

SRL "Arhideea-Grup" **Ar**

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# EXECUTION PROJECT

Replanning of the shooting range located in the basement of the existing S+P+E building of the 'Stefan cel Mare' Police Academy.

Compartment: External Power Supply Networks

The client: "Ștefan Cel Mare" Academy of the MIA      12/25-J-REAE

Chisinau 2025

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Compartment: External Power Supply Networks

Lead project specialist

Oprea Gheorghe

Design engineer

Cristev Dmitrii

Chisinau 2025


List of execution drawings		
Sheet	Description	Nota
1	General data (beginning)	
2	General data (end)	
3	Coordination table	
4	General electrical diagram	
5	Electrical diagram of IRD	
6	Layout plan of the 0.4 kV power cable route. Scale 1:200	
7	Method of laying cables in trenches	
8	Method for executing the repeated grounding system	
9	Lightning protection system (LPS)	
10	Table for selecting cable size at 0.4 kV. Cable register	

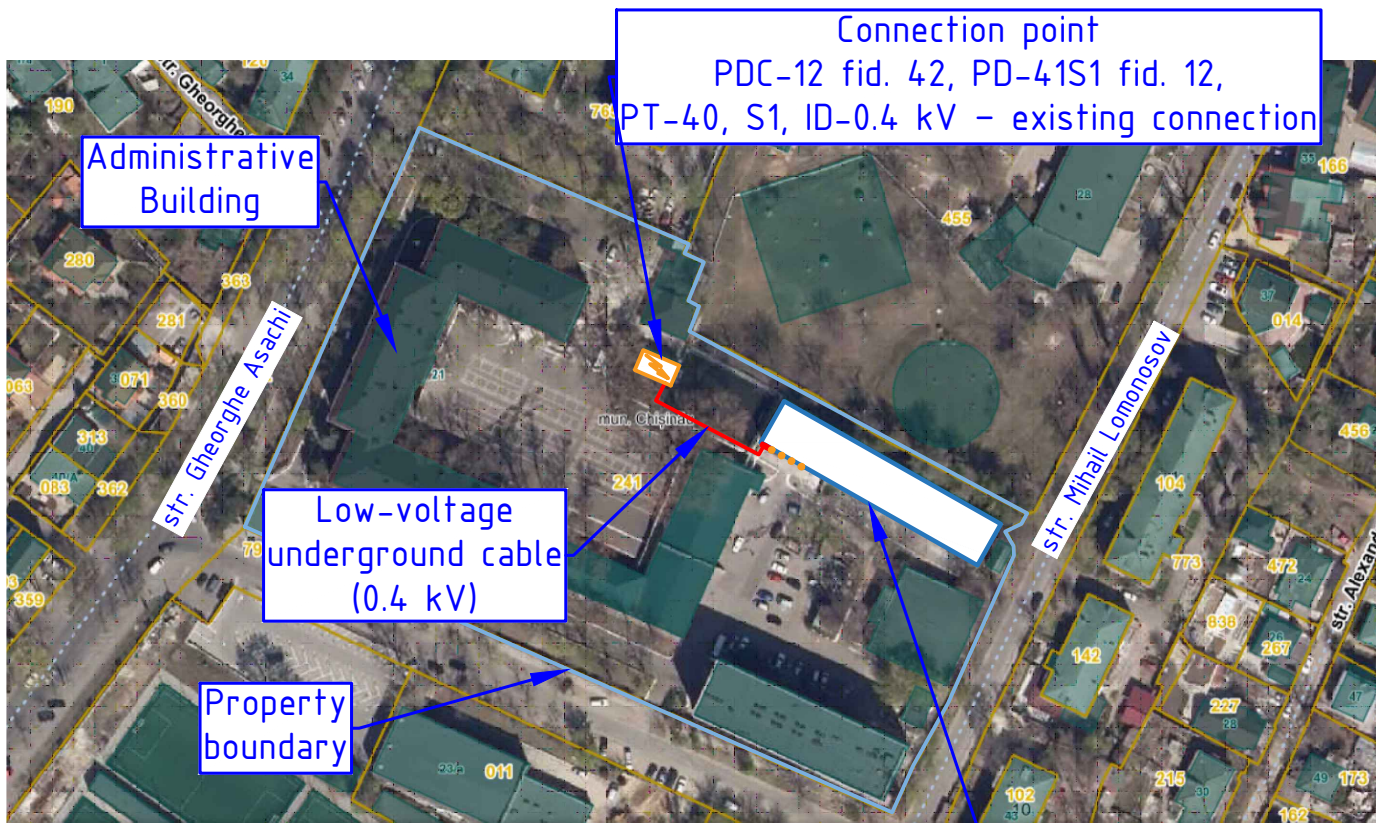
The execution project is developed in accordance with the provisions of the legislative and normative acts in force, which ensure, throughout the entire duration of the construction, the fundamental requirements established in Article 335 of Code No. CUC434/2023 of 28.12.2023 on Urban Planning and Construction:

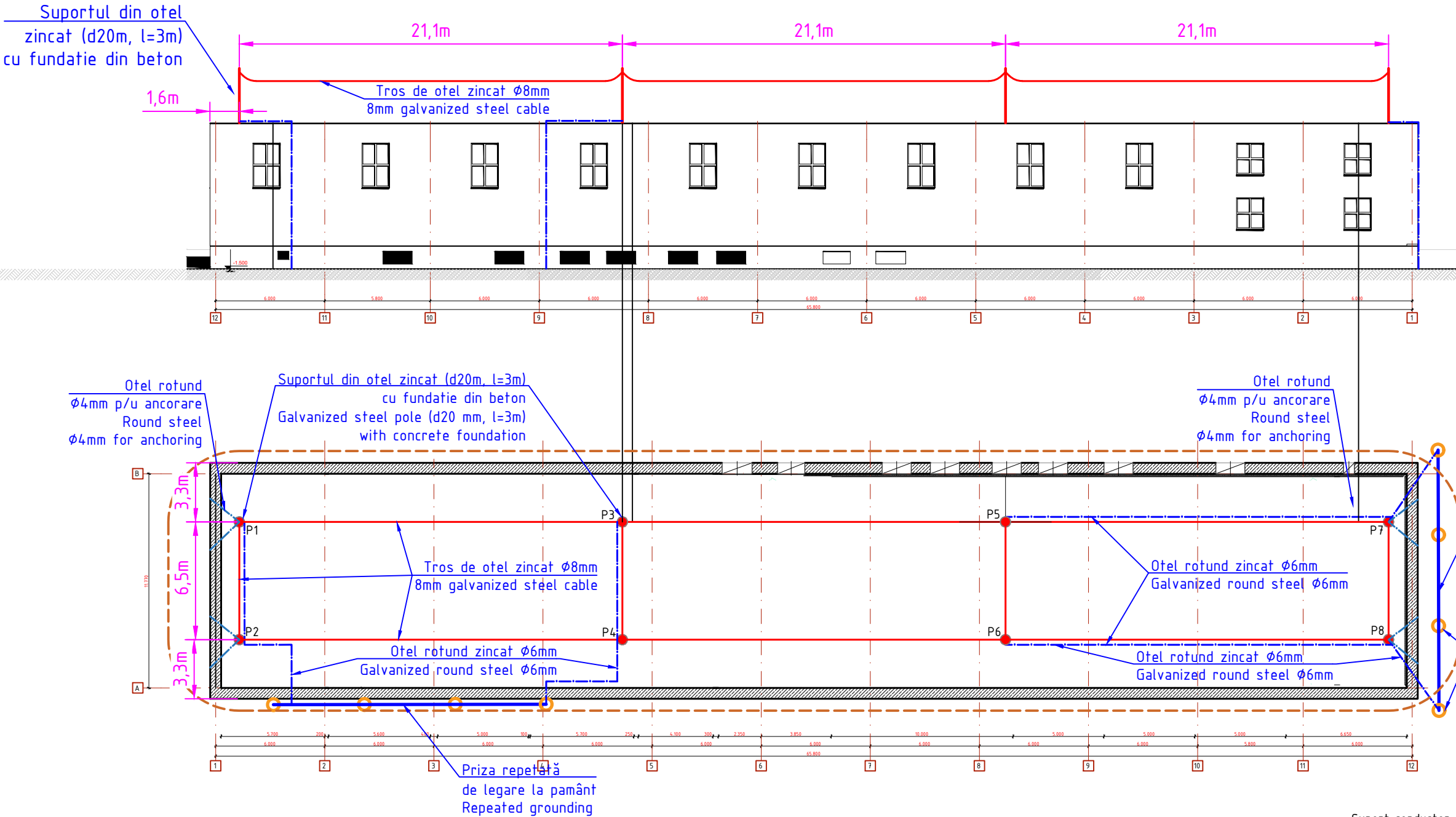
- Requirement 1 – Structural integrity of buildings;
- Requirement 2 – Protection of buildings against fire;
- Requirement 3 – Protection of workers and users of buildings against adverse effects on health and hygiene caused by buildings;
- Requirement 4 – Protection of workers and users of buildings against physical injury caused by buildings;
- Requirement 5 – Sound insulation and acoustic properties of buildings;
- Requirement 6 – Energy efficiency and thermal performance of buildings;
- Requirement 7 – Prevention of hazardous emissions into the environment caused by buildings;
- Requirement 8 – Sustainable use of natural resources from which buildings are made.

Lead specialist: \_\_\_\_\_ Oprea Gheorghe

List of reference and attached documents		
Marking	Description	Note
ПУЭ 7ed	Правила устройства электроустановок	
NCM G.01.03:2016	Instalatii electrotehnice	
NCM G.01.02:2025	Proiectarea si montarea instalatiilor electrice în clădirile locative si sociale	
NCM E.03.02:2014	Protectia impotriva incendiilor a clădirilor si instalatiilor	
NCM A.07.02:2012 /A1:2017	Procedura de elaborare, avizare, aprobare si continutul-cadru al documentatiei de proiect pentru constructii. Cerinte si prevederi principale	
NE1-01:2019	Norme de exploatare a instalatiilor electrice ale consumatorilor noncasnici	
NE1-02:2019	Normele de securitate la exploatarea instalatiilor electrice	
NCM G.02.02:2018	Amenajarea protecției clădirilor și construcțiilor contra trăsnetului	
NCM A.08.02-2014	Securitatea si sănătatea muncii în construcții	
A5-92	ПРОКЛАДКА КАБЕЛЕЙ НАПРЯЖЕНИЕМ ДО 35КВ В ТРАНШЕЯХ	
РД 34.21.122-87	Инструкция по устройству молниезащиты зданий и сооружений	
12/25-J-REAE.SU	Equipment specification	1 sheet

Lead project specialist: Oprea Gheorghe						Certificate Series P-2023, Nr. 994 dated 26.04.2023						
The client: "Ștefan Cel Mare" Academy of the MIA						12/25-J-REAE/IEI/EEF						
						Replanning of the shooting range rooms (basement) and renovation of the sports hall with offices of building 'J' (cadastral no. 0100213.241.04), B+GF+1F, located in the Republic of Moldova, Chisinău municipality, 21 Gh. Asachi Street.						
Mod.	Quan.	Sheet	Doc.No	Signature	Date	External Power Supply Networks. Interior Electric Lighting. Electrical Power Equipment.			Faze	Sheet	Sheets	Scale
									PE	1	9	
Lead Sp.	Oprea Gh.			10.25								
						General data (beginning)			SRL "Arhideea-Grup"			
Design eng.	Cristev D.			10.25								

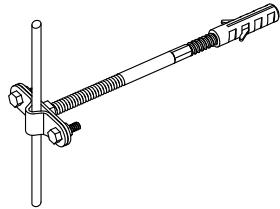
Nr de inv. orig.	Semnatura, data	In scimb Nr. inv.	<div><div><div><div>MAIN INDICATORS</div><div><p>The execution project provides for electric power supply of the shooting range, located in Chişinău municipality, Gheorghe Asachi Street no. 21, by means of a 0.4 kV underground power cable.</p><p>This project has been developed based on the following initial data:</p><ul style="list-style-type: none"><li>- Connection permit No. M40302025120039, dated 31.12.2025, valid until 31.12.2026, issued by I.C.S. “Premier Energy Distribution” S.A.;</li><li>- Technical data provided by the beneficiary;</li><li>- Topographic plan provided by the beneficiary;</li><li>- Applicable technical standards and regulations in force.</li></ul><p>All works shall be carried out within the Beneficiary’s property.</p><p>The reliability category of the facility is Category II (according to the connection approval for power increase, reconnection under Category III is foreseen in the project; the generator project as a backup power source is currently being developed separately by the Beneficiary – as per the technical assignment).</p><p>The connection of internal networks is performed under project IEI/EEF.</p><p>Electric energy consumption will be measured by means of a three-phase electronic electricity meter, connected through current transformers, installed in the metering panel (PEv), mounted on the facade of the building.</p><p>The actual value of the short-circuit current shall be determined based on electrotechnical laboratory measurements, and, if necessary, project adjustments will be carried out accordingly.</p><p>The cross-sections of conductors and cables have been selected based on load current, voltage drop and short circuit current.</p><p>The power supply cable from the transformer substation (PT) to the metering panel (PEv) is of type АПББЩн, installed underground in a trench.The cable section from PEv to IRD-1 is of type АBBГнз, installed in a non-perforated metal cable tray.</p><p>The excavation of the trench for the cable installation shall be carried out manually.</p><p>The PEN conductor separation into PE and N is carried out in the metering panel PEv.</p><p>For protection against electric shock, all electrical equipment is earthed in accordance with the requirements of the applicable standards.</p><p>All accessible metallic parts of the electrical equipment are connected to the protective conductor (PE).</p></div><div><div>INSTALLATION INSTRUCTIONS</div><div><p>The installation of cables and equipment shall be organized and executed according to applicable codes and regulations: ПУЭ, NCM A.08.02–2014, ПТБ, ПТЕ.</p><p>Cable connections shall be executed in accordance with the requirements of GOST 10434–82 and PUE.</p><p>According to PUE §2.1.31, electrical conductors must allow easy identification along their full length by color coding:</p><ul style="list-style-type: none"><li>– Red, brown, white and other colors – for phase conductor marking.</li></ul><p>Materials must be stored properly on site. The contractor is responsible for protecting completed works and storing materials until commissioning.</p><p>The project drawings must be followed during execution. In case of changes to routing, materials, or equipment placement, approval must be requested from the designer (for technical matters) and from the beneficiary (for cost-related matters).</p><p>The project documentation shall be clarified after procurement of electrical equipment, and if necessary, corrections to the design shall be carried out.</p><p>Electrical equipment, cable products, and materials used during installation must be certified in RM and must hold fire-safety compliance certificates.</p><p>The electrical installation may be commissioned only after testing of equipment and protective devices.</p><p>Any modifications to equipment specified in the project must be coordinated with the designer.</p></div></div></div><div><div><div>GROUNDING SYSTEM, PROTECTION AND SAFETY MEASURES</div><div><p>The grounding system is designed and executed in accordance with:</p><ul style="list-style-type: none"><li>– ПУЭ</li><li>– РД 34.21.122–87</li></ul><p>The TN–C–S grounding system is applied in this project.</p><p>For the grounding system, the following components are used:</p><ul style="list-style-type: none"><li>– Vertical steel electrodes Ø20 mm, length l = 3 m, installed at 5 m spacing;</li><li>– Horizontal conductor – steel flat bar 40×4 mm, laid in soil at a depth of 0.7 m;</li><li>– Connections between electrodes and flat bar are made by welding;</li><li>– All external elements are protected against corrosion with black protective coating.</li></ul><p>The grounding system installation works must be completed before the commissioning of the electrical installation, and grounding resistance must be verified by measurements in accordance with applicable standards.</p><p>As protection against indirect contact, the protective PE conductor (Main Equipotential Bonding Bar) shall be connected to IRD-1 and to all metallic parts of equipment, installations, and metal structural elements that may become energized in case of insulation failure.</p></div><div><div>LIGHTNING PROTECTION SYSTEM</div><div><p>The lightning protection system has been designed in accordance with NCM G.02.02.2018 and РД 34.21.122–87.</p><p>To ensure protection of the shooting range, it is necessary to install 8 air terminals made of galvanized round steel with a diameter of 20 mm and a length of 3 m, interconnected by double 8 mm galvanized steel wire on the flat roof of the building.</p><p>From each air terminal, a down conductor made of galvanized round steel with a diameter of 6 mm shall be routed to the repeated grounding electrode and to the grounding system designed for the lightning protection system.</p><p>The connection between the down conductor and the grounding electrodes shall be executed by welding.</p></div></div></div></div><div><div><div>Main Technical Indicators.</div><table><tr><td>Grounding system</td><td>TN–C–S</td></tr><tr><td>Supply network voltage, kV</td><td>0,4</td></tr><tr><td>Calculated power, kW</td><td>139,5</td></tr><tr><td>Calculated current, A</td><td>219,1</td></tr><tr><td>Power factor, (cos φ)</td><td>0,92</td></tr></table></div><div><div>Site Plan. Scale 1:2000</div></div></div></div></div>										Grounding system	TN–C–S	Supply network voltage, kV	0,4	Calculated power, kW	139,5	Calculated current, A	219,1	Power factor, (cos φ)	0,92																																																												
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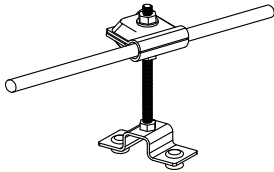
Poz.	Denumirea	Unit. de mas.	Cantitatea
Lucrari de constructie/Construction works			
1	Trench T2 excavation	m <sup>3</sup>	4,5
2	Backfilling of the trench using excavated soil	m <sup>3</sup>	4,5
Lucrari de montaj			
1	Installation of galvanized steel for lightning protection	m	8
2	Installation of galvanized steel cable for lightning protection	m	145
3	Installation of strip in trench	m	18
4	Installation of Ø8 mm round steel on the roof	m	80
5	Installation of Ø8 mm round steel on the facade	m	70
6	Installation of vertical electrode	pcs.	4
7	Installation of the lightning protection fixing clamp	pcs.	8
8	Installation of 20 kg concrete foundation for lightning protection	pcs.	8
9	Installation of strip in trench	m	17
10	Installation of galvanized steel in trench	pcs.	4


- Note:
- Earth resistance of the lightning protection grounding system is 6,86 Ω. The calculations were performed in accordance with NCM G.02.02:2018.
  - The weld length shall be not less than 6d. The weld height shall be not less than 4 mm.
  - Welding shall be performed using electrodes type 3-46 according to GOST 9467-75.
  - Welded areas shall be coated with bitumen varnish for corrosion protection.
  - The earthing trench shall be backfilled with uniform soil, free of gravel, stones, or other debris. After backfilling, the soil shall be compacted.
  - External conductors connected to the earthing electrode shall be painted with black anti-corrosion paint.
  - Lightning protection supports P1, P2, P7, and P8 are additionally anchored with two guy wires each.

Suport conductor pentru fatada  
Wall-mounted conductor support




Suport conductor pentru suprafete  
orizontale si verticale  
Conductor support for  
horizontal and vertical surfaces



BENEFICIAR: Academia "Ștefan Cel Mare" al MAI						12/25-J-REAE				
						Replanificarea încăperilor tirului (subsol) si renovarea sălii de sport cu birouri (Parter Etaj) din blocul lit. "J" (nr. cadastral 0100213.241.04), S+P+E din RM, mun. Chisinău, str. Gh. Asachi 21.				
Mod.	Cant.	Coala	Nr.doc.	Semnatura	Data	Rețele Exterioare de Alimentarea cu Energie Electrică	Faza	Coala	Coli	Scara
							PE	9		
Sp. Principal		Oprea Gh.			01.26					
						Lightning Protection System	SRL "Arhideea-Grup" 			
Ing. proiectant		Cristev D.			01.26					

No	Name and Technical specification	Type of the Echipment	Manufacturer	Unit.	Quantity	Weight, kg	Notes
1	Completion of Connection Point (PT)						
	Load switch with fuses	PPC-400, 3P, 400A		pcs.	1		
	Fuse	ППН37 400/250A gab 2		pcs.	3		
	Cable termination	4KBHTn 4x150-240mm <sup>2</sup>		pcs.	1		
	Connection accessories (lugs, straps, nuts, heat shrink tubes, etc.)			set.	1		
2	Electrical metering panel						
	Metal enclosure IP54 for electricity meter, surface-mounted	BZUM DDE-3 400A		pcs.	1		
	Separator de sarcina	INS320, 3P, 320A	Schneider Electric	pcs.	1		
	Circuit breaker with electronic trip unit	ComPacT NSX250N, 50kA, TMD 250A, 250A, 3P3D	Schneider Electric	pcs.	1		
	Three-phase electronic electricity meter equipped with modem and antenna	ZMG 405 CR4 U=380V In=5..10A		pcs.	1		
	Measuring current transformer	250/5		pcs.	3		
	N/PE busbar set	600A		set.	1		
	Cable termination	4KBHTn 4x150-240mm <sup>2</sup>		pcs.	1		
	Connection accessories (lugs, straps, nuts, heat shrink tubes, etc.)			set.	1		
	Sticker (Electrocution Risk)			pcs.	1		
3	Cable set						
	Braided cable with aluminum conductors and double insulation	АП8БδШп 4x240mm <sup>2</sup>		m	58		
	Copper conductor cable with double insulation, fire-resistant	АВВГнз 5x185mm <sup>2</sup>		m	6		
	Conductor	PV3 1x25mm		m	25		
	Cable terminal lug	Al185mm		pcs.	10		
4	Cable conduits and trays						
	Metal cable tray	100x100		m	12		
	Metal cable tray cover	100x15		m	12		
	PVC pipe SDR 17	D125mm		m	16		
5	Grounding point						
	Galvanized steel rod	L=3m, d=20mm		pcs.	4		
	Steel flat strip	40x4mm		m	18		
	Steel flat strip	25x4mm		m	3		
	M12 bolt			pcs.	10		
	Grounding clamps (for strip)			pcs.	5		
6	Lightning protection system						
	Galvanized steel support	L=3000 x 20 mm		pcs.	8		
	Galvanized round steel	L=3m, Ø20mm		pcs.	4		
	Galvanized steel cable	8mm		m	155		
	Galvanized round steel	6mm		m	130		
	Galvanized round steel	4mm		m	30		
	Galvanized steel strip	40x4mm		m	4		
	Ø20 mm lightning protection fixing clamp	F-FIX-CL		pcs.	8		
	20 kg round concrete foundation	20kg		pcs.	8		
	M12 bolt			pcs.	8		
	Grounding clamps (for strip conductor)			pcs.	4		
	Tensioning sleeve	K798		pcs.	4		
	Conductor support for horizontal and vertical surfaces	lp-35025		pcs.	80		
	Wall-mounted conductor support	lp-31000		pcs.	70		
7	Construction materials						
	Screened sand			m <sup>3</sup>	4,6		
	Concrete slabs			m <sup>2</sup>	30		
	U-shaped mounting profile	K108-1U2		m	4		
	Metal fittings			kg	25		
8	Dismantling and construction works						
	Dismantling of the existing electricity metering board at the transformer substation (TS)			pcs.	1		

In scimb Nr. inv.		The client: "Ştefan Cel Mare" Academy of the MIA						12/25-J-REAE.SU					
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Note: Any modification of the devices indicated in the project must be coordinated with the designer.