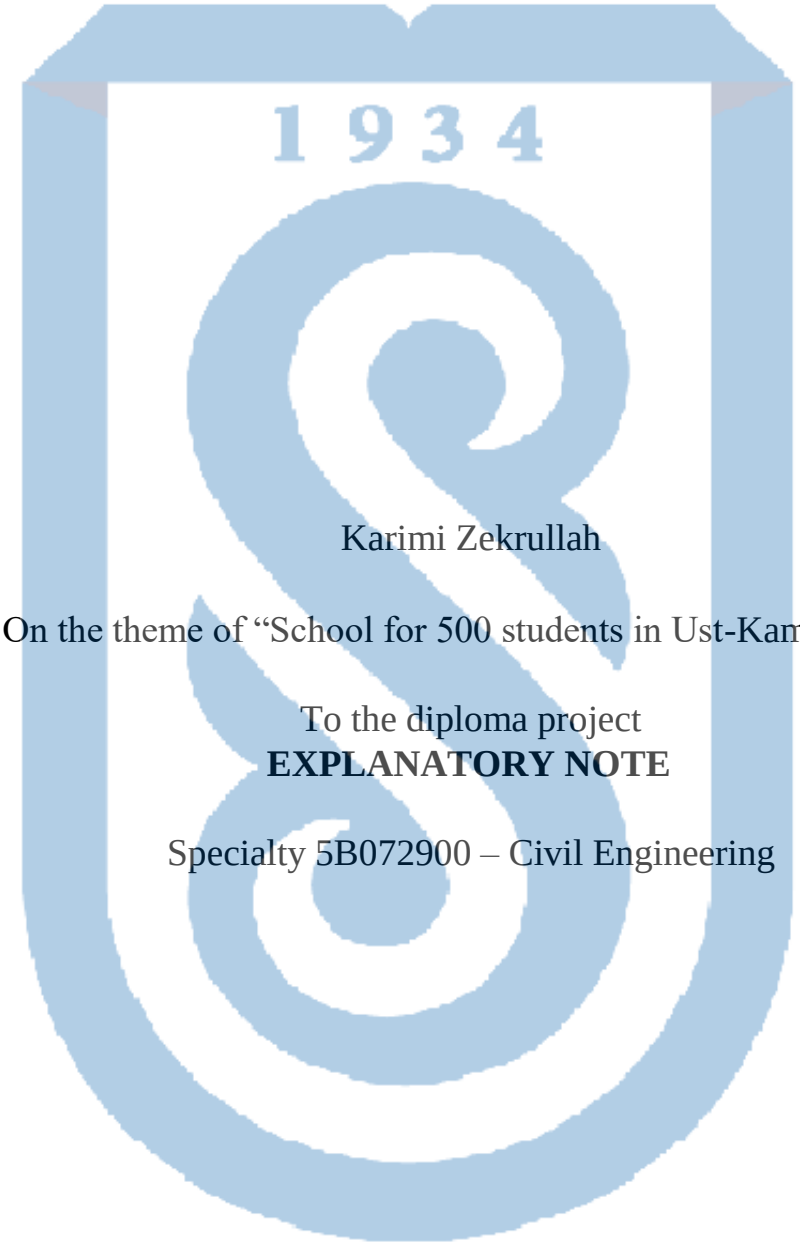
MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN
Kazakh National Research Technical University named after K.I. Satpayev
Institute of Architecture, Construction and Energy named after T. Basenov
Department of «Construction and Building Materials»



Karimi Zekrullah

On the theme of “School for 500 students in Ust-Kamenogorsk "

To the diploma project
EXPLANATORY NOTE

Specialty 5B072900 – 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 500 students in Ust-Kamenogorsk"

Specialty 5B072900 – Civil Engineering

Prepared by Karimi Zekrullah

Supervisor Kozyukova N.V.

«_25_» __05__2020 y.

Almaty 2020

MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN

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Department of «Construction and Building Materials»

APPROVED
Head of Department
_K.Akmalayuli
«27»____01___2020 y.

ASSIGNMENT

Complete a diploma project

Student __ Karimi Zekrullah
Topic "School for 500 students in Ust-Kamenogorsk"
№ _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 – Ust-Kamenogorsk.
Rundown of issues to be considered in the recognition venture:
1 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;
2 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
3 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):
1 Facade of the structure, segments, joints, determinations, plans - 4 sheets;
2 Drawing, detail of the section - 2 sheets;
3 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	

Date 2020---

Supervisor N.V. Kozyukova

The student accepted the task Z. Karimi

АННОТАЦИЯ

Разработан сайт средней общеобразовательной школы на 500 учеников, расположенный в районе

1. пересечение улиц БУРОВ, № 36, в Усть-Каменогорске (Усть-Каменогорск).
2. Участок, отведенный под застройку, имеет форму прямоугольника с общими размерами от 170,0 до 154,0 м. Общая площадь школьного участка составляет 2,6189 га.
3. Вся территория школы разделена на зоны: учебно-экспериментальная зона, зона отдыха, спортивно-оздоровительная зона, подсобное помещение с площадкой для мусорных контейнеров, парковка на 36 машин.

АНДАТПА

Ауданда орналасқан 500 оқушыға арналған орта мектепке арналған сайт Буров көшелерінің қиылысы, № 36, Өскемен (Өскемен).

1. Әзірлеу үшін бөлінген учаске жалпы өлшемдері 170,0-ден 154,0 м-ге дейінгі төртбұрыштың пішініне ие. Мектеп алаңының жалпы ауданы 2,6189 га құрайды.
2. Мектептің барлық аумағы аймақтарға бөлінеді.
3. жаттығу және эксперименттік аймақ, демалыс аймағы, спорттық-сауықтыру аймағы, қоқыс контейнері үшін алаңы бар коммуналдық аймақ, 36 көлікке арналған тұрақ қарастырылған.

ANNOUNCEMENT

Designed site medium secondary school for 500 students located in the area intersections of BUROV streets, No. 36, in Ust-Kamenogorsk(Oskemen).

1. The site allocated for development has the shape of a rectangle with total dimensions of 170.0 to 154.0 m. The total area of the school site It is 2.6189 ha.
2. The entire territory of the\ school is divided into zones.
3. training and experimental zone, recreation area, sports and fitness zone, utility area with a platform for garbage containers, parking for 36 cars is provided.

CONTENT

INTRODUCTION

The project provides for the construction of a 3-story school building with dimensions in axles 77400x77200. Design capacity school-500 students. The organizational and pedagogical structure of the school 3: 3: 3, i.e. full high school with three parallels. Composition of classrooms adopted in agreement with the Ministry of Education and Science, taking into account curriculum for subsequent years.

Also taken into account in the project the possibility of providing inclusive equipment, i.e. involvement disabled people in society, providing access to education for children with special needs. The main goal of integrated (inclusive) education is the realization of the rights of children with disabilities educational opportunities at the place of residence in according to their cognitive abilities and abilities, their social adaptation and integration into society, increasing the role of the family in education and development of your child.

To ensure physical access to school for children with disabilities The functions of the musculoskeletal system include an elevator, a ramp, special furniture. Students with disabilities in development in general education school are provided correctional pedagogical support (escorted). Corrective pedagogical support within the organization of education is provided special teacher (teacher-dialectologist, psychologist or social educator).

The building provides for the installation of a passenger elevator with a loading capacity of 1000 kg. The school is designed as a whole complex of volumes with a single school-wide center. The main entrance to the building is through the lobby, from which the main ways the students move: passage to the dining room, to training blocks, administration rooms, medical cabinet. The main compositional element of training blocks is expanded recreational training blocks through which passes overhead light to the first floor. For storing outerwear and personal of things schoolchildren provided for setting individual metal cabinets in recreational training blocks along the walls. The building consists of blocks A, B and C.

1 The architecture part

1.1 The general part

The standard design is developed in accordance with the assignment for design approved by the Construction Committee, housing and communal services and land management Ministry of Economy of the Republic of Kazakhstan.

Typical project designed for construction in the climate subarea Estimated outdoor temperature: For climate subarea IB

Fire resistance of the building - II;

Degrees of durability - II;

Class of constructive fire safety - CO;

Functional fire safety class - F 4.1

1.2 General plan and improvement Characteristics of the site

Designed site medium secondary school for 500 students located in the area intersections of BUROV streets, No. 36, in Ust-Kamenogorsk(Oskemen).

The site allocated for development has the shape of a rectangle with total dimensions of 170.0 to 154.0 m. The total area of the school site It is 2.6189 ha.

Table 1.1 - The main indicators for the master plan are given in

Name of indictors	Unite	Amount location on	%	MOUNT OF SITE
Land area	ha	2,6189	100	0,5428
Built up area	M2	3973.54		-
The coverage area of driveways, sidewalks, sports and gaming platforms, blind areas	M2	13467.08		3103,0
Landscaping area	M2	8748.38		2325,0

1.3 Planning decision

The entire territory of the school is divided into zones: training and experimental zone, recreation area, sports and fitness zone, utility area with a platform for garbage containers, parking for 36 cars is provided. For solemn buildings in front of the main entrance of the school provides a site. The fencing of the school territory is provided by

reinforced concrete trellised h = 1.6 m according to the series 3.017-1. There are 2 entrances to the school site gates and 4 gates. Fill the pit for jumping with clean sand (without stones, branches and leaves) mixed with sawdust. Before class the contents of the pit are loosened and leveled. The sides of the pit are running on flush with the ground and lined with tarpaulin or rubber. The platform for containers for collecting garbage is organized at the northeast side of the site. Containers are located on asphalt concrete pavement and have a fence on 3 sides with a height of 1.5 m. The designed school building is located in compliance with fire and sanitary standards.

1.4. Landscaping and gardening

All passages are 3.5 m wide. asphalt concrete pavement. Platform for ceremonies and sidewalks near the school building are covered with paving tiles. Playgrounds for schoolchildren, sports fields and paths to them have sand and gravel. On the contour of the designed driveways, sidewalks, sports and leisure grounds are installed on-board a rock. Landscaping of the site is provided taking into account the requirements of SNiRK 3.01- 01Ac-2007. The assortment of plants was selected in accordance with the soil climatic conditions of the area. The climatic conditions for the growth of extremely heavy. Therefore, for the normal growth and development of woody shrub vegetation requires a full range agricultural activities.

Table 1.2 - Technical and economic indicators

Name	Unite	area
Land area	ha	2.6189
build up area	M2	3973.54
The coverage area of driveways, sidewalks, paths and sites	M2	13467.08
area of a / b coating	M2	2887.00
Paving area	M2	2647.00
Area of blind area	M2	380.0
Area of sand and gravel base	M2	2676.00
Area of the pit for jumping	M2	19.35
Square football field	M2	1450.0
Tartan coating area	M2	3407.83
Landscaping area	M2	8748.38
Building percentage	%	15
Percentage of coating	%	52
Present gardening	%	33
Area of additional landscaping	ha	0.5428

1.5 Architectural and planning decisions

Architectural and planning decisions of a school building for 500 students made according to the building for design and in accordance with regulatory requirements:

SP RK 3.02-111-2012, SN RK 3.02-11-2011 "General education institutions" with amendments and additions as of 09.10.2015

SNiP RK 3.02-02-2009 "Public buildings and structures"

RDS RK 2.04-08-2009 "Technical requirements for equipment systems

security and engineering strength strategic especially important government and life support facilities Republic of Kazakhstan";

SP RK 2.02-20-2006 "Fire safety of buildings and structures";

SN RK 2.02-11-2002 "Norm of equipment of buildings, premises and structures automatic fire alarm systems, automatic

fire extinguishing installations and warning people about a fire";

SN RK 3.01-00-2011 "Instruction on the development, coordination,

approval and composition of project documentation for construction ";

SNiP RK 2.04-01-2010 "Construction climatology"; SN RK 3.02-37-2013, SP RK 3.02-137-2013 "Roofs and Roofs"; SP RK 2.04 104 2012 "Natural and artificial lighting"; MSN 3.02-05-2003 "Accessibility of buildings and structures for people with limited mobility population groups "

1.6 Basic Architectural and Planning Solutions

The educational part of the school includes 36 classes general education subjects with a capacity of each 25 students, Total 500 students. Architectural and planning decision secondary school for 500 students provided in the form a complex of buildings (blocks) with a single school-wide center - Block B. Dimensions of the building in axes 77.40m×77.20m Preschool, elementary middle and senior classes are distributed in blocks so as to separate the flows of different age groups of schoolchildren. The structure provides for 3 blocks - A, B, C.

1.7 Block A

Block A is provided in three floors and is intended for students from 5 to 11 classes with the placement of classrooms with all necessary premises of the secondary general education level: workshops of the labor training, classrooms, administration rooms, specialized classrooms, laboratories. The height of the floor is 3.3 m. The height of the technical underground is 2.7 m. The height of the technical floor is 1.6 m. Block A has a stairwell with natural light. through openings in the outer walls. Insulation of

premises is provided within the limits of standards. In project conditions for unhindered and comfortable movement mobility groups. At the entrance there is a ramp with regulatory bias of 12%.

The technical underground is located engineering building support: ventilation chamber. Exits from the technical underground are isolated from exit the building and lead directly out. Basement facing - splitter tile. The external enclosing walls of the technical underground - basement wall panels and diaphragms of rigidity, consist of prefabricated reinforced concrete panels 160 mm thick and covered with a prefabricated crossbar. Basement partitions.

1.8 Block C

Block C is provided in three floors is a central block with lobby and distribution area and is designed to accommodate dining room, auditorium, gym. Floor height 3.9 m. Gym height to the bottom of the protruding structures 7 m. The height of the auditorium is 3.6 m. The height of the thermal field is 2.7 m. Block C has two stairwells with a natural lighting through openings in the exterior walls. Gym evacuation provided through a metal staircase. Insulation of premises is provided within the limits of standards. In project conditions for unhindered and comfortable movement mobility groups. At the entrance there is a ramp with

regulatory bias of 12%. The technical underground is located engineering building support: switchboard, heat point, water meter unit, ventilation chamber. Exits from the technical underground are separated from the exit from the building and lead directly out. Basement facing – splitter tile.

The external enclosing walls of the technical underground – basement wall panels and diaphragms of rigidity, consist of prefabricated reinforced concrete panels 160 mm thick and covered with a prefabricated crossbar.

Basement partitions – brick КР-р-по 250х120х88 / 1,4НФ / 100 / 2,0 / 50 GOST 530-2012, on a solution of M50.

Jumpers – prefabricated series 1.038.1-1 issue 4External enclosing walls of 1-3 floors, attic – brick KR-r-po250x120x88 / 1.4NF / 100 / 2.0 / 50 / GOST 530-2012, on a M50 solution. Value axial tensile strength of masonry untied seams should be 120 kPa. The external brick wall is reinforced with a grid of BP-I 50x450 GOST 6727-80 every 7 rows of masonry.

Outside on the masonry, an external thermal insulation system of buildings with thin plaster on a heater, according to SP 12-101-98. The sequence of operations during installation of the thermal insulation system:

- glue for attaching insulation plates to the base – 4 mm;
- insulation layer – mineral wool slab on basaltfiber with a density of 145 kg / m3 GOST 4640-2011;

- plastic “plate” type dowels with a metal core
- processing of openings, corners and other places of abutment;
- Protect external corners and edges from mechanical damage by installation of perforated corner profile made of aluminum or galvanized steel, the corners sit on the adhesive directly on insulation along the entire height of the wall;
- in the places of adjacency of the insulation to the structural elements of the building (window, doorways, lower part of the wall) its vertical and horizontal edges on the side protect perforated profiles made in the form of a channel, the profile is preliminary fastened to the wall with screwed dowels.
- reinforced bottom layer of plaster with recessed into it reinforcing mesh – 4 mm (ordinary fiberglass mesh alkali-resistant or treated with alkali-resistant compounds);
- the second layer of plaster – 4 mm;
- primer;
- a finishing layer of a rough cover, vapor-permeable – 3mm. Exterior finish – facade paint. Partitions – gas block of thicknesses. 200 mm In 2,5 D600, GOST 21520-89, on glue (thickness of the adhesive layer in horizontal and vertical joints 2.0 mm) with an air gap of 40 mm thickness. Partitions in bathrooms
- brick KR-r-250x120x88 / 1.4NF / 100 / 2.0 / 50 GOST 530-2012, on a solution of M50. Insulation of the attic floor – minplita Techno Ruf V 180 kg / m3 GOST 4640-2011. The insulation is covered with a screed of cement-sand mortar with a thickness of 30 mm Ceilings, coatings – reinforced concrete slabs. Stairs – prefabricated reinforced concrete marches. All steel structures (stepladders, grilles, etc.) are made of ferrous metal, painted with enamel PF 115 GOST 6465 (in 2 layers) according to preliminary primer GF-021 GOST 25129. The roof of the projected building is rolled, the attic is cold, with an internal gutter. There is a lift to the attic along the main stairs. Exits from the attic to the roof through the main stairs are provided. Window blocks – a double-chamber double-glazed window in a single cover of PVC Glasses with soft selective coating with inter-glass distance of 12 mm. Jumpers – prefabricated series 1.038.1-1 issue 4 and metal individual production.

1.9 Block B

Block B is provided in two floors and is designed to accommodate training classes for the junior educational level. Floor height 3.3. m The height of the technical underground is 2.1 m. The height of the technical floor is 1.6 m. Block B has a stairwell with natural light. through openings in the outer walls. Insulation of premises is provided within the limits of standards. In project conditions for unhindered and comfortable movement mobility groups. At the entrance there is a ramp with regulatory bias of 12%. The technical underground is located engineering building support: switchboard, heat point, water meter unit, ventilation chamber. Exits from the technical

underground are separated from the exit from the building and lead directly out.

Basement facing - splitter tile. The external enclosing walls of the technical underground - basement wall panels and diaphragms of rigidity, consist of prefabricated reinforced concrete panels 160 mm thick and covered with a prefabricated crossbar. Basement partitions - brick КР-р-по 250х120х88 / 1,4НФ / 100 / 2,0 / 50 GOST 530-2012, on a solution of M50. Jumpers - prefabricated series 1.038.1-1 issue 4 External enclosing walls of 1-3 floors, attic - brick KR-r-po250x120x88 / 1.4NF / 100 / 2.0 / 50 / GOST 530-2012, on a M50 solution. Value axial tensile strength of masonry untied seams should be 120 kPa. The external brick wall is reinforced with a grid of BP-I 50x450 GOST 6727- 80 every 7 rows of masonry. Outside on the masonry, an external thermal insulation system of buildings with thin plaster on a heater, according to SP 12-101-98.

The sequence of operations during installation of the thermal insulation system:

- glue for attaching insulation plates to the base - 4 mm;
- insulation layer - mineral wool slab on basalt fiber with a density of 145 kg / m3 GOST 4640-2011;
- plastic "plate" type dowels with a metal core (7 pcs. Per 1 m2);
- processing of openings, corners and other places of abutment; - Protect external corners and edges from mechanical damage by installation of perforated corner profile made of aluminum or galvanized steel, the corners sit on the adhesive directly on insulation along the entire height of the wall;
- in the places of adjacency of the insulation to the structural elements of the building (window, doorways, lower part of the wall) its vertical and horizontal edges on the side protect perforated profiles made in the form of a channel, the profile is preliminary fastened to the wall with screwed dowels.
- reinforced bottom layer of plaster with recessed into it reinforcing mesh - 4 mm (ordinary fiberglass mesh alkali-resistant or treated with alkali-resistant compounds);
- the second layer of plaster - 4 mm;
- primer;
- a finishing layer of a rough cover, vapor-permeable - 3mm. Exterior finish - facade paint. Partitions - gas block of thicknesses. 200 mm In 2,5 D600, GOST 21520-89, on glue (thickness of the adhesive layer in horizontal and vertical joints 2.0 mm) with an air gap of 40 mm thickness. Partitions in bathrooms - brick KR-r-250x120x88 / 1.4NF / 100 / 2.0 / 50

GOST 530-2012, on a solution of M50. Insulation of the attic floor - minplita Techno Ruf V 180 kg / m3 GOST 4640-2011.

The insulation is covered with a screed of cement-sand mortar with a thickness of 30 mm Ceilings, coatings - reinforced concrete slabs. Stairs - prefabricated reinforced concrete marches All steel structures (stepladders, grilles, etc.) are made of ferrous metal, painted with enamel PF 115 GOST 6465 (in 2 layers) according to preliminary primer GF-021 GOST 25129. The roof of the projected building is rolled, the attic is

cold, with an internal gutter. There is a lift to the attic along the main stairs. Exits from the attic to the roof through the main stairs are provided. Window blocks - a double-chamber double-glazed window in a single cover of PVC Glasses with soft selective coating with inter-glass distance of 12 mm. Jumpers - prefabricated series 1.038.1-1 issue 4 and metal individual production.

1.10 Training Area

Training rooms include a working area (placement of training student tables), teacher's work area, extra space for placement of educational and visual aids. Demo place teacher in the classrooms of chemistry, biology, physics raised relative to the floor level using a podium 15cm high. Training places depending on the purpose of the premises, equipped with supply systems water, electricity, sewage. Foreign language cabinets equipped with language laboratories half-cups, a teacher's desk with a remote control controls, TV, language receptive installations. IN classrooms provide frontal arrangement of study tables. In the computer science cabinet there is an ordinary and perimeter arrangement of computer tables. Distance between computer the side surfaces are 1.2 meters. The distance from the monitor to the rear side of the computer with an ordinary arrangement of 2 meters.

1.11 Dining Area

Catering for all age groups of students is organized in the dining room. The dining room is designed for 312 seats. Production the premises are fully developed, taking into account the work of the dining room on raw materials. The production capacity of the dining room is 4050 dishes / day. Time work of the dining room from 8.00 to 17.00 6 days a week. Estimated number of dishes taken on the basis of the norm of dishes per student-breakfast-1.5 dishes, lunch- 2.5 dishes, taking into account the possibility of catering for school staff. When space-planning decision was provided flow technological processes excluding counter flows of raw materials, raw semi-finished and finished products, used and clean dishes, and also oncoming traffic of visitors and staff. Production workshops are equipped with thermal, refrigeration, mechanical and auxiliary equipment. The arrangement of equipment is linear-group, allowing group it by process technology with placement in a line. Ancillary equipment is installed in independent lines, located parallel to the lines of thermal equipment. Plot cooking of second courses is equipped with stoves, boilers and other technological equipment. Mechanical equipment in workshops located taking into account convenient maintenance of all technological lines. Workshops have convenient communication with each other, as well as with other rooms. Cold dishes are prepared in a cold area. Realization of ready meals carried out through the transfer case for senior classes and on

duty students for elementary grades. Washing the kitchen and tableware, it is made in specially allocated rooms. Food delivery and The goods are transported by road through the loading zone. In places the greatest heat and moisture emission the project provides for installation exhaust and supply and exhaust umbrellas. The dining room works in one shift. The number of employees in the dining room 13 people Including 1 canteen manager, 4 cooks, 2 distributor cooks, 3 dishwashers, 2 room cleaners, 1 freight forwarder. The dining room.

1.12 Electric lighting

1.12.1 Block A

The section is based on design assignments, assignments architectural, technological and sanitary sections of the project and is developed in accordance with the requirements of the regulations, operating in the territory of the Republic of Kazakhstan:

-Rules of electrical installations of the Republic of Kazakhstan (PUE RK 2015);

-CH RK 4.04-106-2013 * "Electrical equipment for residential and public buildings. Design Rules ";

-SP RK 3.02-111-2012 "Educational institutions";

-CH RK 1.02-01-2009 "Instructions for standard design";

-CH RK 2.04-104-2012 "Natural and artificial lighting." The working draft provides for working lighting of premises, evacuation and emergency lighting. Illumination rates and safety factors adopted in accordance SN RK 2.04-104-2012.

For connecting group lighting lines and a power outlet installation of mounted switchboards of the ShchRN-P type is provided lockable type, including:

- at the input to the shield, automatic switches for the release current 25A;

single-pole circuit breakers for releases 16 A;

-Differential circuit breakers for current 20 A (30 mA) to protect groups with outlets. The choice of types of lamps and light sources made in in accordance with the purpose of the premises and environmental conditions. Combined lighting is used to illuminate classrooms.

Preparation of the floor, in PVC pipes. Management of work, emergency and emergency lighting performed locally by circuit breakers. The installation height of the switches in the premises for children is 1.8m from the floor on the wall from the side of the door handle. In other rooms – until 1m from the floor.

Table 1.3 - The block B categories

Name	Unite	Data
Power Category		II
Mains voltage	IN	380/220
Installed capacity	kW	25.8
Design load	kW	25.0
Maximum voltage loss	%	2.0
The illuminated area	m2	5571,99
amount from LED fixtures	PCS	476
amount fixtures from fluorescent tubes	PCS	71

1.12.2 Block C

The section is based on design assignments, assignments architectural, technological, and sanitary sections of the project and is developed in accordance with the requirements of the regulations, operating in the territory of the Republic of Kazakhstan:

-Rules of electrical installations of the Republic of Kazakhstan (PUE RK 2015);

-CH RK 4.04-106-2013 * "Electrical equipment for residential and public buildings. Design Rules ";

-SP RK 3.02-111-2012 "Educational institutions";

-CH RK 1.02-01-2009 "Instructions for standard design";

-CH RK 2.04-104-2012 "Natural and artificial lighting." The working draft provides for working lighting of premises, evacuation and emergency lighting.

Illumination rates and safety factors adopted in accordance SNiP RK 2.04-104-2012. For connecting group lighting lines and a power outlet installation of mounted switchboards of the ShchRN-P type is provided

lockable type, including:

- at the input there is a shield automatic switches for the current of the release 25 A;

- single-pole circuit breakers for releases 16 A;

- differential circuit breakers for current 20 A (30 mA) to protect groups with outlets. The choice of types of lamps and light sources made in in accordance with the purpose of the premises and environmental conditions.

Installation height of circuit breakers in children's rooms 1.8m from the floor on the wall from the side of the door handle. In other rooms – until 1 m from the floor.

1.13 Protective measures

All electrical work to be done qualified personnel in compliance with the rules of technology safety, taking into account the requirements of the PUE RK 2012, GOST, SNiP RK, SN RK and other applicable regulatory documents. All electrical equipment and materials used must be

Table 1.4 – The block C categories

Name	Unite	Data
Power Category		II
Mains voltage	IN	380/220
Installed capacity	kW	19.6
Design load	kW	19.5
Maximum voltage loss	%	2.0
The illuminated area	m2	3853.2
Quantity from LED lights	PCS	278
Number of fixtures with fluorescent tubes	PCS	156

1.14 Block B

The section is based on design assignments, assignments architectural, technological, and sanitary sections of the project and is developed in accordance with the requirements of the regulations, operating in the territory of the Republic of Kazakhstan:

-Rules of electrical installations of the Republic of Kazakhstan (PUE RK

-CH RK 4.04-106-2013 * "Electrical equipment for residential and public buildings. Design Rules ";

-SP RK 3.02-111-2012 "Educational institutions";

-CH RK 1.02-01-2009 "Instructions for standard design";

-CH RK 2.04-104-2012 "Natural and artificial lighting."

The working draft provides for working lighting of premises, evacuation and emergency lighting. Illumination rates and safety factors adopted in accordance

Snip RK 2.04-104-2012. For connecting group lighting lines and a power outlet installation of mounted switchboards of the ShchRN-P type is provided lockable type, including:

PVC pipes. Management of work, emergency and emergency lighting performed locally by circuit breakers. The installation height of the switches in the premises for children is 1.8m from the floor on the wall from the side of the door handle. In other rooms – until 1 m from the floor.

Table 1.5 - Main technical indicators

Name	Unite	Data
Power Category		II
Mains voltage	IN	380/220
Installed capacity	kW	18.1
Design load	kW	17.4
Maximum voltage loss	%	2.0
The illuminated area	m2	4487.82
Quantity from LED lamps	PCS	331
Number of fixtures with fluorescent tubes	PCS	65

The estimated lighting power of Block A is 19.5 kW.
The estimated lighting power of Block B is 19.5 kW.
The calculated lighting power of Block B is 17.4 kW.

1.15. Lightning protection

According to the joint venture of the Republic of Kazakhstan 2.04-103-2013, the school building is subject to lightning protection according to the requirements of category III (passive). An air terminal is used as an air terminal with a step of a cell no more than 6x6 m, made of steel wire 6 mm in diameter, laid on the roof of the building under a layer of insulation. The down conductors are made of round steel with a diameter of 8 mm and laid from the air terminal to the ground electrodes on the outer walls building. To protect television and radio antennas from atmospheric discharges the project provides for the connection of antennas with an air terminal mesh (see section CC). All lightning protection connections are made by welding.

Earthling switches made of three steel vertical electrodes with a diameter of 16 mm long 3 m, united by horizontal an electrode from a steel strip with a section of 40x4 mm. All electrical work must be completed. qualified personnel in compliance with the rules of technology safety, taking into account the requirements of the PUE RK 2015, GOST, JV RK, SN RK and other applicable regulatory documents. All electrical equipment and materials used must be certified.

Table 1.6 - Main technical indicators

Name	Inductors	Note
Reliability Category	VRU-1 VRU-2	II
power supply	II	
Voltage	38/0/220 380/220	
Total rated power,	kW 187.33 96.09	

Continue of Table 1.6

Power factor	0.95	0.98
Maximum losses voltage%	1,0	0.5

1.16 Communication system

The design of the communication device is made in accordance with GOST 21.603-80. IN the building are foreseen devices domestic structured cabling locally computer network telephone systems, video surveillance networks, television, clock.

1.17 Structured cabling

The SCS project was developed on the basis of architectural and construction, technological and sanitary - technical parts of the project, assignments for design as well as technical specifications. This project provides the following types of structured cable network:

- telephone network;
-local - computer network.

1.18 Grounding

To protect low-current devices from atmospheric discharges The project provides for a lightning rod device. Grounding is subject to dispatch of elevators. Paved grounding line made of round steel d = 6mm from the communication room, which taken into account in the electrical part of the project.

1.19 Fire alarm

1.1 Detailed design of an automatic fire alarm system, warning systems and evacuation management of the building "Medium secondary school for 500 students for IB, IIB, IIIA, IIIB climatic subareas with normal geological conditions", located at: OSKEMEN

1.2 The project proposes equipping the following systems:

- warning system and evacuation control.

1.3. The working draft has been completed in accordance with the requirements of: SN RK 2.02-11-2002 * "Standards for the equipment of buildings, premises and constructions with APS, AUP systems and fire warning of people"; Technical

Regulation "Fire Safety Requirements to protect objects"; GOST 31565-2012 "Cable products. Fire requirements security";

Snip RK 3.02-10-2010 "The device of communication systems, alarm and dispatching of engineering equipment of residential and public buildings. "This documentation is allowed to work after it checks and coordination with the customer. The working documentation is developed in accordance with the task for design and technical regulations.

1.20 Cable lines

4.1 Addressable loops of the SS are performed by the cable KPSng (A) - FRLSLTx

1x2x0.35 mm2.

4.2 12V power lines are carried out by KPSng (A) -FRLSLTx cable 1x2x0.75 mm2.

4.3 Voice Alarm System Lines KPSng (A) -FRLSLTx 1x2x0.75 mm2.

4.4 Lines of the public address system are carried out by cable KPSng (A) FRLSLTx 1x2x0.5 mm2.

4.5 RS-485 interface lines are performed by KPSEng (A) cable - FRLSLTx 1x2x0.5mm2.

4.6 Control lines are carried out by cable KPSng (A) -FRLSLTx

1x2x0.35 mm2.

4.7 Lines between the Sonar RACK and the microphone console performed by Patch Cord RJ-45 cable.

4.8 Cables are laid:

-in the PVC cable channel;

-in a corrugated PVC pipe in technical rooms;

- In a rigid PVC pipe, passages through walls and floors.

1.21 Automatic gas extinguisher

The project section is based on a design assignment, assignments of architectural, construction and sanitary sections project and developed in accordance with regulatory requirements, operating in the territory of the Republic of Kazakhstan:

-Rules of electrical installations of the Republic of Kazakhstan (PUE RK 2015);

-CH RK 2.02-11-2002 * "Standards for the equipment of buildings, premises and facilities system automatic fire department alarm automatic fire extinguishing system and warning people about fire RK 2.02-102-2012 "Fire automation of buildings and structures";

-SNiP RK 3.02-10-2010 "Devices of communication systems, signaling and dispatching engineering equipment of residential and public buildings. Design Standards ";
- SN RK 3.02-11-2011 "Educational institutions";
- SP RK 3.02-111-2012 "Educational institutions";
- SN RK 4.04-07-2013 "Electrical devices."

1.22 Firefighting measures

The school building consists of two 3-storey rectangular blocks (A, C) and one 2-storey block (B), divided among themselves shrink seams, and has a second degree of fire resistance. Class of constructive fire hazard C0 and class of functional fire hazard F4.1.

3-storey block A with a volume of -18137.20 m3, height from ground level to top of the roof - 1357m, dimensions in axles 21.6m by 54.0m. In block classrooms are located with all the necessary facilities and library for students from grades 5 to 11.

Block C has a T-shaped plan consisting of a 3-story transitional part into blocks A, B with dimensions in axes 34.2 m at 13.8 m (20.70 m) s the lobby at the main entrance, an assembly hall with 210 seats on the third floor, variable height 11.69 m, 12.75 m; and 2-story parts with axial dimensions 18.0 on 31.6m, on the ground floor of which there is a dining room with dining a hall for 312 seats, on the second floor - a sports hall, height block 14.53m to the top of the gym roof. The total block is 17871.71m3. 2-storey block In volume-14071.71m3, height-10.27m, dimensions in axles 21.6m to 54.0m. In the block there are training classes with all necessary rooms and a library for students from 1 to 4 classes and preschool children. The total area of the first floor of the school is 3471.63; the second - 3411.90 m2; the third is 1694.03 m2. Above the entire building, except the gym, there is a technical floor 1.6m high. On mark -2,500 and -3,100 there is a technical underground for laying and input of engineering networks. This floor is isolated from the upper floors and has 7 exits. The building has four fire escape stairs - one in blocks A, C and two stairs in block B. From the gym a second emergency exit is provided for the outer glazed the stairs. Three stairs, one in each block, have access to the roof. The message of the roof at elevation is carried out by stepladders. Three emergency stairs have exits directly to the street and one staircase in block B, located in close proximity to the main The entrance to the building has access through the lobby. On the evacuation routes and in the building as a whole, non-combustible Decoration Materials. A fire alarm system is provided throughout the building fire alerts and evacuation controls. Translucent lights with side lighting facing the roof of the building in blocks A and B, made through to the entire height of the blocks. Walls of lamps along the entire height, starting from the floor of the second floor, have tempered glass fencing. In the premises of the communication center

automatic gas is provided fire extinguishing (AGPT). The number of fire extinguishers to protect school premises of various categories of explosive and fire hazard and fire class defined depending on the marginal area protected by one fire extinguisher, and the total area of the premises in accordance with the Technical regulations, table 1 of annex 17; GOST 27331-87. TABLE 1 (fire class)

1.23 Outdoor lighting

Outdoor lighting project for the school construction project the intersection of burov streets, No. 36,"is made on the basis of technical conditions, assignments for design, outline design, as well as improvement plan

territory. The project of outdoor lighting was performed according to the III category of reliability power supply. Power supply source - designed TP 20 / 0.4

kV For automated dispatch lighting control A control cabinet for lighting ACS NO 25-6 is provided. Modes lighting control in the scheme ACS NO 25-6: automatic possible lighting control mode only in time, time and level illumination and only in terms of illumination, as well as manual and remote control modes. The cabinet is mounted on the outside transformer substation wall for easy maintenance.

The project made outdoor lighting of the school yard and sports ground. Playground lighting done spotlights mounted on metal poles 7m high (2 spotlights on a support). Lighting on the school grounds cantilever lamps 7 m high. Supports are supplied complete with lights. The calculation of illumination is performed in the DIALux-4.10 program. Distribution and group lighting networks made by cable with aluminum wires of the brand AVBBSHVNG laid in a trench on

a depth of 0.7 m from the surface of the earth. To protect the cable from mechanical damage when crossing with other communications provided

cable laying in the PND pipe Ø110 mm (in the trench). Connection of luminaires must be carried out uniformly in phase. Grounding conductors from lamp housings are necessary connect to the grounding conductor of the power cable. Cable lines grounded on the bus of the lighting cabinet by attaching to the bus grounding. Project Summary: Reliability category of power supply - III;

Supply voltage - 380/220 V; Total installed power of electric lighting - 2.72 kW; The total number of fixtures, pcs. - 20 pcs.; The total number of spotlights, pcs. - 8 pcs.; Total length of cable lines for electric lighting – 1282

1.24 Ant seismic activity

The main feature of the seismic retention of wonderful frame buildings is determined by the fact that these structures have a huge period own oscillation, which is

how they differ from a frameless building. Complex frame structures own large reserves flexible plastic work and are allowed to work designs beyond limits of ductility and elasticity.

Horizontal effort in complex frame buildings can perceived by its frame and with vertical connection, aperture or core rigidity. These complicated frames have a more correct frame. Design scheme, which accompanies the optimization of various design decisions. The presence in complex frames of various additional element in the form of masonry, ties, diaphragms acts to limit displacements of elements, replenishment of the stiffness of the building. Stiffness cores connections and stiffness diaphragms are designed continuous in height structures and should be located in two directions symmetrically, evenly in the center of stiffness. [7, p. 124] Buildings must be completed by dividing with ant seismic seams into certain compartments if: space-planning and constructive solutions are not determined requirements; centers of gravity differ in different blocks over 30%.

Over the entire height of the building, anti-seismic seams should be divided into equal blocks. Ant seismic seams are required to be performed by the method the construction of several paired frames, or separately frames and walls. Adjacencies blocks in the transition of anti-seismic seams should not always harm them combined horizontal movement during earthquakes. [six, p. 145]

When erecting a building on non-rocky soils, the foundations of buildings, as usually settled on the same level. Technical floors should be built under the whole building. Elevator shafts and stairwells of complex frame buildings should be designed as stiffness cores accepting seismic load. Another option is possible, in the form of built-in simple structures with uniform floor cutting, usually not affecting the stiffness frame. [7, p. 159] The load-bearing walls must be designed so that have flexible connections with the basic frame structures without harming horizontal displacements of the walls. Between columns of the frame and surfaces walls always provide a small gap of at least 20 mm.

2 The structure part

2.1 General Description

1. Standard project of organizations secondary school for 500 students designed for construction in the following climatic subareas:

- climate area – for IB
- standard wind pressure – 38 kgf / m²
- standard weight of snow cover – 100 kgf / m²
- outdoor temperature in the coldest five-day period – 35 ° C

2. Reliability coefficient for liability (SniP 2.01.07-85 Appendix 7).

3. Building class (SniP RK 2.02-05-2009)

- Constructive fire hazard (SP RK 2.02-101-2014) – CO
- for functional fire hazard (SP RK 2.02-101-2014) – Ф4.1.

4. The degree of fire resistance (SP RK 2.02-101-2014) – II 5. The level of responsibility of the building (SniP RK 21-501-93) – II

6. The reliability coefficient for the intended purpose yn = 1.0.

7. Temporary values of loads in classrooms and laboratories, office and household premises – 2.0 kPa, in libraries – 5.0 kPa, in dining room, corridors, halls and stairs 3.0 kPa, in the attic indoors 0.7 kPa, on the floor including visors of entrances – 0,5 kPa.

8. The safety factor for the load is accepted in concert with SniP RK 2.01.07- 85 “Loads and Impacts”.

9. The building is designed in a precast concrete frame with disks.

Floors from prefabricated crossbars, multi-slabs and vertical supporting structures from prefabricated columns and stiffness diaphragms.

10. Strength, stability and spatial rigidity of a building provided by a system of longitudinal and transverse prefabricated diaphragms rigidity, the location of the crossbars in the longitudinal and transverse directions and prefabricated floor disks. Technical solutions adopted in the working drawings correspond to environmental, sanitary, fire and other applicable rules and regulations and provide a safe life and human health facility operation subject to design documentation of events.

2.2 Natural and climatic conditions of the construction area:

The working draft is designed for the construction site with the following climatic conditions:

climatic construction area – 1, subarea – 1B;

the average temperature of the coldest five-day period is minus 35º C;

normative value of snow cover weight – 1.0 kPa;

standard value of wind pressure – 0.38 kPa;

the prevailing wind direction is southwest.
Normative depth of freezing clay soils – 2.1 m.

2.3 Instructions for welded fittings

Welding nets and frames of all reinforced concrete elements GOST 14098-91 “Joints for welded fittings and embedded products reinforced concrete structures. Types, designs and sizes. Welding should run at every intersection of reinforcing bars. 6.2.4. List of hidden works to be accepted with the participation of copyright supervision: - columnar monolithic foundations; monolithic tape foundations.

2.4 Installation instructions for precast frame elements

1 Prior to the installation of prefabricated structures must be performed preparatory work provided for by the head of SN RK 1.03-00-2011 “Construction industry. Organization of enterprise construction. Buildings and constructions »

2 Installation of prefabricated reinforced concrete structures in accordance with with the requirements of SP RK 5.03-107-2013 “Bearing and enclosing constructions “

3 Deviations of the mounted structures from the design position are not must exceed the values established by the joint venture of the Republic of Kazakhstan 5.03-107-2013 “Bearing and building envelope “

4 The assembly of the frame should be done in tiers. Before mounting the frame on the next tier it is necessary to completely complete the installation of all structures of the underlying tier with welding and monolithic its nodes.

5 Completed installation of structures tiered draw up an act of acceptance.

6 At the construction site, corrosion protection of welded joints perform no later than three days after welding.

7 Embedded and connecting parts of prefabricated elements are protected coloring.

8 Corrosion protection is carried out in accordance with the requirements of the joint venture of the Republic of Kazakhstan

2.01-101-2013 “Protection of building structures and structures from corrosion “ Passed through reinforced concrete hearts. Designated fasteners between curtain walls building structures and supporting structures do not interfere with them mutual horizontal spaces in the plane of non-bearing structures under seismic effects. Between carriers and non-bearing structures provide for gaps with a width of 30 mm., filled with elastic pads from granite, polyurethane foam, etc.

2.5 General instructions

1. Calculation of coatings in the axes IT-9-12 (trusses, ties, runs, corrugated board) and in touch IT – 9-12 (beams, decking) is produced in accordance with SniP RK 2.01.07-85 “Loads and impacts and SniP RK 5.04-23-2002” Steel designs. Design Standards “for normative snow load1.5 kPa.

2. The system of elevations adopted according to the drawings of the brand AR.

4. Steel structure materials

1 Material of steel structures of steel C235, C245, C255 and C345-3 (C345-4- for flanges of the lower zones I and II of climatic regions) according to GOST 27772 88

2. Steel flanges for all flange connections C345-3 in accordance with GOST 27772-88. Steel for C345-3 flanges is subject to continuity control in accordance with GOST 27772-88 and clause 2.17 and GOST 22727-88 clause 4.3 ... 4.5 and must satisfy the requirements of paragraph 2.3 and table. 1 “Recommendations for calculation, design, manufacture and installation of flanged joints of steel construction constructions” (Moscow, TsBNTI, 1989) 3. Materials of profiled steel flooring – StZkp steel according to GOST 380-2005

5. Element Connections

1. All factory connections – welded, mounting – on class bolts strength 5.6., 5.8, high-strength boletuses and welding. Fixing corrugated board carried out on self-drilling screws and combined rivets. Consumption of corrugated board fastening elements for coating in I-T axes – 9-12 next: rivets 3BK-4X12-A / C – 1558 pcs. (GOST 26805-86, B6X35 self-tapping screws – 1008 pcs. (TU 36.25.12-13-88), washers under self-tapping screws – 490 pcs. (TU 36-2624-85).

2. The minimum axial force for calculating the attachment of elements N = 50kN Mount the trusses on the simultaneous action of the supporting forces A, N (A – supporting reaction, N – normal force). Design forces are given in kN and kNm.

3. Welded joints:

1) Materials for welding, corresponding to the steels, take according to table 55 SniP RK 5.04-23-2002.

2) Assign the dimensions of the welds according to the forces specified in the design. The minimum length of fillet welds is 60 mm. Minimum size and shape

seams should be taken according to clause 12.8 and table 39 of SniP RK 5.04-23-2002.

3) Perform factory seams with semi-automatic welding in the medium carbon dioxide welding wire Sv08G2S in accordance with GOST 2246-70.

4) Mounting seams to perform semi-automatic welding in a medium carbon

dioxide.

5) Perform butt welds with full penetration, with welding of the root of the seam and with application of output strips. Equal butt joints should have checked by physical methods of quality control.

6) When switching to other types of welding or welding materials, dimensions all specified seams must be recalculated in accordance with

Directions SniP RK 5.04-23-2002.

2.8 Bolted joints without controlled tension.

1 All bolts of accuracy class "B" according to GOST 7798-70 strength class 5.6, 5.8 according to GOST 1759.4-87 – with a diameter of 16 (M16) and 20 mm (M20) with the hallmark of the plant and strength class marking.

2 Nuts according to GOST 5915-70. Round washers in accordance with GOST11371-78, spring washers in accordance with GOST6402-70. Bolts and nuts must meet the requirements GOST 18123-82.

6. All bolts, nuts, washers must be zinc coated.
7. Use of bolts without a mark, marking and coating or a second grades, as well as those made of automatic steels, are not allowed.

5 The nuts of the permanent bolts must be secured against self-loosening – in bolted connections operating on media with spring washers – in joints working in tension – setting jam nut The consumption of fastening elements for the I-T coating – 9-12 is as follows: bolts M20-8gxX100 / 58 (GOST 7798-70) – 20 pcs., M20-8gx50.58 (GOST 7798-70) – 80 pcs. Pcs., nuts M20-7H.5 GOST 5915-70 – 100 pcs., washers 20 (GOST 6402-70) 100 pcs., washers 100 (GOST 1137178) – 100 pcs. The consumption of fastening elements for coating EI – 9-12 is as follows: bolts M20-8gx50.58 (GOST 7798-70) – 24 pcs., Nuts M20-7H.5 nuts GOST 5915-70 – 24 pcs., Washers 20 (GOST 6402-70) 24 pcs., Washers 100 (GOST 1137178) – 24 PCS.

6 Connections on high tensile bolts with controlled tension

1) High-strength bolts of accuracy class "C" – from steel of marika 35 or 40 according to GOST 1050-88

2) Nuts of high strength accuracy class "C" – from steel grade 35 or 40 according to GOST 1050-88

3) High-strength bolts, nuts and washers must meet the technical conditions in accordance with GOST 22356-77

4) Holes for high tensile bolts with controlled tension 2 mm larger than bolt diameter

5) Under the head of the high-strength bolt and high-strength washer should be installed one washer according to GOST 22355-77

6) Contact surface flanges on installation clear wire brushes from dirt, snow, ice

and degrease solvents “friction coefficient μ = 0.35)

7) Axial preload force of each bolt of all flange connections should be 27 tf, regulation tighten the bolts at the time of tightening the nut

8) Instructions on surface differences (deplumation) of joined parts in

Sec. 4.37 4.53 of Snip RK 5.04-18-2002 The consumption of fastening elements for the I-T coating is 9-12 as follows: bolts M24X120 8gxX110XL1 GOST 22353-77 – 40 pcs. , nuts M24- 7N.110 GOST 22354-77 – 40 pcs., Washers 24 GOST 22355-77 – 40 pcs.

2.9 Manufacturing requirements

1. Steel structures shall be manufactured in accordance with requirements: GOST 23118-99 “Steel structures for building. General specifications “ SniP RK 5.04-18-2002 “Metal structures. Production rules and acceptance of work “1.460.3-14 Series Requirements

2. Flanges to check the ultrasonic inspection on the spacing before welding and after welding

3. It is forbidden to tighten the flanges in case of excess permissible backlashes between flanges

4. All closed profiles must be sealed by stubs, connecting elements in a closed section and welding slots with solid welds to prevent ingress moisture inside these elements

5. Modification of design decisions at the stage of development of drawings KMD requires coordination with the developers of this project.

2.10 Energy Efficiency

The project provides for the following energy-saving measures:

1. Installation of thermoregulation fittings for heating appliances;

2. Installation of water meters in the building;

3. Installation of a weather compensator to regulate the work heating systems from an outdoor temperature sensor; 4. Reduction of heat loss due to insulation of pipelines.

2.11 Thermomechanical calculation of the wall

Climatological characteristics for a given construction site:

t x5 = -35 [° C] - the average temperature of the coldest 5 days;

t ext = -7.1 [° C] - the average temperature of the heating period;

z ht. = 234 [days] - the duration of the heating period;

t int = 21 [° C] - air temperature;
Humidity zone is normal.
Operating conditions - A.
λ is the coefficient of thermal conductivity of the material [W / m ° C].
We calculate the degree – day of the heating period according to formula 2 Snip 23-02-2003:

$$D\,d = (t\,int - t\,ext.)\,Z\,ht \quad (1)$$

$$D\,d = (21 - (-7.1)) \times 234 = 6575.4\ [\,o\,C \cdot day]$$

Normalized value of resistance to heat transfer of enclosing structures should be determined by the formula 1 of SNiP 23-02-2003:
R Da b [Cm] W req d 0 00035 6575 701.34.14, 2 1 / = · = + · + = ·
Calculate the thickness of the desired layer according to the formula 8 SP 23-101-2004:

$$R\,0 = 1 / \alpha\,int + R\,K + 1 / \alpha\,ext\,, \quad (2)$$

where R to - thermal resistance of the building envelope, m 2 · ° C / W;
α int - heat transfer coefficient of the inner surface of the enclosing constructions;
α ext - heat transfer coefficient (for winter conditions) of the outer surface building envelope. W / (m • ° C).
As a result of the heat engineering calculation, the thickness insulation is 100 mm, while the total resistance of the enclosing structures are 3.7 [m 2 ° C / W].

Table 2.1 - Thermophysical characteristics of wall materials

Name	Thickness layer δ, m	Density material ρ, kg / m 3	Coefficient thermal conductivity λ, W / m ° C
Brick masonry	0.770	1800	0.70
Min plate	X	62	0,042

2.12. Thermomechanical calculation of window filling

We calculate the degree – day of the heating period according to formula 2 Snip 23-02-2003:

$$D_d = (t_{int} - t_{ext.}) Z_{ht} \quad (3)$$

$$D_d = (21 - (-7.1)) \times 234 = 6575.4 \ [^{o}C \cdot day]$$

For window filling:

6000 m 2 ·ºC / W corresponds to R 0 = 0.6 m 2 ·ºC / W

8000 m 2 ·ºC / W corresponds to R 0 = 0.7 m 2 ·ºC / W

Using the interpolation method, we determine the exact value of R 0:

2000 - 0.1 According to SNiP 23-02-2003 “Thermal protection of buildings” we choose: double-chamber double-glazed window in a single binding, R = 0.65 m 2 ·ºC / W.

Compare the values:

0.65 m 2 ·ºC / W> R 0. = 0,63 m 2·ºC / W.

2.13. Thermomechanical calculation of the coating

Table 2.2 - Thermophysical characteristics of the coating materials

Name	Layer thickness δ, m	Density material γ 0 , kg / m³	Coefficient thermal conductivity λ, W / (m 2 × ° C)
Layer "Technoelast"	0.01	600	0.17
Cement screed sand mortar	0,03	1800	0.93
Mineral wool slabs	x	200	0,076
reinforced concrete slab	0.22	2500	2.04

$$R_k = R_1 + R_2 + R_3 + R_4 + R_5; \quad (4)$$

$$R_{rek} = a \cdot D_d + b = 0.00035 \cdot 6575.4 + 14 = 3.701 \ (m^2 \cdot ^{\circ}C) / W.$$

$$R_o = R_{si} + R_k + R_{se}; \quad (5)$$

$$R_{si} = 0.11; \ R_{se} = 0.043;$$

$$R_k = \delta 1 / \lambda 1 + \delta 2 / \lambda 2 + \delta 3 / \lambda 3 + \delta 4 / \lambda 4 + \delta 5 / \lambda 5; \quad (6)$$

$$R_k = 0.22 / 2.04 + x / 0.076 + 0.03 / 0.93 + 0.01 / 0.17;$$

Determine the required heat transfer resistance:

$$R_{rek} = R_o = 0.1 + x / 0.076 + 0.32 + 0.05;$$

$$X = (4.85 - 0.1 - 0.32 - 0.05) \cdot 0.076 = 0.147 \text{ mm}.$$

We take the thickness of the insulation 150mm.

Section dimensions' h = 80mm; b = 1100mm l = 4755mm

The protective layer adopted 15 mm.

Heavy concrete B25.

Estimated uniformly distributed load on a slab 1.1m wide.

$$q = (g + v) b\gamma f = (3.75 + 1.95) * 1.1 * 0.95 = 5.96 \text{ kN / m 2} \quad (2.1)$$

where: g = 3.75 kN / m 2 - constant load from the dead weight of the plate and floor construction.

V = 1.95 kN / m 2 - temporary operational load.

b = 1.1 m - the width of the plate.

γ f = 0.95 coefficient for the purpose of the building according to SNiP 2.01.07-85 * "Loads and impacts "

2.14. Heating, ventilation and air conditioning

The "Heating and Ventilation" section of a typical project was completed on based on the task for the development of a standard project and in accordance with requirements of state regulations applicable in the territory Republic of Kazakhstan:

- SP RK 4.02-101-2012 "Heating, ventilation and air conditioning";
- SP RK 2.04-01-2017 "Construction climatology";
- SP RK 2.02-20-2006 "Fire Safety";
- SP RK 3.02-111-2012, SN RK 3.02-11-2011 "General education institutions";

-SP RK 1.02-106-2013 "Typical design documentation";

-CH RK 1.02-01-2009 "Instructions for standard design";

-SP RK 2.04-106-2012 "Energy consumption and thermal protection civil buildings

-CH RK 2.04-03-2011 "Thermal protection of buildings";

Estimated outdoor temperature: -35 ° C.

The heating of the building is centralized, the heat source is external heating networks, according to TU No. 2160-11 of 02/19/18 The coolant in the external heating networks accepted water with the parameters 130-70 ° C. The parameters of the coolant in internal systems are accepted:

-in the heating system of classes and premises of the school 85-60 ° C;

-in heating systems of technical rooms and stairwells 130-70 ° C;

-in the hot water system 60 ° C.

Heat item. In the building in block B is designed individual heat point (ITP) with a common input node. On the node heat exchangers, pumps, heat meters, control

measuring instruments and electronic weather compensators ECL. The project provides for connecting nodes to heating networks: Control unit with a closed DHW circuit;

2.15. Heating.

The calculated air parameters in the school premises are adopted according to Applications SP RK 3.02-111-2012 "Educational institutions." Calculations of heat consumption for heating are based on the joint venture of the Republic of Kazakhstan 2.04- 106-2012. Heating system - horizontal two-pipe with associated

coolant movement. Horizontal pipelines perimeter with hidden gasket in the floor ridge plastic pipes. Distribution lines and risers are made of steel pipes. As the main heating devices adopted radiator sectional MS-140 (heat transfer section 160W). Air is discharged from the heating system by air cranes installed on each device, as well as at the top points systems using automatic air vents. Regulation

heat flow from horizontal heating appliances carried out by thermostatic valves RAN-P Deafness. On heating system branches installed manual shut-off and balancing USV-I fittings, and for regulating pressure - differential controller

pressure type ASV-PV with valve partner ASV-I Deafness. In places where pipes pass through walls and floors, install sleeves from pipes of larger diameter. Sealing gaps and holes in gaskets pipelines to perform non-combustible materials, providing standardized fire resistance of fences. Main pipelines of technical rooms, staircases cells, risers of heating systems are made of steel pipes in accordance with GOST3262-85 * and GOST 10704-91 *. All trunk pipelines are isolated K-flex tubular insulation that does not support fire and is self-extinguishing. Before conducting insulation work, clean the pipes from rust and coated with anti-corrosion compound: BT-177 paint in 2 layers on the primer GF-021 in 1 layer. Uninsulated pipelines and paint heaters with oil paint 2 times. Plastic pipes made in accordance with GOST 53630-2009, pipelines laid in the floor structure are insulated MISOT-FLEX ST-RL / SA 9mm thick Production and installation of pipelines should be carried out specialized assembly organizations having trained staff and with sufficient technical funds. Heating systems should be installed in accordance with requirements of Snip 3.05.01-85 “Internal sanitary-technical systems. " All pipelines after installation must be subjected to hydraulic tests with a test pressure of 1.25 working pressure.

2.16. Noise reduction measures.

Silencers are installed on the supply and exhaust systems. Exhaust fans installed in the attic and technical indoors, air ducts are connected to fans through flexible inserts. Exhaust fans are installed on the technical floor on rubber sound-absorbing pad.

2.17 Domestic sewage

The disposal of domestic wastewater from sanitary appliances is provided for in outdoor sewage networks. Pipelines above 0,000 are projected from polyethylene sewer pipes in accordance with GOST22689.1-89; below the mark 0,000 - from cast-iron sewer pipes in accordance with GOST6942-98. For the cleaning of sewer networks, revisions and cleansing The sewer network is ventilated through risers that are led to 0.5 m high from the roof level. The height of the upper surface of the washbasins for the initial classes - not more than 0.6m, for 5-11 classes - not more than 0.7m. In sanitary facilities for pre-school classes are installed children's toilets. Pipelines paved on the attic isolated heat-insulating mats "URSA". Equalizing potential metal shower tray connected by a PVZ copper wire (1x4 mm2) to the ground terminal the nearest electrical panel (see sectional).

2.18 Fire water supply

According to SN RK 4.01-01-2011 “Internal water supply and sewerage buildings and structures” the school provides for firefighting from one jets 2.60 l / s. The project adopted a multi-pump installation WILO CO-2 Helix V 1005 / K / CC Q = 2.60 l / s, H = 33.00 m, P2 = 2.20 kW, in the E-W and 10-11 axes, on around 3.100. Since the number of fire hydrants in the building exceeds 12 pcs., then the network is provided annular, with a loopback in the basement. The main water supply network in the basement is laid out steel pipes GOST 10704-91 * D57x3.0. Risers and eyeliners to firefighters to cranes also, from steel pipes GOST 10704-91 *. B2 backbone networks lay with a slope of 0.002 to the places of water discharge. Backbone networks and risers are insulated with oil paint in two layers on the primer.

2.19 Industrial sewage

Disposal of industrial wastewater from the process dining room equipment and industrial effluents from heat item, pumping and ventilation chambers foreseen to external networks sewers. Connection of technological equipment in the dining room to the networks sewage is provided with a gap of at least 20 mm from the top receiving funnel. Pipelines above -0.600 projected from polyethylene sewer pipes in accordance with GOST22689.1-89; below the mark - 0.600 - from cast-iron sewer pipes in accordance with GOST6942-98. The sewer network is ventilated through risers that are led to 0.5 m high from the roof level. For the collection of industrial effluents and emergency spills in the premises of the pumping station, heat station and ventilation

chambers are provided drainage pit size 500x500x800 (h) with installation in it submersible drainage pump Q = 9 m3 / hour; H = 6 m.

Pipelines of the drainage pressure head sewerage are designed from steel electric-welded pipes in accordance with GOST 10704-91.

2.20 Foundations

Technical requirements. According to geotechnical surveys carried out in 2018 the year GeoTerr LLP Oskemen city arch. (inv.) No. 2/1035 serve as the basis of piles large sands with the following characteristics: IGE 3 - Large sands (and QII-III) with the following regulatory characteristics: ρ = 1.98 g / cm3 /, φ = 36 °, s = 0 kPa, E = 30 MPa Groundwater at the survey site has been discovered everywhere on depth 3.2-3.8m. The absolute mark of the steady level 344.5-344.70 m According to the results of chemical analyzes, groundwater at the site characterized as sulfate-chloride, chloride-sulfate, sodium potassium, magnesium, with a salinity of 1.3-2.4 g / l. In relation to W-4 concrete, groundwater has

weak sulfate aggressiveness on Portlanin relation to steel structures, groundwater is corrosive.

When opening the foundation pit, the soils should be examined a representative of an institute that performed geological engineering research. In case of discrepancies in the actual engineering geological conditions considered in the project must be produced additional soil studies and appropriate changes to the working draft.

Foundations are designed under the column: columns are monolithic grillage 450mm high on pile foundation and with the installation of prefabricated reinforcement concrete glass.

- under the staircase and elevator unit - tape monolithic grillage 450mm high on pile foundation

- under the basement walls - a monolithic beam grillage with a section of 600x450 mm on a pile basis.

The bottom of the foundations on the mark. -3.870, -4.470. Concrete class B25. Foundations are designed in accordance with the joint venture of the Republic of Kazakhstan 5.01-102-2013 “Foundations of buildings and structures”

Installation of prefabricated foundation elements is carried out in accordance with the joint venture of the Republic of Kaz 5.03-107-2013 "Bearing and enclosing structures" Before starting work on the installation of foundations, a prepared foundation must be adopted by act by a commission with the participation of the customer, contractor, geologist. The commission must establish compliance with location, size, pit bottom marks, as well as the possibility of laying foundations on design mark. No breaks of more than two days between the end of the development of the pit and the foundation device. At more long breaks measures must be taken against flooding foundation pit

surface water and freezing. Soils must be protected against humidification by surface waters. by mounting upland ditches on the edge of the pit, and from freezing for the entire construction period. The foundation on frozen ground is not allowed. Under all monolithic foundations, concrete is provided preparation of concrete of class B7.5 with a thickness of 100 mm, with a broadening of 100 mm in each side of the edge of the foundation. 100 mm thick preparation on the foundation plan is conditionally not shown. Backfill the pit with a thorough layer-by-layer seal (SN RK 5.01.01-2013 "Earthworks, foundations and foundations "). Fill with sandy soil without building garbage and organic impurities. (In winter conditions only thawed). To ensure the stability of the basement walls at the unfinished stage construction of the building backfilling of the external sinuses of the pit to produce only after the installation of floor slabs above the basement with monolithic seams and vertical waterproofing.

Backfill should be made evenly around the perimeter of the building. Work shall be carried out in accordance with SN RK 5.01.01-2013 “Earthworks structures, foundations and foundations. "

2.21 Instructions for the implementation of monolithic structures.

1. In this project, the reinforcement class is adopted according to GOST 5781-82 "Steel hot-rolled for reinforcing reinforced concrete structures. Technical conditions".

2. The design location of reinforcing products in the structure should provided by the installation of supporting devices, templates, clamps. It is forbidden to use linings from scraps of reinforcement and wooden blocks. Immediately before concreting the formwork must be cleaned of debris and dirt, and fittings from plaque and rust.

Corrosion protection of embedded parts must be carried out by painting before their installation in the design position. Mounted fittings Responsible Designs Must Be Accepted by Supervision With drawing up an act on hidden work.

3. Concreting structures to produce with the device working seams in places identified only by agreement with the supervision. Withdrawal formwork after concrete reaches 100% design compressive strength. In the initial period of hardening, concrete is necessary protect from atmospheric precipitation or moisture loss, in subsequently maintain the temperature and humidity conditions with the creation of conditions providing an increase in its strength.

4. Concrete care measures, procedure and terms for their implementation, control over their implementation and terms of formwork removal should PPR installed. Movement of people on concrete structures and installation of formwork of overlying structures are allowed after Achievement of concrete strength not

less than 1.5 MPa.

5. Strength, frost resistance, density, water resistance, and other indicators established by the project should be determined according to requirements of current state standards.

6. Undecked surfaces of structures should be covered with steam –and thermal insulation materials immediately upon termination concreting.

Reinforced concrete outlets should be covered or insulated to a height (length) of not less than 0.5 m.

7. When performing concrete work in winter conditions, observe requirements of the joint venture of the Republic of Kazakhstan 5.03-107-2013 "Bearing and enclosing structures".

In the production of concrete work at air temperatures above +25 and relative humidity less than 50% to comply with the requirements of SP RK 5.03-107-2013 "Bearing and enclosing structures"

8. When applying various additives to concrete, the procedure for their use should be established PPR and agreed with the design organization, linking a typical block section.

2.22 Instructions for welded fittings.

Welding nets and frames of all reinforced concrete elements GOST 14098-91 “Joints for welded fittings and embedded products reinforced concrete structures. Types, designs and sizes. Welding should run at every intersection of reinforcing bars.

6.2.4. List of hidden works to be accepted with the participation of copyright supervision:

- columnar monolithic foundations; monolithic tape foundations.

2.23 Calculation of the selection of pumping equipment.

Fire pumping unit According to the joint venture of the Republic of Kazakhstan 4.01-101-2012, pressure losses are calculated according to paragraph 6.3 of formula (2).

$$H\ p = H\ geom\ \Sigma H\ tot,\ l + H\ f - H\ g \qquad (7)$$

Pump installation for premises

$$H = 9.10 + (18.61 + (3.0 + 2.0) + 10\text{-}10 = 32.71 \sim 33.00\ m.s.$$

We select a pumping unit with parameters Q = 2.60 l / s, H = 33.00 m.w.

where: 9.10 m - geometric height of the dictating device

18.61 m.w.- pressure loss in the B2 pipeline

3.0 + 2.0 m.w. - losses in the supply and intake manifold
pumping station taken averaged
10.0 m.w. - the pressure on the spout of the dictating device
10.0 m.w. - warranty pressure in the network

2.24 Installation instructions for precast frame elements

1. Prior to the installation of prefabricated structures must be performed
preparatory work provided for by the head of SN RK 1.03-00-2011
“Construction industry. Organization of enterprise construction.
Buildings and constructions »
2. Installation of prefabricated reinforced concrete structures in accordance with the requirements of SP RK 5.03-107-2013 "Bearing and enclosing
constructions "
3. Deviations of the mounted structures from the design position are not
must exceed the values established by the joint venture of the Republic of Kazakhstan 5.03-107-2013 "Bearing and building envelope "
4. The assembly of the frame should be done in tiers. Before mounting the frame on the next tier it is necessary to completely complete the installation of all
structures of the underlying tier with welding and monolithic its nodes.
5. Completed installation of structures tiered draw up an act of acceptance.
6. At the construction site, corrosion protection of welded joints
perform no later than three days after welding.
7. Embedded and connecting parts of prefabricated elements are protected
coloring.
8. Corrosion protection is carried out in accordance with the requirements of the joint venture of the Republic of Kazakhstan
2.01-101-2013 "Protection of building structures and structures from
corrosion " Passed through reinforced concrete hearts.
Designated fasteners between curtain walls building structures and supporting structures do not interfere with them mutual horizontal spaces in the plane of non-bearing structures under seismic effects. Between carriers and non-bearing structures provide for gaps with a width of 30 mm.
filled with elastic pads from poroizol, granite, polyurethane foam, etc.

2.25 Reinforced concrete structures

1. Multiple slabs are accepted as the main elements of the overlap
floors with a width of 1000, 1200 mm and 1500 mm. Plate length from 2250 d o7080 mm

2. Basement wall panels and diaphragms stiffness which

are combined into a spatial system in a building by welding to

columns consisting of prefabricated reinforced concrete panels with a thickness of 160 mm covered with prefabricated regel.

3. Cross-beam crossbars, one and two-shelf from concrete of class B40. Crossbars Restressed frame height 380 mm, width on top

parts of 400 mm. The height of the support part of the crossbar is 230 mm. The height shelves for supporting plates 150 mm. Crossbar reinforcement taken from restressed fittings of the class K1400 (K-7)

4. The columns of the frame adopted section 400x400 mm, two-story with a height floors of 3300 mm from concrete of class B25. Consoles in columns accepted "Collar". The joint of the columns of the frame is provided 1050 mm higher console columns

5. Coverage over the gym is planned gable with a slope of the upper

farm belts 2.5%. Rigidity and geometric immutability of a disk coating is provided by a system of vertical ties, as well as steel profiled flooring fixed on girders with self-tapping screws.

6. Trusses and bonding coatings are designed from closed bend-welded

rectangular and square section profiles (GOST 30245-2003).

The connection of the lattice elements with truss belts is frameless. Farms

are composed of two shipping marks. Mounting Connections - flanged. The coupling of the supporting elements is provided on the bolts and assembly welding. The design of the coating disc is run-through (channels according to GOST 8240-97). Runs unfasten the upper truss belts in increments of 3 m.

7. Stair Z-shaped precast concrete marches with platforms.

8. The production of prefabricated reinforced concrete structures is provided.

to carry out the capacities of factories located on the territory Republic of Kazakhstan

2.26 Calculation parts

- climate area - for IB
- standard wind pressure - 38 kgf / m²
- standard weight of snow cover - 100 kgf / m²
- outdoor temperature in the coldest five-day period - 35 ° C

2. Reliability coefficient for liability (SNiP 2.01.07-85 Appendix 7).

3. Building class (SNiP RK 2.02-05-2009)

- Constructive fire hazard (SP RK 2.02-101-2014) - CO
- for functional fire hazard (SP RK 2.02-101-2014) - Ф4.1.

4. The degree of fire resistance (SP RK 2.02-101-2014) - II 5. The level of

responsibility of the building (SNiP RK 21-501-93) - II

6. The reliability coefficient for the intended purpose yn = 1.0.

7. Temporary values of loads in classrooms and laboratories, office and household premises - 2.0 kPa, in libraries - 5.0 kPa, in dining room, corridors, halls and stairs 3.0 kPa, in the attic indoors 0.7 kPa, on the floor including visors of entrances - 0,5 kPa.

8. The safety factor for the load is accepted in concert with SNiP RK 2.01.07- 85 “Loads and Impacts”.

9. The building is designed in a precast concrete frame with disks.

floors from prefabricated crossbars, multi-slabs and vertical supporting structures from prefabricated columns and stiffness diaphragms.

10. Strength, stability and spatial rigidity of a building provided by a system of longitudinal and transverse prefabricated diaphragms rigidity, the location of the crossbars in the longitudinal and transverse directions and prefabricated floor disks. Technical solutions adopted in the working drawings correspond to environmental, sanitary, fire and other applicable rules and regulations and provide a safe life and human health facility operation subject to design documentation of events.

2.27. The calculation of the column

b x h = 400x400 mm cross section; a = a ′ = 30 mm; Class B25

heavy concrete; γ b2 = 1.1; Armature class A-III; N = 16.7 kN compressive strength;

M = 33.5 kNm bending moment (due to ETABs); the force of the load under continuous action

N ℓ = 14.03 kN ; M ℓ = 32.8 kNm (at the expense of ETABs); the calculated length of the column

l o = 3300 mm.

We find: R b = 14.5 · 1.1 = 15.95 MPa; E b = 2.7 · 10 4 MPa.

R s = R sc = 365 MPa; E s = 2 · 10 5 MPa .

$$h0 = h - a = 400 - 30 = 370mm$$

$$e0 = \frac{M}{N} = \frac{33.5}{16.7} = 2.005mm$$

$$e\lambda = \frac{M\lambda}{N\lambda} = \frac{14.03}{32.8} = 0.427mm$$

Random eccentricities

$$ea1 = \frac{h}{30} = \frac{400}{30} = 13.33mm$$

$$ea2 = \frac{l0}{600} = \frac{3300}{600} = 5.16mm$$

Estimated eccentricity **e o = 8,151 mm** more than random eccentricity,

so use it to calculate the column. Internal force at minimum compression
find the value of the moment at

$$M1 = M + 0.5N(h0 - a') = 33.5 + 0.5x16.7(370 - 30) = 278.9kNm$$

Long-term load

$$M\lambda 1 = M\lambda + 0.5N\lambda(h0 - a') = 14.03 + 0.5x32.8(370 - 30) = 542.6KNm$$

The radius of inertia of the section.

$$i = \sqrt{\frac{h^2}{12}} = \sqrt{\frac{40^2}{12}} = 11.55cm$$

L0/i=400/11.55>14it is necessary to consider the curvature of the column.
We determine the critical force N cr by the following formula.

$$Ncr = \frac{6.4.Eb}{l0^2}\left[\frac{J}{\varphi\lambda}\left(\frac{0.11}{0.1+\delta e} + 0.1\right) + \alpha Js\right] \quad (7)$$

Where: $\varphi\lambda = 1 + \beta\frac{M\gamma 1}{M1} = 1 + 1\frac{301.5}{434.5} = 1.694$

$$\delta e, min = 0.5 - \frac{0.01l0}{h} - 0.01Rb = 0.5 - 0.01\left(\frac{3100}{400}\right) - 0.01x15.95 = 0.212$$

$$\delta e = \frac{e0}{h} = \frac{151.8}{400} = 0.38$$

$\delta e > \delta e, min$ we accept:

$$\delta e = 0.38$$

$$\alpha = \frac{Es}{Eb} = \frac{2x10^2}{2.7x10^4} = 7.41$$

Moment of inertia of concrete section

$$J = \frac{bh^2}{12} = \frac{40x40^2}{12} = 2.13x10^5cm^4$$

We find the first convergence coefficient for reinforcement $\mu = 2 \cdot 0$,
005 = 0.01

Moment of inertia of the reinforcement relative to the center of the concrete section

$$Js = \mu bh0(0.5h - a)^2 = 0.01x40x37(0.5x40 - 3)^2 = 0.04277x10^5cm^4$$

$$Ncr = \frac{6.4x2.7x10^3}{16.7^3}\left[\frac{2.13x10^9}{1.694}\left(\frac{0.11}{0.1 + 0.38} + 0.1\right) + 7.41x0.04277x10^9\right]$$

$$= 12716200H = 12716.2KN$$

Coefficient

$$\eta = \frac{1}{1 - \frac{N}{Ncr}} = \frac{1}{1 - \frac{16.7}{12716.2}}1.119$$

$$e = e0\eta + 0.5(h0 - a) = 151.8x1.119 + 0.5(370 - 30) = 340mm$$

Effect on the height of the compressed side of concrete

$$\xi R = \frac{\varpi}{1 + \frac{\sigma Sr}{\sigma sc}, u(1 - \frac{\varpi}{1.1})} = \frac{0.722}{1 + \frac{365}{400}(1 - \frac{0.722}{1.1})} = 0.55$$

where $\varpi = 0.85 - 0.08xRb = 0.85 - 0.08x15.95 = 0.722$

We take the coefficient values according to the following formula.

$$\alpha n = \frac{N}{Rb.b.h0} = \frac{16.7x10^9}{15.95x400x370} = 0.572 > \xi R = 0.55$$

$$\alpha s = \frac{\alpha n\left(\frac{e}{h0} - 1 + \frac{\alpha n}{2}\right)}{1 - \delta'} = \frac{0.572\left(\frac{370}{370} - 1 + \frac{0.572}{2}\right)}{1 - 0.081} = 0.128 > 0$$

Where: $\delta' = \frac{a'}{h0} = \frac{30}{370} = 0.081$

$$\xi = \frac{\alpha n(1 - \xi R) + 2\alpha s * \xi R}{1 + \xi R + 2\alpha s} = \frac{0.572(1 - 0.55) + 2x0.128x0.55}{1 - 0.55 + 2x0.128} = 0.564 > \xi R = 0.55$$

α s > 0, the required number of symmetrical reinforcement is

$$As = As' = \frac{N}{Rs} * \frac{e}{h0} - \frac{\xi\left(1 - \frac{\xi}{2}\right)}{\alpha n} = 16.7 * \frac{10^3}{365} * \frac{\frac{340}{370} - \frac{0.128\left(1 - \frac{0.128}{2}\right)}{0.572}}{1 - .081} = 28.6cm^2$$

3Ø36 A-III (As=30,54см2) We accept $\mu = 2 * \frac{As}{bh0} = \frac{2x30.54}{40x37} = 0.041$

ξ = 564.0 > ξ R = 0.55, then there is less eccentricity consider.

We check the cross-sectional strength according to the contract

$$Ne \leq Rbbx\left(h0 - \frac{x}{2}\right) + RscAs(h0 - a') = 1350 * 10^3 * 338$$

$$\leq 15.95 * 400 * 211.6\left(370 - \frac{211.6}{2}\right) + 365 * 3054(370 - 30)$$

$$= 456.3 * 10^6 Hmm < 732.6 * 10^6 Hmm$$

Where: $X = \frac{N}{Rb*b} = 16.7 * \frac{10^3}{15.95*400} = 261.7$ Section strength is ensured.

Table 2.3 - The main indicators for the architectural and planning section are given

The name of indicators	units measuring	Amount,area
2	3	4
Block A		
storeys	floor	3
Built up area	M2	1,242.2

Continue of Table 2.3

Building total area	M2	4,658.73
Useful area of building total volume of building	M2	4 390,30
including below the 0,000 m mark	M3	18 137.20 3 084,05
Block B		
storeys	floor	3
Built up area	M2	1 402,00
Building total area	M2	3 960,89
Useful area of building total volume of building	M2	3 725,18
including below the 0,000 m mark	M3	17 871,71 3 663,10
Block c		
storeys	floor	2
Built up area	M2	1 242,29
Building total area	M2	3 477,37
Useful area of building total volume of building	M2	3 326,25
including below the 0,000 m mark	M3	14 071,71 3 060,51
School total		
Floors of the building	floor	2,3
Capacity	Places	500
Building area	M2	3886,49
Building total area	M2	12096,99
Effective area	M2	11441,73
Estimated area	M2	7592,07
Building volume of the building, total including below the 0,000 m mark	M3	50080,62 9807,66

2.28. Materials

Thermomechanical calculation of building envelopes and the choice of filling type light openings of the school building is based on design decisions with

using effective heat-insulating materials in compliance with requirements of SN

RK 2.04-21-2004 “Energy consumption and thermal protection of civil buildings” taking into account the standard values of the reduced heat transfer resistance windows and stained-glass windows, where R F = 0.57 - which meets the requirements for energy efficiency. Outdoor enclosing walls - brick ceramic Kr-p-po250x120x88 / 1.4NF / 100 / 2.0 / 50 GOST530-2012 on a M50 solution with a thickness of 250mm; Reinforcing walls with masonry nets 50x50x4mm from wire VR-I GOST 6727-80 * through 7 rows of masonry.

Insulation of external walls - mineral wool boards PTE-150, rigid on

basalt base with a bulk density of 145kg / m³ 150mm thick.

Partitions - blocks of cellular concrete B2.5 with a density of D600 GOST 21520-89, 200mm thick on glue. Partitions technical underground - brick ceramic Kr-p-po250x120x88 / 1.4NF / 100 / 2.0 / 35 GOST530-2012 on a M50 solution with a thickness of 120 mm Partitions in bathrooms - ceramic brick КР-р-по 250x120x65 / 1НФ / 100 / 2,0 / 50 GOST530-2012 on a M50 solution with a thickness of 120 mm; Jumpers - prefabricated reinforced concrete in the series 1.038.1-1. 1, 4, and from metal corners in accordance with GOST8509-97.

Basement insulation - miniplate with a bulk weight of 170 kg / m 3

100 mm thick. Exterior finish The architectural and color solutions of the building facades correspond to the approved outline design.

Exterior finish of facades - painting with decorative facade paint according to the system external thermal insulation finished with thin reinforced plaster.

Base - facing with splitter tiles.

The roof is flat, reinforced concrete with a cold attic. The drain is internal

organized.

Insulation of the attic floor - rigid minite plate Techno Ruf V (volumetric

weighing 180 kg / m 3) 220 mm thick.

The roof is rolled, the top layer is Tekhnoelast EKP, the bottom layer is Unfiled EPV Vent. "

window blocks - bound from PVC profiles in accordance with GOST 30674-99 with two-chamber double-glazed windows of ordinary glass with a soft selective coating with glass spacing 12 mm; stained-glass windows - from aluminum profiles GOST 21519-2003; external entrance doors - steel in accordance with GOST 31173-2003.

The standard design provides for finishing materials resistant to exposure to disinfectants and detergents. Interior decoration made taking into account the specifics of the premises and the requirements of regulatory documents.

The ceilings staircase cells and bottom staircase marches painted water-based paint.

Interior finish of exterior walls and brick partitions – improved plaster, drywall partitions - grouting. In the technical underground in in the premises of engineering and technical purposes and the bathrooms of the school, the walls are lined ceramic glazed tiled GOST6141-91. In all the rest auxiliary and working rooms the walls are painted

with acrylic paint, in technical underground - lime whitewash.

Doors - metal-plastic, metal, wooden in accordance with GOST 6629-88 in destination.

Floors of classrooms, classrooms, laboratory assistants, premises of a school-wide destination - commercial linoleum.

Floors of stairwells, workshops - corrugated ceramic tiles.

Floors in bathrooms, showers, in food shop workshops, procedural - ceramic tile with a rough surface in accordance with GOST6787-2001.

In the basement, ventilation chambers - concrete flooring.

Transformer substation The building is one-story, rectangular in plan with axial dimensions 9.6 x 6.90 m, with the height of the premises from the floor to the bottom of reinforced concrete slabs covering 4.05 m.

The building houses the cameras of power transformers, the room RU-0.4 kV, room RU-20 kV. Interior decoration - stucco with cement-sand mortar, lime whitewash.

Floors - concrete with painting.

Exterior finish - ceramic brickwork with jointing, decoration basement with porcelain tiles.

Gates, doors - metal, individual manufacture.

The roof is rafter, pitched, with an external unorganized drain.

The roof is a metal tile.

The blind area is asphalt, 750 mm wide, prepared from crushed stone.

Technical indicators of the building:

Total area - 60.82 m 2 ;

Building area - 91.50 m 2 ;

Construction volume - 544.44 m 3

3 The technological part

3.1 Engineering and geological conditions of the construction site

According to the report on engineering and geological surveys carried out in 2018GeoTerr LLP in the geological structure of the site take part in alluvial mid-Quaternary sediments represented by sandy loam, loams, sands, coarse, gravelly, gravel soils, and eluvial formations of the Mesozoic age, represented by loam. From above these deposits are covered by a fertile soil layer of modern age.

The fertile soil layer is represented by humus loam. Opened everywhere, with a capacity of 0.3 m.

IHE 1. Sandy loam brown, carbonated, solid, from a depth of 1.5 m

plastic, with interlayers of loam, fine sand. Power from 5.4 to 5.5 m.

Recommended values of regulatory characteristics:

Sn = 11 kPa; φн = 20 o; ɣн = 2.0 g / cm 3; E = 9 MPa;

Recommended characteristic values for strain analysis:

C II = 8 kPa; φ II = 18 about; ɣ II = 1.96 g / cm 3.

IHE 2. Loam brown carbonated, solid, from a depth of 1.5 m semi-solid, from a depth of 2.0 m soft-plastic, from a depth of 3.0 m soft-plastic, with layers of loam, sand of medium size. They are opened almost everywhere.

Recommended values of regulatory characteristics: Sn = 13 KPa; φн = 16 o ; ɣн = 2.04 g / cm 3 ; E = 6 MPa;

Recommended characteristic values for strain analysis:

C II = 11 KPa; φ II = 15 about ; ɣ II = 2.02 g / cm 3 .

IHE 3. Sands are large brown, polymictic, water-saturated, with

layers of loam. They are opened everywhere under sandy loam and loam from the depths.

5.5-6.5 m, capacity 1.7-3.0 m.

Recommended values of regulatory characteristics:

Sn = 0 KPa; φн = 36 o ; ɣн = 1.98 g / cm 3 ; E = 30 MPa;

IGE 4. Sands gravel brownish gray brownish brown polymathic, water-saturated, with layers of loam. They are opened everywhere aggressiveness to Portland cement and have medium aggressiveness to reinforcement to reinforced concrete structures. Corrosive activity of groundwater in relation to the aluminum sheath of the cable is high, to the lead sheath is medium.

Soils in relation to W4 concrete are weakly aggressive in areas Portland cement and slightly aggressive for reinforced concrete structures. Corrosive soil aggressiveness with respect to carbon steel is high.

Soils do not possess subsidence and swelling properties.

Groups of soils according to the conditions of manual development: sandy loam - II.

3.2. Natural and climatic conditions of the construction area:

The working draft is designed for the construction site with the following climatic conditions:
climatic construction area - 1, subarea - 1B;
the average temperature of the coldest five-day period is minus 35º C;
normative value of snow cover weight - 1.1 kPa;
standard value of wind pressure - 0.38 kPa;
the prevailing wind direction is southwest.
normative depth of freezing clay soils - 2.1 m.

Construction production in the technology department before the start of construction Preparatory work is carried out: construction site fencing, trees cleaning, demolition of buildings, if there are excess buildings on the construction site.

Temporary roads, temporary constructions on the fenced construction site,

electricity and water pipes will be laid. Equipment needed in construction, they are equipped with machines.

Construction consists mainly of underground and surface processes. Underground The work is called a zero cycle. Digging pits in the zero cycle, The construction of foundations and basement walls, floors. Earth The work is the process of building a building above the zero cycle. These include the construction of columns, ceiling walls.

3.3. Information required for underground works

1. Soil category: II;
2. Outdoor temperature:
t ECT = -35, 0 C - temperature of the coldest day;
t ECБ = - 7,1 0 C - weekly temperature
3. Dense loamy soil.
4. Depth of freezing - 2.1 m
5. Height of the foundation - 2.7 m;
6. Average soil density ρ cp = 1600 kg / m 3 ;
Slope factor, m = 0.75;
Soil slope coefficient, α = 45º;

3.4. Determining the scope of work:

Dimensions of housing: a = 77.40 m, b = 77.20 m(77400x77200)
Width of the bottom of the pit, a = 78.4 m;
Length of the bottom of the pit, b = 78.2 m;
Depth of the pit - H = 4.1 m
Width of the pit surface, c =84.55 m;
Length of the surface of the pit, d = 84.35 m;
The distance of transportation of excess soil is 3 km
Cutting the vegetative layer
S 1 = (10 + c + 10) (10 + d +10) = (10 + 84.55 + 10) (10 + 84.35 + 10) = 11953.29m 2;
The formula for the volume of the pit:

$$Vk = H/6(A + C)x(B + d) + (AxB) + (Cxd)$$
$$= 4.1/6[(78.4 + 84.55)(78.2 + 84.35) + (78.4x78.2) + (84.55x84.35)]$$
$$= 22404.65M^3$$

$$A = a + 1m = 77.4 + 1m = 78.4m$$
$$B = b + 1m = 77.2 + 1m = 78.2m$$
C=A=2Hm=78.4+2x4.1Mx0.75=84.55m
D=B+2Hm=78.2+2x4.1x0.75=84.35

1) A is the length of the bottom of the pit
2) B is the width of the bottom of the pit
3) C is the length of the pit on the roof
4) D is the width of the top of the pit
5) m = 0.75 is the coefficient of soil fall
6) The volume of the flat soil of the pits is according to the following formula
7) determined by

$$V\text{Подг} = FnxΔh = 5975.28x\ 0{,}2 = 1195.$$

where: F n is the area of the bottom of the pit;
Δh- cutting depth of the area (Δh = 0.2 m);
The excavation of the soil in the cavity in the basement of the boiler is as follows determined by the formula ::

$$V0.3 = \frac{Vк - Vж}{1 + K0.p} = \frac{(22404.65 - 24498.648)}{1 + 0.04} = 2013.45m^3$$

where:

VArea=a.b.H=77.4x77.2x4.1=24498.648

H basement 4.1 m;
K 0.p - 0.04

Determining the amount of compaction depends mainly on the area of compaction measured. By setting the average value of the compacted soil layer
we find:

$$Fупл = \frac{V0.3}{hупл} = \frac{2013.45}{0.2} = 10067.25m^2$$

where: V 0.3 - volume of replenishment;

h упл. - thickness of the sealed layer;

Determining the amount of soil to be dumped

Vүйін=Vқ.қ =2013.45 м3

The amount of excess soil transferred to the vehicle by the following formula define:

$$VИ\ Г = Vk - V0.3 = 22404.65 - 2013.45 = 20391.2m^3$$

where: V k - boiler volume;

V o.z. - the amount of soil required for replenishment;

The main construction machine is a single-axle backhoe for digging pits
We use a shovel excavator.

V k =22404.65

Depending on the size of the pit, the capacity of the next bucket
we choose.

V O = 0.65 m3

1 - mechanical excavator jetekpen- Hitachi zx 200 ladle capacity
0.65m 3 ;
2 - with a gravity drive - CaseWX240 with a capacity of 0.65 m 3 ;

Table 3.1 - Determining the load capacity of the excavator.

The volume of the pit (m 3)	Capacity (m 3)
500	0.15
500 ÷ 1500	0.24 and 0.3
1500 ÷ 5000	0.5
2000 ÷ 8000	0.65
6000 ÷ 11000	0.8
11000 ÷ 15000	1
13000 ÷ 18000	1.25
15000	1.5

Table 3.2 - Standard time and cost of the excavator for 100 m 3 of soil

Option 1	N1=3,5 (3,5) 3,71	N2=2,8 (2,8) 2,97
Option 2	N1=3,2	N2=2,8

	(3,2) 3,39	(2,8) 2,97

Determine the number of shifts of the excavator

$$1)\ \sum \text{Пмаш ауыс} = \frac{\left(\frac{v}{100}.N1+\frac{V\text{авт с}}{100}.N2\right)}{8.2} = \frac{\frac{2013.45}{100}.2.8+\frac{10067.25}{100}.3.5}{8.2} = 50.15$$

$$2)\ \sum \text{Пмаш ауыс} = \frac{\left(\frac{v}{100}.N1+\frac{V\text{авт с}}{100}.N2\right)}{8.2} = \frac{\frac{2013.45}{100}.2.8+\frac{10067.25}{100}.3.2}{8.2} = 49.9$$

Determining the performance of the excavator shift

$$\text{П}change\ \ N2 = \frac{Vk}{\sum \text{Пмаш ауыс}} = \frac{22404.65}{50.15} = 446.75m^3/shift$$

$$\text{П}change\ \ N2 = \frac{Vk}{\sum \text{Пмаш ауыс}} = \frac{22404.65}{49.9} = 448.99m^3/shift$$

Depending on the economic efficiency when comparing SES

We accept Hitachi zx 200 .

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

C = 1.08 · C machine switch. / P replacement product ;

Mechanical drive: C machine shift (E - 652) = 28.3

C = 1.08 · C machine switch. / P shift product = 1.08 · 28.3 / 243.5 = 0.1255

Hydraulic drive: C machine shift (EO-4121A) = 33.62

C = 1.08 · C machine switch. / P shift product = 1.08 · 33.62 / 261.87 = 0.1387

For soil transport The labor intensity of an excavator with one loader is given by the following formula determined by:

$$\text{T маш. см} = \frac{\text{Нвр}xVu}{100x8.2} = \frac{2.9x20391.2}{100x8.2} = 72.11mash\ cam$$

$$\text{T маш. см} = \frac{\text{Нвр}xVu}{100x8.2} = \frac{2.9x20391.2}{100x8.2} = 72.11mash\ cam$$

where: T маш.см. - labor intensity of soil preparation;

H вр. - the amount of time to prepare the unit of volume of machine operation;

100 and 8.2 - the number of hours per shift and the corresponding unit of volume;

Determine the required number of dump trucks using an excavator:

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

$$Vgroup = \frac{\text{Vожау}.Kgroup}{Kgroup} = \frac{0.65x1}{0.2} = 3.25m^3$$

Where: k group - the filling factor of the host - **1**

k cop - soil loosening factor **-0.2**

Loam = 20%

2. Determine the weight of the soil on one side of the excavator:

Q = V group · γ = 3.25 * 1.7 = 5.53t

Where: γ - soil density; **Loam-1.7**

3. The number of loads to be transferred to dump trucks

n k = 10 / q k = 10 / 5.53 = 1.8 pieces;

Where: q k is the weight of the soil in one pile;

10 t - load capacity of dump trucks;

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

V ож = V топ · n = 3,25 * 1,8 = 5,9м 3

Where: Group V - the amount of soil in one nest;

n is the number of stitches;

Duration and load of soil transportation by the following formula determined by:

1) t 1 = 2L / V = 2x5 / 45 = 0.22 hours;

Where: L-soil transportation distance : 5 km

Speed of V-dump trucks in the loaded state: V = 45 km / h

Time of unloading and additional operations:

1) t 2 = t t + t m = 0.050 hours;

Where: t t - unloading time - 0.016 hours

t m - time of additional operations - 0.034 hours

Time to load the soil on the dump truck with an excavator, one loading determine in time:

$$Tn = \frac{Voz.Nbp}{3600} = \frac{2.13x3.5x60}{100} = 0.21hours \quad (2)$$

Where: Voz - the amount of soil transferred to the dump truck;

Nb=N1 -100 m 3 of soil time and price norm.

The duration of operation of 1 full cycle of dump trucks is as follows determined by the formula:

tц=t1+t2+tn.=0,22+0,050+0,21=0,48 hours (3)

We determine the require number of dumb trucks by following formula

N=tц/tnp=0,48 /0,21=2,3 =2 маш.;

Where: t ц - time of 1 cycle of dump trucks;

t pogr - time of soil loading on the dump truck;

Labor intensity of soil transportation

T mash.cm =Tmash.cm. N= 72.11x2=144.22 mash,cm

Where: T mash.sm. - labor-intensive excavator with one shovel;

N - number of dump trucks;

Dump trucks:

We determine the unit cost of production by the following formula

KAMAZ-5511

$$\frac{\sum cmix\ .Tm,cm}{V} = \frac{(33.62 + 35.4)x144.22}{2013.45} = 0.479$$

Where: T m.sm. - labor costs of dump trucks;

With fur. - production cost of dump truck shifts; (as a reference accept);

Fundamental equity contribution

$$(\frac{\sum \frac{Цm}{Tg}.Tmash,cm)}{V} = \frac{\frac{24000}{375}x144.2}{2013.45} = 0.444$$

where: C m is the inventory-estimated cost of the dump truck

T g - the number of shifts per year for each machine (reference) perceive as);

Volume of share expenses

$$Cy = Cb + E + Ky = 0.479 + 0.12x0.444 = 0.53$$

excavator with a capacity of 0.65 m 3 Hitachi zx 200 excavator and lifting load weight 10 tons. We choose KAMAZ 5511 dump truck .

Width of the pit: D =30.2m

The largest radius of the excavator in cutting the pit, according to BNzhB2 accept-R CT = 9,2m; .Excavator excavation

define the scheme:

C / R max = 30.2 / 9.2 = 3.2> 3m

Signal passage

Most of the first passage when loading the soil into trucks and one dump

We determine the large width by the following formula:

$$B = b1 + b2 = \sqrt{(Rct^2 - Ln)} + (Rbt - bk/2 - 1)$$

where: l n - duration of movement of the excavator, as a reference we accept. l n = 1.6 m;

R bT - radius of loading of soil on dump trucks, according to BNzhB2 we accept. R bT = 5 m;

b k is the width of the KAMAZ-5511 cargo compartment; we take it as a reference. b k = 2.5 m;

$$Bb = \sqrt{9.2^2 - 1.6^2} - \left(5 - \frac{2.5}{2} - 1\right) = 9.05\text{m}$$

Determine the width of the first sign:

B n = B b -2mH = 9.05 - 2 · 0.75 · 3.8 = 3.35 m ;

The width of the second and subsequent sign passages is given by the following formula define:

$$B = b3 + b4 = \left(Rbt - mn - \frac{bk}{2} - 1\right) + \sqrt{Rn^2 - ln^2}$$

where: R n is the bottom of the pit with a large depth cutting radius;

According to the scheme R n = X + d;

$$X = \sqrt{a^2 - (Hk + hw)^2}$$

where: N k - depth of the pit;

h ш - measure of the height of the direction of the excavator to the axis, reference

accept as. h w = 1.6m;

$$a = \sqrt{(Rct - d)^2 - hw^2} = \sqrt{(9.2 - 1)^2 - 1.6^2} = 8.04m$$

$$X = \sqrt{8.04^2 - (3.8 + 1.6)^2} = 5.96m$$

Rн=5,96+1=6,96 м;

$$B = \left(5 - 0.75x3.8 - \frac{2.5}{2} - 1\right) + \sqrt{6.96^2 - 1.6^2}$$

Crane load capacity:

Q=mmax=1,7 т

The length of the crane hook:

$$Lcr = \frac{B}{2} + 1 + K + 1 + b + \frac{b}{2}$$

Where: B = 4 m - the distance from the slope of the pit to the crane, depending on the type of soil and the depth of the pit.

$$k = H \cdot m = 3.3 \cdot 0.75 = 2.855$$

$$Lcr = \frac{4}{2} + 2.855 + 1 + 23.5 + \frac{23.5}{2} = 41.775m$$

3. Depending on the length, select the brand of crane.

Auto crane for installation of foundations and delivery of fittings

We use XCMG QY50K (load capacity Q max = 50t, arrow length

l cr = 56 m. hook lifting height 30 m).

The concrete mix is delivered to the concrete pumping station C296.

The main technological parameters of the crane include: hook flight L m, hook lifting height H m, crane load capacity Q t.crane We calculate the above characteristics for selection. Hook lifting height:

$$H к = H 0 + H б + H э + Hz + hп \quad (5)$$

where H 0 = 13.57 m - height of the building;

Нб = 0.5 m - height of the hole for safe work;

H э = 3.m is the height of the element, in this case the turning angle height;

Hz = 1 m - height of the sling.

Нп = 2.1m – height of the pulling belt

$$H k = 13.57 + 0.5 + 3 + 1 + 2.1 = 20.17m.$$

where L n = 35 m - the furthest from the edge of the foundation of the building transmission distance to the column. safety zone

.L b = 1 m - from the edge of the foundation of the building to the edge of the crane foundation

L o = 4.5 m - from the edge of the crane foundation to the axis of the crane distance.

0.9 m - from the axis of the crane to the edge of the crane distance.

$$L = 35 + 1 + 4.5\text{-}0.9 = 39.6 \text{ m.}$$

The mass of the rising element

The calculation is made on a bucket of concrete, because it is the largest has a mass.

Crawler depending on the calculated results accept:

LPG-40A crane:

lifting height - 20 m;

load capacity - 40 tons;

the length of the arrow - 4.5 ... 24 m;

- estimated cost - 400.3 thousand tenge;

Cost per machine shift - 420.64 mash-aus.

2) Angle of inclination of the crane boom:

$$\text{tg } \alpha = \frac{\sqrt[3]{h - h_{oc}}}{(l_k + \delta)}$$

where $_h = 13.57$ m - height of the building;

$h_{oc} = 5.1$m - height from the hinge of the arrow to the ground;

$l_k = 6$ m - transfer of cargo from the outer wall of the building close to the crane distance; $\delta = 5.1$ m is the distance from the axis of the arrow to the building;

$$\text{tg } \alpha = \frac{\sqrt[3]{13.57 - 5.1}}{(6 + 5.1)} = 2.05 \qquad \alpha = 63.99\ ^\circ$$

4 The economic part

4.1. Estimaition part

Estimated documentation Construction of a school in the intersection of Streets Burov No. 36, E171 is drawn up in accordance

with STS RK 8.04-07-2018; SCEM RK 8.04-11-2018; SCPG RK 8.04-08-2018; SSC RK 8.04-08-2018; SSC RK 8.04-09-2018;

1. Estimated documentation compiled on the basis of a working draft, with taking into account the local construction conditions for the territory- of the district, 01.00 Oskemen, at prices of 2018 for the 4th quarter.
2. Estimated documentation consists of three books.
3. Unforeseen work and costs included in the amount of 2% state standard by definition of the estimated cost of construction of the Republic of Kazakhstan p. 72
4. MRP2018 - 2405 tenge; МРП2019 - 2525tenge; МРП2020 - 2613tenge.
5. VAT-12% established by applicable law
6. Temporary 1.5% of the table. 1 p. 36; Winter 4 temperature zone; P. VIII.1g; 2.2%
7. In local estimates accounted for estimated profit of 8% of the estimated cost direct costs and overhead. p.20 determination of quantities overhead.
8. The beginning of the duration of the construction is accepted according to the letter of from the 1st quarter of 2019. The construction period is 20 months.

Object cost estimate No. 2-1
(Objective cost estimate)
Estimated cost of work and costs 1 531 638,446 thousand tenge
Normative labor input 180,137 thousand people-h
Estimated salary 237 265,798 thousand tenge

4.2. Estimated documentation

Estimated documentation is developed in accordance with the regulatory document for determination of the estimated cost of construction in the Republic of Kazakhstan, approved by order of the Committee for Construction, Housing and Communal Services and land administration of the Ministry of National Economy of the Republic Kazakhstan dated November 14, 2017 No. 249-нк, on the basis of state estimated standards and accepted design decisions.

The estimated construction cost is subject to approval by the customer and is the basis for determining the limit of funds when implementing projects at the expense of public investment in construction in accordance with paragraph 13 of the

regulatory document on the determination of estimated cost in the Republic of Kazakhstan Estimated documentation compiled by the resource method using

software complex "ABC-4", edition 2018.4 for the production of estimates in current prices of 2018. In the preparation of estimates used:

1) “Collections of aggregated indicators of the value of buildings and structures. The objects non-productive purposes, Collections of elemental estimated consumption rates resources for construction work and installation of equipment, a compilation of estimated prices in the current level of operation of construction vehicles and mechanisms in 2018, Price collections for design work for construction (USN RK 8.02-04-2017, ESN RK 04/08/2015, ESN RK 8.04-02-2015, STsEM RK 8.04-11-2017, STsP RK 8.03-01-2017) Changes and additions Issue 13 ".

2) SSC RK 8.04-08-2018 "The collections of estimated prices at the current level at construction materials, products and structures ”in 2018 (Issue 3) and SSC RK 8.04-09- 2018 “A collection of estimated prices at the current level for engineering equipment facilities construction ”2018 (Issue 2); The list of equipment, materials, products with the application of price lists, names with relevant technical characteristics not available in current price collections approved by the manager GU "Management of regeneration of the urban environment of the city of Astana" in accordance with paragraph 24 State standard for determining the estimated cost of construction in The Republic of Kazakhstan. The estimated cost of construction includes additional costs: overhead determined in accordance with the regulatory document for determining the amount of overhead in construction (Appendix 2 to the order dated November 14, 2017 No. 249-нқ); estimated profit of 8% of the amount of direct costs and overhead (Clause 20, Appendix 2 to Order No. 249-нқ dated November 14, 2017); funds for unforeseen work and costs in the amount of 2% of the cost of construction and installation work chapters 1-9 of the estimate (paragraph 72, Appendix 1 to the order of November 14, 2017 No. 249-нқ); expenses for the construction of temporary buildings and structures (NDZ RK 8.04-05-2015); additional costs for the construction and installation works in the winter time (NDZ RK 8.04-06-2015);

The estimated construction cost is determined in 2018 prices, taking into account the norms backlog of investment and forecast inflation for years of construction, according to the forecast of socio-economic development of the Republic of Kazakhstan for 2018- 2020 established in Annex 1 to the Forecast of socio-economic the development of the Republic of Kazakhstan for 2019-2023 according to protocol No. 33 of August 28 2018 year.

CONCLUSION

The standard design is developed in accordance with the assignment for design approved by the Construction Committee, housing and communal services and land management Ministry of Economy of the Republic of Kazakhstan.

Typical project designed for construction in the climate subarea Estimated standards in force in the Republic of Kazakhstan and is recommended for approval with the following technical and economic indicators: Execution of the diploma project and training of civil engineers is the final stage of the whole preparation process This is great The student in a comprehensive work on all disciplines and theoretical disciplines.

work in practical classes and internships in the project organization put into practice the knowledge and skills acquired in the process.

In the thesis the student expresses his understanding and different purposes understanding, design of complex functional processes that take place in buildings knowledge of norms, design and architectural details

demonstrates knowledge, understanding of the requirements of the construction industry and the economy.

Here you will learn about graphic techniques, different types of fonts, laws comprehension, drawing on a sheet of paper and professionalism.

As a result of the diploma design, a hotel project was created, which is all fully meets modern requirements.

Stores - 2, 3 floors.

Capacity - 500 places.

The total area of the land - 2.6189 ha.

Building total area - 12096.99 m 2 .

Useful area of the building - 11441.73 m 2 .

Construction volume - 50,080.62 m 3 .

Total estimated construction cost

in 2018 prices and forecast

prices 2019-2020, total - 2 761.595 million tenge;

including:

SMR - 2 097.165 million tenge;

equipment - 269,500 million tenge;

other expenses - 394.930 million tenge.

Standard construction time - 20.0 months.

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Application A

1. Calculation of coatings in the axes IT-9-12 (trusses, ties, runs, corrugated board) and in touch IT - 9-12 (beams, decking) is produced in accordance with SNiP RK 2.01.07-85 "Loads and impacts and Snip RK 5.04-23-2002" Steel designs. Design Standards "for normative snow load 1.5 kPa.

2. The system of elevations adopted according to the drawings of the brand AR.

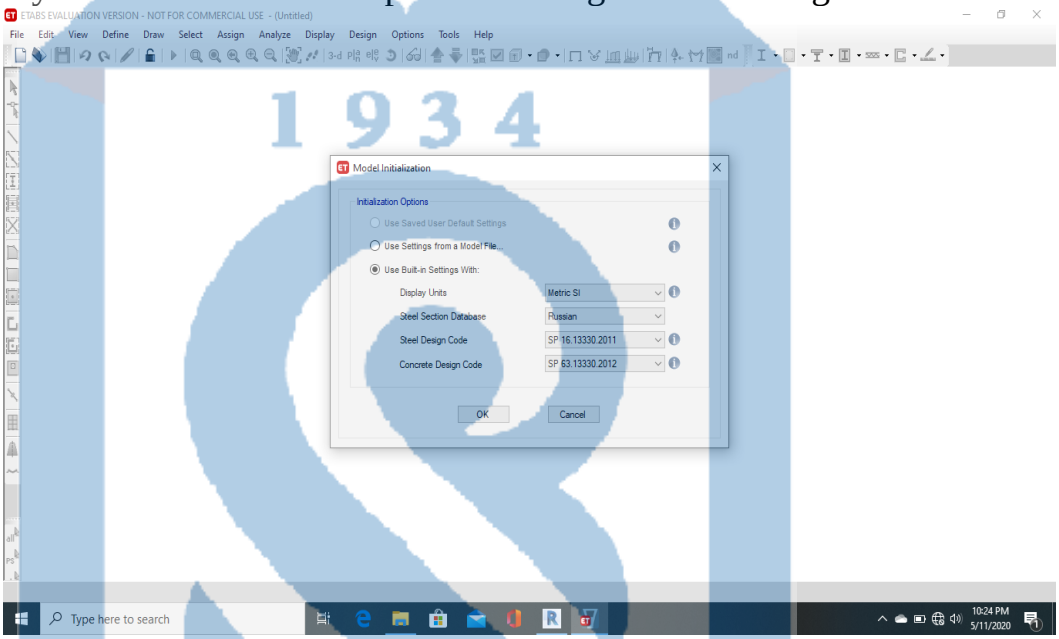


Figure 1- Choosing type of calculation (snip)

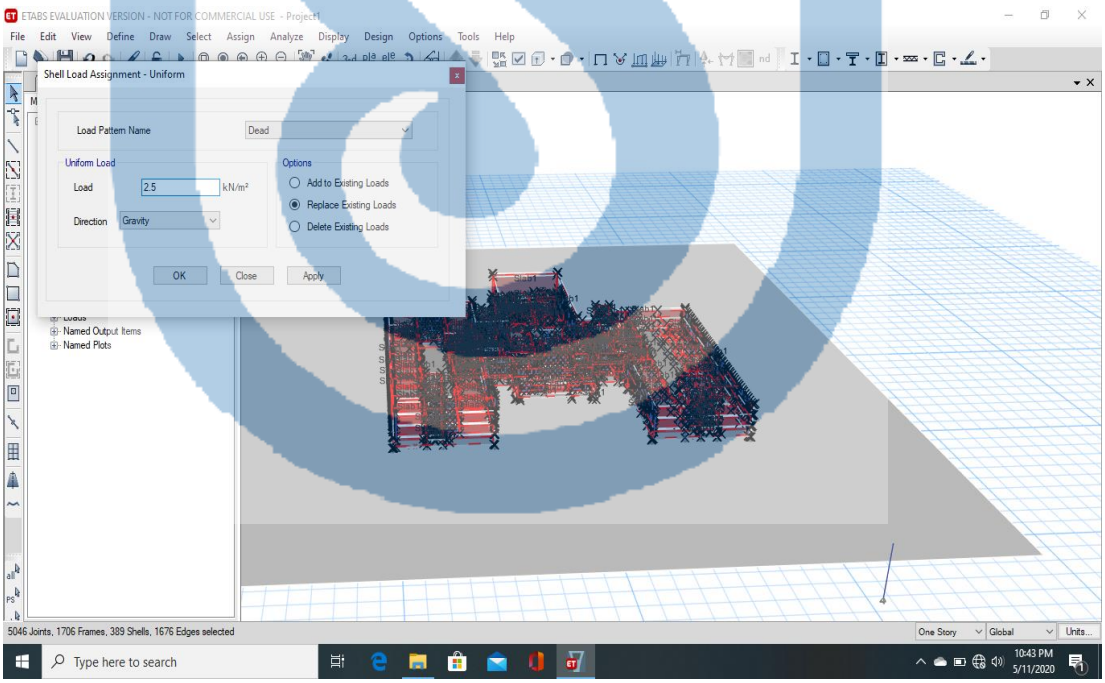


Figure 1.2 - load determination

Continuation of application A

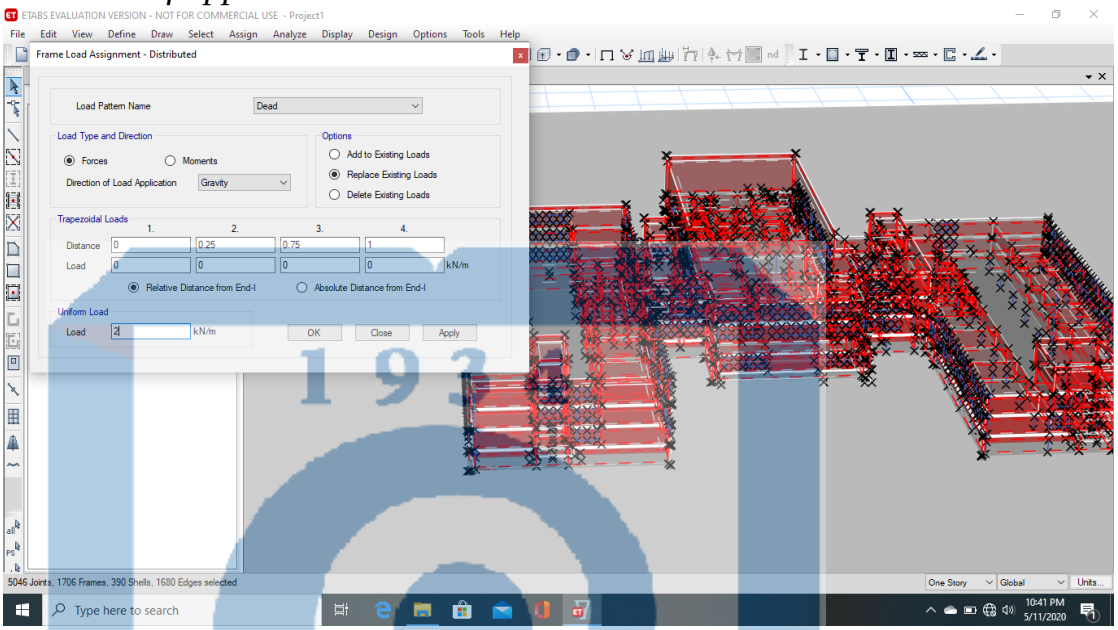


Figure1.3 - Computations of the calculated effect in the calculation of the premium

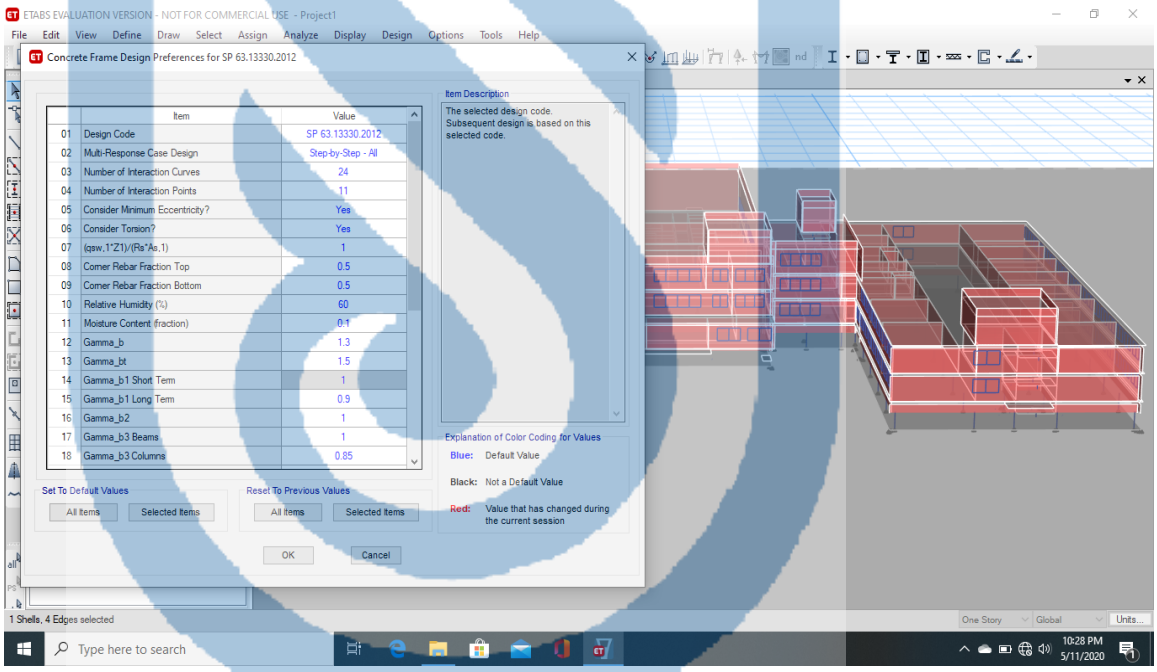


Figure 1.4 - applying material on building

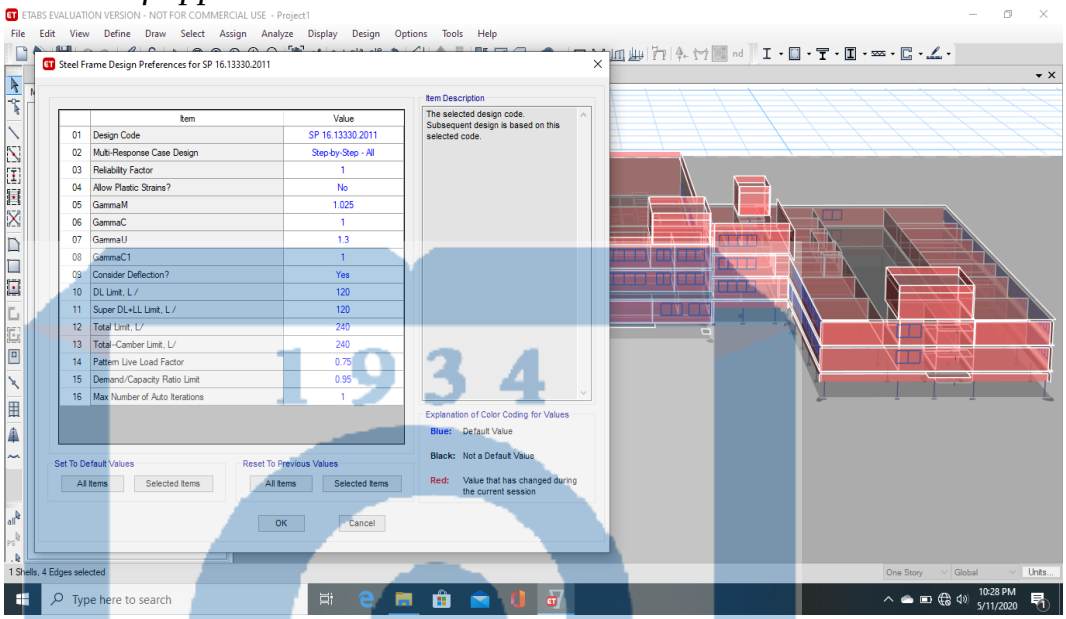


Figure1.5-(designframe) the required reinforcement area of the column

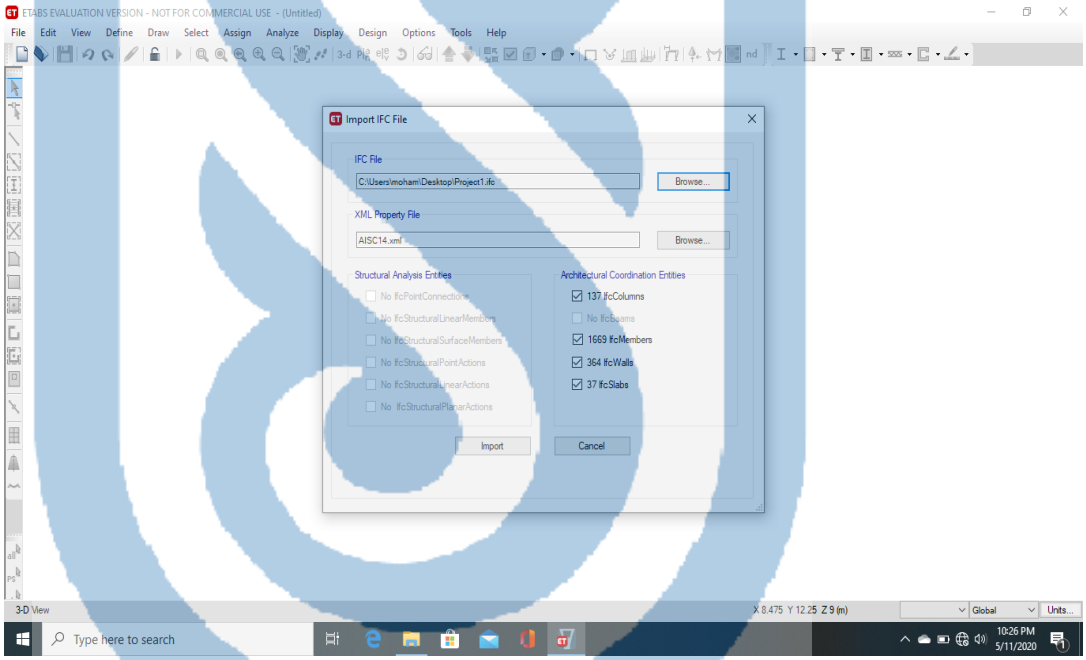


Figure 1.6 - (checking for correction of column slab)

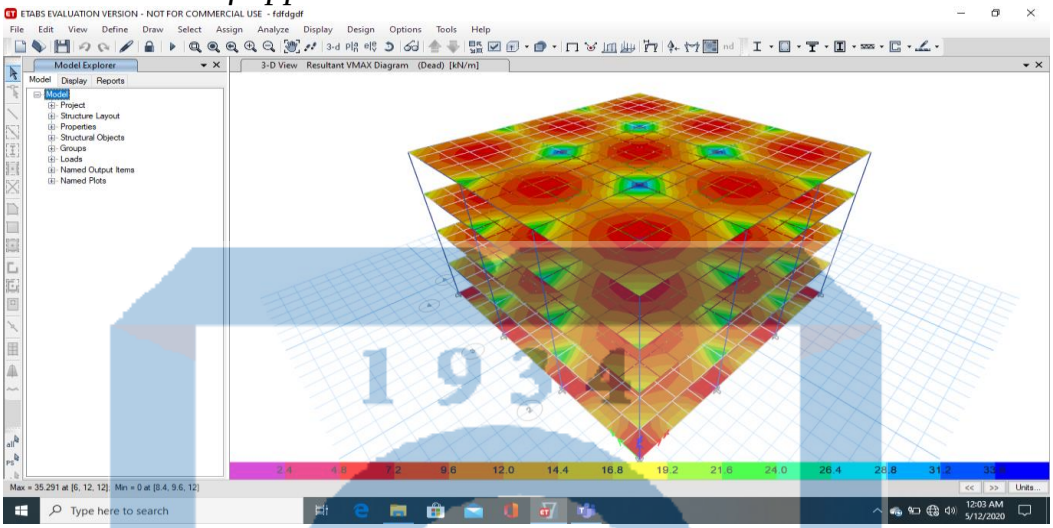


Figure1.7 - Z isopoly of displacement by its own weight

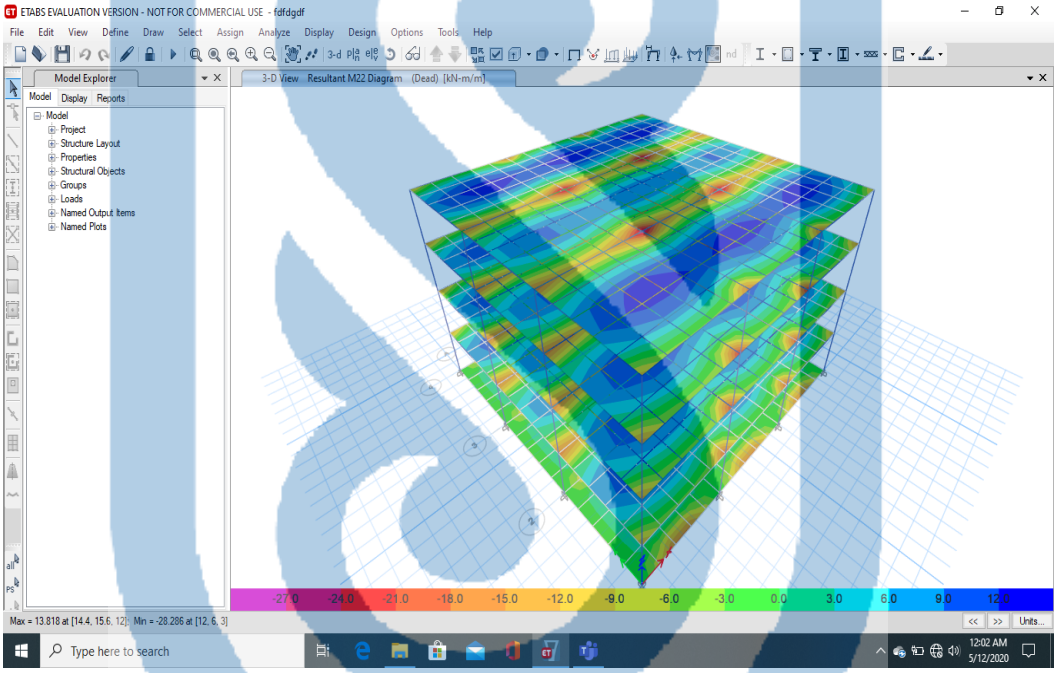


Figure 1.8 - Z isopoly of displacement from constant load

Continuation of application A

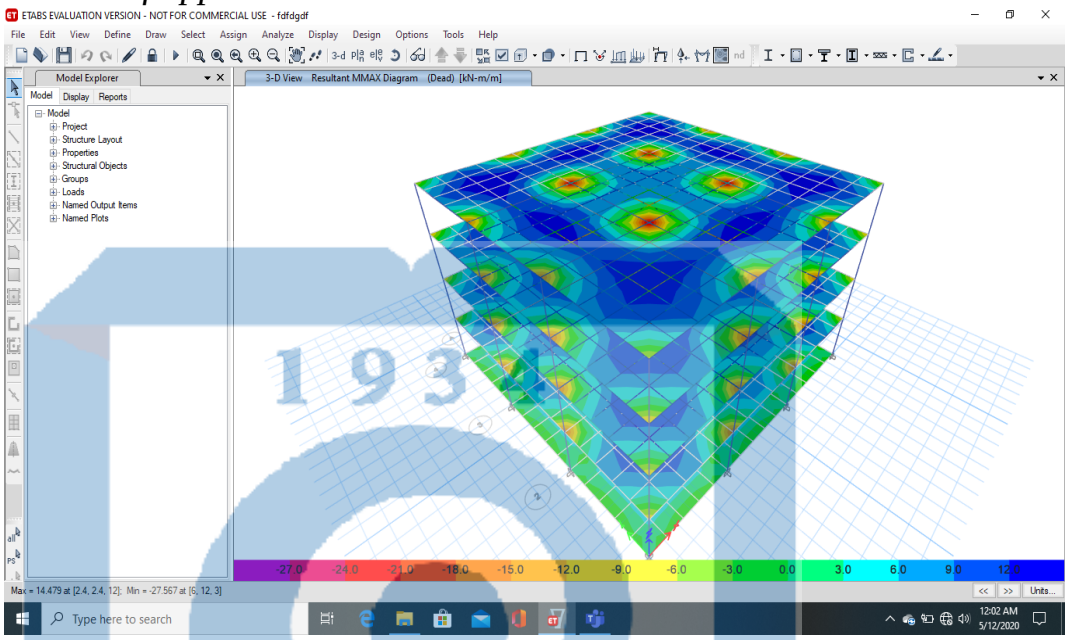


Figure1.9 -Z isopoly of short-term load displacement

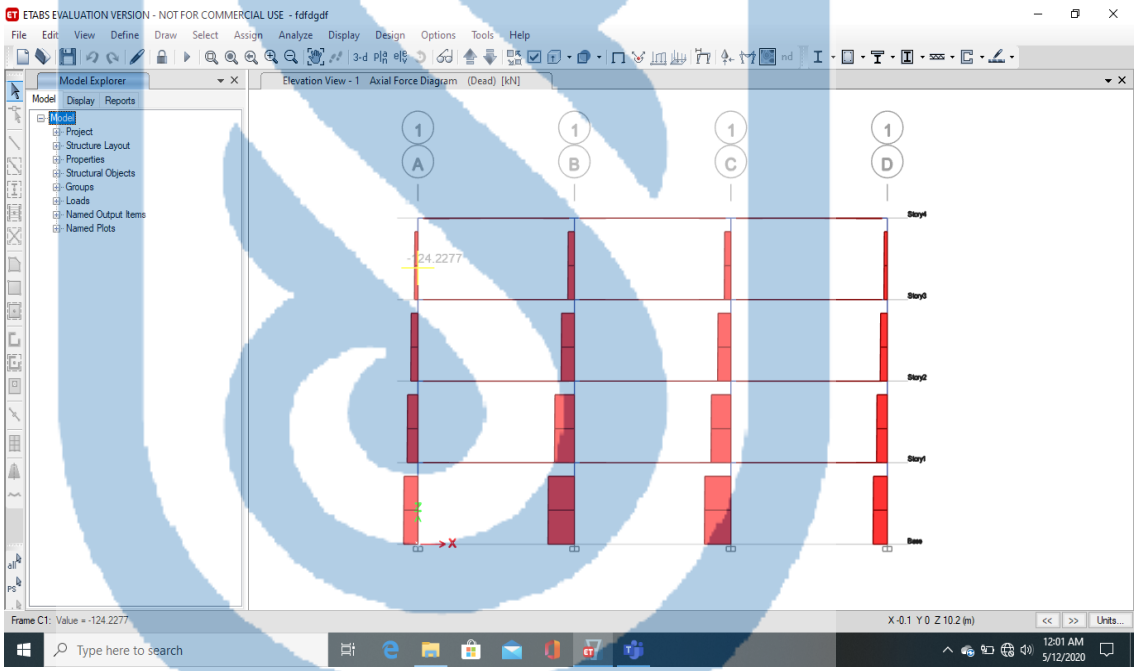


Figure 1.10 - Z isopole of long-term load displacement

Continuation of application A

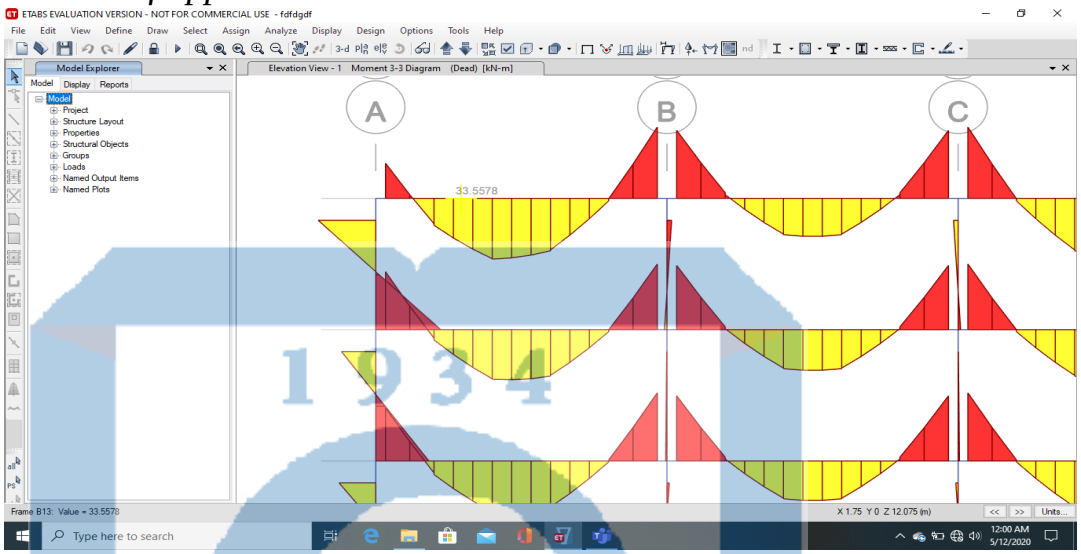


Figure1.11- Percentage of column reinforcement

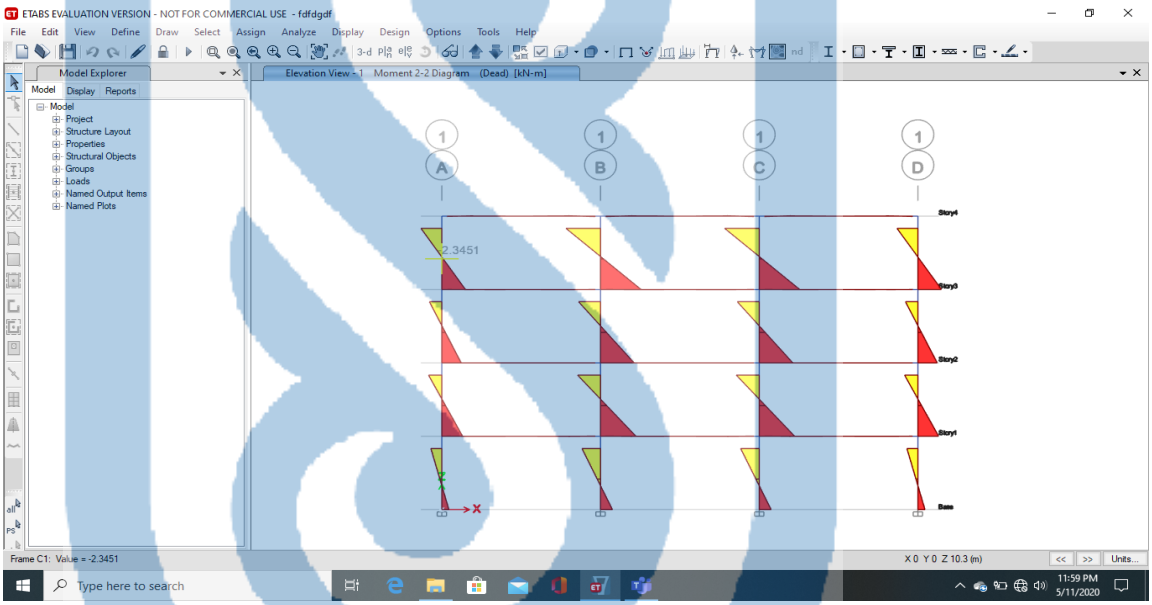


Figure 1.12 - N diagram of the column

Continuation of application A

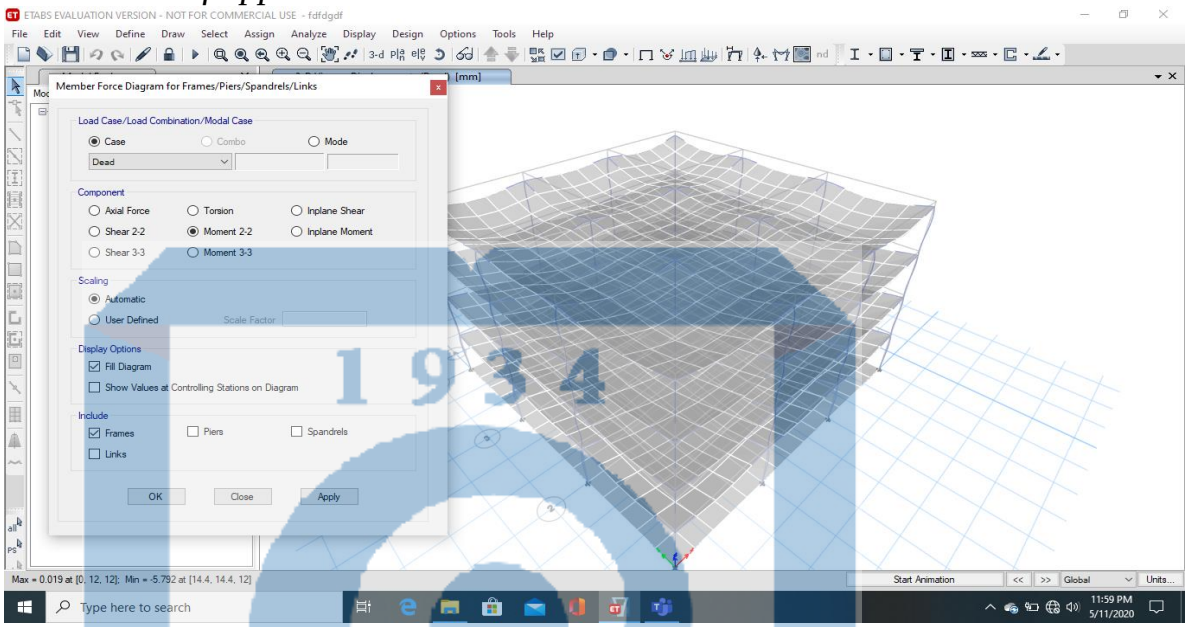


Figure 1.13-Z isopole of long-term load displacement

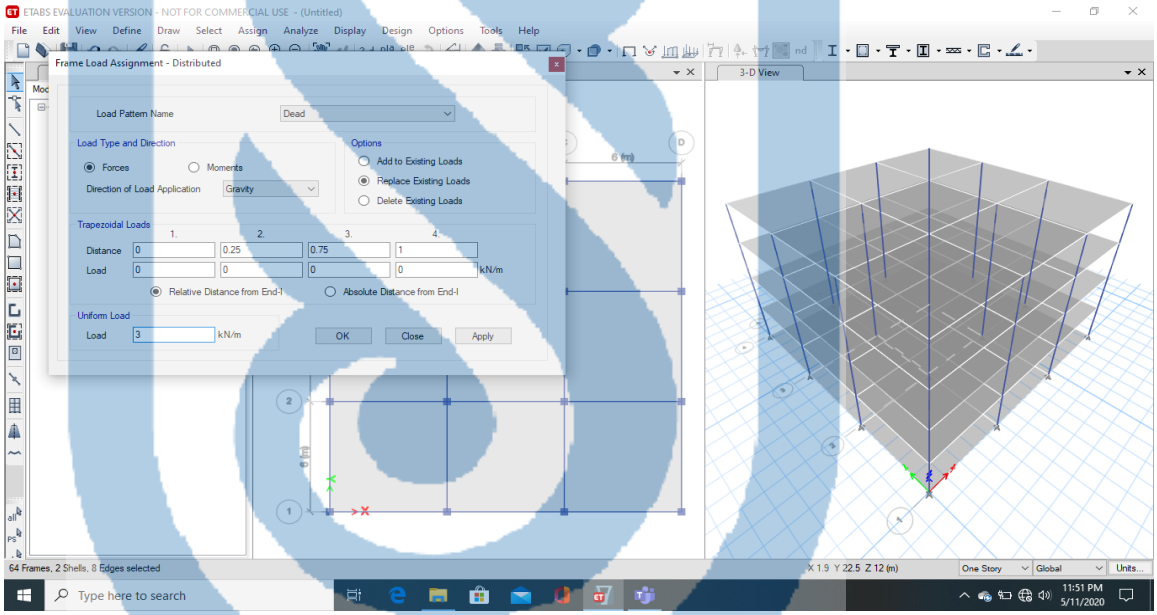


Figure 1.14 - Z isopoly of short-term load displacement

Continuation of application A

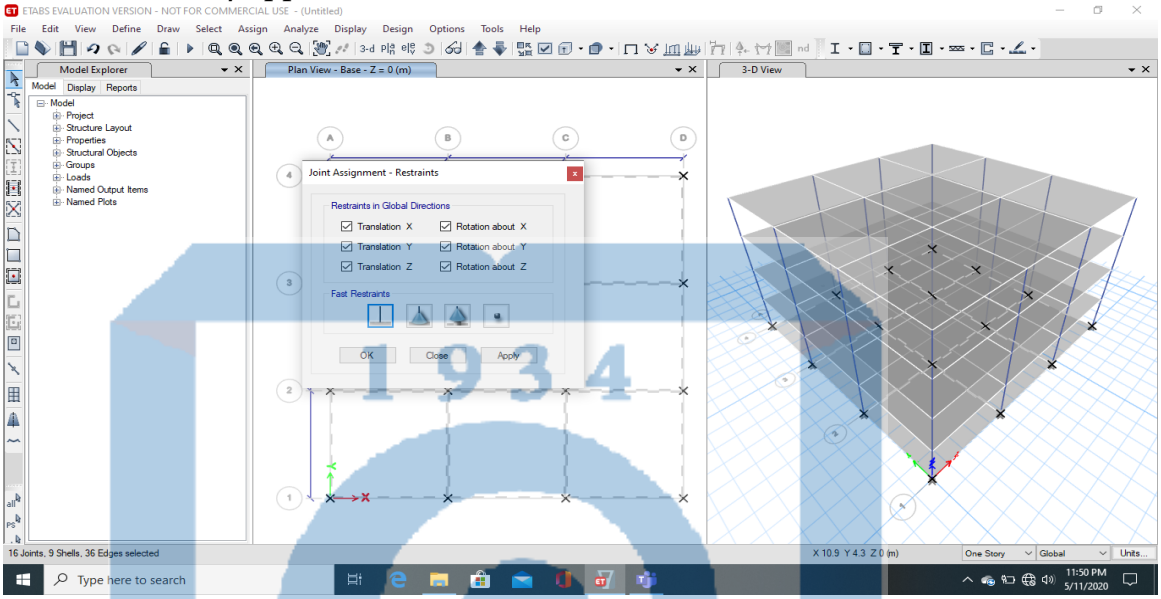


Figure 1.15 - Z isopoly of short-term load displacement

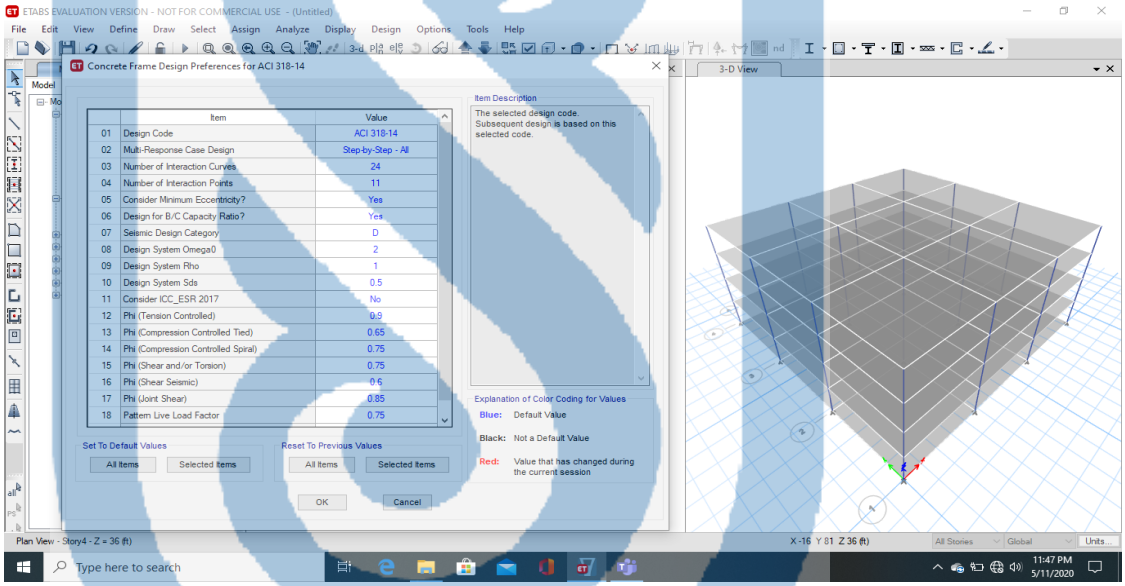


Figure 1.16 Computations of the calculated effect in the calculation of the premium

Continuation of application A

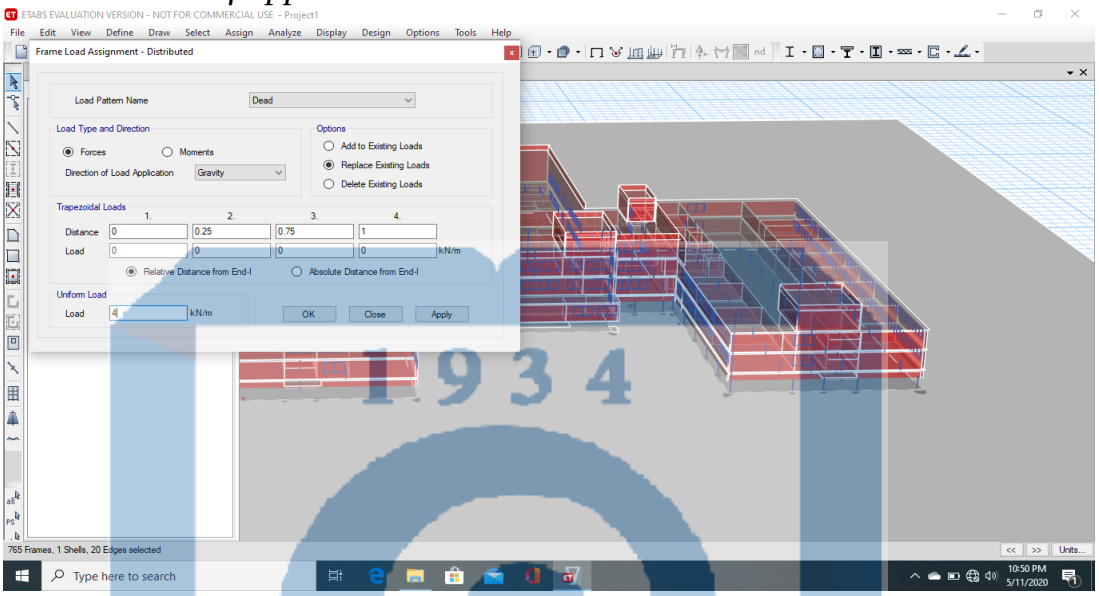


Figure 1.17 - Computations of the calculated effect in the calculation of the premium

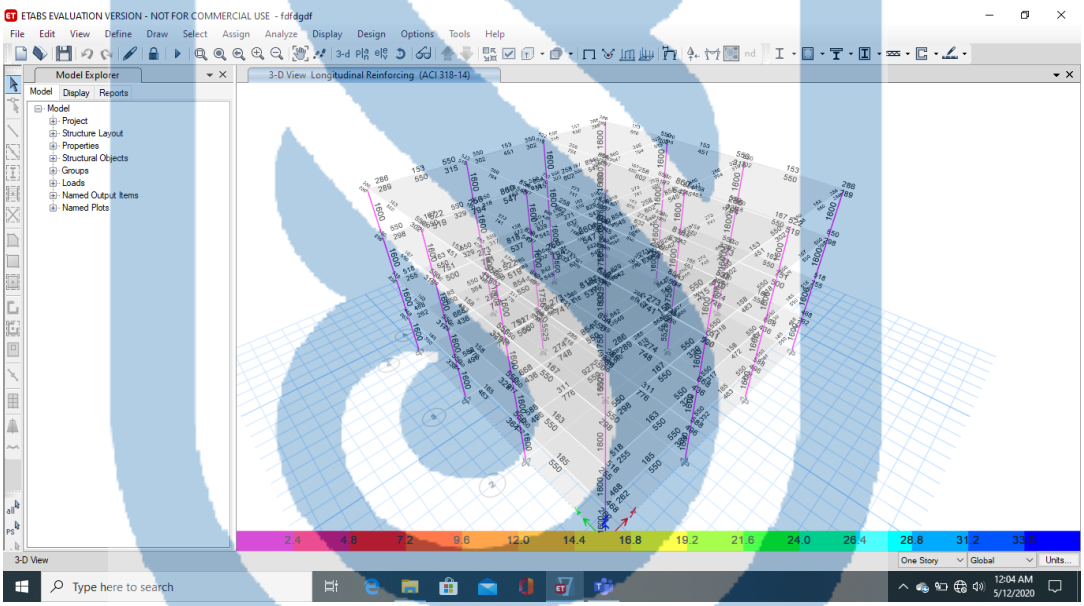


figure 1.18 - (analyzing of all loads)

Application B

Table 21.6.The main technical and economic indicators for the working draft

P.No	Indectors name	Unite	Declared indoctors	**recommended to approval**
1	2	3	4	5
1	Storeys	floor	2;3	2;3
2	Capacity	place	500	500
3	The total area of the land	ha	2,6189	2,6189
4	Building total area	M2	12096,99	2096,99
5	Effective area	M2	11441,73	11441,73
6	Building volume Total estimated cost in prices 2018 years and forecast prices 2019-2020 Total	M3	50080,62	50080,62
7	including: construction and installation work equipment other expenses Including: 2018 year (PIR, Examination)	million tenge	2 519,061 1 880,583 273,482 364,996	2 761,595 2 097,165 269,500 394,930
8	Including: 2018 year (PIR, Examination) 2019 year 2020 year	million tenge		16,832 1 348,876 1 395,887
9	Standard duration Building	months	20,0	20,0

Table 21.5 - Estimated cost, thousand tenge

	Estimated numbers	Name of work and costs	construction installation work	equipment furniture and inventory	other cost	Total	Normative labor capacity, thousand human hours	Estimated wage pay, thousand tenge	Indicators single cost
1	2	3	4	5	6	7	8	9	10
1	№ 2-1-1	Foundations Blocks	58243,507	--	--	58243,507	5,873	8089,377	

		A, B, C							
2	№ 2-1-2	Reinforced concrete structures below mark 0.000 Blocks A, B, C	57368,883	--	--	57368,883	2,920	4039,171	
3	№ 2-1-3	Reinforced concrete structures above mark 0.000 Blocks A, B, C	167621,738	--	--	167621,738	10,282	14209,301	
4	№ 2-1-4	Metal structures Blocks A, B, C	38124,521	--	--	38124,521	1,897	2668,072	
5	№ 2-1-5	Architectural solutions below mark 0.000 Blocks A, B, c	127768,337	--	--	127768,337	29,571	38150,344	
6	№ 2-1-6	Architectural solutions above mark 0.000 Block A	211122,499	--	--	211122,499	31,729	40389,459	
7	№ 2-1-7	Architectural solutions above mark	158810,997	--	--	158810,997	24,348	31538,378	

		0.000 Block C							
8	№ 2-1-8	Architectural solutions above mark 0.000 Block B	18875,706	--	-	188755,706	26,410	33934,686	
9	№ 2-1-9	Lift equipment	1724,011	1383 9,286	-	15563,297	0,970	819,968	
10	№ 2-1-10	WATER SUPPLY. Blocks A, B, C	24097,307	6917 882	-	31015,189	3,462	4822,015	
11	№ 2-1-11	SEWERING. Blocks A, B, C	19317,796	850,876	-	20168,672	2,182	3021,726	
12	№ 2-1-12	Heating (BLOCK A, B, C)	75882,475	4148,514	-	80030,989	6,717	9433,1922	
13	№ 2-1-13	Ventilation (BLOCK A, B, C)	36066,620	7921,613		43988,233	6,508	8393,552	
14	№ 2-1-14	Power electrical equipment Block A	15152,576	-		15152,576	3,026	4163,490	
15	№ 2-1-15	Power electrical equipment Block C	30672,614	770,695		31443,309	5,702	7922,957	
16	№ 2-1-16	Power electrical equipment Block B	6734,348	-		6734,348	1,340	1834,324	
17	№ 2-1-17	Electric lighting Block A	26883,398	-		226883,389	2,444	3318,712	
1	№ 2-	Electric	22011	-		22011,51	2,085	2863,	

8	1-18	lighting Block C	,518			18		863	
19	№ 2-1-19	Electric lighting Block B	19852,162	-		19852,162	1,841	2522,877	
20	№ 2-1-20	Fire alarm	15753,912	2390,074		32703,529	3,581	4912,599	
21	№ 2-1-21	COMMUNICATION SYSTEMS	29375,388	3328,141		4089,104	5,685	7500,219	
22	№ 2-1-22	Automatic gas fire extinguishing	4022,318	66,786		156041,950	0,110	160,225	
23	№ 2-1-23	Production technology	4983,087	151058,863		181439,86	1,719	2157,293	
		TOTAL	1340345,718	191292,729		1531638,446	180,137	237265,798	
24	Normative document on definition cost construction in the Republic of Kazakhstan, p. 26	Including equipment, furniture and inventory customer supply (reference)		151058,863		151058,863			

Table 2 - Estimation tables

P.NO	Object code or local estimate the document		Name of objects and local budget documentation Registration Number Note	Registration numbers	Application
1	2		3	4	5
			CONTENT		
			Consolidated calculation of construction		
			Estimated construction cost		
			Estimated construction cost		
1	2-1		School building	101000	
1.1	No 2-1-1		Foundations Blocks A, B, C 101000	101010	
1.2	No 2-1-2		Reinforced concrete structures below mark 0.000 Blocks A, B, C	101020	
1.3	No 2-1-3		Reinforced concrete structures above mark 0.000 Blocks A, B, C	101030	
1.4	No 2-1-4		Metal structures Blocks A, B, C	101040	
1.5	No 2-1-5		Architectural solutions below mark 0.000 Blocks A, B, C	101070	
1.6	No 2-1-6		Architectural solutions above mark 0.000 Block A	101080	
1.7	No 2-1-7		Architectural solutions above level	101090	

			0.000		
1.8	No 2-1-8		Architectural solutions above mark 0.000 Block B	101100	
1.9	No 2-1-9		Lift equipment	101110	
1.10	No 2-1-10		WATER SUPPLY. Blocks A, B, C	101120	
1.11	No 2-1-11		SEWERING. Blocks A, B, C	101130	
1.12	No 2-1-12		Heating (BLOCK A, B, C)	101140	
1.13	No 2-1-13		Ventilation (BLOCK A, B,	101150	
1.14	No 2-1-14		Power electrical equipment Block A	101160	
1.15	No 2-1-15		Power electrical equipment Block B	101170	
1.16	No 2-1-16		Power electrical equipment Block B	101180	
1.17	No 2-1-17		Electric lighting Unit A	101190	
1.18	No 2-1-18		Electric lighting Unit B	101200	
1.19	No 2-1-19		Electric lighting Unit B	101210	
1.20	No 2-1-20		Fire alarm	101220	
1.21	No 2-1-21		COMMUNICATION SYSTEMS	101230	
1.22	No 2-1-22		Automatic gas fire extinguishing	101240	
1.23	No 2-1-23		Production technology	101250	
2.1	4-1-1		External power supply networks 20kV	101260	
3.1	4-2-1		External power supply networks 0.4kV	101270	
4.1	4-3-1		Outdoor electric lighting networks	101250	
5.1	4-4-1		Transformer substation	101280	
6.1	5-1-1		External	101290	

			communication networks		
7.1	6-1-1		External networks of water supply and sewerage	101300	
8.1	6-2-1		TS	101310	
9.1	7-1-1		Vertical Layout	101320	
10.1	7-2-1		Coatings	101330	
11.1	7-3-1		Landscaping	101340	
12.1	7-4-1		MAF, fencing	101350	

Table 21.3 - Summary estimated calculation

			Estimate cost thousand tenge			
P. No	No of estimates and calculations	Name of objects ,works and expense	Contraction monolithic works	Equipment ,furniture and inventory	Others wok	Cost in tenge
1	2	3	4	5	6	7
1	GN SPP calculation	Design work			13816,839	13816,839
2	Kv2p	Fund for comprehensive study			1211,552 15028,391	1211,552 15028,391
3	Estimate calculation of building	Estimate construction cost			0,000	2366664,628
4		Include at current cost for 2020	1030623,250	132441,813	0,000	1106365,063
5		Include at current cost for 2019	1066541,963	113057.602	0,000	1203599,656
6	Rules for the	Customer cost for technical supervision in			31775,290	31775,290

	provision of life insurance	2020, 1106365,063*2.64%=31775,290				
7	Rules for the provision of life insurance	Customer cost for field supervision in 2020, 1203599,565**2.64%=307049,18			307049,18	307049,18
8	Rules for the provision of life insurance	Customer cost for field supervision in 2020, 1163065,063*0.91%+0=10583,892			10583,892	10583,892
9	Rules for the provision of life insurance	Customer cost for field supervision in 2020, 1203599,565*0.91%+0=10952,756			10952,756	10952,756
		Customer cost for field supervision in 2020,			0,000	0,000
		Total section III			84016,595	84016,595
		Total estimate budget	2097165,2113	269499,415	99044,986	2465709,614
		Including in 2019				
		Section cost				15028,391
10	The code of kz	Value added tax,12%for 2020				1803,407
		All in 2018				18631,798
		In 2019				
		Estimate cost of contract	1030623,2	132441,	0,000	1163065,

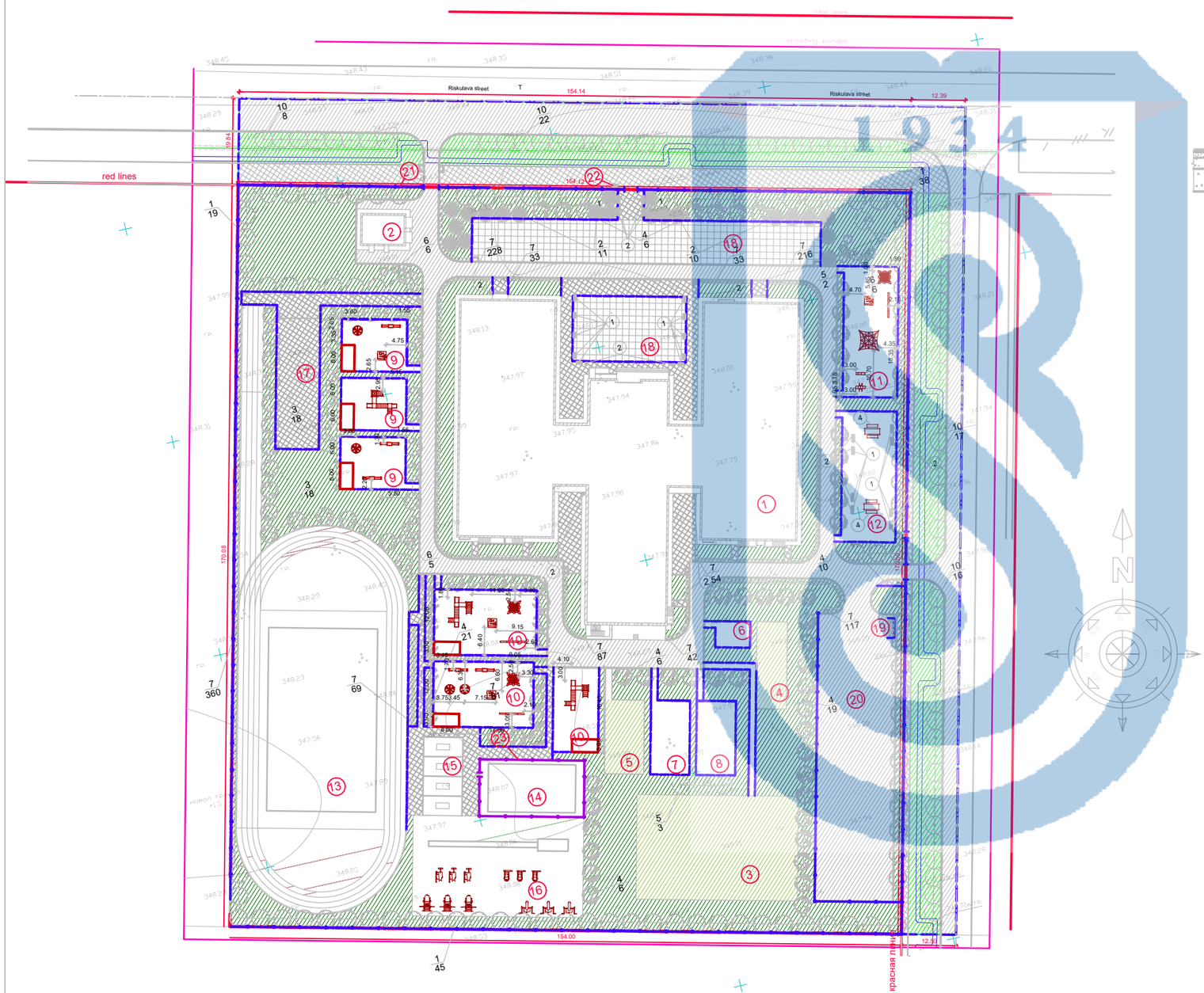
		for 2019	50	813		063
		Customer cost for technical				30704,918
		Customer cost field				10583,892
		Value added tax 12% for 2019				894522,465
		All in 2020				1348876,338
		Estimate cost of contract for 2020	1066541.563	137057,602	0,000	1203599,565
		Customer cost for technical				31775,029
		Customer cost field in 2019				10952,756
		Value added tax 12% for 2019				149559,282
		All in 2020				1395886,632
		All in year total	2097165,213	269499,415	99044,986	2465709,614
10	The code of kz	Value added tax 12% for 2019			295885,154	295885,154
		Total estimates	2097165,213	269499,415	394930,140	276159,768
		Including equipment, furniture ,customers, inventory without VAT accounting		151058,863		151058,863

Table 21.4 - Estimate cost of construction

P.No	No of estimates and calculations	Name of objects ,works and expense	Contraction monolithic works	Equipment ,furniture and inventory	Others wok	Cost in tenge
1	2	3	4	5	6	7
Chapter 2 .the main objects of construction						
1	2-1	School building		191292,729	--	1531638,446

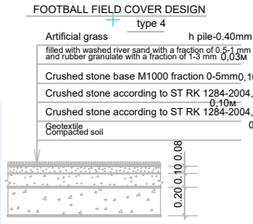
		1340345,717				
		All total		191292,729		1531638,446
Chapter 2 .the main objects of construction						
	4-1	External networks20kv	52311,643	6665,380		58977,023
	4-2	Paired networks0.4kv	13924,112	--		13924,112
	4-3	Outdoor electric networks	7259,596	226,481		7486,077
	4-4	Transformer substation 2x630kva	21385,774	48646,498		70032,272
		Total	94881,126	5553,359		1504119,485
Chapter 5 .objects of transports and communication						
6	5-1	Outdoor communication networks	16287,365	--	--	16287,365
		Total	16287,365	--	--	16287,365
Chapter 6.external networks and structures of water, sewerage, heat supply and gas supply						
7	6-1	Steam water supply and sewerage networks	88559,650	5177,600	--	93737,250
8	6-2	Heating networks	20707,888	286,397	--	20994,285
		Total	109267,538	5463,997	--	114731,535
Chapter 7. landscaping and earth work						
9	7-1	Vertical layout	13651,869	--	--	13651,869
10	7-2	Covering	155646,496	--	--	155646,496
11	7-3	Landscaping	37996,436	--	--	37996,436
12	7-4	MAF	8747,123	--	--	87447,123
		Total for glavs	294741,925	--	--	294741,925
		Total by chapter 1-7	1855523,671	252295,085	--	2107818,755
Chapter 8. temporary building and structure						
13	NDZ RK 8.04-05.15	Temporary building and	27832,855	--	--	27832,855

		structure 1.5%				
		Total	27832,855	--	--	27832,855
		Total by chapter 1-8	1883356,526	252295,085	--	2135651,610
Chapter 9 Additional construction costs						
14	NDZ RK 8.04-05.15	Additional costs in the production of construction and installation work in winter 2.2%	41433,844	--	--	41433,844
		Total	38495,807	--	--	41433,844
		Total by chapter 1-9	1963286,177	252295,085	--	2177085,454
15	GN OSS	Unforessen work and costs -2%	38495,807	--	--	38495,807
		Totale estimated cost	1963286,177	252295,085	--	2215581,261
16		Including for 2019-50%	981643,088	126147,542	--	1107790,631
17		Including for 2020-50%	981643,0881	126147,542	--	1107790,631

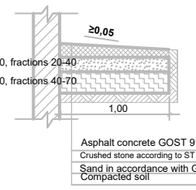


FOOTBALL FIELD COVER DESIGN

type 4



WINDOW



CONVENTIONS:

Designation	Name	Note
K	Projected sewage system household	
K	Designed sewage storm	
T	Designed heating main	
B	Designed household water supply	
	Designed telephone networks	
W1	Projected power supply 0.4 kV	
W2	Projected power supply 20 kV	
W5	Designed networks 0.4 kV outdoor lighting	

EXPLICATION OF BUILDINGS AND STRUCTURES

№ P	Name	Power fire resistance	The main builds. materials	Area unite M2	Build full volume M3	Note
1	school building			3886.49		Project.
2	Transformer substation			91.50		Project.
	Training and experimental zone 1535 m2					
3	Department of orchard and nursery			888.0		Project.
4	Department of field and vegetable crops			140.0		Project.
5	Department of Floral Ornamental Plants			153.0		Project.
6	Primary school			48.0		Project.
7	Department of Botany Site			153.0		Project.
8	Geographical area			153.0		Project.
	Recreation area 1800 m2					
9	Playground			540.0		Project.
	first classes (3 pcs.)					
10	Playground			900.0		Project.
	2-4 classes (3 pcs.)					
11	Playground			375.0		Project.
	5-9 classes					
12	Place of quiet rest 5-9 classes			375.0		Project.
	Sports and athletic area 4857.83 m2					
13	Mini-soccer field (treadmill)			1450.0(2033.83)		
14	Combined playground for			312.0		Project.
	volleyball and basketball					Project.
15	Tennis court			162.0		Project.
16	Combined playground for sports games,			900.0 /19.25/		
	throwing the ball and jumping / including pit for jumping /					
17	Site for initial military training			300.0		Project.
18	Ceremonial venue			1190.0		Project.
19	Waste bin			12.0		Project.
20	Parking at 36 m / places					
21	Fencing of the school territory, 648.20 m.p.					series 3.017-1
	8601-0602-0303 h-2m, gate 8601-0605-0601 -2pcs, 8601-0605-0301 3 m wide gates -2pcs					
22	Information stand, type- / A					Project.
23	Fencing combined platform, 74 m.p.					series 3.017-3
	8601-0605-0302 h-4.5m, gate 8601-0605-0302 -1pc					

LIST OF GREENING ELEMENTS

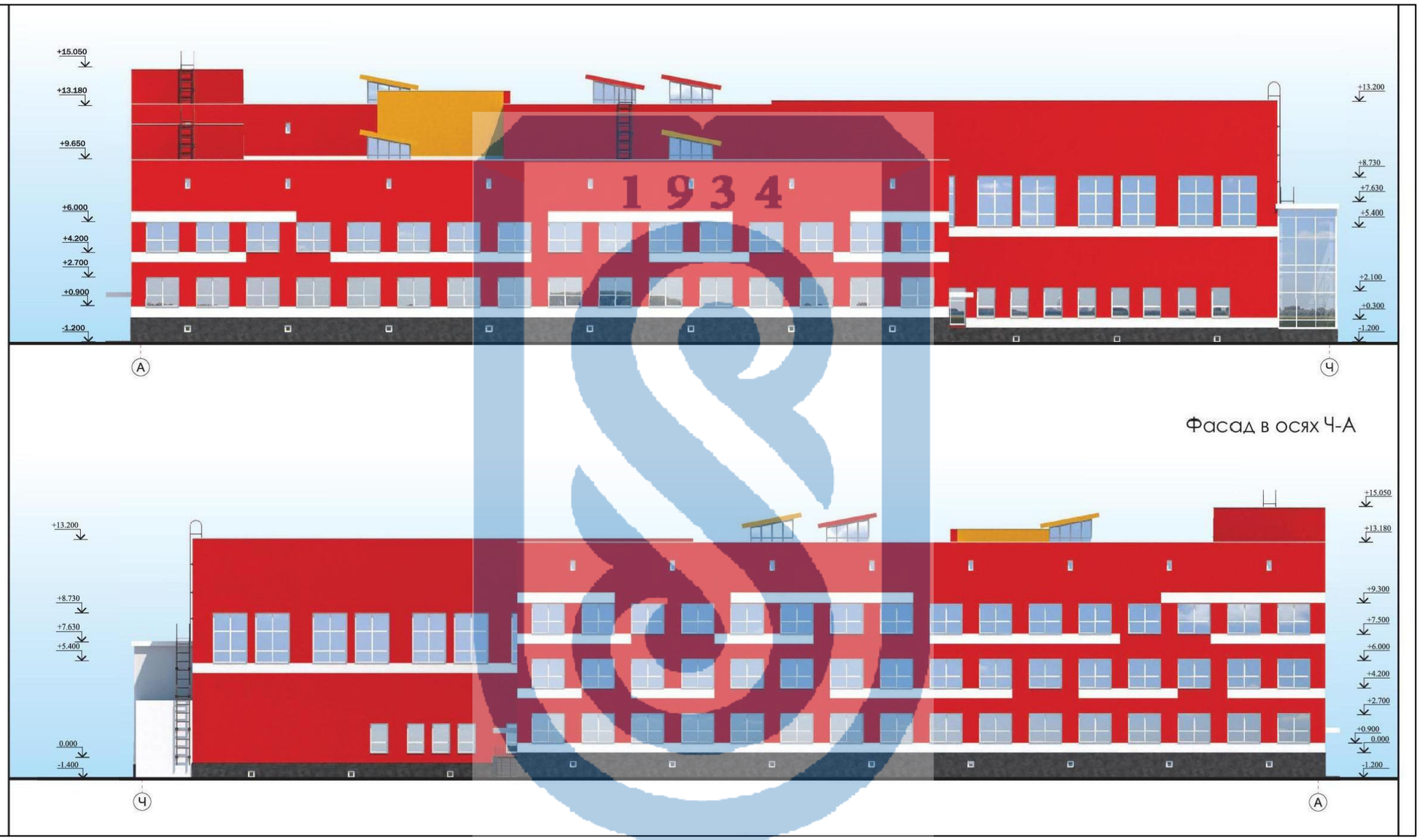
# n.n.		Age,	Quantity, pcs.	Note	
	Trees and bushes			Legend Coma size, m	Pit size without DES, m
1	Ash maple	7-9	102	1,3*1,3*0,6	standard
2	Common pine	7-9	21	1,3*1,3*0,6	standard
3	Cirrus elm	7-9	36	1,3*1,3*0,6	standard
4	Warty birch	7-9	62	1,3*1,3*0,6	standard
5	Mountain ash	7-9	5	1,3*1,3*0,6	standard
6	Common lilac	5-6	17	0,5*0,5*0,4	standard
7	Golden currant	5-6	1320		in the trench
	Total for planting pieces:		1563		
8	Lawn ,м2		7567,38	Bluegrass meadow, red fescue =0,2м 25g. / M2 Fruit. soil 100 %%% h =0,2м	
9	Departments of the garden, nursery and color plants ,м2		1181,00	Fetus. soil 100 %%% h =0,2м	
	Within the boundaries of additional improvement				
10	Cirrus elm	5-6	63	1,3*1,3*0,6	стандартная
11	Газон ,м2		2325	Grass mixture, seeding rate =0,2м	
	Total for planting pieces:		63		

				Satbayev -5B072900 29/03/2020 DP
				Medium secondary school for 500 students area intersection of Burov street no 36 in Astana
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			Architecture part
superviser	Kozyukova.N.V			
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			Construction General plan
Prepared by	K.Zekrullah			

Level	Sheet	scale
DP	6	1:100

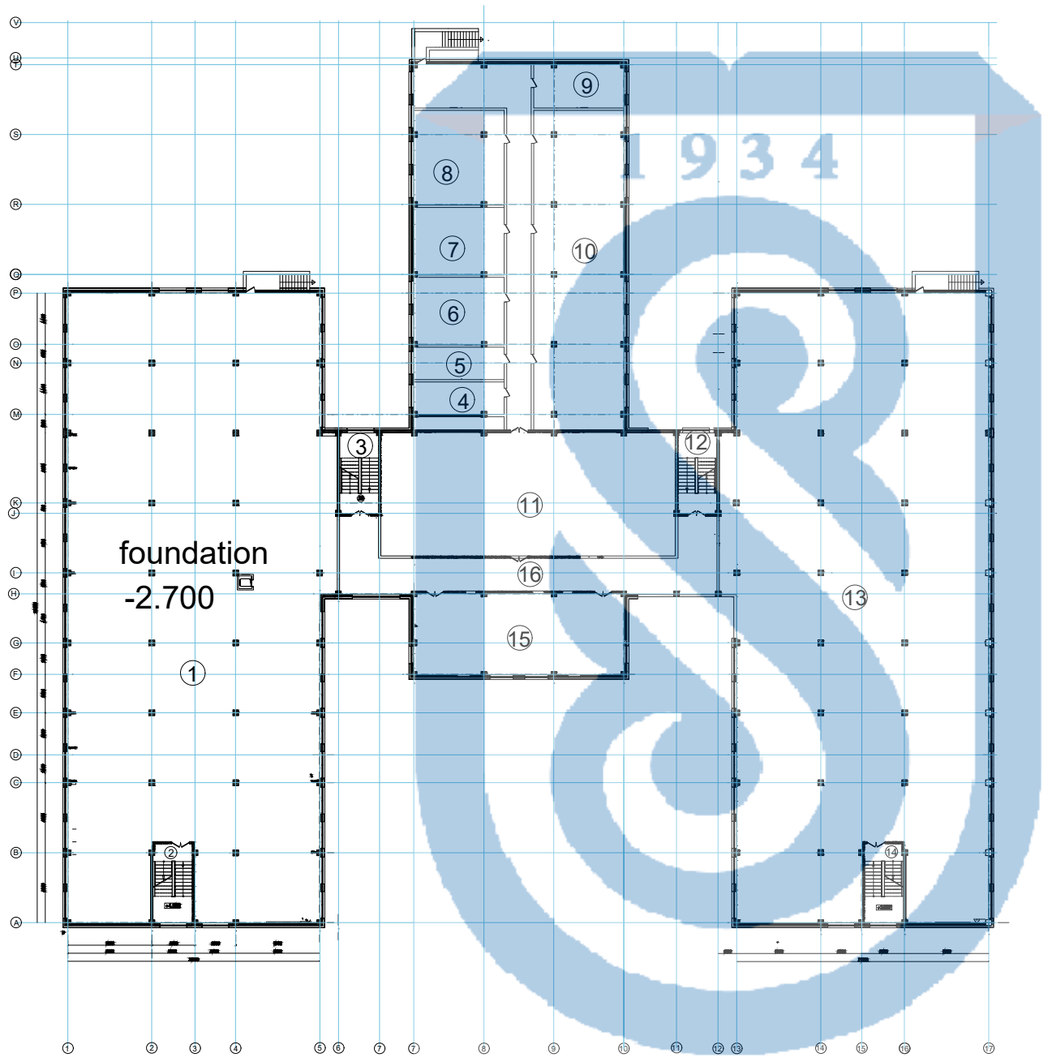
Construction and building Department of Materials

1051*594



				Satbayev -5B072900 29/03/2020 DP		
				Medium secondary school for 500 students area intersection of burov street no 36 in Oskamen		
name	Document №	Signature	date			
head of Dep	K.A.Akmalayuli			Architecture part	Level / Sheet / scale	
superviser	Kozyukova.N.V				DP / 7 / 1:100	
Consultant	Kozyukova.N.V					
controller	Kozyukova.N.V					
Prepared by	K.Zekrullah			facade from sight and east	Construction and building Department of Materials	

foundation plan



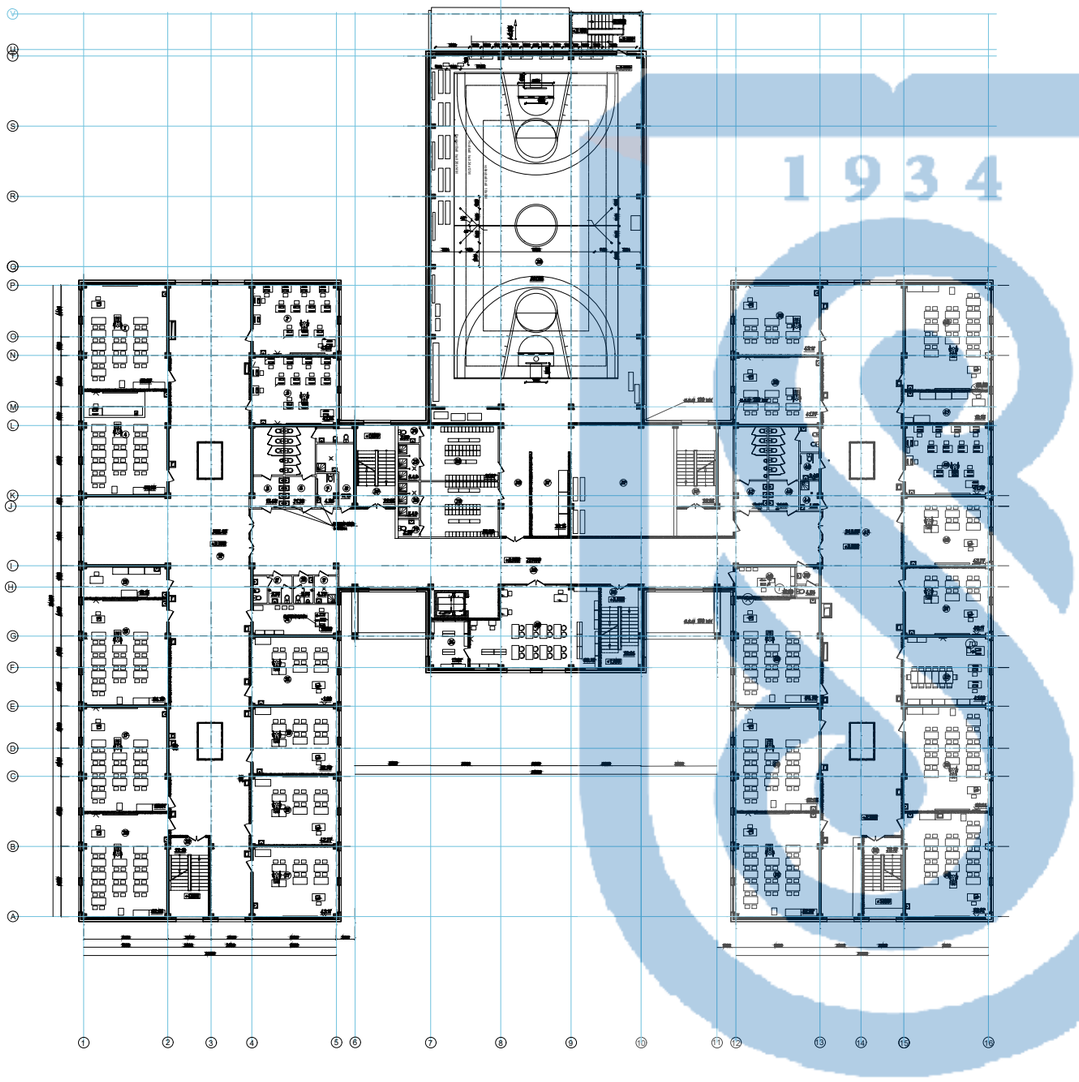
Explication premises

Number	name,nomination	AREA m²
1	basement	1010.66
2	staircase	23.79
3	staircase	26.85
4	technical room	28.38
5	switchboard	23.46
6	technical room	42.98
7	technical room	44.59
8	thermal site room	61.56
9	engineering	24.25
10	technical room	206.39
11	technical	201.59
12	staircase	26.85
13	basement	1016.16
14	staircase	23.79
15	archive	123.45
16	corridor	146.03

				Satbayev -5B072900 29/03/2020DP
				Medium secondary school for 500 students area intersection of Burov street no 36 in oskemen
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			Architecture part
superviser	Kozyukova.N.V			
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			
Prepared by	K.Zekrullah			Construction foundation plan

Level	Sheet	scale
DP	1	1:200

Construction and building
Department of Materials



second floor plan

Explication premises

Number	name,nomination	AREA м²
1	geography cabinet	83.87
2	information cabinet	42.11
3	information cabinet	41.25
4	natural science cabinet	82.55
5	men's toilet	12.48
6	bathroom with women's room	21.29
7	bathroom for men	4.96
8	cleaning equipment room	11.16
9	cleaning equipment room	4.29
10	bathroom for teachers (men)	3.74
11	bathroom for teachers (women)	7.24

Explication premises

Number	name,nomination	AREA м²
12	general corridor for break	305.48
13	laboratory	78.15
14	head of teaching cabinet(minestar)	20.88
15	languages and literature cabinet	64.13
16	languages and literature cabinet	41.88
17	history and laws cabinet	53.81
18	languages and literature cabinet	38.78
19	languages and literature cabinet	42.27
20	history and laws cabinet	42.11
21	languages and literature cabinet	82.55
22	staircase	22.19

Explication premises

Number	name,nomination	AREA м²
23	sport hall	551.85
24	toilet	2.88
25	shower	5.43
26	shower	5.43
27	toilet	2.58
28	dressing room	31.62
29	dressing room	30.89
30	corridor	222.86

Explication premises

Number	name,nomination	AREA м²
31	shell, instructors	22.5
32	sport hall	138.35
33	corridor	222.89
34	media library	22.81
35	library and study hall	58.73
36	staircase	23.04
37	staircase	22.95

Explication premises

Number	name,nomination	AREA м²
38	international languages cabinet	42.11
39	international languages cabinet	41.27
40	class room (class 4)	53.56
41	laboratory	78.75
42	toilet	13.61
43	toilet	21.83
44	cleaning equipment	4.82
45	bathroom for men	3.49
46	information room	41.78
47	corridor for break	363.88
48	self knowledge room	42.27

Explication premises

Number	name,nomination	AREA м²
49	psychology cabinet	12.88
50	toilet	4.54
51	additional room	48.11
52	methodical cabinet head	47.88
53	class room (class 4)	54.78
54	class room (class 4)	52.65
55	class room (class 3)	52.54
56	class room (class 3)	52.52
57	class room (class 3)	52.52
58	staircase	22.19

				Satbayev -5B072900 29/30/2020 DP
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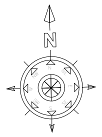
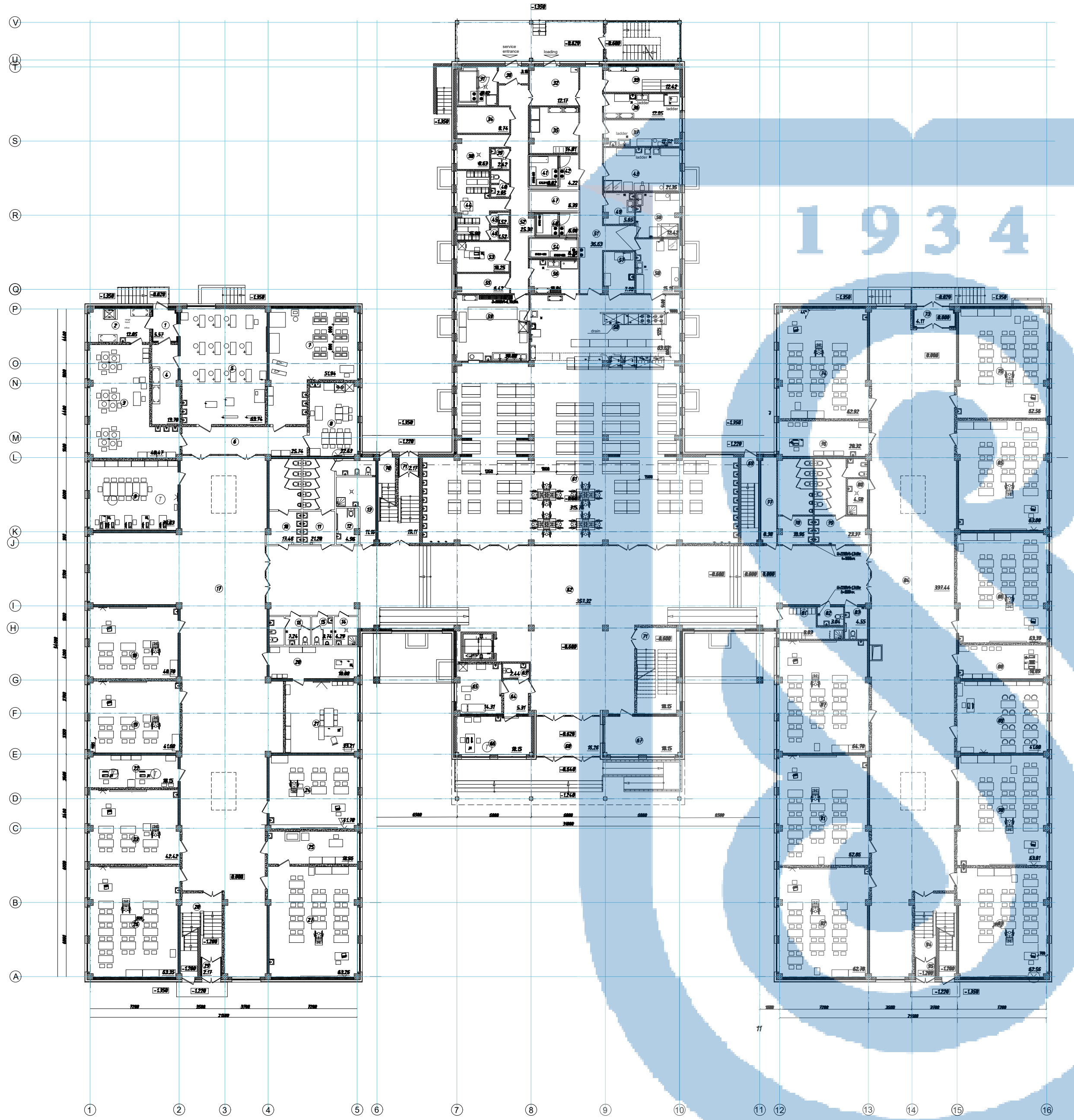
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			Architecture part
superviser	Kozyukova.N.V			
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			
Prepared by	K.Zekrullah			Construction second Floor plan

Level	Sheet	scalae
DP	3	1:200

Construction and building
Department of Materials





first floor plan

Explication of premises

Number	name,nomination	AREA $м^2$
30	tambour ,portal	3.16
31	Food waste room	10.02
32	charging room,boot	12.17
33	pantry of dry products	12.42
34	electric power	8.74
35	pantry of vegetables	14.81
36	vegetable processing workshop	12.05
37	vegetable shop	12.52
38	storage and washing containers	8.63
39	cleaning equipment room	2.42
40	bathroom	2.95
41	cooled chamber (-18)	6.02
42	tambour	4.22
43	meat and fish workshop	21.35
44	staff wardrobe	15.90

Explication of premises

Number	name,nomination	AREA $м^2$
45	shower room	1.52
46	shower room	1.52
47	cooled chamber (-5)	6.39
48	cooled chamber (-5)	6.08
49	processing room	5.65
50	flour shop	12.42
51	corridor	36.63
52	corridor	25.38
53	production manager's office	10.25
54	cooled chamber (-5)	6.39
55	inventory	6.42
56	washing dishes,kitchen	10.84
57	bread cutting room	7.98
58	cold shop	15.16
59	washing tableware	30.80

Explication of premises

Number	name,nomination	AREA $м^2$
60	hot shop	63.63
61	dining room with 312 seats	315.76
62	general hall	357.32
63	bathroom	2.44
64	corridor	5.31
65	medical procedures room	14.31
66	doctor's room	18.15
67	security room	18.15
68	tambour	16.26
69	staircase	9.42
70	staircase	19.11
71	staircase	23.84
72	tambour	2.17

Explication of premises

Number	name,nomination	AREA $м^2$
73	tambour	4.11
74	class room (class 2)	62.92
75	class room (class 2)	62.56
76	speech room	20.32
77	technical staff room	8.38
78	Bathroom	18.96
79	Bathroom with women bath	23.37
80	cleaning room	4.50
81	technical staff room	9.83
82	Bathroom	3.04
83	Bathroom for men	4.55
84	corridor,intertainment	337.44

Explication of premises

Number	name,nomination	AREA $м^2$
85	class room (class 2)	63.00
86	class room (class 1)	63.39
87	class room (class 1)	64.70
88	head teacher of elementary school	18.89
89	library for elementary classes	41.60
90	class room (class 1)	63.01
91	primary class	62.86
92	primary class	62.70
93	primary class	62.56
94	staircase	18.34
95	tambour	2.20

Explication of premises

Number	name,nomination	AREA $м^2$
11	bathroom with women bath	21.20
12	bathroom for men	4.96
13	cleaning equipment room	11.16
14	cleaning equipment room	4.29
15	bathroom for teacers(men)	3.74
16	bathroom with attach toilet for women	7.24
17	corridor for entertainment	314.00
18	self knowledge room	40.78
19	self knowledge room	41.60
20	reception room	18.08

Explication of premises

Number	name,nomination	AREA $м^2$
21	director's cabinet	33.21
22	book keeping and accounting room	18.15
23	math cabinet	42.42
24	math cabinet	41.78
25	laboratory	18.96
26	languages and literature cabinet	63.35
27	basic military training cabinet	63.26
28	staircase	18.35
29	tambour	2.17

Explication of premises

Number	name,nomination	AREA $м^2$
1	tambour	5.57
2	storage room	12.85
3	ceramics workshop	48.47
4	instruments room	13.70
5	universal workshop	63.74
6	corridor	25.74
7	processing workshop room	51.94
8	cooking workshop room	22.63
9	teaching room	39.83
10	boys bathroom	17.46

name	Document №	Signature	date
head of Dep	K.A.Akmalayuli		
superviser	Kozyukova.N.V		
Consultant	Kozyukova.N.V		
controller	Kozyukova.N.V		
Prepared by	K.Zekrullah		

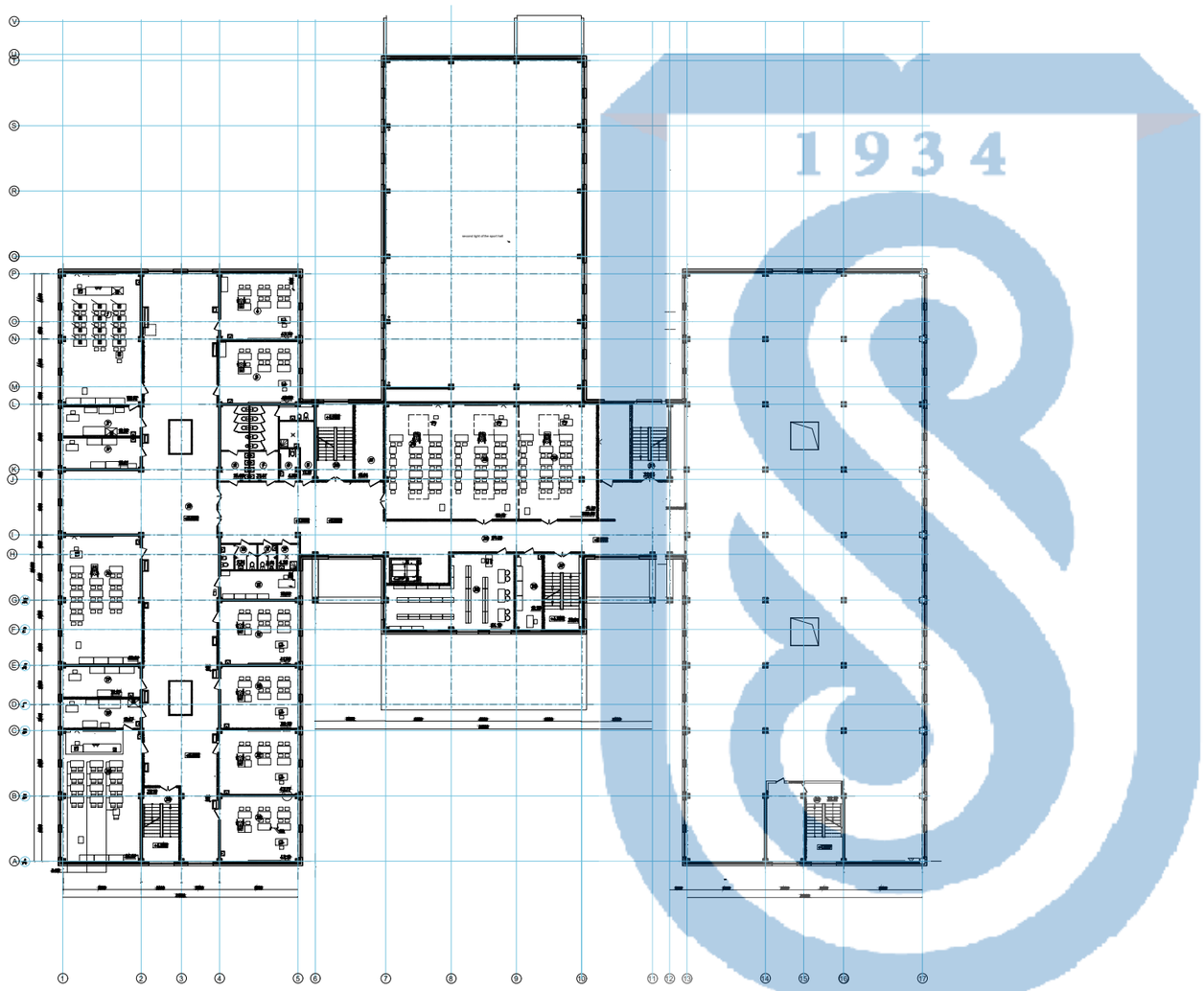
Satbayev -5B072900 29/03/2020 DP

Medium secondary school for 500 students
area intersection of Burov street no 36
in oskemen

Architecture Part	Level	Sheet	scale
	DP	2	1:200

Construction First Floor plan

Construction and building
Department of Materials



Explication of premises

Number	name,nomination	AREA м²
1	chemistry cabinet	85.92
2	laboratory	18.59
3	laboratory	19.61
4	international languages cabinet	42.78
5	international languages cabinet	40.60
6	toilet for men	17.46
7	toilet with attached room for women	28.41
8	toilet for men	4.01
9	cleaning equipment	4.01
10	toilet for teachers(men)	7.24
11	toilet for teachers	3.74
12	cleaning equipment	4.29

Explication of premises

Number	name,nomination	AREA м²
13	corridor for entertainment	386.47
14	biology and biotechnology cabinet	83.92
15	administrative department cabinet	18.08
16	Mathcabinet	41.60
17	laboratory	19.57
18	laboratory	18.57
19	Mathcabinet	39.78
20	physicabinet	85.92
21	Mathcabinet	42.27
22	Mathcabinet	42.13
23	staircase	22.18

Explication of premises

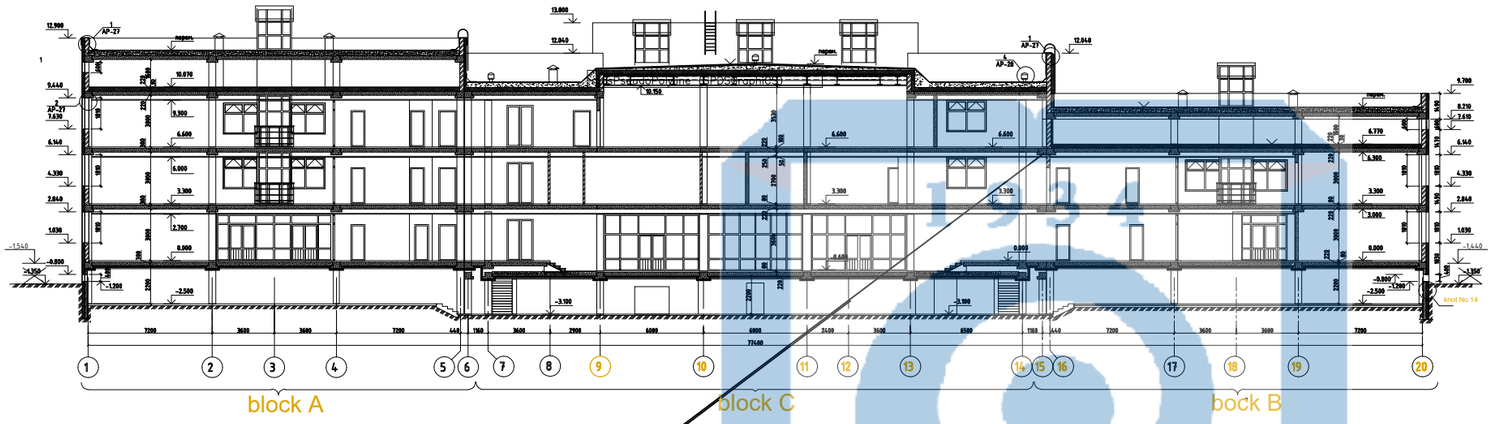
Number	name,nomination	AREA м²
24	languages and literatures cabinet	82.78
25	lecture class	83.78
26	music's cabinet	74.53
27	technology and arts cabinet	85.29
28	corridor	174.83
29	laboratory	18.39
30	resource center	54.19
31	communication	77.84
32	staircase	29.06
33	staircase	22.85

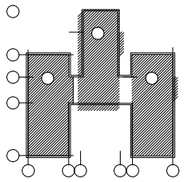
third floor plan

				Satbayev -5B072900 29/30/2020 DP
				Medium secondary school for 500 students area intersection of Burov street no 36 in oskemen
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			Architecture part
superviser	Kozyukova.N.V			
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			
Prepared by	K.Zekrullah			Construction third Floor plan

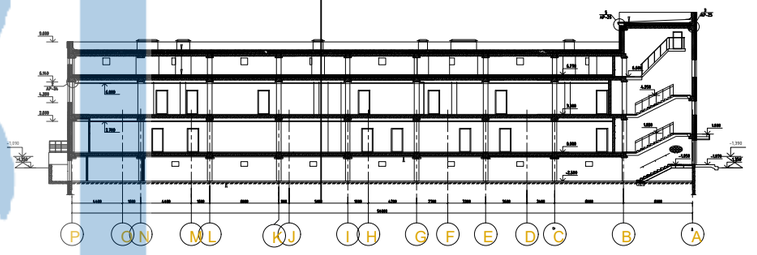
Level	Sheet	scale
DP	4	1:200

Construction and building Department of Materials



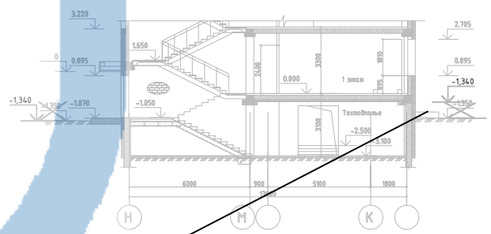


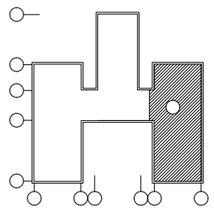
cement sand M150 -30мм
concrete class B12,5 -100мм
ϕ10 A-III-200
ϕ10 A-III-200 mesh reinforced
crushed stone layer fraction 20-40mm -150 mm
compacted soil



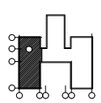
cement sand M150 -30мм
concrete class B12,5 -100мм
ϕ10 A-III-200
ϕ10 A-III-200 mesh reinforced
crushed stone layer fraction 20-40mm -150 mm
compacted soil

secction of block A





screed from cement sand mortar M100 reinforced concrete with mesh ZBp-1 100/zBp1 100,b=40mm.heater impolite technic B 180kg/m3vapor-1layer of deposited technical epp b= 5mm. the base is reinforced concrete slab b=220mm



				Satbayev -5B072900 06/10/2020 DP
				Medium secondary school for 900 students area intersection of Burov street no 36 in oskemen
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			Architecture part
superviser	Kozyukova.N.V			
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			
Prepared by	K.Zekrullah			sectiionns

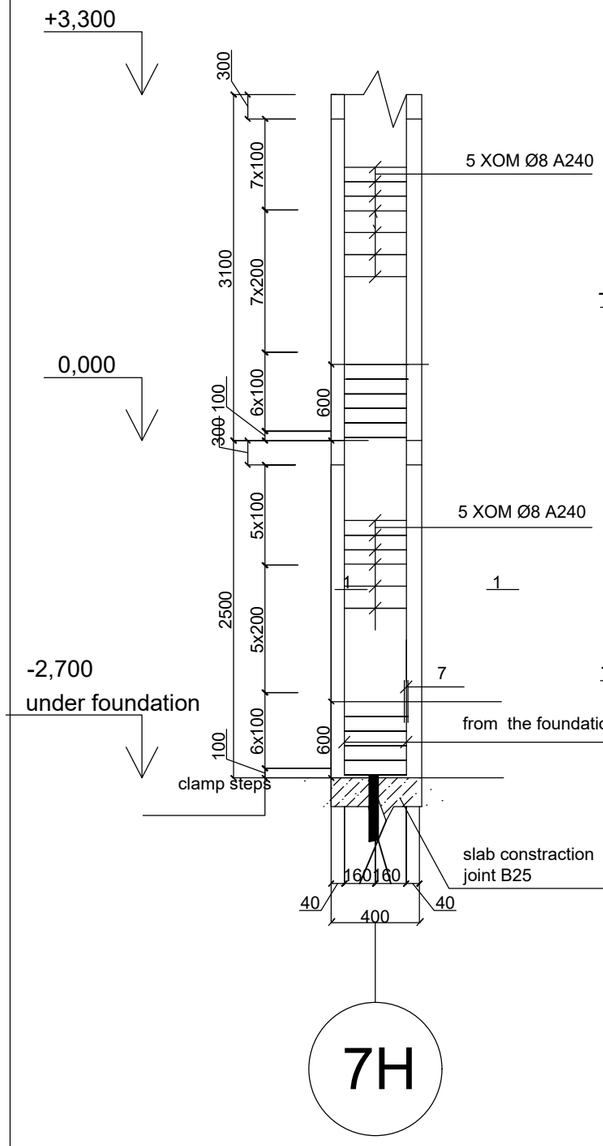
Level	Sheet	scale
DP	1	1:200

Construction and building Department of Materials

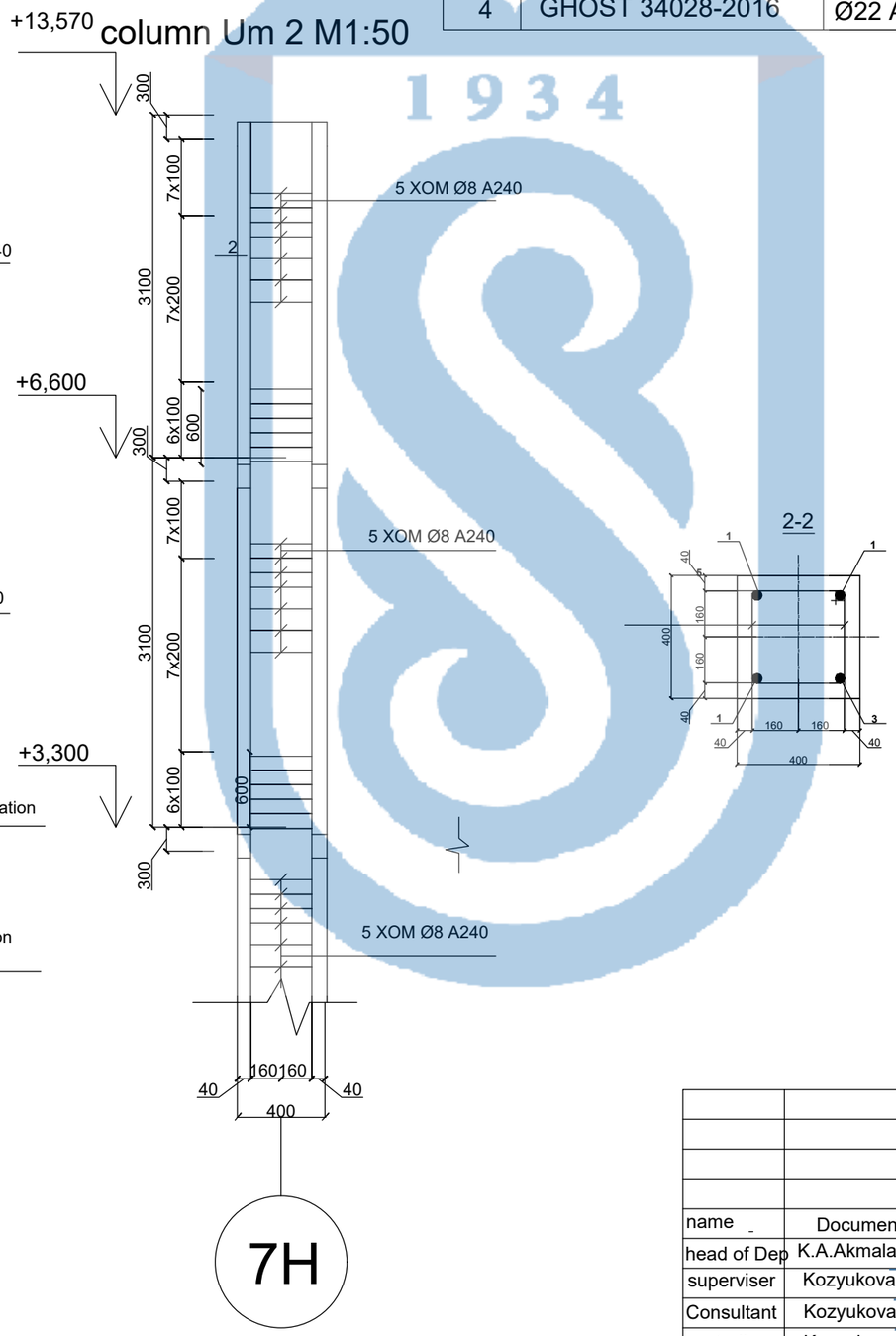
specification of column structure

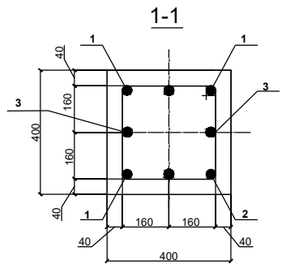
NO	designation	name	count	notice
1	GHOST 34028-2016	Ø22 A500c L=P.M	46	466,1
2	GHOST 34028-2016	Ø16 A500c L=7000	20	11,2
3	GHOST 34028-2016	Ø8 A240 L=1540	258	161,1
4	GHOST 34028-2016	Ø22 A500C L=260	36	28,08

column Um 2 M1:50

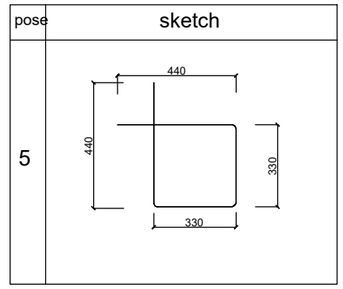


column Um 2 M1:50





Parts sheets

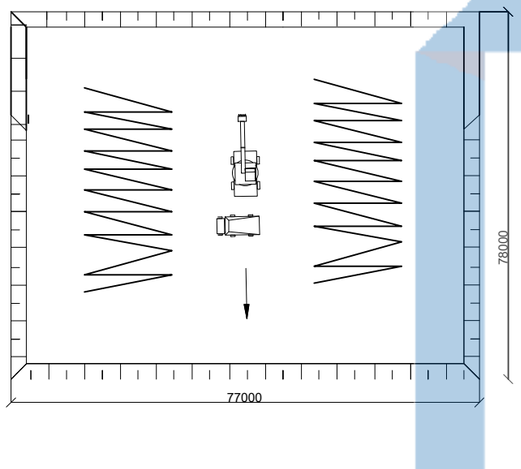


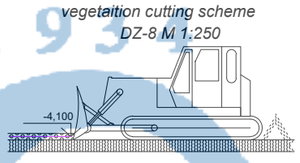
consumption of steel perproduct,kg

products brands	reinforcement products						total cost
	class of reinforcement						
	A500 GHOST -5781-82*			A240 ghost-5781-82*			
	Ø8		stock			stock	
column um2		103,23	103,23				110,2

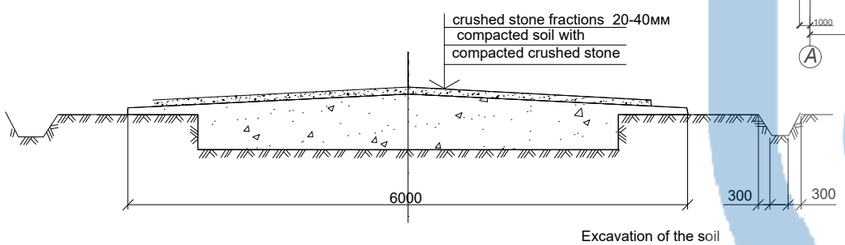
				Satbayev -5B072900 29/03/2020DP
				Medium secondary school for 500 students area intersection of Burov street no 36 in Ust-kamenogorsk(oskemen)
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			constructive part
superviser	Kozyukova.N.V			Level: Diploma; Sheet: 7; scale: 1:50
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			
Prepared by	K.Zekrullah			design of Column
				Construction and building Department of Materials

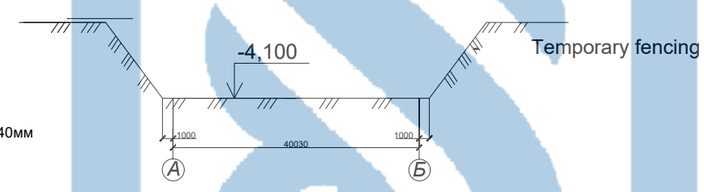
Construction tech plan pit work M1: 100



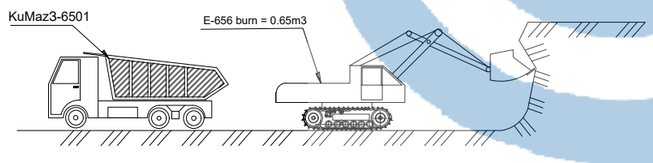


cross section of the temporary roads





Excavation of the soil



Sheet of machine mechanism

№	Name	Brand	Number	The task
1	Bulldozer	ДЗ-8	1	Vegetation cutting, reburial
2	Vertical shovel excavator	=0.65м3	1	Dump the soil translation and auto dump truck translation
3	Dump truck	KUMAZ 5511	1	Excavated soil excavation

Technical and economic indicators

№	name	Measurement units	count
1	The cost of work in the zero cycle	Tenge	-
2	Construction and installation work duration	day	35,5
3	Construction and installation work capacity	person /day	104,73
4	Daily production	м3	-

Safety

1 Prior to the commencement of earthworks, all existing underground communications location must be specified. This is the only way to cultivate the soil near them if there is a written permission of the institutions using the communications and in the presence of a representative of the institution and the driver or foreman allowed only under the supervision of tillage power cable, water pressure, gas without the use of percussion tools in the immediate vicinity of the pipes.
.2. Safety taken into account in KME and GHG when performing earthworks The requirements of the technique must be observed.
3. In the processing of pits and long ditches, the slope to the current size document corresponding or temporary fasteners are made.
4. Assembling works within the whole complex of construction and assembly works One of the most dangerous is the performance of work at high altitudes and with different loads replacement of heavy elements of formations by means of lifting equipment and associated with the installation. Therefore, building structures and machines increase the reliability of work, complete the technology and organization of labor Improvements often involve working conditions and occupational safety.
5. Stand under a bucket or arrow of a working excavator and dig are not allowed to work. Self-blasting with an excavator lowers the rear or side rims of cars, excavators and People are not allowed to live in the car.
6. Water was washed away by strangers during hydromechanical tillage The movement of the hydromonitor flow to the workers while on the ground tillage are not allowed to be in the zone.
7. One of them destroys the frozen soil by plowing, and the other loosens the loose soil Two excavators are working side by side on a section with a radius of 50 m will not happen.
8. The danger of explosion when loosening frozen soil by the method of cliffs safe to protect people, buildings and structures and machinery distance must be maintained.

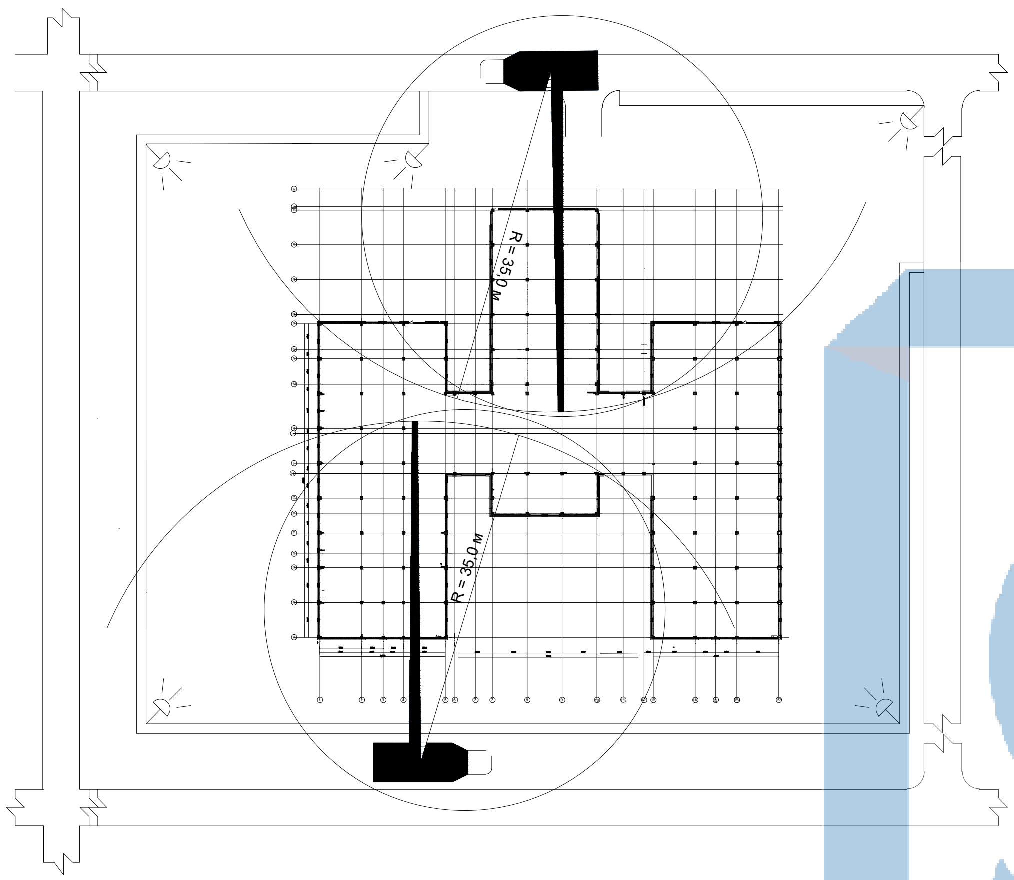
Calendar plan of underground works

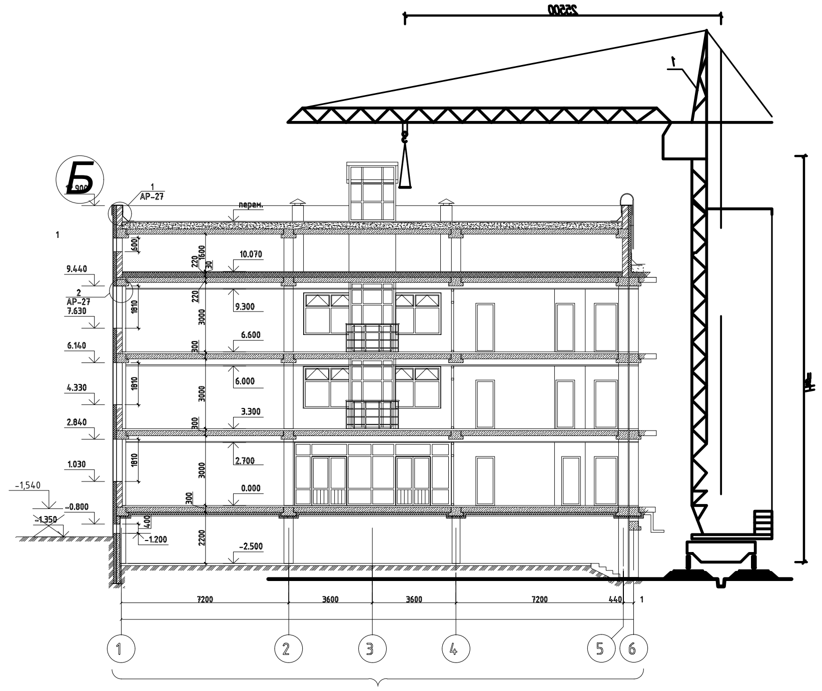
№	Names of works	The of	Volume number	Labor capacity: person day	Labor capacity: a machine shift	Construction machines: brand number	One is shifts work The number of	one around the clock shift nuber	Length of work day	Month / day 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
1	2		3	4	5	6	7	8	9	10
1	Cutting the vegetative layer		1,188	-	0,121	ДЗ-8 (Т-100)	1	1	1	0,5
2	Excavating the soil to the mound		13,65	"	2,997	3-656	1	1	1	6,5
3	Excavation of soil with an excavator		14,2	-	3,982	3-656 КрАЗ-222Б	1	1	1	1,9
4	Bulldozing the group at the bottom of the boiler		1,9	-	0,127	ДЗ-8 (Т-100)	1	1	1	0,063
5	Construction of a leveling layer		23,52	1,663	-	-	-	1	1	0,83
6	Installation of a strip foundation with a crane		199	15,28	5,09	МКА-16 авт	1	4	1	4
7	Installing the cover plate with a crane		1343	76,44	25,48	МКА-16 авт	1	4	2	16,9
8	Re-burial of soil		130	11,41	2,85	МКА-16 авт	1	4	1	2,8
9	Rolling the soil		13,65		0,582	ДЗ-8 (Т-100)	1	1	1	0,29

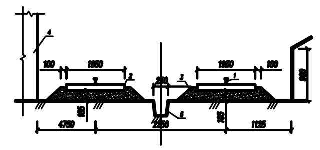
				Satbayev -5B072900 29/03/2020 DP
				Medium secondary school for 500 students area intersection of burov street no 36 in oskemen
name	Document №	Signature	date	
head of Dep	K.A.Akmalayuli			Technology part
superviser	Kozyukova.N.V			
Consultant	Kozyukova.N.V			
controller	Kozyukova.N.V			
Prepared by	K.Zekrullah			underground calendar work plan

Level	Sheet	acale
DP	5	1:200

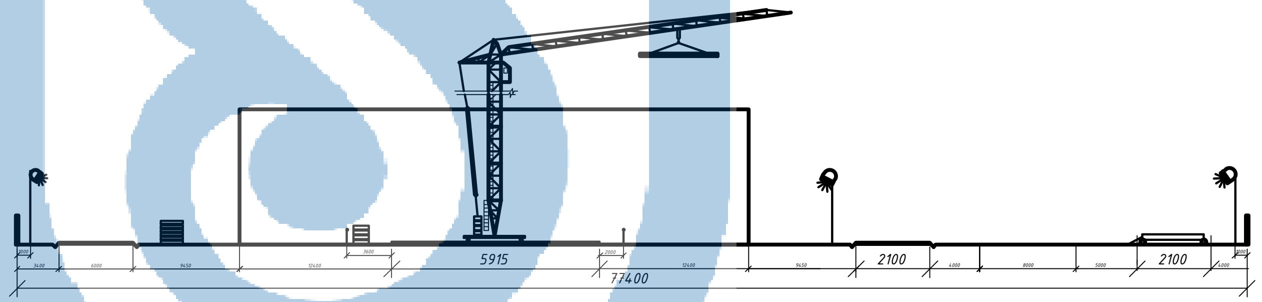
Construction and building Department of Materials







Excavation of the soil



technical economic indicators

№	name	mesrure unit	The number of
1	Duration of earthworks	day	35,5
2	Construction of a building duration	day	425
3	Construction and installation work total duration	month	20

Calendar plan of underground works

№	Names of works	Volume The number of	Labor capacity person day	Labor capacity a machine shift	Construction machines brand	Construction machines number	One in shifts work The number of	one around the clock shift nuber	Length of work ,day	Month day
1	2	3	4	5	6	7	8	9	10	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 28 29 30 31 32 33 34 35 36 37 38 39
1	Cutting the vegetative layer	1,188	-	0,121	Д3-8 (Т-100)	1	1	1	0,5	
2	Excavating the soil to the mound	13,65	-	2,997	Э-656	1	1	1	6,5	
3	Excavation of soil with an excavator	14,2	-	3,982	Э-656 КрАЗ-222Б	1	1	1	1,9	
4	Bulldozing the group at the bottom of the boiler	1,9	-	0,127	Д3-8 (Т-100)	1	1	1	0,063	
5	Construction of a leveling layer	23,52	1,663	-	-	-	1	1	0,83	
6	Installation of a strip foundation with a crane	199	15,28	5,09	МКА-16 авт	1	4	1	4	
7	Installing the cover plate with a crane	1343	76,44	25,48	МКА-16 авт	1	4	2	16,9	
8	Re-burial of soil	130	11,41	2,85	МКА-16 авт	1	4	1	2,8	
9	Rolling the soil	13,65	-	0,582	Д3-8 (Т-100)	1	1	1	0,29	

Schedule of ground works

Machine needs statement

№	name	өлш. бірл.	Brand	count
1	Excavator	day/a	Komatsu PC200-8	1
2	Bulldozer	day/a	Д3-8	1
3	Dump truck	day/a	КАМАЗ 5511	8
5	Auto concrete pump	day/a	АБН 65/21 (58150В)	1
6	Rink	day/a	Caterpillar CB 224	1
7	Truck crane	of the day	XCMG 25	1

name	Document №	Signature	date
head of Dep	K.A.Akmalayuli		
superviser	Kozyukova.N.V		
Consultant	Kozyukova.N.V		
controller	Kozyukova.N.V		
Prepared by	K.Zekrullah		

Satbayev -5B072900 06/10/2020 DP

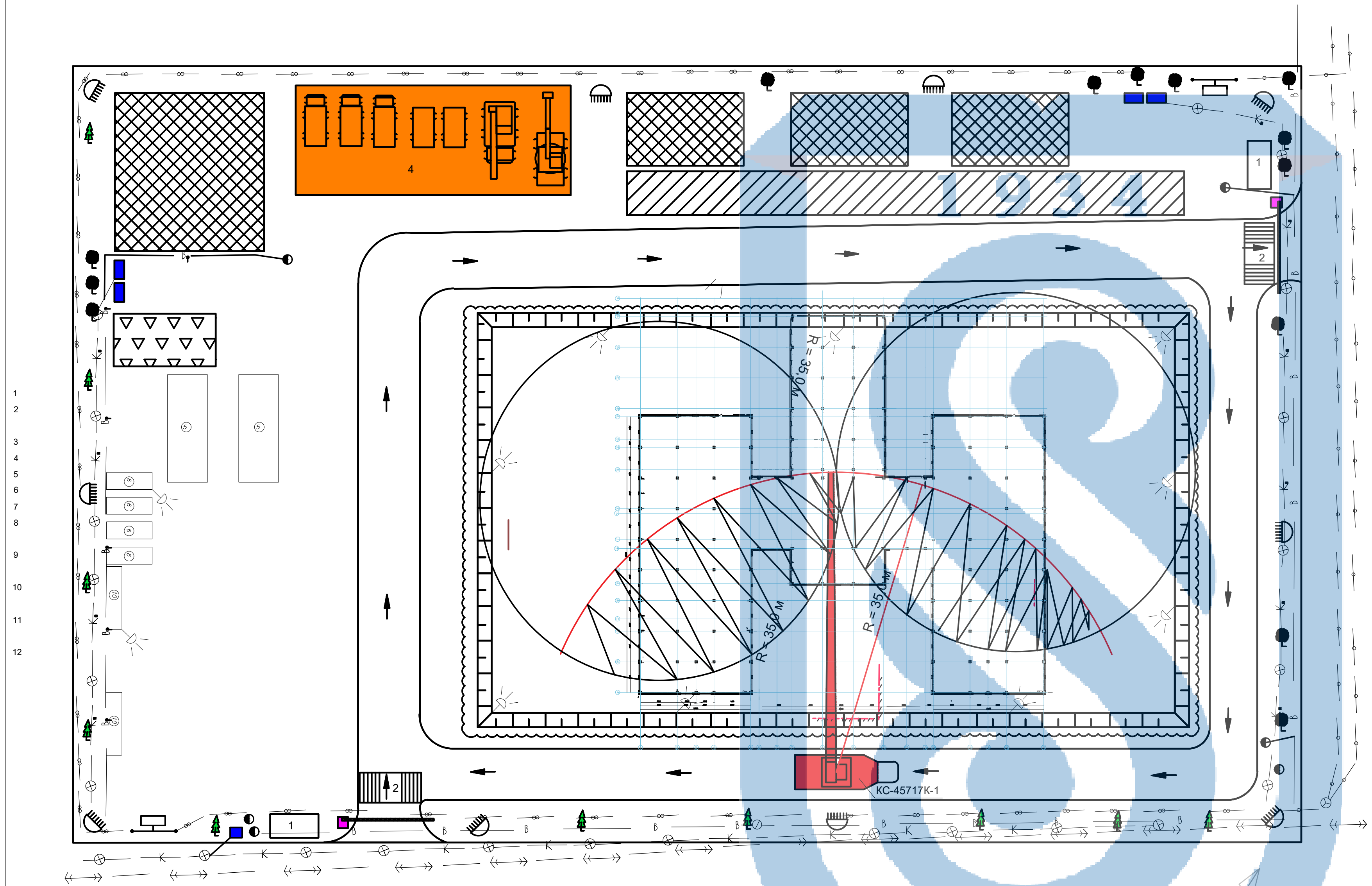
Medium secondary school for 500 students area intersection of Burov street no 36 in Oskemen

	Level	Sheet	scale
Technology part	DP	16	1:50

Construction technical map and underground calendar work plan

Construction and building Department of Materials

Construction master plan M1: 100



Symbols

1- Office building
2- door
3-KC-45717K-1
4- Car wash
5- dining room

6 - Construction materials temporary storage warehouse
7- Engineering office building
8-Toilet

9 - Reception of food and accommodation
10-Shower
"Sunshine
- Temporary fencing

Sheet of machine mechanism

№	Name	Brand	Number	The task
1	Bulldozer	ДЗ-8	1	Vegetation cutting, reburial
2	Vertical shovel excavator	=0.65м3	1	Dump the soil translation and auto dump truck translation
3	Dump truck	KUMAZ 5511	1	Excavated soil excavation

Technical and economic indicators

№	name	Measurement units	count
1	The cost of work in the zero cycle	Tenge	-
2	Construction and installation work duration	day	35,5
3	Construction and installation work capacity	person /day	104,73
4	Daily production	м3	-

Safety

1 Prior to the commencement of earthworks, all existing underground communications location must be specified. This is the only way to cultivate the soil near them if there is a written permission of the institutions using the communications and in the presence of a representative of the institution and the driver or foreman allowed only under the supervision of tillage power cable, water pressure, gas without the use of percussion tools in the immediate vicinity of the pipes.

.2. Safety taken into account in KME and GHG when performing earthworks The requirements of the technique must be observed.

3. In the processing of pits and long ditches, the slope to the current size document corresponding or temporary fasteners are made.

4. Assembling works within the whole complex of construction and assembly works One of the most dangerous is the performance of work at high altitudes and with different loads replacement of heavy elements of formations by means of lifting equipment and associated with the installation. Therefore, building structures and machines increase the reliability of work, complete the technology and organization of labor Improvements often involve working conditions and occupational safety.

5. Stand under a bucket or arrow of a working excavator and dig are not allowed to work. Self-blasting with an excavator lowers the rear or side rims of cars, excavators and People are not allowed to live in the car.

6. Water was washed away by strangers during hydromechanical tillage The movement of the hydromonitor flow to the workers while on the ground tillage are not allowed to be in the zone.

7. One of them destroys the frozen soil by plowing, and the other loosens the loose soil Two excavators are working side by side on a section with a radius of 50 m will not happen.

8. The danger of explosion when loosening frozen soil by the method of cliffs safe to protect people, buildings and structures and machinery distance must be maintained.

Calendar plan of underground works

№	Names of works	The number of Volume	Labor capacity: person day	Labor capacity: a machine shift	Construction machines: brand number		One in shifts work The number of	one around the clock shift nuber	Length of work ,day	Month / day
1	2	3	4	5	6	7	8	9	10	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 28 29 30 31 32 33 34 35 36 37 38 39
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5	Construction of a leveling layer	23,52	1,663	-	-	-	1	1	0,83	
6	Installation of a strip foundation with a crane	199	15,28	5,09	МКА-16 авт	1	4	1	4	
7	Installing the cover plate with a crane	1343	76,44	25,48	МКА-16 авт	1	4	2	16,9	
8	Re-burial of soil	130	11,41	2,85	МКА-16 авт	1	4	1	2,8	
9	Rolling the soil	13,65	-	0,582	ДЗ-8 (T-100)	1	1	1	0,29	

name	Document №	Signature	date
head of Dep	K.A.Akmalayuli		
supervisor	Kozyukova.N.V		
Consultant	Kozyukova.N.V		
controller	Kozyukova.N.V		
Prepared by	K.Zekrullah		

Satbayev -5B072900 29/03/2020 DP

Medium secondary school for 500 students area intersection of burov street no 36 in oskemen

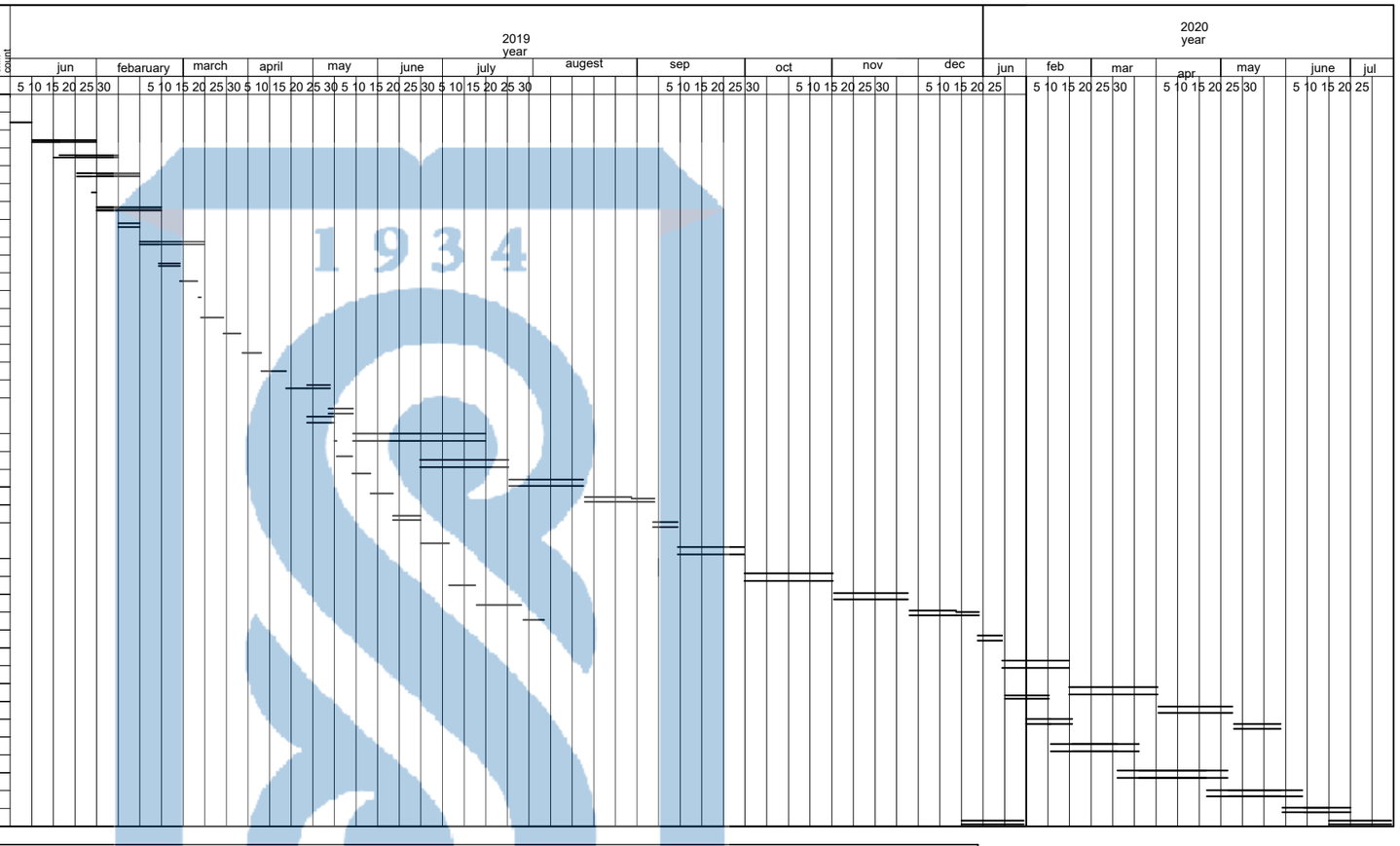
Technology part	Level	Sheet	acale
	DP	5	1:200

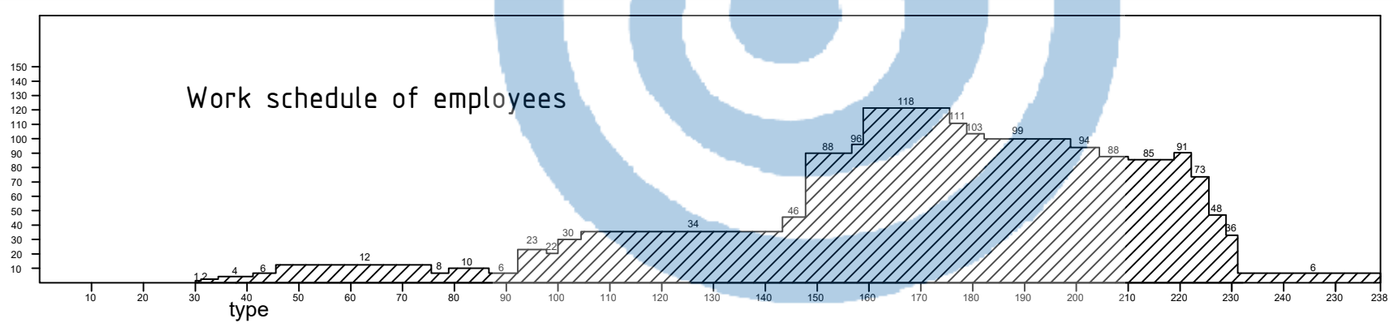
Construction master plan and underground calendar work plan

Construction and building Department of Materials

Schedule of ground works

№	Name of construction industry	work volume unit of measure	count	person day	Required Mach,fur Name	Mash. count	Work duration	Shift count	one work shift count
		ВнР Вid							
	1	2	3	4	5	6	7	8	9
	Basement								
1	Fastening and installation of fittings	1т	7,6	9,3	-	-	4,65	1	2
2	Install the template	1м2	896,8	42,65	-	-	7,1	2	3
3	Concrete leveling with a concrete pump	1м3	627,8	22,96	-	-	5,29	1	2
4	Disassembly of molds	1м3	896,8	22,96	-	-	3,8	2	3
5	Waterproofing	1м2	8,968	2,51	-	-	2,51	1	1
6	Installation of basement formwork	100м2	281	17,5	-	-	4,4	2	2
7	Setting the shape of the basement wall	1м2	715,1	21,8	-	-	5,45	2	2
8	Setting the beam formwork	1м2	508,6	17,36	-	-	4,34	2	2
9	Set the ceiling	1м2	173,3	63,59	-	-	5,3	2	6
10	Tie and install the column reinforcement	1м2	8,13	8,6	-	-	4,3	1	2
11	Tie and install wall fittings	Т	0,48	0,67	-	-	0,67	1	1
12	Tie and install beam reinforcement	Т	7,84	9,56	-	-	4,78	1	2
13	Installing the ceiling reinforcement mesh	Т	8,46	8,87	-	-	4,435	1	2
14	Acceptance of concrete from a distance of auto concrete	Т	3,8	3,8	-	-	3,8	1	1
15	Leveling the top concrete mix	100м3	28,16	7,5	-	-	3,75	1	2
16	Leveling the concrete mix on the wall	1м3	38,87	3,74	-	-	3,74	1	1
17	Concrete mix for beams and ceilings smoothing	1м3 1м3	347,7	34.34	-	-	5,7	2	3
18	Concrete surface side watering		17,38	0,3	-	-	0,3	1	1
19	Distribution of columns	100м2	281,6	7,2	-	-	3,6	1	2
20	Distribution of wall forms	1м2	715,1	13,95	-	-	3,5	1	4
21	Distribution of beam forms	1м2	508,6	8	-	-	4	1	2
22	Distribution of ceilings	1м2	173,3	23,32	-	-	5,83	2	2
23	Basement wall waterproofing	1м2	38,24	13,5	-	-	6,75	1	2
	The whole building is 1-3 blocks	100м2							
24	Installation of 1st floor columns	1м2	42,24	26.3			6,575	1	4
25	Installation of 2-3 floors	1м3	76,04	49.7			12.4	1	4
26	Acceptance of concrete mix	1м3	11,53	11,5			5,5	1	2
27	1st floor brick masonry	100м3	104,7	52.4			5,24	2	5
28	2-3 layers of brick masonry	1м3	198,3	67.2			11,2	2	3
29	Installation of the 1st floor roof	1м3	272	13,1			6,5	1	2
30	Installation of a 3-story roof	1м2	151,2	24,5			6,1	2	2
31	Thermal insulation	1м2	36,72	37,77			6,2	2	3
32	Waterproofing	100м2	38	32.3			5,4	1	6
33	Door and window installation blocks	100м2	263	175,6			14,63	2	6
34	Plastering walls and ceilings	of the day	404,9	476,1			19,8	2	12
35	Emulsification of walls and ceilings	100м2	404,9	282,3			14,1	2	10
36	Sanitary works	100м2	2,73	113,6			11,4	2	5
37	Facade finishing	100м2	1083	197			14	2	7





N п/п	name	unite	totals
1	total labor intensity	person/day	8120
2	duration of construction	month	20
3	standard duration of construction	month	20
4	uneven workforce movement coefficient	---	0,28

Satbayev -5B072900 29/03/2020 DP

Medium secondary school for 500 students
area intersection of burov street no 36
in Oskemen

name	Document №	Signature	date
head of Dep	K.A.Akmalayuli		
superviser	Kozyukova.N.V		
Consultant	Kozyukova.N.V		
controller	Kozyukova.N.V		
Prepared by	K.Zekrullah		

Technology part

Level	Sheet	scale
DP	16	1:100

Construction work schudle and underground calendar work plan

Construction and building
Department of 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: Карими Зекрулла

Название: School for 500 students in Ust-Kamenogorsk

Координатор:Надежда Козюкова

Коэффициент подобия 1:2,2

Коэффициент подобия 2:0

Замена букв:29

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: Карими Зекрулла

Название: School for 500 students in Ust-Kamenogorsk

Координатор: Надежда Козюкова

Коэффициент подобия 1:2,2

Коэффициент подобия 2:0

Замена букв:29

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

Karimi Zekrullah
5B072900-Civil Engineering

Topic: “School for 500 students in Ust-Kamenogorsk”

Based on the tasks issued by the consultants, the architectural - construction, design - structural, organizational - technological and economic sections of the graduation project were developed.

The architectural and construction section was executed using the Revit program. A 3D model of the building was developed, as well as other drawings were made in the AutoCAD program.

The design and structural section was performed using the LIRA-SAPR (analytical part) and AutoCAD (graphic part) programs.

The estimated section is calculated in the program ABC 4.

In the main section (for this specialization) - construction and technology - the wishes for the application of IT - competencies + are not taken into account, with: vertical planning of construction sites; comparison of earthmoving, lifting and concrete-laying equipment; layouts of formwork and implementation of concrete curing; calculation of calendar plans and the need for building materials. However, the above calculations are performed in the traditional way, meeting the requirements of RUE, RP and the department.

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.