The documentation represents an investment project – architectural survey of an existing municipal building, Balkan Sports Hall, and a design proposal for repair and rehabiitation works and internal reorganization for which no approval of an investment designt and a building permit is required under articl 151 of the TDA.

The present Engineering Compendium on Electrical part is designed to provide detailed information in the tender documentation to the technical project proposal, which is an integral part of the project documentation of the project " We invest in sport for career development of young people – the motive power of smart growth and cohesion between the Municipalities of Botevgrad and Leskovac, under Interreg-IPA CBC Bulgaria–Serbia Programme, 2014TC16I5CB007, Call for proposals № 2014TC16I5CB007 - 2015-1, Priority Axis 2: Youth, Specific objective 2.1: Skills and Entrepreneurship.

During the design pocess, the "Ordinance №05 / 4 for design, construction and exploitation of building water and sewerage systems" -2005, Ordinance №1-3-1971 on construction and technical rules and norms for ensuring of fire safety and all currently operating regulations are being provisioned.

I. GENERAL PART

The object of design is the internal electrical installations of the residential building.

The project covers the following electrical installations:
- Power installation and electrical panels;
- Lighting installation and emergency lighting;
- Fire alarm system;
- Earthing and lightning protection installation.

Purpose of the project: Design of internal electrical installations of the building in accordance with the current legislation:
- Ordinance No 3 "On the layout of electrical systems and power lines";
- Ordinance No. 4 on design, construction and operation of electrical installations in buildings from 14.08.2003;
- Bulgarian State Standard (BDS) 1786-84. Natural and artificial lighting;
- Design standards for lightning protection of buildings and external facilities;
- Safety regulations for the exploitation of electrical installations and equipment;
- Ordinance No. 8 - Rules and norms for the location of technical ducts and facilities in settlements - 1999

The site has a"normal fire hazard" in accordance with Ordinance No I3-1971 of 29 October 2009.

The site is categorized in Category III according to "Lightning Protection Design Norms for Buildings and External Facilities".

The site is a consumer of the category III of electricity supply security according to the Regulation on the Design of Electrical Installations and Power Transmission Lines (amended in State Gazette No. 90 and 91 of 2004).

II. TECHNICAL PART

Еднолинейните схеми на ГРТ е показана на лист № 6/6 в графичната част.

2.1 ELECTRICITY SUPPLY:

The Contracting Authority has a CEZ Contract for the Sale of Electricity for Economic and Social Activity. The supplied electric power is 50 kW, enough to power the building. Measurement of the electricity consumed is done in LmLP.

The external power supply to MEB is not the subject of this project. The same is done according to the Electric Power Distribution Enterprise.

The earthing bus of LmLP will be connected to a stationary ground with DB-A1 1x35 mm and R3 ≤ 4 Ω

The board has a degree of protection IP65 and should be implemented according to the standard of NEC 02-1990. 2.

The board is manufactured in accordance with BDS EN60439-1.

The board is non-combustible, mechanically damages proof and adapted for locking. The dashboard has a bottom entry and an outlet from above.

The dashboard will be installed in the room in the location indicated on sheet 1/6 in the graphics section.

The one-line MDB schemes are shown on sheet 6/6 in the graphical section.

The electrical installation in the building is executed to the main circuit board TN-C, and after the GRT in the building TN-S circuit with three and five-wire cables.

All cables are calculated at rated permissible current and permissible voltage drop. The type of cables, the number and the cross section of the cores are given in the single-line diagrams of the boards.

After removing the cables, the holes are covered with E90 fireproof mortar.

2.2. ELECTRICAL INSTALLATIONS

The installation will be executed according to the TN-S scheme, located open in the PVC ducts in the rooms, on a grid in the corridors and on the supporting structure of the lighting installation in the sports hall with the CBT cable as follows:

- Lighting installation with 2x1,5 mm2 and 3x1,5 mm2 cables.
- general needs contacts with 3x2,5 mm2 cables.
-motor-based technology process consumers with cables shown in the single-line diagrams of the boards. Contact electric plug with cable and boiler 3x4mm2.

The project draft decision provides for:

- replacement of existing lighting fixtures with new ones with higher efficiency, low electricity consumption, meeting the requirements for lighting norms, visual comfort and complying with the European standards;
- emergency lighting.

By replacing the luminaires, you achieve 30% energy savings.

The type, number and position of the luminaires and the way they are powered is shown in the attached drawings.

The type of luminaires is consistent with the spaces in which they will be installed.

The number of luminaires is determined on the basis of the normative lighting norms for this type of room.

The layout of the buildings is consistent with the sample of the architectural furnishings of the rooms.

Lighting control will be done through standard, serial or deviator keys for hidden installations. All switches are mounted at the locations indicated in the plans at a height of 1.30m. from the ready floor and 10-15cm. from the door frames.

The construction of emergency evacuation lighting, realized with illuminators with LL with built-in ABS, is foreseen. The installation will be executed with cable CBT3x1.5mm2, installed in installation channels of fire resistantc PVC. The illumination of the floor at the center line along the evacuation path meets the requirements of Ordinance No I3-1971 of 29 October 2009.

The propulsion system includes the power supply for household consumers, computers, and the process technology installation.

The location of the contacts is in line with the furnishings.

All contacts at a height of 1.50m. from a ready floor to the places specified in the plans.

The panels will have protective elements according to the power and purpose of the respective terminals. In order to protect the current circuits, the supply contact outlets for switching of mobile consumers according to art.1789 and 1796 (3) of Ordinance No. 3 provide for defective current protection with a working current of 30 mA.

The number and type of current circuits required for power supply, lighting, heating, control, signaling, information and communication technologies, etc. are determined depending on:

1. the location of points where power is required;
2. expected loads from the different circles;
3. daily and annual changes in power needs;
4. presence of special conditions (eg presence of harmonics);
5. requirements for management, signaling, information and communication technologies, etc .;
6. Expected future power needs (if known).

All openings through walls and ceilings should be wired after the installation has been completed.

In places where the installation has to go past chimneys it should be placed around the ceiling or a heat-insulating surface should be placed between the wall and the wires.

The following minimum distances shall be observed when executing installations:

- between the electrical installation and the plumbing pipes at a parallel laying - at least 10 cm and at intersection - at least 5 cm.
- between the power and telephone installation - minimum 10 cm
- the contact openings should be at least 25 cm away from radiant heaters, sinks and other open plumbing or heating fittings.

2.4. EARTHING AND LIGHTING PROTECTION INSTALLATION

The lightning protection installation shall be executed in accordance with "Standards for the design of lightning protection of buildings and external facilities". According to Table 1, the object is categorized as the 3rd category of lightning protection.

In view of the architectural design of the building, a lightning barrier mounted on a mast with a height of 1 m is provided at the indicated location of the drawing. It is connected to two holes laid on supports and under the plaster and from galvanized rail to grounding according to the attached detail of the drawing .

The earthing of the lightning conductors shall be executed with two earthing plugs made of galvanized 2 1/2" 2 m long pipes. The connection between them shall be made by means of the earthing bus and welding, and the connection between the earthing bus and the lightning conductors shall be made by means of a bolt A 1.5 m connection from the ground with a straight terminal connector in a terminal box. The impulse resistance measured should not exceed 10 ohms. The lightning protection of the building is provided according to the requirements of Ordinance No 8 of 28 December 2004 on lightning protection of buildings, outdoor facilities and open spaces. The external protection system protects the building from direct lightning strikes by taking it away.

The ground panel of the building is grounded. After checking the grounding, in case of deviations from the standard values, the grounding system must be completed by connecting to new grounding devices until

the norm values have been reached using a 40/4 mm galvanized rail. The landings are to be filled with two earthing plugs of 2 1/2" galvanized pipes with a length of 2.5 m. The connection between them and the earthing bus is to be carried out by welding and the connection between the earth busbar and the tray is made by means of a bolted connection. The impulse resistance measured should not exceed 10 ohms. After the main switchboard, zero and protected conductors should have no connection.

The metal non-lead parts of the electrical equipment will be connected to the protective conductor via the 3rd / 5th / cable of the power lines.

The indirect contact protection is via AIP through automatic circuit breakers whose characteristics provide the standard shutdown time /0.4s/ of the damaged section / Ordinance 3, Art. 206). All metallic non-conducting parts of the electrical connection and plug-in terminals of the contact connections are connected to the directly grounded source neutral / by separate protective conductors (3rd or 5th cable).

Sections of the protective and leveling conductors comply with the minimum permissible and the cross section of the phase conductors (Ordinance 3, Art. 166, 176). Insulation and conduction of the zero wires are in compliance with Ordinance 3, art.1762, 1879. The protective conductors for electrical equipment are insulated and in a common cover with the others, hidden under the plaster.

Switching elements should not be installed in the PE circuit!

N and PE shoud not be conntected in the switchboards!

NOTE: Protocols should be dragted for the results of the necessary measurements and for the method of laying the installation - acts for hidden works to be presented to the Acceptance Commission.

The design meets the requirements of the applicable regulations for this type, which should be strictly observed in the construction and operation of the site.

For the execution of the construction and assembly works qualified personnel should be hired.

In the detailed quantitative accounts made on the basis of the technical design under part ELECTRO, All types of construction and assembly works, which are envisaged for accomplishment of the objective – construction of a dwelling that can be put into exploitation - are being reflected

B. Safety, occupational hygiene and fire safety

B1. Technical safety and security

When building electrical networks and installations the norms and rights of safety and hygiene of labor must be observed, according to the normative documents:

Ordinance No. Iз-1971 on Construction and technical rules an for ensuring fire safety "

Labor Safety Regulations for construction and installation works

Ordinance №31 on the structure and safe exploitation of lifting equipment

Regulations for fulfilling and accepting construction and assembly works

Ordinance on ensuring safety and hygiene conditions of work

Ordinance № 1 for the exploration and design works on Capital construction

The labor protection rules given in the passport and the instructions for the exploitation of each of the machines used, taking into account its specific features.

Labor protection rules are specific to each site, according to the working conditions.

Prior to commencing construction, the construction site must be enclosed with a solid fence at a minimum height of 1.80 m.

It is forbidden to admit work to uninstructed persons who use special work clothes and personal protective equipment.

The electrical panels must be locked and the light wagons - grounded. Only electrical engineering has the right to work on electrical panels and machines.

In the process of exploitation the mechanization must be technically sound with sound and light signals checked before starting work.

There must be a first aid kit on the construction site with the necessary dressing and disinfecting materials.

There must be a Labor Safety and Security Technique instruction book in the office of the site, which includes:

- The type of instruction;
- The position of the instructed;
- Instructional subject;
- The success of assimilating the instruction;
- Instruction date;
- Instructor.

During the construction of the building electrical system it is not allowed to use products which do not comply with the requirements of Bulgarian State Stabdards (BDS) and EU standards. Quality materials should be used. Wire should be identified in accordance with IEC 446:1089 "Color and digital identification of wires".

All construction and assembly workds are to be implemented in strict compliance with the applicable regulatory documents and approved project.

The installation and testing of the installations and the external networks should be managed by specialists who have been specially trained and comply with the requirements of the manufacturer.

The following precautions are envisaged:

1. The electrical installations provided for in the project should be carried out and maintained by qualified technicians in strict compliance with the applicable regulations cited at the beginning of this explanatory note.

2. Parts of permanent electrical installations for temporary power supply shall not be used until they are fully completed and put into exploitation.

3. Precautions shall be taken in the case of tests on electrical installations to protect workers and other persons on the site from falling under voltage and electric shock.

4. Installations, in particular connections in electrical installations, welding and reinforcement of pipes, fittings, radiators, ventilation ducts, etc., which are performed simultaneously with other types of construction and assembly works, shall be carefully executed and supervised by the technical head of the site or by a qualified person authorized by him.

5. Installation of parts and assemblies from the technological equipment and pipelines to the existing ones, as well as their connection to temporary installations, pipelines or other operating systems, should start after the written permission of the owner or the operating company.

6. When installing the technological equipment of pipelines in the vicinity of cables, wires or busbars, the Technical Manager shall take the necessary measures to protect the workers from falling under voltage and to protect the installations from damage.

7. Before installation, make the necessary measurements and issue the relevant records from a licensed laboratory.

Repairs to electrical installations should only be carried out by competent and qualified persons in case of switched off voltage.

B2. Fire safety

Any worker who goes to work for the first time or changed to another job must be thoroughly instructed on the Safety, occupational hygiene and fire safety norms.

In order to ensure the fire safety of the construction, the products that are used must be equipped with specifications related to fire safety.

According to "Regulation № I-з-1971 on construction and technical rules and fire safety standards", the building is class F2, subclass F2.1, functional fire hazard category and fire hazard category F5D.

With regard to fire safety for electrical installations, the site is characterized by normal fire hazard and no special requirements are present.

The following precautions are foreseen:

1. For protection against contact - thoroughly made insulation of all current-carrying parts, installation of the earth leakage protection for all contacts and deflection of the protective conductor.

2. Emergency protection (short-circuit) - automatic switch-off of the voltage from the automatic circuit-breakers with maximum current switches conforming to the power of the consumers and their supply lines.

In accordance with the requirements of ORDER № Iз -1971 of 29 October 2009 on technical and safety rules for fire safety, the conditions laid down in the following provisions shall be complied with:

Art. 239. (1) Switchgear (switches, switches and sockets), junction boxes, sockets, lamps, etc. to be provided on and in constructions and supports made of products with a reaction-to-fire class not lower than A2.

(2) The elements of the electrical installations under art. 1 to be provided on and in structures and holders made of products of classes of reaction to fire B, C, D, E and F, provided that substrates of products of reaction-to-fire class not lower than A2 and of a thickness of at least 10 mm are placed under and / or around them

Art. 246. (1) The panels of electrical boards in works of functional fire hazard class F5 to be executed by products with a reaction-to-fire class not lower than A2.

Art. 263. The connection and junction boxes of the electrical installations in the places of all classes of fire hazard to be executed by products with a reaction-to-fire class not lower than C.

The proposed design solution for the service part and the envisaged construction and assembly works for the sports hall also provides an opportunity for its multifunctional use for sports training, training and practical activities and development of several types of sports.