

MINING AND METALLURGY INSTITUTE

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Lermetin

YEREVAN, ARMENIA

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Hydrotechnical and Geotechnical Department

1. Hydrotechnical department

Pursuant to executed contracts, the department has developed major projects for mining and processing enterprises across the Republic of Armenia. These projects include the design of tailings storage facilities, dams, tailings pipelines (including syphons, tunnels, and other hydraulic structures), canals, and reservoirs. Notably, the department has prepared tailings storage facility designs for the following mining operations: Teghout, Vallex Group, Akhtala, Kajaran, Agarak, Ararat, and Kapan.

The work is carried out using modern licensed software, including AutoCAD, Microsoft Office, Adobe Acrobat, and Pipe Flow.

The Hydrotechnical Department is staffed with highly qualified specialists who are fully equipped to develop projects in compliance with international standards for all types of hydraulic structures. These include hydroelectric power plants, reservoirs, drainage canals, pressure and non-pressure pipelines, water supply systems, water infrastructure for mining enterprises, and pumping stations.

1.1 Completed projects

No	Client	Project	Date
1	Kapan Mining and Processing Enterprise CJSC	Transportation of tailings from the processing plant to the Artsvanik tailings storage facility	2004
2	Deno Gold Mining Company CJSC	Tailings storage facility in the Geghanush River gorge. Tailings pipeline	2005
3	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility in the Artsvanik River gorge, syphon No. 4. Reconstruction of the tailings pipeline surge tower for a processing plant capacity of 12.5 Mt/year	2006
4	Scientific and Production Association "RIVS"	Tailings storage facility. Tailings flume from the main building to the shaft	2007
5	Teghout CJSC	Tailings storage facility. Water diversion structures. Water intake dam	2008
6	Teghout CJSC	Tailings storage facility. Water diversion structures. Drainage channel	2009
7	Teghout CJSC	Dukanadzor waste rock management facility. Diversion of the Dukanadzor River	2010
8	Teghout CJSC	Drainage structures, drainage channel	2010
9	Vallex Group	Tailings storage facility, Phase II. Increase in tailings storage capacity	2010
10	Akhtala Mining and Processing Enterprise CJSC	Expansion and reconstruction of the Nahatak tailings storage facility. Tailings pipeline from the tailings pond in the explosive storage area to the entrance of tunnel No. 2	2010
11	Vallex Group	Reinforced concrete drainage pipeline	2010
12	GeoProMining Gold LLC, Ararat Gold Recovery Plant	Expansion and reconstruction of the tailings storage facility. Drainage structures and hydraulic fill technology	2011
13	Teghout CJSC	Tailings storage facility. Tailings pipeline	2011

14	Agarak Copper Molybdenum Combine CJSC	Processing plant water supply. Backup water pipeline and pump station of the 3rd lift. Backup water pipeline	2013
15	Gold Star CJSC	Tundirget processing plant: Tailings storage facility, primary dam, collector	2013
16	Akhtala Mining and Processing Enterprise CJSC	Nahatak tailings storage facility. Revision. Syphon relocation	2014
17	Vallex Group	Tailings storage facility. Clarified water pond	2014
18	Vallex Group	Process water supply from the River	2015
19	Agarak Copper Molybdenum Combine CJSC	Tailings storage facility. Reconstruction of tailings storage facility No. 1 in the Davazami Gorge. Final technical solutions for tailings storage facility reconstruction	2015
20	Agarak Copper Molybdenum Combine CJSC	Reconstruction of tailings storage facility No.1 in the Davazami Gorge. Slurry pump station. Collector from the slurry pump station	2015
21	Akhtala Mining and Processing Enterprise CJSC	Increasing the hydraulic fill volume of the tailings storage facility on the Nahatak River. Use of the remaining capacity of the tailings storage facility in the explosives storage area	2015
22	Vallex Group	Hydraulic fill technology of the tailings storage facility	2016
23	Zangezur Copper-Molybdenum Combine CJSC	Artsvanik tailings storage facility. Syphon No.4 reconstruction	2016
24	Zangezur Copper-Molybdenum Combine CJSC	Artsvanik tailings storage facility. Syphon No.2 tailings pipeline	2017
25	Agarak Copper Molybdenum Combine CJSC	Reconstruction of tailings storage facility No.1 in the Davazami Gorge. Slurry pump station. Collector from the slurry pump station	2018
26	GeoProMining Gold LLC, Ararat Gold Recovery Plant	Tailings pipeline for ore processing at 1.75 million tonnes per year	2019
27	GeoProMining Gold LLC, Ararat Gold Recovery Plant	Emergency slurry discharge ponds	2019
28	GeoProMining Gold LLC, Ararat Gold Recovery Plant	Gravity pipeline and settling pond for pit water	2019
29	GeoProMining Gold LLC, Sotk Mine	Gravity pipeline for pit water	2020
30	GeoProMining Gold LLC, Ararat Gold Recovery Plant	Protected trench for the slurry pipeline	2020
31	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility: tailings pipeline from syphon No.4 to the dam. Dam reconstruction	2020
32	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility: syphon No.1, emergency and service pond	2020
33	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility: syphon No.2, emergency and service pond	2020

34	Vallex Group	Existing tailings storage facility, Phase II: Discharge pond	2021
35	Vallex Group	Process water supply: Freshwater pump station near the River	2021
36	Vallex Group	Water intake pond on the River	2021
37	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility: discharge ponds of the hydraulic fill pipeline and drainage system	2021
38	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility: water diversion channel on the north-eastern slope of the Artsvanik tailings storage facility	2021
39	Zangezur Copper-Molybdenum Combine CJSC	Water balance of the Artsvanik tailings storage facility	2021
40	GeoProMining Gold LLC	Raising the dam of the existing tailings storage facility	2022
41	GeoProMining Gold LLC	Drainage system of the existing tailings storage facility	2022
42	GeoProMining Gold LLC	Hydraulic fill technology of the existing tailings storage facility	2022
43	Zangezur Copper-Molybdenum Combine CJSC	Intermediate channel in the Dzorateghi dump	2022
44	Zangezur Copper-Molybdenum Combine CJSC	Settling basin at the Dzorateghi dump	2022
45	Zangezur Copper-Molybdenum Combine CJSC	Main channel at the Dzorateghi dump	2023
46	Zangezur Copper-Molybdenum Combine CJSC	Construction of a new tailings pipeline at Siphon Area No.1	2023
47	Zangezur Copper-Molybdenum Combine CJSC	Construction of a new tailings pipeline at Siphon Area No.2	2023
48	Zangezur Copper-Molybdenum Combine CJSC	Recirculated water supply system from the Artsvanik tailings storage facility to the Geghi pump station. Pressure pipelines	2023
49	Zangezur Copper-Molybdenum Combine CJSC	Spitakjur dumping site. Drainage channels	2023
50	Zangezur Copper-Molybdenum Combine CJSC	Dismantling of retaining wall structures and design of new retaining walls	2024

51	Agarak Copper Molybdenum Combine CJSC	Feasibility study for potential expansion of the Tailings storage facility No.3	2024
52	Zangezur Copper-Molybdenum Combine CJSC	Construction of a new tailings pipeline at Siphon Area No.4	2024
53	Zangezur Copper-Molybdenum Combine CJSC	Improvement of the Voghchi River bed. Diversion of the river into a channel	2024
54	Zangezur Copper-Molybdenum Combine CJSC	Dismantling of retaining wall structures and design of new retaining walls	2024

1.2 Licensed international software

№	Name
1	AutoCAD
2	Microsoft Office
3	Adobe Acrobat
4	Pipe Flow Expert
5	Pipe Flow Wizard
6	Pipe Flow Advisor

2. Water supply department

The Water Supply Department develops all the necessary projects for mining and processing enterprises in Armenia. Specifically, for Teghout, Vallex Group, Kajaran, Agarak, and Ararat. These projects include reservoirs, pumping stations, water pipelines, treatment facilities, on-site and off-site water supply and sewage networks, drainage water diversion from tailings storage facilities, and internal water supply and drainage systems for industrial enterprises.

The work was carried out using licensed software, including AutoCAD, Microsoft Office, Adobe Acrobat, and Pipe Flow.

The Water Supply Department is ready to develop projects that meet international standards for mining and processing enterprises in the areas of water supply and sewage systems.

2.1 Completed projects

No	Client	Project	Date
1	Teghout CJSC	Off-site water supply networks and structures for the dormitory facility site	2014
2	Teghout CJSC	Production site of the flotation unit. Piping system for technological water supply.	2014
3	Teghout CJSC	Production site of the flotation unit. Molybdenum flotation and dewatering section. Piping system for technological water supply	2014
4	Teghout CJSC	Industrial water supply from the Debed River. Pumping station. Installation of the 4th pum	2014
5	Teghout CJSC	Open pit. Mechanized warehouse for ammonium nitrate, capacity 500 tons. External water supply and sewerage networks	2014
6	Teghout CJSC	Production site of the flotation unit. Flotation section. Analytical laboratory. Sanitary facilities	2014
7	Teghout CJSC	Collection and use of drainage water from the Dukandzor Gorge. Pumping station with a reservoir, capacity 30m³	2014
8	Teghout CJSC	Production site of the flotation unit. Equipment water cooling system	2014
9	Teghout CJSC	Transshipment base at the Akhtala station. Liquid reagents warehouse. Reconstruction	2014
10	Teghout CJSC	Auxiliary facilities of the enterprise. Stormwater treatment facilities for the parking lot near Checkpoint #1	2014
11	Teghout CJSC	Tailing storage facility. Clarified water pond. Fresh water supply well from the Debed River to the flow dissipator	2014
12	Teghout CJSC	Open pit production site. Refuelling station for the dump trucks. Operator's room	2014
13	Vallex Group	Industrial water supply from the River. Pumping station.	2014
14	Vallex Group	Recirculated water supply from the tailings storage facility. Pumping station	2014
15	Vallex Group	Administrative building	2014
16	Vallex Group	Industrial water supply from the river. Water pipeline from the pumping station of production fresh water to the settling pond	2014

17	Vallex Group	Water pipelines from the pumping station of recirculated water supply to the reservoirs of the flotation unit production site	2014
18	Vallex Group	110/35/6 kv substation. Internal water supply and sewerage networks	2014
19	Vallex Group	Industrial water supply. Water reservoirs	2014
20	Vallex Group	Processing plant. Flotation section	2015
21	Vallex Group	Processing plant. Domestic premises	2015
22	Vallex Group	Processing plant. Internal water supply and sewerage networks	2015
23	Vallex Group	Processing plant. Analytical laboratory	2015
24	Vallex Group	Processing plant. Crushing unit. Piping system for technological water supply	2015
25	Vallex Group	Processing plant. Flotation unit. Piping system for technological water supply	2015
26	Teghout CJSC	Akhtala railway station, fuel products base. Water supply and sewerage networks and facilities	2015
27	Teghout CJSC	Open pit. Crushing and sorting unit	2015
28	Vallex Group	Reconstruction of the plant. Expansion. Pumping station for recirculated water supply	2016
29	Vallex Group	Reconstruction of the plant with an increase in capacity to 5 million tons/year. Equipment water cooling system	2016
30	Vallex Group	Reconstruction of the plant with an increase in capacity to 5 million tons/year. Flotation unit. Piping system for technological water supply	2016
31	Vallex Group	Reconstruction of the plant with an increase in capacity to 5 million tons/year. Crushing unit. Piping system for technological water supply	2016
32	Teghout CJSC	Tailings storage facility. Drainage water pumping station with a reservoir	2016
33	Teghout CJSC	Open pit production site. Heavy-duty vehicle garage. Stormwater treatment station	2016
34	Teghout CJSC	Recirculated water supply pumping station from the tailings storage facility. Expansion	2016
35	Teghout CJSC	Production site of the flotation unit. Mechanical section	2016
36	Teghout CJSC	Recirculated water supply pumping station from the tailings storage facility. Reconstruction	2016
37	Teghout CJSC	Explosives storage facility with a capacity of up to 60 tons. Laboratory	2017

38	Teghout CJSC	Mine site industrial area. Mine water drainage system	2017
39	Teghout CJSC	Explosive materials warehouse with a capacity of up to 60 tons. Laboratory	2017
40	Teghout CJSC	Production site of the flotation unit. Plant capacity expansion to 15 million tons/year. Recirculated water pipeline from reservoirs	2017
41	Teghout CJSC	Production site of the flotation unit. Warehouse rooms. Reagents storage	2017
42	Vallex Group	Reconstruction of the plant with an increase in capacity to 5 million tons/year. Lime silo with a capacity of 250m³	2017
43	Vallex Group	Production site of the flotation unit. Installation of the 2nd thickener (ø14m)	2017
44	Vallex Group	Industrial water supply from the River. Pumping station. Installation of the 4th pump	2017
45	Vallex Group	Heavy-duty vehicle garage. Warehouse. Tire repair section. Administrative and domestic premises	2018
46	Vallex Group	Heavy-duty vehicle garage. Repair workshop. Welding section	2018
47	Vallex Group	Recirculated water pipeline from pumping station #2 to reservoirs, 500m³	2018
48	Agarak Copper Molybdenum Combine CJSC	Reconstruction of the tailings storage facility No.1 in the Davazami Gorge. Slurry pumping station	2018
49	Agarak Copper Molybdenum Combine CJSC	Reconstruction of the tailings storage facility No.1 in the Davazami Gorge. Industrial Sewerage Network	2018
50	Agarak Copper Molybdenum Combine CJSC	Increase in the capacity of the Processing Plant (CP) from 3.5 to 4.5 million tons/year. Grinding area	2018
51	Vallex Group	Installation of flotation machines (160 m³ capacity)	2019
52	Vallex Group	Heavy-duty dump truck garage. Reconstruction	2019
53	Vallex Group	Cement copper production from oxidized ores	2019
54	Vallex Group	Cement copper production from oxidized and mixed ores	2019
55	Vallex Group	Cement copper production from oxidized and mixed ores. Percolator No.3	2019
56	Vallex Group	Molybdenum concentrate production plant. Administrative and utility premises	2019
57	Zangezur Copper-Molybdenum Combine CJSC	Artsvanik tailings storage facility. Horizontal drainage system. Gravity and pressure pipelines	2019
58	GeoProMining Gold LLC	Recirculated water pumping station near the tailings storage facility	2019
59	Agarak Copper Molybdenum Combine CJSC	Industrial water supply. Third-lift pumping station	2020

60	Agarak Copper Molybdenum Combine CJSC	Industrial water supply. Expansion of the second-lift pumping station	2020
61	Agarak Copper Molybdenum Combine CJSC	Industrial water supply. 2,000 m³ recirculated water reservoir	2020
62	Zangezur Copper-Molybdenum Combine CJSC	Vertical drainage wells installed at the Artsvanik tailings storage facility. Gravity and pressure pipelines	2020
63	Zangezur Copper-Molybdenum Combine CJSC	Cement copper production from oxidized and mixed ores in percolators	2020
64	Vallex Group	Tailings storage facility No. 2. Recirculated water pumping station	2020
65	Vallex Group	Cement copper production from oxidized and mixed ores in percolators	2020
66	Zangezur Copper-Molybdenum Combine CJSC	Tailings storage facility. Emergency siphon No.2 and service pool	2021
67	Zangezur Copper-Molybdenum Combine CJSC	New ore feed line for ball mills in the semi-autogenous grinding section of the plant	2021
68	Vallex Group	Existing tailings storage facility, stage II: slurry pumping station	2021
69	Vallex Group	Industrial water supply: freshwater pumping station near the river	2021
70	Vallex Group	Industrial water supply. Second-lift pumping station	2021
71	Vallex Group	Water pipeline. Pumping station No.1	2022
72	Vallex Group	Water pipeline. Pumping station No.2	2022
73	Vallex Group	Molybdenum concentrate production plant	2022
74	Zangezur Copper-Molybdenum Combine CJSC	Recirculated water supply system from Artsvanik tailings storage facility to the Geghi pumping station. Pumping stations	2023
75	Zangezur Copper-Molybdenum Combine CJSC	Recirculated water supply system from pumping station No.1 to the plant. Pumping stations	2023
76	Zangezur Copper-Molybdenum Combine CJSC	Increase in the capacity of the Kajaran processing plant to 30 million tons per year. Extension to the grinding and flotation building. Administrative building	2024
77	Zangezur Copper-Molybdenum Combine CJSC	Increase in the capacity of the Kajaran processing plant to 30 million tons per year. New building extension of the processing plant in axes d–e, 4–62024	2024
78	Zangezur Copper-Molybdenum Combine CJSC	Increase in the capacity of the Kajaran processing plant to 30 million tons per year. Flotation section of the new processing plant building. Technological equipment water supply system	2024

79	Zangezur Copper-Molybdenum Combine CJSC	Increase in the capacity of the Kajaran processing plant to 30 million tons per year. Grinding section of the new processing plant building. Technological equipment water supply system	2024
80	Zangezur Copper-Molybdenum Combine CJSC	Increase in the capacity of the Kajaran processing plant to 30 million tons per year. Lubrication station cooling system	2024
81	GeoProMining Gold LLC	Underground section of the waste storage complex (below -40 m elevation). 50 m³ reservoir with pumping station	2024
82	GeoProMining Gold LLC	Design of the waste storage complex for the Sotk mine. Ground-level section of the storage complex	2024

2.2 Licensed international software

No	Name
1	AutoCAD
2	Microsoft Office
3	Adobe Acrobat
4	Pipe Flow Expert
5	Pipe Flow Wizard
6	Pipe Flow Advisor

3. Geotechnical department

The Geotechnical Department conducts geotechnical investigations of the foundations and dams of tailings and water reservoirs, assesses the technical condition of tunnels and retaining walls, and evaluates the stability of foundations of hydraulic structures. In addition, the department studies the physical and mechanical properties of soils and materials, and analyzes hydrogeological and geophysical data, providing accurate and reliable data essential for project implementation. The department performs field and laboratory soil investigations (drilling, sampling, testing), analyzes the physical, mechanical, and hydrological characteristics of soils, designs foundations for buildings, bridges, dams, tunnels, and other structures, calculates the stability of slopes, embankments, and fills, and develops solutions for soil stabilization or deformation prevention (e.g., landslides).

3.1 Completed projects

No	Client	Project	Date
1	Natural Resources Management CJSC	Assessment of the stability of the southern dam of the Geghanush Tailings storage facility	2022
2	Dorproject Institute LLC	Assessment of the technical condition of the Nalband tunnel	2023
3	Zangezur Copper-Molybdenum Combine CJSC	Assessment of the current stability condition of the Artsvanik tailings dam	2023
4	Kajaran Municipality	Assessment of the technical condition of the water conveyance structures No.2 and No.3 in the city of Kajaran	2023
5	Kapan Mining and Processing Combine CJSC	Assessment of the technical condition of the river Geghanush diversion tunnel	2024
6	Zangezur Copper-Molybdenum Combine CJSC	Assessment of the condition of the Artsvanik tailings storage facility tunnels	2024
7	Agarak Copper Molybdenum Combine CJSC	Assessment of the current stability condition of the Davazami tailings dam	2023 - 2024

3.2 Licensed international geotechnical software

No	Name and Model
1	Geo5 Software version 5.2024.116.0
2	GeoStudio Software 2019 R2
3	CPeT-IT Software v.3.9.3.7
4	CLiq Software 3.0

3.3 Available equipment

No	Equipment	Model	Function
1	CPT	TG 63-150	Crawler-mounted drilling rig
2	Packer testing/Lugeon Test	Single packer	Hydrogeological geotechnical testing

1 CPT TG 63-150

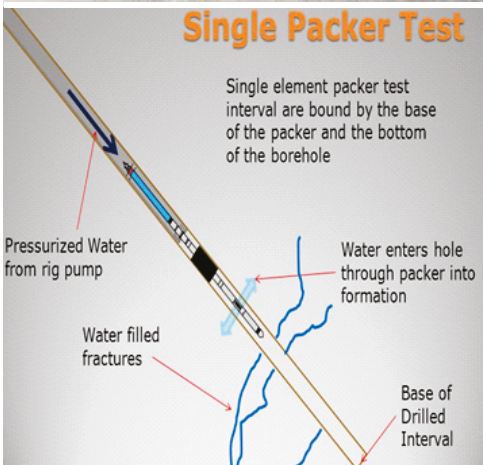


Description

Cone Penetration Test (CPT) is a method used to determine the geotechnical and engineering-geological properties of soils, as well as to establish the stratigraphy of soil layers. The CPT involves the hydraulic vertical penetration of an electric probe into the ground at a constant speed. The probe records, in real-time, the friction along the shaft, the cone resistance, and the pore pressure. The processing of these parameters provides a range of data, including the soil type (sand, clay, or silt), pore water pressure profiles, and the shear strength values of the material in its natural saturated state.

Application

- Assessment of the stability of tailings dam embankments.
- Design of foundations for buildings and structures.
- Assessment of foundations for roads and railways.
- Research for bridges and other large engineering structures.
- Assessment of the stability of areas adjacent to excavations.
- Collection of undisturbed samples from various depths.



Description

Packer testing is a method for measuring the permeability of rock formations at specific sections of boreholes. It is based on recording the pressure and water flow rate.

Application

Packer testing is widely used in the following areas:

Hydrotechnical construction

- Assessment of permeability of dam foundations.
- Prediction of filtration flows in reservoirs.

Tunnel construction

- Investigation of permeability of rock masses.
- Prediction and monitoring of infiltration water flow at the construction sites.

Tunnel construction

- Assessment of hydrogeological conditions of the soil and rock masses at the vicinity of deposits.
- Inspection of waterproofing systems during the design of tailing dams.

Geotechnical investigations

- Slope stability analysis with the account of impact water pressure.
- Determination of fracturing, porosity, and hydrodynamic parameters of soil and rock masses.

4. Engineering-geological survey department

Engineering-geological surveys are conducted through visual inspection, borehole drilling, and excavation of underground workings. These investigations determine the stratification of soils at the project sites, the depth of soil contacts, hydrogeological conditions, and the physical and mechanical properties of the soils. Soil condition indicators are also identified. The work is carried out in accordance with national and international technical standards and procedures, in line with the applicable norms and regulatory documents.

4.1 Completed projects

No	Client	Project	Date
1	Teghout CJSC	Expansion of the sand-gravel soil quarry of the tailings storage facility	2017
2	Vallex Group	Tailings storage facility. Tailings pipeline culvert	2018
3	Teghout CJSC	Concentrate storage	2018
4	Vallex Group	Increase in the plant capacity to 7.0 million tons per year. Ore crushing and transportation to the grinding section	2018
5	Vallex Group	New, №2 tailings storage facility	2018
6	Vallex Group	New tailings storage facility	2018
7	GeoProMining Gold LLC	Sotk deposit: Treatment plant and gravity pipeline	2019
8	MGTSM CJSC	Concentrate storage	2019
9	Vallex Group	Tailings storage facility №2: Tailings pipeline culvert route	2019
10	GeoProMining Gold LLC	Ararat cyanide tailings storage: Floating platform for circulating water pumps	2021
11	VPA Invest LLC	Wake Park water sports and entertainment center	2021
12	Yell Extreme Park LLC	Construction of the Zip-Line attraction at the Yell Extreme Park	2022
13	Yell Extreme Park LLC	Construction of the "Apage Resort" hotel	2022
14	Profenergy Group LLC	Agarak Copper-Molybdenum Plant 110/35/6 kV PS and 110 kV overhead power line"	2022
15	Yell Extreme Park LLC	Tension cable fastenings for the Zip-Line attraction at Yell Extreme Park	2022
16	Bedrosyan Architectural Office LLC	Engineering-geological surveys were conducted at the site "Improvement of the ancient city of Dvin and the adjacent area, including the development of tourist infrastructure" under the sub-programme "Museification of the historical city of Dvin, Armenia."	2022
17	Zangezur Copper-Molybdenum Combine CJSC	New grinding and flotation areas	2023

18	Zangezur Copper-Molybdenum Combine CJSC	New thickener area	2023
19	Zangezur Copper-Molybdenum Combine CJSC	Engineering-geological surveys were conducted at the pumping station	2023
20	Zangezur Copper-Molybdenum Combine CJSC	New line Ø1220.0 mm, culvert №1	2023
21	Zangezur Copper-Molybdenum Combine CJSC	New line Ø1220.0 mm, culvert №2	2023
22	Zangezur Copper-Molybdenum Combine CJSC	Dismantling of retaining wall structures and construction of new retaining walls	2024
23	Zangezur Copper-Molybdenum Combine CJSC	Engineering-geological surveys were conducted at the "landslide area"	2024
24	Zangezur Copper-Molybdenum Combine CJSC	Vokhchi River restoration and riverbed regulation	2024
25	Kredl LLC	Engineering-geological surveys were conducted at the site named "Dalma Gardens."	2024

4.2 Available equipment

No	Equipment	Model
1	Drilling rig	URB 2A-2 rotary drilling rig
2	Drilling rig	UGB-1VS Universal Geological Drilling Rig
3	Drilling rig	UGB-1VS Universal Geological Drilling Rig

URB 2A-2 rotary drilling rig		
Maximum drilling depth with flushing	m	350
Drilling depth with air flushing (one/two compressors)	m	30/50
Initial drilling diameter with air flushing	mm	300
Final drilling diameter with air flushing	mm	110
Initial drilling diameter with flushing	mm	450
Final drilling diameter with flushing		
-in hard rocks	mm	190
-in soft rocks	mm	294

Drill bit rotation speed - speed 1 - speed 2 - speed 3	rpm	140 225 325
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2 and 3 UGB-1VS Universal Geological Drilling Rig	
Nominal drilling depth (auger d135-180)	50-12 m
Vertical well drilling (d130-300 mm), drilling depth up to	45 m
Transport base of the drilling rig	ZIL 131
Mast height	8,65 m
Rotator stroke	3,2 m
Mast lifting capacity	52 kH
Rated power of the main drive	44 kW
Maximum torque	5000 nM

Construction Department

5. Construction unit

The Construction Department provides the following services in the field of design and construction:

- Develops projects in accordance with the requirements of the Client and current legislation, from preparing technical specifications to assisting with state expertise and other supervisory authorities;
- Designing civil and industrial enterprises and productions;
- Designing road networks, transport communications, bridges, and overpasses;
- Foundation design for dynamic machinery and equipment;
- Designing metal structures (a comprehensive process of developing drawings, calculations, and technical documentation for the production of various metal constructions);
- Development of cost estimation documentation;
- Author's supervision over construction.

5.1 Completed projects

No	Client	Project	Date
1	Vallex Group	Processing Plant, Grinding Area -Architectural Solutions (ARCH), Reinforced concrete (RC), Steel Structures (STL), master plan, cost estimate	2015
2	Vallex Group	Processing Plant. Filtration Area - ARCH, RC, STL, master plan, cost estimate	2015
3	Vallex Group	Contract No. 18/2018. Increase of plant capacity to 7.0 million tons per year. Ore crushing and transportation to the grinding area	2015
4	Teghout CJSC	Processing Plant. Crushed Ore Storage Facility – STL, cost Estimate	2015
5	Teghout CJSC	Rock drying facility AC, Master plan, cost estimate	2015
6	Vallex Group	Processing Plant. Thickener area -STL, cost estimate	2015
7	Vallex Group	Processing Plant. Grinding Area. Oil Station – RC, master plan, cost estimate	2015
8	Teghout CJSC	Crushed ore storage area - Pebble lime receiving hopper - Architectural-construction (AC), master plan, cost estimate	2015
9	Vallex Group	Processing Plant. Grinding area. Conveyor gallery- STL, cost estimate	2015
10	Vallex Group	Processing Plant. Analytical laboratory - AC, Master plan, cost estimate	2015
11	Vallex Group	Utility facilities - AC, Master plan, cost estimate	2015
12	Vallex Group	Industrial water supply. Switching chambers - AC, master plan, cost estimate	2015
13	Teghout CJSC	Open-pit industrial area facilities. Heavy-duty vehicle garage. Compressor station - AC, master plan, cost estimate	2015
14	Teghout CJSC	Open-pit industrial area facilities. Crushing and sorting unit - AC, master plan, cost estimate	2015

15	Teghout CJSC	Open-pit industrial area facilities. Heavy machinery garage. Reconstruction of the washing station – AC, master plan, cost estimate	2015
16	GeoProMining Gold LLC	Compressor station. Ararat Processing Plant - ARCH, RC, STL, Master plan, cost estimate	2015
17	Teghout CJSC	Railway station "Akhtala". Oil products base - AC, Master plan, cost estimate	2015
18	Vallex Group	Pump station with cooling tower - AC, Master plan, cost estimate	2015
19	Teghout CJSC	Railway station "Akhtala". Checkpoint - AC, Master plan, cost estimate	2015
20	Vallex Group	Copper concentrate warehouse - ARCH, RC, STL, Master plan, cost estimate	2015
21	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Main building. Reconstruction of the ceiling at elevation 9.700 - AC, cost estimate	2015
22	Vallex Group	Plant reconstruction. Ore reception area - RC, Master plan, cost estimate	2015
23	Vallex Group	Plant reconstruction. Grinding area - ARCH, RC, STL, Master plan, cost estimate	2016
24	Teghout CJSC	Tailings storage facility. Pump station for drainage water with a reservoir - AC, Master plan, cost estimate	2016
25	Teghout CJSC	transhipment base at "Akhtala" railway station. Concentrate storage - AC, Master plan, cost estimate	2016
26	Teghout CJSC	Open pit industrial site. Heavy machinery garage. Fuel storage - AC, Master plan, cost estimate	2016
27	Vallex Group	Plant reconstruction. Flotation area. Foundations for flotation machines V=160m3 - RC, cost estimate	2016
28	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Vibrating screen installation with sum - AC, master plan, cost estimate	2016
29	Vallex Group	Plant reconstruction. Recirculation pump station from the tailings pond - AC, master plan, cost estimate	2016
30	Vallex Group	Plant reconstruction. Grinding area. Foundations for ball mill BM 21'x27'-6' - RC, cost estimate	2016
31	Vallex Group	Plant reconstruction with a capacity increase to 5 million tons of ore per year. Flotation area. Foundations for mill BM 3200x3100 - RC, cost estimate	2016
32	Vallex Group	Plant reconstruction with a capacity increase to 5 million tons of ore per year. Grinding area - ARCH, RC, STL, cost estimate	2016
33	Vallex Group	Plant reconstruction with a capacity increase to 5 million tons of ore per year. Flotation area - ARCH, RC, STL, cost estimate	2016
34	Vallex Group	Plant reconstruction with a capacity increase to 5 million tons of ore per year. Substation 110/35/6. Switchgear - AC, master plan, cost estimate	2016
35	ACP CJSC	Vehicle scale Q=80t - AC, cost estimatea	2016

36	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Screen installation at the grinding area - AC, master plan, cost estimate	2016
37	Vallex Group	Plant reconstruction. Blower station - AC, cost estimate	2016
38	ACP CJSC	Converter gas stack - AC, cost estimate	2016
39	Teghout CJSC	Mechanical workshop - RC, STL, master plan, cost estimate	2016
40	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Reconstruction of the ore reception area, replacement of the covering for the wagon tipper shed - AC, master plan, cost estimate	2016
41	Teghout CJSC	Explosive material storage, capacity 60t. Explosive materials warehouse - AC, master plan, cost estimate	2017
42	Teghout CJSC	Explosive material storage, capacity 60t. Laboratory - AC, master plan, cost estimate	2017
43	Teghout CJSC	Explosive material storage, capacity 60t. Guard room - AC, master plan, cost estimate	2017
44	Vallex Group	Lime silo, capacity 60.0m ³ - AC, cost estimate	2017
45	Teghout CJSC	Explosive material storage, capacity 60t. Lightning rods - AC, cost estimate	2017
46	Teghout CJSC	Expansion of the Teghout copper - molybdenum mine to 15 million tons of ore per year. Technical design - AC, cost estimate	2017
47	Teghout CJSC	Tailings storage facility Second tailings pipeline line with a capacity of 15 million tons of ore per year - RC, STL, cost estimate	2017
48	Vallex Group	Installation of the second thickener, diameter 14.0 - AC, cost estimate	2017
49	Vallex Group	Pump station for process water supply from the River. Installation of the 4th pump - AC, master plan, cost estimate	2017
50	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Reconstruction of the lime solution preparation area - AC, master plan, cost estimate	2017
51	Teghout CJSC	Processing plant site. Warehouse premises. Reagent warehouse - ARCH, RC, STL, master plan, cost estimate	2017
52	Teghout CJSC	Processing plant site. Warehouse premises. Material and technical warehouse - ARCH, RC, STL, Master plan, cost estimate	2018
53	Vallex Group	Installation of the second cyclone - ARCH, RC, STL, Master plan, cost estimate	2018
54	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Ore reception area. Ramp - RC, cost estimate	2018
55	Vallex Group	Core storage - AC, Master plan, cost estimate	2018
56	Vallex Group	Ammonium nitrate warehouse - AC, Master plan, cost estimate	2018
57	Vallex Group	Repair workshops. Welding area - ARCH, RC, STL, master plan, cost estimate	2018

58	Vallex Group	Warehouse. Tire repair area. Administrative and household premises - ARCH, RC, STL, master plan, cost estimate	2018
59	Agarak Copper Molybdenum Combine CJSC	Pump station - ARCH, RC, STL, master plan, cost estimate	2018
60	Agarak Copper Molybdenum Combine CJSC	Ore chute - RC, cost estimate	2018
61	Agarak Copper Molybdenum Combine CJSC	Pulp pump station - ARCH, RC, STL, master plan, cost estimate	2018
62	Teghout CJSC	Expansion of the Teghout Copper and Molybdenum Combine to 15 million tons of ore per year. Flotation area - ARCH, RC, STL, master plan, cost estimate	2018
63	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Installation of containers in the lime and thickening areas - AC, cost estimate	2018
64	Agarak Copper Molybdenum Combine CJSC	Increase in production capacity to 4.5 million tonnes of ore per year. Grinding area. ARCH, RC, STL, master plan, cost estimate	2018
65	Agarak Copper Molybdenum Combine CJSC	Increase in production capacity to 4.5 million tonnes of ore per year. Crushed ore bunker. ARCH, RC, STL, master plan, cost estimate	2019
66	Agarak Copper Molybdenum Combine CJSC	Increase in production capacity to 4.5 million tonnes of ore per year. Thickener and tanks. AC, master plan, cost estimate	2019
67	Vallex Group	Molybdenum concentrate production plant - ARCH, RC, STL, master plan, cost estimate	2019
68	Vallex Group	Installation of flotation machines V = 160.0 m ³ - AC, cost estimate	2019
69	Vallex Group	Increase in production capacity to 7 million tonnes of ore per year. Bin with conveyor belt - ARCH, RC, STL, cost estimate	2019
70	Vallex Group	Heavy-duty vehicle garage. Reconstruction - AC, cost estimate	2019
71	GeoProMining Gold LLC	Ararat Gold Recovery Plant. Tailings pipeline to the Ararat plant Metal supports for the tailings pipeline - AC, cost estimate	2019
72	Agarak Copper Molybdenum Combine CJSC	Retaining walls - RC, cost estimate	2019
73	Vallex Group	Ore crushing and transportation to the grinding section. Transformer substation 1x630-6/0.4kV - TS, cost estimate	2019
74	GeoProMining Gold LLC, Sotk Mine	Mine water treatment plant facility - AC, master plan, cost estimate	2019
75	Vallex Group	Increase in production capacity to 7 million tonnes of ore per year. Crushing and transportation of ore to the receiving bin - AC, cost estimate	2019
76	Vallex Group	Molybdenum concentrate production plant. Administrative and utility facilities and transformer substation ТП - AC, cost estimate	2020
77	Vallex Group	Tailings storage facility No.2. Recirculated water pumping station - AC, cost estimate	2020
78	Vallex Group	Increase in production capacity to 7 million tonnes of ore per year. 3-stage ore crushing. Bins with conveyor belt - AC, STL, RC, cost estimate	2020

79	Vallex Group	Copper concentrate production plant - AC, cost estimate	2020
80	Agarak Copper Molybdenum Combine CJSC	Third-lift pumping station - AC, master plan, cost estimate	2020
81	Vallex Group	Phase II of the operating tailings storage facility and pulp pumping station, substation - AC, cost estimate	2020
82	Agarak Copper Molybdenum Combine CJSC	Expansion of the second industrial water supply pumping station - AC, master plan, cost estimate	2020
83	Agarak Copper Molybdenum Combine CJSC	Industrial water supply. Recirculated water tank with a volume of 2000 m³ - RC, master plan, cost estimate	2020
84	Agarak Copper Molybdenum Combine CJSC	Technical floor of the water tower, replacement of RC structures with STL - AC, cost estimate	2021
85	Akhtala Mining and Processing Enterprise CJSC	Nahatak Tailings Storage Facility. Tailings pit - AC, cost estimate	2021
86	Lorva Geo CJSC	Conveyor storage facility - AC, cost estimate	2021
87	Vallex Group	Copper production area - AC, master plan, cost estimate	2021
88	Vallex Group	Phase II of the operating tailings storage facility. Pulp pumping station - AC, master plan, cost estimate	2021
89	Vallex Group	Ammonium nitrate warehouse - AC, master plan, cost estimate	2021
90	Zangezur Copper-Molybdenum Combine CJSC	New ore supply line for ball mills in the semi-autogenous grinding section - ARCH, RC, STL, master plan, cost estimate	2021
91	Agroinvest	Aragatsotn region, Parpi village, farm territory. Building design - AC, master plan, cost estimate	2021
92	ACP CJSC	Ball mill area reconstruction - AC, cost estimate	2022
93	Vallex Group	Waterline. Pumping station No.1. Pumping station No.2 - AC, master plan, cost estimate	2022
94	Zangezur Copper-Molybdenum Combine CJSC	Recirculated water supply system from the Artsvanik tailings storage facility. First pumping station. Second pumping station - ARCH, RC, STL, master plan, cost estimate	2022
95	Lernametalurgiai Institute CJSC	Yerevan, Arin-Berd St. Testing laboratory and auxiliary rooms. Laboratory No.1; No2. Warehouse No.1, No.2, No.3. Transformer substation. Firewater reservoirs - ARCH, RC, STL, master plan, cost estimate	2023
96	Zangezur Copper-Molybdenum Combine CJSC	Construction of a new crushed stone production unit at the quarry - ARCH, RC, STL, master plan, cost estimate	2024
97	GeoProMining Gold LLC	Design of the backfilling complex for the Sotk mining site. On-the-ground part of the backfilling complex - ARCH, RC, STL, SLD, master plan, cost estimate	2024
98	GeoProMining Gold LLC	Installation area for machinery and lifting equipment - ARCH, RC, master plan, cost estimate	2024
99	GeoProMining Gold LLC	Increase in production capacity to 30 million tons/year at the processing plant. Main building - ARCH, RC, STL, master plan, cost estimate	2024

100	Zangezur Copper-Molybdenum Combine CJSC	Increase in production capacity to 30 million tons/year at the processing plant. Flotation building - ARCH, RC, STL, master plan, cost estimate	2024
101	Zangezur Copper-Molybdenum Combine CJSC	Increase in production capacity to 30 million tons/year at the processing plant. Grinding building - ARCH, RC, STL, master plan, cost estimate	2024
102	Zangezur Copper-Molybdenum Combine CJSC	Increase in production capacity to 30 million tons/year at the processing plant. Extensions - ARCH, RC, STL, master plan, cost estimate	2024
103	Zangezur Copper-Molybdenum Combine CJSC	Warehouse - ARCH, RC, STL, master plan, cost estimate	2024
104	Zangezur Copper-Molybdenum Combine CJSC	Reinforced concrete platform for technical equipment and structure - RC, master plan, cost estimate	2024
105	Zangezur Copper-Molybdenum Combine CJSC	Reconstruction of existing retaining walls and new retaining wall - ARCH, RC, master plan, cost estimate	2024

5.2 Licensed international software programs

№	Name
1	AutoCAD
2	Microsoft Office
3	Adobe Acrobat
4	ЛИРА-САПР

6. Department of transportation and master planning

The Department of Transportation and Master Planning provides the following services in the field of design and construction

- Design of road networks, transportation communications, bridges, and overpasses;
- Calculation of retaining walls;
- Design and preparation of landscaping projects;
- Design of civil structures;
- Author's supervision of construction.

6.1 Completed projects

№	Client	Project	Date
1	Teghout CJSC	Processing plant industrial site. On-site roads at elevations 1013 m and 1020 m	2014
2	Teghout CJSC	Mine industrial site. Concrete paving of the heavy-duty haul truck garage area	2016
3	Vallex Group	Bypass road	2019
4	Vallex Group	Bypass road	2019
5	Agarak Copper Molybdenum Combine CJSC	Increase in ore processing capacity to 4.5 million tons per year. Crushed ore bin	2019
6	Agarak Copper Molybdenum Combine CJSC	Increase in ore processing capacity to 4.5 million tons per year. Thickener and tanks	2019
7	Vallex Group	Molybdenum concentrate production plant	2019
8	GeoProMining Gold LLC, Sotk Mine	Mine water treatment plant facility	2019
9	Agarak Copper Molybdenum Combine CJSC	Pump station No.3 (third lift)	2020

10	Agarak Copper Molybdenum Combine CJSC	Expansion of the second industrial water supply pump station	2020
11	Agarak Copper Molybdenum Combine CJSC	Industrial water supply: 2,000 m³ recirculated water tank	2020
12	Vallex Group	Copper production area	2021
13	Vallex Group	Ammonium nitrate warehouse	2021
14	Zangezur Copper-Molybdenum Combine CJSC	New ore supply line for ball mills in the semi-autogenous grinding area	2021
15	Agroinvest	Aragatsotn region, Parpi village, farm territory - building design	2021
16	Vallex Group	Water pipeline, pump station No.1	2022
17	Zangezur Copper-Molybdenum Combine CJSC	Recirculated water supply system from Artsvanik tailings storage facility: first pump station, second pump station	2022
18	Lernametalurgiai Institute CJSC	Yerevan, Arin Berd street - testing laboratory and utility rooms: laboratory No. 1; No.2; warehouse No.1, No.2, No.3; transformer substation; firewater tanks	2023
19	Zangezur Copper-Molybdenum Combine CJSC	Construction of a new crushed stone production unit at the quarry	2024
20	GeoProMining Gold LLC	Design of the backfill plant at Sotk mine - above-ground facilities of the backfill complex	2024
21	Zangezur Copper-Molybdenum Combine CJSC	Equipment and lifting mechanism installation yard	2024
22	Zangezur Copper-Molybdenum Combine CJSC	Increase in processing plant capacity to 30 million tons/year - main wing	2024
23	Zangezur Copper-Molybdenum Combine CJSC	Increase in processing plant capacity to 30 million tons/year - flotation area	2024
24	Zangezur Copper-Molybdenum Combine CJSC	Increase in processing plant capacity to 30 million tons/year - grinding area	2024
25	Zangezur Copper-Molybdenum Combine CJSC	Increase in processing plant capacity to 30 million tons/year - extensions	2024
26	Zangezur Copper-Molybdenum Combine CJSC	Reinforced concrete platform for technical equipment and structures	2024
27	Zangezur Copper-Molybdenum Combine CJSC	Reconstruction of existing retaining walls and construction of a new retaining wall	2024

6.2 Licensed international software programs

No	Name
1	Civil 3D
2	AutoCAD
3	Microsoft Office

7. Cost estimation department

The Cost Estimation Department provides the following services in the field of design and construction.

- Development of cost estimate documentation

7.1 Completed projects

No	Client	Project	Date
1	Teghout CJSC	Tailings storage facility. Water diversion structures. Water intake dam	2008
2	Teghout CJSC	Dukanadzor waste dump facilities. Diversion of the Dukanadzor River	2010
3	Vallex Group	Phase II tailings storage facility. Capacity increase	2010
4	Vallex Group	Reconstruction of the plant with an increase in ore processing capacity to 5 million tons per year	2016
5	Agarak Copper Molybdenum Combine CJSC	Increase in processing plant capacity to 4.5 million tons of ore per year	2018
6	Zangezur Copper-Molybdenum Combine CJSC	Equipment and lifting mechanism installation area - ARCH, RC, master plan, cost estimate	2024
7	Zangezur Copper-Molybdenum Combine CJSC	Increase in processing plant capacity to 30 million tons/year. Main wing - ARCH, RC, STL, master plan, cost estimate	2024
8	Zangezur Copper-Molybdenum Combine CJSC	Processing plant capacity increase to 30 million tons/year. Flotation area - ARCH, RC, STL, master plan, cost estimate	2024

All projects completed by Lermetin CJSC were duly accompanied by comprehensive cost estimation documentation.

Geological Exploration Department

8. Drilling service

The Drilling Service staff have carried out core drilling operations during the exploration of numerous deposits, including the Teghout and Vallex deposits. Drilling was performed both from the surface and from underground mine workings. The total length of boreholes drilled by the service exceeds 400,000 meters.

Currently, the Drilling Service is equipped with the following drilling equipment: Christensen CS 1000 P6, Christensen CS 140, and Diamec U6 (all manufactured by Atlas Copco), as well as a URB 3A3 rotary drilling rig for hydrogeological drilling, manufactured in Russia.

8.1 Available equipment

No	Drilling Rig Model
1	Christensen CS 1000 P6
2	Christensen CS 140
3	Diamec U6
4	URB 3A3

1 Christensen CS 1000 P6	
Maximum Drilling Depth (m)	600
Drilling Diameter	76-122
Core Diameter (mm)	45,1-85
Inclination Angle (°)	45-90
Transport Base	Kamaz 4310



3 Diamec U6	
Maximum Drilling Depth (m)	300
Drilling Diameter	76-96
Core Diameter (mm)	45,1-63,5
Inclination Angle (°)	0-360
Transport Base	



2 Christensen CS 140	
Maximum Drilling Depth (m)	1400
Drilling Diameter	76-122
Core Diameter (mm)	45,1-85,0
Inclination Angle (°)	45-90
Transport Base	Self-propelled



4 URB 3A3		
Maximum Drilling Depth (m)	500	
Drilling Diameter	190-508	
Core Diameter (mm)	-	
Inclination Angle (°)	90	
Transport Base	URAL 4320	



9. Geological service

The specialists of geological service were involved in the exploration of the Teghout deposit (2005–2015) and the Vallex deposit (2009–2015). They contributed to the development of the full range of graphical materials, the creation of the block model, and the calculation of reserves. The licensed Micromine software was used for block modelling and reserve estimation.

10. Sample preparation laboratory

The Margahovit Sample Preparation Laboratory processed samples from the Teghout and Vallex deposits, as well as from several other deposits. During its operation, the laboratory processed over 500,000 core, trench, bulk, technological, and other types of samples. The Sample Preparation Laboratory is equipped with the necessary equipment.

10.1 Available equipment

No	Equipment	Model
1	Jaw Crushers	JC-6 and JC-10
2	Roll Crushers	RC-6
3	Cup Mills (Grinders)	IV-4
4	Sample Splitters	SS-5, SS-10 and SS-20

Mining Department

The Mining Department offers the following services

- Assessment of the quantity and quality of mineral reserves, degree of exploration, and readiness for development; evaluation of the industrial significance of reserves, provided their extraction is integrated and economically rational, using modern technologies;
- Monitoring of the mining massif and excavations;
- Quality control of work at any stage of mine development (i.e., data collection, geotechnical design, etc.);
- Slope stability analysis;
- Hydrogeological and engineering geological observations and studies;
- Analysis of possible changes in hydrogeological and engineering geological conditions of the deposit during its operation, as well as potential water inflows into underground excavations;
- Development and justification of measures to combat surface and underground water inflows;
- Analysis and synthesis of hydrogeological and engineering geological data from the operating deposit, and development of measures to optimize hydrogeological and drainage work methods;
- Preparation of a technical and economic justification for mining and ore processing enterprises;
- Preparation of a technical project for deposit development;
- Preparation of the project for mining allotments within defined boundaries;
- Development of a mining work development plan (scheme);
- Preparation of a pilot industrial development project.

11.1 Completed projects

No	Client	Project	Date
1	CJSC Chronimet Metal Trading CIS	Lichk copper deposit: site selection for essential operational infrastructure and location map	2014
2	Vallex Group	Issued for construction design for the development of the deposit, Section No.3	2018
3	Zangezur Copper-Molybdenum Combine CJSC	Issued for construction design for the eastern (Dzotateg) waste dump of the Kajaran open - pit mine	2018
4	Vallex Group	Issued for construction design for the development of the north - western section of the deposit	2018
5	Vallex Group	Final adjustment of the waste dump area	2019
6	Vallex Group	Issued for construction design of mining works at the open pit (Stage 1); (Stage 2)	2020
7	Vallex Group	Issued for construction design of quarry productivity up to 6 million tons per year	2020
8	Vallex Group	Design of the waste dump at the existing tailings storage facility	2020
9	Zangezur Copper-Molybdenum Combine CJSC	Underground drainage system of the Kajaran quarry	2022
10	Zangezur Copper-Molybdenum Combine CJSC	Stability assessment and boundary modification of the waste rock dump	2022
11	GeoProMining Gold LLC, Sotk Mine	Underground part of the backfilling complex at the Sotk mine	2022
12	GeoProMining Gold LLC, Sotk Mine	Contract for research works	2024

11.2 Licensed international software programs

No	Name
1	AutoCAD
2	Microsoft Office
3	Micromine

Department of Ore Processing Technology Development and Implementation

The main activities of the department include:

- Development of technological flow diagrams for the processing of mineral ores;
- General testing of processing plants to improve technological performance;
- Preparation of technological regulations for the processing plant;
- Technological design of the main sections of the processing plant.

12.1 Completed projects

No	Client	Project	Date
1	Vallex Group	Flotation section of molybdenum concentrate production	2020
2	Vallex Group	Pump station for transferring tailings of the processing plant	2021
3	Vallex Group	Section for the production of cement copper	2021
4	Vallex Group	Section for the production of grinding vapours	2021
5	ACP CJSC	Turquoise sorting area	2022
6	ACP CJSC	Section for the production of grinding vapours	2022
7	Zangezur Copper-Molybdenum Combine CJSC	Crushed ore storage	2022
8	ACP CJSC	Copper sulphate production area	2023
9	Zangezur Copper-Molybdenum Combine CJSC	Crushed stone production area	2024
10	GeoProMining Gold LLC	Construction of the Sotk mine backfill complex (contract No. 041122)	2024
11	AMP HOLDING LLC	Metallurgical furnace gas cleaning system	2024

12.2 Licensed international software programs

No	Name
1	AutoCAD
2	Microsoft Office

Department of Scientific and Laboratory Research

13. Environmental monitoring laboratory

13.1 Completed projects over the last 10 years

No	Client	Project
1	Armenian Wine Factory LLC	Carrying out sampling and analysis of soils, grounds, mineral raw materials, water, and atmospheric air, as well as determining the quality of chemicals and reagents
2	Sahakyanshin CJSC	
3	Global Real Estate LLC	
4	Zangezur Copper-Molybdenum Combine CJSC	
5	LER-EX LLC	
6	Vayk RSC LLC	
7	Malishka Resources LLC	
8	Meghradzor Gold LLC	
9	Agarak Copper-Molybdenum Combine CJSC	
10	Aragats-Perlite OJSC	
11	ARMPower CJSC	
12	GeoProMining Gold LLC	
13	Lichkvaz CJSC	
14	NRM CJSC	
15	Geospace LLC	
16	Cluster LLC	
17	Akhthala Mining and Processing Enterprise	
18	SMART CITY LLC	
19	BIOGEOTECH LLC	
20	GEVLER LLC	
21	ShinCertificate LLC	
22	Vallex Group	
23	MEGO GOLD LLC	
24	Geozone LLC	
25	GTB STEEL LLC	
26	Neosystem LLC	
27	RID LLC	
28	Antar Resort LLC	
29	Saranist LLC	
30	Yerevan State Pedagogical University (YSPU)	
31	Norgeo LLC	
32	Crystal Tech LLC	
33	Geomineral LLC	
34	Ararat Cement CJSC	
35	Gagarin Agro CJSC	
36	Georesearch LLC	
37	Miami City LLC	
38	SHANSI HYDRAULIC CONSTRUCTION ENGINEERING BUREAU GROUP CO LLC	
39	Yerevan State University (YSU)	
40	Tsaturyan Consulting	

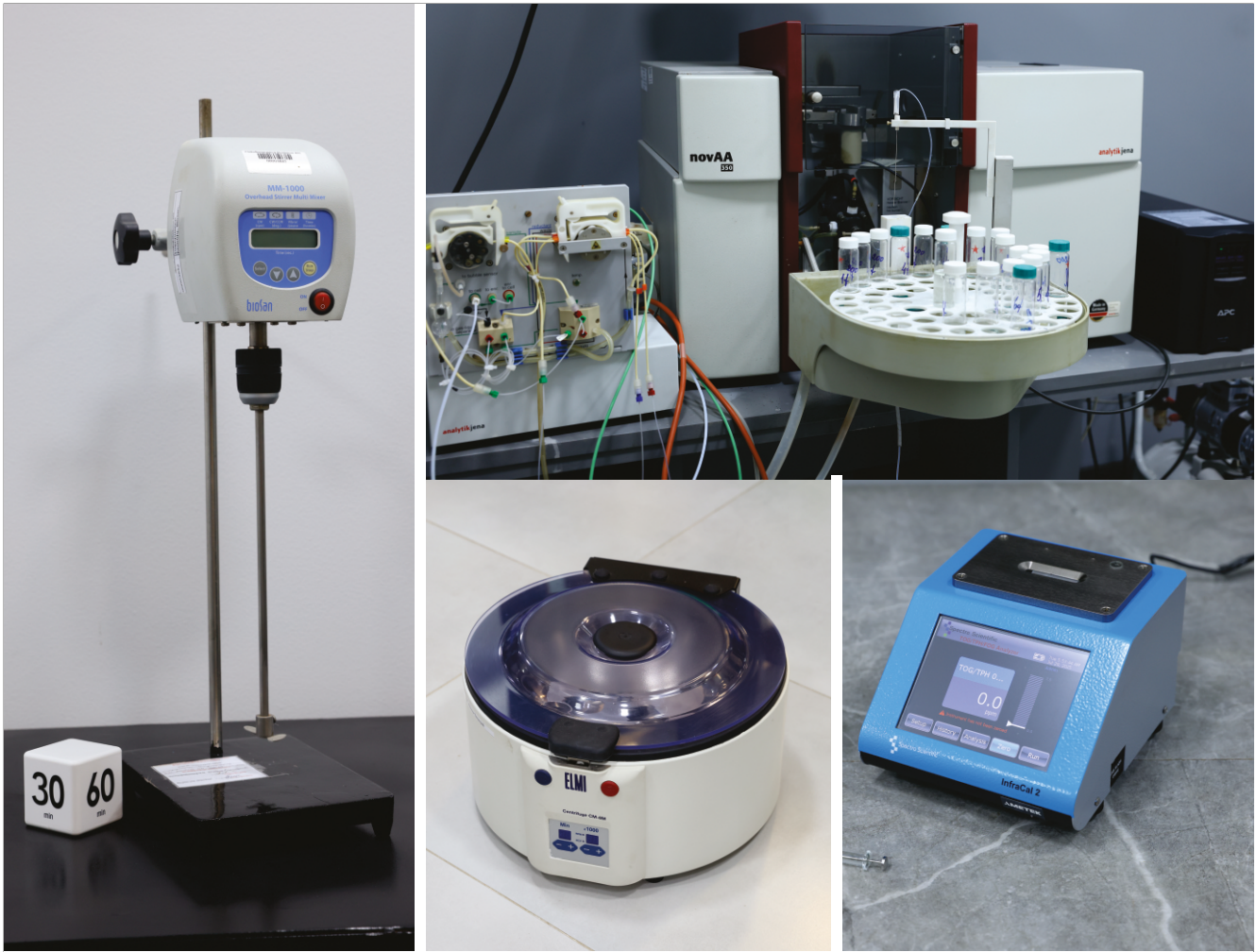
13.2 Available equipment

Equipped with measuring instruments (testing equipment) (hereinafter referred to as MI), intended for product/object testing.

No	Name of the characteristics (indicators) of the tested product/object	Name of the MI, type, (brand) serial number, country of manufacture, company	Main technical specifications (measurement range, etc.)	Calibration data (certificate number, certificate of conformity, issue date, calibration frequency)	Explanations
1	Determination of chemical elements and their compounds in soils, grounds, rocks, and concrete.	Thermoregulatory system (muffle furnace) SNOL 1.6.2.0.0.8/9-M1 No.20400 USSR	Temperature (50 - 900) °C	Internal verification protocol (IV) No. M.P. 2/2024 OMOS 05.08.2024 Once a year	IV
2		Thermoregulatory system (muffle furnace) SNOL 1.6.2.5.1/9U3 No.23197 USSR	Temperature (50 - 900) °C	Internal verification protocol (IV) No. M.P. 2/2024 OMOS 05.08.2024 Once a year	IV
3		Drying oven LOIP LF 60/350 VSI No.5607 Russia	Temperature (60 - 350) °C	Internal Verification Protocol (IV) No. SHS 3/2024 OMOS 05.08.2024 Once a year	IV
4		Laboratory electronic balance GAS MWP-300 H No.0890 Korea, GAS	(0.01 - 300) g	Internal Calibration Protocol (IC) No. VE 1/2023 OMOS 18.12.2024 Once a year	IC
5		Laboratory electronic balance KERN ABS220 No.WB12AR0020 Germany (FRG)	(0-220) g	Calibration Certificate No.0211-ML-2024 10.11.2024 Once a year	National Body for Standards and Metrology (NBSM)
6		Set of standard weights, class F1 No.34425390 Russia	1mg-100 g	Calibration Certificate No.0175-ML-2024 10.11.2024 Once a year	NBSM
7		Set of working weights GA 200A No.431 USSR	(1-100) g	Internal Calibration Protocol (IC) No. NG 2/2024 OMOS 18.12.2024 Once a year	IC
8		Set of working weights No.47 USSR	(0,005-0,25) g	Internal Calibration Protocol (IC) No. NG 1/2024 OMOS 18.12.2024 Once a year	IC
9		Digital thermometer TCM 9410/M1 No.011-3612 Temperature sensors TTC06-1300-2 HA(K) No.50411162028TTU01-600-2 Pt100 № 51211162042	(-50 ++600) °C 105°C 450°C (600 +1300) 0C 800°C 900°C 1100°C	Calibration Certificate No.25/2024 No.26/2024 04.03.2024 Once a year	NBSM
10		Photo colorimeter KFK-3-«3OMZ» No.1770234 Russia	(0-100) %	Internal Calibration Protocol (IC) No. FK 1/2024 OMOS 13.02.2024 Once a year	IC

11	Determination of chemical elements and their compounds in soils, grounds, rocks, and concrete.	Atomic absorption spectrometer nov AA 350 No.113A0651 and hydride attachment HS-60 No. C01039 Germany, ANALYTIK JENA ANALYTIK JENA	(0-100) %	Daily calibrations using standard solutions	Service Protocols of the Belarusian Company «Empros» LTD. 09.06.2021 10.06.2021 29.09.2023
12		Liquid analyser H198194 No.03130049991 Romania	(0.0 ÷ 14) pH 0 ÷ 200 µS/cm	Daily calibrations using standard solutions	—
13		Laboratory glass thermometer No.141-5 Russia	(-30÷+50) °C -15°C 10°C 25°C	Calibration Certificate No.23/2024 04.03.2024 Once a year	NBSM
14		Laboratory glass thermometer No.288 Russia	(0 ÷360) °C 105°C 170°C 250°C	Calibration Certificate No.24/2024 04.03.2024 Once a year	NBSM
15		pH meter Toledo PH S 400 № 00005025 KHP	(-1÷+14) pH	Calibration after 100 measurements using a titration standard	—
16		Liquid analyser EXPERT-001-4(0.1) Russia	O ₂ (0 ÷ 20 mg/dm³)	Daily calibrations using standard solutions	—
17		Petroleum products analyser Infra Cal 2 TOG/TPH ATR-SP No. N405-2034-8144 USA	0,3-2000 ppm 3-2000 ppm	Calibration Certificates issued by Spectro Scientific 100-00337 Rev: C 100-00340 Rev: C 08.10.2023	—
18		Multiparameter photometer No.HI 8320 Romania	Ammonia 0 - 10.0 mg/L Nitrates 0 - 30.0 mg/L	—	—
19		TDS (Total Dissolved Solids) meter H198301 No.LA01380063 Romania	0 ÷ 2000 ppm	Daily calibrations using the TDS standard solution	—
20		Thermo-hygrometer TKA-PKM (20) No.20 5926 Russia	(0-50)°C (10-99) %	Calibration Certificate No.22/2024 04.03.2024 and No.0078-TL-202412.07.2024. Once per year	NBSM
21		Water and soil extract conductivity meter No.LA05320419 HANNA Romania	Measurement range (1.4 - 5.0) mS/cm	Calibration with a standard sample	—
22		Turbidity meter BANTE Tb100	0.02-1000 NTU	Calibration with a standard reference	—
23		Inductively Coupled Plasma Mass Spectrometer NexION, T8990011, 899S3110101G Perkin Elmer, Germany	(0-100) %	—	—

No	Name of auxiliary equipment, type (brand)	Serial number (if available), date of purchase or commissioning	Designation
1	Water Distiller LAUDA-GFL 2004, FRG	No. 1904906, 2024, October	Distillate collection
2	Water Distiller (glass bi-distiller) BS, RF	PJSC "Khimlaborapribor" 2020, January	Bi-distillate collection
3	Centrifuge SIA ELMI, Latvia	№ LV-1006 2022	—
4	Programmable Lab-Mechanical Stirrer MM-1000, Latvia	01030617.0,10008 2014	Suspension mixing
5	Shaker Elpan 358, Poland	№1419 2016	Shaking of extracts, suspensions
6	Yie Ya Decomposition Unit	№36 2024	Sample decomposition
7	Air Thermostat XT-3/40-2, Republic of Belarus	№893 2010	Thermal testing of standard solutions, titrants, and reagents



14. Laboratory of geomechanics and engineering geological surveys

The laboratory determines the physical and mechanical properties of soils, rocks, and processing plant tailings.

Geomechanical studies provide insight into site conditions, foundation quality, and behaviour under external influences.

All laboratory tests are carried out in accordance with the requirements of international standards (GOST and ASTM). The laboratory is capable of performing combined investigations to determine the physical and mechanical properties of soils, rocks, as well as construction materials such as crushed stone, sand, and concrete. One of the key geological properties determined in the laboratory is the deformation and elasticity modulus. The physical and mechanical characteristics of the site are also assessed through in-situ (field) testing.



The Laboratory of Geomechanics and Engineering Geological Surveys is one of the few facilities capable of inspecting concrete and reinforced concrete structures and linings using ultrasonic non-destructive testing (Pundit PD8050).

For the purposes of forecasting, timely accident prevention, and assessing the technical condition of hydraulic structures, the Laboratory of Geomechanics and Engineering Geological Surveys manufactures piezometers for measuring hydrostatic or hydrodynamic pressure. The laboratory is certified for interlaboratory soil analysis (MSI 265-PIG-09/2024), and future plans include conducting interlaboratory comparative studies on rock samples and construction materials.

All laboratory staff are certified in accordance with ISO/IEC 17025:2019

14.1 Completed projects over the last 10 years

No	Client	Project
1	Zangezur Copper-Molybdenum Combine CJSC	Determination of the physical and mechanical properties of the Artsvanik tailings dam, stability calculation
		Determination of the physical and mechanical properties of the waste dump soil and stability calculation of the tailings at Zangezur Copper-Molybdenum Combine CJSC
		Assessment of the condition of the Artsvanik tailings dam using the CPT system and sampling of tailings to determine physical and mechanical properties
		Determination of the physical and mechanical properties of construction sites
		Assessment of the condition of the Pkhrut tailings dam using the CPT system
2	TITIZYAN & SON LLC	Determination of the physical and mechanical properties of construction sites
	TITIZYAN & SON LLC	Determination of the physical and mechanical properties of construction sites at Zangezur Copper-Molybdenum Combine CJSC
3	GeoZon LLC	Determination of the physical and mechanical properties of the studied territories
4	Agarak Copper Molybdenum Combine CJSC	Determination of the physical and mechanical properties of tailings deposits of tailings dams
		Assessment of the condition of the Zangezur Copper-Molybdenum Combine CJSC tailings dam using the CPT system
5	Kapan Mining and Processing Company CJSC	Determination of the physical and mechanical properties of tailings deposits at the tailings dam
		Assessment of the condition of the Geghanush tailings dam using the CPT system and sampling of tailings to determine physical and mechanical properties
		Determination of the physical and mechanical properties of embankments at the tailings dam
		Determination of the physical and mechanical properties of rock samples
		Assessment of the technical condition of the water drainage tunnel at the Geganush tailings dam
6	Vallex Group	Assessment of the condition of the tailings dam using the CPT system
		Determination of the physical and mechanical properties of the slopes at the open pit
7	Institute of Water Problems and Hydro-Engineering named after I.V. Yeghiazarov	Determination of the physical and mechanical properties of the Tsakhkadzor reservoir
8	GeoProMining Gold LLC	Study of the materials for the backfilling complex at the Sotk deposit
		Assessment of the condition of the Ararat Mining and Processing Plant tailings dam using the CPT system, sampling, and determination of the physical and mechanical properties of the tailings

9	Kredl LLC	Determination of the physical and mechanical properties of the soils of the “Dalma” gardens
10	Assessment of the condition of the Nazik tailings dam using the CPT system, sampling, and determination of the physical and mechanical properties of the tailings	
11	Assessment of the technical condition of the Nalband interstate road tunnel	
12	Determination of the physical and mechanical properties of rock samples collected from the anchorage points of the tension ropes at LLC “Yell Extreme Park”	
13	Determination of the physical and mechanical properties of the sand quarry soils at “Makur Avaz” LLC	
14	Determination of the physical and mechanical properties of the soils at NRM LLC	
15	Determination of the physical and mechanical properties of the soils at “Lichkvaz” LLC	

15. Assay laboratory

The Assay Section of the Testing Laboratory is engaged in determining the content of precious metals (gold, silver, platinum, palladium) in products of the mining and metallurgical industries (ores, concentrates, tailings, intermediates, slags, mattes...), as well as in alloys and jewellery production waste

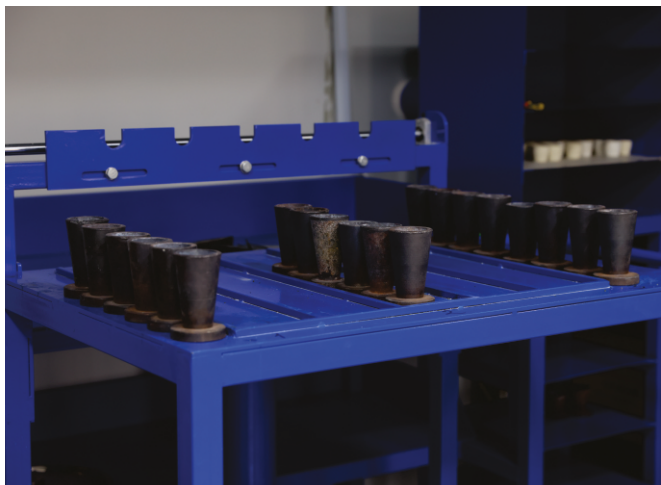
15.1 Completed projects

No	Client	Project	Date
1	Vallex Group	Determination of gold and silver in ores, concentrates, and tailings	2018-2023
2	ASSAT Mining and Gold Recovery Plant LLC	Determination of gold and silver in ores, concentrates, and tailings	2018-2019
3	ABMT LOGISTIC LLC	Determination of gold and silver in concentrates	2018-2020
4	Zangezur Copper-Molybdenum Combine CJSC	Determination of gold and silver in ores	2018
5	Teghout CJSC	Determination of gold and silver in concentrates	2018
6	ACP CJSC	Determination of gold and silver in various samples	2018-2024
7	GeoProMining Gold LLC	Determination of gold and silver in ores, concentrates, tailings, and technological intermediates	2018-2024
8	KA Minerals LLC	Determination of gold and silver in ores	2019
9	GeoRaid LLC	Determination of gold and silver in ores	2019-2020
10	Research Center	Determination of gold and silver in ores, concentrates, tailings, and alloys	2020
11	EKUVEST LLC	Determination of gold and silver in ores	2020
12	ASSAT Mining and Gold Recovery Plant LLC	Determination of gold and silver in ores, concentrates, and tailings	2021

13	AT Group LLC	Determination of gold and silver in ores	2021
14	SAGAMAR CJSC	Determination of gold and silver in ores	2021-2022
15	SAGAMAR CJSC	Determination of gold and silver in ores, concentrates, tailings, and technological intermediates	2022
16	NARANE GOLD LLC	Determination of gold and silver in ores	2022
17	ARDI GROUP 777 LLC	Determination of gold and silver in ores, concentrates, tailings, and technological intermediates	2023-2024
18	BACTEK ECO LLC	Determination of gold and silver in ores, alloys	2023
19	MEGRADZOR GOLD CJSC	Determination of gold and silver in ores, concentrates, tailings, and technological intermediates	2024
20	GEO SURVEY LLC	Determination of gold and silver in ores, concentrates, tailings, and technological samples	2024-2025

15.2 Available equipment

No	Equipment	Model	Function
1	Crucible Furnace	YX – FF – 25 China	Crucible Melting
2	Muffle Furnace	SNOL1.6.2.0.0.8/9 № 8520	Cupellation
3	Muffle Furnace	SNOL1.6.2.5.1/1U2 № 21174	Cupellation
4	Muffle Furnace	SNOL1.6.2.5.1/11U2 № 37654	Cupellation
5	Muffle Furnace	SNOL1.6.2.5.1/9 № 14293	Cupellation
6	Muffle Furnace	SNOL1.6.2.5.1/9 № 14294	Cupellation
7	Laboratory Electronic Balance	AUD – GR № 14212457 Japan	Weighing of gold-silver beads and gold scrap
8	Laboratory Electronic Balance CUW – 420H No. 0454100069	CUW – 420H № 0454100069	Weighing of sample weights and charge components
9	Psychrometric thermometer	№ 8101145	Measurement of temperature and humidity in the weighing room



16. Geology laboratory

16.1 Current functions and capabilities of the geology laboratory

The laboratory conducts petrographic and mineralogical studies. The thin section preparation unit produces transparent and polished thin sections from chip samples; fused transparent thin sections (from sands, crushed samples, and monofractions); and fused polished thin sections from processing products (concentrate, processing tailings, metallurgical slags, and mattes), which are analysed using Polam L 213-M and Polam R 312 microscopes. Mineralogical studies make it possible to address issues such as:

1. Ensuring the study of the mineral composition and structural features of all types of solid mineral resources during geological exploration..
2. Qualitative and quantitative control of concentrate in technological processes at all processing stages.
3. Prospective mineralogical studies – predictive mineralogy.
4. Comprehensive mineralogical study of the mineral (ore and non-ore) composition of ores and their processing products (concentrate, processing tailings, metallurgical slags, and mattes).
5. Evaluation of the suitability of construction sand, gravel, and cladding materials in accordance with the relevant GOST standards and based on qualitative and quantitative composition.
6. Determination of the bulk density of rocks and ores and its approval based on mineralogical composition.
7. The only laboratory in Armenia that prepares and studies fused polished and fused transparent thin sections, enabling a more detailed analysis of the mineralogical composition of ores and their processing products.

16.2 Completed projects

No	Client	Project	Date
1	Lichkvaz CJSC	Study of the mineral composition of ore and processing products from the Lichkvaz-Tey deposit	2020
2	Chaarat Kapan CJSC	Determination of the mineral composition of samples from "Chaarat Kapan" CJSC	2020
3	Sahakyanshin LLC	Study of the mineralogical-petrographic composition of sand and crushed stone from Araks and Kotuts	2020
4	Sahakyanshin LLC	Study of the mineralogical-petrographic composition of sand and crushed stone	2021
5	Vallex Group	Mineralogical-petrographic study of chip samples from the copper-molybdenum deposit	2021
6	Vallex Group	Mineralogical-petrographic study and determination of the bulk density of core samples from the copper-molybdenum deposit	2021
7	Technology Solutions CJSC	Mineralogical study of concentrate and cake	2021
8	Sahakyanshin LLC	Study of the mineralogical-petrographic composition of sand provided by LLC "Sahakyanshin"	2022
9	Lichkvaz CJSC	Study of the ore mineralogical composition of samples from the Lichkvaz polymetallic gold deposit	2022
10	Sagamar CJSC	Mineralogical characteristics of the technological sample of ore from the "Sagamar" section of the Armanis deposit	2022
11	Technological sample	Study of the mineralogical composition of samples from the Alaverdi deposit	2022

12	Vallex Group	Consolidated report on the mineralogical-petrographic study and determination of the bulk density of core samples from the Southern section of the copper-molybdenum deposit	2022
13	Kapan CJSC	Study of the mineralogical composition of samples from the Tejadin deposit	2023
14	GeoProMining Gold CJSC	Study of the mineralogical composition of samples from the Ararat plant	2023
15	Geospace LLC and Cluster LLC	Mineralogical study of flotation tailings from the ore deposits of the Nazik and Pkhrut deposits	2023
16	Technological sample	Mineralogical characteristics of technological ore samples from the Alaverdi waste piles	2023
17	Technological sample	Mineral composition of concentrate (Kajaran)	2023
18	T-Metal CJSC	Study of the properties and composition of concentrate samples	2023
19	Technological sample	Study of the mineralogical composition of samples from the Tavush-Khndzorut ore field	2023
20	Megradzor Group LLC	Study of the mineralogical composition of the composite averaged sample from the Megradzor ore	2024
21	Kapan Mining and Processing Plant CJSC	Mineralogical-petrographic study of ore samples from the Shahumyan deposit	2024
22	GeoProMining Gold LLC	Study of the mineralogical composition of samples collected from the tailings of the southwestern area of the Sotk deposit	2024

16.3 Licensed international software programs

No	Name
1	Microsoft Office

16.4 Available equipment

No	Equipment	Model	Function
1	Polarizing microscope	Polam L 213-M x 200	Study of geological samples under transmitted light
2	Ore microscope	Polam R 312 x 400	Study of ore mineral composition under reflected light
3	Stereoscopic microscope	MSP-2 x 90	Observation of direct three-dimensional images of objects



17. Analytical laboratory

The Analytical Department of the Testing Laboratory is engaged in determining the content of various metals (copper, iron, molybdenum, lead, zinc, gold, silver, sulphur, silicon, etc.) in the products of the mining and metallurgical industries (ores, concentrates, tailings, semi-products, solutions, etc.), as well as in alloys and waste from various productions

17.1 Completed projects

No	Client	Project	Date
1	Zangezur Copper-Molybdenum Combine CJSC	Determination of copper, molybdenum, sulphur, iron, gold, silver, etc., in ores, concentrates, and tailings	2018
2	Teghout CJSC	Determination of copper, molybdenum, iron, gold, silver, etc., in ores, concentrates, and tailings	2018
3	Amor CJSC	Determination of copper, zinc, lead, and gold in ores, concentrates, tailings, and intermediate processing products	2018
4	KA Minerals LLC	Determination of copper, lead, zinc, gold, silver in ores	2019
5	ASSAT	Determination of copper, lead, zinc, gold, silver, etc., in ores, concentrates, and tailings	2018-2019
6	IBM T Logistic LLC	Determination of copper, lead, zinc, gold, silver, etc., in ores, concentrates, and tailings	2020
7	AT-Group CJSC	Determination of copper, zinc, lead, and gold in ores, concentrates, tailings, and technological intermediate products	2021
8	Technology Solutions CJSC	Determination of copper, iron, molybdenum, gold, silver, etc., in ores, concentrates, tailings, technological samples, and solutions	2021
9	Sagamar CJSC	Determination of copper, zinc, lead, and gold in ores, concentrates, tailings, and technological intermediate products	2022
10	Narane Gold CJSC	Determination of copper in ores	2022

11	Bactek Eco LLC	Determination of copper, lead, zinc, iron, sulphur, gold, and silver in ores	2023
12	Vallex Group	Determination of copper, iron, molybdenum, gold, silver, etc., in ores, concentrates, and tailings	2018-2023
13	ACP CJSC	Determination of copper, molybdenum, iron, sulphur, gold, silver, etc., in various samples	2018-2024
14	GPM GOLD LLC	Determination of copper, iron, gold, and silver in ores, concentrates, tailings, solutions, and intermediate processing products	2018-2024
15	ARDI GROUP 777 LLC	Determination of copper, gold, and silver in ores, concentrates, tailings, intermediate processing products, and solutions	2023, 2024
16	Mexradzor Gold CJSC	Determination of copper and gold in ores, concentrates, tailings, and intermediate processing products	2024
17	GeoSurvey LLC	Determination of copper, lead, zinc, and gold in ores, concentrates, tailings, processing samples, and solutions	2024, 2025

17.2 Available equipment

№	Equipment	Model	Function
1	Atomic Absorption Spectrometer	Agilent AAS 240FS	Determination of various metals in solutions
2	Atomic Absorption Spectrometer	Varian AAS 240FS	Determination of various metals in solutions
3	Temperature Control System (Muffle Furnace)	SNOL 1/11	Sintering, ashing, fusion, calcination, etc.
4	Laboratory Electronic Scales	CY 360 № 286048	Weighing of sample and reagent portions
5	Laboratory Electronic Scales	EP 214C № 1127461383	Weighing of sample and reagent portions
6	Thermo-hygrometer	eti 810/145	Measurement of ambient temperature and humidity



18. Ore processing laboratory

The scope of the laboratory's core activities includes the following tasks and areas related to the assessment of ore processability and the evaluation of their products:

- Development of ore processing technologies for gold-containing ores and base metal ores;
- Enhancement or adjustment of ore processing flowsheets for operating plants;
- Development of processing technologies for the processing of legacy tailings from processing plants;
- Adjustment of reagent regimes in production (in collaboration with reagent suppliers) through laboratory studies to improve processing performance;
- Application of the following enrichment methods: flotation and gravity separation, cyanidation of ore and processing product samples, percolation and bottle leaching;
- Conducting rational (phase) analysis of gold-bearing ores to determine the gold occurrence forms;
- Determining the particle size distribution of materials through sieve analysis, along with the calculation of metal distribution by fractions;
- Performing sample preparation of geological specimens for analysis, including fine grinding and crushing of composite samples to achieve a grinding fineness of 80-90% passing through the -71 µm sieve.

Research on the development of a technological scheme for the processing of ores and their processing products includes data on the chemical and mineralogical composition of the feed material; enrichment indicators of the ore with the specification of methods and optimal enrichment parameters; the proposed technological scheme with a calculation of the qualitative-quantitative and water-slurry enrichment schemes. During the course of the research, depending on the test results, certain tasks initially included in the approved research program under the contract may be excluded or included, subject to the agreement of both parties.

18.1 Completed projects

№	Client	Project	Date
1	Sagamar CJSC	Study of the processing potential of composite samples from the ore and tailings of the Armanis deposit	2010
2	Sagamar CJSC	Study of the processing potential of ore from the Armanis polymetallic deposit	2011
3	Aletig CJSC	Development of a processing technology for tailings to produce conditionable copper, molybdenum, pyrite, magnetite, and quartz concentrates, and studying the possibility of obtaining alumina from the tailings of the Kajaran plant	2011
4	Bactek Eco LLC	Study of the enrichment potential and development of a processing technology for gold-containing ore from the Archut deposit	2013
5	ACP CJSC and Teghout CJSC	Development of a processing technology for ores from the Teghout deposit	2005-2014
6	Armenian-Canadian company Polymet Corporation CJSC	Development of a processing technology for sulphide polymetallic ores from the Vazashen deposit	2015
7	GeoProMining Gold LLC	Performing rational analysis of gold occurrences for monthly sampling of enrichment products at Ararat Gold Mining Plant	2015-2025
8	K Minerals LLC	Study of the flotation and gravity processing potential of gold-containing ore from the Tutkhun deposit	2018
9	GeoRaid LLC	Study of the flotation processing potential of two technological samples of gold-containing ore from the Mutsk deposit	2019

10	Vallex Group	Studying the possibility of obtaining conditionable molybdenum concentrate from the copper-molybdenum sample KM-19 from the deposit	2020
11	Equivest Alliance Foundation LLC	Development of a processing technology for sulphide polymetallic ores from the "Round Shishka" area of the Urut mining field to obtain a high-quality flotation collective lead-zinc concentrate	2020
12	Vallex Group	Study of the gravity and flotation processing potential of four samples with varying oxidation levels from the deposit	2021
13	Lichkvaz CJSC	Study of the mineralogical composition and development of a flotation processing regime for gold-polymetallic ore from the Lichkvaz deposit	2022
14	Bactek Eco LLC	Determining the optimal parameters for decontaminating cyanidation cakes of gold-containing ores from the Archut deposit	2023
15	GeoSurvey LLC	Development of a processing technology for copper ores from mining field No.2 of the Tatna deposit in the Syunik region	2024

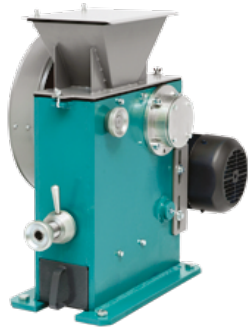
18.2 Licensed international software programs

No	Name
1	Microsoft Office

18.3 Available equipment

Laboratory equipment

The laboratory is equipped with the necessary equipment and installations for conducting key operations - ore preparation, gravity and flotation ore processing, leaching and cyanidation of gold-bearing and copper ores, and dewatering of processing products. During experiments, additional control and measuring instruments are also used alongside the main equipment.

Equipment for ore preparation			
			
Jaw Crusher Laboratory SHD 6 Manufacturer: VibroTech	Roll Crusher DVG 200x125 Manufacturer: VibroTech	Laboratory Ball Mill -1S Applicable drum volumes: 1–7 L	Disk Pulverizer ID 200 Manufacturer: Vibrotechnik

			
Vibrating Mill IV-4 Manufacturer: Grant	Reduction Unit MRU with PG 1 Feeder Manufacturer: Vibrotechnik	Sample Divider DP 10; DP 15 Manufacturer: Mechanobr Technika	Sieve Analyzer A30 Manufacturer: Vibrotechnik

Gravitational equipment	
	
Knelson KC-MD3 Concentrator Manufacturer: Savona Equipment Ltd Location: Savona, British Columbia, Canada	Concentration table CKO-0.5 Manufacturer: Mechanobr Technika

Flotation equipment with chamber volumes ranging from 0.2L to 8L		
		
Laboratory Flotation Machine, Type FMP-L Manufacturer: TVELL LLC	Flotation Machine FML 0.3 (189 FL) Manufacturer: Mechanobr Technika	Laboratory Flotation Machine 911MPE-D12-A Manufacturer: China

Equipment for leaching and cyanidation	
	
Bottle agitator	Percolators

Dewatering units		
		
Laboratory filter press SM-5L LAARMANN	Drying oven SNOL 420/300 LFN	Drying oven LF-60/350-VS2 (60 L, 350°C) Manufacturer: "LOIP"

Department of Heating and Ventilation

Undertakes the geotechnical and soil mechanics segment of design works pertaining to civil and industrial buildings and structures.

19.1 Completed projects

No	Client	Project	Date
1	Teghout CJSC	Ventilation of the main building, thickening, dewatering areas, and ammonium nitrate warehouse. Issued for construction design	2014
2	GPM Gold LLC	Ventilation of the chemical warehouse at the Ararat processing plant. Issued for construction design	2014
3	Vallex Group	Ventilation of the main wing and filtration department. Issued for construction design	2015
4	Vallex Group	Ventilation of blower sections, oil station, and pumping station. Issued for construction design	2016
5	Teghout CJSC	Increasing the production capacity of the Teghout mine to 15.0 million tons per year. Project stage	2017
6	Agarak Copper Molybdenum Combine CJSC	Ventilation of the expanded part of the main wing and pulp pumping station. Issued for construction design	2018
7	GPM Gold LLC	Expansion of the Ararat processing plant with an increase in capacity to 1.75 million tons per year. Project stage	2019
8	Zangezur Copper-Molybdenum Combine CJSC	Ventilation of circulating water pumping stations No.1 and No.3. Issued for construction design	2020
9	Zangezur Copper-Molybdenum Combine CJSC	Ventilation of circulating water pumping station No.2. Issued for construction design	2021
10	Zangezur Copper-Molybdenum Combine CJSC	Ventilation of circulating water pumping stations No.4 and No.5. Issued for construction design	2022
11	Zangezur Copper-Molybdenum Combine CJSC	Ventilation of the new flotation area, blower sections, and dosing. Project stage	2023
12	Zangezur Copper-Molybdenum Combine CJSC	Ventilation of compressor sections, oil station, electrical supply to flotation and grinding areas. Project stage Ventilation of the new main wing, blower sections, compressor, oil station, electrical supply to flotation and grinding areas. Issued for construction design	2024

19.2 Licensed international software programs

No	Name
1	AutoCAD
2	Microsoft Office

Energy Department

Comprehensive design of the electrical engineering component in mining industry projects

20.1 Completed projects

No	Client	Project	Date
1	Teghout CJSC	Electrical engineering solutions of Teghout copper-molybdenum mine, including: - Power electrical equipment and lighting for all sections and auxiliary facilities of the plant - Substations 2x6300 kVA and 2x4000 kVA, 35/6 kV - Substations 10/0.4 kV with a capacity of 2x2500 kVA and 2x1600 kVA, 2x630 kV - A series of 6/0.4 kV substations - Overhead lines 35 kV, 10 kV, 6 kV, mainly double-circuit	2007-2017
2	Vallex Group	Electrical engineering solutions of copper-molybdenum mine, including: - Power electrical equipment and lighting for all sections and auxiliary facilities of the plant - Substations 110/35/6 kV with a capacity of 2x16,000 kVA - Substations 2x1000 kVA 35/6 kV - A series of 6/0.4 kV substations - Overhead lines 35 kV, 10 kV, 6 kV, mainly double-circuit	2014-2021
3	Gold Star CJSC	Tundirget Processing Plant. Electrical engineering solutions	2013
4	GeoProMining Gold LLC	Electrical engineering solutions for the reconstruction of the Ararat processing plant	2013-2022
5	Agarak Copper Molybdenum Combine CJSC	Electrical engineering solutions for the reconstruction of the Agarak Copper-Molybdenum Mine	2018-2020
6	Zangezur Copper-Molybdenum Combine CJSC	Electrical engineering solutions for the expansion of the Kajaran Copper-Molybdenum Mine, including recirculating water supply pump stations with 6 kV switchgear, mine drainage systems, including underground pumping stations, ventilation, lighting, complete mine substations, etc.	2018-2024

20.2 Licensed international software programs

No	Name
1	AutoCAD
2	Microsoft Office

Topographic and Geodetic Department

21.1 Completed projects

No	Client	Project	Date
1	Teghout CJSC	Expansion of the sand and gravel quarry for the tailings management facility	2017
2	Vallex Group	Tailings storage facility. Tailings pipeline siphon	2018
3	Teghout CJSC	Concentrate storage	2018
4	Vallex Group	Increase in the plant's production capacity to 7.0 million tons per year. Ore crushing and transportation to the grinding area	2018
5	Vallex Group	New tailings storage facility №2	2018
6	Vallex Group	New tailings storage facility	2018

21.2 Licensed international software programs

No	Name
1	AutoCAD
2	Microsoft Office

21.3 Available equipment

No	Equipment	Model	Function
1		Matrice 600 Pro drone	Matrice 600 Pro is a six-rotor aerial platform designed for professional aerial photography and photogrammetry.
2		UAV Laser Scanner Phoenix Scout-32 and photogrammetry camera	Enables efficient scanning of small areas of the Earth's surface. Designed for use with the Matrice 600 Pro UAV.

Licenses and accreditations of Lermetin CJSC

License of the First Category for the Development of Urban Planning Documentation, excluding Structural and Architectural Sections, No. ԶՊԼ-000278, issued on 21st August 2024



License of the First Category for the Provision of Exploration and Survey Services for Urban Development Projects, No. ԶՊԼ-001796, dated November 4, 2024



3		NOVA MS60 robotic Total Station Leica Switzerland	An electro-optical instrument used in surveying and construction
4		VIVA TS16 robotic Total Station Leica Switzerland	An electro-optical instrument used in surveying and construction
5		TS 06 plus Total Station Leica Switzerland	An electro-optical instrument used in geodesy and construction
6		Reference station GPS – chinese Satellite navigation system	Continuously track satellite signals to calculate and transmit differential corrections for rover equipment.
7		Rover station GPS – chinese Satellite navigation system	GNSS RTK GPS is used in surveying and mapping for civil engineering and geology.

Accreditation Certificate No. 000697, dated December 16, 2021, confirming that the activities of the experimental laboratory of Lermetin CJSC are in compliance with the GOST ISO 17025-2019 standard



Certificates and licenses

23.1 Certificates and qualifications of the hydraulic engineering department

Annex to First-Category License No. ՔՊՆ-000278-07, dated August 21, 2024: Hydraulic Structures (Hydraulic Systems, Hydroelectric Structures)



Certificate of First Category No. H-000457, dated June 13, 2024, issued to Mr. Armen Ohanyan, certifying his qualification as a Designer of Hydraulic Structures



Certificate of First Category No. H-000623, dated June 27, 2024, issued to Mr. Edward Mkrtchyan, certifying his qualification as a Designer of Hydraulic Structures.



Certificate of First Category No. H-000455, dated June 13, 2024, issued to Mr. Sevak Melkonyan, certifying his qualification as a Designer of Hydraulic Structures.



23.3 Certificates and qualifications of the geotechnical department

Annex to First Category License No. ՔՊՆ-001796-12, dated March 6, 2025: Building and Structure Condition Assessment and Passportization.

Certificate of First Category No. H-000845, dated July 19, 2024, issued to Ms. Shushanik Asatryan, certifying her qualification as a designer of water supply and drainage systems.



Certificate of First Category No. H-001173, dated August 22, 2024, issued to Ms. Liana Hovsepyan, certifying her qualification as a designer of water supply and drainage systems



Certificate of First Category No. H-000499, dated June 17, 2024, issued to Mr. Gevorg Bezirdzhyan, certifying his qualification as an Engineer for Surveys and Certification



Certificate of Subcategory "A1" of the First Category, No. ԿԱԴ-Ա1-011, dated February 22, 2019, issued to Mr. Gevorg Bezirdzhyan, certifying his qualification as an Engineer-Designer for the Design of Industrial, Residential, and Public Buildings and Structures.



23.4 Certificates and qualifications of the engineering geology survey department

Annex to First Category License No. ՔՊՆ-001796-11, dated November 4, 2024:
Engineering-Geological Survey



Certificate of First Category No. H-001382, dated August 28, 2024, issued to Mr. Arman Hakobyan, certifying his qualification as a Geological Engineer for Surveys.



23.5 Certifications and qualifications of the geomechanics and engineering-geological survey laboratory

Certificate of participation of a laboratory in proficiency testing through interlaboratory comparison tests





Engineering for Geohazards

This is to certify that

Anush Ghazaryan

attended this 50 hour online course
from 11/07/22 to 22/08/22


Ingeoexpert

Certificate of attendance

This certificate is presented to

Anush Ghazaryan

for attending the 50 hour online
Advanced Soil Mechanics

from July 18 to August 29, 2022


Ingeoexpert

Content

- Module 1: Introduction to Geohazards
- Module 2: Rockfall
- Module 3: Shallow Slope Failures and Stabilization
- Module 4: Debris Flow
- Module 5: Avalanche
- Module 6: Construction

Content

1. Settlement and soil compression
2. Consolidation settlement
3. Shear strength of soils
4. Shear strength testing
5. Bearing capacity
6. Geotechnical design to Eurocode 7



23.7 Certificates and qualifications of the construction department

Certificate of Subcategory “A” of the Highest Category No. ՃԲԴ-Ա-0251, dated 27 July 2021, issued to Mr. Mkrtich Hakobyan, authorizing the holder to carry out professional activities in the field of architecture without any limitations.



Certificate of Subcategory "A2" of the Second Category No. ԿԱԴ-Ա2-004, issued on February 22, 2019, to Ms. Lilit Mkrtchyan, certifying her qualification as a Structural Engineer for the Design of Industrial, Residential, and Public Buildings and Structures.



Certificate of Subcategory "A1" of the First Category No. ԿԱԴ-Ա1-040, issued on July 29, 2020, to Mr. Robert Chibukhchyan, certifying his qualification as a Structural Engineer for the Design of Industrial, Residential, and Public Buildings and Structures.



23.8 Certificates and qualifications of the transport and master plan department

Certificate of First Category No. H-002095, dated September 14, 2024, issued to Mr. Armen Hovhannisyanyan, certifying his qualification as a Transport Infrastructure and Facilities Design Engineer.



23.9 Certificates and qualifications of the mining department



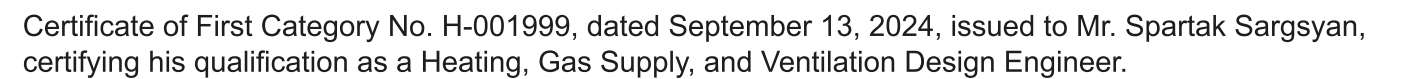
Certificate of First Category No. H-000058, dated March 11, 2024, issued to Mr. Gevorg Muradyan, certifying his qualification as a Geological Survey Engineer.



23.10 Certificates and qualifications of the department of ore processing technologies development and implementation



Annex to First Category License No. ԶՊԼ-000278-06, dated September 10, 2024: Heat and Gas Supply and Ventilation (Ventilation Systems, Heating and Air Conditioning Systems, Heat Supply and Gas Supply Systems).



23.12 Certificates and qualifications of the energy department

Annex to First Category License No. ՔՊԼ-000278-05, dated October 22, 2024: Electric Power Supply (Internal and External Power Supply Networks, Electric Lighting, Power Supply Systems, Photovoltaic and Wind Power Plants)



Certificate of First Category No. H-002505, dated September 20, 2024, issued to Ms. Anush Sargsyan, certifying her qualification as an Electrical Engineer-Designer.



First-Class Certificate No. H-001958 dated 13 September 2024, issued to Sashik Tunyan, certifying his qualification as an Electrical Power Engineer-Designer.



23.13 Certificates and qualifications of the environmental monitoring laboratory

Accreditation Certificate No. 000697, dated 16.12.2021, confirming that the activities of the experimental laboratory of Lermetin CJSC comply with the GOST ISO/IEC 17025-2019 standard.





Accreditation Certificate No. 000697, dated December 16, 2021, confirming that the activities of the experimental laboratory of Lermetin CJSC comply with the GOST ISO 17025-2019 standard.



