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# WORKING PROJECT

Album RC (Reinforced Concrete Structures) Project:

#### General Instructions

#### 1. Basic Initial Data

- 1.1. The working drawings for reinforced concrete structures have been developed based on the technical documentation specified in the general instructions for the architectural drawings (AR
- 1.2. The reference elevation 0.000 corresponds to the finished floor level of the first floor, which matches the absolute elevation of 718.85 on the master plan.
- 1.3. Site conditions:
- -Climatic zone of the construction site: IIIB
- -Standard snow load for Snow Zone II: 120 kg/m<sup>2</sup>
- -Standard wind pressure for Wind Zone II: 39 kg/m<sup>2</sup>
- -Design temperature: -25°C
- -Seismic intensity: 9 points. The confirmed site seismic intensity is 9 points.
- -Soil seismic category: II
- 1.4. Building importance class: II (second)
- 1.5. Operational conditions: heated interior.
- 1.6. Engineering and geological conditions of the construction site are provided on sheet KZh-2-4.
- 1.7. Fire resistance rating of the building: II (per SP RK 2.02-101-2014)
  - Functional fire hazard class: F 3.1
  - Structural fire hazard class: C1
- Fire hazard class of building materials: KO
- 1.8. Load safety factors γf for the weight of structural elements: 1.05

#### Project Characteristics

- 2.1. Design solutions are made in accordance with the following regulations:
- Structural calculations have been performed in accordance with the following normative
- -SP RK 2.03-30-2017\* "Construction in Seismic Zones"
- -SP RK EN 1990:2002+A1:2005/2011 "Basis of Structural Design"
- -SP RK EN 1991-1-1:2002/2011 "Actions on Structures. Part 1-1: Self-weight, Permanent and Imposed Loads on Buildings"
- -SP RK EN 1991-1-3:2003/2011 "Actions on Structures. Part 1-3: General Actions. Snow Loads" -SP RK EN 1992-1-1:2004/2011 "Design of Concrete Structures. Part 1-1: General Rules and Rules for Buildings"
- -SP RK EN 1993-1-1:2005/2011 "Design of Steel Structures. Part 1-1: General Rules and Rules for Buildings" (with amendments as of 30.12.2021)
- -SN RK 2.01-01-2013 "Protection of Building Structures from Corrosion"
- -SN RK 5.01-102-2013 "Foundations of Buildings and Structures"

#### 2.2. Materials of the Structures

Materials used in the structures:

- -Foundation: heavy concrete, strength class C20/25 (B25)
- -Frame and floor slabs: heavy congrete, strength class C20/25 (B25)
- -Reinforcement steel: longitudinal A400C (GOST 34028-2016) and transverse A240 (GOST 34028-2016)

## 3. Structural Solutions

outlined in the working project are followed."

Chief Project Engineer

No. / Signature

- 3.1. -The canopy is attached to the existing reinforced concrete building.
  - -The building plan configuration is rectangular, with dimensions of 10.1 x 3.08 m.

  - -The structural system is a steel frame building.
    -The enclosing structures are made of "sandwich" panels and aluminum curtain wall systems.
  - -The foundation is a monolithic reinforced concrete socket-type footing.
  - -The steel frame is made of welded and rolled profiles.
- -The reinforced concrete elements in the design are made from concrete class C20/25 (B25) with reinforcement of class A240 and A400C according to GOST 34028-2016.

"The technical solutions adopted in the working drawings comply with the environmental, sanitary, hygienic, fire safety, and other applicable construction codes and regulations, as well as state standards in force in the Republic

of Kazakhstan, and ensure the safe use of the facility for human life and health, provided that the measures

-The steel elements are made from steel grade C245.

## Seismic Protection Measures

Seismic protection measures have been implemented in accordance with the requirements of SP RK 2.03-30-2017 "Construction in Seismic Zones (Areas) of the Republic of Kazakhstan." The volumetric-planning and structural solutions have been made considering the guidelines of SP RK 2.03-30-2017, ensuring symmetry and regularity in the distribution of masses and stiffness in both plan and elevation.

The calculations were performed using the displacement-based finite element method with the "LIRA-SAPR 2022" software package.

The design of the building's load-bearing structures was carried out for both basic and special load combinations, with seismic loads considered as special loads. The design seismic loads were taken in accordance with the requirements of SP RK 2.03-30-2017 "Construction in Seismic

## 7.Anti-Corrosion Measures and Waterproofing

Anti-corrosion protection of the construction structures is carried out in accordance with SN RK 2.01-01-2013 "Protection of Building Structures from Corrosion."

The protective layers for the reinforcement of monolithic reinforced concrete structures are provided according to SNiP RK 5.03-34-2005 "Concrete and Reinforced Concrete Structures." All steel structures must be painted with enamel PF-115 (GOST 6465-76) in two coats over GF-021 primer (GOST 25129-82), with a total coating thickness of no less than 50 microns. Before painting, metal structures must be cleaned of rust, scale, and grease.

All concrete and reinforced concrete structures in contact with the ground must be coated with hot bitumen in two coats.

- -Waterproofing measures for the foundation elements against seasonal groundwater level fluctuations are implemented as follows:
- -Laying of a waterproofing base made of two layers of polyethylene film (200 µm thick) on top of a compacted gravel-sand cushion at elevation 717.15.
- -Laying a reinforced polyvinyl chloride film "Renolit Alkorplan Water" on top of the polyethylene film base, with joints welded by hot air.
- -Laying of a pressure layer of waterproofing made from concrete C8/10 (B-7.5) with a thickness of 100 mm, which also acts as a levelling layer under the foundation elements of the building. -Construction of a protective retaining wall around the perimeter of the foundation from
- cement-sand split blocks, 190 mm thick and 1700 mm high (from elevation 717.15 to 718.85). -Waterproofing the external surface of the retaining wall with reinforced polyvinyl chloride film
- "Renolit Alkorplan Water" and welding the joints with hot air. -Protection of the external surface of the vertical waterproofing from direct contact with backfill soil using a plastic profiled membrane "Gruntflex Dreraj" with a thickness of 8 mm.

## 8. Execution of Works

The backfill works must be carried out in accordance with the construction method statement. Monolithic concrete and reinforced concrete structures should be executed in accordance with SN RK 5.03-07-2013 "Load-Bearing and Enclosing Structures." If construction joints are required, they should be placed in the least critical areas of the structures.

Welding of embedded elements and reinforcement must be carried out in accordance with GOST 14098-2014. Welding should be performed with electrodes E42A, E50A as per GOST 9467-75. Anti-corrosion protection of steel embedded elements must comply with the requirements of SN RK 2.01-01-2013.

The execution of works should follow the requirements of:

- -SN RK 5.01-01-2013 "Earthworks, Foundations, and Foundations."
- -SP RK 03-106-2012 "Occupational Safety and Health in Construction."
- -Construction work in winter conditions must be carried out in compliance with the relevant
- -SN RK 1.03-00-2011 "Construction Production. Organization of Construction of Enterprises, Buildings, and Structures."
- -SN RK 5.03-07-2013 "Load-Bearing and Enclosing Structures."
- -SN RK 5.01-102-2013 "Foundations of Buildings and Structures."
- -SN RK 2.04-05-2014 "Insulation and Finishing Coatings."
- -SP RK 03-106-2012 "Occupational Safety and Health in Construction."

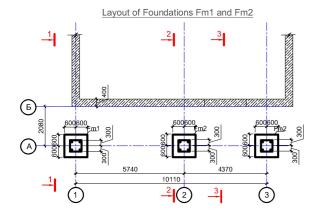
# List of Working Drawings of the Main Set

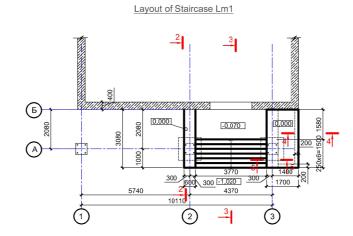
List	Title / Name	Note
1	General Data	
2	Layout of Foundations Fm1 and Fm2 and Staircase Lm1	
3	Framework Elements Layout	
4	Spatial Frame Kp1, Kp2 Anchor Groups Ag1	

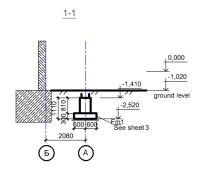
#### List of Referenced and Attached Documents

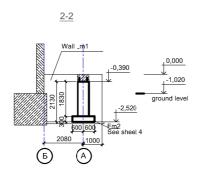
Designation	Title / Name	Note
SP RK 2.03-30-2017*	"Construction in Seismic Zones"	
SP RK EN 1990:2002+A1:2005/2011	"Basis of Structural Design"	
ST RK EN 10279-2016	Hot-Rolled Steel Channels	
SP RK EN 1991-1-1:2002/2011	"Actions on Structures. Part 1-1: Self-Weight, Permanent and Imposed Loads on Buildings"	
SP RK EN 1991-1-3:2003/2011	"Actions on Structures. Part 1-3: General Actions. Snow Loads"	
SN RK 5.01-102-2013	"Foundations of Buildings and Structures"	
SP RK EN 1992-1-1:2004/2011	"Design of Reinforced Concrete Structures. Part 1-1: General Rules and Rules for Buildings"	
SN RK 2.01-01-2013	"Frotection of Structural Elements from Corrosion"	
SNIP RK 1.03-05-2001	"Occupational Safety and Health in Construction"	
SNIP RK 1.03-06-2002	"Construction Works. Organization of Construction of Enterprises, Buildings, and Structures"	

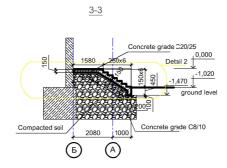
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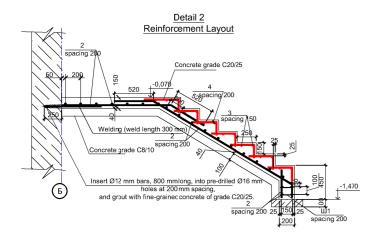


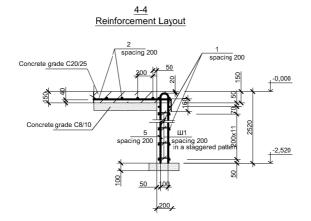


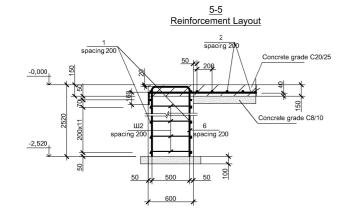












	Foundation Specification												
Nº	Title / Name	Designation	Qty.	Weight kg	Note								
Fm1	Sheet KZh-4	Foundation Fm1	1										
Fm2	Sheet KZh-5	Foundation Fm2	2										
Lm1	See this sheet	Staircase on Ground Lm1	1										

# List of details

Nº	Sketch	Nº	Sketch	Nº	Sketch	Nº	Sketch	Nº	Sketch
Ш1	144 100 100 Bend	Ш2	525 100 100 Bend	4	320	5	2500	6	2500

# Steel consumption statement, kg.

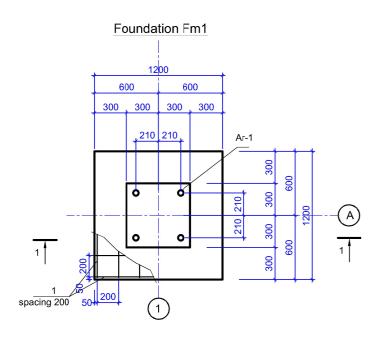
	Reinforcement products									
Element grade			F	Rebar of	f grade					
		Α	400C		<u>a</u>					
	GOST34028-2016					GOST	34028-2	2016	Total	
	Ø 10	<b>Ø</b> 12	<b>ø</b> 16	<b>Ø</b> 20	Grand total	Ø 8	<b>Ø</b> 10	Grand total		
Staircase Lm1	79	678			757	127		127	884	

# Specification of elements

Mark	Designation	Title /	Name	Qty. pcs.	Unit Weight, kg	Note
		Stairca	se Lm1			
1	GOST34028-2016	Ø12 A400C	L=270	270	0,888	
2	GOST34028-2016	Ø12 A400C	L=205	205	0,888	
3	GOST34028-2016	Ø10 A400C	L=4020	15	2,48	
4	GOST34028-2016	Ø10 A400C	L=500	133	0,31	
5	GOST34028-2016	Ø12 A400C	L=5100	22	4,5	
6	GOST34028-2016	Ø12 A400C	L=5500	32	4,9	
Ш1	GOST34028-2016	Ø8 A240	L=345	240	0,14	
Ш2	GOST34028-2016	Ø8 A240	L=725	360	0,26	
		Mate	rials			
		Concrete grade C20/	25 for slab-on-ground	0,785		M <sup>3</sup>
		Concrete grade	C20/25 for walls	11,38		M <sup>3</sup>
		Concrete grade C2	0/25 for staircases	2,54		M <sup>3</sup>
		Concrete g	rade C8/10	2		M <sub>3</sub>

- Tie the reinforcement with birding wire at all intersections.
   Anchoring rods (item 2) mustbe horizontally anchored into the walls of the main house fou notation by 250 mm.
   For staircase construction, the base soil must be compacted in layers of 20 cm each, compacting to a density of K\_comp.=0.96.
   Item III o be installed in a saggered pattern.
   The height and number of steps shall be confirmed after final site grad ing.
   The floor slab shall be cast monolithically with the walls.
   Refer to sheets KZh-3 to KZh-4 for FM1 and FM2.

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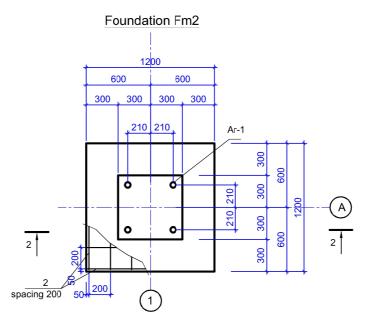
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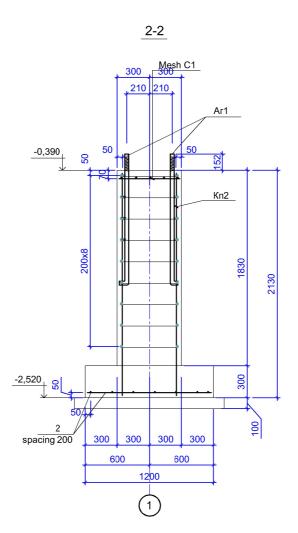
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# Steel Consumption Schedule, kg

Ctoc Concamption Concade, Ng														
		Reinforcement Products							Embedded Parts					
Element grade		Rebar C	Class				Bolt		Rolled Steel					
Element grade	A400C				A240		Bolt 1.1 (Steel 09G2S		) ∟ 110x10			Total		
	GOS	ST 3402	8-2016		GOS	Г 34028	-2016	GOS	ST 2437	9.1-80	ST RK EN	I 10056	-1-2012	
	Ø 12	Ø 16	Ø 18	Grand total	Ø 10		Grand total	Ø 24	Ø 30	Grand total	∟110x10		Grand total	
Foundation Fm1	35	9		44	6		6		37	37				87
Foundation Fm2	57	9		66	6		6		37	37				109

# Specification

Mark	Title / Name	Designation		Qty.	Unit Weight, kg	Total Weight
		Foundation Fm1				87
1	GOST34028-2016	Ø12 A400C	L=15	15	0,888	13
АГ-1	see sheet 4	AΓ-1 Anchor Group		1	43	43
Кп1	see sheet 4	Кп1 Spatial Frame		1	22	22
C1	this sheet	C1 Mesh		1	9	9
		Concrete C20/25 (B25	) м3	0,73		
		Concrete C8/10	м3	0,196		
		Mesh C1				
3	GOST34028-2016	Ø16 A400C	L=570	10	0,9	9
		Foundation Fm2				109
2	GOST34028-2016	Ø12 A400C	L=15	15	0,888	13
АГ-1	see sheet 4	AΓ-1 Anchor Group		1	43	43
Кп2	see sheet 4	Кп2 Spatial Frame		1	44	44
C1	this sheet	C1 Mesh		1	9	9
		Concrete C20/25 (B25	) м3	1,1		
		Concrete C8/10	мЗ	0,196		

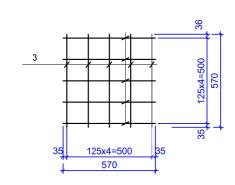
# Mesh C1

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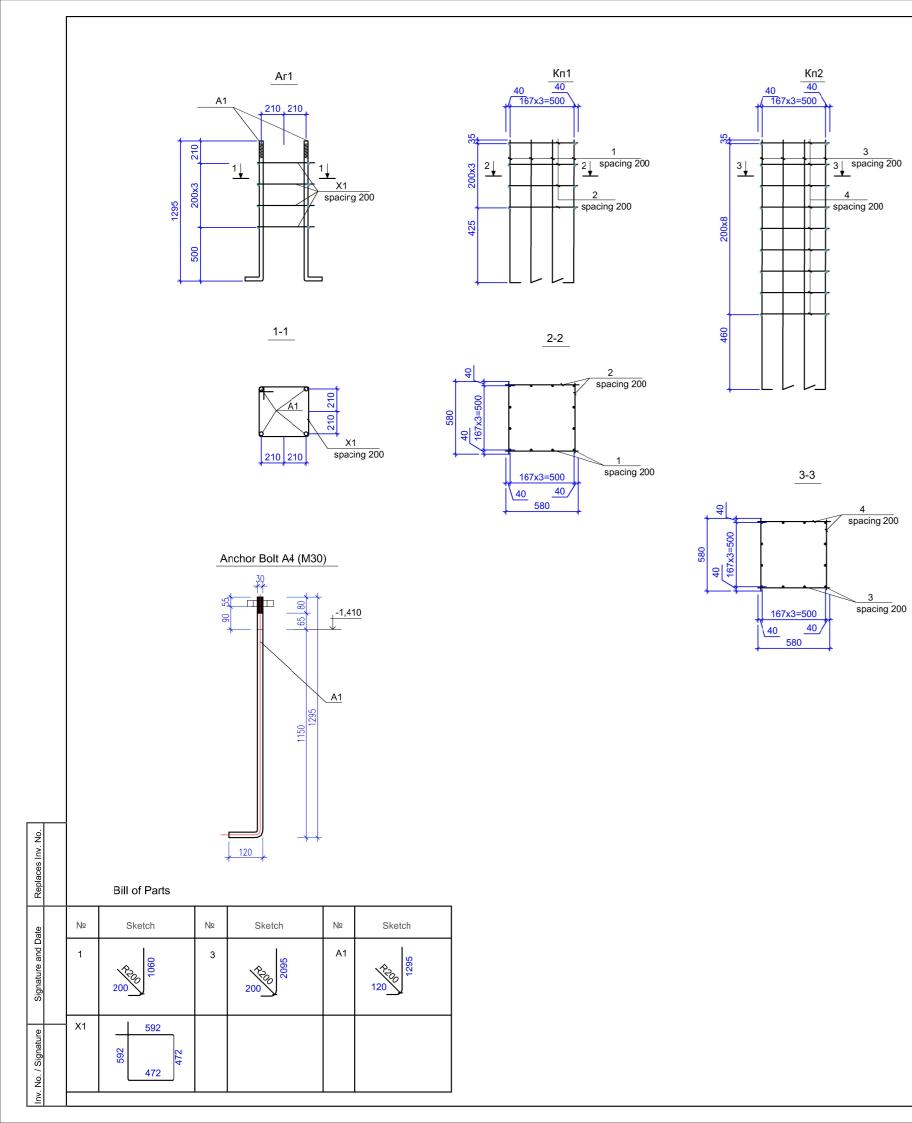
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- Reinforcement shall be tied with binding wire at all intersections.
   Foundations shall be cast monolithically with Staircase Lm1.
- Anchor groups must be fixed in their design position during installation.
   Refer to this sheet together with sheet KZh 2.4.

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# Specification

Mark	Title / Name	Designation	Qty.	Unit Weight, kg	Total Weight
		Кп1			22
1	GOST 34028-2016	Ф12 A400C L=1260	12	1,1	13,4
2	GOST 34028-2016	Ф12 A400C L=580	16	0,51	8,2
		Кп2			44
3	GOST 34028-2016	Ф12 A400C L=2295	12	2,1	24,5
4	GOST 34028-2016	Ф12 A400C L=580	36	0,51	19
		Аг1			43
A1	GOST 24379.1-80	Bolt 1.1 M30×1415 (Steel 09G2S)	4	9,2	37
X1	GOST 34028-2016	Ø10 A240 L=2128	4	1,31	5,3

- 1. Reinforcement shall be tied with binding wire at all intersections.
- 2. Refer to this sheet together with sheet KZh 3.

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