**AGREED:**

by decision of the Technical Commission

(decision No., protocol No.)

(date)

**I APPROVE:**

Director of the Strategy Department

(name, surname, signature)

(date)

DESIGN TASK

Construction of a new 330 kV ETL Vilnius-Neris

**INVESTMENT PROJECT NO. PLSV18094**



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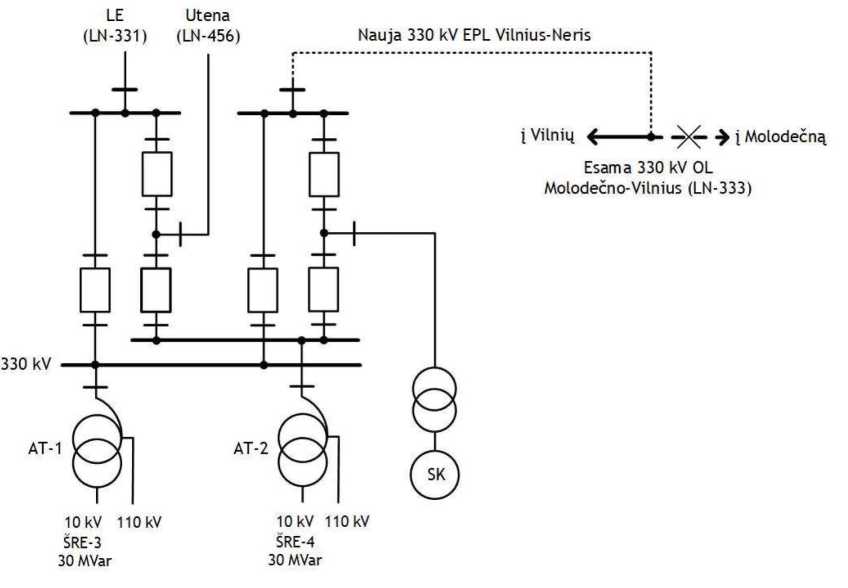
1. **General information:**

|  |  |  |
| --- | --- | --- |
| **Title of the project** | “Construction of a new 330 kV ETL Vilnius-Neris“ | |
| **Project number** | PLSV18094 | |
| **Main characteristics** | 330 kV | |
| 80,687 km | |
| **Project preparation stage** | Technical design and contract works (“up to the key”) | |
| **Project manager** |  |  |
| **Project owner** |  |  |
| **Type of construction** | New construction/reconstruction | |
| **Category of structures** | Special | |
| **Address** | Nemenčinė eldership, Bezdoniai eldership, Lavoriškės eldership, Mickūnai eldership, Šatrininkai eldership, Kalveliai eldership, Rukainiai eldership, Marijampolė eldership, Pagiriai eldership, and Juodšiliai eldership, Vilnius district municipality and Paneriai eldership, Vilnius city territory | |

Design task “Construction of a new 330 kV overhead line Vilnius-Neris” No. PLSV18094

1. DESIGN TASK REQUIREMENTS:
   1. GENERAL REQUIREMENTS
2. The construction of a new single-circuit 330 kV Vilnius-Neris overhead transmission line and related modifications to the existing Neris transformer substation are planned for 2021-2025. The existing 330 kV overhead line Vilnius-Molodečno (LN 333) will be used for part of the 330 kV Vilnius-Neris overhead line in the section between pylons No. 1-59. The existing 330 kV overhead line Vilnius-Molodečno (LN 333) in the section between pylons No. 1-59 shall be reconstructed and the section between pylons No. 60-85 shall be disconnected and dismantled.
3. The total length of the planned 330 kV Vilnius-Neris overhead line (LN 519/520) is 80.687 km: the length of the new line is 57.942 km, and the length of the reconstruction of the existing 330 kV Vilnius-Molodečno overhead line (LN 333) is 22.745 km. Route according to the attached Environmental Impact Assessment Report (Annex 1).
4. The construction of the 330 kV OL Vilnius-Neris and the reconstruction of the existing 330 kV OL Vilnius-Molodečno (LN 333) on the section between pylons No. 1-59 will be carried out on a “up to the key” basis.
5. The technical design shall be prepared and formalized in accordance with this design task, the Law on Construction, STR 1.04.04:2017 "Building Design, Expert Examination of a Design", Lithuanian Standard LST 1516:2015 "Building Design. General Requirements for Formalization" and the provisions of other normative documents and rules regulating construction and design in force in the Republic of Lithuania, as well as the connection/technical conditions and/or special requirements set by the relevant authorities.
6. The technical design of the structure, the detailed design of the work, and any other design solutions or their adjustments shall be prepared in the building information model as defined in the requirements of the transmission system operator LITGRID AB (hereinafter - TSO) for the preparation of the building information model (EIR) (Annex 2).
7. The technical design must be based on the standard technical and other requirements annexed to the design task.
8. The preparation of the technical design must follow the TSO standard technical requirements for the composition of the technical design (Annex 3).
9. The scope of the submission of the technical documentation of the Main equipment for approval and the compilation and structure of the tables of the technical specifications of the technical design shall be in accordance with the requirements of the TSO Procedure for justifying the compliance of the main equipment with the Customer's requirements and the requirements for the compilation of the technical specifications of the technical design (Annex 4). The explanatory note to the Technical design shall stipulate that the Contractor shall provide the completed Technical design specifications with documentation supporting the compliance requirements prior to the commencement of the preparation of the detailed design of the works and the ordering of the Main equipment. Prior to the ordering of the Main equipment, the TSO shall assess the conformity of the equipment supplied by the Contractor with the design task and the design solutions in accordance with the standard technical requirements for the equipment. Equipment shall be ordered upon approval of the TSO.
10. In all cases, the technical and detailed design must be prepared as separate projects.
11. The Contractor shall carry out the preparation of the technical design and work design. The developer of the technical design (hereinafter - Designer) shall perform all necessary actions related to the preparation of the technical and work design, including, but not limited to, obtaining the conditions of access, special/architectural conditions, organising/updating engineering, archaeological, geological and other investigations (at his/her own expense), supervising the project, obtaining building permits, and obtaining any other necessary permits for the execution of the works (including, but not limited to, those specified in the design task), preparation of clearing and other documents necessary for the withdrawal of forestry permits, organisation of construction completion works (preparation of geodetic photographs of the Object, cadastral measurements of the Object (structure) and the land plot on which the Object (structure) is located, preparation of the cadastral data file(s) of the immovable property and its/their coordination with the TSO (prior to the coordination with the cadastral manager) and coordination with the cadastral manager (prior checking). Text data on digital media is available in Word and PDF formats, while graphical data is available in CAD, PDF, IFC and BCF formats). The technical design solutions should be agreed with the responsible employees of the TSO. The coordination shall be carried out through a project manager appointed by the TSO, implementing the requirements set out in the EIR document. Submit 2 copies of each part of the technical design for review, 1 paper copy and 1 (one) digital copy (in the Common Data Environment (CDE), the BIM data exchange and project team communication infrastructure specified in the EIR document). The technical design, prepared, agreed and submitted after the general examination of the building project, must be submitted in 4 copies, 3 of which must be in hard copy (one marked "Original" and bearing the original signatures of the heads of the parts of the project and the project manager who have prepared the technical design, and authenticated by the original seal) and 2 copies. 1 digital copy with all signatures (in the Common Data Environment (CDE), the BIM data exchange and project team communication infrastructure specified in the EIR).
12. The pages of each paper copy of the technical design file shall be numbered consecutively, with the page numbers of the project file being indicated in the project file composition sheet (each project file shall contain the contents of the file).
13. The digital information of the design documentation shall be provided in \*.pdf format, in which the composition of the design documentation (file names) must be identical to that of the paper version, as well as in Microsoft Word (\*.doc) and Excel (\*.xls), and the graphical information (drawings) shall be provided in AutoCAD (\*.dwg) formats (editable) as well as in .ifc and .bcf formats.
14. The disconnections of the 330-110 kV part of the transmission network, as foreseen in the agreed work schedule, will be included in the annual schedule of disconnections of the TSO part. Notwithstanding this, after the approval of the technical design (the part of the construction organisation defining the scope, sequence and order of the disconnections), the Contractor is required to draw up and agree on a schedule for the reconstruction works-disconnections of the object (detailed requirements are set out in the points below). This schedule shall be consistent with the terms of the above schedule defining the disconnections of existing electrical installations and shall be a detail of the execution part of the schedule.
15. Detailed requirements relating to the timing of the project's works-disconnections and other information required for planning and coordination of disconnections are set out in points 14 to 26 of these conditions.
16. The technical design of the TSO part shall describe the sequence and stages of the project. The details of the stages and duration of the contract works and the sequencing of the works shall be at a level that makes clear the scope and indicative duration of the disconnection of the operational facilities of the part of the transmission network to be disconnected, as well as the durations of the stages indicated. The scope of disconnections shall be coordinated with the TSO during the preparation of the technical design of the TSO part of the electricity transmission network.
17. The pre-construction and construction organisation part of the project, which includes basic information on the sequence of works, the necessary disconnections of existing installations and the estimated duration of the individual stages, must be carried over to the parts of the technical design that will be coordinated with the third parties that have issued the connection/technical conditions. Take into account the connection/technical conditions issued by third parties in the design.
18. The Designer’s sequencing of works shall be based on the principle that the disconnection of existing electrical installations shall be carried out to the minimum extent and within the minimum time limits. For the purpose of assessing the deadlines, a timetable for human and technical resources must also be included in the organisation of works section of the technical design.
19. The Designer shall be guided primarily by the following in the sequencing of the works:
    1. Simultaneous disconnection of the 330kV Vilnius-Molodečno OL (LN 333) and the 330kV Vilnius-Lietuva E I OL (LN332) or the 330kV Vilnius-Lietuva **E** II OL (LN533) is not possible;
    2. Simultaneous disconnection of the 330kV Vilnius-Molodečno OL (LN 333) and the 330kV Lietuvos E-Neris OL (LN331) is not possible;
    3. Simultaneous disconnection of the 330kV Vilnius-Molodečno OL (LN 333) and the 330kV Neris - Utena OL (LN456) is not possible;
    4. Simultaneous disconnection of the 330kV OL Lietuvos E-Neris (LN 331) and the 330kV OL Neris-Utena (LN456) is not possible;
    5. Simultaneous 330/110/10 kV Neris TS disconnection on the 330kV side is not possible;
    6. The works at the intersection with the 330 kV OL Vilnius-Neris (LN 519/520) (new route) and the 110 kV OL Vilnius-Kalveliai (approximately between pylons No. 19-22 of the 110 kV OL Vilnius-Kalveliai) shall be designed in such a way as to ensure that the total disconnection time of the 110 kV OL Vilnius-Kalveliai is not longer than 12 calendar days.
    7. The works on the parallel sections with the 110kV OL Vilnius-Vilnia I and the 110kV OL Vilnius-Vilnia II (double-circuit) shall be designed in such a way as to avoid the need for disconnection of the 110kV OL Vilnius-Vilnia I and the 110kV OL Vilnius-Vilnia II;
    8. The works in parallel sections with the 110kV OL Vilnius-Jašiūnai shall be designed in such a way that no disconnection of the 110kV OL Vilnius-Jašiūnai is required;
    9. Design the works in such a way that during the construction of the new 330 kV Vilnius-Neris OL (LN 519/520), the existing 330 kV Vilnius-Molodečno OL is in operation. The reconstruction of the existing 330kV Vilnius-Molodečno OL is only possible for its reconstruction from the 330kV Vilnius TS to the 330kV Vilnius-Molodečno OL (LN 333) pylon No. 59 and for the alignment of the protections between the 330kV Vilnius and the 330kV Neris TS.
    10. It should be noted that due to the ongoing projects "Reconstruction of 330kV and 110kV switchyards of 330/110/10 kV Neris TS and 110kV Neris TS" and "Installation of new synchronous compensators for Lithuanian ES" by TSO, the sequence of works and design solutions for this project will have to be aligned to the projects listed above (provided that there is an overlap of the timing of works of projects).
20. The scope and sequencing of the works shall be planned in the technical design in such a way that the emergency start-up time of the installation (existing line) can be identified at any point in time during the execution of the works, i.e. it shall be expressed in a specific numerical value and shall not be equated with the entire construction period. Specify in the technical design the emergency start-up time of the installation (existing line), if necessary with different times for different stages. In this case, the emergency switch-on time of the installation is understood as defined in the Regulations on Dispatching Control of the Electricity System approved by the Minister of Energy of the Republic of Lithuania (hereinafter - the Regulations).
21. The technical design specifies that the contractor carrying out the transmission part of the works shall be responsible for drawing up a work-disconnection schedule for the reconstruction of the site and for coordinating it with the TSO. A detailed schedule for the reconstruction works-disconnections shall be agreed at least 90 calendar days before the start of the on-site works. The contractor shall update the schedule of works-disconnections and re-negotiate any changes in the progress and/or timing of the works within more than 1 month. A standard form-sample of the Works-Disconnections Schedule is available in (Annex 5).
22. The technical design of the transmission part of the network specifies that the contractor is obliged to submit to the TSO the disconnection requirements for the following calendar year to the extent and within the timeframe set out in the Dispatching Regulation for the Management of the Electricity System and in the TSO Internal Procedures (by 1 August of the year of the following year for the installations of the 330 kV part of the network and by 30 October of the year of the following year for the installations of the 110 kV part of the network).
23. The technical design of the transmission part of the network specifies that the contractor must submit to the TSO the disconnection requirements for the following calendar month to the extent and within the timeframes set out in the Dispatching Regulation for the Management of the Electricity System and in the TSO internal procedures (for the 330 kV part by the first day of the current month for the next month, and for the 110 kV part by the tenth day of the current month for the following month).
24. The technical design of the transmission network section shall specify that any failure to coordinate the timing of unscheduled disconnections (i.e. disconnections that do not correspond to the dates of the approved reconstruction schedule, or disconnections that have not been scheduled in the reconstruction schedule, or the Contractor has not provided the TSO with information in accordance with the requirements of clauses 16 and 17 of this chapter), the failure of the TSO to coordinate the timing of the reconstruction, or the failure of the Contractor to disconnect the electrical facilities at the requested time, shall not be deemed to be a failure to perform the project for the fault of the TSO. Such unscheduled disconnections will not take priority over other work in the TSO annual and monthly schedules.
25. The technical design of the part of the transmission network shall provide for the organisation of training for the participation of TSO representatives and operational personnel performing operational management services for the part of the equipment belonging to the TSO on site. The training shall be carried out on site, with the number of sessions and dates to be determined by coordinating the work-disconnections schedule.
26. It should be noted in the technical design that when organising works on the overhead lines of the transmission network, where disconnection and earthing of 0.4-35 kV overhead lines is required, the personnel (contractor) carrying out the works shall draw up a schedule of the works to be carried out, which is to be agreed upon with the TSO and the AB ESO 20 days in advance prior to the start of the works. Upon receipt of a coordinated, approved schedule and an application for disconnection of 0.4-35 kV overhead lines from the TSO, the operational employees of AB ESO shall coordinate the time of disconnection with the consumers (if necessary). When the TSO contractors carry out works on the TSO overhead lines, the grounding, wire removal, and installation of the 0.4-35 kV overhead lines is carried out by AB ESO contractors. The 0.4-35 kV crossing OL disconnection schedule form is available at (Annex 6).
27. The commissioning of refurbished or newly installed equipment may only be carried out in accordance with an approved one-off commissioning programme, in the presence of representatives of the Contractor and the TSO RPA, and only on working days and during working hours. The commissioning programme shall be prepared by the Contractor and coordinated with TSO and other interested parties.
28. In the technical design it should be noted that the contractor shall prepare and coordinate with the TSO RPA the operational maintenance instructions for the installations and the standard switching sheets/programmes, and organise the testing of the automated standard switching sheets with the TSO DCS, either prior to the completion of the construction of the installation or in individual stages (depending on the detailed schedule of the works-disconnections). Standard switching sheets shall be drawn up for all new installations (circuit breakers, busbars, main circuit breakers and busbar protectors). Standard switching programmes are drawn up for electricity transmission lines. Standard switching sheets and programmes are drawn up separately for disconnection/switch off and switch on. The list of sheets and programmes is coordinated separately with TSO. The sheets and programmes, prepared and agreed by signature with the TSO System Management Centre (primary commutation) and the Infrastructure Maintenance Centre RPA personnel (operations in secondary circuits), shall be submitted to the TSO System Management Centre in hard copy (with signatures) and in \*.docx format on computer media in Lithuanian language.
29. All equipment, cabinet and line markings shall be agreed with the TSO and shall comply with the requirements of the Transmission Network Operational and Technical Naming and Marking Procedure (Annex 7). All new electrical installations and cabinets shall be provided with operational signs on weatherproof plates. The inscriptions of the equipment and automatic switches in the cabinets of OSE, DCSSP, ACSSP, RPA shall be agreed with the TSO before the production of the equipment and devices starts. If the reconstruction is accompanied by the replacement or new installation of equipment in other substations, there is also a requirement that all markings of the newly installed or replaced equipment, cabinets and lines in these substations must be agreed with the TSO.
30. The composition of the technical design (design files/volumes) shall be determined by the Designer, after assessing the scope of the design works to be the basis for obtaining the building permit and in agreement with the TSO. A separate file must be kept in the technical design:
    1. Technical specifications for equipment/materials must be in both Lithuanian and English. It must be possible to export the technical specifications (in Lithuanian and English) from the Building Information Model (BIM).
    2. The cost sheets shall be compiled in a single file in accordance with the cost sheets prepared for the relevant parts of the project. The cost sheets contained in the relevant parts of the project files shall be completed in accordance with the format of main table D.1A. of Annex D, “Form of Cost Sheet”, to LST 1516:1998, and the cost sheets contained in a separate cost sheet file shall be completed in accordance with the format of main table D.1B. of Annex D, “Form of Cost Sheet”, to LST 1516:1998. The cost sheets shall be provided to the Customer in hard copy and in a digital and editable \*.xls (Excel) format. This file and the relevant sub-project files should indicate that the bill of quantities are contained in the individual sub-project files and that the bill of quantities file contains the aggregated cost data for the project. It shall be possible to export cost sheets from the Building Information Model (BIM).
    3. After obtaining the technical conditions of AB ESO (conditions for the relocation (reconstruction) of electricity networks and facilities), design technical solutions for the removal of electricity networks and facilities belonging to AB ESO, which fall within the territory of the TSO area and which are interfering with the execution of construction works. The technical design shall contain copies of the document of agreement between the responsible persons of the TSO for each part of the design (file) of the technical design drawn up (except for the cost estimate, technical specification and cost sheet files). The individual parts (files) of the AB ESO project must contain copies of the approvals of the responsible persons of AB ESO. The technical design, which has been prepared and agreed with the interested parties, will be forwarded in a separate file to the TSO.
    4. Evaluate the design solutions and installed equipment of Vilnius TS and Neris TS 330 kV switchyards.
31. Only the General part of the technical design (file) must contain a copy of the design brief.
32. The general part of the technical design (file), as prepared, must contain copies of the document of agreement by the responsible persons of the TSO.
33. Within the technical feasibility of the installation of overhead power lines, fix the wires as high as possible in the sections between the pylons in the immediate vicinity of the residential area. Carry out measurements of the electric fields in the premises of the dwellings in the OL protection zone until the construction completion certificate is issued. If parameter values are found to exceed the permissible limits, take measures to reduce the values of the electric field parameters to those allowed (e.g. earthing of roofs, replacement of roof coverings with steel, etc.).

**Neris TS 330 kV distribution scheme after reconstruction**



Note: A part of the existing 330 kV Molodečno-Vilnius line has to be disconnected from the connection point of the new line on the Molodečno side in order to form the new 330 kV Vilnius-Neris line.

Figure 1. Construction of a new 330 kV Vilnius-Neris ETL

1. **ELECTRICAL ENGINEERING**
2. Design and installation of the 330 kV Vilnius - Neris OL feeder to the 330 kV facilities of the Neris TS.
3. Design and installation of the 330 kV Vilnius - Neris feeder to the 330 kV facilities of Vilnius TS.
4. For the installation of the high-frequency communication channel in the 330 kV OL Vilnius - Neris, use the high-frequency primary equipment installed in phases A and C of the existing LN 333 (Molodečno) of Vilnius TS. Provide for the dismantling, transport and installation of the single-phase high-frequency primary equipment (communication barrier and communication capacitor) at the Neris TS. The solutions for the installation of the high-frequency duct in the 330 kV OL Vilnius - Neris are presented in the technical design. Before dismantling the equipment in Vilnius TS and after installing it in Neris TS, carry out inspections of the equipment in accordance with the requirements of the Transmission Network Equipment Testing Regulation and submit test reports. In the post-installation protocols for the Neris TS, provide a comparison of the measured characteristics with those measured for the Vilnius TS before dismantling.
5. Provide for the dismantling of the existing current transformers ST-333 of the 330 kV Vilnius substation and their transfer to the emergency reserve of the TSO. Equipment transferred to the emergency reserve shall be tested in accordance with the requirements of the Transmission Network Equipment Testing Regulation before dismantling. The test protocols shall be submitted to the TSO together with the equipment to be placed in reserve. Provide for the delivery of the equipment to be preserved to the IPC Eastern Region Emergency Reserve Storage Site. The connection terminals for the equipment to be dismantled shall be retained with the equipment and handed over to the IPC personnel.
6. Design the direct connection of the L-333-0 switchgear of the Vilnius TS to the Š-333 busbar. If direct connection is not possible, design and install supporting insulators on existing metallic structures in place of the ST-333 to be dismantled, in accordance with the standard technical requirements for 400-110 kV supporting insulators given in Annex 8. After the direct connection of L-333-0 to Š-333, provide for the dismantling and storage of the structures supporting ST-333 at the site until they are handed over to a company contracted by TSO. The transfer of metal waste is organised by IPC Eastern Region employees. The location of the storage of metal waste must be agreed with the responsible IPC employees. Provide for the arrangement of the earthing circuit after dismantling the foundations.
7. Install cables with a minimum capacitance of 1680 A (single phase) in accordance with the standard technical requirements for flexible conductors for use in 400-110 kV substations in Annex 9, in the space between the 330 kV busbar Š-333 and the L-333-0 divider. The cables to be installed shall be solid, without splices.
8. Newly designed connection terminals shall comply with the standard technical requirements given in Annex 10.

**3.3. ELECTRICITY TRANSMISSION LINES**

General requirements:

1. Design the installation of wiring with an electrical capacity of at least 1680 A (single phase). Number of AL1-382/49-ST1A or similar wires per phase - 2 pcs.
2. Design the installation of 1 lightning protection cable with fibre optic cable (hereinafter - LPC with FOC) in accordance with the scopes given in the section "Telecommunication equipment".
3. Provide calculations and results for the thermal immunity to short-circuit currents of LPC with FOC**;**
4. Design the adjustment works for wires and LPC with FOC and provide calculation tables for tensile forces and deflections in the installation and steady-state modes;
5. Provide steady-state tables of wire and LPC with FOC deflections for each span of a newly constructed and reconstructed overhead line (hereinafter - OL), indicating the length of the anchor span, the length of the specific span, the tensile forces of the wires and LPC with FOC in the anchor span, the deflections of LPC with FOC, the deflections of the wires, and the distances from the ground surface or civil engineering structures at the point of maximum deflection of the wire at the following environmental conditions: conductor warm-up temperature +80°C, ambient temperature +35°C, no frost and no wind, and ambient temperature -5°C, frost and wind present.
6. Provide a summary table of calculations of the vertical distances between the conductor and the LPC with FOCfor each OL in the spacing frame, indicating the length of the spacing frame, the normative and calculated values of the distances.
7. Provide a longitudinal profile of the OL, which shall include the deflections of the wires and LPC with FOC, the distances from the wires to the ground and to the surface of the water, the distances at the intersections with other engineering infrastructure, for the normal and the critical (ambient temperature calculated at t= +35°C, wire heating temperature calculated at t= +80°C, wind velocity calculated at v= 0,6 m/s) operating modes of the OL. The distances from the lower wires of the OL to the ground and water surfaces, to the surfaces of cars, railways and waterways shall be designed at least 1.5 m greater than the distances specified in the Rules for the Installation of Electrical Power Lines (hereinafter - RIEPL) for the critical (calculated ambient temperature t= +35°C, cable heating temperature t= +80°C, wind speed v= 0.6 m/s) mode of OL operation;
8. Provide a layout of the OL route where the position of the planned OL edge wires and the existing edge wires (330 kV OL in the Vilnius-Molodečno section from pylon No. 1 to pylon No. 59) can be identified in a horizontal projection;
9. For the 330 kV Vilnius - Neris OL, one complete phase transposition cycle must be designed. During the preparation of the technical design, the locations (supports) for the transposition of the phases must be agreed with the TSO.
10. The cost sheet shall include the recording of the actual tensile forces of the wires and LPC with FOC and the minimum distances from the lower cables of the OL to the ground and water surfaces, as well as to the points of intersection with other engineering infrastructure, the measurements, and the submission of reports of the results to the Customer;
11. Provide calculations and results for the selection of specific installation locations for vibration dampers-distance springs. Evaluate the need for additional vibration dampers at the cable fixing points.
12. Design the installation of new insulator garlands, linear fittings and earthing circuits. Provide calculations and results for the selection of the electromechanical characteristics of insulator garlands and linear reinforcement. Provide drawings (overall dimensions, components) of the insulator garlands.
13. The resistance of the earthing circuits of the supports shall not exceed 10 Q. Drawings for the installation of the earthing circuits for the supports shall be provided;
14. Design the installation of permanent signs on the pylons in accordance with the requirements set out in Annex 11.
15. Evaluate the requirements of the "Description of the Obstacle Marking Procedure", approved by Order No. 2BE-109 of the Director of the Lithuanian Transport Safety Administration of 26 March 2020;
16. Design and select the OL elements in accordance with the requirements of Annexes 12-25.
17. Intersections with the AB ESO electricity network should be taken into account in the design.

Requirements for the reconstruction of the Vilnius - Molodečno line (between pylons No. 1 - 59):

1. Design of the replacement of 47 reinforced concrete (hereafter - g/b) intermediate pylons with metal intermediate pylons. In total: 47 pcs.
2. Design for the replacement of 7 pcs of g/b intermediate-corner pylons with metal anchor supports. In total: 7 pcs.
3. Design for the replacement of 5 pcs of metal anchor supports with metal anchor supports. In total: 5 pcs.
4. Design metal grating spacers and metal grating anchor supports in accordance with the requirements of the section “Part on Building Structures”.
5. Possible reduction of the number of OL pylons by designing pylons on the OL axis at new locations. When pylons are proposed to be built on new sites, written consents must be obtained from the landowners on whose land the pylons are to be installed.
6. Dismantle the 330 kV Vilnius - Molodečno section between pylons No. 60 - 85. Carry out the necessary modifications (reinforcements) to pylon No. 86, if necessary, to ensure that the pylon is able to operate in single-sided tension. Section 86 - 93 shall not be dismantled.

Requirements for the construction of the 330 kV OL Vilnius - Neris (LN 519/520) (from the Neris TS to the 330 kV OL Vilnius - Molodečno (LN 333) pylon No. 59):

1. Design metal grating spacers and metal grating anchor supports in accordance with the requirements of the section “Part on Building Structures”.
2. The new 330 kV OL Vilnius - Neris shall be fed to TS Neris via the new double-circuit 330 kV OL Utena - Neris (LN-456) pylon No. 1 foreseen in the project "Reconstruction of 330-110-10 kV Neris TS".

Requirements for the route of the overhead line:

1. The new pylons shall be selected and constructed without extending/changing the boundaries of the existing transmission line protection zone (330 kV OL **Vilnius - Molodečno**) and the boundaries of the engineering infrastructure corridor planned in the Engineering Infrastructure Development Plan **(from the Neris TS to the 330 kV OL Vilnius - Molodečno pylon No. 59)**.If it appears that the proposed technical solutions extend/alter the boundaries of the existing protection zones or extend/alter the boundary of the planned engineering infrastructure corridor, do the following:
2. Establish and register in the Real Estate Register the easement(s) granting the right to construct, maintain and use underground/overground communications. Carry out all the actions necessary to establish and register the easement(s) in the Real Estate Register (drawing up the land plot plan(s) with the easement(s) to be established, organising the signing of the easement agreements, payment of compensation, etc.). Provide an extract(s) from the Central Data Bank of the Real Estate Register of the land plot(s) confirming the registration of the easement(s) in the Real Estate Register, and any other necessary third-party consents, at the time of coordination of the technical design.
3. Submit the consent of the owner(s) of the land plot(s) or the state or municipal land trustee for the establishment of a protection zone for electricity networks in accordance with Article 7 of the Law on Special Land Use Conditions of the Republic of Lithuania. Indicate on the drawings the existing and projected protection zones for electricity networks.
4. Identify and register in the Real Estate Cadastre and in the Real Estate Register the areas subject to special land use conditions (electricity network protection zones). Carry out all the necessary steps for the registration of these areas in the Real Estate Cadastre and the Real Estate Register. Provide extracts from the Central Data Bank of the Real Estate Register of the land parcels, confirming the registration of areas subject to special land use conditions (electricity network protection zones).
5. The new construction section **(from the Neris TS to the 330 kV Vilnius - Molodečno pylon No. 59)** shall be designed within the limits of the engineering infrastructure corridor planned in the engineering infrastructure development plan. The process of preparation of the territorial planning document is carried out in the Information System for the Preparation of Territorial Planning Documents and State Supervision of the Territorial Planning Process of the Republic of Lithuania (TPDRIS) that can be fount at www.tpdris.lt, TPD No. S-NC- 00-18-500. The sections of the new construction route are preliminary, the final routes will be finalised after the approval of the engineering infrastructure development plan.
6. The technical design shall include the modelling of the necessary height of the pylons and wires to achieve the required result of keeping the electric field strength below 1 kV/m in the entire vicinity of the dwellings listed in Table 2.8.27 of the PAV Report (Annex 1) within the protection zone. If necessary, select the appropriate type of pylons, transposition of wires and other solutions in agreement with the TSO during the technical design stage. Calculations of the electric and magnetic field strengths generated by the 330 kV OL and their results shall be provided. The submitted “Pylon Height Modelling Study” (Annexes 26 and 27) is of an informative nature and it is the responsibility of the contractor to ensure that the results of the calculations carried out and the actual measurements of the electromagnetic fields are in line with the results of the calculations.
7. Where the construction site falls within land and territories belonging to third parties, the Contractor must inform the owners or managers of the land or territories in writing 3 months in advance of the works being carried out. The draft letter of information must be agreed with the TSO. The Contractor must also compensate the owners or managers of the land and sites for damages caused by the works.

**3.4. RELAY PROTECTION AND AUTOMATION (RPA)**

General part:

1. Perform the necessary calculations according to the RIEPLRPA to guide the selection of the principles and devices.
2. Perform RPA tuning, configuration, reconfiguration and complex tests in accordance with the requirements of the TSO Transmission Network Facilities Operation Regulation, the EIC, and the Rules for the Operation of Power Plants and Electricity Networks.
3. The RPA equipment shall be microprocessor-based with a self-monitoring system that meets the requirements of the EIC and other technical and regulatory documents. The standard technical requirements for microprocessor relays and controllers are given in Annex 28. Other requirements for microprocessor relays and controllers not specified in the standard technical requirements are selected during the development of the technical project;
4. The LN 333 telecommand transmission equipment at Vilnius TS will be transferred to the TSO reserve, subject to the agreement of the TSO Transmission Grid Department's Infrastructure Supervision Centre's Eastern Region RPA Engineer.
5. The new RPA and control equipment shall have all the necessary interfaces for the connection of communication paths and secondary circuits, for the fulfilment of measurement, protection, automation, monitoring and control functions.
6. Design and implement modifications in the secondary circuits of Neris TS and Vilnius TS related to the change of the primary scheme and the construction of a new 330 kV OL Vilnius-Neris (LN 519/520), design and install new telecommand transmission equipment and longitudinal differential protection for the 330 kV OL Vilnius-Neris (LN 519/520), as well as their integration into the substations' RPA circuitry.
7. The existing LN333 RPA equipment of Vilnius TS shall be preserved and used to protect the new 330 kV Vilnius-Neris OL (LN 519/520).
8. The equipment of the new 330 kV OL Vilnius-Neris (LN 519/520) shall be preserved and used for the protection of the RPA connection to be installed during the reconstruction of Neris TS (the telecommand transmission equipment and the differential protection shall not be installed during the reconstruction of the Neris TS, and have to be installed in this project).
9. Draw up structural diagrams assessing the necessary changes to be made to the existing RPA structure:

* RPA connection to metering transformers;
* 330 kV RPA equipment functional connections and element layouts in cabinets;
* interactions between the functions of the RPA equipment;
* functional diagram of the connection of RPA devices to the PDT;
* functional diagram of the RPA surveillance system (monitoring);
* a functional/structural scheme for the transmission of RPA and pre-emergency automation telecommands (transmitted/received, direct or in transit, redundant) between Transmission network switchyards, power stations and substations related to the construction of the 330 kV OL Vilnius-Neris (LN 519/520). The diagram(s) shall depict and indicate the destinations, quantities, types of transmission/reception channels, preserved and newly designed telecommand transmission facilities, RPA and other devices or appliances involved in telecommand formation and transmission for all transmitted (transmitted/received, direct or in transit, standby) commands;
* direct operating current supply to RPA devices.

1. The design of the RPA structural diagrams (including 330 kV) shall be based on the TSO description of the development of standard functional diagrams for relay protection and automation in technical designs for 110 kV transformer substations of the transmission network, which is given in Annex 29.
2. The requirements for the digital communication channels and equipment for pre-emergency automation and RPA telecommand transmission shall be specified in the part on telecommunications of the technical design. The principles and conditions for the formation of telecommands, together with the need for telecommand sales facilities, shall be defined in the RPA part of the technical design.
3. Each microprocessor-based RPA unit shall have an integrated emergency process recorder recording operating and emergency currents voltages and freely selectable internal and external signals.
4. Each microprocessor-based RPA device shall have an event recorder function to record the operation of all types of internal logic (including protections and automation) of the device.
5. RPA terminals requiring current summation to perform protection functions shall have the required number of analogue current inputs and the current summation shall be performed in the terminals' internal logic.
6. Each RPA unit shall have an integral light alarm to indicate malfunction of the unit, effects of functions and automation, and other RPA operations as required.
7. Provide a 10-15% reserve for binary inputs/outputs and RPA terminals.

Interfaces and data exchange between the RPA and other substation equipment:

1. data exchanges between RPA devices and TCTD shall be carried out via IEC61850 ed.2.0 protocol (vertical communication) in Neris TS, IEC61850 ed.1.0 protocol (vertical communication) in Vilnius TS;
2. Each RPA device shall be connected to two separate PDT switches via separate interfaces to ensure the reliability of the information exchange. The duplicated data traffic over these dual connections shall be controlled by the IEC 62439 (PRP) protocol.
3. The secondary circuits of current and voltage transformers shall be connected to the relays by copper cables;
4. Secondary circuits for control and process signals are connected to relays via copper cables.
5. Cables and wires for secondary RPA circuits shall be copper stranded, with flame retardant insulation. All cables in the RPA circuits connecting the secondary circuits of the switchyard's main devices to the microprocessor devices shall be shielded (concentric copper tape shielding) and shall be provided with potential equalisation. The standard technical requirements for control cables connecting relay protection/automation and open switchgear primary installations are given in Annex 30, and for wiring for the internal installation of outdoor and indoor cabinets in Annex 31.
6. The cable connecting the high-frequency primary telecommand transmission facilities of the high-frequency communication channels of the open switchyard and the high-frequency telecommand transmission facilities installed in the SCP 330 kV shall comply with the technical requirements in Annex 32.
7. The equipment used in the RPA data exchange using the IEC 61850 ed.2.0 (1.0) protocol (together with its internal software version) must be fully interoperable and must have a document from the manufacturer confirming that the device and its software has been tested and operates in accordance with the IEC 61850 standard.

330 kV OL Vilnius-Neris (LN 519/520) telecommand transmission equipment

1. Two independent stand-alone sets of RPA command transmission/reception equipment shall be installed for both ends of the overhead line at Neris TS and Vilnius TS;
2. The command devices must be identical for both ends of the overhead line (Neris TS and Vilnius TS);
3. Each existing set of protectors of the under-construction 330 kV OL Vilnius-Neris (LN 519/520) shall transmit/receive telecommands through separate telecommand transmission/reception facilities. The command transmission devices shall operate over independent physical communication channels (one communication channel shall be an optical link and the other a high frequency (AD) link);
4. Telecommand devices operating on different communication channels shall be installed in separate cabinets or together with a set of OL protectors forming a telecommand. Design separate RPA cabinets for each set of telecommand transmission equipment in Neris TS. The Vilnius TS telecommand transmission facilities shall be installed at the locations that will become vacant after the dismantling of the existing 330 kV Vilnius-Molodečno (LN 333) telecommand transmission facilities. The locations of the telecommands are to be adjusted during the preparation of the technical design.
5. The management of all and individual, received and transmitted telecommands from the DCS shall be designed and installed. During the reconstruction of the Neris TS, it is planned to install an RPA function controller and a bipolar relay controller together with the required number of bipolar relays for the control of the telecommands, with an additional controller to be designed only if necessary. Telecommand management is in place in Vilnius TS and must be maintained when new telecommand transmission facilities are installed. During the preparation of the technical design or detailed design, the solutions implemented in the Neris TS and the Vilnius TS need to be verified and the necessary changes need to be designed.
6. Design and install all the necessary secondary equipment for the AD link in the Neris TS.
7. The existing 330 kV Vilnius-Molodečno (LN 333) AD telecommand transmission equipment of Vilnius TS shall be dismantled and transferred to the TSO emergency reserve.
8. The existing 330 kV Vilnius-Molodečno (LN 333) ARLA RPA cabinet and its equipment are no longer in use at Vilnius TS, the existing circuits and equipment are to be de-energised and retained in Vilnius TS reserve, with the corresponding adjustments to the detailed design.
9. Each new telecommand transmission facility to be designed shall receive/transmit at least 8 telecommands.
10. The design of new telecommand transmission facilities linked to relay protection and automation shall comply with the standard technical requirements specified in Annex 33. Other requirements, not specified in the standard technical requirements, for telecommand transmission equipment associated with relay protection and automation shall be selected during the development of the technical design.
11. The project costs shall include calculations and tests of the attenuation parameters of the high-frequency communication channels of the RPA telecommand transmission at both ends of the newly constructed 330 kV Vilnius-Neris OL (LN 519/520) (the tests shall be carried out both at the Vilnius TS and the Neris TS), (on a line with no voltage and with voltage), and selection of the best phase combination for attenuation between the ends of the line, combination of high-frequency primary and secondary equipment, preparation of test reports.

Differential protection of 330 kV OL Vilnius-Neris (LN 519/520):

1. Design and install one independent longitudinal differential protection set operating via an optical communication channel with all necessary equipment for both ends of the lines (Vilnius TS and Neris TS).
2. The new differential protection terminals at Vilnius TS and Neris TS must be equivalent/identical from the same manufacturer, and the data exchange between them must be carried out using the interfaces and protocols specified by the equipment manufacturer.
3. The installation of the longitudinal differential protection set for Vilnius TS should be designed in the existing 330 kV Vilnius-Molodečno (LN 333) RPA cabinets or a separate new RPA cabinet.
4. The installation of the longitudinal differential protection set for the Neris TS should be designed in the existing RPA cabinets of the 330 kV Vilnius-Neris OL (LN 519/520) or a separate new RPA cabinet should be designed.
5. The terminals of the longitudinal differential protection shall be connected to the secondary windings of the current-measuring transformers of the two circuit-breakers supplying the line, and the terminals shall be provided with a sufficient number of analogue current-measuring inputs for this purpose.
6. Main longitudinal differential protection functions of OL:
   1. line differential current protection function;
   2. integrity control function for current circuits;
   3. selecting the affected phase and switching it off;
   4. The differential protection of Vilnius TS and Neris TS is connected to two current transformers;
   5. the possibility to enter at least 2 groups of provisions.
   6. at least 8 light indicators to display the effects of guards and alarms.
   7. an emergency process recorder to record operating and emergency currents voltages and freely selectable internal and external signals;
   8. an event recorder function that records the operation of all types of internal logic (including guards and automation) of the device.

Relay protection and automation functions are controlled from the RPA devices and DCS:

1. Upgrading of the SRD to a higher level.
2. Changes to groups of RPA provisions.
3. Control of the current protection function of the longitudinal differential line of 330 kV OL Vilnius-Neris (LN 519/520).
4. Management of all and individual, received and transmitted telecommands.

Requirements for RPA cabinets installed in substation control rooms (hereinafter - indoor cabinets):

1. New RPA indoor cabinets shall be fitted to the standard technical requirements set out in Annex 34.
2. Other equipment, not specified in the standard technical requirements, required to complete the indoor cabinets shall be selected during the preparation of the detailed design.
3. A completed TSO inspection report of the installation of the main and other RPA equipment in the RPA indoor cabinets during factory testing (with the endorsements of the maintenance engineer and the contractor/cabinet manufacturer's representative) shall be attached to the factory test programmes and reports provided by the cabinet manufacturer. The form of protocol is given in Annex 35.
4. Electromechanical relays for RPA electrical circuits shall comply with the standard technical requirements given in Annex 36. Other requirements for electromechanical relays for RPA circuits not specified in the standard technical requirements shall be selected during the development of the technical design.

Requirements for outdoor intermediate terminal cabinets for installation in open switchyard (hereinafter - outdoor cabinets):

1. New outdoor cabinets installed in an open switchgear shall comply with the standard technical requirements set out in Annex 37.
2. Other requirements for intermediate terminal cabinets not specified in the standard technical requirements shall be selected during the design of the work.
3. A completed TSO inspection protocol for the assembly of main and other RPA equipment in outdoor intermediate terminal cabinets during factory testing (with the endorsements of the maintenance technician and the contractor's/cabinet assembler's representative) shall be included in the factory test programmes and protocols provided by the cabinet manufacturer. The form of protocol is given in Annex 38.

Installation of other RPA equipment:

1. All automatic switches used for operational switching in new cabinets for OSE and VP shall be designed in locations at least 1 m from the floor (OSE from ground level);
2. The contacts of the terminal relays of the RPA devices controlling the switchgear shall be capable of interrupting the current of the control coils of the switchgear at the rated voltage. For the control of divider and earthing switch drives, appropriate contacts shall be integrated in the plug-in controllers.
3. Design separate automatic transfer switches for the binary inputs of each new/relocated microprocessor controller or guard terminal for power supply and short-circuit protection on secondary circuits.
4. Cables, wires and conductors of secondary circuits to be connected to terminal sets or devices shall be marked with special labels stating:
   1. for wires - the numbers of the two ends at which the wire is connected, the terminal set and the terminal to which it is connected, and the name of the circuit (in accordance with the DP principle diagrams);
   2. for cable conductors - the numbers of the terminal block and the terminal to which it is connected, the name of the circuit (according to the wiring diagrams of the DP) and the number of the cable (according to the DP cable logbook);
   3. for secondary circuit cables - cable type, number (according to the DP cable logbook), addresses of the termination points (from/to), length;
5. The markings on the secondary circuit cables, their conductors and internal wiring in the existing connections (RPA outdoor and indoor cabinets, cable ducts, drives of the main equipment) of the Vilnius TS and Neris TS 330 kV, due to the connection of the new OL, have to be replaced by new ones and to be in line with the actual reality, with the corresponding adjustments of the existing working drawings up to the level of the reality.

Changes to other Transmission network facilities related to substation reconstruction:

1. The technical design shall describe and provide calculation conclusions for the necessary RPA changes to be carried out in other transmission network facilities related to the reconstruction (330 kV LE TS, Utena TS, Neris TS, Vilnius TS).
2. The cost of this project includes the cost of the additional RPA equipment to be purchased related to the construction of the 330 kV Vilnius-Neris OL (LN 519/520) and the connection to Vilnius TS, Neris TS, together with the cost of the installation, configuration, tuning, adjustment, and complex testing of this equipment.
3. Carry out the necessary modifications to the configuration of the protectors and the RPA provisions, cross-testing and testing of the operating currents in the RPA installations. Due to the change of operational names of Vilnius TS and Neris TS, provide for the change of all related RPA circuit tags, change of operational designations, updating of operational and technical instructions, updating of work projects to the realistic level.
4. Provide for the amendment of the RPA provisions related to the construction of the 330 kV OL Vilnius-Neris (LN 519/520) line in the above mentioned TS’s.

RPA equipment monitoring system (monitoring):

1. The new RPA terminals are integrated into the existing monitoring system (Vilnius TS and Neris TS), which is virtually separated from the control system.
2. The RPA terminals of the new 330 kV Vilnius-Neris OL (LN 519/520) connection shall be subject to local continuous monitoring of the condition of the connection facilities and information on their condition shall be transmitted to the TSO's DCS.
3. The workstations of the TSO’s RPA engineers shall be able to remotely monitor the RPA terminals from their workstations using the software provided by their manufacturer. The data shall be transmitted via the internal TSO technology routed computer network (VPN) to the existing monitoring data collection workstations at the TSO headquarters and at the TSO Infrastructure Maintenance Centre of the operating region of the RPA engineers.
4. Software suites for local/remote monitoring of relay protection and control equipment (including fault logging and analysis) shall be provided by the manufacturer of the new RPA terminals.

Software and documentation:

1. The RPA equipment shall be accompanied by: real-time operating system-adapted technology software suites with licences that allow the user to execute the algorithms of the guards, the logging and analysis of the functioning of the guards, and the additional real-time monitoring of the incoming data. The software enables the user to associate different working options with external devices and RPA modes of the object, and to activate additional functions.
2. Licences shall not be provided if, according to the licence provider, the Customer has purchased a sufficient number of licences for the equipment to be supplied and the version of its internal software is compatible with the existing software.
3. User descriptions, user manuals, technical service descriptions (in hard copy and \*.docx format on computer media, in English and Lithuanian), functional and principle descriptions of the RPA equipment, devices, software, and user manuals must be prepared and approved, internal configurations (settings, logic, list of IEC61850 ed.2.0/ed.1.0 signals to be received and given in horizontal communication), configuration diagrams (in hard copy and \*.dwg format on computer media).
4. The drawings of the RPA part, both in the technical and work designs, shall be provided in hard copy and in \*.dwg format on a computer storage medium with the possibility for the user to adjust/correct the drawings during operation.
5. Revisions and additions to the existing Vilnius TS and Neris TS RPA principal and installation diagrams shall be submitted in an editable DWG format, and updated paper versions shall be submitted.
6. Provide for the participation of Transmission system operator’s RPA personnel in the factory testing of RPA indoor and outdoor cabinets.

Issuing and amending the RPA provisions.

* 1. When drawing up the timetable, it shall include the time required to prepare the calculation tasks for the TSO RPA provisions.
  2. Evaluate/take into account the deadlines for issuing RPA provisions when scheduling disconnections.
  3. The calculation of the RPA Provisions starts after the main equipment of the line has been coordinated in accordance with the technical specifications of the technical design prepared for the TSO part of the project, which has been subjected to an expert examination, and the working design of the 330 kV overhead power line Vilnius-Neris (LN 519/520) has been available with the types of the line's supports, the location of the wires and the parameters of the grounding cables and the distance between the wires within them.
  4. For a new substation or switchyard being reconstructed or constructed in a single phase (for one or more of its connections), the RPA provisions shall be issued for a period of 5 months after the approval of the main equipment.
  5. For a new substation or switchyard being reconstructed or constructed in several phases (for one or more connections within it), the RPA provisions are issued on a phase-by-phase basis, with the first phase being issued within 5 months after the approval of the main equipment. The RPA provisions are issued for subsequent phases after the completion of each phase within 3 months.
  6. For temporary interconnection schemes that require temporary interconnections in several phases at a substation or switchyard under reconstruction or under construction (for one or more connections), the RPA provisions shall be issued within 3 weeks, after the coordination of the temporary interconnection scheme and the schedule of disconnections with TSO.
  7. In substations and switchyards where the need to change the RPA provisions is related to a substation under construction or reconstruction (one or more connections), the changes to the RPA provisions shall be carried out at the time of switching on the reconstructed or newly constructed substation. In such cases, the RPA provisions shall be issued before the reconstructed or newly built substation or switchyard (one or more connections therein) is switched on after the last phase of reconstruction or construction.

3.5. CONTROL, SIGNALLING AND MEASUREMENTS IN VILNIUS TS AND NERIS TS

1. Designing changes to the teleinformation (signals, control and measurements) of the new 330 kV OL Vilnius-Neris (LN 519/520) connections in Neris TS and Vilnius TS, related to the change of the original diagram and the construction of the new 330 kV OL Vilnius-Neris (LN 519/520).
2. Design the telecommunication information (signals, control and measurements) related to the planned installation of the new telecommand transmission equipment (TPE) and longitudinal differential protection for the new 330 kV OL Vilnius-Neris (LN 519/520) in Neris TS and Vilnius TS.
3. The teleinformation list shall be developed, coordinated with the TSO and tested in accordance with the TSO-approved Description of Requirements for the Remote Control of Transmission Network Transformer Substation’s and Switchyard’s Equipment. The document is available on the TSO website at [www.litgrid.eu](http://www.litgrid.eu): Network Development>Standard Technical Requirements>Remote control of substation’s and switchyard’s equipment. The document is also provided in Annex 40.
4. The technical design shall foresee the need for operational name changes and/or other related works (preparation of object signal lists, coordination with TSOs, testing, changes to instructions, diagrams and other documentation) to be carried out on other transmission network objects related to the construction of the new 330 kV Vilnius-Neris OL (LN 520) (see chapter Relay protection and automation). Identify in the technical design the work to be carried out on other transmission network assets on an asset-by-asset basis. In the case of changes to other facilities in the transmission network, the signal lists for these facilities shall be prepared, coordinated with the TSO, and the testing shall be carried out for each substation (object) individually, in accordance with the TSO approved Description of Requirements for Remote Control of Transmission Network Transformer Substations and Switchyard Equipment in the Transmission Network.
5. The TSO shall provide the contractor with lists of existing teleinformation (signals, control and measurements) for the related transmission network objects (see chapter Relay protection and automation). Further completion, adjustment and coordination of the volumes of these lists of TS signals with the TSO responsible employees shall be carried out within the teleinformation lists provided. The lists shall include a separate section for newly designed and incorporated teleinformation (signals, control and measurement).
6. The Contractor's designers shall identify all existing teleinformation (signals, control and measurements) directly related to the protection, control and measurement of the 330 kV Vilnius-Neris OL (LN 519/520) connections in the teleinformation lists of the related transmission network objects provided. The need for changing the names or states of this teleinformation (signals, control and measurements) shall be evaluated in the course of the design, taking into account the requirements of the TSO description of remote control. New teleinformation shall be added or the names of existing signals or statuses, commands or measurements shall be adjusted or existing teleinformation shall be deleted as required.
7. The Contractor's designers shall review all existing teleinformation lists of related transmission network objects (see chapter Relay protection and automation) and assess the need for modification of the existing teleinformation that does not directly belong to, or is not related to, the connections of the 330 kV OL Vilnius-Neris (LN 519/520). If necessary, the teleinformation lists of the related other objects in the transmission network (see chapter Relay protection and automation) shall be adjusted and the existing signals, control commands or measurements shall be tested accordingly.
8. All teleinformation directly related to the 330 kV OL Vilnius-Neris (LN 519/520) connection facilities shall be tested in the associated transmission network facilities. Existing teleinformation shall also be tested in those scopes where changes have been made (signals, control and measurements) due to newly designed, adjusted teleinformation scopes.

3.6. COLLECTION AND TRANSMISSION OF TELEINFORMATION

1. Taking into account the RPA changes in the related transformer substations (Vilnius TS, Neris TS, 330 kV LE TS, Utena TS), changes to teleinformation volumes must be assessed, and the necessary changes to the collection, transmission and management of teleinformation must be designed and implemented:
2. during the design phase, the technical solutions shall be agreed and complete lists of signals in the TCTD configuration, including signals in the reconstructed part, signals to be deleted during the reconstruction and new signals, shall be prepared and submitted;
3. the configuration of the TCTDshall be carried out with the addition of newly designed teleinformation, and the hardware and software of the TCTD shall be upgraded or supplemented in case of insufficient TCTD resources.
4. The installation and configuration of TCTD and packaged equipment shall be carried out by personnel certified by the manufacturer of the equipment, or by its authorised agents, in certified centres. Certificates of competence shall be submitted before the start of work;
5. Testing of the TCTD data exchange (site acceptance test - SAT) after the equipment has been installed at the site according to the design, providing a test report.
6. The teleinformation collection and transmission part of the technical and work designs shall be presented in separate TIS files in accordance with the TSO requirements for the composition of technical designs as set out in Annex 3.
7. The solutions and timing of the 330kV TS Neris reconstruction project must be assessed.

3.7. TELECOMMUNICATION MEASURES

1. Design a fibre optic communication line - lightning protection cable with fibre optic cable (hereinafter - LPC with FOC) on the newly designed 330 kV OL Vilnius-Neris (LN 519/520):
   1. number of optic fibres - 72;
   2. Recommendation for optic fibre - ITU-T G.652D;
   3. The installation of the LPC with FOC shall be carried out in accordance with the cable manufacturer's instructions;
   4. The LPC with FOC shall be placed on the gantries by installing LPC with FOC-FOC couplings and LPC with FOC reserve wrapping devices;
   5. Emergency reserve: LPC with FOC - 2 km, coupling- 1 set.
   6. The technical requirements for LPC with FOC are set out in Annex 41.
   7. The technical requirements for the couplings of the LPC with FOC are given in Annex 42.
2. Design fibre optic cable (hereinafter - FOC) inlets:
   1. to the communication hardware of the control panel of the 330/110/10 kV Neris TS;
   2. to the communication apparatus of the administrative building of the 330/110/10 kV Vilnius TS;
   3. In order to maintain independent FOC runs, underground FOC shall be installed in newly designed and installed ⌀110 mm HDPE communication cable duct systems (CCDS)**;**
   4. Design and install 32mm diameter HDPE pipes to protect the fibre optic cable from the LPC with FOC-FOC couplings to the newly designed and installed communication manholes. The exterior and interior surfaces shall be smooth;
   5. Design and install new galvanised steel 50 mm inner diameter, minimum 3 mm wall thickness, protective conduits to carry the fibre optic cable from the portals to the newly designed and installed communication manholes;
   6. The technical requirements for communication protection pipes are given in Annex 43;
   7. number of optic fibres - 72;
   8. Recommendation for optic fibre - ITU-T G.652D;
   9. design and install communication manholes only in substation areas;
   10. Type of communication manholes - reinforced concrete RKŠ-1-3;
   11. The covers of communication manholes shall be lockable;
   12. Typical requirements for communication manholes are given in Annex 44;
   13. The FOC shall be completed in existing telecommunications cabinets in newly designed and installed fibre distribution panels (FDP) with E2000/APC-type connectors;
   14. Leave the process FOC stocks in the manholes or crawl space.
   15. The technical requirements for the FOC are given in Annex 45.
   16. The technical requirements for FDP are given in Annex 46.
3. 330kV Vilnius substation to connect the newly designed RPA devices for data transmission via the existing substation data network(hereinafter - SDN). The SDN must be extended with analogue switches.
4. Design and install a second channel for RPA telecommand transmission over the existing SDH network. Design and install the differential protection channel via direct optical fibre.
5. The solutions and timing of the 330 kV Neris TS reconstruction project must be assessed.
6. All telecommunications equipment shall be marked in accordance with the Transmission Network Operational and Technical Naming and Marking Procedure (Annex 7).
7. Upon completion of the fibre optic cable installation, provide a fibre optic passport for the entire route and original fibre reflectograms in \*.sor format.
8. The telecommunications part of the technical design shall be presented in a separate volume. The technical and work project material must be submitted in paper and electronic versions. There must be two electronic versions: one with editable rights (in MS Word, MS Excel, Autocad [\*.dwg], MS Visio formats), the other with the author's version, which cannot be edited.

3.8. ACCOUNTING FOR ELECTRICITY

1. During the connection of the new 330 kV Vilnius - Neris (LN 519/520) 330/110/10 kV Vilnius TS to the existing 330 kV Vilnius - Molodečno OL (LN-333), appropriate changes shall be made to the electricity metering and information transfer diagrams (operational names of the electricity metering equipment, markings and labels of the secondary circuit cables and conductors). Any changes will be coordinated during the design process.
2. When connecting a new 330 kV OL Vilnius - Neris (LN 519/520) in the 330/110/10 kV Vilnius TS in the 330 kV connection of the existing OL Molodečno - Vilnius (LN-333), and dismantling the ST-333 installed in this connection, the commercial metering equipment of the line LN-333, the 330 kV VP (in the R17 in the KAS cabinet) and the secondary circuits of the commercial metering, as well as the commercial metering related devices shall be dismantled in parallel.
3. During the execution of the replacements, the return of equipment, devices or disposal issues should be coordinated with the Eastern Region of the TSO Infrastructure Supervision Centre (330/110/10 kV Vilnius TS, Vilnius, Tiškevičiaus str. 72A.).

3.9. BUILDING STRUCTURES

1. Design the dismantling of the 330 kV Vilnius - Molodečno section between pylons 60 - 85. Section 86 - 93 shall not be dismantled.
2. Carry out the necessary modifications (reinforcements) to pylon No. 86, if necessary, to ensure that the pylon is able to operate in single-sided tension (anchor support).
3. Metal anchor-corner supports U330-1+9 (1 piece), U330-1+14 (5 pieces) dismantled from the reconstructed 330 kV OL Jurbarkas - Bitėnai shall be used for the construction of the 330 kV OL Vilnius-Neris. Metal spacers P330-3 (15 pcs.) and P330-3+5 (2 pcs.) dismantled from the reconstructed 330 kV OL Jurbarkas - Bitėnai shall be used for the reconstruction of 330 kV OL Vilnius - Molodečno section, between pylons 1-59. Install the intermediate pylons in parallel with the 110 kV OL Vilnius-Vilnia l,ll, relocating them in such a way as not to extend the existing overhead line protection zones. When adapting the 330 kV OL Jurbarkas - Bitėnai pylons for the construction of the 330 kV OL Vilnius-Neris, the design documentation of the pylons to be used shall be taken into account and it shall be evaluated (recalculated) whether the mechanical characteristics of the pylons to be used are suitable for the specific intermediate supports. Documentation of the dismantled pylons is given in Annexes 47-51. When submitting a bid, the Contractor must estimate the costs required for:

* partial or complete removal of pylons at the point of storage;
* transport of selected or partially selected pylons to the site (-300 km);
* for the assembly of pylons;
* all bolted connections that are damaged by corrosion or that have been dismantled in the course of dismantling prior to shipment shall be replaced by new ones of equivalent or better performance.

1. When designing OL pylons, a maximum of two types of main structure (base pylon without extension) shall be provided for the entire line. For newly designed intermediate and corner supports, all external dimensions (lengths of traverses, spacing between traverses, wire attachment points in traverses (except for wire attachment points in the lower traverses), spacing between wires in the support, spacing between foundation anchor bolt attachment points, etc.) shall be the same as those given in Annexes 52-55.
2. The intermediate and corner supports of the reconstructed 330 kV Vilnius - Molodečno OL shall be designed according to the technical parameters of the existing line without extending the protection zone. When designing single-strand intermediate OL pylons, provide a maximum of two types of main structure (base pier without extension) for the whole line. For newly designed intermediate and corner supports, all external dimensions (lengths of traverses, spacing between traverses, wire attachment points in traverses (except for wire attachment points in the lower traverses), spacing between wires in the support, spacing between foundation anchor bolt attachment points, etc.) shall be the same as those given in Annexes 52-55. OL intermediate pylons shall be designed for no more than two types of basic (without extensions) structure. Exceptionally, in agreement with the TSO, in locations where it is not possible to maintain the requirements of the normative magnitudes of the electric and magnetic field strengths with the parameters of the pylons specified in Annex 5, it is possible to design pylons with different overall dimensions. Summary tables of the characteristics of the newly designed supports shall be provided, indicating: climatic conditions (wind, frost areas), permissible maximum gauge, wind and weight spacings, number of wires to be installed per phase, diameter, mass, diameter, mass and permissible tension of the lightning protection cable (6max. load, 6t=-40oC, 6t=+5oC), support mass etc.
3. Other metal structures shall be designed in accordance with STR 2.05.08:2005 “Design of steel structures. Main provisions”.
4. The steel structures of overhead lines shall be hot-dip zinc coated and shall comply with the TSO Standard Specifications as specified in Annex 56. All bolts, nuts and washers are hot-dip galvanised.
5. At least two exploratory boreholes shall be provided in the design for each multifuctional pylon of the OL.
6. The foundations under the metal structures, depending on the hydrogeological conditions of the site, shall be made of factory-manufactured monolithic reinforced concrete products of a standardised type and shall comply with the TSO Standard Technical Requirements (Annex 57). The concrete part of a g/b factory or monolithic foundation shall be at least 20 cm above ground level. Foundation anchor bolts and nuts shall be coated with an anti-corrosion coating in accordance with the requirements specified in LST EN 2063 or equivalent.
7. Note: The embedded part of the foundation anchor bolts shall not be galvanised.
8. In accordance with the "List of Regulated Construction Products" approved by the Ministry of Environment of the Republic of Lithuania, the construction products used in the construction of the facility must have certificates (Declaration of Conformity, Declaration of Performance, Testing Protocols, etc.) issued by the Notified Bodies designated by the Minister of Environment of the Republic of Lithuania in accordance with the Ordinance of the Republic of Lithuania No. D1-601 of 27 June 2018.
9. The foundations of the piers shall be designed in reinforced concrete of the standard factory precast type. In exceptional cases, depending on the hydrogeological conditions, they may be borehole or peat. Design work is carried out according to: Building Standard RSN 156-94 “Building Climatology”; Building Technical Regulation STR 2.05.04:2003 “Effects and Loads”; Building Technical Regulation STR 2.05.08:2005 “Design of steel structures. General Provisions"; Building Technical Regulation STR 2.05.05:2005 "Design of Concrete and Reinforced Concrete Structures"; Building Technical Regulation STR 1.05.06:2010 "Building Design"; Lithuanian Standard LST EN 1992-1-1:2005 "Eurocode 2. Design of reinforced concrete structures. Part 1-1. General and building regulations”; Lithuanian standard LST EN 1993-1-1:2005 “Eurocode 3. Design of steel structures. Part 1-1. General and building regulations”; Lithuanian standard LST EN 1997-1:2005 “Eurocode 7. Geotechnical design. Part 1. Basic rules”; Lithuanian standard LST EN 1997-2:2007 “Eurocode 7. Geotechnical design. Part 2. Exploring and testing the substrate“. The minimum number of tests per substation shall be one test borehole per 20 acres, but not less than two test boreholes in the case of small-area substations; the Lithuanian standard LST EN 1536:2011 "Performance of special geotechnical works. Drilled piles”; Lithuanian standard LST EN 12699:2003 “Special geotechnical works. Shoring piles" and other applicable norms in the Republic of Lithuania."
10. In the areas of dismantled structures, the ground surface shall be levelled, the excavations shall be backfilled with local or imported soil where necessary to restore the integrity of the pavement, and compacted in accordance with the requirements of the technical specifications, if provided. The works shall be carried out in accordance with STR 1.06.01:2016 “Construction works. Supervision of construction” and ST 121895674.06:2009 “Excavation and site preparation works”.
11. Manage waste generated during construction in accordance with the requirements set out in the chapter “Part on environmental protection”.

Supports

1. General requirements

The supports shall be designed as single-strand steel pylons.

The supports shall be designed to enable maintenance work to be carried out, including the following:

* safe use of support structures;
* replacement of insulators and fittings;
* maintenance of wires and lightning protection cables.

Other requirements

1. The metal structures (gantries and supports) supporting the 330 kV **AS** equipment shall be designed in metal profiles in accordance with the TSO Standard Specifications for Steel Structures in Annex 58.
2. The steel structures of the 330 kV open switchgear shall be hot-dip zinc coated and shall comply with the TSO Standard Technical Requirements as specified in Annex 56. All bolts and nuts and washers are hot-dip galvanised.
3. Cables and their shield potential equalisation conductor shall be laid in the ground from the SCP to the building structures of the installation in SCP pipes and/or cable ducts. Cable ducts - above ground, reinforced concrete, covered with g/b panels. Reinforced concrete products shall comply with the requirements of LST EN 13369 and the TSO Standard Technical Requirements in Annex 58. Fire sand barriers in g/b ducts - in accordance with the requirements of the EIC. When designing cable ducts, assess the condition and capacity of existing ducts. From PVC pipes to electrical equipment, in coated factory-filled hot-dip galvanised metal trays.
4. The structures of all existing 330 kV installations, their structural and other technological dependencies, including utilities, which will be replaced during the reconstruction or in the cages to be reconstructed will not be used, dismantled and disposed of.
5. Water drainage and drainage system as necessary.
6. Installation of an information and interpretation stand at the main entrance to the site. Information on the stand:

* the name of the customer;
* designer;
* name of the contractor;
* name, surname, contact Tel. of the construction manager;
* name, surname and contact Tel. of maintenance manager
* project start and completion dates.

The information on the stand shall be easily legible from a distance of 5 m.

1. Design the restoration of the roads, access roads and adjacent land used during the project to the original design situation.
2. According to the "List of Regulated Construction Products" approved by the Ministry of Environment of the Republic of Lithuania, the construction products used in the construction of the facility must have certificates issued by the Notified Bodies designated by the Order of the Minister of Environment of the Republic of Lithuania No. D1-871 of 27 November 2013.

3.10. ENVIRONMENTAL PROTECTION, OCCUPATIONAL SAFETY

1. The technical design shall provide for the implementation of the measures specified in the 2020 Environmental Impact Assessment of the construction of the new 330 kV Vilnius - Neris EPL (Annex 1) and the Environmental Protection Agency's Decision on the environmental impact of the construction of the 330 kV Vilnius - Neris ETL (Annex 60) of 18/11/2020 No. (30.1)- A4E-10530.
2. Provide estimates of hazardous and non-hazardous waste generated during construction and operation, including names, codes and quantities, including dismantling of equipment that is not required by the TSO (a list of equipment to be retained is provided by the IPC Eastern Region).
3. In order to preserve the fertile topsoil, prior to excavation at the footing sites, the soil should be excavated and stockpiled at the edge of the work area; after the completion of the construction works, the excavated soil should be used for the restoration of the existing condition.
4. During spawning and spawning migration, construction works on the 330 kV Vilnius-Neris OL, which may frighten fish or cloud the water, shall not be carried out in the rivers Vilnia, Bezdonė and Taurija (section 1) and Vokė and Rudamina (section 2), and within 25 m of the coast, in the periods from 15 March to 30 June and from 15 September to 31 December.
5. No felling and extraction in all forest groups from 15 March to 1 August (except in young forests and logging sites in forest group IV).
6. No deforestation and extraction works during the important period for grey grouse breeding from 1 February to 1 August in the section of the 330 kV OL Vilnius-Neris route (length approx. 2.5 km), which is located within 1 km of the boundaries of the Taurija Ornithological Reserve.
7. Where possible, construction work (demolition of pylons, installation of pylons, pulling of wires) in forested areas should not be carried out during the most intense bird breeding season, ***i.e. from 1 April to 1 July***.
8. In order to prevent birds from hitting the wires, provide for the installation of "spiral" or "pendant" type rotating reflectors on the LPC with FOC to increase the visibility of the wires by installing them at intervals of 7 m or 6 m, respectively, and by covering 60% of the length between the supports: in the section near the ponds of UAB “Arvydai” Fishery Farm, the ponds of Mickūnai, Šatrininkai, Rukainiai.
9. Archaeological prospecting at the sites of the new pylons, up to 200 m from the river banks (see point 2.7.4 of the PAV Report).
10. Provide environmentally safe places in the technical design for the temporary storage of machinery, materials, waste according to their types during construction, and temporary roads.
11. Based on the information in the PAV report, prepare an environmental monitoring plan for the operation of the overhead line for a period of 3 years. The monitoring plan must be agreed with TSO and the Environmental Protection Agency.
12. The supports shall be installed in compliance with the requirements set out in Chapter XXIX "Protection strips and zones of water reservoirs" of the Resolution of the Government of the Republic of Lithuania No. 343 of 12/05/1992 "On the Approval of the Special Conditions for Use of Land and Forests".
13. During the design process, measurements of the electromagnetic field and noise levels shall be carried out on the plots of existing dwellings referred to in table 2.8.27 of the PAV report (the measurement plan to be agreed with the customer) and the protocols submitted.
14. Modelling of the projected electric and magnetic fields for the existing residential plots within the protection zone of the reconstructed overhead line, as indicated in table 2.8.27 of the PAV report, taking into account the height of the pylons and wires to be installed in those areas (see Design Task, point 70 of the chapter "Power transmission lines").
15. Organise and carry out, at its own expense and without prejudice to environmental requirements, the accounting of waste generated during construction, the collection of packaging waste from new installations, the dismantling of dismantled installations until the separation of the waste in accordance with the waste classifications set out in the Rules on Waste Management, the marking of the waste, and the transfer of the waste to the appropriate waste handlers according to the waste type;
16. Collect and store the generated metal waste on site until it is handed over to a company contracted by the TSO; the handing over of the metal waste will be organised by IPC Eastern Region employees.
17. Keep records of all waste generated on site in accordance with the Rules of Waste Management in the GPAI system. Provide the technical assessment committee with an overall report on the waste generated on the site, with documents confirming the transfer of waste (transfer-acceptance acts, hazardous waste accompanying notes), and with the name and address of the site under construction.
18. Maintain records of imported taxable packaging and taxable products in accordance with the "Law on Management of Packaging and Packaging Waste" and the "Rules on Management of Packaging and Packaging Waste", prepare tax returns and pay taxes in accordance with the "Law on Environmental Pollution Tax".
19. During the test switch-on, measurements of the electromagnetic field and noise levels shall be carried out on the residential plots listed in table 2.8.27 of the PAV report (the measurement plan to be agreed with the TSO) and reports submitted.

3.11. THE ROUTE OF THE OVERHEAD LINE THROUGH A FORESTED AREA

1. In case there is a forest on the parts of the land plots owned by state land trustees or private owners within the boundaries of the established easement where the OL is being projected, the contractor shall, in accordance with the procedure established by the legislation, draw up the deforestation documents for all the plots, individually on behalf of the owner of each of the plots obtain a permit for deforestation, and draw up the other documents necessary for obtaining the forest clearance. The contractor must hand over the felled timber to the owner free of charge, leaving it within the boundaries of the owner's land parcel.
2. 330 kV OL shall be designed in the forest area in accordance with the requirements of the applicable legislation of the Republic of Lithuania, including but not limited to the following:

* Law on Environmental Protection of the Republic of Lithuania;
* Law on Land of the Republic of Lithuania;
* Law on Water of the Republic of Lithuania;
* Law on Protected Areas of the Republic of Lithuania;
* Law on Forests of the Republic of Lithuania;
* Resolution of the Government of the Republic of Lithuania No. 343 of 12/05/1992 "On Approval of Special Conditions for Land and Forest Use";

-Resolution No. 1116 of the Government of the Republic of Lithuania of 14/08/1995 "On the reclamation of damaged land and the preservation of the fertile layer of soil".

ANNEXES:

1. Construction of a new 330 kV electricity transmission line Vilnius - Neris. Environmental Impact Assessment Report, 199 pages;
2. Customer's requirements for the preparation of the building information model (EIR), 10 pages;
3. LITGRID AB requirements for the composition of the technical design, 12 pages;
4. LITGRID AB requirements for the drafting of technical specifications for a technical project. Procedure for justifying compliance of major equipment with the Customer's requirements, 25 pages;
5. Standard form for the schedule of works-disconnections, 1 page;
6. 0,4-35 kV crossing OL disconnection schedule form, 1 page;
7. Description of the procedure for establishing and marking operational and technical names of the transmission network, 44 pages;
8. Standard technical requirements for 400-110 kV supporting insulators, 3 pages.
9. Standard technical requirements for flexible conductors (wires) for use in 400-110 kV substations, 3 pages;
10. Standard technical requirements for 400-330-110 kV primary equipment connection terminals, 4 pages;
11. Requirements for marking of overhead line supports for 400-110 kV overhead lines, 3 pages;
12. Standard technical requirements for glass-plate insulators for overhead lines of 330-110 kV, 2 pages;
13. Standard technical requirements for aluminium non-insulated wires with steel stranded cores for overhead lines of 400-110 kV, 2 pages;
14. Standard technical requirements for aluminium non-insulated wires with steel stranded cores for overhead lines of 400-110 kV, 2 pages;
15. Standard technical requirements for the installation of the earthing circuit of 400-110 kV overhead line supports, 4 pages;
16. Standard technical requirements for tension clamps of the bolted type for 400-110 kV overhead line wires and lightning protection cables without fibre optic cable, 2 pages;
17. Standard technical requirements for tension clamps of the compression type for 400-110 kV overhead line wires and lightning protection cables without fibre optic cable, 2 pages;
18. Standard technical requirements for wedge-type tension clamps for 400-110 kV overhead line wires and lightning protection cables without fibre optic cable, 2 pages;
19. Standard technical requirements for distance springs-vibration dampers for 400-330 kV overhead lines, 2 pages;
20. Standard technical requirements for the composition of glass insulator festoons for 400-110 kV overhead lines, 4 pages;
21. Standard technical requirements for protective rings for insulator festoons for overhead line insulators of 400-330 kV, 3 pages;
22. Standard technical requirements for lightning protection cables for 400-110 kV overhead lines (without fibre optic cable), 3 pages;
23. Standard technical requirements for lightning protection cable with fibre optic cable (LPC) for 400-110 kV overhead lines, 3 pages;
24. Standard technical requirements for vibration dampers for 110 kV overhead lines (Stockbridge type), 3 pages
25. Standard technical requirements for clamps for supporting aluminium conductors with steel stranded cores for 400-110 kV overhead lines, 3 pages;
26. Modelling of the spatial layout of 330 kV overhead line wires and permissible electromagnetic field parameters, 92 pages
27. Modelling of the spatial layout of 330 kV overhead line wires and permissible parameters of electromagnetic fields, annexes;
28. Standard technical requirements for microprocessor relays and controllers for relay protection and automation for 400/330/110/10 kV substations, 10 pages;
29. Description of the implementation of the standard structural diagrams for relay protection and automation in the technical designs of 110 kV transformer substations in the transmission network, 24 pages;
30. Standard technical requirements for control cables connecting relay protection/automation and open switchgear primary equipment, 6 pages;
31. Standard technical requirements for wiring for internal mounting of outdoor and indoor cabinets, 2 pages;
32. Standard technical requirements for cables connecting high-frequency telecommand transmission equipment and open switchgear primary equipment, 2 pages;
33. Standard technical requirements for telecommunications transmission system equipment associated with relay protection and automation, 12 pages;
34. Standard technical requirements for indoor cabinets for relay protection and automation, 7 pages;
35. Customer's inspection report of the set-up of the main and other equipment in the RPA indoor cabinets during factory tests, 10 pages;
36. Standard technical requirements for electromechanical relays for relay protection and automation circuits, 6 pages;
37. Standard technical requirements for outdoor intermediate terminal cabinets, 7 pages;
38. Customer's inspection report on the installation of main and other equipment in RPA outdoor cabinets during factory tests, 9 pages;
39. Description of requirements for complex testing of relay protection and automation (RPA) equipment for transmission transformer substations and switchyards, 24 pages;
40. Description of requirements for remote control of transmission network transformer substations and switchyard equipment, 287 pages;
41. Standard technical requirements for lightning protection cable with fibre optic cable (LPC with FOC) for 400-110 kV overhead lines, 3 pages;
42. Typical requirements for the design of LPC with FOC couplings, 3 pages;
43. Technical requirements for communication protection tubes, 3 pages;
44. Typical requirements for communication wells, 2 pages;
45. Typical requirements for the design of a fibre optic cable, 3 pages;
46. Typical requirements for the design of a fibre distribution plant, 2 pages;
47. 19500\_1-01-DP-SK1\_Laida\_A\_Taip built, 55 pages;
48. 19500\_1-01-DP-SK2\_Taip built, 30 pages;
49. 19500\_1-02-DP-SK1\_Laida\_A\_Taip built, 46 pages;
50. 19500\_1-02-DP-SK2\_Taip built, 29 pages;
51. 2017-12-04 DP expert report, 2 pages;
52. Standard design for a 330 kV single-circuit intermediate support (with up to 5° bend angle), 72 pages;
53. Standard design for a 330 kV single-circuit anchor support (31° to 60° angle of inclination), 25 pages;
54. Standard design for a 330 kV single-circuit anchor support (turning angle 61° to 90°), 71 pages;
55. Typical design for a 330 kV single-circuit anchor support (bending angle from 6° to 30°), 70 pages;
56. Standard technical requirements for hot-dip galvanizing of steel structures of 400-110 kV substations, switchgear installations and overhead lines, 5 pages;
57. Standard technical requirements for factory reinforced concrete foundations for 330-110 kV voltage transformer substations and open switchgear electrical installations, 3 pages;
58. Standard technical requirements for steel structures supporting electrical equipment for 330-110 kV open switchgear, 4 pages;
59. Standard technical requirements for reinforced concrete overhead cable ducts for 330-110 kV voltage transformer substations and open switchgears, 2 pages;
60. Environmental Protection Agency 18/11/2018 No. (30.1 )-A4E-10530 "Decision on the environmental impact of the construction of the 330 kV ETL Vilnius - Neris", 13 pages.

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