



LIMITED LIABILITY  
COMPANY «ENGINEERING  
COMPANY FORTIS»

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Working project

«Current repair of anti-radiation shelter № 52108 (group P-4) Ingul Lyceum of Ingul village council, at the address: st. Sadova, 49, Ingulka village, Bashtanka district, Mykolaiv region»

Electro-technical solutions

173-WP-2024-F-ES

Chief Project Engineer

Qualification Certificate for Engineering and Construction Design  
AS № 019809. Ministry of Regional Development, Construction,  
Housing and Communal Services of Ukraine. Attestation  
Architectural and Construction Commission.

Shelikhova. V.

2024

Agreed






Inv. No. Podl.	Subp. and date	Deputy. Inv. No.

Denomination	Name	Note
	<u>Referenced documents</u>	
NPAOP 40.1-1.32-01	Rules for the arrangement of electrical installations. Electrical equipment of special installations.	
PUE-2017	Rules for the arrangement of electrical installations	
5.407-64	Installation of single wall and broach boxes	
DBN V.2.5-28-2018	Natural and artificial lighting	
DBN V.2.5-23:2010	Design of electrical equipment of civil facilities appointment	
	<u>Documents to be attached</u>	
173-WP-2024-Φ-ES.S	Specification of equipment according to working drawings	on five sheets

Chief engineer of the project Shelikhova. V

*[Handwritten signature]*

№ p/n	Name
1	Arrangement of trenches and bases for the installation of cables
2	Arrangement of cable laying in the trench
3	Installation of protective coating of cables
4	Grounding and zeroing arrangement
5	Checking the wires of lighting networks laid on the walls and in the furrow under the plaster
6	Acceptance of ready-made design of electrical installations

						173-WP-2024-F-ES			
						«Current repair of anti-radiation shelter № 52108 (group P-4) Ingul Lyceum of Ingul village council, at the address: st. Sadova, 49, Ingulka village, Bashtanka district, Mykolaiv region»			
Sw.	Stake.	Arc.	doc. no	Signature	Date				
CPE		Shelikhova				Electrical Solutions			
Developed		Kovaleva							
Checked		Shelikhova							
						General data			
Norm.control		Vetrov							

Grounding

The external grounding loop of the diesel generator set is composed of one 15 m long depth earthing conductor and horizontal grounding conductor (strip steel 40x4 mm). The resistance of the grounding device must not exceed 4 ohms at any given time year.

Trenches with earthing conductors must be covered with soil that does not have stones and construction waste. Falling asleep should take place with tamping the soil.

Automatics

The supply and exhaust ventilation control equipment is supplied as a set and remains unchanged.

Gas contamination alarm of premises is made on the basis of gas detectors QE1-QE3 type DG-12/N and alarm module QA1 type MD-8. B (with built-in rechargeable battery). The gas detectors are connected to the alarm module via the A1 hub, located next to the QA1 alarm module in room 2 of the shelter. QE1-QE3 gas detectors are installed indoors shelter at a height of at least 0.3 m from the upper ceiling, as close as possible to the places where engineering networks enter the building (most probable sources of methane leakage, see arc. 5). The electrical wiring of the gas control system is made of cables of the MKShV type in plastic corrugated pipes on the walls of the premises.

The gas control alarm system provides:

- ▶ continuous automatic control of pre-explosive concentrations of methane in the air of shelter premises;
- ▶ issuing a signal to the collective warning alarm and to the console of the integrated dispatch systems of the district about the presence of dangerous concentrations of methane in the air (20 % NCPV) if such services are available;
- ▶ issuing a signal about the presence of dangerous concentrations of methane in the air (20 % NCPV).

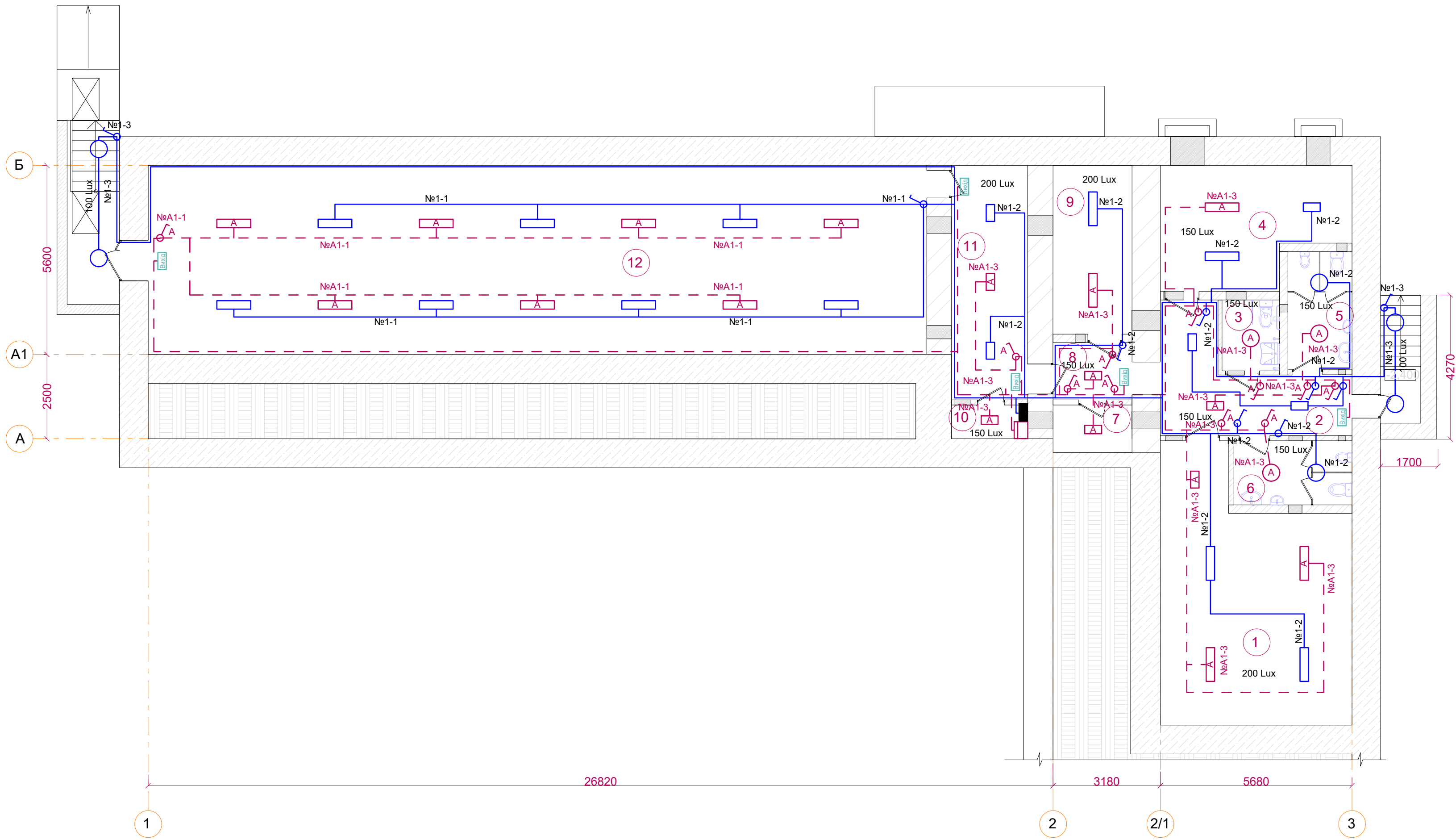
Agreed:					
Inv. No. ob.	Signature & Date	Deputy. Inv. No.			
Sw.	Stake.	Sheet	doc no.	Signature	Date

Agreed

Deputy. Inv. No.

Subp. and date

Inv. No. Podi.



Notes  
This sheet look with specification 173-WP-2024-F-ES. S.2

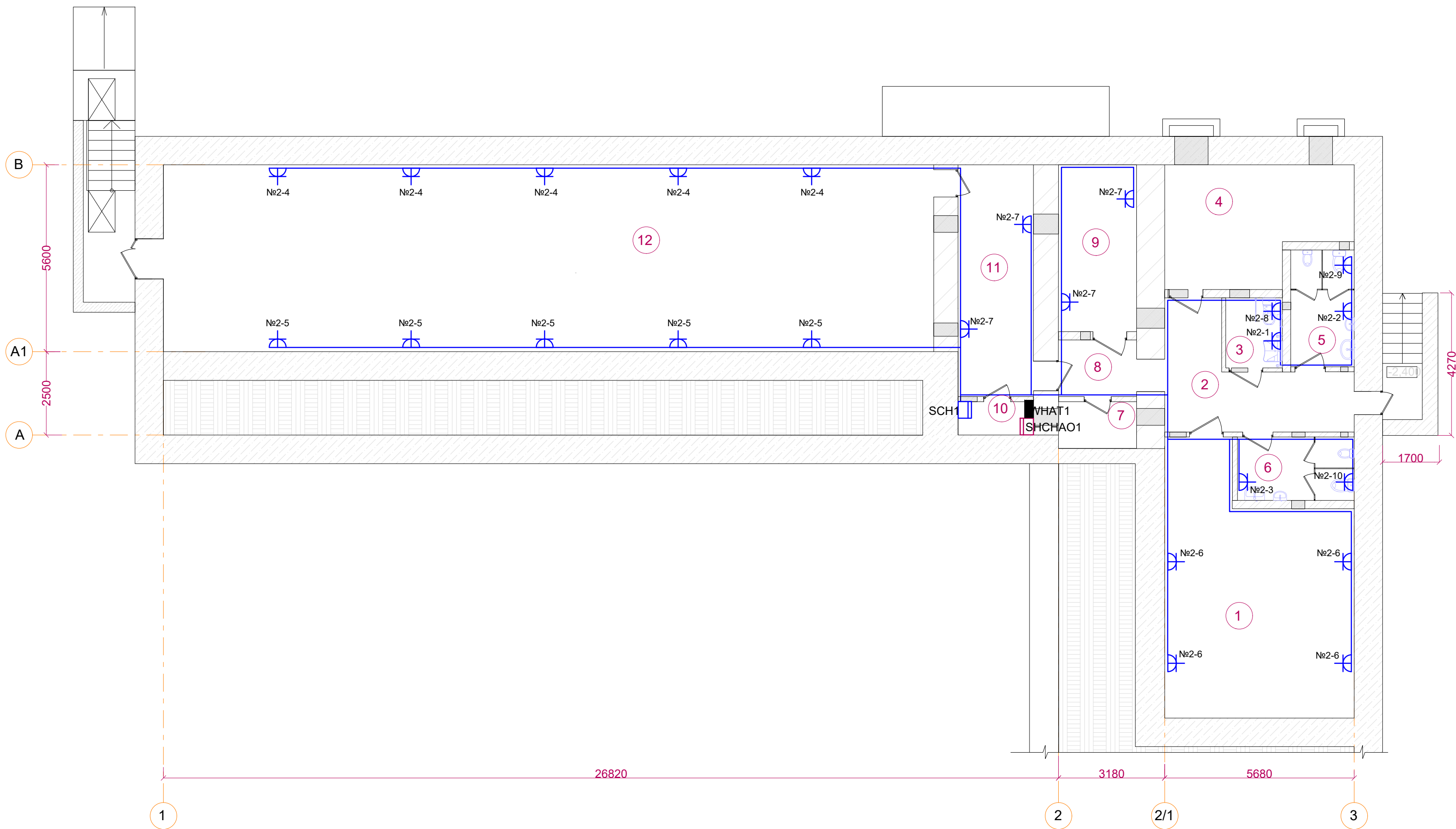
### Explication of premises






Number of room	Name	Area, m²	Note
1	Premises for persons subject to shelter	39.98	4-DPP07V-40 $\frac{1 \times 43}{2,3}$ 1-DPP07V-20 $\frac{1 \times 22}{2,3}$
2	Corridor	14.03	3-DPP07V-20 $\frac{1 \times 22}{2,3}$
3	Universal sanitary and hygienic premises. for LMG	3.57	LED GLOBO LC-18Bm $\frac{1 \times 18}{2,3}$
4	Ventilation	18.15	DPP07V-20 Vt $\frac{1 \times 22}{2,3}$ 2-DPP07V-40 Vt $\frac{1 \times 43}{2,3}$
5	Women's bathroom	6.65	2-LED GLOBO LC-18Bm $\frac{1 \times 18}{2,3}$
6	Men's bathroom	6.65	2-LED GLOBO LC-18Bm $\frac{1 \times 18}{2,3}$
7	Water conservation facilities	3.28	DPP07V-20 $\frac{1 \times 22}{2,3}$
8	Corridor	3.98	DPP07V-20 $\frac{1 \times 22}{2,3}$
9	Premises for persons subject to shelter	11.70	2-DPP07V-40 Vt $\frac{1 \times 43}{2,3}$
10	Switchboard room	2.26	DPP07V-20 $\frac{1 \times 22}{2,3}$
11	Premises for persons subject to shelter	15.71	3-DPP07V-20 $\frac{1 \times 22}{2,3}$
12	Main room	129.25	No1-1 14-DPP07V-40 $\frac{1 \times 43}{2,3}$
Total area		255.21	

- Legend
- NoA1-3 emergency lightning
  - No1-2 - number of group
  - Switch of lightning group
  - Switch of emergency lightning
  - SHCHAO1 Emergency lighting board
  - SCHO1 Lighting board
  - 1. DPP07V-20 Vt  $\frac{1 \times 22}{2,3}$
  - 2. DPP07V-40 Vt  $\frac{1 \times 43}{2,3}$
  - 3. LED lamp, surface-mounted, 6 W, emergency
  - 4. steirs: 2-DBB27U-12-Selenium-LED-1 - 12  $\frac{1 \times 12}{2,3}$
  - 5. LED GLOBO LC-18 Vt  $\frac{1 \times 18}{2,3}$
  - 6. RBO01VSP-6-b-104  $\frac{1 \times 6}{2,1}$

173-WP-2024-F-ES					
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Sw. Stake	Arc. doc. no	Signature	Date	Electrical Solutions	
CPE	Shelikhova				
Developed	Kovaleva				
Checked	Shelikhova			Plan of lighting networks in the shelter	
Norm.control	Vetrov			FORTIS	

Explication of premises			
Number of room	Name	Area, m <sup>2</sup>	Note
1	Premises for persons subject to shelter	39.98	
2	Corridor	14.03	
3	Universal sanitary and hygienic premises. for LMG	3.57	
4	Ventilation	18.15	
5	Women's bathroom	6.65	
6	Men's bathroom	6.65	
7	Water conservation facilities	3.28	
8	Corridor	3.98	
9	Premises for persons subject to shelter	11.70	
10	Switchboard room	2.26	
11	Premises for persons subject to shelter	15.71	
12	Main room	129.25	
	Total area	255.21	
	Estimated area	#####	

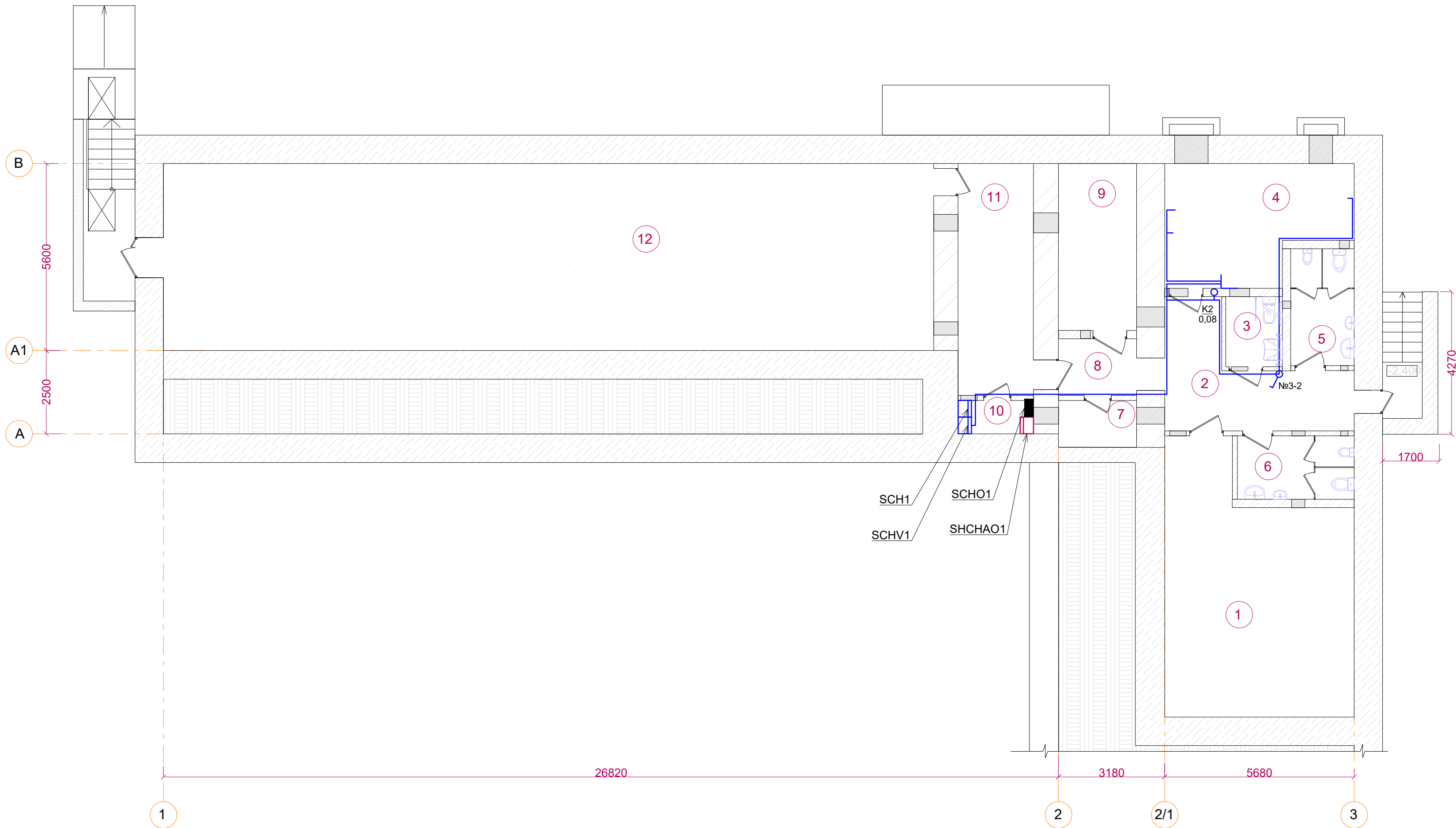


							173-WP-2024-F-ES			
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Sw. Stake	Arc. doc. no	Signature	Date					Stage	Sheet	Sheets
CPE	Shelikhova						Electrical Solutions	WP	3	
Developed	Kovaleva									
Checked	Shelikhova									
							Plan of the socket network in the shelter			
Norm.control	Vetrov									








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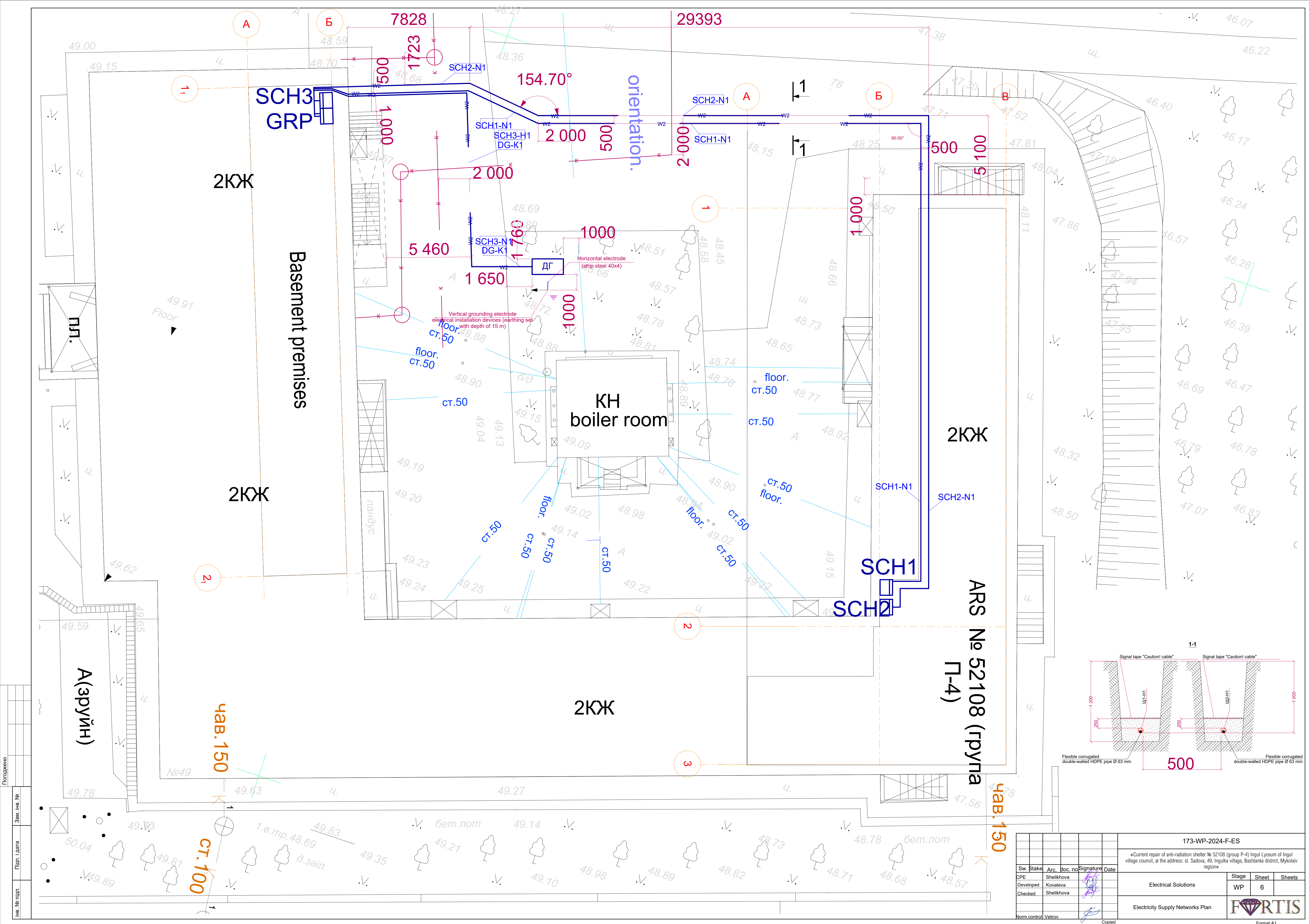


Explication of premises			
Number of room	Name	Area, m²	Note
1	Premises for persons subject to shelter	39.98	
2	Corridor	14.03	
3	Universal sanitary and hygienic premises. for LMG	3.57	
4	Ventilation	18.15	
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12	Main room	129.25	
	Total area	255.21	
	Estimated area	#####	

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Sw. Stake	Arc. doc. no	Signature	Date	Electrical Solutions			Stage	Sheet	Sheets
CPE	Shelikhova						WP	4	
Developed	Kovaleva								
Checked	Shelikhova								
				Electricity Supply Networks Plan ventilation equipment in the shelter					
Norm.control	Vetrov								

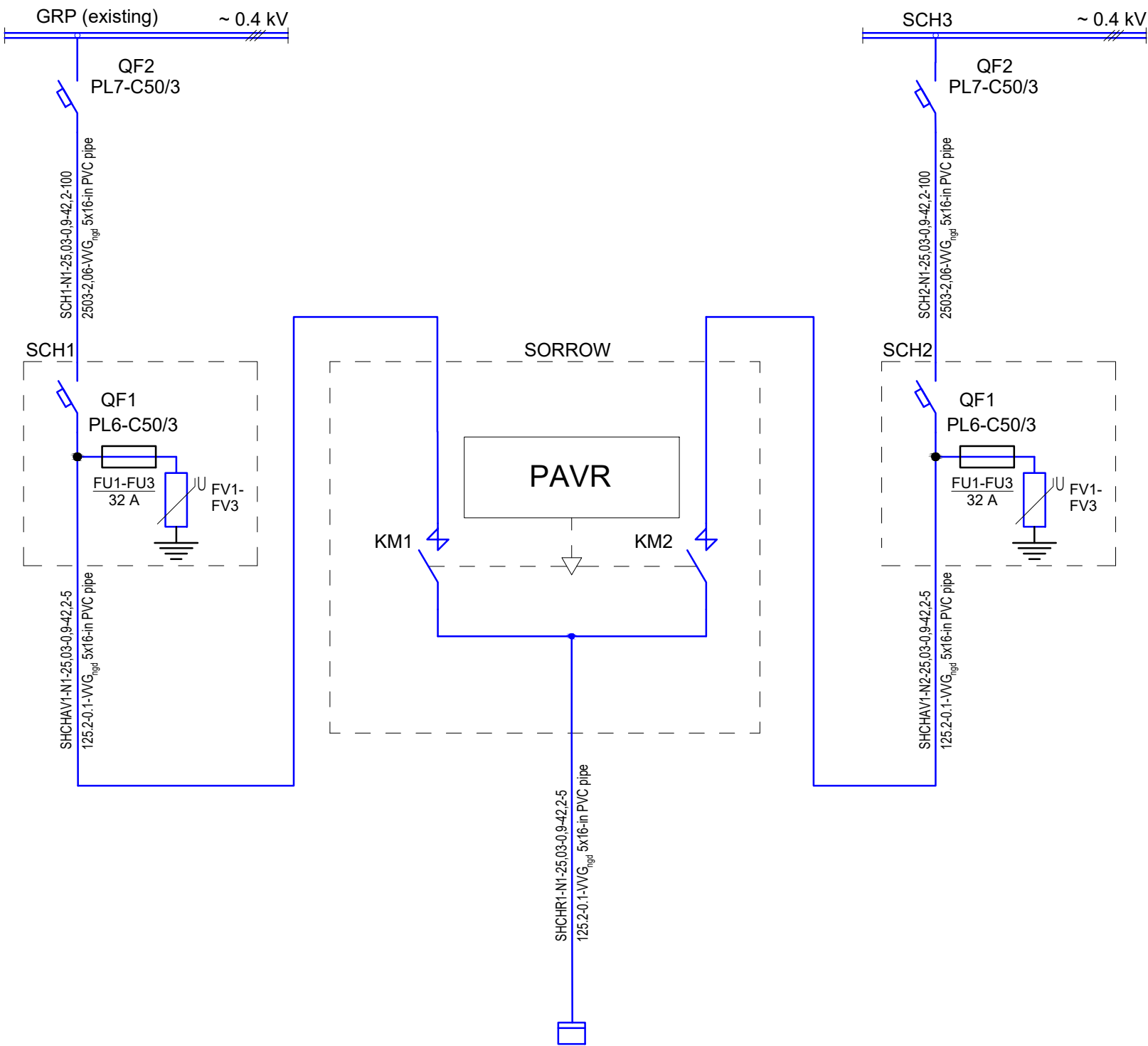
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




A2 format



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Inv. No. Podl.	Subp. and date	Deputy. Inv. No				

<p>Power Supply</p>	<p>Marking - calculated load, kW - coefficient (a) to the extent permitted by the provisions of this convention, the secretary-general of the current, A is the length of the section, m</p> <p>Load torque, kWxm - voltage loss, % - brand, conductor cross-section - laying method</p>
<p>Distribution Point: number, type; installed and Rated power, kW.</p> <p>Apparatus at the input: type; current, A</p>	
<p>Circuit breaker or fuse: type; trip current or fuse, A</p>	
<p>Magnetic starter: type; heating current element, A</p>	
<p>Marking - calculated load, kW - coefficient (a) to the extent permitted by the provisions of this convention, the secretary-general of the current, A is the length of the section, m</p> <p>Load torque, kWxm - voltage loss, % - brand, conductor cross-section - laying method</p>	
<p>Group shield; apparatus at the input; type; Rated current, A</p>	
<p>Number by location on the plan</p>	
<p>Installed power, kW</p>	
<p>Loss of tension up to the shield, %</p>	



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Sw.	Stake.	Arc.	doc. no	Signature	Date					
CPE		Shelikhova				Electrical Solutions		Stage	Sheet	Sheets
Developed		Kovaleva						WP	7.1	
Checked		Shelikhova								
						Single-line electrical diagram power supply of the shield SHCHR1				
Norm.control	Vetrov									



Pos. on the diagram	Name	Quantity	Note
SCHVR	Shield ABP, I <sub>n</sub> = 63 A	1	Technoton LLC Energy
SCH1	Enclosure with mounting panel metal 40*40*25, IP31, UBox series	1	ASKOUkrem
QF1	Circuit breaker Ir=50 A 3p 380 V, 50 Hz, PL6-C50/3	1	EATON
FU1-FU3	Fusible knife fuse, In.b.= 32 A, NH00 gG 32A/500V 120kA	3	ETI
	Fuse disconnecter, KVL-00 3p BC95	1	ETI
FV1-FV3	Lightning current limiter, combined lightning arrester class I + II, FLP-12,5 V/4	1	SALTEK
SCH2	Enclosure with mounting panel metal 40*40*25, IP31, UBox series	1	ASKOUkrem
QF1	Circuit breaker Ir=50 A 3p 380 V, 50 Hz, PL6-C50/3	1	EATON
FU1-FU3	Fusible knife fuse, In.b.= 32 A, NH00 gG 32A/500V 120kA	3	ETI
	Fuse disconnecter, KVL-00 3p BC95	1	ETI
FV1-FV3	Lightning current limiter, combined lightning arrester class I + II, FLP-12,5 V/4	1	SALTEK

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Inv. No. Podl.

Subp. and date

Deputy. Inv. No.

Distributive device	Apparatus lines that departs (input). Denomination Type, I <sub>nom</sub> A tripper, A	Network Section 1	Starting apparatus Denomination Type, I <sub>nom</sub> A release or smelting Insert, A	Network Section 2	Cable, wire				Trumpet		Electricity consumer			
					Denomination	Mark	Quantity veins and intersection	Length m	Marked-(a) to the extent permitted plan	Length, m	Denomination	R <sub>wst</sub> or R <sub>nom</sub> Kw	I <sub>rozr</sub> or I <sub>nom</sub> , I <sub>start</sub>	Name type, designation
<div>SCHR1 UBox 24 mod.</div> <div><div>L1</div><div>L2</div><div>L3</div></div>	<div>PL6-C50/3</div> <div>PL6-C16/3</div> <div>PL6-C32/3</div> <div>PL6-C40/3</div> <div>PL6-C16/3</div> <div>PL6-C16/3</div> <div>PL6-C10/1</div> <div>PL6-C10/1</div> <div>PL6-C10/1</div>			1	SCHR1-N1	VVG <sub>ngd</sub>	5x16	5	GR 40	5	SCHR1	27,56 25,03	42,2	Input from SHCHAVR
				2										
				1	SH1-H1	VVG <sub>ngd</sub>	5x2,5	5	GR 25	5	-	0,667	1,52	Lighting shield SH1
				2										
				1	SCH1-N1	VVG <sub>ngd</sub>	5x4	5	GR 25	5	-	7,8	13,98	Power shield SHCHS1
				2										
				1	SCHV1-N1	VVG <sub>ngd</sub>	5x6	5	GR 32	5	-	17,16	26,75	Ventilation shield SHCHV1
				2										
				1	SHCHAO1-N1	(N) NHN FE 180/E30	5x2,5	5	GR 25	5	-	0,677	1,77	Emergency Shield Lighting SHCHAO1
				2										
				1	1-H1	VVG <sub>ngd</sub>	5x2,5	45	GR 25	45	-	0,55	0,98	Lift for MGN
				2										
				1	4-1	(N) NHN FE 180/E30	3x1,5	10	GR 20	10	-	0,1	0,53	Device acceptance and control Fire Fighting Aircraft
				2										
				1	4-2	VVG <sub>ngd</sub>	3x1,5	10	GR 20	10	-	0,06	0,32	Alarm Module QA1 gas contamination
				2										
				1	4-3	VVG <sub>ngd</sub>	3x1,5	10	GR 20	10	-	0,055	0,29	Source uninterrupted UPS power1
				2										

Sw. Stake.

Arc. doc. no

Signature

Date

CPE

Developed

Checked

Norm.control

Shelikhova

Kovaleva

Shelikhova

Vetrov

173-WP-2024-F-ES

«Current repair of anti-radiation shelter № 52108 (group P-4) Ingul Lyceum of Ingul village council, at the address: st. Sadova, 49, Ingulka village, Bashtanka district, Mykolaiv region»

Electrical Solutions

Single-line electrical diagram distribution network of the switchboard SCHR1

Stage

Sheet

Sheets

WP

8

F

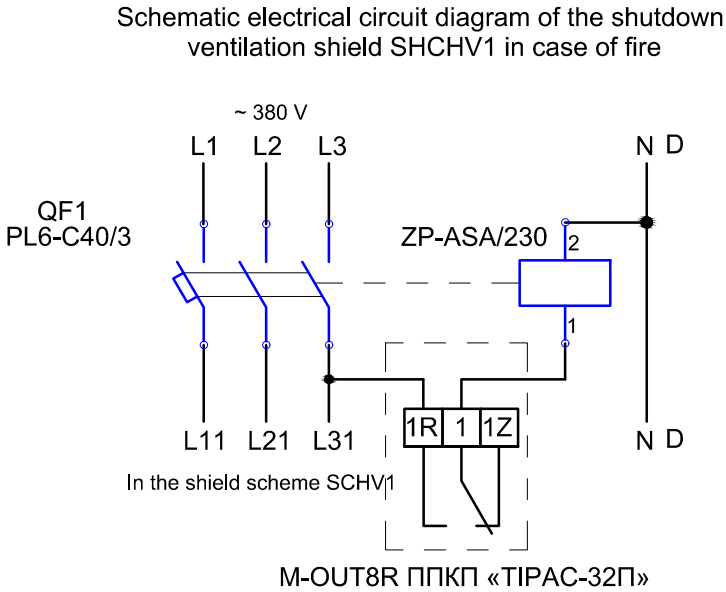
ORTIS







Distributive device	Apparatus lines that departs (input). Denomination Type, I <sub>nom</sub> A tripper, A	Network Section 1	Starting apparatus Denomination Type, I <sub>nom</sub> A release or smelting Insert, A	Network Section 2	Cable, wire				Trumpet		Electricity consumer			
					Denomination	Mark	Quantity veins and intersection	Length m	Marked-(a) to the extent permitted plan	Length, m	Denomination	R <sub>wst</sub> or R <sub>nom</sub> Kw	I <sub>rozr</sub> or I <sub>nom</sub> , I <sub>start</sub> A	Name type, designation
SCHV1 UBox 24 mod.	PL6-C40/3			1	SCHV1-N1	VVG <sub>ngd</sub>	5x6	5	GR 32	5	SCHV1	17,16	26,75	Input from SCHR1
				2										
	ZP-ASA/230				(N) NHN FE 180/E30		2x1,5	10	GR 20	10	SCHV1			Contact from the appliance fire alarm
					SCHV1-C1									
	PL6-C32/3		SCHK-PV1 (complete set)	1	3-1	VVG <sub>ngd</sub>	5x4	20	GR 25	20				
				2	EK-PV1-N1	VVG <sub>ngd</sub>	2(4x2,5)	10	GR 25	10				
				3	M1-PV1-N1	VVG <sub>ngd</sub>	4x1,5	10	GR 25	10				
				4	M2-PV1-N1	VVG <sub>ngd</sub>	4x1,5	10	GR 25	10				
	PL6-C10/1			1	3-2	VVG <sub>ngd</sub>	3x1,5	30	GR 20	30		0,14	0,63	Ventilation Unit B1
				2										
	PL6-C10/1			1	3-3	VVG <sub>ngd</sub>	3x1,5	20	GR 20	20		0,08	0,43	Fire Fighting Valve K1
				2										
	PL6-C10/1			1	3-4	VVG <sub>ngd</sub>	3x1,5	20	GR 20	20		0,08	0,43	Fire Fighting K2 valve
				2										



\* The schematic diagram of the electrical shutdown of the ventilation panel SHCHV1 in case of fire is made для модуля М-OUT8R ППКП "Tiras-32P", when using a different PPCP, contact numbers may differ from those shown in the diagram;

173-WP-2024-F-ES					
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Sw. Stake.	Arc. doc. no	Signature	Date	Electrical Solutions	
CPE	Shelikhova				
Developed	Kovaleva			Single-line electrical group diagram shield network SHCHV1. Schematic electrical diagram of the switchboard shutdown ventilation of SHCHV1 in case of fire.	Stage
Checked	Shelikhova				WP
Norm.control Vetrov				Sheet 11	
				Sheets	







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Cable Magazine

Denomination cable wire	Route		Passage through				Cable, wire					
	Beginning	End	pipe			stretch- for example, in the case of the united states	on the project			laid		
			Denomination	Diameter by state- dard, mm	Length m		Mark	Quantity number and intersection lived	Length m	Mark	Quantity number and intersection lived	Length m
SCH1-N1	Existing HCJ	Switchboard Shch1	GR FRI	40 63	55 45		VVG <sub>ngd</sub>	5 x 16	100			
SHCHAVR-N1	Switchboard Shch1	Automatic Transfer Switch Shield SORROW (input no1)	GR	40	5		VVG <sub>ngd</sub>	5 x 16	5			
SCH2-N1	Switchboard Shch3	Switchboard Shch2	GR FRI	40 63	55 45		VVG <sub>ngd</sub>	5 x 16	100			
SHCHAVR-N2	Switchboard Shch2	Automatic Transfer Switch Shield SORROW (input no2)	GR	40	5		VVG <sub>ngd</sub>	5 x 16	5			
SCHR1-N1	Automatic Transfer Switch Shield SORROW	Switchboard SHCHR1	GR	40	5		VVG <sub>ngd</sub>	5 x 16	5			
SH1-H1	Switchboard SHCHR1	Lighting shield SH1	GR	25	5		VVG <sub>ngd</sub>	5 x 2.5	5			
SCH1-N1	Switchboard SHCHR1	Power shield SHCHS1	GR	25	5		VVG <sub>ngd</sub>	5 x 4	5			
SCHV1-N1	Switchboard SHCHR1	Ventilation shield SHCHV1	GR	32	5		VVG <sub>ngd</sub>	5 x 6	5			
SHCHAO1-N1	Switchboard SHCHR1	Emergency lighting panel SHCHAO1	GR	25	5		(N) NHN FE 180/E30	5 x 2.5	5			
QA1-H1	Switchboard SHCHR1	QA1 Alarm Module	GR	20	10		VVG <sub>ngd</sub>	3 x 1.5	10			
QE1-K1	Hub A1	QE1 Gas Detector	GR	16	30		MKShV	2 x 2 x 0.5	30			
QE2-K1	Hub A1	QE2 Gas Detector	GR	16	20		MKShV	2 x 2 x 0.5	20			
QE3-K1	Hub A1	QE3 Gas Detector	GR	16	20		MKShV	2 x 2 x 0.5	20			
A1-K1	Hub A1	QA1 Alarm Module	QC	40x40	2		JZ-500	10 x 1.0	3			
QA1-K2	QA1 Alarm Module	Collective Warning alarm & integrated dispatch service (ODS)	Specified when creating such services									
EK1-N1	Supply Control Panel PV1 exhaust unit	Electric heater of the first EK1 degrees	GR	25	10		VVG <sub>ngd</sub>	4 x 2.5	10			
EC2-N1	Supply Control Panel PV1 exhaust unit	Electric heater of the second EC2 degrees	GR	25	10		VVG <sub>ngd</sub>	4 x 2.5	10			
M1-N1	Supply Control Panel PV1 exhaust unit	Electric supply drive M1 fan	GR	20	10		VVG <sub>ngd</sub>	4 x 1.5	10			
M1-K1	Supply Control Panel PV1 exhaust unit	Electric supply drive M1 fan	GR	20	10		KVVG <sub>ngd</sub>	7 x 0.75	10			
M2-N1	Supply Control Panel PV1 exhaust unit	Electric drive of the exhaust M2 fan	GR	20	10		VVG <sub>ngd</sub>	4 x 1.5	10			

Legend

GR 25 - corrugated plastic pipe F 25 mm;

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CPE		Shelikhova							WP	14.1	
Developed		Kovaleva									
Checked		Shelikhova					Cable Magazine				
Norm.control		Vetrov									



Agreed

Inv. No. Podl.	Subp. and date	Deputy. Inv. No.
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Cable Magazine

Denomination cable wire	Route		Passage through				Cable, wire					
	Beginning	End	pipe			stretch- for example, in the case of the united states	on the project			laid		
			Denomination	Diameter by state- dard, mm	Length m		Mark	Quantity number and intersection lived	Length m	Mark	Quantity number and intersection lived	Length m
M2-K1	Supply Control Panel PV1 exhaust unit	Electric drive of the exhaust M2 fan	GR	20	10		KVVG <sub>ngd</sub>	7 x 0.75	10			
dP1-K1	Supply Control Panel PV1 exhaust unit	Supply filter pressure stat dP1 sections	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
dP2-K1	Supply Control Panel PV1 exhaust unit	Exhaust section filter pressure stat dP2	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
dP3-K1	Supply Control Panel PV1 exhaust unit	Pressure stat of the recuperator section dP3	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
dP4-K1	Supply Control Panel PV1 exhaust unit	Supply fan pressure stat dP4 Sections	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
dP5-K1	Supply Control Panel PV1 exhaust unit	Exhaust fan pressure stat dP5 Sections	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
Tz1-K1	Supply Control Panel PV1 exhaust unit	Safety Thermostat електронагрівача Tz1	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
To-K1	Supply Control Panel PV1 exhaust unit	Outdoor Temperature Sensor Air To	GR	20	20		KVVG <sub>ngd</sub>	2 x 0.75	20			
Ts-K1	Supply Control Panel PV1 exhaust unit	Supply Temperature Sensor air Ts	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
Te-K1	Supply Control Panel PV1 exhaust unit	Exhaust Temperature Sensor air Te	GR	20	10		KVVG <sub>ngd</sub>	2 x 0.75	10			
SPV1-K1	Supply Control Panel PV1 exhaust unit	Air Valve Servo inlet section SPV1	GR	20	20		KVVG <sub>ngd</sub>	3 x 0.75	20			
SPV2-K1	Supply Control Panel PV1 exhaust unit	Air Valve Servo exhaust section SPV2	GR	20	20		KVVG <sub>ngd</sub>	3 x 0.75	20			
SPV3-K1	Supply Control Panel PV1 exhaust unit	Air Valve Servo recirculation sections SPV3	GR	20	10		KVVG <sub>ngd</sub>	3 x 0.75	10			
UPS-H2	Accumulator battery AKB	Uninterruptible power supply UPS	GR	25	3		PVZ	2(1 x 16)	3			

Legend

GR 20 - corrugated plastic pipe Ø 20 mm;

						173-WP-2024-F-ES		sheet
SW	Stake. Outp.	Sheet	doc no.	Signature	Date			14.2

[illegible]

[illegible]

[illegible]



Agreed

		Position	Name and technical characteristics	Type, brand, designation	Code equipment product material	Manufacturing plant	Units of measurement	Amount	Weight of unit kg	Note									
		1	2	3	4	5	6	7	8	9									
			Cable and wire products																
		1	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 5x16		Pivdenkabel	m	215											
		2	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 5x6		Pivdenkabel	m	5											
		3	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 5x4		Pivdenkabel	m	25											
		4	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 5x2,5		Pivdenkabel	m	50											
		5	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 3x2,5		Pivdenkabel	m	290											
		6	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 3x1,5		Pivdenkabel	m	350											
		7	Refractory power cable with copper servicemen, with PVC compound insulation, with external PVC compound sheath of reduced fire hazard	(N) NHN FE 180/E30 5x2,5		Zaporozhye plant non-ferrous metals	m	5											
		8	Refractory power cable with copper servicemen, with PVC compound insulation, with external PVC compound sheath of reduced fire hazard	(N) NHN FE 180/E30 3x1,5		Zaporozhye plant non-ferrous metals	m	240											
		9	Refractory power cable with copper servicemen, with PVC compound insulation, with external PVC compound sheath of reduced fire hazard	(N) NHN FE 180/E30 2x1,5		Zaporozhye plant non-ferrous metals	m	10											
				Gas Pollution Alarm															
		QE1 - QE3	Double Threshold CH Gas Detector <sub>4</sub>	DG-12/N		GAZEX	piece	3											
		QA1	Alarm module with built-in battery	MD-8. B		GAZEX	piece	1											
		A1	Hub	K-8		GAZEX	piece	1											
		1	Plastic box 40x40 mm	LHD 40X40		KOPOS	m	2											
		2	Flexible halogen-free self-extinguishing PP pipe with low smoke	SUPER MONOFLEX HFPP	1216HFPP_L100	KOPOS	m	70											
		3	Holder for fixing pipes to the base material		5316_LB	KOPOS	piece	140											
		4	Control cable with copper stranded conductors with insulation and sheath made of PVC compound, with digitally marked conductors	JZ-500 10x1,0		company AST-Lighting	m	3											
Deputy. Inv. No.		5	Cable with copper stranded conductors with insulation and sheath of self-extinguishing polymeric materials, pair twist	MCS <sub>h</sub> 2x2x0.5		Cable Factory Energoprom	m	70											
		6	Universal self-tapping screw	5x45			piece	140											
		7	Plastic dowel	8x40			piece	140											
Subp. and date		<div>*The project allows for the replacement of the specified in the specification equipment and materials for similar in their technical parameters.</div>																	
Inv. No. Podl.		173-WP-2024-F-ES. S									Arc								
																			4

Agreed

		Position	Name and technical characteristics	Type, brand, designation	Code equipment product material	Manufacturing plant	Units of measurement	Amount	Weight of unit kg	Note
		1	2	3	4	5	6	7	8	9
			<u>Supply and exhaust ventilation unit PV1</u>							
		1	Flexible halogen-free self-extinguishing PP pipe with low smoke	SUPER MONOFLEX HFPP	1220HFPP_L100	KOPOS	m	190		
		2	Flexible halogen-free self-extinguishing PP pipe with low smoke	SUPER MONOFLEX HFPP	1225HFPP_L100	KOPOS	m	20		
		3	Holder for fixing pipes to the base material		5320_LB	KOPOS	piece	380		
		4	Holder for fixing pipes to the base material		5325_LB	KOPOS	piece	40		
		5	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 4x2,5		Pivdenkabel	m	20		
		6	Power cable with copper servicemen, with PVC compound insulation of reduced fire hazard, with outer sheath made of PVC compound of reduced fire hazard	VVG <sub>ngd</sub> 4x1,5		Pivdenkabel	m	20		
		7	Control cable with copper SPG, with PVC compound insulation, with PVC outer sheath reduced fire hazard compound	KVVG <sub>ngd</sub> 7x0,75		Pivdenkabel	m	20		
		8	Control cable with copper SPG, with PVC compound insulation, with PVC outer sheath reduced fire hazard compound	KVVG <sub>ngd</sub> 3x0.75		Pivdenkabel	m	50		
		9	Control cable with copper SPG, with PVC compound insulation, with PVC outer sheath reduced fire hazard compound	KVVG <sub>ngd</sub> 2x0.75		Pivdenkabel	m	100		
		10	Universal self-tapping screw	5x45			piece	420		
		11	Plastic dowel	8x40			piece	420		
		SHAO1	Metal switchboard, hinged, with equipment:	UBox 12 мод. (N і РЕ шина)		АСКОУкрем		шт	1	
			input circuit breaker I <sub>p</sub> =16 A, 3p, 380 В, 50 Гц	PL6-C16/3		EATON		шт	1	
			differential current switch I <sub>н</sub> =25 A, I <sub>д</sub> =300 mA, 4p, 380 В, 50 Гц	PF6-25/4/03		EATON		шт	1	
			automatic switch I <sub>p</sub> =10 A, 1p, 230 В, 50 Гц	PL6-C10/1		EATON		шт	3	
			<u>Re-earthing</u>							
		1	Rod grounding set ø16 mm	G-16/30		FS		kit	2	
		2	Strip steel 40x4 mm	ДСТУ 103-76		UA		m	20	
		3	Strip holder bracket	ND2310ZC		DCS-Ukraine		piese	15	
		4	Grounding jumper with flat pressing	2Т1		DCS-Ukraine		piese	8	
		<div>*The project allows for the replacement of the specified in the specification equipment and materials for similar in their technical parameters.</div>								