for driving fire trucks at any time of the year. Gate for entry must be at least 4 m wide. The construction site must have fire source indicators water supply and primary fire extinguishing means, fire posters safety and warning labels. Up to the foundation of the construction should be more accurately defined and mark the location of fire hydrants to ensure the required radius of their service up to 100.00 meters and the possibility of access to them fire engines, in addition to installing fire shields at the rate of one per 1000 sq. m. plot. Fire hydrants must be in work condition, and in winter should be insulated. Regular monitoring of the required content of the construction site, technical condition of fire extinguishing means, roads, lighting and communications, and in addition to a sufficient number of posters and signs. To provide fire safety at the construction site Inventory sanitary - household premises located closer than 15.00 meters from the projected residential building, separated by a fire wall from reinforced concrete elements with a height of at least 3.00 meters. In all sanitary household and storage facilities must contain primary funds fire extinguishing (fire extinguishers). Places for cooking bitumen must be provided with boxes of dry sand, capacity 0.5 m3, shovels and fire extinguishers. Bitumen not allowed during cooking leave boilers unattended.

4.3 Environmental protection

In the process of construction and installation works, implementation is taken into account a number of environmental protection measures. Existing green spaces falling into the construction zone, according to opportunities should be transplanted. Industrial and domestic wastewater, occurring at the construction site must be cleaned and decontaminated. Temporary travel routes for mounting mechanisms must installed according to damage prevention requirements tree-shrubby vegetation. The section "Environmental Protection" shows and analyzes constructive decisions and environmental measures laid down in it;

characteristics; - types of impacts and main sources of technologic impact; - character and intensity alleged impacts the designed facility on the air during construction and facility operation; - the amount of production waste, their degree of danger, conditions storage and disposal (disposal); - expected environmental changes due to exposure construction and operation of the designed facility. The most important environmental problems in the construction and operation of the designed facility is: -

air protection; - soil and soil protection; - protection of the subsoil. These design issues are addressed comprehensively and include The following key points: - removal and storage of garbage in designated areas; - reinforced anti-corrosion insulation; - anticorrosive protection of structures. Thus, we can conclude that, subject to all design decisions, as well as compliance with environmental measures; operation of the designed facility is possible without prejudice to the environment.

4.4 Life safety

Synoptic requirement and illumination at workplaces. During the construction of the school, construction work is carried out as in warm as well as in the cold season, for this reason for safety Vital functions are greatly affected by meteorological conditions. They are affected by temperature, humidity and speed air, barometric pressure and thermal radiation. A distinctive feature of construction production is that that builders have to work in both high and negative atmospheric phenomena (wind, rain, snow, etc.) and solar radiation. Protecting workers from hypothermia is achieved by providing their warm clothes and shoes, the establishment of a working regime with periodic breaks for heating workers in special rooms. A similar room was provided during the development of the construction plan in composition of temporary buildings. Thus, as numerous construction works are carried out in two shifts, then an important safety issue is the creation of required illumination of the site. For this, projection lighting of the site is designed. For localized lighting, additional light sources installed on buildings, machines, portable installations etc.

4.5 Possibility of electric shock to workers

Electricity is widely used at the construction site: - For the electric drive of machines and mechanisms; - For lighting; - For electric welding. Construction production is characterized by negative criteria, forming the danger of electric shock: construction the equipment is operated mainly in humid rooms and in open areas exposed to atmospheric precipitation. Probability of defeat appears during the operation of electrical installations in which current-carrying conductors and car bodies can be energized as a result insulation damage. To prevent probable results, you must increase electrical safety at the construction site, that is: Disconnect networks supplying construction machinery at the end of work; - Disconnect inactive from the mains inactive for certain periods of time electricity consumers; - Check all power sources before use and Troubleshoot in a timely manner.

CONCLUSION

The first chapter of the thesis shows architectural and construction the part according to the result of which we determined for ourselves the location Schools for special children in Q on the general plan, orientated with the main technological process, most clearly set tasks in the space-planning and structural solutions of the building. The second chapter shows the design part, as a result of which a static calculation of the building frame was made in the program of Lear 2013 and calculation of the main structures (monolithic floor slabs, columns), and In addition, the selection of reinforcement for these structures. The third chapter describes the technology and organization of construction, I agree with the results of which it was determined: the amount of material technical resources, the complexity of work and the cost of computer time, and in addition to In addition, the main production methods are shown. In the fourth chapter, the economic effect, estimated cost home construction, normative labor, estimated wages, unit cost indicator for the option with minimal labor. According to the results of local estimates, an object estimate was made and consolidated estimates of the cost of construction cost makes up 920351.814 thousand tinge.

New materials and technologies were used in the project. Feasibility study of the project and the decisions made confirms the rationality. The following results were achieved during the writing of the thesis: - Volumetric placement in the design of any building and the choice of architectural solutions is not only important, but also urban correct placement of the object in the middle of the construction site will be found. - The architectural solution of the building is, first of all, the lifting structures should be stabilized in the right choice. Modern construction is high allows you to use a series of positional systems, including monolithic skeleton leading position. - Ability to calculate structures using computer technology there is a software package. This is the process of calculation and design capacity; with the entire necessary load on the structural schedule of the building It is possible to register effects. Built of the main elements of the building The combination of different loads gives accurate results. - At the same time, the department of technology of construction production is all designed taking into account modern methods and production methods. Construction effective selection of machinery and equipment for the timing and labor process the ability to often reduce the complexity, to plan properly gives.

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Application A

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

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

X axis linear X
Y axis linear Y
Z axis linear Z
UX angular around the axis X
UY angular around the axis Y
UZ angular around the axis Z

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

СП 14.13330 2011. Construction in seismic areas. Updated Edition of SNiP II-7-81 *.
СП 16.13330 2011. Steel structures. Updated Edition of SNiP II-23-81 *.
СП 20.13330 2011. Loads and impacts. Updated edition of SNiP 2.01.07-85 *
СП 22.13330 2011. Foundations of buildings and structures. Updated Edition of SNiP 2.02.01-83 *.
СП 24.13330 2011. Pile foundations. Updated edition of SNiP 2.02.03-85.
СП 35.13330 2011. Bridges and pipes. Updated edition of SNiP 2.05.03-84.
СП 63.13330.2012. Concrete and reinforced concrete structures. The main provisions. Updated edition of SNiP 52-01-2003.
СНиП 2.01.07-85*. Loads and impacts.
СНиП 2.03.01-84*. Concrete and reinforced concrete structures.
СНиП II-7-81*. Construction in seismic areas.
СНиП II-23-81*. Steel structures.
СНиП 2.02.01-83*. Foundations of buildings and structures.
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СНТ 2.01.08-99*. Construction in seismic areas. Turkmenistan.

ПН 01.0.1-09. Construction in seismic areas. Georgia
AzDTN 2.3-1-2010. Construction in seismic areas. Azerbaijan.
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МКС ЧТ 22-07-2007. Earthquake-resistant construction. Tajikistan.

The types of finite elements used are indicated in document 1.
In this document, except for the node numbers related to
to the existing element, the types of stiffness's are also indicated.

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

Тип 10. Universal spatial core КЭ.

Тип 41. Universal rectangular CE shell.

Тип 44. Universal quadrangular КЭ 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:

Loading 1 - static load
Loading 2 - static load
Loading 3 - static load
Loading 4 - static load
Loading 5 - static load
loading 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,
Following download characteristics:

Loading 1 - static load

This load is considered as a constant load.

Loading 2 - static load

This load is considered as a constant load.

Loading 3 - static load

This load is considered as a constant load.

Loading 4 - static load

This load is counted as a long-term

load.

Loading 5 - static load

This load is counted as a long-term load.

Loading 6 - static load

This load is counted as a long-term load.

Ч Т Е Н И Е Р Е З У Л Ь Т А Т О В С Ч Е Т А

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 (ECF).

Section 5 prints the tabulations in tabular form
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 axis linear X
Y axis linear Y
Z axis linear Z
UX angular around the axis X
UY angular around the axis Y
UZ angular around the axis Z

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.

N section 8, the calculated
Force combination (ECF) in the elements for each section and
Additional information on combinations of efforts.

The following ECF groups are calculated:

Group A1 - includes only those downloads that have a duration
Actions; this group includes permanent, long-term and short-term downloads; types of downloads - 0, 1, 2.

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 downloads;
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 duration
Except seismic and other special.
Group D2 - includes group C2 plus seismic loading.

The calculated combinations form 4 result tables:
Table 1 - ECF calculated, calculated by the calculated values of efforts.
Table 2 - ECF estimated long-term obtained by multiplying the calculated Effort on appropriate duration factors.
Table 3 - regulatory DCS obtained by dividing the estimated effort by Appropriate load safety factors.
Table 4 - ECF regulatory long-term obtained by multiplication Regulatory efforts at appropriate duration factors.

The headings of the DCS tables contain the following indices:
ЭЛМ – element number in the circuit;
НС – number of the calculated cross-section in the element (all FEs except the core have one design section);
КРТ – number of criteria by which this combination of efforts is made, According to type КЭ;
СТ – column number of combination coefficients from the source data table ECF;
КС - a sign of the presence in the combinations of crane (K) and / or seismic (C)
loads;
Г 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:

ПЭ – sign of membership of the element;
ЭЛМ – serial number of an element in a circuit or in a super element;

НС – number of the calculated cross-section in the element (all FEs except the core have one design section);
КРТ – criterion number according to type КЭ;
СТ – column number of combination coefficients from the source data table ECF;
КС – sign of the presence in the combinations of crane (K) and / or seismic (C)
Loads;
Г – the index of the internal group is A1, B1, C1, D1, A2, B2, C2, D2.

Continuation of application A

И Н Д Е К С А Ц И Я И П Р А В И Л А З Н А К О В

У С И Л И Й В К О Н Е Ч Н Ы Х Э Л Е М Е Н Т А Х

Type 10. Universal spatial core КЭ.

The finite element perceives the following types of efforts:
N axial force; positive sign
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
Counterclockwise when viewed from
Tsar 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 41. Universal rectangular 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
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 Z1).
MY moment in force
on a section orthogonal to the axis Y1; positive sign
Corresponds to the stretching of the lower fiber (relative
Axis Z1).
MXY torque;
A positive sign corresponds to the curvature of the diagonal -
Whether 1-4 directed downward bulge (relatively

```
     Axis Z1).
    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;
        positive sign matches direction
        Forces with the direction of the Z1 axis on that part of the 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
             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 the moment acting on the cross section orthogonal to the axis X1;
         A positive sign corresponds to stretching
         Lower fiber (relative to the Z1 axis).
    MY the moment acting on the section orthogonal to the 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
           Axis Z1)        QX shear force in a section orthogonal to 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 shear 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.
```

Calculation Protocol

Дата: 23.04.2020

GenuineIntel Intel(R) Core(TM) i5-8250U CPU @ 1.60GHz 8 threads

Microsoft Windows 10 RUS 64-bit. Build 17763

Available Physical Memory Size = 2605485568

22:27 Reading raw data from a file C:\Users\Public\Documents\LIRA SAPR\LIRA SAPR 2016 NonCommercial\Data\Mohammad Younis calculation·.txt

22:27 Control of the source data of the main circuit

Continuation of application A

Number of nodes = 24476 (of which the number of undeleted = 24476)
Amount of elements = 26927 (of which the number of undeleted = 26927)
MAIN DIAGRAM
22:27 Optimize unknown order
Number of unknowns = 111836
STATIC LOADING CALCULATION
22:27 Stiffness matrix formation
22:27 Load Vector Formation
22:27 Stiffness matrix decomposition
22:27 Calculation of Unknown
22:27 Decision control
Results Formation
22:27 Topology Formation
22:27 Movement formation
22:27 Calculation and formation of efforts in elements
22:27 Calculation and formation of efforts in elements
22:27 Calculation and formation of plots of deflections in the rods
22:27 Calculation and formation of plots of deflections in the rods
Total nodal loads on the main circuit:
Loading 1 PX=0 PY=0 PZ=3250.18 PUX=2.3731e-014 PUY=-7.85413e-014 PUZ=0
Loading 2 PX=0 PY=0 PZ=3187.2 PUX=1.74409e-014 PUY=-1.13187e-013 PUZ=0
Loading 3 PX=0 PY=0 PZ=931.52 PUX=2.58127e-015 PUY=-1.34337e-014 PUZ=0
Loading 4 PX=0 PY=0 PZ=1912.32 PUX=1.2202e-014 PUY=-6.54893e-014 PUZ=0
Loading 5 PX=0 PY=0 PZ=2549.76 PUX=1.84956e-014 PUY=-8.6299e-014 PUZ=0
Loading 6 PX=0 PY=0 PZ=835.758 PUX=5.40019e-015 PUY=-2.65239e-014 PUZ=0
Calculation completed successfully
Time spent = 0 min

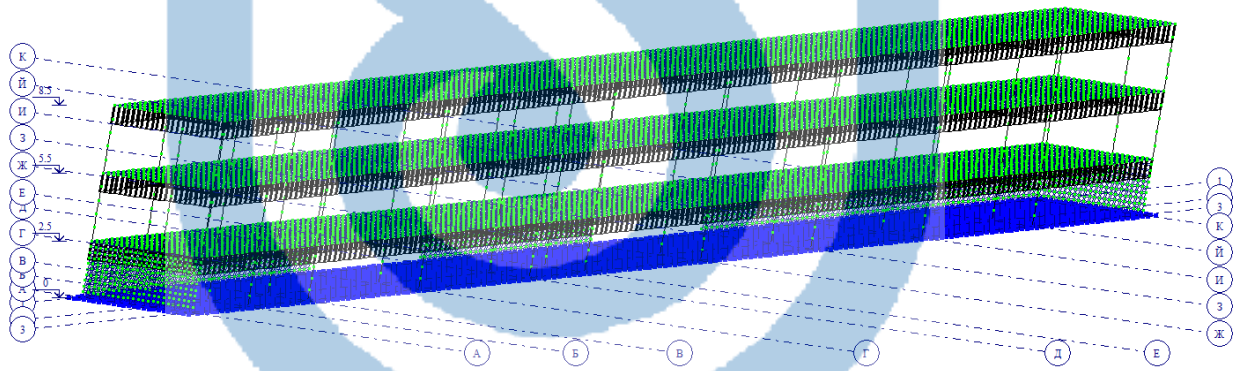

Figure A.1 - Design scheme

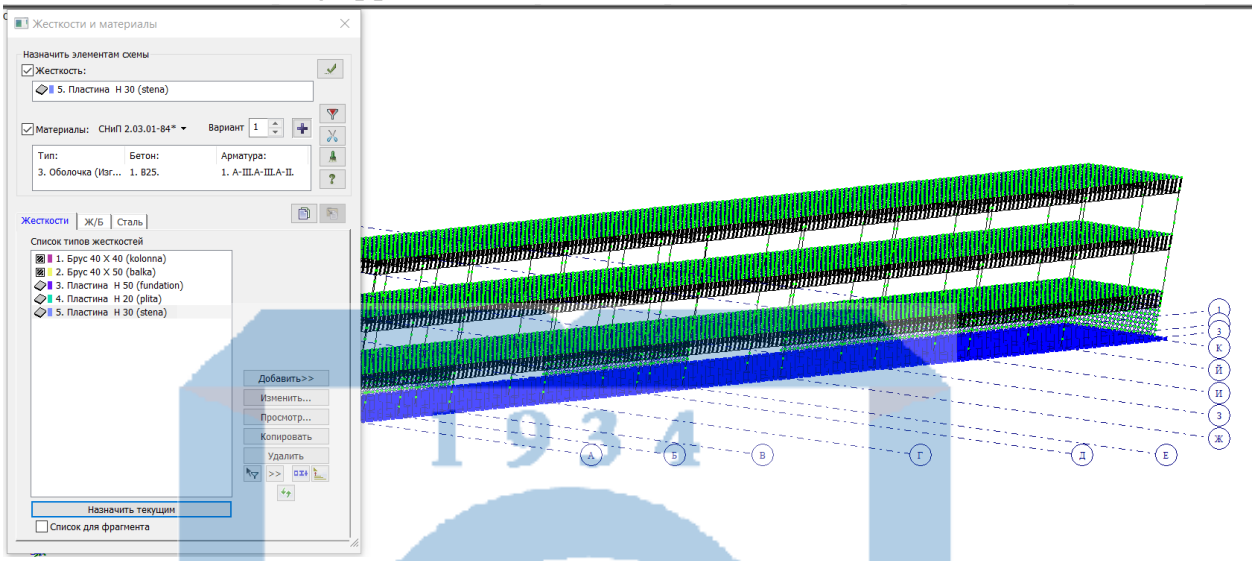

Figure A.2 - Stiffnesses

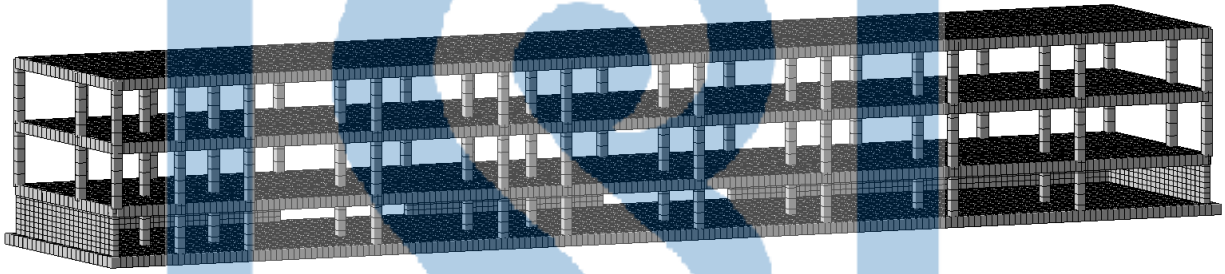

Figure A.3 - Spatial model

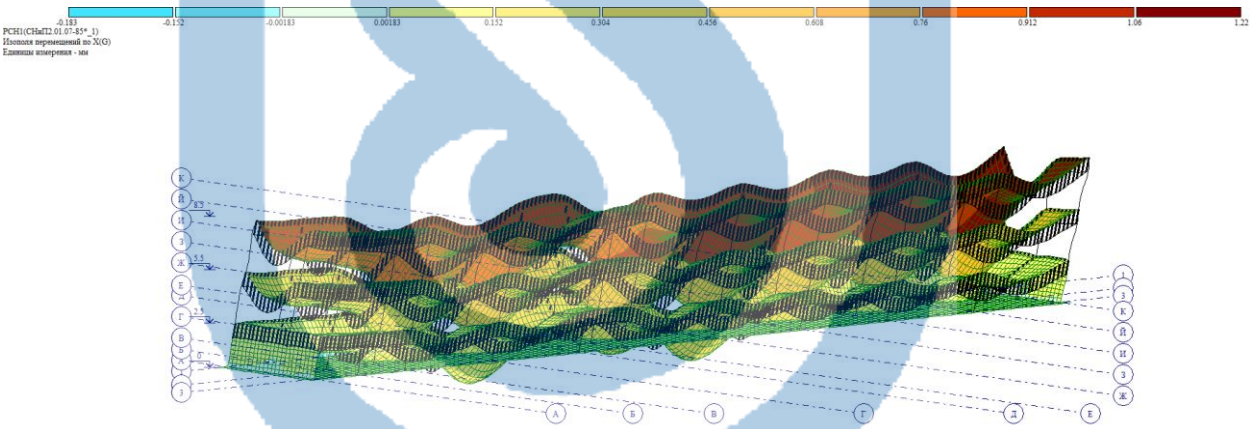

Figure A.4 - Mosaic of displacement from RSN along the X axis

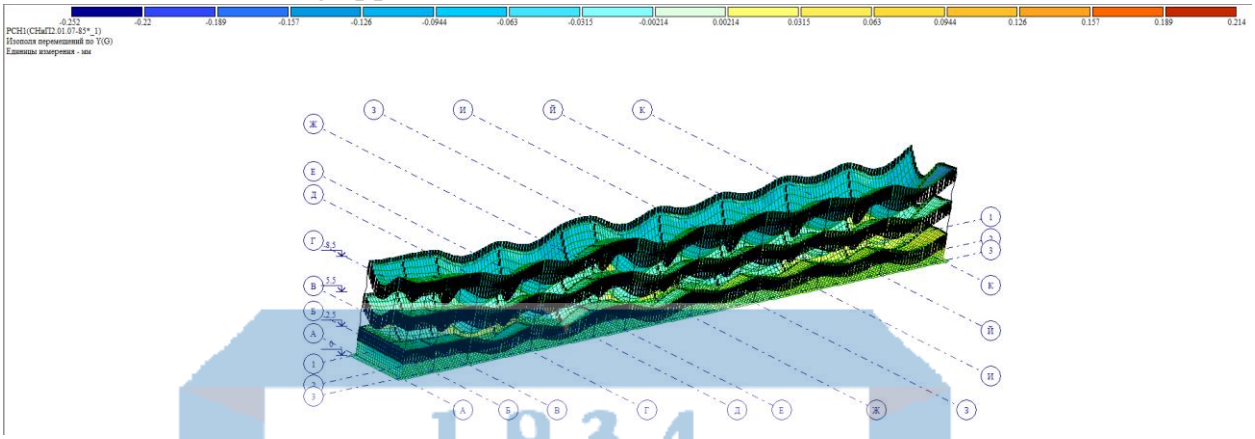

Figure A.5 - Mosaic of displacement from RSN along the Y axis

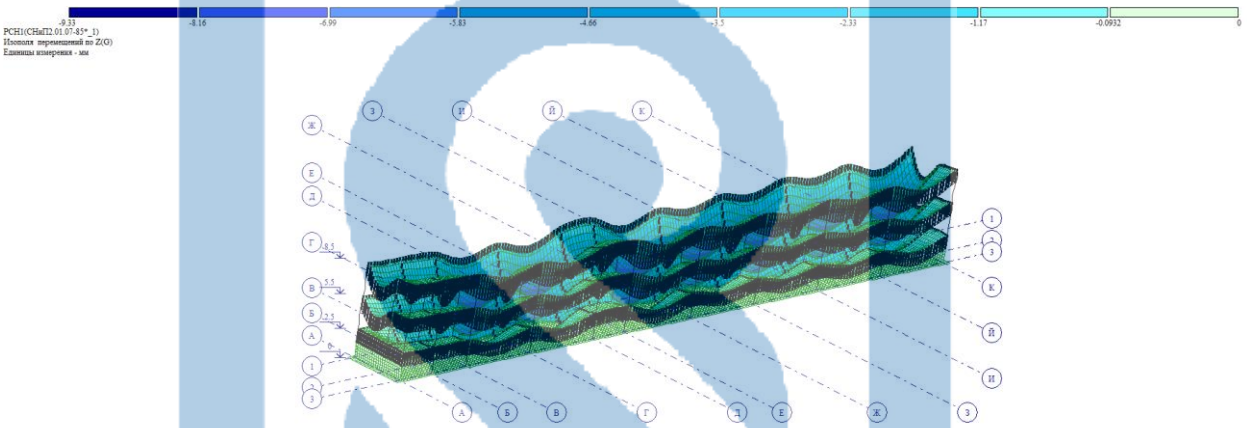

Figure A.6 - Mosaic of displacement from RSN along the Z axis

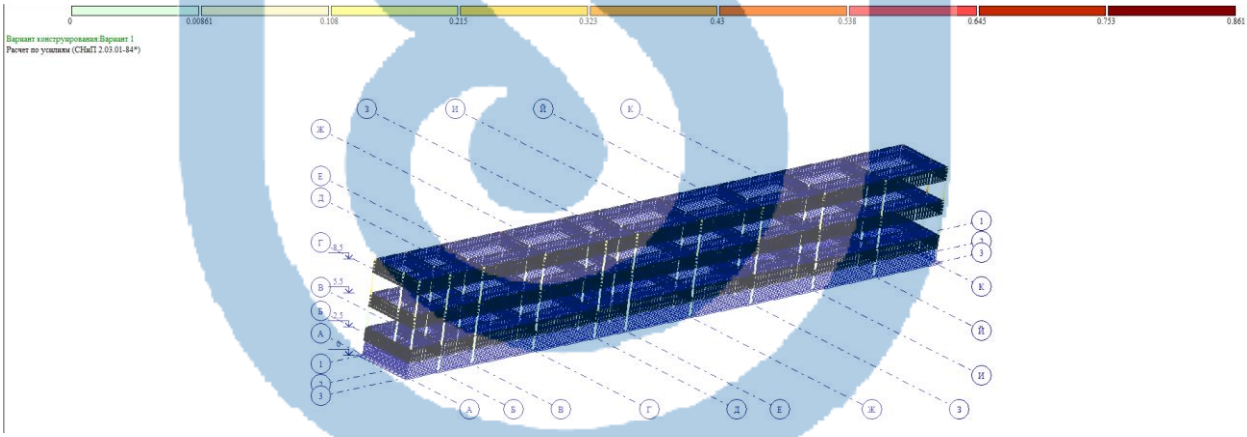

Figure A.7 - Design. Percentage of reinforcing columns

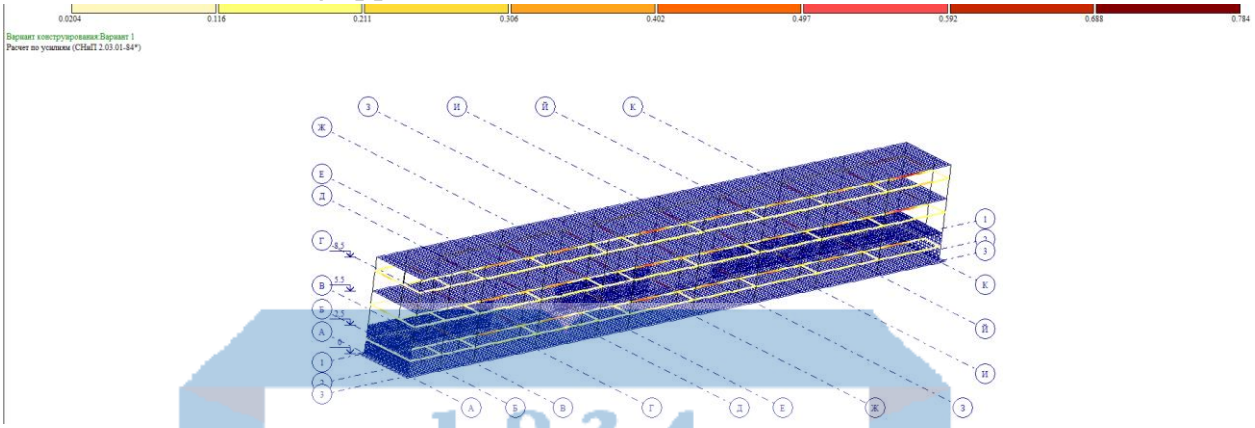

Figure A.8 - Design. Percentage reinforcement of crossbars

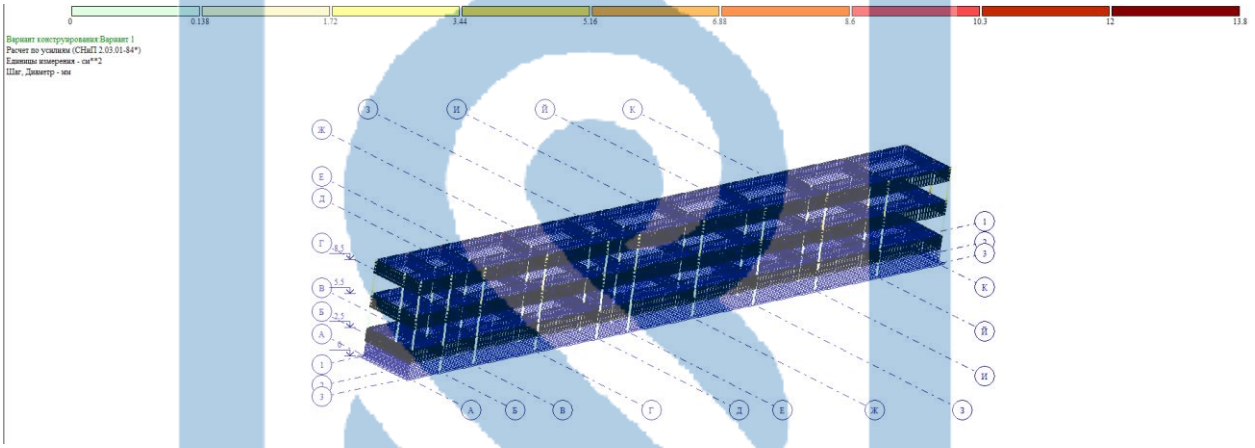

Figure A.9 - Design. Column

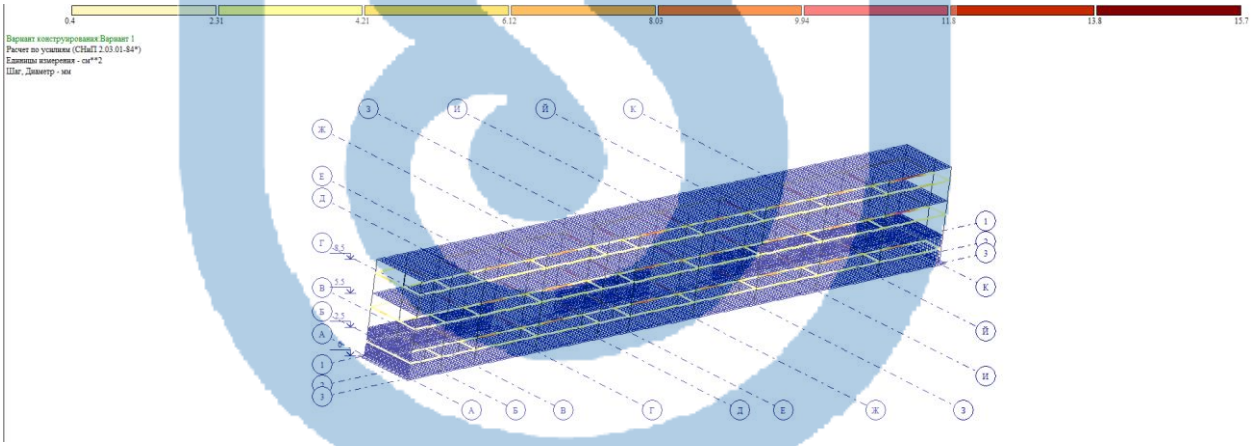

Figure A.10 - Design. Crossbar

Appendix B

application 2
to the normative document for the determination of the estimated cost of construction in the Republic of Kazakhstan

The form 4

Construction Name School

Object name School

Local budget number 02-001-001
(Local cost estimate)

the Underground work
(name of work and costs)

Base:

Estimated cost 202389.123 thousand tenge
Estimated salary 23345.233 thousand tenge
Normative labor input 17.67671 thousand tenge

Compiled at current prices as of 2019.

№ п/п	Code of norms resource code	Name work and costs	Unit measuring	amount	Unit cost, tenge		Total cost, tenge			Overhead, tenge	Total cost with HP and СП, tenge	Labor costs of construction workers, total
					Total	exploitation of cars	Total	machine operation	materials			
					the salary working builders	including the salary drivers	the salary working builders	including the salary drivers	equipment, furniture, inventory	Estimated profit, tenge		Labor costs of drivers, total
1	2	3	4	5	6	7	8	9	10	11	12	13
		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 the cramped conditions of the built-up part of cities										
		Section No. 1 Earthwork										
1	1110-0113-0101	Fences are deaf. Pole Mounting Device	m2 fence	1160.0	5766.63	324.51	6689295	376434	3283080	2865248	10318906	2267.80
					2611.88	132.61	3029781	153828	-	764363		75.37

1	2	3	4	5	6	7	8	9	10	11	12	13
2	1101-0207-1302	Shrubs and light forests are medium. Cutting in soil of natural occurrence with brush cutters on a tractor 79 кВт (108 л с)	га	10.45	12228.11	12228.11	127784	127784	-	29452	169815	-
					-	3914.47	-	40906	-	12579		22.71
3	1101-0102-0302	Soils of 2 groups. Development with loading on dump trucks by excavators with a bucket with a capacity of 1 m3	м3 грунта	11441.0	190.50	179.99	2179507	2059291	1198	493607	2886963	90.78
					10.40	49.52	119018	566547	-	213849		460.50
4	1101-0101-0302	Soils of 2 groups. Development into a dump with excavators " Dragline ", " Backhoe " with a bucket with a capacity of 1 (1 - 1.2) m3	м3 грунта	3798.0	134.77	127.68	511853	484917	-	105381	666613	25.51
					7.09	31.44	26936	119426	-	49379		110.94
5	1101-0205-0802	Soils of 2 groups. Manual development in pits with moving mobile conveyors	м3 грунта	781.5	1615.41	149.59	1262440	116907	-	861638	2294004	907.71
					1465.81	65.50	1145533	51187	-	169926		48.41
6	1137-0103-0104	Sand preparation for structures. Device	m3 of concrete, gravel or sand in the structure	413.3	3840.48	372.92	1587269	154128	844483	599284	2361477	432.52
					1424.29	169.12	588658	69896	-	174924		39.64
7	1101-0104-0405	Trenches and pits. Filling with bulldozers with a capacity 279 кВт (108 л с)when moving soil up to 5 m. Group of soils	m3 of soil	3798.0	22.19	22.19	84264	84264	-	25728	118791	-
					-	9.41	-	35734	-	8799		16.60

1	2	3	4	5	6	7	8	9	10	11	12	13
8	1101-0201-0101	Priming. Sealing with trailed rollers on a pneumatic wheel 25 tons. First pass along one track with a layer thickness of 25 cm	м3 compacted soil	18990.0	92.15	92.15	1749902	1749902	-	522897	2454623	-
					-	38.24	-	726246	-	181824		342.21
9	1108-0101-0303	Walls, foundations. Horizontal waterproofing in 2 layers	м2 surface	2842.0	2056.29	51.62	5843969	146719	4868206	803075	7178808	656.93
					291.71	12.13	829044	34477	-	531764		22.88
		Section total № 1					20036283	5300346	8996967	6306310	28450000	4381.25
							5738970	1798247	-	2107407		1139.26
		Total section:	tenge				28450000					
		including:										
		- salary of construction workers	tenge				5738970					
		- the cost of operating the machines	tenge				5300346					
		- including the salary of drivers	tenge				1798247					
		- materials, products and structures	tenge				8996967					
		- overhead	tenge				6306310					
		- estimated profit	tenge				2107407					
		Section No. 2 Foundations										
10	1106-0101-0101	Concrete preparation. Device	м3	275.55	15525.72	1291.24	4278113	355802	3470563	489878	5149430	427.79
					1639.44	314.20	451748	86579	-	381439		57.45
11	1106-0101-0114	Base concrete slabs flat. Device	м3	1653.3	14702.32	1397.02	24307337	2309686	19670200	2648843	29112674	1844.26
					1407.76	352.85	2327451	583366	-	2156494		383.11

1	2	3	4	5	6	7	8	9	10	11	12	13
12	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32мм CT PK 2591-2014	т	171.9	207694.00	-	35702599		35702599	-	38558807	
					-	-		-	-	2856208		-
13	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm CT PK 2591-2014	т	17.19	216789.00	-	3726603		3726603	-	4024731	
					-	-		-	-	298128		-
		Total section number 2					68014652	2665488	62569965	3138721	76845642	2272.05
							2779199	669945	-	5692269		440.56
		Total section:	tenge				76845642					
		including:										
		- salary of construction workers	тенге				2779199					
		- the cost of operating the machines	tenge				2665488					
		- including the salary of drivers	tenge				669945					
		- materials, products and structures	tenge				62569965					
		- overhead	tenge				3138721					
		- estimated profit	tenge				5692269					
		Section No. 3 Frame										
14	1106-0501-0104	Reinforced concrete columns in wooden formwork up to 4 m high, perimeter up to 2 m. Device	м3	37.63	38230.54	7220.69	1438616	271715	576879	597391	2198888	450.05
					15679.56	1765.93	590022	66452	-	162881		43.57

1	2	3	4	5	6	7	8	9	10	11	12	13
15	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm CT PK 2591-2014	т	0.75	216789.00	-	162592		162592	-	175599	
					-	-		-	-	13007		-
16	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32 mm CT PK 2591-2014	т	7.526	207694.00	-	1563105		1563105	-	1688153	
					-	-		-	-	125048		-
		Total section number 3					3164313	271715	2302576	597391	4062640	450.05
							590022	66452	-	300936		43.57
		Total section:	tenge				4062640					
		including:										
		- salary of construction workers	tenge				590022					
		- the cost of operating the machines	tenge				271715					
		- including the salary of drivers	tenge				66452					
		- materials, products and structures	tenge				2302576					
		- overhead	tenge				597391					
		- estimated profit	tenge				300936					
		Section No. 4 Walls										
17	1106-0601-0205	Reinforced concrete walls and partitions up to 3 m high, up to 500 mm thick. Device	м3	410.4	30303.33	4273.30	12436484	1753761	6252548	4396914	18180070	3379.23
					10794.77	978.56	4430175	401599	-	1346672		265.05

1	2	3	4	5	6	7	8	9	10	11	12	13
18	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm CT PK 2591-2014	т	8.2	216789.00	-	1777670		1777670	-	1919884	
					-	-		-	-	142214		-
19	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32 mm CT PK 2591-2014	т	82.0	207694.00	-	17030908		17030908	-	18393381	
					-	-		-	-	1362473		-
		Total section number 4					31245062	1753761	25061126	4396914	38493335	3379.23
							4430175	401599	-	2851359		265.05
		Total section:	tenge				38493335					
		including:										
		- salary of construction workers	tenge				4430175					
		- the cost of operating the machines	tenge				1753761					
		- including the salary of drivers	tenge				401599					
		- materials, products and structures	тенге				25061126					
		- overhead	tenge				4396914					
		- estimated profit	tenge				2851359					
		Section No. 5 Overlap										
20	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32 mm CT PK 2591-2014	т	110.0	207694.00	-	22846340		22846340	-	24674047	
					-	-		-	-	1827707		-

1	2	3	4	5	6	7	8	9	10	11	12	13
21	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm CT PK 2591-2014	т	11.0	216789.00	-	2384679		2384679	-	2575453	
					-	-		-	-	190774		-
22	1106-0801-0101	Bezel-less overlapping up to 200 mm thick. The device at a height of from the reference area to 6 m	м3	551.1	34502.64	2158.41	19014404	1189497	11255831	6252268	27288006	5108.15
					11919.93	547.17	6569076	301548	-	2021334		197.54
		Total section number 5					44245423	1189497	36486850	6252268	54537506	5108.15
							6569076	301548	-	4039815		197.54
		Total section:	tenge				54537506					
		including:										
		- salary of construction workers	tenge				6569076					
		- the cost of operating the machines	tenge				1189497					
		- including the salary of drivers	tenge				301548					
		- materials, products and structures	tenge				36486850					
		- overhead	tenge				6252268					
		- estimated profit	tenge				4039815					
		Total estimate					166705733	11180807	135417484	20691604	202389123	15590.73
							20107442	3237791	-	14991786		2085.98
		Total estimate:	tenge				202389123					
		including:										
		- salary of construction workers	tenge				20107442					
		- the cost of operating the machines	tenge				11180807					

1	2	3	4	5	6	7	8	9	10	11	12	13
		- including the salary of drivers	tenge				3237791					
		- materials, products and structures	tenge				135417484					
		- overhead	tenge				20691604					
		- сметная прибыль	tenge				14991786					

Compiled _____

position, signature (initials, surname)

Checked _____

position, signature (initials, surname)

Appendix 2
to the normative document for the determination of the estimated cost of construction in the Republic of Kazakhstan

The form 4

Construction Name School

Object name Aboveground

Local budget number 02-002-001
(Local cost estimate)

the Aboveground
(name of work and costs)

Base:

Estimated cost 591335.103 thousand tenge
Estimated salary 90216.564 thousand tenge
Normative labor input 66.17675 thousand tenge

Compiled at current prices as of 2019.

№ п/п	Code of norms resource code	Name work and costs	Unit measuring	amount	Unit cost, tenge		Total cost, tenge			Overhead, tenge	Total cost with HP And СП, tinge	Labor costs of construction workers, total
					Total	exploitation of cars	Total	machine operation	materials			
					the salary working builders	в т.ч. the salary drivers	the salary working builders	в т.ч. the salary drivers	equipment, furniture, inventory	Estimated profit, tenge		Labor costs of drivers, total
1	2	3	4	5	6	7	8	9	10	11	12	13
1	1106-0501-0201	Walls. Stucco improved cement-lime mortar for stone	м3	504.68	59825.99	28630.85	30192979	14449419	7055216	11134383	44633551	6273.17
					17215.55	7028.70	8688344	3547242	-	3306189		2347.57
2	1115-0201-0101	Walls. Stucco improved cement-lime mortar for stone	м2 plastered surface	16718.7	1207.37	34.46	20185674	576144	4215336	12720456	35538620	10215.13
					920.78	30.29	15394194	506376	-	2632490		401.25
3	1106-0701-0401	Crossbars of civil buildings in metal formwork. Device	м3	1288.8	36410.25	5812.46	46925530	7491095	17859820	21341293	73728169	16148.66
					16740.08	1456.67	21574615	1877355	-	5461346		1233.77

1	2	3	4	5	6	7	8	9	10	11	12	13
4	1106-0801-0101	Bezel-less overlapping up to 200 mm thick. The device at a height of from the reference area to 6 m	м3	3364.5	32666.33	1876.88	109905882	6314748	68717553	33191726	154545417	27117.87
					10365.16	475.80	34873581	1600843	-	11447809		1048.71
5	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32мм CT PK 2591-2014	т	722.32	207694.00	-	150021530		150021530	-	162023252	
					-	-		-	-	12001722		-
6	1109-0301-0401	Trusses-crane-girders with a span of more than 30 m. Installation upon delivery in bulk	т constructions	147.0	43029.27	24942.68	6325303	3666575	1294642	1486270	8436499	984.90
					9279.50	5373.66	1364086	789928	-	624926		405.72
7	2106-0209-0201	Steel structures from one profile ГОСТ 23118-2012	т	147.0	589603.00	-	86671641		86671641	-	93605372	
					-	-		-	-	6933731		-
8	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm CT PK 2591-2014	т	80.4	216789.00	-	17429836		17429836	-	18824223	
					-	-		-	-	1394387		-
		Total estimate					467658375	32497981	353265574	79874128	591335103	60739.73
							81894820	8321744	-	43802600		5437.02
		Total estimate:	tenge				591335103					
		including:										
		- salary of construction workers	tenge				81894820					
		- the cost of operating the machines	tenge				32497981					
		- including the salary of drivers	tenge				8321744					

1	2	3	4	5	6	7	8	9	10	11	12	13
		- materials, products and structures	tenge				353265574					
		- overhead	tenge				79874128					
		- estimated profit	tenge				43802600					

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position, signature (initials, surname)

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position, signature (initials, surname)

Appendix C

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

Construction Name School

Object name school for children with special needs in Karaganda city

Consolidated Resource List No. 02-001-001
by building, construction, facility, construction

Underground work
(name of the building, structure, object, construction site)

Base:
Local resource sheets (estimates)

№ п/п	Resource Codes	Name of resources	Unit measuring	amount	Cost, thousand tenge	
					per unit measuring	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	5108.1459	1.28600	6569.076
2	0101-0101-0132	Labor costs of construction workers (average grade 3.2)	person-h	3920.0727	1.31100	5139.215
3	0101-0101-0130	Labor costs of construction workers (average rank 3)	person-h	3408.8967	1.26200	4302.028
4	0101-0101-0133	Labor costs of construction workers (average grade 3.3)	person-h	2267.8	1.33600	3029.781
5	0101-0101-0134	Labor costs of construction workers (average grade 3.4)	person-h	432.5185	1.36100	588.658
6	0101-0101-0120	Labor costs of construction workers (average rank 2)	person-h	453.2987	1.05600	478.683
7	0101-0102-0100	Labor costs of drivers	person-h	2085.9903	-	-
		Weighted average job category 3.1				
		Total ФОТ::				20107.441
		Machines and mechanisms by type				
		Bulldozers				
1	3101-0101-0103	Bulldozers, 79 кВт (108 л.с.)	маш.-ч	394.67356	5.07700	2003.758
		Crawler Excavators				
2	3101-0201-0104	Crawler-mounted single-bucket diesel excavators, 1 m3	маш.-ч	252.82704	8.74200	2210.214
		Vibrators				
3	3104-0101-0101	Deep vibrator	маш.-ч	338.678719	0.03700	12.531
4	3104-0101-0201	Surface vibrator	маш.-ч	456.057294	0.01500	6.841
		Mobile and stationary tower cranes				
5	3105-0101-0102	Tower cranes8 т	маш.-ч	888.909509	6.17700	5490.794
		Jib cranes on the road				
6	3105-0102-0102	Truck-mounted cranes, 10 Т	маш.-ч	82.151448	5.20700	427.763
		Jib Crawler Cranes				

1	2	3	4	5	6	7
7	3105-0104-0201	Crawler-mounted cranes for hydropower construction, 16 T	маш.-ч	34.553947	4.03500	139.425
		Forklift trucks				
8	3105-0501-0101	Forklift trucks, 5 т	маш.-ч	8.235795	4.68900	38.618
		Conveyors				
9	3105-0503-0102	Mobile belt conveyors 15 м	маш.-ч	132.112575	0.63700	84.156
10	3105-0503-0101	Mobile belt conveyors up to 10 м	маш.-ч	87.805432	0.37300	32.751
		Other electrical equipment				
11	3106-0103-0501	Direct current installations for manual arc welding	маш.-ч	840.356848	0.16600	139.499
		Trailed road rollers				
12	3201-0102-0301	Trailed road rollers on pneumatic wheels, 25 т	маш.-ч	29.918745	0.73600	22.020
		Bitumen boilers				
13	3201-0201-0101	Bitumen mobile boilers, 400 л	маш.-ч	124.52223	0.72300	90.030
		Machines for planting plants and others				
14	3206-0102-0701	Mounted brush cutters on a tractor, 79 кВт (108 л.с.) hydraulically operated	маш.-ч	22.713075	5.62600	127.784
		On-board cars				
15	3301-0201-0101	Cars, onboard, to 5 т	маш.-ч	70.765797	2.89100	204.584
		Crawler tractors				
16	3304-0101-0102	Crawler tractors, 79 кВт (108 л.с.)	маш.-ч	29.918745	4.75900	142.383
		Cutting tool				
17	3403-0102-0201	Electric chain saws	маш.-ч	49.398376	0.07500	3.705
		Planers				
18	3403-0201-0101	Electric Planers	маш.-ч	21.344	0.12200	2.604
		Hammers, drills, screwdrivers, wrenches, construction guns				
19	3403-0302-0301	Electric drills	маш.-ч	112.3228	0.01200	1.348
		Total for construction machines and mechanisms:				11180.808
		including pay for drivers	тенге			3237.792
		Contractor Supply Materials				
		Dense rock for construction work				
1	2101-0201-0604	Crushed stone from dense rocks for construction works M1000, fraction 40-70 мм СТ РК 1284-2004	м3	0.45764	2.61800	1.198
		Natural sand for construction work				
2	2101-0401-0101	Natural sand ГОСТ 8736-2014	м3	433.965	1.65500	718.212
		General purpose concrete				
3	2102-0101-0301	Heavy concrete B7,5 ГОСТ 7473-2010	м3	1686.366	11.38600	19200.963
4	2102-0101-0601	Heavy concrete B15 ГОСТ 7473-2010	м3	1014.11695	12.42700	12602.431
5	2102-0101-0101	Heavy concrete B3,5 ГОСТ 7473-2010	м3	281.061	10.64900	2993.019
		Mortar solutions				
6	2102-0401-2801	Mortar ready masonry heavy cement grade M25 ГОСТ 28013-98	м3	71.05	9.57800	680.517

1	2	3	4	5	6	7
		Ceramic brick				
7	2103-0101-0103	Brick ceramic unary ordinary corpulent brand M100, dimensions 250 мм x 120 мм x 65 мм ГОСТ 530-2012	1000 шт.	0.58	25.99600	15.078
		Fittings				
8	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32 mm СТ РК 2591-2014	т	371.426	207.69400	77142.952
9	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) diameter from 6 to 12 mm СТ РК 2591-2014	т	37.14	216.78900	8051.543
		Wire				
10	2105-0307-1007	General Purpose Low Carbon Light Steel Wire, Superior Quality, Heat Treated, 1.1 mm Diameter ГОСТ 3282-74	кг	63.9276	0.11200	7.160
		Separate structural elements of buildings and structures (columns, beams, trusses, communications, crossbars, racks and т.д.)				
11	2106-0801-0101	Individual structural elements of buildings and structures with a predominance of hot-rolled profiles, the average mass of an assembly unit up to 0,1 т	т	2.7555	463.32700	1276.698
		Round timber (logs)				
12	2107-0101-9901	Softwood round timber for construction from 140 mm to 240 mm thick, from 3 m to 6.5 m long ГОСТ 9463-88	м3	20.532	31.57200	648.236
		Edged bars and bars				
13	2107-0201-0301	Coniferous edged bars from 4 m to 6.5 m long, from 75 mm to 150 mm wide, from 40 mm to 75 mm thick, 3 grades ГОСТ 8486-86	м3	34.85298	25.49200	888.472
14	2107-0201-0201	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, 2 varieties ГОСТ 8486-86	м3	11.810075	47.24500	557.967
15	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 ГОСТ 8486-86	м3	5.45589	57.04600	311.237
		Edged boards				
16	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 ГОСТ 8486-86	м3	30.044	47.48400	1426.609
17	2107-0203-0305	Softwood edging boards up to 6.5 m long, from 75 mm to 150 mm wide, 44 mm thick and more, 3 grades ГОСТ 8486-86	м3	21.40623	47.48400	1016.453
18	2107-0203-0304	Softwood edged boards up to 6.5 m long, from 75 mm to 150 mm wide, from 32 mm to 40 mm thick, 3 grades ГОСТ 8486-86	м3	9.28	47.48400	440.652

1	2	3	4	5	6	7
19	2107-0203-0303	Softwood edging boards up to 6.5 m long, from 75 mm to 150 mm wide, 25 mm thick, 3 grades ГОСТ 8486-86	м3	2.92083	47.48400	138.693
20	2107-0203-0405	Coniferous edged boards up to 6.5 m long, from 75 mm to 150 mm wide, 44 mm thick and more, 4 grades ГОСТ 8486-86	м3	5.82753	21.66800	126.271
		Unedged boards				
21	2107-0204-0205	Unneeded boards of coniferous species up to 6.5 m long, any width, 44 mm thick or more, 2 grades ГОСТ 8486-86	м3	0.63971	40.66400	26.013
		Other products				
22	2107-0510-0701	Inventory racks wood-metal sliding	шт.	15.4308	20.70200	319.448
		Ruberoid, glassruberoid, roofing, glassine				
23	2110-0401-1001	Waterproofing roofing ТГ-350 ГОСТ 10923-93	м2	6252.4	0.22700	1419.295
		Waterproofing mastics				
24	2110-0501-1404	Mastic frost-resistant bituminous-oil МБ-50 ГОСТ 30693-2000	кг	11936.4	0.22400	2673.754
		Lime				
25	2113-0102-0801	Building quicklime lump, grade 1,ГОСТ 9179-77	т	0.839149	31.84900	26.726
		Bitumen				
26	2113-0104-0103	Bitumen oil construction ГОСТ 6617-76 brands БН 90/10	т	0.45472	127.57700	58.012
		Bolts				
27	2113-0201-0901	Construction bolts with nuts and washers ГОСТ 1759.0-87	т	0.36936	499.61100	184.536
28	2113-0201-0902	Construction Hex Bolts with Hex Nuts ГОСТ 1759.0-87	т	0.08468	456.85200	38.686
		Nails				
29	2113-0209-0401	Flat head construction nails ГОСТ 283-75	кг	843.1525	0.40900	344.849
		Technical fluids				
30	2113-0703-0201	Kerosene for technical purposes brands КТ-1, КТ-2	т	0.68208	53.70000	36.628
31	2113-0703-1405	Technical water	м3	14.639488	0.02900	0.425
		Fabrics				
32	2113-0803-1101	Bag fabric ГОСТ 30090-93	10 м2	120.850719	6.93200	837.737
		Components, consumables for tools				
33	2113-0812-1035	Electrodes, d=4 мм, Э42 ГОСТ 9466-75	т	0.877245	211.27300	185.338
		Other materials				
34	2113-0816-9902	Antiseptic paste	т	0.12354	605.54700	74.809
35	2113-0816-2701	Coal tar	т	0.30856	80.24400	24.760
		Shields of formwork, flooring				
36	2701-0101-0104	Boards from boards, thickness 25 mm	м2	828.9936	1.02200	847.231
37	2701-0101-0105	Boards from boards, thickness 40 mm	м2	59.5188	1.25800	74.875
		Total contractor supply materials:				135417.483

1	2	3	4	5	6	7
		Total:				166705.732

Compiled _____
position, signature (initials, surname)

Checked _____
position, signature (initials, surname)

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

Construction Name School

Object name Aboveground

Consolidated Resource List No. 02-002-001
by building, construction, facility, construction

Aboveground work
(name of the building, structure, object, construction site)

Base:
Local resource sheets (estimates)

№ п/п	Resource Codes	Name of resources	Unit measuring	amount	Cost, thousand tenge	
					per unit measuring	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	27117.87	1.28600	34873.581
2	0101-0101-0133	Labor costs of construction workers (average grade 3.3)	person-h	16148.664	1.33600	21574.615
3	0101-0101-0140	Labor costs of construction workers (average rank 4)	person-h	10215.1257	1.50700	15394.194
4	0101-0101-0135	Labor costs of construction workers (average grade 3.5)	person-h	7258.0724	1.38500	10052.430
5	0101-0102-0100	Labor costs of drivers	person-h	5437.0212	-	-
		Weighted average job category 3.4				
		Total ФОТ:				81894.820
		Machines and mechanisms by type				
		Mortar Pumps				
1	3103-0205-0202	Mortar pumps, 3 m3 / h	маш.-ч	401.2488	1.41300	566.965
		Vibrators				
2	3104-0101-0101	Deep vibrator	маш.-ч	958.25954	0.03700	35.456
3	3104-0101-0201	Surface vibrator	маш.-ч	1613.6142	0.01500	24.204
		Mobile and stationary tower cranes				
4	3105-0101-0102	Tower cranes, 8 т	маш.-ч	4446.2156	6.17700	27464.274
		Jib cranes on the road				
5	3105-0102-0102	Truck-mounted cranes, 10 т	маш.-ч	93.33898	5.20700	486.016
		Jib Crawler Cranes				
6	3105-0104-0105	Crawler Cranes 100 т	маш.-ч	174.93	18.94900	3314.749
		Gantry cranes				
7	3105-0202-0303	Gantry cranes when working on the installation of technological equipment,32 т	маш.-ч	5.88	6.07400	35.715
		Лебедки				
8	3105-0402-0302	Electric winches with traction effort up to 12,26 кН (1,25 т)	маш.-ч	150.4683	0.06100	9.179
		Forklift trucks				

1	2	3	4	5	6	7
9	3105-0501-0101	Forklift trucks, 5 т	маш.-ч	9.08415	4.68900	42.596
		Other electrical equipment				
10	3106-0103-0201	Multi-operator welding rectifiers with up to 30 posts	маш.-ч	114.66	1.07100	122.801
		Other equipment for welding and cutting				
11	3106-0202-0501	Apparatus for gas welding and cutting	маш.-ч	164.64	0.02600	4.281
		On-board cars				
12	3301-0201-0101	Cars, onboard, to 5 т	маш.-ч	131.393648	2.89100	379.859
		Cutting tool				
13	3403-0102-0201	Electric chain saws	маш.-ч	154.767	0.07500	11.608
		Grinding machines				
14	3403-0202-0101	Electric grinding machines	маш.-ч	10.29	0.02700	0.278
		Total for construction machines and mechanisms:				32497.981
		including pay for drivers	tenge			8321.745
		Contractor Supply Materials				
		General purpose concrete				
1	2102-0101-0601	Heavy concrete B15 ГОСТ 7473-2010	м3	5235.3497	12.42700	65059.691
		Finishing solutions				
2	2102-0402-0206	Heavy finished mortar, cement-lime 1:1:6 ГОСТ 28013-98	м3	315.98343	13.33500	4213.639
		Channels				
3	2105-0204-0703	Channel hot-rolled with an internal bias of the sides of the shelves № 22У-40У carbon steel of ordinary quality ГОСТ 380-2005	т	0.28518	406.90600	116.041
		Fittings				
4	2105-0301-3202	Hot-rolled reinforcing steel A-III (A400) diameters from 14 to 32 mm СТ РК 2591-2014	т	722.32	207.69400	150021.530
5	2105-0301-3001	Hot-rolled smooth reinforcing steel A-I (A240) диаметром от 6 до 12 мм СТ РК 2591-2014	т	80.4	216.78900	17429.836
		Wire				
6	2105-0307-1007	General Purpose Low Carbon Light Steel Wire, Superior Quality, Heat Treated, 1.1 mm Diameter ГОСТ 3282-74	кг	928.326	0.11200	103.973
7	2105-0307-1013	Hot-rolled wire of normal accuracy in steel coils СВ-08А diameters from 6.3 mm to 6.5 mm ГОСТ 10543-98	кг	4.41	0.07000	0.309
		Steel ropes				
8	2105-0310-1108	Steel double lay rope, type ТК, design 6x37 (1 + 6 + 12 + 18) +1 o.s., galvanized, from grade B wire, marking group 1770 N / mm2, diameter 5 mm ГОСТ 3241-91 (ГОСТ 3071-88)	10 м	2.7489	4.16900	11.460
		Other steel building envelope of industrial buildings				

1	2	3	4	5	6	7
9	2106-0209-0201	Steel structures from one profile ГОСТ 23118-2012	т	147.0	589.60300	86671.641
		Separate structural elements of buildings and structures (columns, beams, trusses, communications, crossbars, racks and т.д.)				
10	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	т	16.8225	463.32700	7794.318
11	2106-0801-0102	Individual structural elements of buildings and structures with a predominance of hot-rolled profiles, the average weight of the assembly unit from 0.1 to 0.5 tons	т	1.617	439.69200	710.982
		Edged bars and bars				
12	2107-0201-0301	Coniferous edged bars from 4 m to 6.5 m long, from 75 mm to 150 mm wide, from 40 mm to 75 mm thick, 3 grades ГОСТ 8486-86	м3	209.2719	25.49200	5334.759
13	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 ГОСТ 8486-86	м3	33.30855	57.04600	1900.120
14	2107-0201-0101	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, grade 1 ГОСТ 8486-86	м3	0.1176	60.07000	7.064
		Edged boards				
15	2107-0203-0305	Softwood edging boards up to 6.5 m long, from 75 mm to 150 mm wide, 44 mm thick and more, 3 grades ГОСТ 8486-86	м3	87.81345	47.48400	4169.734
16	2107-0203-0204	Coniferous edged boards up to 6.5 m long, from 75 mm to 150 mm wide, from 32 mm to 40 mm thick, 2 grades ГОСТ 8486-86	м3	35.8696	52.90300	1897.609
17	2107-0203-0303	Softwood edging boards up to 6.5 m long, from 75 mm to 150 mm wide, 25 mm thick, 3 grades ГОСТ 8486-86	м3	17.83185	47.48400	846.728
		Other products				
18	2107-0510-0701	Inventory racks wood-metal sliding	шт.	94.206	20.70200	1950.253
		Lime				
19	2113-0102-0801	Building quicklime lump, grade 1, ГОСТ 9179-77	т	2.89347	31.84900	92.154
		Bolts				
20	2113-0201-0901	Construction bolts with nuts and washers ГОСТ 1759.0-87	т	0.3969	499.61100	198.296
		Nails				
21	2113-0209-0401	Flat head construction nails ГОСТ 283-75	кг	3134.1974	0.40900	1281.887
		Technical gases				
22	2113-0701-0401	Technical gaseous oxygen ГОСТ 5583-78	м3	139.65	0.25200	35.192

1	2	3	4	5	6	7
23	2113-0701-1002	Propane-butane, technical mixture ГОСТ Р 52087-2003	кг	41.16	0.14400	5.927
		Oils				
24	2113-0702-0101	Anthracene oil ГОСТ 11126-88	т	3.1466	44.84000	141.094
		Technical fluids				
25	2113-0703-1405	Technical water	м3	67.162215	0.02900	1.948
		Fabrics				
26	2113-0803-1101	Bag fabric ГОСТ 30090-93	10 м2	14.433705	6.93200	100.054
		Ropes, cords, threads и.т.д.				
27	2113-0804-0301	Impregnated hemp ropes ГОСТ 30055-93	т	0.0147	1863.75100	27.397
		Components, consumables for tools				
28	2113-0812-1035	Electrodes, d=4 мм, Э42 ГОСТ 9466-75	т	0.5145	211.27300	108.700
		Primer for metal, wood, concrete and other surfaces				
29	2204-0101-0502	Glyphtal primer, ГФ-021 СТ РК ГОСТ Р 51693-2003	т	0.04557	426.06900	19.416
		Solvents				
30	2204-0601-0602	Solvents for paints and varnishes Р-4 ГОСТ 7827-74	т	0.0882	603.82500	53.257
		Shields of formwork, flooring				
31	2701-0101-0104	Boards from boards, thickness 25 mm	м2	2896.8345	1.02200	2960.565
		Total contractor supply materials:				353265.574
		Total:				467658.375

Compiled _____
position, signature (initials, surname)

Checked _____
position, signature (initials, surname)

Appendix D

Appendix 4
to the normative document for the determination of the estimated cost of construction in the Republic of Kazakhstan

The form 2

Customer Mohammad Younis Sarwari
(name of company)

Approved / Agreed upon

Estimated construction cost in the amount of 920351.814 thousand tenge

including:
value added tax 98609.123 thousand tenge

(link to approval / approval document)

"____"_____20____г.

Estimated cost of construction

School
(name of construction site)

Compiled at current prices as of 2019.

№ п/п	No. of estimates and calculations other documents	Name of chapters objects, work and costs	Estimated cost, thousand tenge			Total, thousand tenge
			construction assembly works	equipment furniture and inventory	other cost	
1	2	3	4	5	6	7
		Chapter 2. The main objects of construction				
1	02-001	Are common	202389.123			202389.123
2	02-001-001	Civil works	202389.123			202389.123
3	02-002	Aboveground	591335.103			591335.103
4	02-002-001	Aboveground	591335.103			591335.103
		Total Chapter 2	793724.226			793724.226
		Total chapters 1 - 7	793724.226			793724.226
		Chapter 8. Temporary buildings and structures				
5	НДЗ РК 8.04-05-2015, Table 1 п.36	Funds for the construction and dismantling of titular temporary buildings and structures. Type of construction: Housing and civil engineering in cities and workers' settlements Schools, kindergartens, nurseries, shops, administrative buildings, cinemas, theaters, art galleries and other civil engineering buildings - 1.5%	11905.863			11905.863
		Total in Chapter 8	11905.863			11905.863
		Total chapters 1 - 8	805630.089			805630.089
		Total chapters 1 - 9	805630.089			805630.089
6	НД ССС	Unforeseen work and costs - 2%	16112.602			16112.602

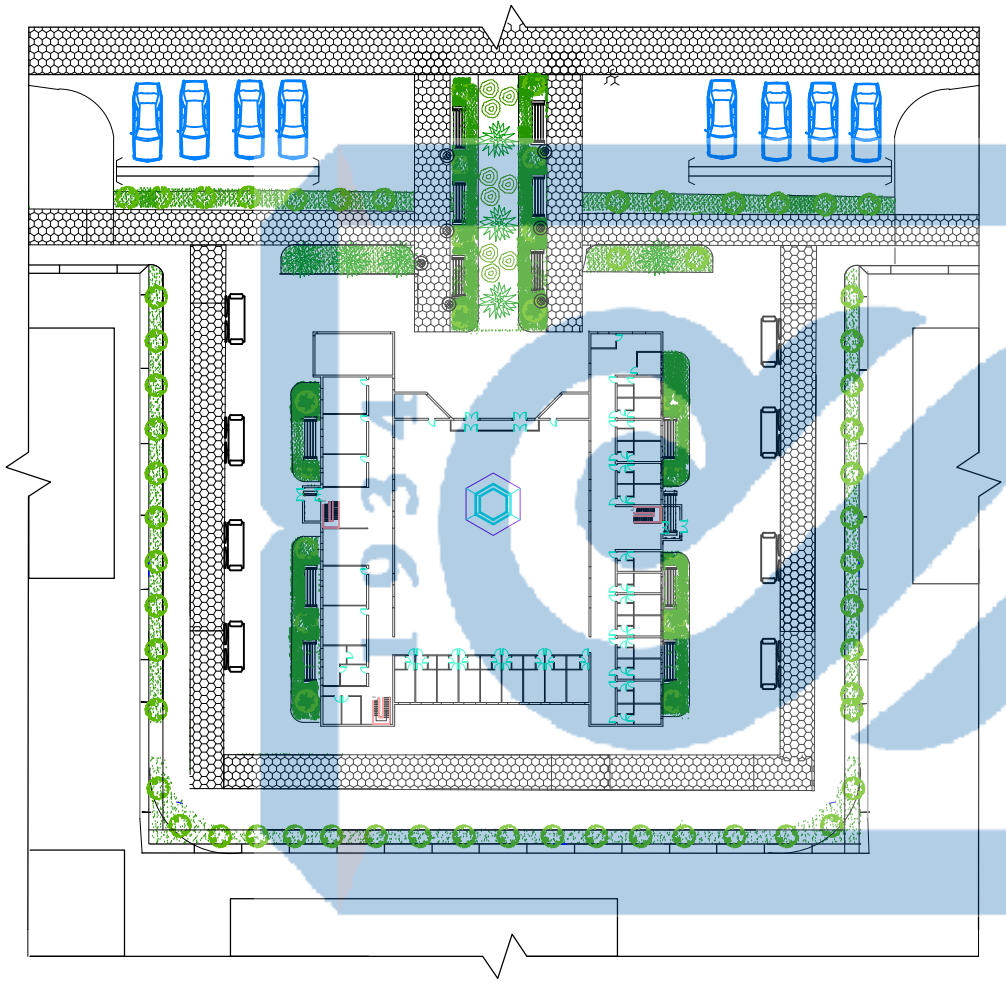
1	2	3	4	5	6	7
		Total estimated cost	821742.691			821742.691
7	Codex РК от 10.12.2008 № 99-IV, ст.268	Value added tax (НДС) - 12 %			98609.123	98609.123
		Total Estimated	821742.691		98609.123	920351.814

Project Manager _____
signature (initials, surname)

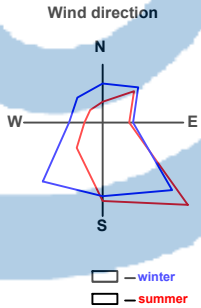
Chief Project Engineer _____
signature (initials, surname)

Chief _____ department
(name) signature (initials, surname)

1-General plan

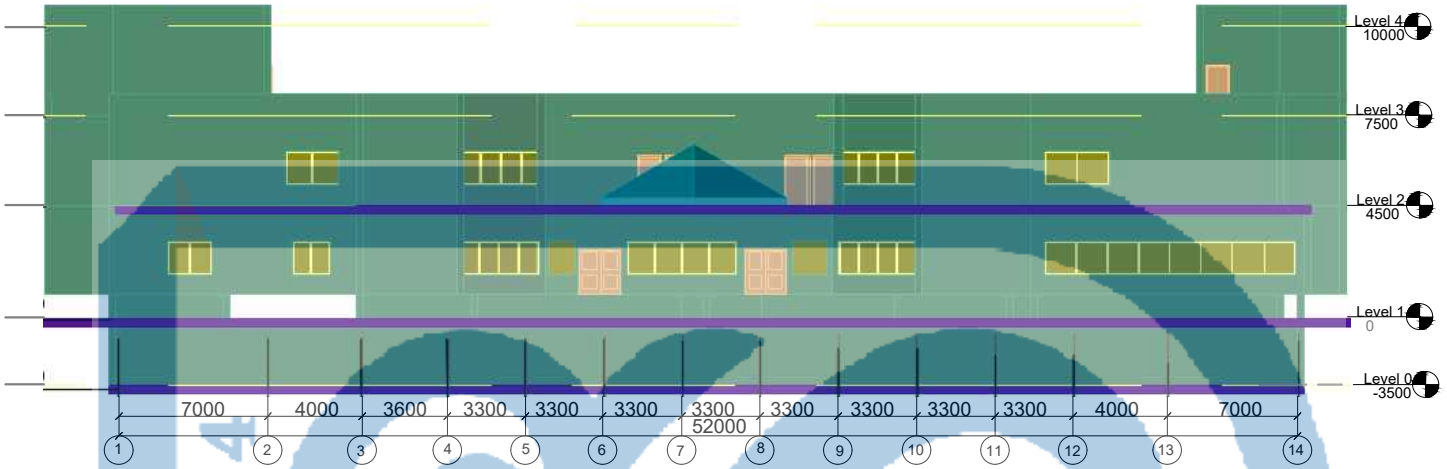


N	symbols	Names
1		Designed
2		built building
3		plot boundary
4		three
5		green area
6		asphalt road

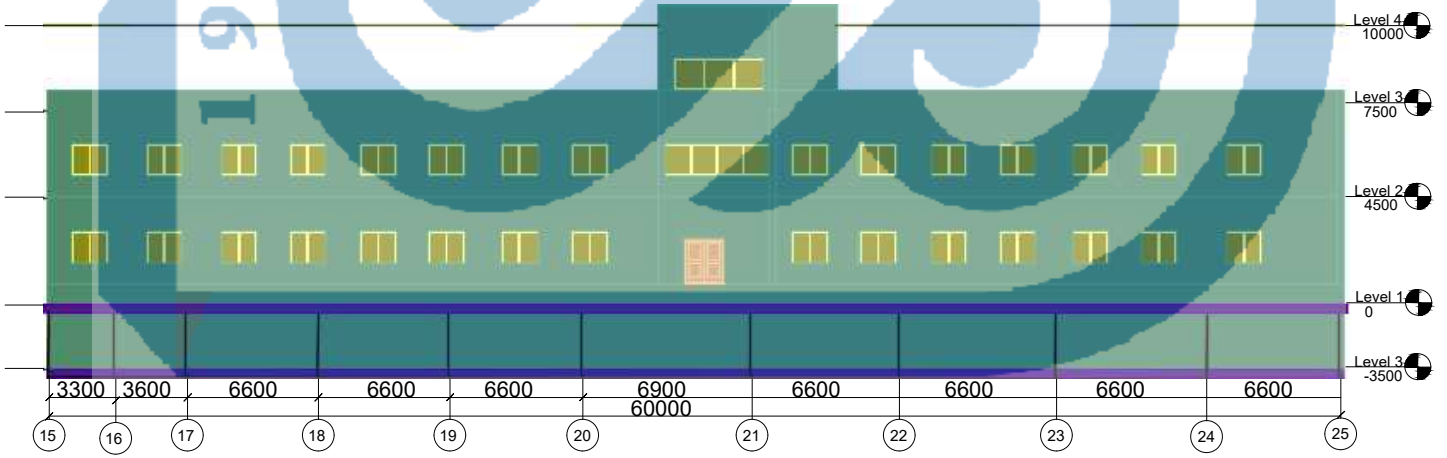


				KazNITU -5B072900 .29-03/2020 DP		
				school for children with special needs in Karganda city		
name	Document №	Signature	date			
Head of Dep	Akmalayuli K.A.			Architectural part	Level: DP	Sheet:	scale: 1:200
Superviser	Kozyukova.N.V					
Consultant	Kozyukova.N.V					
Controller	Kozyukova.N.V					
Prepared by	M.Younis sarwari			General plan	Department of Construction and Building Materials	

1-Elevation M1:200

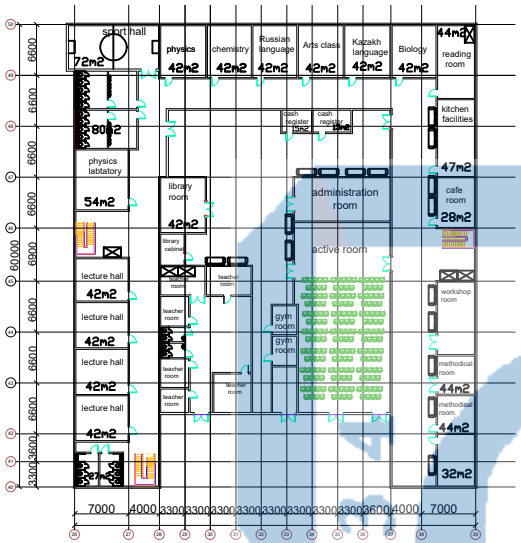


2-Elevation M1:200

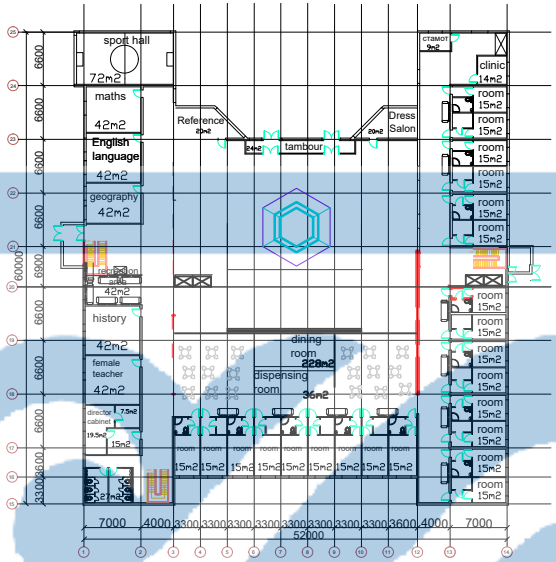


				KazNITU -5B072900 .29-03/2020 DP		
				school for children with special needs in Karganda city		
name	Document №	Signature	date			
Head of Dep	Akmalayuli K.A.			Architectural part	Level: DP	Sheet:	scale: 1:200
Superviser	Kozyukova.N.V					
Consultant	Kozyukova.N.V					
Controller	Kozyukova.N.V					
Prepared by	M.Younis sarwari			Elevation	Department of Construction and Building Materials	

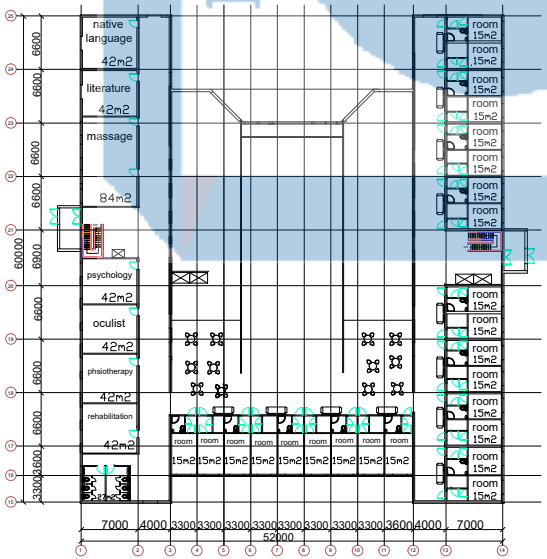
1-underground plan
M1:200



2-first floor plan
M1:200



3-second floor plan
M1:200



Spatial specification		
nember	Name	Area
1	sport hall	72 м²
2	math room	42 м²
3	Administration room	64 м²
4	English language	42 м²
5	Geography	42 м²
6	recreation area	42 м²
7	history room	42 м²
8	female room	42 м²
9	director cabinet	19.5 м²
10	toilet room 2	27 м²
11	room 48	15 м²
12	reference room	20 м²
13	tambour	24 м²
14	dress salon	20 м²
15	CTAMOT	9 м²
16	Clinic	14 м²
17	Dining room	228 м²
18	dispensing room	36 м²
19	literature room	42 м²
20	massage room	84 м²
21	psychology	42 м²
22	Oculist room	42 м²
23	phsiotherapy	42 м²
24	rehabilitation	42 м²
25	toilet underground	80 м²

Spatial specification		
nember	Name	Area
25	physic laboratory	54 м²
26	lecture hall 4	42 м²
27	teacher room 6	24 м²
28	gym room 2	12 м²
29	active room	300 м²
30	cash register 2	15 м²
31	cafe room	28 м²
32	kitchen facilities	47 м²
33	reading room	44 м²
34	biology room	42 м²
35	kazakh language	42 м²
36	arts class	42 м²
37	russian language	42 м²
38	chemistry room	42 м²
39	phsics room	42 м²
40	workshop room	44 м²
41	methodical room	44 м²
42	rest room	32 м²
43	library room	42 м²

name	Document №	Signature	date
Head of Dep	Akmalayuli K.A.		
Superviser	Kozyukova.N.V		
Consultant	Kozyukova.N.V		
Controller	Kozyukova.N.V		
Prepared by	M.Younis sarwari		

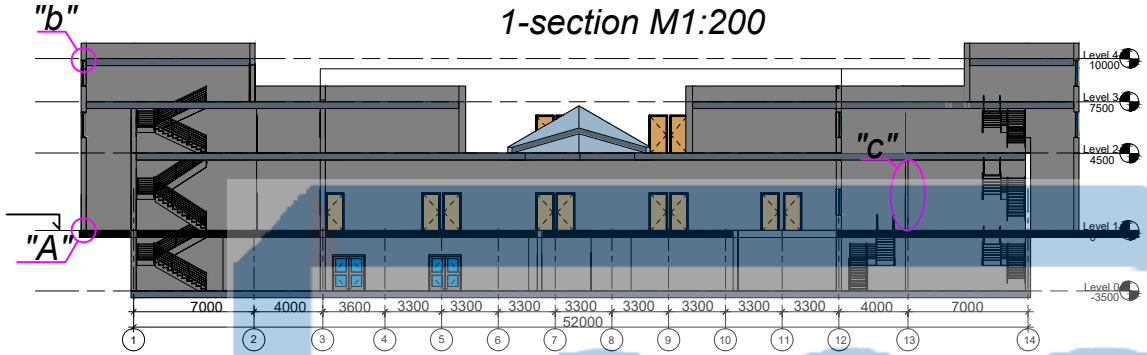
KazNITU -5B072900 .29-03/2020 DP

school for children with special needs in Karganda city

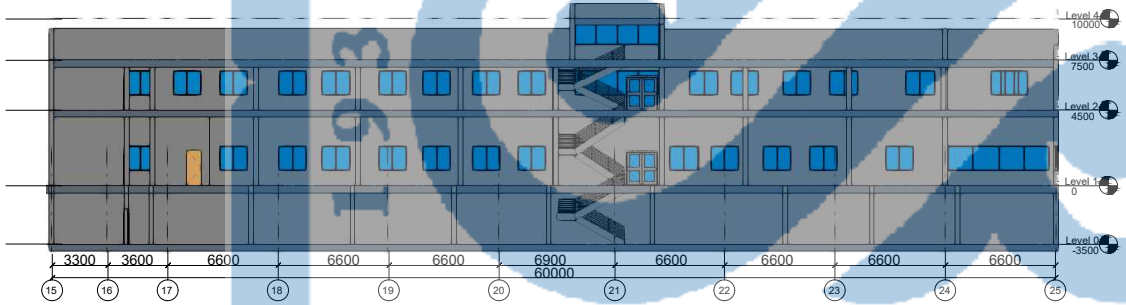
Architectural part	Level	Sheet	scale
	DP		1:200

floor plan

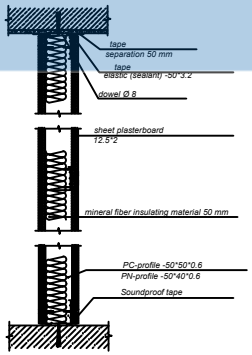
Department of Construction and Building Materials



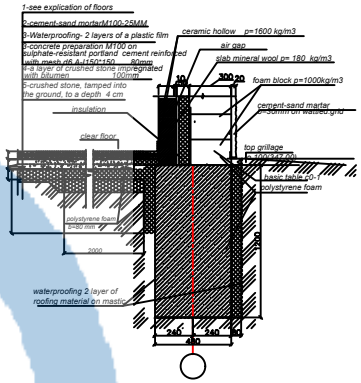
1-section M1:200



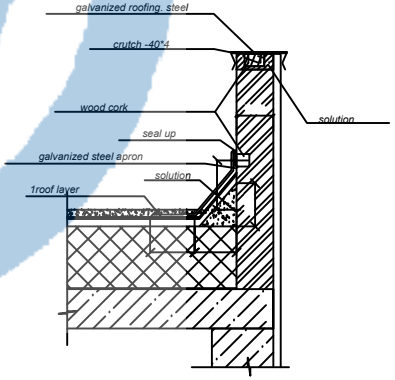
2-section M1:200



joint "c"



joint "A"



joint "b"

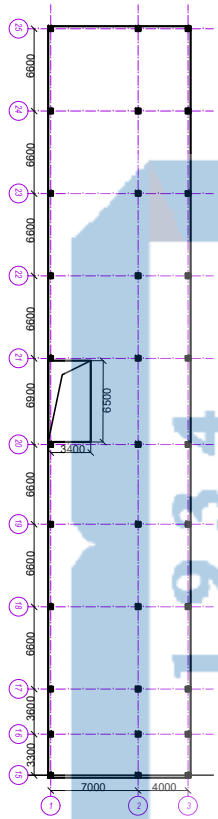
				KazNITU -5B072900 .29-03/2020 DP
				school for children with special needs in Karganda city
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			Architectural part
Superviser	Kozyukova.N.V			Level: DP; Sheet: ; scale: 1:200
Consultant	Kozyukova.N.V			
Controller	Kozyukova.N.V			section
Prepared by	M.Younis sarwari			Department of Construction and Building Materials

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

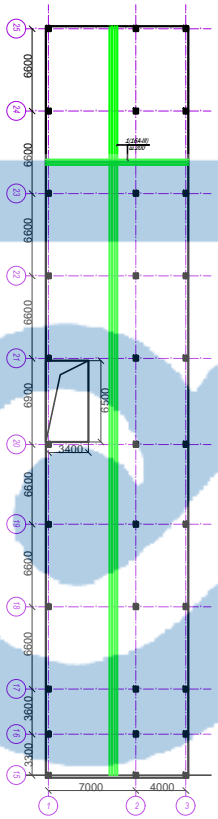
Agreed:

Signature and Date

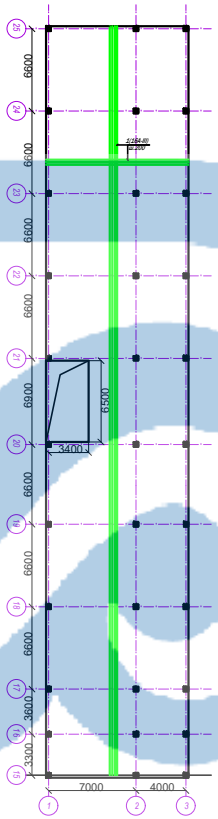
Formwork drawing of floor slab on отм. +11.500



The scheme of reinforcing the slab on отм. +11.500 on the bottom



The scheme of reinforcing the slab on отм. +11.500 on the top face



sheet of details

Pos.	Sketch
2	120 120 120 120

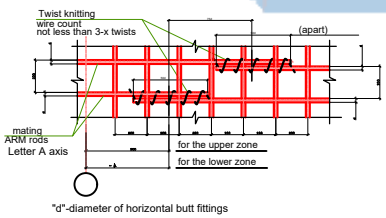
Floor slab specification at elevation +11.500

pos.	Designation	Name			Count	Weight ед.кг	Note
		Stove on отм. +11.500				1634.4	кг
1	ГОСТ Р 5781-82*	Ø 16	A-III	L= 6875	пм	0.888	6105 кг
4	ГОСТ Р 5781-82*	Ø 8	A-I	600	4375	0.237	1036.875 кг
		Concrete B25			132	м3	

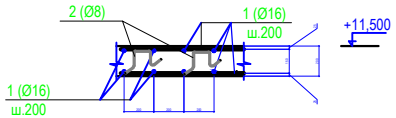
Statement of steel consumption, кг

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 отм. +11.500	0	1036.875	0	1036.8	0	0	0	0	0	0	0	7383	6420.35

Docking unit for single lap reinforcement (without welding)



Section1 - 1



				KazNITU -5B072900 .29-03/2020 DP
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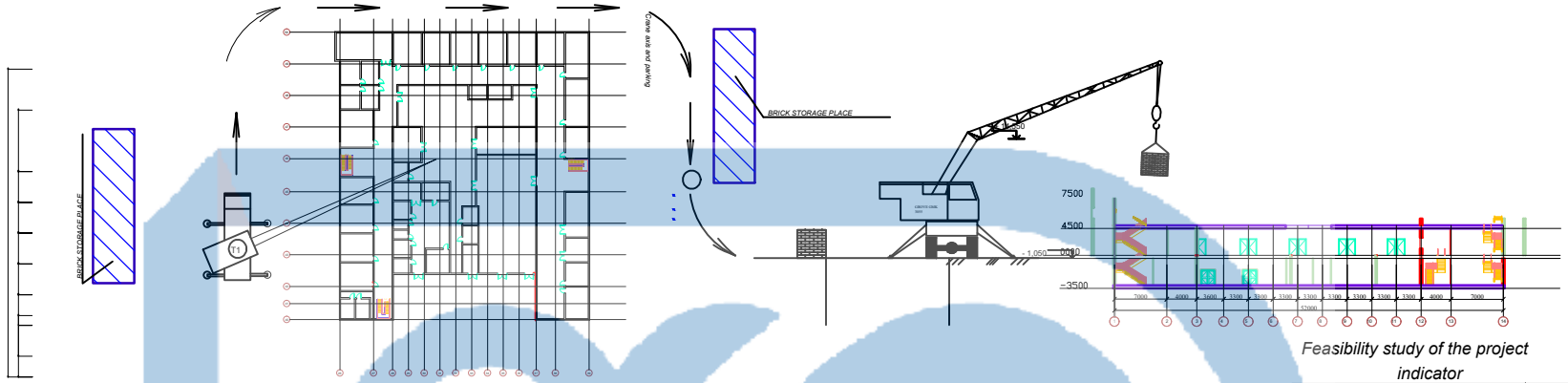
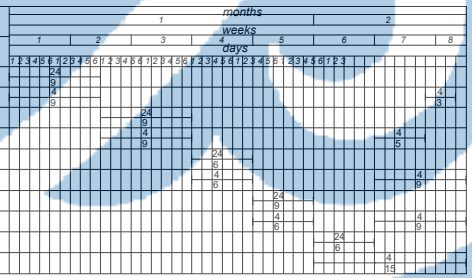
name	Document №	Signature	date	
Head of Dep	Akmalayuli K.A.			Level / Sheet / scale
Superviser	Kozyukova.N.V			Constructive part / DP / 1:200
Consultant	Kozyukova.N.V			
Controller	Kozyukova.N.V			slab
Prepared by	M.Younis sarwari			Department of Construction and Building Materials

Technological map of masonry works

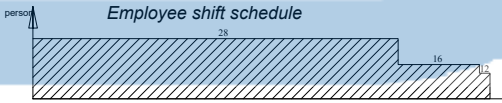


Schedule of work production

p/c	Name	unit	Work volume	Labor cost	Маш.	work duration	The composition of the link specialty discharge
1	1-tiling of the outer walls of the floor	м3	363	4,54	0,61	9	stone 4p-1, 3p-1
2	1-he partition walls of the room on the floor are ceramic preference	м2	378	1,21	0,06	14	stone 4p-1, 2p-1
3	2-tiling of the outer walls of the floor	м3	241	4,54	0,61	6	stone 4p-1, 3p-1
4	2-The partition walls of the room on the floor are ceramic	м2	403	1,21	0,06	15	stone 4p-1, 2p-1
5	3-tiling of the outer walls of the floor	м3	241	4,54	0,61	6	stone 4p-1, 3p-1
6	3-The partition walls of the room on the floor are ceramic	м2	403	1,21	0,06	15	stone 4p-1, 2p-1
7	капау						
8							
9							
10							



Employee shift schedule



Feasibility study of the project indicator

№	Name of indicators	Unit of measurement	mumber
1	Labor intensity for the whole volume of work	person*h	8934,96
2	Labor intensity per 1 m³ of bricklaying	person*h/м3	5,29
3	The product of labor per person in the shift	м³	1,47
4	Wages for all work	million. tenge	4,308

Material needs sheet

№	Name	Measurement unit	number	Mark
1	Brick	housand pieces	675,3	M 75
2	Cement-sand mortar	м³	401,31	B 25
3	Reinforcement	кг	525,24	Ø4 Bp-1

Machines, mechanisms and tools spreadsheets

№	name	mark	number	Notes
1	Truck crane	GROVE GMK 3055	1	Materials delivery
2	Welding transformer	ТД-300	1	grain structures tension
3	Hinged lifting platforms	Ра 50700 5500x1100	5	masonry wall
4	Pallets	ГОСТ 18343-80	6	assembling bricks
5	Stairs for lifting platforms		2	masonry wall
6	Metal box for mortar		6	masonry wall
7	Stone metal set		16	masonry wall
8	Disposable rail		3	masonry wall

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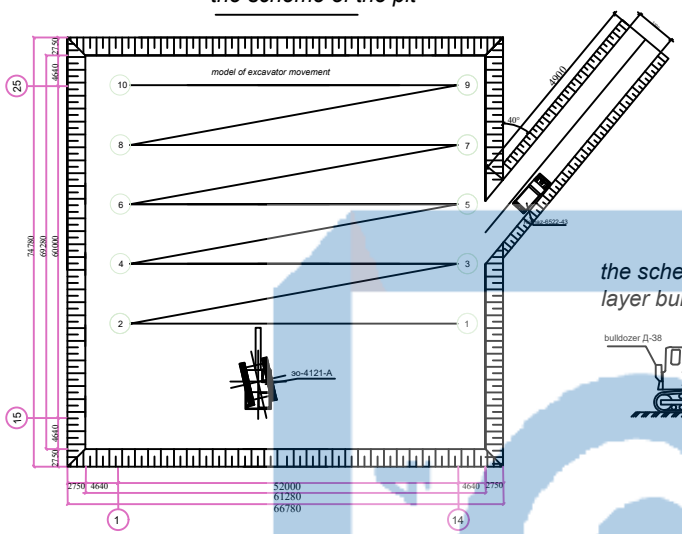
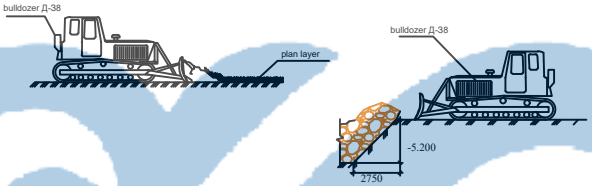
Superviser	Kozyukova.N.V			Level: DP; Sheet: ; scale: 1:200
Consultant	Kozyukova.N.V			
Controller	Kozyukova.N.V			*Technological map of masonry works*
Prepared by	M.Younis sarwari			Department of Construction and Building Materials

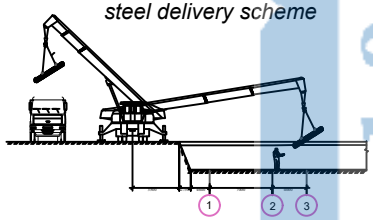
the scheme of the pit



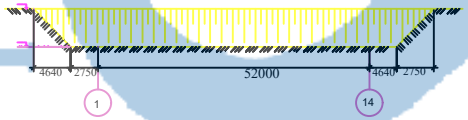
the scheme of cutting the layer bulldozer



steel delivery scheme

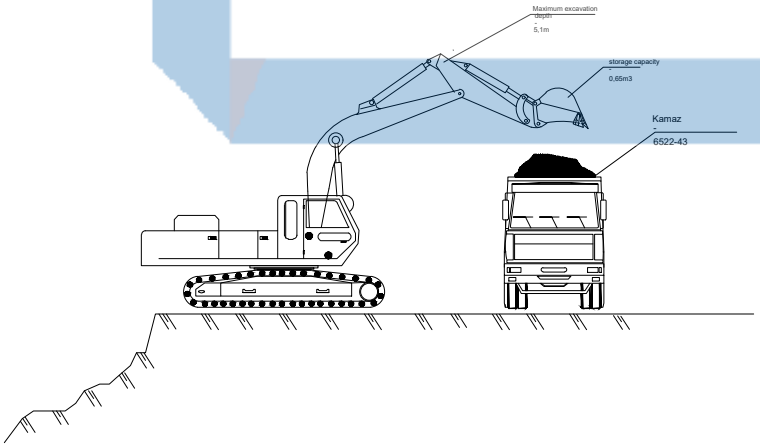


section 1-1



Rules for production work

Before starting earthworks, it is necessary to determine the technical condition of buildings and structures included in the construction area and the location of underground utilities.
Gravel preparation work should be started before the sun cools down, when the air temperature is above +5 degrees.
It is strictly forbidden to compact snow, ice or snow cover.
First of all, it is necessary to carry out all the preparatory work, clean and design the area. Before making a temporary road to the car, laying electricity, water supply system, foundation works, it is necessary to dig a pit and drive pegs along the overhead lines.
Check the axis lines at each corner and measure half the width of the foundation. The thread is pulled on the peg.
Before assembling the blocks, first install the corner beacon block and then assemble from corner to center.
It is necessary to measure the work frequently with a geodetic instrument.
After installation of the foundation, concreted between the 2 blocks, smoothed. When installing the foundation, concreting of the monolithic area should be carried out in parallel.



Calculation of labor costs

№	Job title	Regulatory-reference	Number of jobs	Labor productivity: unit work ч.-hour м.-hour	Labor productivity: all ч.-см м.-см	Basic ЗП: units for manual operation mechanic	Basic ЗП: all by hand mechanic	ENiR on the composition of the link
1	With material delivery 1 floor preference	Е3-12	733,3	3,6 / 0,22	330,0 / 20,46	0-06,3 / 0-02,4	73-86 / 28-14	machinist5p-1 The mason 4p-2 The mason3p-2
2	1floor slab coating installation	Е4-1	74	1,2 / 0,3	13,38 / 2,93	0-66,8 / 0-21,1	52-10 / 18-46	machinist5p-1 The mason 4p-1 Tас қалаушы2р-1
3	With delivery material 2 floor preference	Е3-12	733,3	3,6 / 0,22	330,0 / 20,46	0-49 / 0-48	103-64 / 124-37	machinist5p-1 The mason 4p-2 The mason3p-2
4	2 floor slab coating installation	Е4-1	78	1,2 / 0,3	14,61 / 3,02	0-66,8 / 0-21,1	53-50 / 17-54	machinist5p-1 The mason 4p-1 The mason 2p-1
5	Preference for attic walls	Е3-12	189,7	3,6 / —	85,57 / 5,31	2-17 / —	411-69 / —	machinist5p-1 The mason 4p-2 The mason3p-2
6	Slab contraction joints should intersect at the openings for columns	Е4-1	78	1,2 / 0,3	14,61 / 3,02	0-84,9 / 0-31,8	58-10 / 19-46	machinist5p-1 The mason 4p-1 The mason 2p-1
7	Parapet installation	Е3-12	17,25	3,3 / —	6,68 / 0,41	0-84,9 / 0-31,8	58-10 / 19-46	The mason5p-1 The mason 4p-2 The mason3p-2
	Everything:				700,43 / 79,67		3202-54 / 405-70	

Machines and mechanisms used

Name	mark, ГОСТ, ТУ	unit. Measurement	Required. number nembers
Electric Balta	МЭ-4202А	N	1
scarpelder for stone work	ТУ-22-4399-79	N	3
Балта-кирочка МКИ	ГОСТ 11049-83	N	7
Balta-fist МКИ type	ГОСТ 11049-83	N	3
Metal scraper	ТУ-22-4629-80	N	1
Shovel the solutionПР type	ГОСТ 3620-76	N	4
Concrete and stone works КБ	ГОСТ 9533-81	N	7
Steel canopies К-40, К-50 type	ТУ-22-401-82	N	1
Steel seams Р1 and Р2 type	ГОСТ 12803-76	N	5
Assembled metal meter	МСМ 49-77	N	4
Marking cord	ТУ-22-5076-81	N	4
Steel type suspension	ГОСТ 7948-80	N	5
Angular tree	ТУ-22-3949-77	N	2
Construction levelУС-1 type	ГОСТ 9416-83	N	1
Flexibility level (aqueous	ТУ-25-11760-77	N	1

Technical and economic indicators

Name	Indications
Normative labor costs of workers per person	5095,09
Normative consumption of machine time mash.h	636,59
Wages of employees at prices in 2013 tenge	3202-54
Wages for mechanized work tenge	405-76
Duration of work	39
labor costs per person per shift	1,84

name	Document №	Signature	date
Head of Dep	Akmalayuli K.A.		
Superviser	Kozyukova.N.V		
Consultant	Kozyukova.N.V		
Controller	Kozyukova.N.V		
Prepared by	M.Younis sarwari		

KazNITU -5B072900 .29-03/2020 DP

school for children with special needs in Karganda city

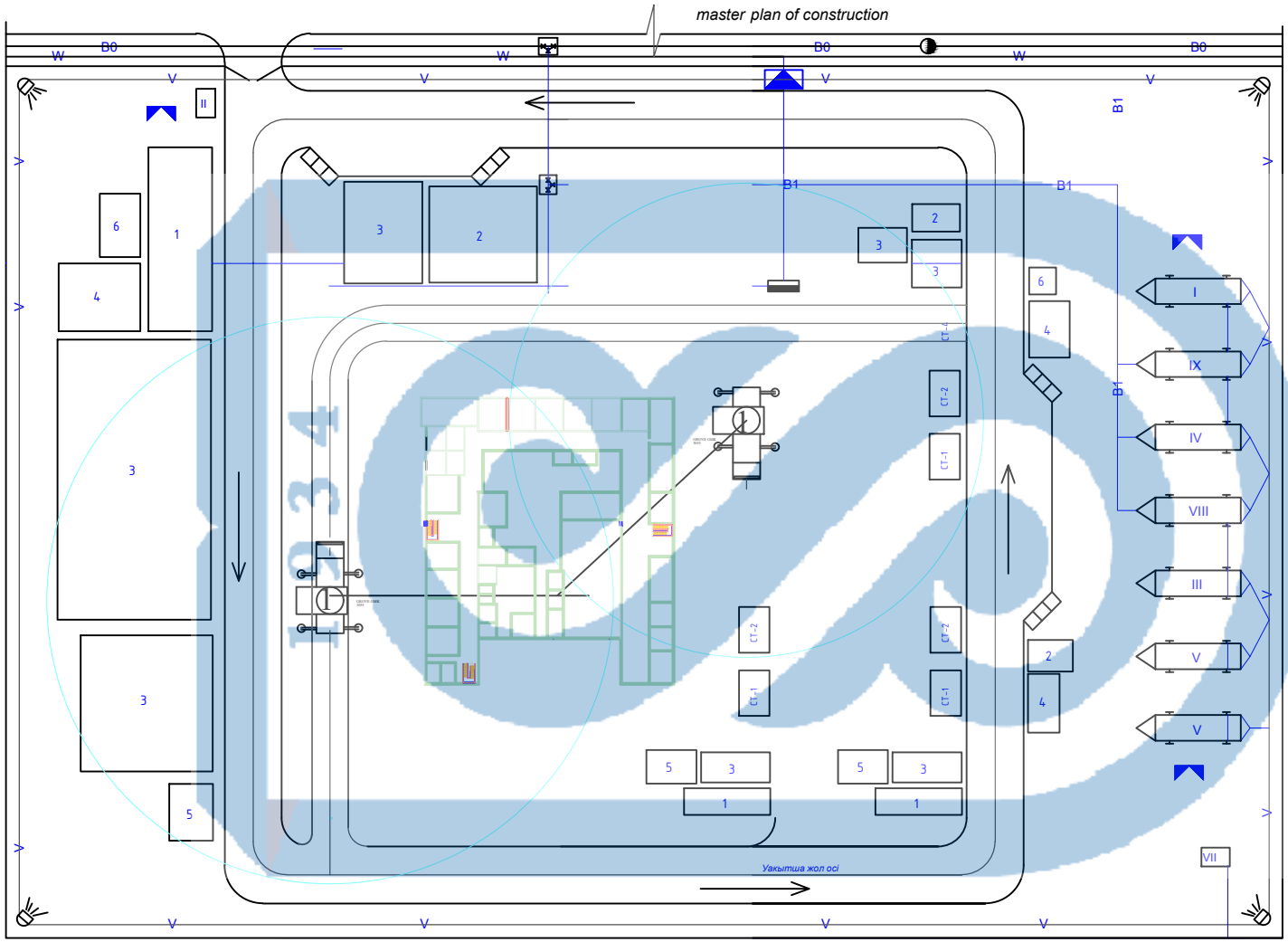
Technological part

Level	Sheet	scale
DP		1:200

the scheme of the pit

Department of Construction and Building Materials

master plan of construction



CONDITIONAL SYMBOLS

- projected building
- temporary mobile building
- shed
- production warehouse area
- fire safety equipment
- W — power line
- V — temporary lighting networks
- fire safety shield
- heavy wardrobe
- transformer
- danger zone boundary
- the boundary of the work area
- fencing of the territory
- concrete and solvent reception point
- lighting device
- water supply connections
- permanent water supply of general purpose
- temporary household drinking water

WAREHOUSE EXPLOSION

№	Name	Unit	Measur м2	Warehouse (Open/Shelter)
1	Pillars	м2	119,7	Open
2	Beams	м2	136,5	Open
3	Floor plate	м2	3120	Open
4	Cover plate	м2	152	Open
5	Window blocks	м2	8	Shelter
6	Door blocks	м2	12,2	Shelter

EXPLOSION B3uC

№ п/п	Name	Building type	Building size
I	Dedicated to the foreman	ПСВ	9*2,7
II	Passage-dispatching	Assemble	2*3
III	Change of clothes	ПСВ, combine	9*2,7
IV	Washing up	ПСВ	9*2,7
V	Dining and rest area	ПСВ	9*2,7
VI	Place of heating	ПСВ	9*2,7
VII	Cleaner	Assemble	2*3
VIII	Plumbers	ПСВ, combine	9*2,7
IX	Electricians	ПСВ	9*2,7

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Consultant	Kozyukova.N.V		
Controller	Kozyukova.N.V		
Prepared by	M.Younis sarwari		
Technological part	Level: DP	Sheet:	scale: 1:200
master plan of construction	Department of Construction and Building Materials		

Schedule of work production

	name of works	scope of work		labor costs per/person	Shift number	number of units per shift	number of jobs in the unit	the term of the work is days
		unit of measurement	scope of work					
1	cutting the plant layer	м3	517.8	0.57	1	1	1	1
2	the search for the pit	м3	4354.3	4.78	1	1	1	2
3	compaction of the mass	м3	1553	2.29	2	1	1	1
4	regrouping of the pit	м3	1318	0.95	1	1	1	1
5	Concrete blank placement	м3	224.38	36.93	2	3	2	3
6	Reinforced concrete foundations placement	м3	138	80	2	2	4	5
7	Tape foundations placement	м3	541.34	186.2	2	2	4	12
8	reinforced concrete columns placement	м3	132.42	113.68	2	2	4	7
9	reinforced concrete beams placement	м3	310.6	258.91	2	2	4	16
10	1-floor out masonry walls	м3	279.13	154.59	2	6	2	7
11	1-upstairs room masonry walls	м2	245.68	48.55	2	1	2	12
12	1-the floor solid cast installation of hinges	м3	70.48	112.56	2	1	4	7
13	1-floor tiles installation	piece	122	29.92	2	1	4	4
14	1-layer solid cost casting coating	м3	56.79	579	2	1	12	12
15	2-exterior layer brick walls	м3	271.88	133.41	2	6	2	6
16	2-laying ceramic walls on the floors of the room	м2	184.215	27.19	2	2	2	7
17	2-the installation of the second floor solid cast iron	м3	40.07	34.09	2	1	4	4
18	2-installation of floor tiles	piece	122	29.92	2	1	4	4
19	2-pouring a layer of solid cast coating	м3	35.79	363	2	1	12	8
20	3-layered exterior walls of ceramics preference	м3	121.69	96	2	6	2	4
21	3-tiling of multi-storey partition walls	м2	80.6	22.65	1	2	2	3
22	3-the installation of the third floor solid cast iron	м3	28.56	31.85	2	2	4	2
23	3-pouring a layer of solid cast coating	м3	94.19	958.8	2	1	12	20
24	placemen of stairs and platform	piece	4	0.68	1	1	2	1
25	Installation of window blocks	м2	970.2	103.77	2	2	2	13
26	Installation of door blocks	м2	260.08	38.65	2	1	2	9
27	plaster from cement-lime mortar	м2	3840.08	473	2	2	5	23
28	water emulsion painting of room walls	м2	3840.08	277.69	2	10	1	14
29	the thickness is poured 20mm cement screed	м2	1770	76.79	2	3	3	4
30	installation of 20 mm thick mosaic floor	м2	673	128.88	2	5	2	6
31	Parquet floor installation	м2	3064	115.78	2	5	2	6
32	installation of ceramic floor tiles	м2	1532	198	2	5	2	10
33	Cement flooring	м2	3064	125.21	2	3	3	7
34	installation of wooden and concrete plinths	М	1707.86	40.3	2	2	1	3
35	the installation of short elements of the roof	м3	60.28	165.37	2	5	2	8
36	Installation of staples	м3	78.96	212.8	2	5	2	11
37	coating of metal tiles	м2	1137.6	65.83	1	5	2	4

Months: May | June | July | August | september | October

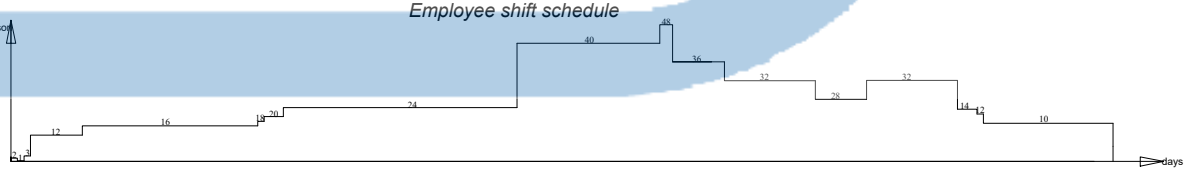
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

Technical-economic indicator

N	name	unit of measurement	number
1	duration of construction works	month	5,5
2	labor intensity of construction works	person-day	5328.6
3	Normative labor input		83.8534
4	Estimated cost	thousand tenge	793724.266
5	Estimated salary	thousand tenge	113561.797

K = N/Nop < 1,5
Nop = Q/ T
N - maximum number of workers on the construction site number
Q - total labor capacity
T - Duration of construction works days
Nop - average construction site workers саны
Nop = Q/ T =5328,6/166 = 32.10
K = N/Nop = 48/26,85 = 1,49 < 1,5

Employee shift schedule



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Consultant	Kozyukova.N.V			
Controller	Kozyukova.N.V			Schedule of work production
Prepared by	M.Younis sarwari			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: Саррари Мохамад Юнус

Название: School for children with special needs in Karaganda

Координатор:Надежда Козюкова

Коэффициент подобия 1:2

Коэффициент подобия 2:0

Замена букв:4

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: Саравари Мохамад Юнус

Название: School for children with special needs in Karaganda

Координатор: Надежда Козюкова

Коэффициент подобия 1:2

Коэффициент подобия 2:0

Замена букв:4

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

Sarwari Mohammad Younis
5B072900-Civil Engineering

Topic: “School for children with special needs in Karaganda”

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

The student successfully completed all the tasks. Sarwari Mohammad Younis 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 excellent 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
Master of technical science, lecturer

_____ Kozyukova N.V.

«25» _____05_____ 2020г.