Initial Environmental Examination

October 2020

Uzbekistan: Distribution Network Modernization Project

Prepared by {complete and accurate name of government agency or private sector project sponsor} for the Asian Development Bank. {This is an {updated} {revised} version of the draft originally posted in {Month Year} available on {http://www.adb.org/projects/xxxxx-xxx/documents}.}

Preparing Sustainable Energy Investment Projects – Distribution Network Modernization Project TA-9708 UZB

Initial Environmental Examination

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Acronyms and Abbreviations

ADB	–	Asian Development Bank
AIP	–	Annual Investment Plan
AM	–	Accountability Mechanism
API	–	Air Pollution Index
APLIC	–	Avian Power Line Interaction Committee
BOD	–	Biochemical oxygen demand
CIS	–	Commonwealth of Independent States
COD	–	Chemical oxygen demand
dB	–	Decibel
DI	–	Design Institute
DSEI / POVOS	–	Draft Statement of Environmental Impacts
EA	–	Executing Agency
EARF	–	Environmental Assessment and Review Framework
EIA	–	Environmental Impact Assessment
EMF	–	Electromagnetic Field
EMP	–	Environmental Management Plan
EN	–	Endangered
EU	–	European Union
FGD	–	Focused Group Discussion
F-TRTA	–	Transaction Technical Assistance Facility
FWS	–	US Fish and Wildlife Service
GFDRR	–	Global Facility for Disaster Reduction and Recovery
GHG	–	Greenhouse Gases
GoU	–	Government of Uzbekistan
GOST	–	State Occupational Safety Standards
GRM	–	Grievance redress mechanism
IBA	–	Important Bird Area
IEE	–	Initial Environmental Examination
IES	–	International Environmental Specialist
IFC	–	International Finance Corporation
IFI	–	International Financial Institutions
IUCN	–	International Union for Conservation of Nature
JSC	–	Joint-stock company
kV	–	Kilovolt
kWh	–	Kilowatt Hour
KBA	–	Key Biodiversity Area
LARF	–	Land Acquisition Framework
LARP	–	Land Acquisition and Resettlement Plan
LC	–	Least concern
Masl	–	Meters above sea level
MAC	–	Maximum Admissible Concentrations
MPC	–	Maximum Permissible Concentration
MPD	–	Maximum Permissible Discharge
MPE	–	Maximum permissible emissions
MSK	–	Medvedev–Sponheuer–Karnik
NENU	–	National Energy Networks of Uzbekistan
NGO	–	Non-governmental Organization
NO_2	–	Nitrogen Dioxide
NT	–	Near Threatened
OM	–	Operations Manual
OHL	–	Overhead Line

OHS	–	Occupational Health and Safety
PCB	–	Polychlorinated Biphenyl's
PCR	–	Physical Cultural Resources
PIC	–	Project Implementation Consultant
PM	–	Particulate Matter
PMU	–	Project Management Unit
POP	–	Persistent Organic Pollutant
PPE	–	Personal Protective Equipment
PSSA	–	Program Safeguards System Assessment
PTES	–	Territorial Distribution Company
PV	–	Photovoltaic
PVC	–	Polyvinyl Chloride
PZVOS	–	Draft of Concept Statement on Environmental Impact
REN	–	Regional Electricity Networks
RoW	–	Right of Way
SanPiN	–	Sanitary Regulations and Standards
SCADA	–	Supervisory Control and Data Acquisition
SCNP	–	State Committee of the Nature Protection
SEE	–	State Environmental Expertise
SEI	–	Statement of the Environmental Impact
SEMPs	–	Specific Environmental Management Plans
SFP	–	Safeguard Focal Point
SniP	–	Construction Standards
SIP	–	Self Supporting Insulated Cables
SO_2	–	Sulphur Dioxide
SPS	–	Safeguard Policy Statement
SS	–	Safeguard Specialist
SZ	–	Safety Zone
TA	–	Technical Assistance
UNEP	–	United Nations Environment Program
UE	–	Uzbekenergo
UN	–	United Nations
UNECE	–	United Nations Economic Community for Europe
UZS	–	Uzbekistani so'm
VOC	–	volatile organic compounds
VU	–	Vulnerable
WBG	–	World Bank Group
WHO	–	World Health Organization
ZEP	–	Statement on Environmental Consequences
ZVOS	–	Concept Statement on Environmental Impact (Uzbekistan EIA)

CURRENCY EQUIVALENTS
(as of October 2020)

Currency unit	–	UZS (Uzbekistan so'm)
$1.00	=	10,304 so'm

1. Executive Summary

1.1. Introduction

1. This Initial Environmental Examination (IEE) is part of the process of compliance with the ADB guidelines in relation to the Distribution Modernization Project. This project forms part of the wider ADB funded Preparing Sustainable Energy Investment Project (TA-9709 UZB).

2. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the project. More specifically, the IEE:

- Describes the existing socio-environmental conditions within the project area;
- Describes the project design, construction activities and operational parameters;
- Describes the extent, duration and severity of potential impacts;
- Analyzes all significant impacts; and
- Formulates the mitigation actions and presents it all in the form of an Environmental Management Plan (EMP).

3. Based on the existing ADB Environmental Safeguards Policy (2009), this project falls under ADB's project category B as the proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects.

1.2. Description of the Project

4. A significant part of low voltage distribution networks [1] was built during the Soviet electrification periods from 1950s to 1970s. More than 80% of low-voltage lines have operated for over 30 years and 30% of substation transformers urgently require replacement. The old and deteriorated distribution system has developed serious problems, such as high system losses, overloads, voltage drops related to increased load demand and increasingly frequent blackouts, especially during peak demand times in the winter. High electricity losses in the distribution system, estimated at 20% of net generation, offset the government continued efforts to modernize its power generation assets and result in missed opportunity costs for high value gas exports and exacerbation of greenhouse gas emissions considering 80% of its power generation is from burning natural gas.

5. The modernization of distribution networks and nationwide installation of advanced electricity meters are priority investment program of the government. The proposed program will help Uzbekistan address high system losses in the power distribution system and improve the electricity supply reliability, particularly in the remote areas through modernization of distribution networks in 3 focus regions—Bukhara, Jizzak, and Samarkand.

6. The main components of the project include:

- Installation of pole-mounted transformers 10 (6) / 0.4 kV;
- Construction of overhead distribution lines (OHL) 0.4-6-10 kV;
- Construction of belowground distribution lines (cables) 0.4-6-10 kV;
- Automation of electric networks by the SCADA system;
- Construction of pilot roof -mounted solar Photovoltaic (PV) projects; and

[1] 10 kV and below.

- Construction and commissioning of workshops for the manufacture of distribution line poles.

7. The project, which will be implemented by the Joint Stock Company (JSC) Regional Electric Networks (REN), is a rolling five-year project and although the total amount of works and the types of works have been established for these five years, only the locations of the first years project activities are actually known (approximately 1,800 activities, 600 in each region). Annual investment plans (AIPs) will be prepared at the start of each year of the project by REN and the its regional distribution companies (referred to in this report as 'PTES') and these plans will specify the locations where activities will be undertaken during that specific year.

1.3. Alternatives

8. 'No Project' Option - The electricity demand in Uzbekistan has been increasing for the past several years, and the government estimates its power demand will be doubled by 2030. The key factors fueling the increasing power demand include increasing population, rapid urbanization, industrialization, improvement in per capita income and village electrification programs of Uzbekistan's central and provincial governments. In order to match the increasing trend in the power demand, regular investments in various segments of the power network, including distribution, are vitally important otherwise, the gap between the supply and demand will keep on increasing. In case the proposed project is not undertaken, Uzbekistan will not be able to cope with the increasing demand and the existing system will remain over-loaded, energy losses will also remain high, and the system reliability will progressively decrease, with increasing pressure on the system. The utility will also forego the opportunity of increasing its consumers' base as well as revenue associated with the system expansion. In view of the above, the 'no project' option is not a preferred alternative.

9. Alternative Regions - The project regions have been selected by ADB and REN for investment as part of a countrywide network modernization program. Alternative regions could have been selected for funding by ADB and REN, however, in terms of environmental impacts the region selected makes little difference as the activities undertaken are the same in all regions. Accordingly, an assessment of alternative locations is not warranted.

10. Alternative Technology - The use of insulated overhead lines in areas of low/medium load density has been selected over uninsulated wires due to a higher degree of safety with respect to aerial uninsulated wire. The use of underground cable is recommended in urban areas with high density housing. The use of underground cables also has benefits in terms of eliminating bird electrocutions in these areas.

1.4. Existing Facilities and Operations

11. As part of the preparation of the IEE, a number of PTES operational facilities were visited in the three Project regions to establish the current working conditions of these facilities which will be used to implement the Project. The following summarizes the findings of these visits

12. PTES Facilities – A number of environmental, health and safety issues were noted during inspections of the PTES facilities (maintenance yards and warehouses) mainly relating to lack of fire safety equipment, first aid equipment, ventilation and poor management of hazardous wastes. A corrective action plan (CAP) has been prepared as part of this IEE to address these issues.

13. Polychlorinated Biphenyl's (PCBs) - Due to the age of the equipment used in large parts of the electricity distribution system (more than 30 years old) it is possible that PCBs are present within transformer oil. Consultations with Samarkand, Bukhara and Jizzak PTES and the regional State Committee for Nature Protection (SCNPs) have revealed that there is little or no understanding of PCBs and their risks. No PCB tests have been undertaken in the distribution system to date and until testing of transformers is undertaken the presence of PCBs in the distribution system cannot, and should not, be ruled out. Measures to manage the potential PCB issue are provided by this IEE.

14. Oil Storage - Transformer oil is stored in above ground storage tanks in PTES warehouses. Some of these tanks showed visible signs of wear and leaks and spills of oil were noted around the tanks (none of the spills / leaks were considered to be significant). Most of the tanks did not have any form of containment measures to capture leaks and spills of oil, or any adequate transfer procedures. None of the PTES had specific procedures for the management and distribution of transformer oil.

15. A corrective action plan (CAP) has been prepared as part of this IEE to address these issues.

1.5. Key Baseline Environment Conditions

16. Distribution projects are generally located in urban and rural villages locations. As part of this IEE eighteen Year 1 activity sites were visited in Jizzak, Bukhara and Samarkand. All of the sites visited were almost exclusively located within Jizzak city and Samarkand city or their suburbs. The Year 1 activities visited in Bukhara take place in small settlements to the north of Bukhara city. Accordingly, the environmental conditions in the sites visited were fairly constant in all project areas, and can be summarized as follows:

- **Topography** – The land where the activities are located is generally flat. None of the Year 1 activities visited were located in mountainous areas.
- **Geohazards** – As with most of Uzbekistan, there is a risk of earthquakes, but generally they have a low impact on distribution systems. The potential for flooding does exists close to some major rivers, although the risk of mudslides and landslides is limited to the mountainous areas between Samarkand region and Tajikistan. None of the Year 1 activity sites visited are located in these areas.
- **Hydrology** – None of the Year 1 activity sites visited are located within the vicinity of any hydrological feature, with the exception of some agricultural drainage ditches.
- **Air Quality** – Dust storms are prevalent in Bukhara. In the rural villages air quality is generally good due to the lack of traffic and industrial activity. Within the cities air quality is variable depending on the proximity to major roads and industrial areas.
- **Nationally Designated Sites** – Three nationally designated sites are located in the Project regions. No Year 1 visited activity sites are located in these areas. However, it is possible that other planned activities could be located in, or close to the Zeravshanskiy state nature reserve which also comprises a number of rural settlements.
- **Internationally Designated Sites** – A number of internationally designated sites have been identified in the three Project regions. None of the proposed Year 1 activity sites visited will impact upon these areas. All of the internationally designated sites are located in remote areas and it is considered unlikely that any of the 1,800 planned activities or future activities proposed under annual investment plans would be located in these areas.
- **Physical Cultural Resources** – The central areas of both Samarkand and Bukhara are listed as UNESCO World Heritage Sites. None of the Year 1 activities visited, with the

exception of a transformer replacement in Muborak, will be located in these areas (both core and buffer zones). However, it is possible that other planned activities could be in these areas.

- **Noise** – Noise levels follow a similar pattern to air quality. In the rural setting noise levels are low, but in urban areas they tend to be higher depending on the proximity to major roads.

1.6. Key Impact Identification

17. The key impacts identified during the preparation of this IEE are summarized below.

18. Air Quality – Any dust and release of exhaust gases during the construction phase are likely to be short term and localized. The potential exists for hazardous vapors to be released from PCBs in confined spaces if they are heated. However, heating of PCBs is not undertaken during the removal of oils from transformers.

19. Hydrology – Leaks and spills of hazardous liquids could occur during the construction phase, but the amounts of such liquids used at work sites is small and as such the significance of any spill is considered to be low. The main risk relates to the historical leakage of oil from existing transformers. This could have been occurring over a period of time prior to the project commencement during the removal, installation and operation of the transformers.

20. Soils – Only minor impacts to topsoil or agricultural soils are anticipated around the areas of distribution lines. However, contaminated soils are present around the base of some transformers. This soil will be removed when new transformers are installed.

21. Spoil Material – Most excavated material will be replaced in trenches and holes and compacted in place, thereby reducing the requirement for disposal of significant quantities of spoil material.

22. Geohazards – None of the Year 1 sites visited have been identified as being specifically prone to geohazards. It is unlikely that any of the other activities planned in Year 1 and activities in future investment years will be located in areas prone to geohazards, seismic issues withstanding.

23. Biodiversity – No Year 1 activities visited are planned in Designated areas. However, it is possible, although unlikely, that they could be part of the 1,800 sites planned for Year 1 and also under future investment plans. The most significant potential impact of the Project, in terms of biodiversity, relates to bird electrocution on overhead lines. Electrocutions occur at poles when a bird completes a circuit by touching two energized parts or an energized and grounded part. Bird collisions with distribution poles of the type proposed as part of the Project are not considered to be a significant risk at this stage of the Project, however, the risk could increase if future activities are planned close to sensitive bird sites, such as IBAs. This is considered unlikely due to the remoteness, and low population in many of these locations.

24. Land Acquisition – The program is classified B for involuntary resettlement as the impacts are deemed insignificant. Land is owned by the state in Uzbekistan. Currently there are no land acquisition requirements from the private land users for the installation of the transformers and distribution line poles as these will be rehabilitated or installed on state land, mostly along the road right of way.

25. Waste – Small volumes of general construction waste will be generated by the project, as well as larger volumes of old overhead wires and poles. These wastes will all be disposed of according to the on-going waste management procedures operated by PTES. The key waste management issue identified is disposal of waste oil, which may potentially contain Polychlorinated Biphenyl's (PCBs). PTES currently have no methods to identify and manage oil contaminated with PCBs.

26. Noise and Vibration – Noise levels maybe elevated above IFC daytime limits where construction activities occur (construction will not occur during nighttime periods). However, this will be limited to areas adjacent to site works which will be short term. Low levels of vibration could be induced by excavation works, but not at a level anticipated to cause cosmetic damage to buildings.

27. Physical Cultural Resources – None of the Year 1 activities visited are located in the core, or buffer zones of UNESCO sites with the exception of Muborak, in Samarkand. However, it is possible that planned activities, both in Year 1 and in future investment years could occur in these areas. Consultations, with the Regional Inspection for the Protection of Cultural Heritage in Bukhara, noted that PTES have been working in thee UNESCO areas for a number of years and duly follow set procedures for working in these areas and as such they have no specific reasons to prohibit PTES activities in these areas and are happy with the way that they conduct works in these areas.

28. Occupational Health and Safety - Key OHS issues identified by the PTES appear to be workers not following set OHS procedures and falling from heights. Data provided by REN indicates that workers need either better supervision or training and perhaps better equipment for working at height. This issue needs to be assessed further in more detail as part of a specific health and safety assessment, more of which is outlined below.

29. Community Health and Safety - No data on community accidents and fatalities associated with the distribution system in Uzbekistan have been provided by REN. However, in the United Kingdom on average, there are 20 fatalities and 400 people are injured as a result of coming into contact (or close proximity) with electricity overhead lines and underground cables and therefore it is safe to assume similar accident and fatality rates (per capita) exist in Uzbekistan.

30. Cumulative Impacts - No other infrastructure projects have been identified close to the Year 1 Project sites visited that may result in significant cumulative impacts, e.g. the rehabilitation of the road network in the project area, development of large scale industrial or residential facilities, etc. Given the nature of the works it is also considered unlikely that any activities undertaken in Year 1 and future investment years would contribute to significant cumulative impacts.

31. Transboundary Impacts - No specific activities have been identified that could result in significant transboundary impacts, either in the Year 1 sites visited, or in subsequent investment years.

32. Induced Impacts - Upgrading of the distribution system, especially extending the coverage of the network, may lead to some localized residential, and possibly light-industrial/commercial expansion in residential settlements. This is considered more likely in the small villages where upgrades are planned rather than in the city centers, such as Jizzak. The network in these areas may be upgraded and expanded generally by one or two kilometers which is not anticipated to

lead to levels of development in these areas which would result in significant induced impacts, for example in the form of pressure on local health care systems, or other social infrastructure.

1.7. Key Corrective, Management and Mitigation Actions

33. The key corrective actions required as part of the Project, and outlined in the Corrective Action Plan (CAP) include:

- Prepare a detailed assessment of OHS in REN and PTES.
- Undertake a further assessment of community health and safety risks to determine if PTES procedures relating to community health and safety are in line with international best practice.
- PTES Maintenance facilities in all regions shall be fitted with suitable ventilation systems compliant with national regulations.
- The integrity of underground oil storage tanks at PTES facilities shall be tested to ensure that there are no leaks from these tanks.

34. The key mitigation measures to be applied at the design phase of the project include:

- Provision of measures to contain spills and leaks from pad-mounted transformers.
- Locating pole-mounted transformers away from sensitive locations, such as water courses.
- Where appropriate, in terms of climate and financial aspects, consider the use of dry transformers as opposed to oil filled transformers.
- Incorporate the design specifications provided by the Avian Power Line Interaction Committee (APLIC) for new distribution systems where appropriate.

35. Prior to the start of construction, REN shall prepare their Specific Environmental Management Plan (SEMP) which will include a detailed waste management plan. REN shall also establish the grievance redress mechanism and ensure that all relevant permits for construction are in place.

36. During the construction phase, REN and its subcontractors, will be responsible for implementing a range of generic, good practice construction methods which will ensure that the significance of any potential impacts is generally kept to a minimum. These would include for example, measures to manage dust, elevated noise levels, etc. These measures have all been included within the project EMP and the Corrective Action Plan (CAP). A number of more specific mitigation measures have been developed as part of this IEE, they include:

- **Hydrology** - All transformers will be inspected on delivery to the PTES warehouses for signs of leaks and also before installation at site. REN will also strictly follow the construction procedures for pad-mounted and pole-mounted transformers which have been developed specifically for this Project and are included as **Appendix A** and **Appendix B**.
- **Soils** - Any areas of oil leaks beneath transformers will be excavated, stored in labelled metal drums and returned to PTES facilities for storage. The labelled containers will include a reference number which correlates with the removed transformer which will be tested for PCBs at the PTES warehouse according to the project procedures for PCBs (included in **Appendix C**). If the PCB tests indicate that the transformer oil is contaminated, the container containing the soils will be labelled as PCB waste. The waste will be managed according to the PCB Safe Management Procedures included as **Appendix D** of this EIA. If the results of the tests are negative for PCBs the soils will be

collected for disposal as hazardous waste by a state licensed waste management company.

- **Designated Sites** – No direct impacts to designated sites are currently foreseen as part of Year 1 sites visited. However, prior to the commencement of works in any other activity site an environmental assessment screening (EAS) activity will be undertaken by the project implementation consultant (PIC) which include measures to prevent project activities occurring in designated sites.
- **Bird Electrocutions and Bird Collisions** – A range of international best practice design measures have been proposed to prevent bird electrocutions. These measures will be included in activity locations where the environmental assessment screening (EAS) has identified potential significant risks, e.g., located close to sensitive bird sites (e.g. within 1km of an Important Bird Area (IBA). In such instances the activity will be further assessed by a national bird specialist (employed by the PIC). If the findings of the additional assessment indicate that special status birds could be significantly impacted by the activity a new IEE will be prepared to include details of the specific activity and its location and any required mitigation measures such as adding line markers to overhead lines, or replacing OHL with below ground cables.
- **Nest Management** - Prior to the start of construction the PICs environmental specialist shall make a pre-work survey of the work sites before any works commence as part of the EAS to identify any nests. Where nests are present on poles the old poles shall be left in-situ if possible so that the nest can continue to be used. Poles with nests shall not be removed during the nesting season. Where the above is not possible consideration shall be given to the use of nesting platforms on new poles.
- **Removal of Transformers** - Transformers shall be removed from site and returned to PTES facilities for re-use, recycling or disposal by state licensed waste management companies. Waste oil from transformers shall be tested according to the Guidelines for the Identification of Polychlorinated Biphenyls, **Appendix C** in this IEE. If PCBs are found in the oil, PTES shall follow the procedures outlined in the Framework Plan for the Safe Management of PCBs, **Appendix D** in this IEE.
- **Noise** - Work will be undertaken in daytime hours only – in accordance with WBG definitions. Mobile noise barriers shall be used where noise levels create nuisance.
- **PCR** - PCR training shall be provided to PTES Environmental Focal Points in PCR management, which will include input from the Head of the Bukhara Province Department for Cultural Heritage Protection.
- **Worker Fatalities** - In the event of any fatality occurring during the construction phase at any Project work site, provide ADB with the details of the fatality within one week of the event occurring in a Fatality Report.
- **Community Health and Safety** - All new pad-mounted transformers must be locked with access only available to PTES. A Project Safety Awareness leaflet will be prepared and will be distributed to all homes within the vicinity of the work sites. The leaflets shall provide information relating to the risks of interfering with the distribution network.

37. During the operational phase REN shall ensure that all transformers are maintained according to manufacturer's specifications and that they are replaced at the end of their lifecycle according to manufacturer's specifications. Regarding waste management, PTES will follow the waste management measures specified during the construction phase, specifically those procedures relating to PCBs and also develop standard operational procedures for waste management, including site-specific plans for maintenance areas and warehouses.

1.8. Monitoring Actions

38. To ensure that all of the above mitigation actions are completed according to the requirements of this IEE, monitoring shall be undertaken of project works by the REN / PTES and the PIC. Primarily observational monitoring is required during the construction phase via the RENs Safeguard Specialist and their Safeguard Focal Points from each PTES. The PIC will also perform weekly inspections of the PTES (and their subcontractors) environmental and social performance throughout the construction period as well as completion of activity based EAS. The PIC shall have the right to suspend works or payments if PTES is in violation of any of their obligations under the EMP and this EIA.

39. In addition to the observational monitoring, the PTES will also be responsible for testing transformer oil (via an internationally certified company) for traces of PCBs. Monitoring of air quality, noise and water will only be undertaken in the event of a complaint from project stakeholders.

1.9. Consultations

40. Stakeholder engagement has been undertaken throughout the development of the project, with the view to determining and responding to the views of interested and parties potentially affected by the project throughout the life of the project, and ensure open and transparent, two-way communication between REN and stakeholders.

41. To date ten formal stakeholder consultation sessions (all documented in this IEE) have been undertaken to discuss the IEE and land acquisition issues. All of the findings and comments from the consultation events, both positive and negative, have been recorded in this IEE and where relevant, mitigation measures have been prepared to manage the issues identified. Further, as part of the EAS for all activities, the PIC will undertake consultation with local stakeholders throughout the five-year program. The findings of these consultations will be recorded as part of the EAS.

1.10. Conclusions

42. This IEE has established that, with the exception of the residual impacts mentioned below, there are no significant environmental issues that cannot be either totally prevented or adequately mitigated to levels acceptable to the government and international standards for project activities.

43. The key identified residual impacts during the construction phase include:

- **Disposal of PCBs** - The measures included in this IEE to undertake PCB testing and the procedures for management of any identified PCB containing oils will reduce the potential for significant impacts to occur. Uzbekistan is lacking adequate facilities for the treatment and disposal of PCB containing oils and therefore it is recommended that oil is stored at the REN facilities, before it is shipped in bulk to a certified disposal site. Until agreements are in place with the certified disposal facility and shipping methods devised the residual impacts will be **low**.
- **Accidents involving workers** - Until a detailed OHS assessment is undertaken and specific measures are put in place to better manage OHS and reduce the potential risk for accidents and fatalities to occur, the residual risks remain **medium**.
- **Accidents at project sites involving local community** - Constructing equipment in line with national safety codes and implementing any recommended best practice procedures

along with safety awareness campaigns, will limit the risk of accidents occurring. However, members of the public are still likely to do random things which lead to occasional accidents. This issue affects the distribution network as a whole and is not a result of any specific failure of the project itself, but residual impacts remain **low** as accidents cannot be entirely ruled out.

44. The identified residual impacts during the operational phase include:

- **Bird Electrocution** - Despite the proposed mitigation measures it is still possible that some bird electrocutions will occur. However, the proposed mitigation measures will limit the number of birds affected. Residual impacts will be **low**.
- **Accidents involving workers** – Similar to the construction phase, the residual risks remain **medium** until assessment of OHS issues are undertaken and plans are put in place to adequately manage identified issues.

1.11. Implementation

45. Implementation will be achieved via continuous assessment throughout the five-year investment program. Initially, the CAP, EMP and its mitigation and monitoring programs, contained herewith will be included within the contract documents between ADB and REN. The CAP will be implemented by REN according to the schedule provided in the CAP.

46. The requirements of the EMP will be implemented throughout the construction and operational period of the project. Contract documents shall state that REN / PTES will be responsible for the implementation of the requirements of the EMP through his own SEMP which will adopt all of the conditions of the. The SEMP will be approved and monitored by the International PIC throughout the construction phase of the project.

47. In addition, prior to the commencement of works at any activity site, the PIC shall undertake additional site assessment using the EAS. The EAS will screen out any activities located in designated sites and ensure that, where potentially significant impacts are identified, a new IEE will be prepared to account for these activities (A consolidated IEE can be prepared for activities located in a similar geographical area). If a new IEE is prepared, REN will be responsible for preparing an updated SEMP. In addition, an IEE will be required for construction of distribution line over 10km. For subsequent Project years, EAS will continue to be completed for each activity site by the PIC. These procedures are outlined in full in the Project Environmental Assessment and Review Framework (EARF).

48. Further, the environmental capacity of REN and PTES is not strong and as such development of a network of safeguards staff will be required centrally in the PMU, and within the three regions. A training program will be provided to these staff to ensure that the project mitigation and monitoring activities (specifically those relating to PCBs) is followed.

49. The PIC will be responsible for oversight of REN / PTES activities throughout the construction phase of the project. If the PIC notes any non-conformance with the SEMP (and the EMP) REN / PTES can be held liable for breach of the contractual obligations of the EMP / EIA.

50. Finally, it has been noted REN / PTES need assistance with occupational health and safety (OHS) matters within the company as a whole. This IEE is not the platform to make detailed OHS recommendations for the electricity utility as a whole and as such it has been recommended that a detailed assessment of OHS is undertaken by ADB prior to the start of any works in Year

One to identify key weaknesses and propose action plans and training to help improve work health and safety conditions which can help to reduce the number of accidents and fatalities within the utility.

2. Introduction

2.1. General

51. This section of the report; a) provides the background to the energy sector in Uzbekistan, b) summarizes the project need and objectives, c) outlines the purpose of the IEE, d) describes the project category and e) describes the scope of the IEE and the structure of the report.

2.2. Energy Sector Background

2.2.1. Country Context

52. Uzbekistan's aging and dilapidated infrastructure in the whole energy supply chain increasingly results in system inefficiencies, unreliable electricity supply that dampens the economic development and business confidence, and uneven access to energy across provinces contributing towards widening regional income disparities. The obsolete energy transmission and distribution system has developed serious problems overtime, such as increasingly frequent electricity blackouts especially during peak demand times in the winter, putting social service systems, such as education and health care, at risk.

53. Of the 230,000 km of transmission and distribution lines in Uzbekistan, 213,400 km are in the distribution grid. A significant part of low voltage distribution grids was built during the Soviet electrification periods from 1950s to 1970s. More than 80% of low-voltage lines have operated for over 30 years and 30% of substation transformers urgently require replacement. The old and deteriorated distribution system has developed serious problems, such as high system losses, overloads, voltage drops related to increased load demand and increasingly frequent blackouts, especially during peak demand times in the winter. High electricity losses in the distribution system, estimated at 20% of net generation, offset the government continued efforts to modernize its power generation assets and result in missed opportunity costs for high value gas exports and exacerbation of greenhouse gas emissions considering 80% of its power generation is from burning natural gas.

54. The modernization of distribution networks and nationwide installation of advanced electricity meters are priority investment program of the government. The proposed program will help Uzbekistan address high system losses in the power distribution system and improve the electricity supply reliability, particularly in the remote areas through modernization of distribution networks in 3 focus regions—Bukhara, Jizzak, and Samarkand.

55. The project will complement ADB's ongoing energy sector programs by supporting reforms at the distribution company level and addressing emerging issues in the sector reform. The program aligns with ADB's country partnership strategy for Uzbekistan 2019 2023, which supports economic transformation.

2.2.2. Regional Context

56. To date, overhead and cable lines have been operating for more than 40 years, which far exceeds their regulatory period. More than 70% of the length of power lines and the stock of transformer substations have 100% physical deterioration, as a result, it is impossible to maintain their effective and working condition in the future due to capital repairs. Structurally, the

overwhelming majority of 0.4 kilovolt (kV) overhead lines is made with non-insulated wire, which, if a wire breaks in a populated area, can pose a threat to the lives of residents of settlements.

57. Examining one of the project regions (Bukhara) it can be seen that the total annual loss of electricity in the distribution system in 2016 amounted to 324,060,743 thousand kilowatt hours (kWh) or 11.13%, including in networks of 0.4-6-10 kV - 207 713.775 thousand kWh or 21.14%. Operating costs in the region for 2016 amounted to 292.31 million Uzbek som (UZS) for current and 2174.39 million UZS for major repairs. In 2016, 282 emergency disconnections (blackouts) were recorded in the region. Costs associated with the elimination of accidents amounted to 38.1 million UZS.

58. Considering the above, it can be concluded that the existing distribution network in the electric grid sector does not meet the requirements of modern functioning society and is a hindrance to economic development.

2.3. Project Overview and Objectives

2.3.1. Technical Assistance Overview

59. The project forms part of the transaction technical assistance facility (F-TRTA) which will provide project preparation support to a series of ensuing projects, comprising the:

- **Distribution Network Modernization Project ($300 million), the focus of the IEE in hand;**
- Regional Gas Transmission Efficiency Enhancement Project ($300 million); and
- Regional Energy Transmission and Dispatch Enhancement Project ($400 million).

60. All ensuing projects are among the Government of Uzbekistan's priorities for energy sector development under Uzbekistan's 2030 strategy.

61. The three ensuing energy projects to be prepared under the F-TRTA are of similar nature. These projects are aligned with the government's objectives to strengthen reliability of the energy sector to increase its sustainability and efficiency and mobilize private sector investments. The projects aim to improve the quality of energy supply, reduce aggregate technical and commercial losses, and improve the financial performance of energy utilities.

2.3.2. Project Overview and Objectives

62. The **Distribution Network Modernization Project comprises** four outputs: (i) distribution system modernized and expanded, (ii) modernization of the dispatch center and operations, (iii) institutional capacity enhanced for improved sector sustainability, and (iv) energy-based innovations in support of the *Obod qishloq* (prosperous villages) program.[2]

63. The objectives of the project are:

- Distribution system modernized and augmented.
- Institutional capacity enhanced for improved sector.
- Renewable energy use promoted in the distribution system.

[2] The *Obod qishloq* program aims to address the critical gaps of basic infrastructure in remote villages in accordance with the Decree of the President dated 29 March 2018.

2.3.3. Implementation

64. The executing agency is the Joint-Stock Company Regional Electrical Power Networks, referred to in this report as REN. REN manages thirteen regions of Uzbekistan. Within each region a branch of REN operates and maintains the distribution network in these regions. Three branches, or territorial distribution companies (referred to by REN as PTES), Bukhara PTES, Samarkand PTES and Jizzak PTES will implement the Project through their own staff, or subcontractors.

Box 1: A Note on Uzbekenergo

In early 2019 Uzbekenergo (UE) managed Uzbekistan's distribution, transmission and generation business. All three components are now managed by separate entities, REN managing the distribution side and National Energy Networks of Uzbekistan (NENU) managing the transmission side.

2.4. Purpose of the IEE Report

65. This Initial Environmental Examination (IEE) is part of the process of compliance with the ADB Safeguard Policy Statement (2009) in relation to the project.

66. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the project. The IEE provides a detailed description of the direct and indirect environmental effects associated with the proposed project during key periods of work.

67. More specifically, the IEE:
- (i) Describes the existing socio-environmental conditions within the project area;
- (ii) Describes the project design, construction activities and operational parameters;
- (iii) Describes the extent, duration and severity of potential impacts;
- (iv) Analyzes all significant impacts; and
- (v) Formulates the mitigation actions and monitoring program and presents it all in the form of an Environmental Management Plan (EMP).

2.5. Category of the Project

68. Based on the existing ADB Environmental Safeguards Policy (2009), this project falls under ADB's project Category B as the proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. The project will not be subject to Environmental Assessment according to national regulations. This is further described in Box 2 below in Section 3.5 of the report relating to National Environmental Impact Assessment Legislation.

2.6. IEE Boundaries

69. The project activities, which are described in detail in **Section 4**, are almost exclusively small-scale construction / rehabilitation works where activities are limited to areas no more than

a few square meters in size (e.g. rehabilitation of pole mounted transformers) or over a few linear kilometers (e.g. rehabilitation of distribution poles and lines). Most of the works are undertaken in urban, or semi-rural locations where the environment is heavily influenced by human activities. There is little interaction with surface water courses and none with notable habitats. Accordingly, this IEE focuses on the environmental conditions immediately around the work sites, e.g. within 50 meters of each work site. No indirect impacts occurring outside of these project boundaries are anticipated as there is no requirement for borrow pits, quarries, labour camps, etc.

2.7. Methodology Applied

70. The methodology is based on the ADB, Safeguard Policy Statement (2009) and the joint experience of the International and National environmental consultants involved in the IEE.

71. Background data and information was obtained from published and unpublished sources, e.g., on: climate, topography, geology and soils, natural resources, flora and fauna, agriculture, and socio-economic data. In addition, data was taken from the Project feasibility studies as well as data obtained during the preparation of the Program Safeguards System Assessment (PSSA).[3]

72. Several site inspections of year 1 activities were conducted jointly by the International Environmental Specialist and National Counterpart during April 2019 and February 2020. Distribution line sites were visited (where access was possible) along with locations of transformers (both kiosk type and pole mounted) and areas of potential environmental significance assessed carefully.

73. Discussions were held with a number of stakeholders in order to determine their perceptions of the level of impact from the Project works (see **Section 7**). Data and information obtained have been incorporated where appropriate in the IEE Report.

2.8. Report Structure

74. Based on the findings of the scoping report, the following report structure was recommended.

75. **Introduction –** The section in hand provides the introductory information.

76. **Legal, Policy and Administrative Framework –** This section presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of Uzbekistan that apply to the proposed project.

77. **Description of the Project –** Section 4 describes the project need and its environmental setting. A scope of works is also provided indicating the type of construction works required. A summary of the Projects alternatives is also provided.

78. **Existing Facilities and Operations** – This section of the IEE provides an overview of the existing Bukhara, Samarkand and Jizzak PTES facilities and operations. Firstly, a review of the PTES maintenance yards is provided. Secondly, an overview of current PTES practices regarding

[3] The project was originally intended to be financed under a Results Based Lending (RBL) modality. As part of the RBL activities a PSSA was prepared which included a review of Uzbekistan's environmental and social safeguards system, including its legislative framework, standards, etc.

hazard liquids, waste management and polychlorinated biphenyl's (PCBs) is provided. A corrective action plan (CAP) is also provided.

79. **Description of the Environment –** This section of the report discusses the regional and local environmental baseline conditions. This section is divided into subsections relating to:

(i) Physical: geology and soils; topography; climate and air quality; hydrology; geohazards.
(ii) Biological: flora and fauna; Notable flora and Fauna (Red List species); protected areas.
(iii) Social: population; communities; demographics; employment and socioeconomics; land use; infrastructure (including local access roads); transport; public health; cultural heritage; archaeology; waste management; occupational and community health and safety and noise

80. **Environmental Impacts and Mitigation Measures –** Section 7 outlines the potential environmental impacts and proposes mitigation measures to manage the impacts.

81. **Stakeholder Consultation, Information Disclosure –** Section 8 provides a summary of all of the stakeholder consultation activities undertaken.

82. **Environmental Management Plan –** This section of the IEE comprises an Environmental Mitigation Plan and an Environmental Monitoring Plan.

83. The Environmental Mitigation Plan:

(i) Clearly identifies what specific potential impacts various types of works may have on the sensitive receptors;
(ii) Provides concrete actions prescribed for managing these impacts, including location and timing of these actions;
(iii) Provides cost estimates for the main discrete mitigation measures (those that are unlikely to be part of a construction company' corporate policy and will not necessarily be included into general pricing of the contract); and
(iv) Specifies responsibility for the implementation of each mitigation activity.

84. The Environmental Monitoring Plan:

(i) Lists all prescribed mitigation measures by types of construction activities;
(ii) Provides selected criteria of monitoring implementation of mitigation measures;
(iii) Specifies methods for measuring outcomes of applied mitigation measures (visual, instrumental, survey, etc.);
(iv) Identifies location and timing/frequency of monitoring mitigation measures by the prescribed criteria;
(v) Gives cost estimates of monitoring mitigation measures by the prescribed criteria; and
(vi) Specifies responsibility for tracking each monitoring criterion.

85. **Conclusions and Recommendations –** The final section of the report provides the report conclusions and recommendations, including a description of any residual impacts.

3. Policy, Legal and Administrative Framework

3.1. National Environmental Legislation

86. Uzbekistan has created a legal framework in the field of environmental protection and environmental management, which is designed to ensure the rights and obligations of citizens enshrined in Articles 50 and 55 of the Constitution of Uzbekistan. These are more than 100 laws, about 50 Decrees of the President and Decrees of the Cabinet of Ministers of the Republic of Uzbekistan and other by-laws and regulatory documents. A list of Uzbekistan's environmental legislation as it pertains to the proposed project is given in Table 1.

Table 1: List of Environmental Laws Relevant to the Project

Year	Law / Regulation
08.12.1992	Constitution of Uzbekistan
09.12.1992	Law "On nature protection"
06.05.1993	Law "On water and water use"
25.05.2000	Law "On Environmental Expertise"
07.05.1993	Law "On Especially Natural Territories"
26.12.1997	Law "On protection and use of flora"
26.12.1997	Law "On protection and use of fauna"
27.12.1996	Law "On air safety"
05.04.2002	Law "On wastes"

87. Brief summaries of the listed documents are given below:

88. **Constitution of Uzbekistan.** In accordance with the Constitution of the Republic of Uzbekistan, land, subsoil, water, flora and fauna and other natural resources are national wealth, subject to rational use and protected by the state.

89. **Law on Environmental Expertise.** Environmental Impact Assessment in Uzbekistan is called State Environmental Expertise (SEE). SEE is regulated by the Decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 491 dated December 31, 2001.

90. **Law on Nature Protection** regulates the legal relationship between the bodies of the state authority and the physical persons or legal entities (without distinction-legal form) in the field of environmental protection and in the use of nature on all Uzbekistan's territory including its territorial waters, airspace, continental shelf and special economic zone. The law defines the principles and norms of legal relations, rights and obligations and responsibilities, awareness raising, education and scientific research in the field of environment, key players and principles of environmental management; describes economical mechanisms and levers; ecological insurance; basics of environmental audit; environmental requirements during privatization; justifies needs of environmental standards and limits (air, water, soil, noise, vibration, fields, radiation) and ecological requirements for production, transportation and storage of goods and food products; ecological requirements applicable to waste; states necessity of environmental impact assessment and related issues (strategic environmental protection and transboundary environment assessment) referring to Environmental Assessment Code; defines general principles of environmental protection; considers different aspects on protection of ecosystems, protected areas, issues of global and regional management, protection of ozone layer, biodiversity and international cooperation aspects. As stated in the law, in order to protect the climate against

the global changes, the subject of the business activity is obliged to observe the limits to green-house gas emissions as well as to take measures for mitigating this emission.

91. **Law on Water and Water Use** regulates water use, defines rights and obligations of water users, sets out the types of licenses for the use of water, the rules and conditions of their issuance, considers conditions of suspension, withdrawal and deprivation of license, regulates water flows. The law states liability of all natural and legal persons to prevent pollution of catchment basins, water reservoirs, snow and ice covers, glaciers, permanent snow cover with industrial, household and other wastes and emissions which may cause deterioration of the underground water quality; prohibits piling of industrial and household wastes near the public water headwork's and in their sanitation protection zones, bans construction of facilities and implementation of any other activity which may cause water pollution; sets requirements for forest use within water protection zones. The state management of water protection and use is exercised through accounting, monitoring, licensing, control and supervision.

92. **Law on Air Safety.** The law regulates protection of atmospheric air from man-caused impact. Pollution of atmospheric air is emission of hazardous substances originating from activities which are able to have negative impact on human health and environment. Maximum permitted limits for concentration of hazardous substances into the atmospheric air are defined for each contaminants and represent maximum concentration of hazardous pollutants, in averaged time span, recurring action of which has not have negative impact on human health and environment.

93. **Law "On State Sanitary Supervision"** - №657-XII of 07/03/1992 (as amended on 03.09.2010). It regulates social relations in the field of sanitary-epidemiological well-being and radiation safety, the right of people to a healthy environment and other related rights, guarantees and guarantees for their realization.

94. **Law on Waste** provides the legal conditions for implementation of measures aiming at prevention of generation of waste and increased re-use, environmentally sound treatment of waste (including recycling and extraction of secondary raw materials, as well as safe disposal).

95. The Law on Waste No.362-II of April 5, 2002 (modified January 4, 2011) states that citizens have the right to a safe and healthy environment, to participate in the discussion of projects, and compensation for damage to their life, health or property.

96. **Law on Especially Protected Territories.** Forms a legal basis for planning, establishment and maintenance and assignment of categories of protected areas, described funding issues for each category. It specifies ownership forms of land and other natural resources in protected areas, allowed and prohibited activities.

97. Protected natural areas are divided into the following categories depending on their purpose and regime:

- **State nature reserve** - Any activity on the territory of state reserves is prohibited, except for research and monitoring of the natural environment. Fire-fighting measures are allowed in state reserves.
- **Complex (landscape) reserves** - On the territory of complex (landscape) reserves, any activity is prohibited, except for research, recreational activities, monitoring of the natural environment, as well as haying and grazing, harvesting (collecting) wild plants for food

purposes, wild plant medicinal and technical raw materials for their own needs of employees of complex (landscape) reserves and citizens living in their protected zones.

- **Natural park;**
- **State monuments of nature**;
- **Territories for the conservation, reproduction and restoration of individual natural objects and complexes**;
- **Protected landscape**; and
- **Territories for managing individual natural resources**.

98. The Law on Especially Protected Territories, Article 5 states that protected natural territories are lands of nature protection, treatment, recreation and historic-cultural purpose. It is prohibited to undertake activities in such territories that undermine the objectives or purpose of these territories and withdrawal of lands of especially protected natural territories is allowed in exclusive cases in the order, established by the legal framework of the Republic of Uzbekistan. Articles 18 through 45 establishes specific activities that are not permissible within different categories of protected national territories.

99. Specifically, "*On the territory of state national natural parks there is not admitted:*

- *cutting of a wood (except sanitary and cutting of maintenance);*
- *activity of the enterprises, representing ecological danger;*
- *actions, changing a hydrologic and hydro-geological mode;*
- *actions, causing erosion of soils, and also degradation of vegetative and animal world;*
- *production of road and engineers-communication works, not connected to activity of state national natural parks*;"

100. However, the law does not specifically prohibit activities such as installation of electricity distribution lines and transformers in nationally designated sites—but it is unlikely that the distribution network encroaches significantly into these areas due to their remoteness or lack of customers

101. **Law on Protection and Use of Flora** regulates protection and usage of flora growing in natural condition, as well as in cultivation and its reproduction and conservation of gene pool of wild plants. The Cabinet of Ministries, local government bodies and special authorized agencies implement the law. State Committee of Nature Protection (SCNP) and Head Department of Forestry under the Ministry of Agricultural and Water Resources are the special authorized agencies in flora protection and its usage. The Cabinet of Ministries, SCNP, local government bodies and Head Department of Forestry are responsible for implementing on the national level the administration of the law.

102. **Law on Protection and Use of Fauna.** This Law regulates relations in the field of protection and use of wild animals living in a state of natural freedom on land, water, atmosphere and soil, constantly or temporarily inhabiting the territory of the Republic of Uzbekistan, as well as contained in semi-free conditions or artificially created habitat for scientific or nature protection goals.

3.2. National Social Legislation

103. A list of Uzbekistan's social legislation as it pertains to the proposed project is given in Table 2**.**

Table 2: List of Social and Land Ownership Related Laws Relevant to the Project

Year	Law / Regulation	Last revision
29.08.1996	Civil code of Uzbekistan	18.04.2018
21.12.1995	Labor code	16.10.2018
30.04.1998	Land Code	24.07.2018
13.01.1992	Law on employment	03.01.2018
30.08.2001	Law on Preservation and Utilization of Objects of Cultural Heritage	18.04.2018
29.08.1996	Law on Public Health	13.06.2017
01.08.2018	Decree of the President of the Republic of Uzbekistan №5495 on measures on cardinal improvement of investment climate in the republic of Uzbekistan.	01.08.2018
29.05.2006	Resolution of Cabinet of Ministers № 97 on compensation for losses to individuals and legal entities due to seizure of land plots for state and public needs	29.05.2006
25.05.2011	Resolution of Cabinet of Ministers № 146 on improve the procedure of granting land plots, protect the rights of legal entities and individuals on land and improve the architecture of settlements and the efficient use of their settlements land for construction.	25.05.2011
16.06.2018	Resolution of Cabinet Ministers №3857 on measures to improve the effectiveness of training and realizing projects with participation of international financial institutions and foreign government financial organizations.	16.06.2018

104. Brief summaries of the listed documents are given below.

105. **Civil Code** defines the legal status of participants of civil relations, the grounds and procedure of implementation of property rights and other proprietary rights, rights on intellectual property, regulates the contractual and other obligations, as well as other property and related personal non-property relations. The Civil Code defines general rules of property seizure, determination of property cost and rights for compensation, terms of rights termination.

106. **Labor code and Law on employment.** These two documents are main legislations regulating labor relations of individuals employed with labor contract by enterprises, institutions, organizations of all type ownership forms, including contracted by individuals. These legislations are considering interests of employees and employers provide efficient function of labor market, just and secure labor conditions, protection of labor rights and employees health, promote to growth of labor productivity, increase of work quality, raising on this matter welfare and social livelihood level of the population. The following summarizes the key points of the Labor Code:

- Age of Employment**.** Article 7 of the Labor Code states that Forced labor, i.e., forced to perform work under the threat of any punishment (including as a means of labor discipline) is prohibited. The right to work is permitted for persons aged 16 and older. Articles 49 and 51 of Administrative Code of Uzbekistan impose fines for violation of above-mentioned regulations on forced and child labor.
- Wages and Deductions. Contracts and collective agreements establish the form and amount of compensation for work performed. It is forbidden to pay in kind, except in cases established by the Government of the Republic of Uzbekistan (Labor Code Article 153). The Government establishes a minimum wage (Article 155). From September 2019, the minimum wage payment for a full-time position, cannot be less than 634,880 UZS (or $67,4). In areas with adverse climatic and living conditions, district coefficients and

allowances for wages are established. There is no established minimum wage for seasonal and daily workers (minimum payment for hour of work).

- Women. Nighttime work, overtime work, work on weekends and business trips for pregnant women and women with children under the age of 14 (with disabled children up to 16 years old), are allowed only with their consent. Herewith, recruitment of pregnant women and women with children under 3 years of age for night works is allowed only if there is a medical certificate confirming that such work does not threaten the health of the mother and child (Article 228). Pursuant to the Presidential Decree No. PP - 4235 of March 7, 2019, men have received the same package of rights related to the childcare since 1 May 2019, only one of the parents (male or female) can decide to take maternity leave.
- Working Hours. The standard work week is 40 hours, with less allowed for those under 18 and for women who have children up to 3 years old. The number of hours per day, and days per week, is established in the contract/agreement between the employer and employee. Employers must provide time off each workday for "rest and food", and also paid time off in case time is needed to cool off, to warm up, or to breastfeed children. Details of time off are established in contracts/agreements.
- Leave. In addition to national holidays, employees have to receive at least 15 working days of paid leave per year, with workers under 18 years of age receiving at least 30 calendar days and disabled employees receiving 30 calendar days (Article 134-135). In addition, those who work in unhealthy and unfavorable working conditions receive an additional seven days and those who work in unfavorable climate conditions receive an additional eight days.
- Overtime Work. Overtime compensation as specified in employment contracts or agreed to with an employee's trade union, which can be implemented in the form of additional pay or leave. The law states that overtime compensation should not be less than 200% of the employee's average monthly salary rate (broken down by hours worked).
- Labor Disputes. The general court system, where civil and criminal cases are tried, is responsible for resolving labor-related disputes. This can be done on a regional or city level. Formally, workers can file their complaints through the Prosecutor General's Office. The Ministry of Employment and Labor Relations should provide legal support to employees in their labor disputes.[4]

107. **Land Code.** The Land Code is the main regulatory framework for land related matters in Uzbekistan. The land code regulates allocation, transfer and sale of land plots, defines ownership and rights on land. It describes responsibilities of different state authorities (Cabinet of Ministers, region, district and city hokimiyats) in land management; rights and obligations of land possessor, user, tenant and owner; land category types, land acquisition and compensation issues, resolution of land disputes and land protection. The land code also defines the terms of rights termination on land plot, seizure and land acquisition of land plot for state and public needs, and terms of seizure of land plot in violation of land legislation.

108. **Law on Public Health.** The main objectives of legislation on the protection of public health are: guaranteeing the rights of citizens to health care from the state; the formation of a healthy lifestyle of citizens; legal regulation of the activities of state bodies, enterprises, institutions, organizations, public associations in the field of public health.

[4] Uzbekistan Agriculture Modernization Project. Labor Management Procedures. World Bank. 2019.

109. **Resolution of Cabinet of Ministers № 97.** This resolution regulates compensation for losses to individuals and legal entities due to seizure of land plots for state and public needs. This regulation is mainly dealing with land plots, houses, building and structures of individuals and legal entities. The resolution determines the procedure for seizure of land or part thereof, as well as the procedure for calculating the amount of compensation to individuals and legal entities for the demolished residential, industrial and other buildings, structures and plantings in due to seizure of land for state and public needs.

110. **Resolution of Cabinet of Ministers № 146.** This Resolution is aimed to improve the procedure of granting land plots, protect the rights of legal entities and individuals on land and improve the architecture of settlements and the efficient use of their (settlements) land for construction in accordance with the Land Code and the Town Planning Code. This resolution has approved two Regulations: (i) Regulation on the procedure for granting land for urban development and other non-agricultural purposes, (ii) Regulation on the procedure of compensation for land possessors, users, tenants and owners, as well as losses of agriculture and forestry.

111. **Resolution of Cabinet Ministers № 3857.** The resolution “On measures to improve the effectiveness of training and realizing projects with participation of international financial institutions and foreign government financial organizations” partly provides that payment of compensation for the land acquisition, demolition of houses, other structures, plantings within the framework of projects with the participation of International Financial Institutions (IFIs), if it is agreed and stated in agreements, then will be carried out by authorized bodies in accordance with the requirements of IFIs or Foreign Governmental Finance Organizations.

112. **Decree of the President of the Republic of Uzbekistan № 5495.** Decree “On measures on cardinal improvement of investment climate in the republic of Uzbekistan" partly provides that the adoption of decisions on the seizure of land for state and public needs is allowed only after an open discussion with interested parties whose land plots are planned to be seized, as well as assessing the benefits and costs; demolition of residential, industrial premises, other structures and structures belonging to individuals and legal entities, with the withdrawal of land plots is allowed after the full compensation of the market value of immovable property and losses caused to owners in connection with such withdrawal.

113. **The Law on the Protection and Use of Objects of Archaeological Heritage and the Law on the Protection and Use of Cultural Heritage.** The laws regulate the protection and use of cultural and archaeological objects; but these relate more explicitly to State measures for preservation, excavation, and use of objects of cultural heritage. The Law on the Protection and Use of Cultural Heritage is directed primarily at preservation and management of important elements of the built environment, but also addresses protection of historical, archaeological, aesthetic, ethnological, or anthropological territories, as well as natural landscapes connected with historical event.

114. The Laws establish procedures for use of surveys and qualified state agencies and expertise in the field, and the protection and use of archaeological heritage, conservation measures, and terms and conditions for cadastral surveys, excavations, supervision, etc.

Box 1. A Note on World Heritage Sites

Bukhara. Relevant national laws and regulations concerning the World Heritage property include the Law on the Protection and Use of Cultural Heritage Properties (2001). Current laws together with urban planning codes provide protection of monuments of cultural heritage and their buffer zones. These documents are reflected in the Master Plan of Bukhara City in 2005. In addition, the Cabinet of Ministers of the Republic of Uzbekistan approved special Decree No. 49 of 23 March 2010 "On State program on research, conservation, restoration and adaptation to modern use of the cultural heritage properties of Bukhara until 2020." At present, this state program is being implemented, which provides an additional layer for the protection and conservation of the property. Management of monuments of cultural heritage in Bukhara is carried out by the Ministry of Culture and Sports of the Republic of Uzbekistan at national level and Bukhara Regional Inspection for Protection and Utilization of Monuments of Cultural Heritage and local authorities at regional level.

Samarkand. There are adequate legal provisions for the safeguarding of the heritage property. The State Samarkand Historical Architectural Reserve was established under the Decree of the Cabinet of Ministers of the Republic of Uzbekistan (26 May 1982). Within the Reserve, all construction and development works are done according to the recommendations of the Samarkand Regional Inspection on the Preservation and Restoration of Objects of Cultural Heritage. The overall responsibility of the management of protected areas is with the Ministry of Cultural and Sport Affairs and the Samarkand provincial government. The operating bodies that influence the conservation and management of the property include the Ministry of Culture and Sports of the Republic of Uzbekistan and the Principal Scientific Board for the Preservation and Utilization of Cultural Monuments, the municipalities of the Samarkand Region and Samarkand City, the Samarkand Regional State Inspection on the Protection and Utilization of Cultural Heritage Objects. Decisions on construction/reconstruction within the protective Reserve of Samarkand are taken in consultation with the Samarkand Regional State Inspection on the Protection and Utilization of Monuments, or by the Scientific Board on the Protection and Utilization of Monuments in Samarkand. Major projects receive approval at the national level.

3.3. National Occupational Health and Safety (OHS) Legislation

115. The following provides a summary of the national OHS legislation which is particularly relevant to the project given the nature of project works.

Table 3: List of OHS Laws and Regulations Relevant to the Project

Adopted On	Law / Regulation
03.07.1992	Act on State Sanitary Control
06.05.1993	Law on Occupational Safety
06.06.1997	Regulations on Investigation and Registration of Occupational Accidents and other Work Related Impairment of the Health of Workers
10.12.2008	Decree on the Industrial Security of Dangerous Production Sites
30.09.2009	Law on Fire Safety
15.09.2014	Decree on Further Perfection of Measures for the Occupational Safety of Workers

Source: www.ilo.org.

116. **Act on State Sanitary Control.** Provides, inter alia, for sanitary measures to improve labour conditions. Also deals with requirements for radiation safety and State jurisdiction.

117. **Law on Occupational Safety**. The law establishes a system of social, economic, organizational, technical, sanitary, and health as well as medical and preventive arrangements aimed at providing safety and health protection and capacity for persons at the workplace. Part II of the Law on Occupational Safety (Articles 8 through 14) establishes the norms for labor safety, including requirements in design, construction, and installation of production facilities, training in labor safety measures, financing of labor safety measures at the workplace, and ensuring safe and healthy working conditions. Part III of the Law on Occupational Safety (Articles 16 through 19) establishes procedures for guarantee of rights of workers to safety at the workplace, in particular ensuring access to medical examinations, measures of labor safety, and sanitary and healthy working conditions, training and information on labor safety procedures, and rights to information on working conditions and safety. Part IV and Part V of the Law on Occupational Safety deal with State and Public Supervision and Control and Liabilities, respectively.

118. **Further Perfection of Measures for the Occupational Safety of Workers**. Establishes, inter alia, a provision on the procedure of organizing attestation of workplaces by working conditions and hazardousness of equipment, according to the attached appendix No.1; establishes the provision on the procedure of granting qualification certificate to specialist of attestation according to appendix No.2; orders the Ministry of Higher and Secondary Professional Education to include in study courses special sections on the occupational safety; also orders other state executive bodies to carry out certain activities for the perfection of measures for occupation safety. Introduces appendices No.1, 1a, 1b, 2, 3,4, 5, 6, 7, 8 for the Provision on the procedure of organizing attestation of workplaces by working conditions and hazard of equipment; appendices 1–4 for the Provision on procedure of granting qualification certificate to specialist of attestation.

119. **Decree on the Industrial Security of Dangerous Production Sites** - Provides, inter alia, for compulsory civil liability insurance in case of damage caused to the health, life or property of third parties or to the environment. Also deals with the development of human resources and skills to better assess, monitor and prevent industrial hazards to be undertaken by the competent institutions.

120. **Regulations on Investigation and Registration of Occupational Accidents and other Work-Related Impairment of the Health of Workers**. An employee who has been fully or partially disabled through the fault of the management as a result of an occupational accident or disease is paid an allowance and compensated for damage to health by the enterprise in accordance with the “rules of compensating damage due to occupational injury, disease or other work-related impairment of health” approved by Decree of the Cabinet of Ministers of Uzbekistan of February 11, 2005 No. 60.

121. In addition to the main legislation the Republic has national normative documents addressing the issues of occupational health and safety. They include the Sanitary Rules and Norms (SanPiN), State Occupational Safety Standards (GOST, SSBT), Construction Norms and Rules (SNiPs), standards of the content of harmful substances (maximum allowable concentrations and levels), normative methodological documents on individual issues setting forth concrete requirements to occupational safety in hazardous facilities, when manufacturing or applying various products, etc.

3.4. Administrative Framework

122. **The State Committee on Nature Protection (SCNP):** SCNP is responsible for environmental protection. The main tasks of the SCNP are ensuring the implementation of a unified state policy in the field of environmental safety, environmental protection, use and reproduction of natural resources; the implementation of state control over the observance by ministries, state committees, departments, enterprises, institutions and organizations, as well as individuals, in the area of the use and protection of land, mineral resources, water, forests, flora and fauna, atmospheric air; interdisciplinary integrated environmental management; and organization and coordination of work to ensure a favorable state of the environment and improve the environmental situation.

123. **Center for State Ecological Expertise:** The activities of the Center for State Ecological Expertise are directly related to the consideration of materials for Environmental Impact Assessment (EIA) and the issuance document on determination of compliance of the planned or carried out business and other activities with environmental requirements and determination of the admissibility of the implementation of the object of environmental expertise.

124. The main state bodies responsible for the implementation of Occupational Health and Safety (OHS) policy are:

- The Ministry of Employment and Labour Relations, including the State Labor Inspection under the Ministry with territorial branches distributed all over the Republic;
- The State Inspection for Safety in Industry, Mining and Housing and Utilities Sector;
- The Department of State Sanitary Epidemiological Supervision under the Ministry of Health of the Republic of Uzbekistan.

125. The Ministry of Employment and Labor Relations has an OHS directorate and the State Labour Inspection and its regional branches in the Republic of Karakalpakstan, Viloyats (provinces), the Tashkent city and district directorates and branches on labor, employment and social security. They constitute a single system of supervision and monitoring compliance with OHS requirements at the ministries and agencies, institutions, organizations, industrial and agricultural enterprises, with the exception of hazardous facilities that are under the jurisdiction of the State Inspection on Safety in Industry, Mining and the Housing and Utilities Sector. The structural units of the State Inspection for Safety in Industry, Mining and the Housing and Utilities Sector are responsible for sectoral inspections including for supervision of the work of power stations, substations and networks.

3.5. National Environmental Impact Assessment Legislation

126. The national EIA procedure is regulated by the Law "On the Environmental Examination" and the Regulations "On the State Environmental Expertise" (SEE), approved by DCM # 949 On approval of the Regulation of the State Ecological Expertise (22.11.2018). The Resolution specifies the legal requirements for EIA in Uzbekistan. According to the Resolution, SEE is a type of environmental examination carried out by specialized expert divisions to set up the compliance of the planned activities with the environmental requirements and determination of the permissibility of the environmental examination object implementation.

127. The special authorized state body in the field of SEE is the SCNP. SEE is carried out by the three specialized expert divisions of the SCNP:

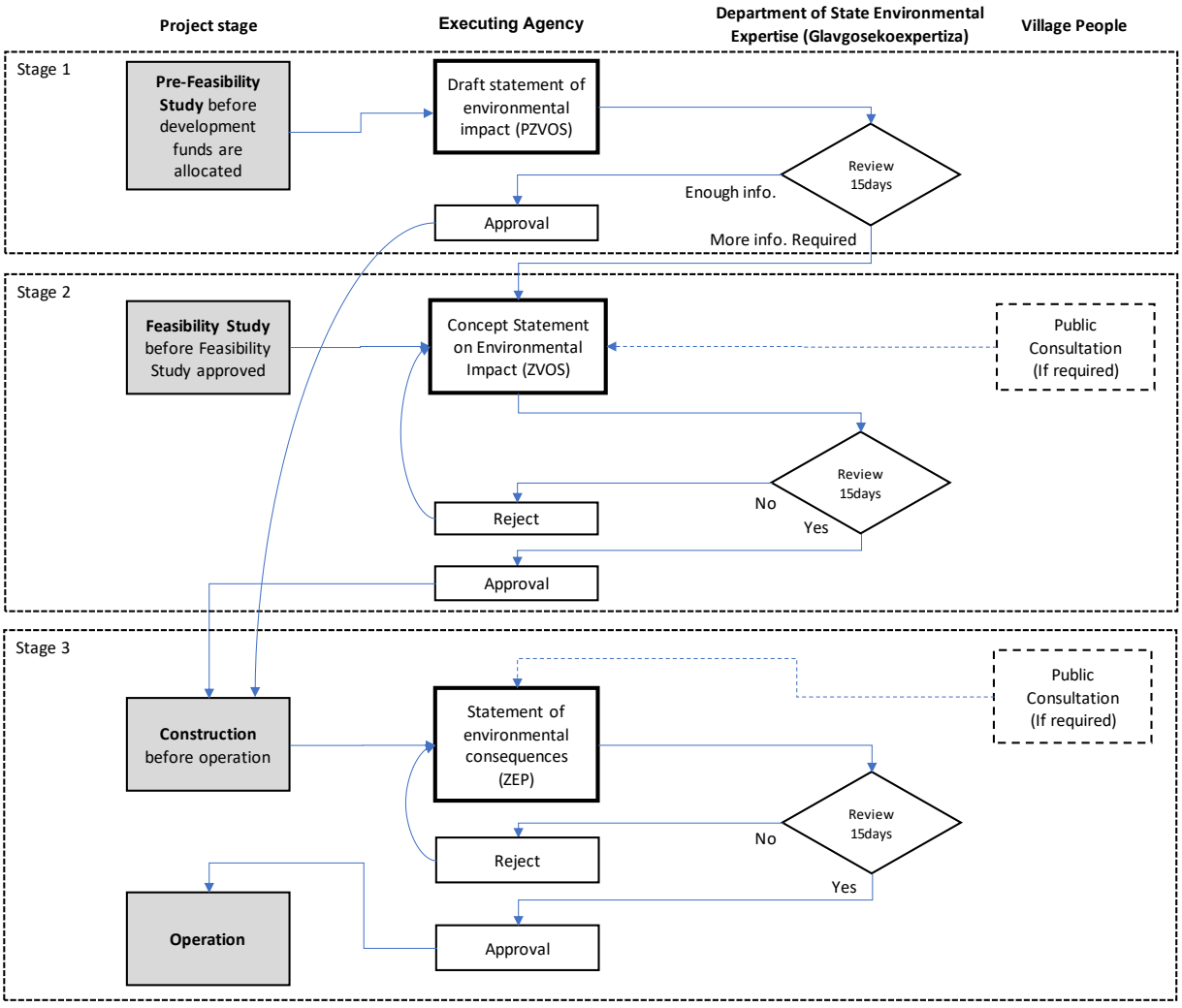
- The state unitary enterprise "The Center of the State Environmental Examination" of the SCNP, hereinafter referred to as "The Center of the State Environmental Examination SUE" - carries out the state environmental examination of EIA of the objects of economic activity classified as the I and II categories of environmental impact (high and medium risk);
- The state unitary enterprise "The Center of the State Environmental Examination" of the Republic of Karakalpakstan - carry out environmental examination of EIA of the objects of economic activity classified as the III and IV categories of environmental impact (low risk and local impact);
- The state unitary enterprises "The Center of the State Environmental Examination" of regions and Tashkent city - carry out environmental examination of EIA of the objects of economic activity classified as the III and IV categories of environmental impact (low risk and local impact).

128. The three stages of the EIA and their required results are summarized as follows:

129. **Stage I:** "A Draft Statement of the Environmental Impact ("DSEI") shall be carry out at the planning stage of the proposed project prior to the allocation of funds for development. The DSEI is prepared at the planning stage of the Project. A DSEI shall include:

- The state of the environment prior to the implementation of the planned activities, the population of the territory, land development, analysis of environmental features;
- Situational plan with an indication of the geographical coordinates of the object in question, available recreational areas, settlements, irrigation, land-improvement facilities, farmland, power lines, transport, water, gas pipelines and other information about the area;
- The envisaged (planned) main and auxiliary objects, used equipment, technologies, natural resources, materials, raw materials, fuel, analysis of their impact on the environment;
- Expected emissions, discharges, wastes, their negative impact on the environment and ways to minimize them;
- Storage, storage and disposal of waste;
- Analysis of alternatives to the planned or ongoing activities and technological solutions from the standpoint of nature conservation, taking into account the achievements of science, technology and best practices;
- Organizational, technical, technological solutions and measures that exclude negative environmental consequences and reduce the impact of the object of examination on the environment;
- Analysis of emergency situations (with an assessment of the likelihood and scenario of preventing their negative consequences);
- Forecast of environmental changes and environmental consequences as a result of the implementation of the object of examination.

Figure 1: State Environmental Expertise Procedure



130. The DSEI shall be reviewed and approved at the national level (for projects relating to category I and II) or at the regional level (for projects relating to category III and IV) under the SCNP. The SEE confirms the category of the project and identifies the main issues that the project beneficiary shall focus on in the next stages of the environmental assessment process and during the project implementation (construction or rehabilitation works).

131. **Stage II:** "A Statement of the Environmental Impact" ("SEI") shall be prepared based on the conclusions of the SEE on the DSEI. The SEI shall include:

- assessment of environmental problems of the selected site based on the results of engineering and geological surveys, model and other necessary studies;
- environmental analysis of technology in relation to identified problems of the site;
- results of public hearings; and
- reasoned studies of environmental measures to prevent the negative effects of the implementation of the object of examination.

132. **Stage III:** "State Environmental Consequences" ("ZEP") is the final stage of the SEE process and shall be carried out prior to the start of the project. The report describes in detail the changes in the project made as a result of the analysis of the SEE during the first two stages of the EIA process, the comments received during public consultations, the environmental standards applicable to the project, and the environmental monitoring requirements related to the project, as well as the main conclusions.

133. The Conclusion of SEE shall be valid for three years from the date of its issuance. If the object is not implemented within three years from the date of issue of the Conclusion of the SEE needs to be revised and re-submitted to the SCNP for revision and approval.

134. The Conclusion of the SEE shall be sent to the relevant regional (city) control inspections in the field of ecology and environmental protection for control. Such inspections under the SCNP supervise the compliance with the requirements and conditions specified in the Conclusion of the SEE.

Box 2. Status of Project SEE

As part of the project, the projects feasibility study provided the following conclusions regarding environmental assessment:

'Under this project, environmental protection measures are not provided. In accordance with the letter of the State Committee for Nature Protection of the Republic of Uzbekistan dated 10.04.02, No. 18/66, electric networks of 0.4-6 kV belong to IV, the lowest category of environmental activities. In accordance with the "Sanitary norms and rules for protecting the population from exposure to an electric field", approved by the Main Sanitary and Epidemiological Administration No. 2971, protection of the population from the effects of an electric field created by power lines of alternating current of industrial frequency with a voltage of up to 10 kV is not required.

The project will not have a negative impact on the environment. An environmental assessment is not required. Due to the absence of factors negatively affecting the environment during automation of the electricity metering process, as well as in accordance with the statement of work, these issues were not considered.

The technological processes considered in the project are non-waste and are not accompanied by harmful emissions into the environment (both air and water). In this regard, the implementation of air-water protection measures to reduce harmful emissions is not provided.'

3.6. Environmental Regulations and Standards

135. Uzbekistan has a large set of specific standards that refer to emissions, effluent discharge, and noise standards, as well as standard to handle and dispose specific wastes ranging from sewage to hazardous wastes. The following summarizes these laws and standards along with other international best practice standards.

3.6.1. Air Quality and Emissions

136. National Standards – Air quality in Uzbekistan in measured against Maximum Permissible Concentrations (MPC) and Maximum Permissible Emissions (MPE).

137. Ambient Air Quality Standards, or MPCs, are established by SanPiN 0293-11 (May 16, 2011). According to the United Nations Environment Program (UNEP), Uzbek national ambient air quality standards meet World Health Organization (WHO) standards.[5] The MPCs relevant to the Project are show in Table 4**.**

Table 4: National Air Quality MPCs

Parameter	Uzbekistan MPC (mg/m^3)			
	30 min	24 Hour	Monthly	Annually
Nitrogen Dioxide (NO_2)	0.085	0.06	0.05	0.05
Nitrogen Oxide (NO)	0.6	0.25	0.12	0.06
Sulphur Dioxide (SO_2)	0.5	0.2	0.1	0.05
Dust	0.15	0.1	0.08	0.05
Carbon Monoxide (CO)	5.0	4.0	3.5	3.0

138. Emission standards are stipulated by The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 14 of January 21, 2014 “On Approval of the Regulation on the Procedure for Developing and Coordinating Environmental Draft Projects”. It states that the main criterion for establishing MPE are quotas for pollutants.

139. IFC / WBG Standards – The International Finance Corporation (IFC), part of the World Bank Group (WBG), have established ambient air quality standards based on WHO guidelines. WBG guideline limits will be followed during the construction and operational phase of the Project. The following table illustrates the guidelines.

Table 5: WBG Ambient Air Quality Guidelines [6]

Parameter	Averaging Period	Guideline Value (mg/m^3)
Sulphur Dioxide (SO_2)	10 minute	20
	24 Hour	500
Nitrogen Dioxide (NO_2)	1 Hour	40
	1 Year	200
Particulate Matter PM_{10}	24 Hour	20
	1 Year	50
Particulate Matter $PM_{2.5}$	24 Hour	10
	1 Year	25

Project Air Quality Standards

140. Any air quality monitoring during the construction phase will be undertaken against national standards. This is based on the criteria adopted by the WBG which state that:

[5] https://wedocs.unep.org/bitstream/handle/20.500.11822/17141/Uzbekistan.pdf?sequence=1&isAllowed=y.
[6] Not including interim targets.

'*Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards* ***by applying national legislated standards****, or in their absence, the current WHO Air Quality Guidelines*.'[7]

141. As noted above, Uzbekistan have their own national legislated standards and as such they will be applied to the Project in the event that air quality monitoring is required as a result of complaints from members of the public.

3.6.2. Water quality

142. The scope of works does not suggest that there will be any significant wastewater discharge from Project work sites, or any significant impacts to water bodies and as such no water quality monitoring will be required.

Project Standards

143. Not applicable.

3.6.3. Noise

144. National Standards - SanPiN No. 0267-09 is used to ensure the rules of acceptable noise levels for residential areas in Uzbekistan. These rules and regulations establish permissible noise parameters in residential, public buildings and residential buildings of populated areas created by external and internal sources, as well as general requirements for measurements, measurement methods and hygienic noise assessment at research sites. Evaluation of the sound level at the calculation point is performed for the day and night period of the day (from 7 to 23 hours and from 23 to 7 hours) and takes into account the maximum intensity of the sound source level during the half-hour period. Table 6 presents the permissible noise levels in the territories that are most significant for the project. The levels are almost identical to IFC standards shown below, with the exception of the periods where IFC are slightly more stringent.

Table 6: Noise limits from SanPiN No. 0267-09

Purpose of premises or territories	Time	SanPiN No. 0267-09
Territories adjacent to homes, clinics, dispensaries, rest homes, boarding houses, nursing homes, childcare facilities, schools and other educational institutions, libraries.	From 7 am to 11 pm	55 dB(D)
	From 11 pm to 7 am	45 dB(A)

145. IFC / WBG Standards – To meet WBG guideline requirements noise impacts will not exceed the levels presented in Table 7 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off site. This project will comply with both WBG Guidelines and Uzbek Standards.

[7] Environmental, Health and Safety Guidelines. Air Emissions and Ambient Air Quality. WBG. 2007.

Table 7: WBG Noise Level Guidelines

Receptor	One-hour L_{aeq} (dBA)	
	Daytime 07.00-22.00	**Night-time 22.00 – 07.00**
Residential; institutional; educational	55	45
Industrial; commercial	70	70

146. Workplace Noise - In order to protect the health of staff in the workplace Uzbekistan, utilizes the law (SanPiN) No. 0120-01 - "Sanitary norms and rules to ensure acceptable noise levels in the workplace". This document provides acceptable noise levels for various types of work, the most significant of which are listed below in Table 8**.** In addition, WBG provides noise limits for various working environments, which are also illustrated in Table 8**.**

Table 8: Working environment Noise Limits

Type of work, workplace	SanPiN No. 0120-01	General EHS Guidelines of WBG
Performance of all types of work at permanent workplaces in industrial premises and at enterprises operated since March 12, 1985	80 dB (A)	
Heavy industry		85 Equivalent Level Laeq, 8h
Light industry		50-65 Equivalent Level Laeq, 8h

* Laeq- equivalent average sound pressure level

Project Noise Standards

147. For any construction phase monitoring, WBG guideline limits will be followed as the nighttime period is slightly longer than Uzbek standards. For workplace noise, national guidelines shall be followed.

3.6.4. Vibration

148. International Standards – The German Standard DIN 4150-3 – Vibration in Buildings – Part 3: Effects on structures provides short term and long-term limits[8] for vibration at the foundation for various structures. This standard is considered international best practice and will be followed as part of the Project.

Table 9: Guideline Values for Vibration Velocity to be Used When Evaluating the Effects of Short-term and Long-term Vibration on Structures

Group	Type of structure	Guideline Values for Velocity (mm/s)				
		Short-term				Long-term
		At foundation			Uppermost Floor	Uppermost Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10

[8] Short-term vibrations are defined as those that do not occur often enough to cause structural fatigue and do not produce resonance in the structure being evaluated and long-term vibrations are all the other types of vibration.

Group	Type of structure	Guideline Values for Velocity (mm/s)				
		Short-term				Long-term
		At foundation			Uppermost Floor	Uppermost Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
2	Residential dwellings and buildings of similar design and/or use	5 (105 dB)	5 to 15	15 to 20	15	5 (105 dB)
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3 (100.5 dB)	2 to 8	8 to 10	8	2.5 (99.0 dB)

Source: DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures.

149. DIN 4150-3 notes that "experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the value in the table does not necessarily lead to damage".

Project Vibration Standards

150. Vibration impacts are not anticipated to be significant. However, in the event that complaints are received and monitoring is required, the project shall follow German Standard DIN 4150-3 during the construction phase.

3.6.5. Electromagnetic Field and Security Zones

International Electromagnetic Field (EMF) Standards

151. WBG EHS guidelines for Electric Power Transmission and Distribution refer to International Commission on Non-Ionizing Radiation Protection (ICNIRP), which establish reference levels for general public exposure to electric field as 5 kV/m and for magnetic fields 200 μT. In the UK, the exposure limit is 360 μT[9] (reference level 100 μT) and according to the UK Energy Network Association (ENA) no distribution circuit will ever produce fields this high.[10] The typical level of magnetic field and electric fields under a power line are shown in the table below. The table shows that at voltages below 10kV EMF values are well below exposure limits.

Table 10: Typical Ground-level Field Levels from Overhead Power Lines (11 / 33 kV)

Description	Magnetic Field (microteslas)	Electric Field (kV/m)
Maximum field (under lines)	7	0.7
Typical Field (under line)	0.2 – 0.5	0.2
Typical field (25m to side)	0.01 – 0.05	0.01 – 0.02
Typical Field (100m to side)	Less than 0.01	Less than 0.001

Source: Electric and Magnetic Fields – The Facts. Energy Networks Association. 2012.

[9] Only where the time of exposure is significant.
[10] https://www.energynetworks.org/assets/files/electricity/she/emfs/ENA%20training%20distribution%20EMFs%20v5.pdf.

152. Underground cables do not produce external electric fields because they are surrounded by a metal sheath which screens the electric field. A 132 kV below ground cable buried at 1m depth would produce a magnetic field of 72 μT.[11]

153. Corresponding ICNIRP limits for general occupational exposure to electric and magnetic fields are significantly higher at 10 kV/m and 1,000 μT, respectively. In the UK, the occupational exposure limits (high action level) are 6000 μT and 20 kV/m and 1000 μT and 10 kV/m (low action level).

Box 3: Occupational Effects of EMF – UK Case

The main effects the UK occupational exposure limits are protecting against is that the external electric or magnetic field induces a smaller internal field in the body. That internal electric fields in the body can then interfere with nerves.

If you are below both the sensory and the health effects limits, there should be no direct effects on the body. There may be indirect effects, either through microshocks or on implanted medical devices such as pacemakers. Whilst microshocks may be present, they should be limited to acceptable levels below the sensory effects limits.

If you are above the sensory effects limits but still below the health effects limits, you could potentially experience some sensory effects. The main example would be magnetophosphenes, a flickering sensation in the vision. These effects are transient - they disappear as soon as the field is removed - and they are not known to be harmful. That is why the Regulations allow you to exceed these sensory effects limits under certain conditions.

If you are above the health effects limits, you may experience "peripheral nerve stimulation". This means there could be interference with the nerves of, for example, the limbs, which could be painful and, for example if you were working at height, possibly dangerous. Even so, there is no suggestion of permanent harm, except at much higher levels.

Source: http://www.emfs.info/limits/limits-organisations/regulations-2016/.

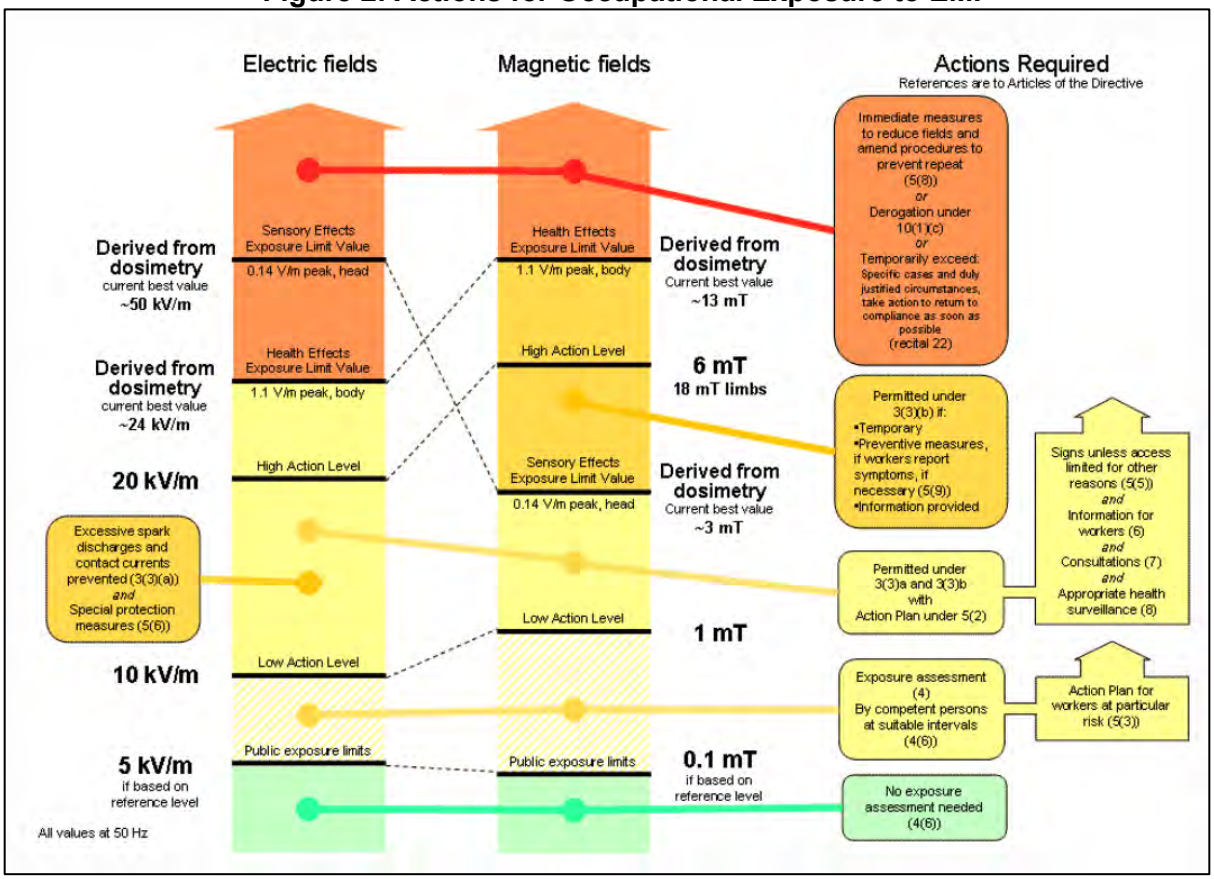
154. The EU have also provided guidance via a Directive on occupational exposure to EMF (2013/35/EU) on EMF exposure which is closely based in ICNIRP guidelines. The Directive requires different actions at successive action levels and exposure limit values. They are shown in the figure below and d summarised as follows:

- You have to do an exposure assessment as soon as you exceed the public exposure limits.
- You can exceed the action levels provided you have put in place various provisions.
- You can exceed the sensory exposure limit values provided you control any sensory effects that might arise.
- You cannot exceed the health exposure limit value.

155. As noted above, maximum EMF levels are anticipated to be below the limit for public exposure. Therefore, no exposure assessment is therefore required.

[11] http://www.emfs.info/compliance/public/.

Figure 2: Actions for Occupational Exposure to EMF



National Security Zones

156. The security zone is installed depending on the type of protected object. The list of types of zones is established by the Land Code, according to which 28 types of zones with special conditions of use of the territory are defined, for example, security zones of pipelines, electric grid facilities, lines of structures and communication, roadside lanes, etc. The security zone of the gas pipeline or the power line can entail the ban on construction of any buildings, buildings and constructions. The presence of a sanitary protection zone indicates a ban on the construction of residential facilities. The presence of a cable means that any earthworks are carried out only if the organization - owner of such a cable line - agrees. Land plots are not seized from their owners, land users, landowners and tenants, but within the boundaries of these plots a special regime may be introduced for their use, limiting or prohibiting those activities that are incompatible with the purpose of establishing such zones.

157. The following table provides the security zones for various types of distribution lines.

Table 11: Electrical Network Security Zones

#	Type	Standard Width of Security Zone (m)
1	Low-voltage cable line (0,4 kV)	2
2	Low-voltage air-line (0,4 kV)	2
3	High-voltage cable line (10/6 kV)	20
4	High-voltage air-line (10/6 kV)	20

158. Note that in special cases, with the permission of the Cabinet of Ministers of the Republic of Uzbekistan, it is allowed to build electric grid facilities in protected natural areas, state reserves, protected areas of natural parks, state biosphere reserves, etc.[12]

3.6.6. Waste

159. National Standards - The Law on Waste No.362-II of April 5, 2002 (modified January 4, 2011) regulates solid waste treatment procedures and defines the authority of various institutions involved in solid waste management. The law also provides rules for the transport of solid waste. Hazardous wastes that are transported must undergo environmental certification and be transported by special vehicles.

3.6.7. Hazardous material

160. National Standards - The order to place hazardous chemicals and hazardous materials in special landfills, their protection and disposal, approved by the State Committee for Nature Protection, the Ministry of Emergency Situations, the Ministry of Finance, the Ministry of Health No. 2438 of March 20, 2013. The provision identifies hazardous chemicals, toxic materials, special landfills and special vehicles. The state organization “Kishlokkime” (Agricultural Chemicals) is responsible for the transportation and disposal of hazardous materials.

161. Transportation of such materials should be carried out in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 35 dated February 16, 2011 “On rules of transportation of hazardous materials in the territory of Uzbekistan”. The Ministry of Health and the State Committee for Nature Protection approve proper performance of work.

3.6.8. Occupational Health and Safety Standards

162. All works on construction of power lines will be carried out with observance of measures on environmental protection and on the basis of the following regulatory documents, norms and standards:

- ShNK 4.02.33-04 Transmission lines.
- ShNK 4.02.67-07 Electric installation works. Repair and construction works.
- KMK 2.01.11-97 Engineering protection of the territories, buildings and constructions against the hazardous geological processes. Main provisions of the design KMK 3.05.06.97 "Electrotechnical devices"
- KMK 3.01.02-00 * "Safety measures in construction"
- The Rules for Electrical Equipment Installation.
- RD (Ruling Document) 34.20.501-05. Operating Rules for the Power Plants and Electric Networks.
- RD (Ruling Document) 34.03.202.95. Safety Rules for the Electrical Equipment Operation.
- Sanitary norms and rules (SNR) on the effects of the electric field generated by overhead transmission lines of alternating currents of industrial frequency;
- "Instructions for design of fire protection of the power enterprises"

163. The government have created a Special Republican Commission on preparation of the program of measures to prevent the introduction and spread of coronavirus in the Republic of

[12] The Analysis of Lands in Security Zones of High-Voltage Power Lines on the Example of Ferghana Valley. International Journal of Multidisciplinary Research. February 2020.

Uzbekistan (Commission) in accordance with ORDER President of Uzbekistan (On the formation of a special republican commission to prepare a program of measures to prevent the import and spread of a new type of coronavirus in the Republic of Uzbekistan dated January 29, 2020, № P-5537).

3.7. International Agreements and Conventions

164. The global agreements in which Uzbekistan is a Party are as follows:

- UN Framework Convention on Climate Change (06/20/1993).
- Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (05/26/1993).
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (12/22/1995).
- Paris Convention on Protection of the World Cultural and Natural Heritage (12.22.1995).
- UN (Rio) Convention on Biological Diversity (05.05.1995).
- United Nations Convention to Combat Desertification (08/31/1995).
- Convention on International Trade of Endangered Species of Wild Flora and Fauna (07/01/1997).
- Bonn Convention on the Conservation of Migratory Species of Wild Animals (05/01/1998);
- Ramsar Convention on Wetlands of International Importance Especially as Wildlife Habitat (30.08.2001), etc.
- UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (9.08.2007).
- Convention on the Law of the Non-Navigational Uses of International Watercourses (August 9, 2007).

165. As a member of the Commonwealth of Independent States (CIS) countries, Uzbekistan is a member of the Interstate Environmental Council on the harmonization of environmental legislation, the development of the EA and the development of economic instruments for environmental protection, as well as a member of the Interstate Environmental Fund for financing environmental protection in interstate and regional programs.

Box 4. A Note on PCBs

Polychlorinated Biphenyl's (PCBs) belong to a category of pollutants classified as 'persistent organic pollutants' or POPs. The safe management of POPs is guided by the Stockholm Convention on Persistent Organic Pollutants, which became effective in 2004. According to the Stockholm Convention, it is forbidden to: (i) produce, import, and trade PCBs; (ii) reuse and process PCB waste; and (iii) refill PCB equipment. Furthermore, the existing PCBs and all equipment contaminated with PCBs have to be eliminated in an environmentally sound manner without producing hazards for humans or the environment until 2025. Currently, **the Republic of Uzbekistan is not party to this Convention** and there is no legislation to regulate and manage PCBs.

3.8. Asian Development Bank Safeguard Policies 2009

166. The ADB has three safeguard policies that seek to avoid, minimize or mitigate adverse environmental impacts and social costs to third parties, or vulnerable groups as a result of development projects. The Project requires the application of both environmental safeguard and social safeguard.

Safeguard Requirements 1: Environment

167. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. Eleven 'Policy Principles' have been adopted as part of the ADBs Safeguard Policy Statement (SPS 2009), including:

168. Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks. (**The project was screened by the ADB and classified as a category B project**).

169. Conduct an environmental assessment for the proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate. (**The IEE herewith provides the environmental assessment for the project, including an assessment of climate change. Transboundary impacts are not applicable**).

170. Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative. (**Alternatives have been considered, including the 'no project' alternative in Section 4).**

171. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle. (**An EMP has been prepared for the project and is outlined in detail in Section 10 Environmental Management Plan).**

172. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish

a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance. **(Consultations were held to discuss environmental issues, the findings of the consultations (and a description of the project grievance redress mechanism) are presented in Section 8 - Stakeholder Engagement, Information Disclosure and Grievance Mechanism).**

173. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders. (**This IEE and its EMP will be disclosed on the ADB website**).

174. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports. (**The IEE and its EMP outline a plan to monitor the implementation of the EMP and the institutional responsibilities for monitoring and reporting throughout the Project lifecycle: Section 9 - Environmental Management Plan).**

175. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources. (**Critical habitats have not been identified that maybe significantly impacted by the Project at this stage. Additional measures have been incorporated which should prevent any future impacts to these areas**).

176. Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides. (**The IEE outline the mitigation plan of the EMP: Section 9 - Environmental Management Plan).**

177. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities. (**The IEE and its EMP outline the requirement for specific community health and safety plans: Section 9 - Environmental Management Plan).**

178. Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. (**A sample chance find procedure is provided in this IEE**).

Safeguard Requirements 2: Involuntary Resettlement.

179. The objectives are to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups. The safeguard requirements underscore the requirements for undertaking the social impact assessment and resettlement planning process, preparing social impact assessment reports and resettlement planning documents, exploring negotiated land acquisition, disclosing information and engaging in consultations, establishing a grievance mechanism, and resettlement monitoring and reporting.

180. The involuntary resettlement requirements apply to full or partial, permanent or temporary physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) resulting from (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. Resettlement is considered involuntary when displaced individuals or communities do not have the right to refuse land acquisition that results in displacement. (**A Draft Land Acquisition and Resettlement Framework (LARF) has been prepared for the Project according to the requirements of ADB).**

Safeguard Requirements 3: Indigenous Peoples.

181. The objective is to design and implement projects in a way that fosters full respect for indigenous peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the indigenous peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them. (**The project does not involve impacts to Indigenous Peoples and therefore no further actions relating to this safeguard are required**).

3.9. Gap analysis

182. The environmental assessment of the project will need to satisfy both, the national requirements of Uzbekistan and ADB. A harmonized safeguard framework is developed for conducting the IEE study of the project. The framework is given below.

Table 12: Comparison of ADB and Uzbekistan Legislation Requirements

Aspect	ADB	Uzbekistan	Harmonized Framework
Environmental Policy and Regulations	ADB's SPS (2009) sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:	EIA is called State Environmental Expertise (SEE) in Uzbekistan. SEE is stipulated in the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan	The Project follows both ADB's SPS (2009) and Resolution No.491, December 2001.

Aspect	ADB	Uzbekistan	Harmonized Framework
	-Environmental safeguards, -Involuntary resettlement safeguards, and -Indigenous peoples safeguards	No. 491 dated December 31, 2001.	
Screening	This project is category B.	This project falls into category II of the environmental impact with medium risk.	All the requirement of ADB will cover the requirement of Uzbekistan requirement. Then the project will follow the Category B of ADB.
Alternatives	Examination of financially and technically feasible alternatives to the project location, design, technology and components, their potential environmental and social impacts.	Alternative assessments are to be carried as per request of the Center for State Ecological Expertise.	Assessment of alternatives will be included.
EIA Report	Guidelines and Table of Contents are provided for IEE report in SPS (2009). EMP will include proposed mitigation measures, monitoring and reporting requirements, institutional arrangements, schedules and cost estimates. The report should be in English.	Draft of Concept Statement on Environmental Impact (national acronym PZVOS) requires, Baseline, analysis of alternatives, Pollution prevention plan, Waste storage, and other mitigation. The report should be in Russian.	The project prepared IEE report in English following the form of ADB. After that IEE report is translated in Russian or Uzbek and change the format in Uzbekistan style. The contents of two reports are same but layout and language is different.
Public Consultations	“Meaningful” consultation with affected people are required for the project.	Public consultation is not required in the process of Draft of Concept Statement (PZVOS).	A wide range of public consultations have been undertaken to ensure they are ‘meaningful’.
Public Disclosure	Draft IEE will be published in ADB website before project approval by the Board.	If the report has secrets of official or private organization, it should not be disclosed.	Draft IEE report (English and Russian or Uzbek) will be published in ADB Website. The copies of the Russian version of Draft of Concept Statement on Environmental Impact will be made available at the affected villages.

4. Description of the Project

4.1. Introduction

183. This section of the report presents the project description in two stages, firstly for the project as a whole, meaning all five years of the investment program and secondly for Year 1 project activities, including the design, construction and operation and maintenance aspects of the project.

184. Note that this is a rolling five-year project and that although the total amount of works and the types of works are known, only the locations of the first years project activities are actually known. Annual investment plans (AIPs) will be prepared at the start of each year of the project by REN and the PTES, and these plans will specify the locations where activities will be undertaken during that specific year.

4.2. Five Year Project Overview, Costs and Location

4.2.1. Overview

185. The main components of the project include:

- Installation of pole-mounted transformers 10 (6) / 0.4 kV;
- Construction of overhead distribution lines (OHL) 0.4-6-10 kV;
- Construction of belowground distribution lines (cables) 0.4-6-10 kV;
- Automation of electric networks by the SCADA system;
- Construction of pilot solar Photovoltaic (PV) projects; and
- Construction and commissioning of workshops for the manufacture of distribution line poles.

186. The following tables summarize these activities by region and the project costs.

Table 13: Summary of Project Activities and Benefits

#	Description	Unit	Total	Samarkand	Bukhara	Jizzak
1	New Distribution Line Construction	KM	1,959	750	699,58	509,8
2	New Transformer Installation	Unit	911	240	399	272
3	Rehabilitation of Distribution Line	KM	11,212	4,250	4,635	2,,327
4	Rehabilitation of transformers	Unit	3,367	1,360	868	1139
5	Forecasted reduction of technological losses of electric energy for its transmission after the completion of the project in the networks 0,4-6-10 kV	thousand kWh	13,177	51,681	38,098	41,998
		%	33	31	34	35
6	Annual Prevention of Emergency Shutdowns	Times	923	99	745	79
		% to 2018	5.6	2.9	8.6	5.3
		Million UZS	145	41	90	15
7	Annual Maintenance Cost Savings	Million UZS	737	84	388	265
		% to 2018	5.6	2.9	8.6	5.3
		Million USD	26.2	11.9	8.8	5.6

#	Description	Unit	Total	Samarkand	Bukhara	Jizzak
8	Reduction of Fuels and Lubricants	%	21	29	20	13

Figure 3: Pole Mounted Transformer	Figure 4: Pad-Mounted Kiosk Transformer
	
This figure illustrates a newly installed pole-mounted transformer in Samarkand. Note that the transformer is located at least three meters above ground to ensure that it cannot be tampered with. The unit carries around 20 liters of oil. There is no mechanism to capture leaks of oil from the unit, but this is considered to represent normal practice for pole mounted transformers.	Example of a new pad-mounted transformer located in Bukhara. The surface beneath the transformer is impermeable, but there is no specific drip tray or bund to capture leaks of oil which could run out of the kiosk if there is a large leak.

4.2.2. Costs

187. The following table presents the costs of the entire project

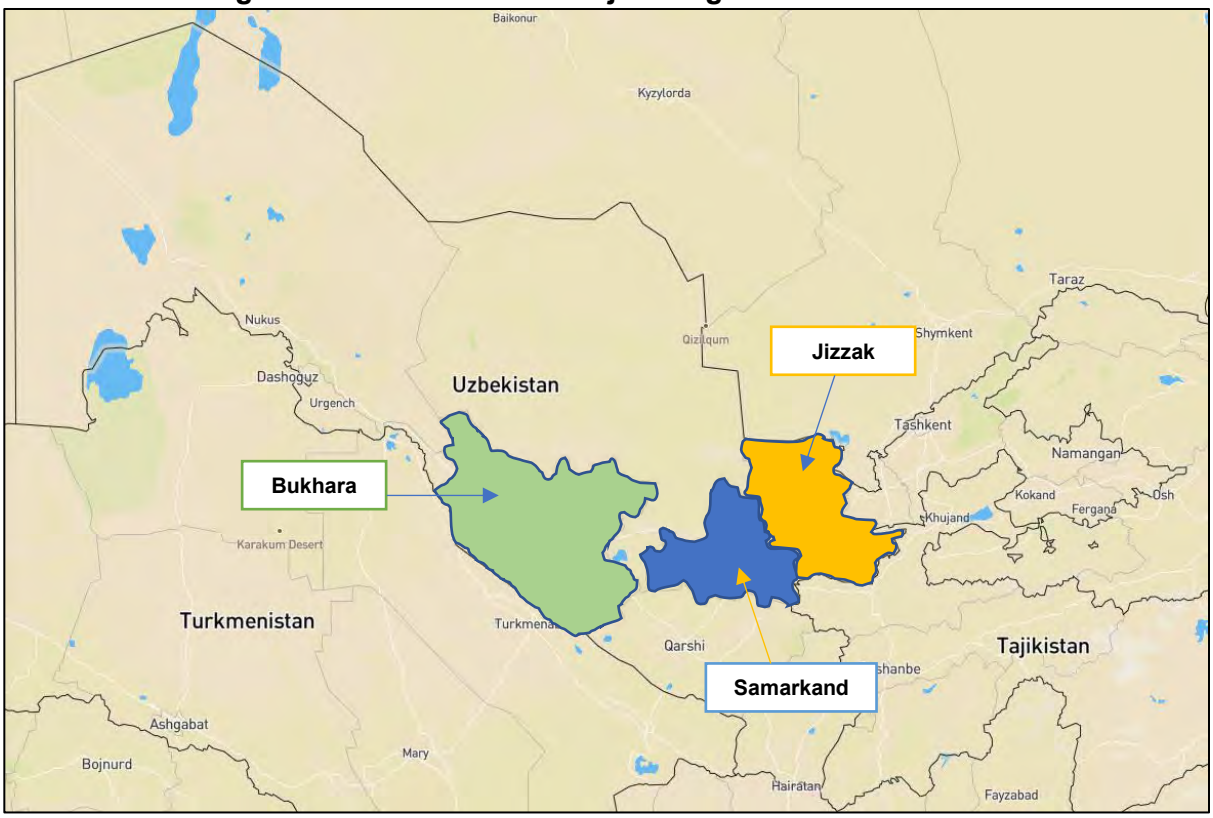
Table 14: Summary of Project Costs

#	Component	Unit	Total	Source of Funds	
				ADB Loan	GOU Funds
1	Total Project cost	Thousand USD	304,014	300,000	4,014
2	Machinery and Equipment	Thousand USD	58,971	58,971	
3	Construction and Installation Works	Thousand USD	236,743	236,743	
4	Other Costs	Thousand USD	5,613	4,285	1,328
5	Financial Costs in Investment Period	Thousand USD	2,686	-	2,686

4.2.3. Project Location

188. The project will be located in three regions of Uzbekistan, Bukhara, Samarkand and Jizzak (see Figure 5). The locations of the Year 1 activities in each of the regions are shown in Figure 6, Figure 7 and Figure 8.

Figure 5: Location of the Project Regions within Uzbekistan



4.3. Year 1 Activities and Locations

189. 1,800 activities are proposed in Year 1. As part of this IEE 18 site were visited to get an understanding of the typical work sites and potentially sensitive receptors. These 18 sites are listed in the table below and the 1,800 sites are provided in **Appendix K.**

Table 15: Year 1 Activity Locations Visited

#	Region	Makhalla and location
1	Samarkand	Muborak - Located 2.5 km. away from local electricity network company
2		Kavola 4 - Located 2.2 km. away from local electricity network company
3		Baraka - Located 6.1 km. away from local electricity network company
4		Kul - Located 5.5 km. away from local electricity network company

#	Region	Makhalla and location
5		Samarqand district Jangijoy - Located 7.2 km. away from local electricity network company
6		Samarqand district Jangibog - Located 8.0 km. away from local electricity network company
7		Samarqand district Urta Okhalik - Located 9.2 km. away from local electricity network company
1	Bukhara	5 Bukhara district Yangi Turmush (Makhalla) - Located 2.5 km. away from Kechkalok village local electricity network company (transformer)
2		Bukhara district Yangi Turmush (Makhalla) - Located 2.0 km. away from Charimgaron village local electricity network company
3		Bobkent district, Shakarkent (Makhalla), - Located 1.7 km. away from Ogari village local electricity network company «КТП» 11 (transformer)
4		Shofirkon district A. Navoi (Makhalla) – Located 2.0 km. away from Chakar village local electricity network company (transformer)
5		Shofirkon district Chukurak (Makhalla) – Located 1.8 km. away from Yukori Chukurak village local electricity network company (transformer)
1	Jizzak	Sh. Rashidov district Khayrobod (Makhalla), Buiuk Ipak and Ankhorilik str. – In order to decrease the capacity for the transformer substation No. 369 it is required to build additional 0.5 km. line (10 KVa) for a new 160 KVa transformer
2		Sh. Rashidov district Yangihayot (Makhalla), Kurgontepa village – In order to decrease the overload capacity for the transformer substation No. 437/160 it is required to modernize additional 2.0 km. line (10 KVa) for a new 160 KVa transformer
3		Sh. Rashidov district Fayzabod (Kishlok), Omachi (Makhalla) – In order to decrease the overload capacity for the transformer substation No. 379 it is required to build additional new 160 KVa transformer
4		Jizzak city, A.Temur (Makhalla), for households located by f. Sangzor greenhouse it is required to build a 1.0 km line (10 KVa) for a new 250 KVa transformer substation
5		Jizzak city, Bogishamol (Makhalla), f. Sangzor - it is required to modernize a 1.0 km line (10 KVa) for an existing transformer No.311
6		Bunedkor (Makhalla), f. Kalia-1 - – In order to decrease the overload capacity for the transformer substation No. 257 it is required to build a new 160 KVa transformer station

Figure 6: Location of Year 1 Activities Visited – Bukhara

Figure 7: Location of Year 1 Activities Visited - Samarkand

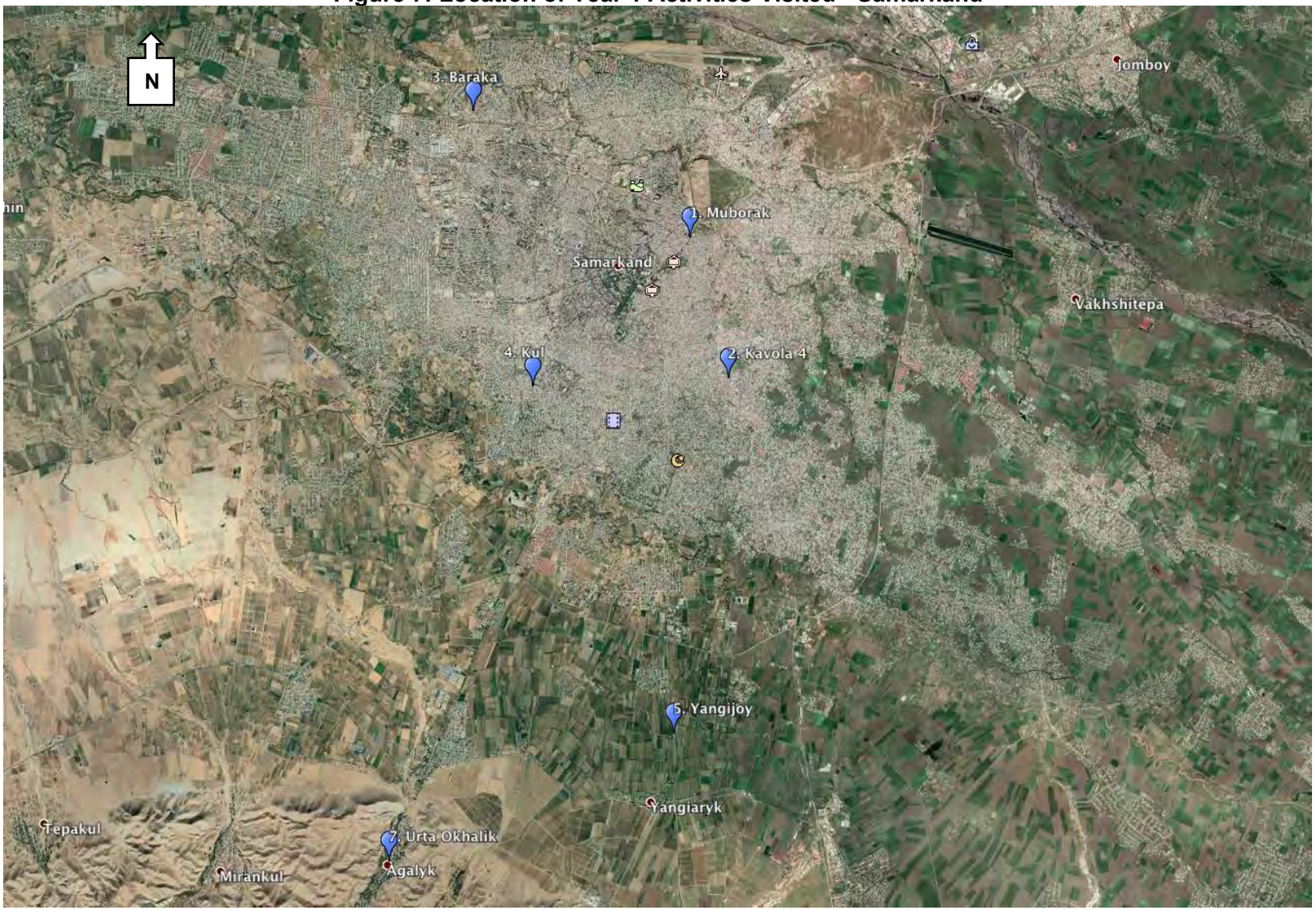
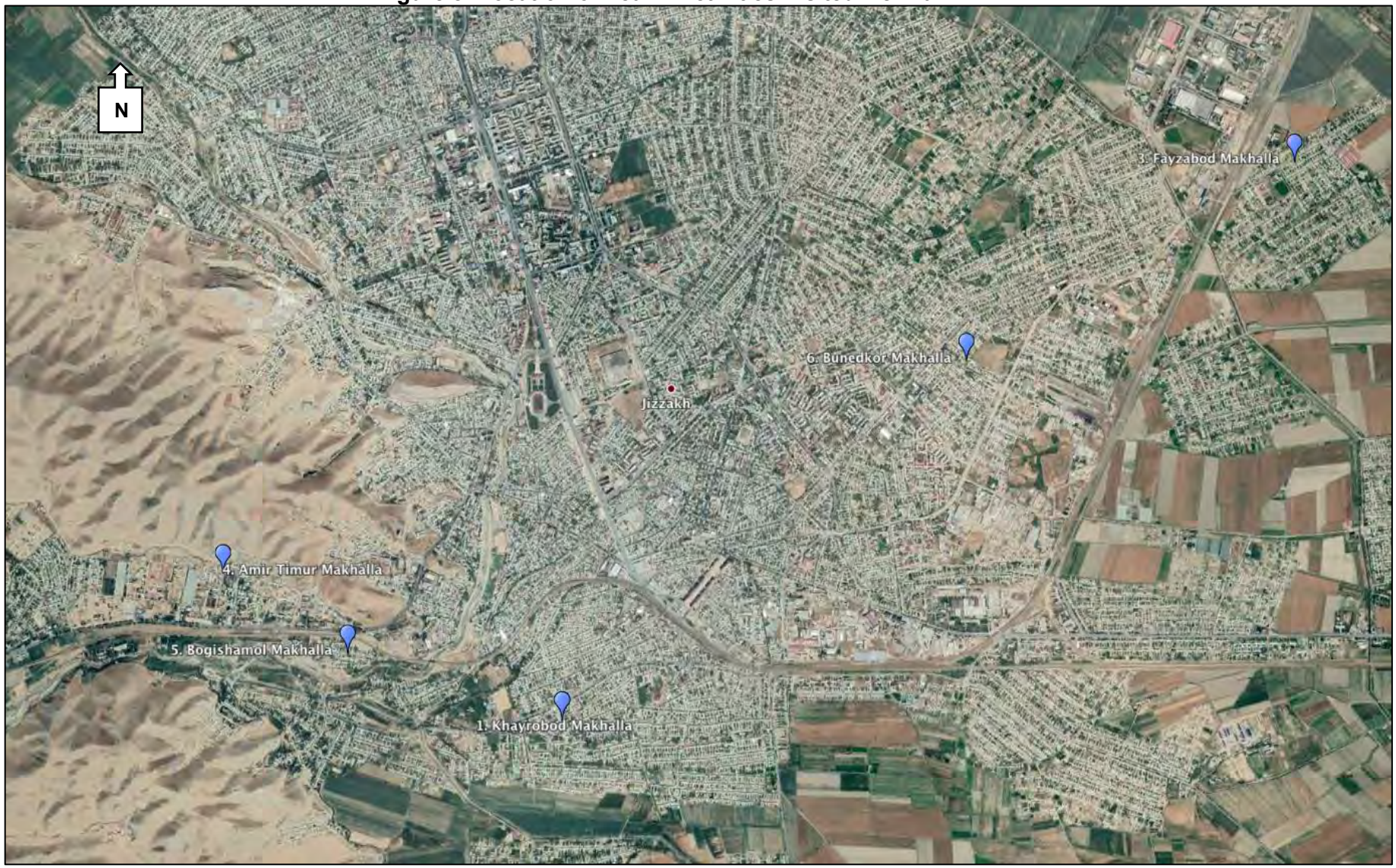


Figure 8: Location of Year 1 Activities Visited – Jizzak



4.4. Design and Construction Activities

4.4.1. 0.4-6-10 kV Overhead Lines (OHL)

190. The following items are typically required for the construction of 0.4-6-10 kV OHL:

- Stones for compaction of base
- Concrete Poles
- Support of cross arms
- Cross arms[13]
- Post insulators[14]
- 3 Phase disconnector and surge arresters[15]
- Fuses
- 10kV aluminium conductor
- 10kV cable
- Polyvinyl Chloride (PVC) Pipe
- Anchors[16] and guy wires[17] / push guys[18]

191. The following equipment is required for the construction of 0.4-6-10 kV OHL:

- Truck mounted Auger
- Arial Work Platform 'cherry picker'
- Truck
- Mobile Crane with Claw Arm
- Survey Equipment
- Mobile compactors

192. The key tasks involved in the 0.4-6-10 kV OHL construction works include:

- Inform local community in advance of works and any potential electricity disruptions.
- Move equipment to site using trucks.
- Prepare worksite, including erection of warning signs and safety fences.
- Dismantle old poles and transport old poles to PTES maintenance yard.
- Drill / dig new footings for poles.
- Erect new poles.
- String lines using cherry pickers.

[13] A cross-arm is secured to a pole and used to mount various types of circuit protection devices and support distribution conductors.
[14] An insulator is a material that prevents the flow of an electric current and can be used to support electrical conductors. The function of an insulator is to separate the line conductors from the pole. Insulators are fabricated from porcelain, glass, and fiber glass, treated with epoxy resins and rubberlike compounds.
[15] Transformers and other equipment on pole lines are very expensive to purchase and very time-consuming to install. To keep them in good working order, you must protect them from overcurrent and overvoltage conditions. You do this by installing protective devices.
[16] The anchor is the foundation of the pole line, and its purpose is to take the strain of all the weight of the equipment installed on a pole line. For example, on a straight pole line the strain of equipment, hardware and conductor support devices is distributed evenly along all the poles through the conductors. At the end of a pole line, or wherever the pole line changes direction, the strain is borne by only one pole. If left unsupported, this one pole will slowly be pulled toward the rest of the pole line until it collapses. To prevent this, a guy wire and anchor are installed. The guy wire transfers the strain from the pole to an anchor that is firmly imbedded in the earth.
[17] A guy is a brace or wire fastened to the pole to strengthen it and keep it in position.
[18] A push guy, or a push brace, is used when it is impossible to use down guys. When it is impossible to obtain sufficient right-of-way for a pole guy, the push brace can usually be installed.

- Remove any waste materials, such as packaging waste, scrap wires, etc.

193. The following pictures illustrate some of these steps in the construction / replacement of distribution poles.

Removal of Existing Pole – The area around the existing pole to be removed is fenced of and signposted to warn locals of the works and to prevent access to the site. The lines are removed manually from the existing pole via a cherry picker whilst the pole is removed using a mobile crane with a claw arm. A small bob-cat excavator is used to remove soils from around the base of the pole.

Placement of New Pole – the new pole is lifted into place by the mobile crane. In the case of a new pole location, the hole will be excavated using the Bob-cat or a truck mounted auger.

Placement of New Pole – Workers help maneuver the pole into the existing hole.

Backfilling – Excavated material is re-used to backfill around the new pole using the Bob-cat excavator.

Stringing the Line – The line is replaced by a worker using the cherry picker. Any waste materials are then removed from the work area which is swept and then any fencing and warning signs are removed before moving on to the next pole.

4.4.2. Pole-Mounted Transformers

194. New pole-mounted transformers will be installed using cherry pickers and mobile cranes as per **Figure 9** below which illustrates such an activity occurring in Jizzak by the PTES. The transformers sit on cross arms installed at least 3m above ground level.

195. Refurbishment / replacement of existing pole-mounted transformers will follow similar procedures with the mobile crane and cherry pickers being used to remove and reinstall any transformers. In general, these include the following:

- Inform local community in advance of works and any potential electricity disruptions.
- Move equipment to site (2-3 persons).
- Prepare worksite, including erection of warning signs and safety fences.
- Dismantle and remove old transformer using cherry picker.
- Transport old transformer to PTES maintenance yard for repair / recycling / disposal.
- Install new transformer using cherry picker.
- Connect kiosk to the existing network.
- Remove any waste materials, such as packaging waste, scrap wires, etc.

196. Temporary safety fences shall be erected around each work site. Warning signs will be displayed around work sites to warn workers and members of the local community of potential risks. All crews shall have a competent person responsible for first aid. Every crew shall have a first aid box at the worksite.

Figure 9: REN Installing a Pole Mounted Transformer, Jizzak

Source: Consultants Own Photo. Jizzak. June 2019

4.4.3. 0.4-6-10 kV Below Ground Cables

197. The following summarizes the works required for below ground cables which will mainly be constructed in urban areas, such as Jizzak city.

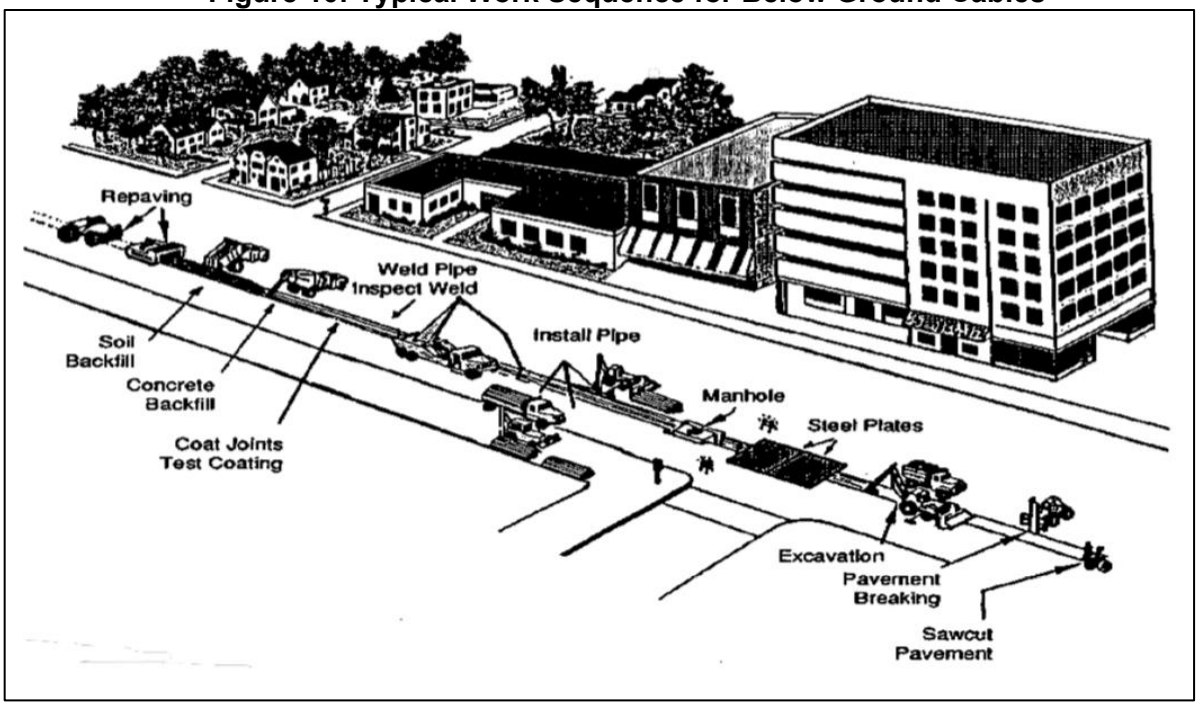
198. **Route Selection** - Route selection is more than determining the shortest distance. The route of the cable must also be chosen to:

- facilitate the future development of the network.
- avoid natural and man-made obstructions that will add to the cost of installation.
- avoid environmentally sensitive and polluted areas.
- provide safe access for installation and repair.
- account for the physical limitations of affecting the pulling of cables.[19]

199. **Pre-construction** - Similar to overhead transmission construction, underground construction begins by staking the right of way (RoW) boundaries and marking sensitive resources. Existing underground utilities are identified and marked prior to the start of construction.

200. **Construction** - If the transmission line is constructed within roadways, lane closures will be required, and traffic control signage installed. Construction activities and equipment will disrupt traffic flow. On average, around 50m of traffic lane are closed during construction as works progress along the alignment. When materials and equipment are delivered, additional lengths or lanes of traffic may be closed. Construction areas need to be wide and level enough to support the movement of backhoes, dump trucks, concrete trucks, and other necessary construction equipment and materials. Construction areas in road RoWs are typically 2–3m wide with 1–1.5m for trench construction. Most commonly, a backhoe is used to dig the trench. The excavation starts with the removal of the top soil in unpaved areas or the concrete/asphalt in paved areas. The depth of the trenches ranges from 0.6m to 1.5m.

Figure 10: Typical Work Sequence for Below Ground Cables



Source: Underground Electric Transmission Lines. Public Service Commission of Wisconsin.

[19] Standard for Distribution Line Design Underground. Ergon Energy Network.

201. **Restoration** - Site restoration for underground construction is similar to overhead transmission line construction restoration. When construction is completed, roadways, landscaped areas, and undeveloped areas are restored to their original condition and topography. Highway lands and shoulders are re-constructed so as to support road traffic. Roadside areas and landscaped private properties are restored with top soils that was previously stripped and stockpiled during construction or with new topsoil. Any infrastructure impacted by the construction project such as driveways, curbs, and private utilities are restored to their previous function, and yards and pastures are vegetated as specified in landowner easements.

Figure 11: Typical Trench Dimensions

Source: Underground vs. Overhead Transmission and Distribution. NEI Power Engineering. 2009

4.4.4. Pad-mounted 'Kiosk' Transformers

202. Pad-mounted transformers are prefabricated and transported to site on a flatbed truck. Ground will be prepared prior to the arrival of the transformer, comprising either a concrete pad (see Figure 12), or a compacted gravel base with steel or concrete footings for the transformer to be placed upon (see Figure 13).

203. The selection of the site for a pad-mounted transformer will be as close as practical to the optimum position for electricity supply distribution. The site will also:

- be secure from third party and environmental damage.
- be relatively flat and structurally sound.
- not be subject to tidal inundation, storm surge, or flooding (1:100 year risk).
- provide secure and safe access for operational purposes.
- consideration for road safety.
- not be an obstruction or public nuisance.

204. The transformers will be lifted onto the site using a mobile crane with claw arm. Any existing transformers will be removed from site and sent to the regional warehouses for spare parts, or recycling.

Figure 12: Pad-Mounted 'Kiosk' Transformer

Source: Consultants own photo. Stockholm. 2019.

Figure 13: Pad-Mounted 'Kiosk' Transformer

Source: Consultants own photo. Armenia. 2019.

4.4.5. Items the Project will Not Include

205. The project will not require the construction or upgrading of any access roads, construction camps, or laydown areas. The project will not require borrow pits or quarries.

4.4.6. Solar PV

206. The details of the pilot solar PV projects have yet to be determined, but they will broadly comprise Installation of small-scale, roof-mounted and/or community-based solar power projects in rural areas (maximum 100–200 kilowatts per project or less depending on the power demand in the region, with a combined capacity of all projects of no more than 1 megawatt).

207. Typical construction activities include:

- Transport of equipment / materials to site in trucks
- Installation of panel footings.
- Installation of panels frames.
- Installation of solar panels.
- Connection to network.
- Removal of waste materials from site.

The IEE will be updated when further details of this pilot project is known, including any information relating to transmission lines connecting the facility to the grid, or to local consumers. However, only lithium ion batteries shall be procured and used.

4.4.7. Land Acquisition

208. A draft land acquisition and resettlement framework (LARF) has been prepared according to ADB SPS (2009). REN will be responsible for the timely implementation of the LARF. The details of the LARF are provided in Section 8.4.2.

5. Analysis of Alternatives

5.1. General

209. One of the objectives of an IEE is to investigate alternatives to the project. In relation to a proposed activity “alternatives” mean different ways of meeting the general purposes and requirements of the proposed activity.

210. In general, it is noted that the project intends to reconstruct the old transmission line that has fallen into disrepair, as such there are few realistic alternatives. Accordingly, the following section provides an assessment of the ‘no action’ alternative and alternative locations.

5.2. ‘No Project’ Alternative

211. The “No Action” Alternative in this instance is defined as a decision not to undertake the proposed construction of the project.

212. The electricity demand in Uzbekistan has been increasing for the past several years, and the government estimates its power demand will be doubled by 2030. The key factors fueling the increasing power demand include increasing population, rapid urbanization, industrialization, improvement in per capita income and village electrification programs of Uzbekistan’s central and provincial governments. In order to match the increasing trend in the power demand, regular investments in various segments of the power network – generation, transmission, and distribution are vitally important. Otherwise, the gap between the supply and demand will keep on increasing. In case the proposed project is not undertaken, Uzbekistan will not be able to cope with the increasing demand and the existing system will remain over-loaded, energy losses will also remain high, and the system reliability will progressively decrease, with increasing pressure on the system. The utility will also forego the opportunity of increasing its consumers’ base as well as revenue associated with the system expansion. In view of the above, the ‘no project’ option is not a preferred alternative.

5.3. Alternative Regions

213. The project regions have been selected by ADB and REN for investment as part of a countrywide network modernization program. Alternative regions could have been selected for funding by ADB and REN, however, in terms of environmental impacts the region selected makes little difference as the activities undertaken are the same in all regions. Accordingly, an assessment of alternative locations is not warranted.

5.4. Alternative Technologies

5.4.1. Overhead Distribution Lines and Underground Distribution Lines

214. As noted above, two types of distribution line are proposed for the project, overhead (insulated and uninsulated wire) and below ground. The projects feasibility study assessed these options, the findings of which are presented below.

Table 16: Comparison of Distribution Line Types

Type	Advantage	Disadvantage
Overhead uninsulated wires	• Lower construction costs (with equivalent nominal capacity). • Lower recovery time in case of malfunction.	• Higher operating costs. • Vulnerability to environmental objects • Vulnerability in interaction with birds
Overhead insulated wire type SIP-2,3	• Average construction costs. • Lower maintenance costs (e.g. tree pruning) • No impact on environmental objects and interactions of birds. • Fewer regulatory restrictions.	• Higher repair time costs compared to uninsulated wire solutions • Significant time spent on detection and recovery
Underground cable	• Less vulnerability to environmental objects. • Indifference in interaction with birds. • Fewer regulatory restrictions.	• Higher construction costs. • Significant financial costs for detection and recovery • Vulnerability in the presence of rodents.

215. Based on the above table, the use of insulated overhead lines (0.4kV) of SIP (self supporting insulated cables) type in areas of low/medium load density is a good compromise between the three alternatives. In addition, it can also guarantee a higher degree of safety with respect to aerial uninsulated wire. Insulated wires will also prevent bird electrocution on the insulated portions of the lines and also provide more visibility to birds due to their thickness which will help reduce collisions.[20]

216. The use of low-voltage underground cable is recommended in urban areas with high density housing. This will eliminate the risk of impacts to birds via collisions or electrocutions.

217. The total cost of overhead lines with insulated wires is comparable, and sometimes even lower, compared to traditional overhead lines with uninsulated wires, despite the higher cost of the conductor due to insulation. Indeed, installation is simpler, and the path can be better optimized due to the smaller safety distances that must be respected. In addition, in small villages this type of conductors can be installed directly on the wall of a house, supported by steel wire or self-supporting neutral central conductors.

5.4.2. Air cooled and Oil Cooled Transformers

218. There are two types of transformers being used in the industry currently: Dry-type transformers and oil-cooled transformers. Dry-type uses air as a cooling medium, and liquid cooled uses oil. Although both types have the same end result there are a number of differences between them worth noting as follows:

[20] Protecting birds on powerlines: a practical guide on the risks to birds from electricity transmission facilities and how to minimise any such adverse effects. erman Society for Nature Conservation, Registered Charity and BirdLife Partner Germany. Page 11.

- **Maintenance:** Oil cooled transformers required more maintenance procedures, which must be performed more often than dry-type. The oil needs to be sampled to test for contamination, whereas dry type transformers are very resistant to chemical contaminants.
- **Costs (Initial and Operating):** Compared to oil cooled, dry type has a significantly higher operating loss. Oil filled transformers have a higher standard energy efficiency, and as a result have a higher lifespan than dry type.
- **Noise:** Oil cooled transformers have a lower operating sound level, thus less noise pollution than dry-type.
- **Recyclability:** The end of life recycling for dry type is limited, while oil units boast an easier core/coil reclamation. Oil cooled have superior operating life and maintainability, producing less waste and requiring less replacements and labor.
- **Efficiency:** Dry type transformers are larger units, limited in voltage and size, making them more prone to overheating if they experience overload. As a result, they have higher electrical losses, and it is more expensive to maintain dry type power supply over time. Oil cooled units are smaller and more efficient. They require less demand and create a smaller environmental footprint.
- **Voltage Capabilities:** Dry type transformers are designed to handle small to medium MVA and voltage ratings, making them ideal for smaller applications. Oil cooled transformers can handle heavier loads, so applications that require higher voltages will require oil units.
- **Location:** Dry type is specified for use in buildings and near buildings. Dry type transformers are less flammable and pose less of a fire risk, making them ideal for shopping malls, hospitals, residential complexes and other commercial areas. Oil cooled transformers are used in outdoor installations due to the possibility of oil leakage and spills which pose a fire risk.

219. Taking these variables into account, oil units appear to be the better option overall with higher energy efficiency, recyclability, low noise pollution, lower operational costs and a small environmental footprint. However, oil units simply cannot be used in any situation. However, dry type are safer units to operate around people and areas where fire hazards may exist.

220. The PTES will determine which type of transformer will be installed, and this IEE includes measures to mitigate impacts from both types.

6. Existing Facilities and Operations

6.1. General

221. This section of the IEE provides an overview of the existing Bukhara, Samarkand and Jizzak PTES facilities and operations. Firstly, a review of the PTES maintenance yards is provided. These are the locations where waste transformers and equipment will be sent for recycling and disposal. Secondly, an overview of current PTES practices regarding hazard liquids, waste management and PCBs is provided.

6.2. PTES Facilities

Samarkand PTES

222. Samarkand PTES warehouse and its maintenance yard are located in a secure compound. All maintenance activities are undertaken within a building located on an impermeable surface. PPE was generally well applied across the site, however items such as fire safety equipment, ventilation systems, etc. did not appear to be adequate; further detailed assessment of the OHS issues at these sites is recommended.

223. During transformer maintenance works oil is removed from the transformer unit for treatment. Oil is either re-used in the transformers after treatment or if it does not meet the technical specifications for re-use it is stored in a below ground storage tank where it is periodically collected by a state authorized waste management contractor. The volumes of oils collected are routinely reported to REN Headquarters in Tashkent by the Samarkand PTES. Nobody in the warehouse or maintenance yard knew about PCBs, or if they were present in any transformer oil.

	
Waste transformers located in front of the below ground oil storage tank in Samarkand PTES maintenance area. According to the Engineer in charge of the PTES Oil Department, a new storage tank should be constructed due to the age of the existing tank and the potential for leaks from the tank.	Lifting equipment for removal of the transformer coils from transformer units Samarkand maintenance area.

Bukhara PTES

224. The maintenance yard in Bukhara PTES is located in the city itself (but outside of the UNESCO (United Nations Educational, Scientific and Cultural Organization) designated area). The area is quite well organized compared to Jizzak maintenance yard. Only transformer equipment under 35kV is maintained at this facility. All other transformer equipment is sent to REN in Tashkent for repairs (note the ADB project only includes networked activities of 10kV and lower). The maintenance activities are divided into four areas. The first area, located outside, included a type of bunded gravel pit, used to store the transformers awaiting repair. The purpose of the pit is to capture any small leaks of oil from the transformers, and not any major leaks and spills. The second area is the maintenance area itself. This is enclosed within one of the main maintenance yard buildings. As noted below, activities here do not represent a significant pollution risk, but there are some obvious occupational health and safety issues. The third area comprises the oil treatment equipment. Oil removed from transformers under maintenance in the unit next door are treated in this area. Ventilation in this area was considered inadequate. After treatment the oil is tested in the laboratory on the second floor of the maintenance building. The laboratory did not test for PCBs and no staff in the maintenance yard were aware of PCBs or their hazardous properties. The following photos illustrate the conditions of the site noted in March and April 2019.

	Old transformers were stored outside of the maintenance area. The transformers here were mostly located in some type of gravel pit, assumed to catch small leaks and spills of oil, however, the suitability of this area to contain larger spills and leaks of a few liters is questionable. The Bukhara PTES warehouse and maintenance yard has been located in this area for more than 80 years and as such it is assumed that there has been contamination to the ground beneath the site (formerly this site was the location of Bukharas first thermal diesel fired power plant, constructed in the 1930's).

	The mainetance area is kept in a better condition than Smarkand and Jizzak, although the workers did not appear to wear any form of Personal Protective Equipment (PPE), e.g. safety boots. A small ventilation unit was noted in the wall. All maintenance activities in this area are completed on hardstanding, and within drip trays to prevent leaks and spills of oils. None of the staff were aware of PCBs or their hazards.
	The units pictured here are used to treat transformer oil. The contents of solids, humidity, dissolved air and gas in the oil must be kept as low as possible in order to avoid a drastic decrease in the dielectric power. Any transformer insulating oil contamination severely affects the capacity of the oil to withstand high voltages without generating electrical discharges. Safe and efficient cleaning are therefore of utmost importance to the safety and efficiency of transformer operation. After treatment the oils are tested in the on-site lab. Oils meeting the required standard are re-used, oils not meeting the required standard are collected by a licensed waste management company for recycling. Note that because the oil does not meet the required standard for re-use in the transformer, it does not eliminate them from being re-used for other non-transformer related uses.

Jizzak PTES

225. The warehouse and maintenance yards are in separate locations in Jizzak PTES. Two main issues were observed in the Jizzak warehouse, firstly the storage of transformers waiting to be taken to the maintenance yard was not adequate, or considered best practice as shown in the photos below. Secondly, bulk oil storage tanks did not have suitable spill / leak containment measures. Jizzak maintenance yard was poorly maintained, there was a lack of ventilation, fire safety measures were inadequate, and waste was being burned in a corner of the site. Most of the maintenance activities were however undertaken within the closed maintenance unit, thereby preventing leaks and spills of oil migrating from the site.

	Scrap transformers located in the Jizzak PTES maintenance yard (approximately 20 minutes drive from the PTES Headquarters). All of the maintenance activities are carried out inside of the yard on concrete hardstanding, as such there is minimal risk of oil leaks migrating from this site.
	Signs of waste being burned at the boundary of the Jizzak maintenance yard. Adjacent properties are non-residential. Waste insulation paper was noted in this area. The paper is contaminated to some degree by transformer oil, but according to the PTES it is not classified as hazardous waste under national regulations.
	The maintenance yard in Jizzak was poorly maintained. Fire safety equipment was limited across the site and there was no plan to deal with any emergency at the site. Equipment was left lying around the floor, presenting safety hazards ventilation systems appeared inadequate and there appeared to be no system to manage wastes, except for burning waste material as identified above. According to the unit manager some materials are sent for recycling, but there were no records of waste movements kept at the site.

	The contents of the first aid box at Jizzak maintenance yard is clearly inadequate.
	The warehouse in Jizzak PTES is located adjacent to the PTES headquarters. Some transformers were kept haphazardly around the site, some of which showed signs of small oil leaks. These transformers were waiting to be sent to the PTES maintenance yard for rehabilitation. A large above ground oil storage tank was noted without any containment measures.

6.3. Polychlorinated PCBs

226. Due to the age of the equipment used in large parts of the electricity distribution system (more than 30 years old) it is possible that PCBs could be present within transformer oil. Consultations with Uzbekenergo, Samarkand, Bukhara and Jizzak PTES and regional SCNPs in March and April 2019 revealed that there is little or no understanding of PCBs and their risks.

227. According to a recent World Bank funded transmission project in Uzbekistan "*A large sample of oil from transformers (around 30) was tested by Uzbekenergo (UE), and no PCB was found.*"[21,22] None of the discussions undertaken as part of this IEE with UE, REN or PTES mentioned this previous testing program, however, this may be due to the fact that the testing was undertaken within the transmission sector, not in the distribution sector. Additional PCB testing of transmission transformers was undertaken as part of the ADB funded Northwest Region Power Transmission Line Project. Transformer oil in the Khorezm Substation was tested. The six

[21] Modernization and Upgrade of Transmission Substations, Uzbekistan. Environmental and Social Management Framework. World Bank, 2015.
[22] Combined Project Information Documents / Integrated Safeguards Data Sheet (PID/ISDS). Appraisal Stage. World Bank, 2016

samples tested by a certified laboratory in Germany did not reveal PCB concentrations above 0.1 mg/kg (0.1 ppm).

228. The World Bank funded transmission project suggests that the PCB findings are in line with the findings from other similar projects in CIS countries (for example in Moldova the conducted full inventory of PCBs that involved all electrical transformers shows only less than 1% of oil is contaminated with PCBs). However, other recent distribution modernization projects in Armenia indicate that PCBs are present in transformer oil, and in some cases in values greater than 50ppm (8 out of 20 transformers tested).[23] In summary, until further testing of transformers is undertaken **the presence of PCBs in the distribution system cannot, and should not, be ruled out**.

229. Further, the decision on the original Project Draft Statement of Environmental Impacts (DSEI)[24] prepared by the SCNP (6th June 2017) states that PCBs could be present in the distribution system and that a plan for identifying PCBs should be prepared as part of the next stage of SEE (SEI) for all regional activities.

6.4. Oil Storage

230. Where practical, transformer oil is re-used (see **Waste Oil** below). However, sometimes this is not possible, or practical and the oil must be replaced. Transformer oil is stored in above ground storage tanks in PTES warehouses. Some of these tanks showed visible signs of wear and leaks and spills of oil were noted around the tanks (none of the spills / leaks were considered to be significant). Most of the tanks did not have any form of containment measures to capture leaks and spills of oil, or any adequate transfer procedures. None of the PTES had specific procedures for the management and distribution of transformer oil.

6.5. Waste Oil

231. Waste oil is generated by PTES when transformers are sent for maintenance and the oil within the transformer no longer meets the required technical specification after treatment. Maintenance activities for equipment with a voltage of 10kV and lower only occurs at PTES maintenance facilities (which are normally combined with the PTES warehouse facilities). Larger capacity equipment (which is not part of the project), is sent to Tashkent for maintenance. Oil which does not meet the technical requirements, after treatment and testing, is transferred to bulk oil storage tanks, most of which are located below ground. The tanks are periodically emptied by a licensed waste management company. The PTES keep a record of the volumes of waste oil removed from the site and report these details to the REN in Tashkent and SCNP. This procedure itself is considered an effective one, however, visits to PTES maintenance yards suggest that the oil storage facilities are aging and it is not possible to confirm the integrity of the tanks.

6.6. Solid Waste

232. Solid wastes generated at the maintenance yards are either reused by PTES (e.g. transformer parts) recycled where practical (e.g. transformer copper coils, aluminum cases) or

[23] Armenia: ENA-Modernisation of Distribution Network. EBRD, 2018.
[24] Originally this project formed part of a country wide program to upgrade the distribution network. ADB planned to fund the activities in Jizzak, Samarkand and Bukhara through a Results Based Lending (RBL) modality, and the government planned to fund the activities in the remaining regions. A DSEI was prepared for the countrywide program.

collected for disposal by state licensed waste management companies. However, as noted in Jizzak, some waste materials, including insulation paper, was being burned on site. PTES keep records of the types and volumes of waste produced on site and routinely report the findings to REN in Tashkent and SCNP. During site visits to maintenance areas and warehouses the absence of specific waste storage containers was noted. There does not appear to be any formalized system of waste management, rather materials are simply dumped, or stored in an area of the maintenance yard, e.g. copper coils, until the are collected for recycling / disposal. The decision of the Program DSEI (6th June 2017) by the SCNP recommends that a plan should be development for waste management and that all collecting, and disposal of waste shall be undertaken by licensed companies.

6.7. Oil / Fuel Leaks

233. During site visits to three regions (Bukhara, Samarkand, Jizzak) the Consultant team was shown examples of new pad-mounted transformers that had been constructed as part of on-going government programs. It was noted that none of these transformers appear to have any mechanism to capture leaks of oil (or spills when oil needs to be topped-up), e.g. a drip dray, or containment bund. Discussions with the Design Institute (DI) responsible for preparing design documentation for this Project confirmed that there are no specific design requirements to contain leaks and spills of oils for this type of equipment, mainly due to their relatively small size. The decision of the Program DSEI (6th June 2017) by the SCNP recommends that fueling of construction equipment shall be undertaken at special locations and not at the work sites themselves.

6.8. Community Safety

234. During site visits to the three project regions it was noted that some of the existing pole mounted transformers were only positioned one or two meters off the ground. This represents a potential safety and security risk. Consultations with the Design Institute confirmed that there is a specific requirement for pole mounted transformers to be located at least 3.0 meters above ground. This specification was noted on new pole mounted transformers which had recently been constructed as part of government funded works. Accordingly, as long as pole mounted transformers are constructed in-line with the required specification no significant safety and security risks are anticipated.

235. Access to some of the new pad-mounted transformers is not secure. These units should be locked with padlock, but most were secured only by nuts and bolts which could easily be unscrewed with a wrench.

236. Periodic community safety awareness programs are also provided by the PTES, through TV and newspapers.

237. The decision of the program DSEI (6th June, 2017) by the SCNP recommends that construction activities shall be undertaken in accordance with the national instruction (SanPiN) No. 0236-07 "Sanitary standards and rules for ensuring safety for the population living near high-voltage power lines"

6.9. Occupational Health and Safety

238. A review of REN accident statistics has been undertaken as part of this IEE to determine if accidents are occurring in the company, and why. The following summarizes the findings of the data provided by REN to ADB.

239. **Number of Injured and Fatalities** – The following tables illustrates the high number of fatalities that are currently occurring in REN and the PTES. The number of fatalities is quite evenly spread amongst the regions, but Ferghana and Tashkent PTES shows the highest numbers. To make a comparison, Electrical Networks of Armenia the Distribution and Transmission utility of Armenia has 6,800 employees and registered three fatalities in both 2018 and 2019, an average of approximately one fatality for every 2,266 employees. REN employs approximately 24,500 in the PTES. With an average of 9.5 fatalities per year it can be seen that one fatality occurs for every 2,581 staff which is broadly in line with the numbers found in Armenia. Whilst this number is still considered unacceptable, it does suggest that Uzbekistan's fatality rate does not differ significantly from regional levels.

Table 17: REN Accident Statistic Summary, 2018

#	REN	Number of Employees	2018			Fatality per Total Number of Employees
			Number of casualties	Number of injured		
				Total	Fatalities	
1	Karakalpak	1,589	2	2	1	1,589
2	Andijan	2,005	0	0	0	0
3	**Bukhara**	**1,372**	**1**	**1**	**1**	**1,372**
4	**Jizzak**	**1,486**	**0**	**0**	**0**	**0**
5	Kashkadarya	2,302	2	2	2	1,151
6	Navoi	1,024	0	0	0	0
7	Namangan	1,963	1	1	1	1,963
8	**Samarkand**	**2,386**	**0**	**0**	**0**	**0**
9	Syrdarya	1,006	1	1	1	1,006
10	Surkhandarya	1,554	2	2	1	1,554
11	Tashkent	2,524	0	0	0	0
12	Fergana	2,422	3	3	3	807
13	Khorezm	1,136	0	0	0	0
14	Tashkent city	1,684	1	1	0	0
Total		**24,453**	**13**	**13**	**10**	**2,445**

Source: REN, 2020.

Table 18: REN Accident Statistic Summary, 2019

#	REN		2019			Fatality per Total Number of Employees
			Number of casualties	Number of injured		
				Total	death cases	
1	Karakalpak	1,589	0	0	0	0
2	Andijan	2,005	0	0	0	0
3	**Bukhara**	**1,372**	**2**	**2**	**1**	**1,372**
4	**Jizzak**	**1,486**	**1**	**1**	**1**	**1,486**
5	Kashkadarya	2,302	1	1	1	2,302
6	Navoi	1,024	0	0	0	0
7	Namangan	1,963	1	1	1	1,963
8	**Samarkand**	**2,386**	**1**	**1**	**0**	**0**
9	Syrdarya	1,006	1	1	0	0
10	Surkhandarya	1,554	2	2	1	1,554
11	Tashkent	2,524	3	4	3	841
12	Fergana	2,422	1	1	1	2,422
13	Khorezm	1,136	0	0	0	0
14	Toshkent city	1,684	0	0	0	0
Total		**24,453**	**13**	**14**	**9**	**2,717**

Source: REN, 2020.

240. **Types of Accidents and Incidents** – ADB provided the Consultant with data from REN relating to the types of accidents during 2019 and 2020 (note that is does not directly correspond with the table above). The following provides a summary of the data provided.

- Tashkent PTES, February 22, 2019 – Worker (20+ years of experience) entered a facility without permission to fix equipment. A fire started. Worker was burned on the head.
- Syrdarya PTES, June 1, 2019 – Worker (five year's experience) approached a conductive component at an unsafe distance. Workers left and right hands were amputated.
- Bukhara PTES, June 19, 2019 – Worker (one year's experience) died whilst disconnecting a 10kV OHL.
- Jizzak PTES, August 9, 2019 – Worker (with two year's experience) died. No specific cause was noted.
- Namangan PTES, July 8, 2019 – Worker (40 year's experience) died in car accident on the way to site.
- Surkhandarya PTES, August 14, 2019 – Worker accident involving a 6kV OHL. No further details provided.
- Bukhara PTES, October 12, 2013 – Worker (one year's experience), climbed a pole and fell, breaking a leg.
- Surkhandarya PTES, October 24, 2019 – Worker (experience 3 years) approached a conductive 10kV component at an unsafe distance and died of electric shock.

- Ferghana PTES, November 27, 2019 – Worker (seven year's experience) had a 0.4kV OHL fall on top of him, killing him.
- Samarkand PTES, December 10, 2019 – Worker (eight year's experience), climbed a pole, without authorization and had an electric shock. Workers condition is satisfactory.
- Kashkadarya PTES, December 15, 2019 – Worker (eleven year's experience) was killed by an electric shock due to several organizational failures at a work site leading to worker touching live equipment.
- Tashkent PTES, December 26, 2019 - – Worker (four year's experience) was killed by an electric shock due to several organizational failures at a work site leading to worker touching live equipment.
- Karakalpakstan PTES, April 12, 2020 – Worker (19 year's experience) fell from a pole. Victim currently in Hospital.
- Kashkadarya PTES, April 12, 2020 – Worker (27 year's experience) approached to close to equipment and had an electric shock.
- Ferghana PTES, April 20, 2020 – Worker (five year's experience) was electrocuted due to not wearing appropriate PPE.
- Khorezm PTES, April 14, 2020 – Worker (fourteen year's experience) fell from a pole and hurt his leg.

241. PTES do provide regular health and safety training to their staff. However, discussions with PTES staff and management as well as observations during site visits, indicate that personal protective equipment and other health and safety equipment (e.g. firefighting equipment, first aid boxes, adequate ventilation) is not always provided in suitable quantities or quality at PTES facilities and work sites.

242. Regarding infectious disease and specifically COVID-19, the government have created a Special Republican Commission on preparation of the Program of measures to prevent the introduction and spread of coronavirus in the Republic of Uzbekistan (Commission) in accordance with ORDER President of Uzbekistan (On the formation of a special republican commission to prepare a program of measures to prevent the import and spread of a new type of coronavirus in the Republic of Uzbekistan dated January 29, 2020, № P-5537).

6.10. Correction Action Plan

243. The following table provides the corrective action plan for the issues identified above. Note that there are no specific corrective actions for PCBs as they will be managed through the EMP and PCB management procedures prepared as part of this IEE.

Table 19: Corrective Action Plan

Proposed Action	Indicators	Responsible Teams	Timeframe	Costs
1. Waste and waste oil • Develop standard operational procedures for waste management, including site-specific plans for maintenance areas and	1) Waste procedures developed. 2) Integrity tests completed.	1) PTES / PIC 2) PTES	1) Within the first 3 months of the Project 2) By the end of the first year	1) Included in PIC IESS Costs 2) $6,000 per PTES

Proposed Action	Indicators	Responsible Teams	Timeframe	Costs
warehouses. • Integrity testing of all bulk oil storage containers.			of the program	
2. Storage of oil • Ensure oils (and any other hazardous liquids) are stored at PTES maintenance yards/warehouses in impermeable containment areas consistent with best practice.	1) No leaks and spills of oils observed around oil storage areas during annual facilities audits.	1) PTES Health and Safety Department	1) By the end of the first year of the Project	1) $2,000 per PTES
3. Community health and safety • Ensure all new and existing transformer kiosks are fitted with suitable locks to prevent unauthorized access. • Undertake further assessment of community health and safety risks	1) Locks provided on transformers inspected as part of annual audits. 2) Reduced number of accidents involving the community and PTES facilities.	1) PTES Engineering Department to undertake works and PIC to audit sites 2) PIC	1) Program developed and rolled out during year 1 of the Project 2) Assessment undertaken prior to the start of works	1) $1,000 per PTES for locks 2) Assessment Included in PIC International OHS Specialist Costs
4. Occupational health and safety • Undertake a detailed occupational health and safety audit of the PTES maintenance and warehouse areas and implement any corrective actions. The audit shall include the assessment of any emergency procedures.	1) Health and safety audit completed. 2) Suitable ventilation, fire safety equipment, and first-aid facilities installed at all sites. 3) Emergency response procedures at all sites.	1) PIC 2) PTES 3) PTES	1) Prior to the start of the Project activities 2) Prior to the start of the Project activities 3) Prior to the start of the Project activities	1) Assessment Included in PIC International OHS Specialist Costs 2) $2,000 per PTES 3) Assessment Included in PIC International OHS Specialist Costs

7. Description of the Environment

7.1. Introduction

244. This section of the report presents a description of the environment. The description is provided on two levels, firstly at the regional level (Samarkand, Bukhara and Jizzak) providing an overarching description of the following characteristics:

- **Physical Characteristics**
    1. Topography
    2. Soils
    3. Geohazards
    4. Hydrology
    5. Climate and Air Quality [25]
- **Biological Characteristics**
    1. Protected and Notable Areas
    2. Habitats and Notable Flora
    3. Notable Terrestrial and Aquatic Fauna
- **Socio-Economic Characteristics**
    1. Demographics
    2. Economy and Employment
    3. Industry and Agriculture
    4. Infrastructure, Transportation and Utilities
    5. Community Health, Safety and Education
    6. Physical Cultural Resources

245. Secondly, a description is provided of the local environment for each Year 1 project location that was visited as part of this IEE. This information provides a simple summary of the immediate environment setting of each site, and will not for example describe the climatic conditions, or geology in each of these respective locations.

7.2. Physical Environment

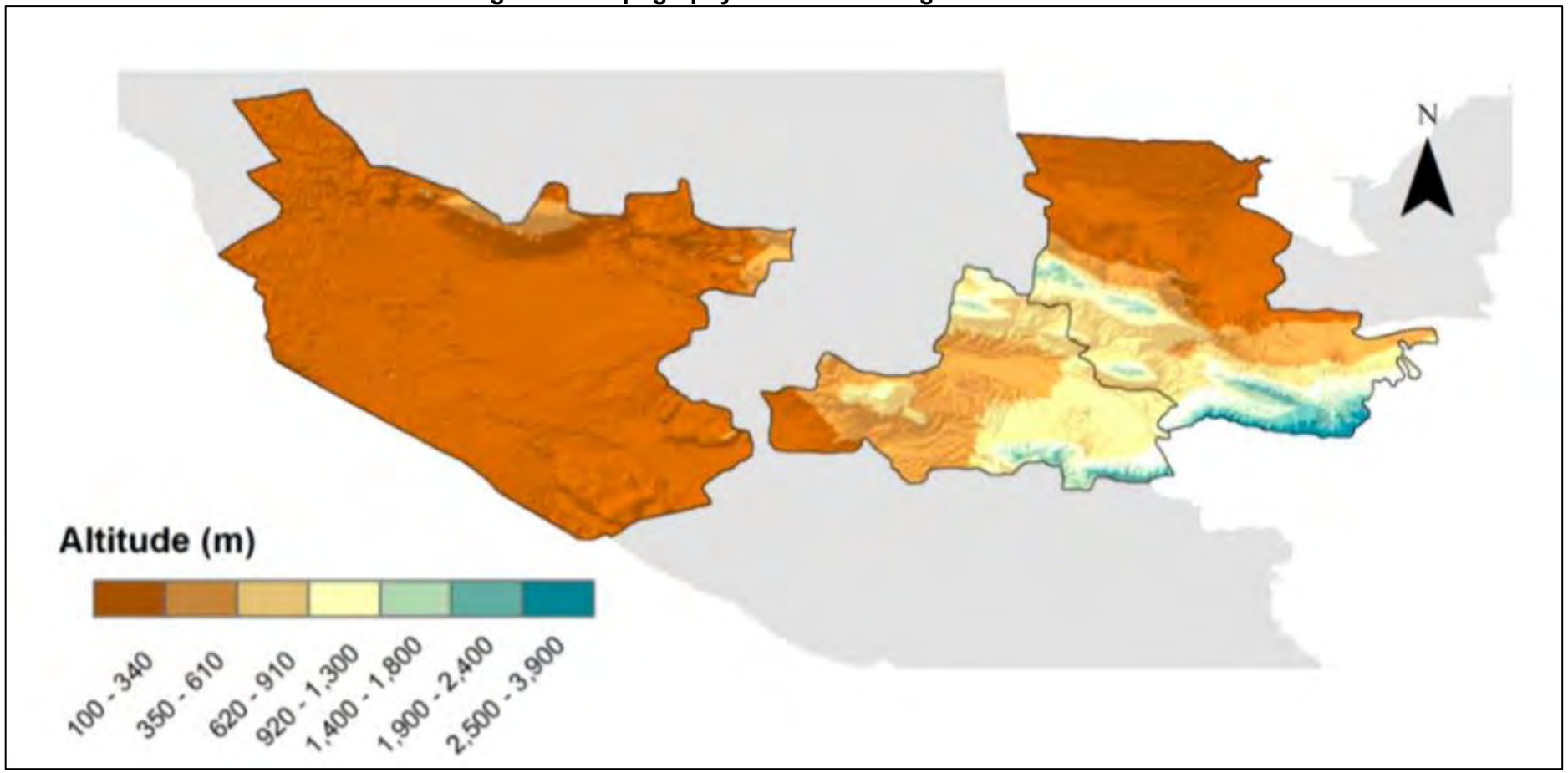
7.2.1. Topography

246. **Samarkand** - Samarkand province is located in the western part of Pamir-Alay mountains, in the middle part of Zaravshan river basin. Relief is mainly represented by the Zaravshan river basin valley that falls from east (750-800 m) to west (350 m). Hills are located on both north and south sites of the valley. Samarkand city is located at an elevation of around 725 meters above mean sea level.

247. **Jizzak** - Aside from the mountains on its eastern border, Jizzak province is a semi desert dryland, much of it in the Arnasy Depression, a flat expanse, which through vast irrigation has become an important dryland agriculture area. The eastern mountains are snow- capped and provide much of the local water in many small streams which, as soon as they reach lower elevation, are diverted for irrigation purposes. Jizzak city is located at an elevation of 375 meters above mean sea level.

[25] Note that climate change issues are not discussed in this report. A separate Climate Risk and Vulnerability Assessment has been completed for the Project: TA-9656 UZB: Sustainable Energy Access – Distribution Network Modernization Program Climate Risk and Vulnerability Assessment. Futurewater. 2019.

Figure 14: Topography of the Three Regions



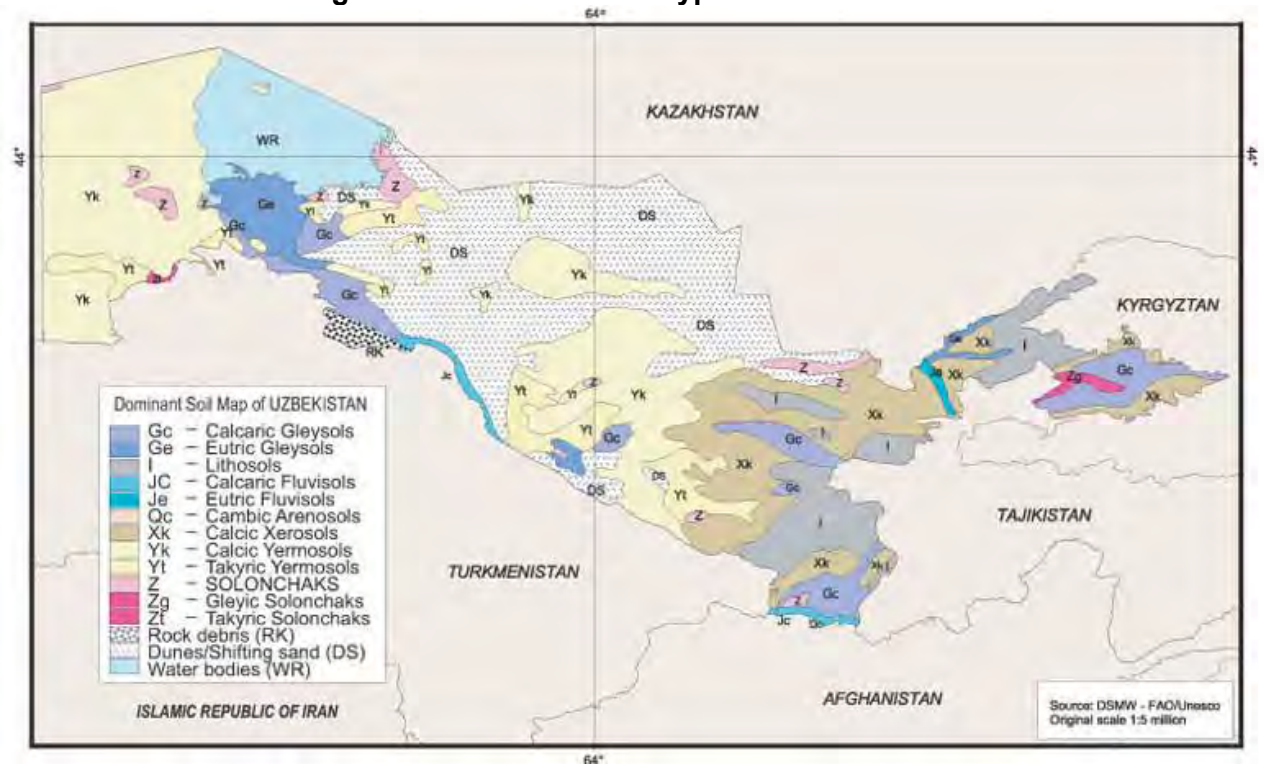
Source: TA-9656 UZB: Sustainable Energy Access – Distribution Network Modernization Program Climate Risk and Vulnerability Assessment. Futurewater. 2019.

248. **Bukhara** – Bukhara region represents an even desert valley, the Kyzyl-Kum Desert, with highlands. There are mountains in the southern part of the region. These are Tamdytay (922 m), Bukantau (764 m), and Kuldjuktau (785 m). In geomorphological terms the city of Bukhara is located in the south part of the Bukhara oasis within the large Bukhara-Hivinsky depression at an elevation of around 225 meters above mean sea level.

7.2.2. Soils

249. The genesis of the soil forming rocks in Uzbekistan is very varied. This, combined with the complexity of the lithological structure of the soils, the different hydro-geological conditions, an arid continental climate and the vegetation has led to the formation of many different soils. In Uzbekistan, the soils are of high-altitude belts and desert zones.[26] Figure 15 illustrates the dominant soil types in Uzbekistan.

Figure 15: Dominant Soil Types of Uzbekistan



Source: FAO, http://www.fao.org/3/Y4711E/y4711e04.htm#TopOfPage.

250. **Jizzak** - In the Jizzak region, a large part of the plain territory is occupied by light gray soils. In the Hungry Steppe, these soils are saline, loamy and clayey in terms of mechanical composition, while at the northern foot of the Nurata Ridge they are eroded skeletal or cartilaginous and pebbly loamy soils. In the east of the Hungry Steppe, meadow sierozem soils, saline and slightly saline soils are developed. A characteristic feature of light sierozems is the presence of small reserves of humus (11.8%), and, accordingly, nitrogen. High carbon content and alkaline reaction promotes the transition of phosphorus into hardly digestible forms. In addition, light sierozems are subject to secondary salinization during irrigation. The main reasons of soil salinization are connected with unsatisfactory drainage due to the lack of optimal collector

[26] http://www.fao.org/3/Y4711E/y4711e04.htm#TopOfPage.

drainage network, lack of leaching and agrotechnical measures, evaporation of filtered waters reaching the gypsum horizon. In the extreme north of the plain territory of the region semi-fixed sands with spots of desert sandy soils are widespread. In the south of the region, on the slopes of the Turkestan ridge and its spurs, the soil cover has a vertical zonality. Typical sierozems, clay and loamy, sometimes eroded soils are widespread in the foothills and in hilly foothills up to a height of 1000-1200 m. In the high foothills at an altitude of 1200-1400 m, dark clay and loamy gray soils are developed, mainly eroded. Brown clay and loamy eroded prevail in the middle zone of the mountains within the altitudes of 1400-2500 m, in some places - gravelly soils and brown mountainous loamy or gravelly soils. Over 2500 m, brown eroded gravelly soils are common among rocks and screes and have small spots - light-brown high-mountain soils, gravelly, with rock outcrops.[27]

251. **Samarkand** - Soil is mainly sierozem (grey) soil. The type of soil depends on attitude. On the flat area and on the foothills up to 500 m the soil is presented by light sierozem, at 1500—1700 m attitude the soil is dark sierozem, in the steppe area - sandy soil, takyr, brown sierozems and alkali soils.

252. **Bukhara** - All of the soils found in the Bukhara region are characterized by a very low humus content (1% - 2%). The soil atlas of Uzbekistan shows 11 different major soil types for this region, which can be sorted into four different categories; a) Sand and desert sand soils (These soil types dominate the western part of the Bukhara region, where the Kyzyl-Kum is located), b) Grey-Brown soils (These soil types dominate the northern and eastern parts of the region which are characterized by intensive irrigation farming on aridic soils.), c) Takyr soils (Not very common, these soil types can be found mainly in the central part of the Bukhara region, interlocked with grey-brown and sandy soils.), d) Meadow soils (These soil types of the desert oases are located along the Zaravshan river and its former riverbed, reaching out to the Amudarya).[28]

7.2.3. Geohazards

253. Uzbekistan is exposed to earthquakes, drought, flooding, mudslides, and landslides. According to the GFDRR (Global Facility for Disaster Reduction and Recovery), over 9% of its total land area is at risk from natural and man-made disaster, with nearly 66% of the population living in these areas and approximately the same percentage of the national GDP earned in them. Among the natural hazards, earthquakes cause the largest economic losses, but also hydrometeorological extremes cause increasingly severe economic damage.[29]

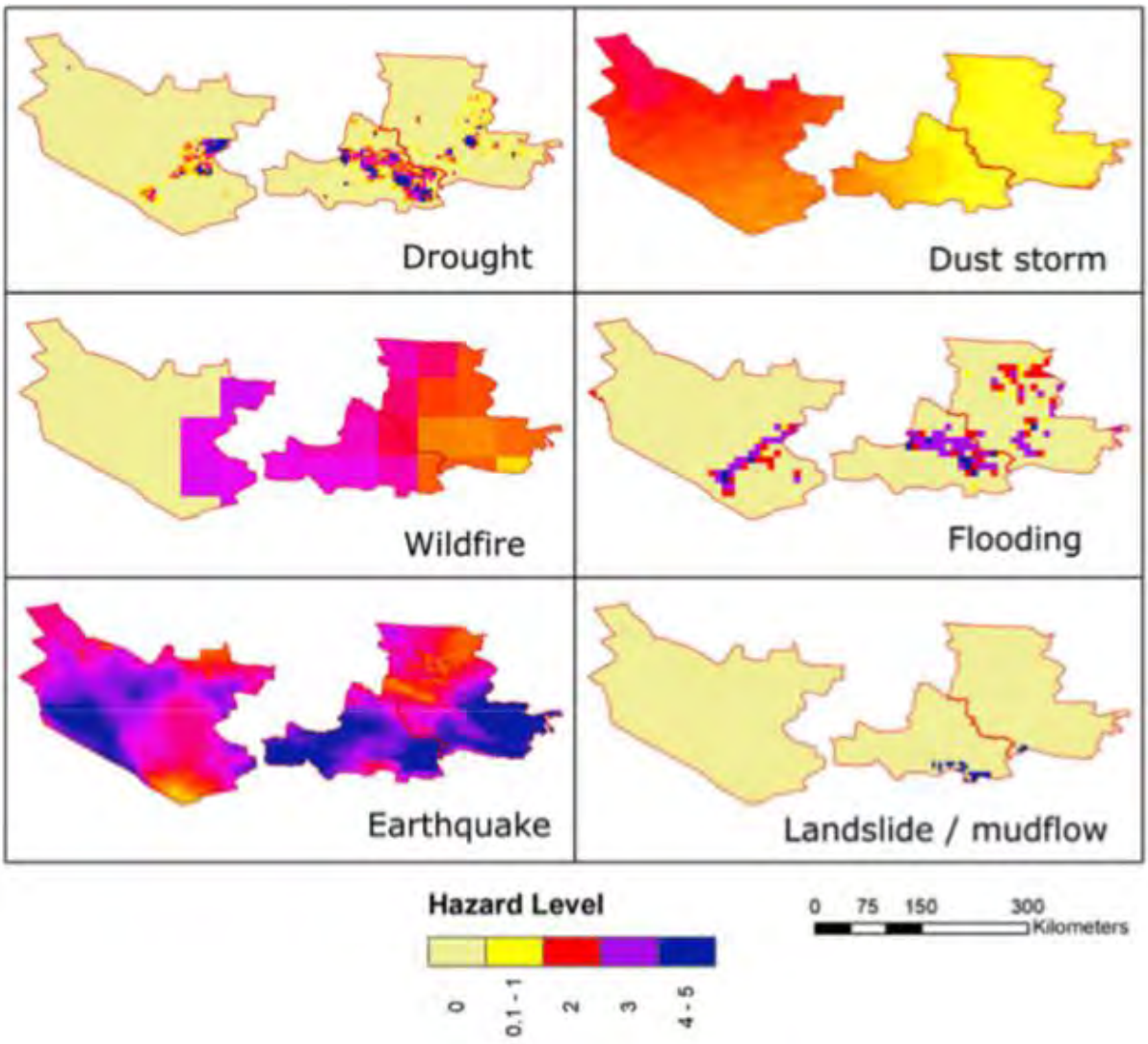
254. Extreme temperatures, both in the summer and winter, can be a major hazard in the country. In recent years, the raising temperatures due to climate change are exacerbating the impact of climate-related disasters, for example leading to prolonged drought conditions in agricultural areas with large economic consequences. A related hazard: dust storms is of increasing concern. Also, floods are a key hazard in particular areas in Uzbekistan.

255. Figure 17 shows the hazard level of natural hazards most relevant to the targeted provinces (Bukhara, Samarkand and Jizzak) of the Distribution Network Modernization Program. As can be seen, earthquakes are the principal natural hazard. Dust storms is a hazard type that affects the whole region. Wildfires affect mostly the eastern more mountainous regions (see

[27] Prosperous Villages Project. Environmental and Social Management Framework. World Bank. 2019.
[28] The Modern Problems of Sustainable Use and Management of Irrigated Lands on the Example of the Bukhara Region (Uzbekistan). Journal of Water Resource and Protection August 2015.
[29] https://www.gfdrr.org/en/uzbekistan.

Figure 16). The flood and drought hazard are relatively local according to the used database. However, the drought hazard can be assumed to have a more uniform impact, especially in the western region given the governing climate (see Figure 16).

Figure 16: Current Natural Hazard Risks in the Project Area



Source: -9656 UZB: Sustainable Energy Access – Distribution Network Modernization Program Climate Risk and Vulnerability Assessment. Futurewater. 2019.

7.2.4. Hydrology

256. **Jizzak** –The hydrographic network of the Jizzak region is represented by a small number of rivers, streams and sais[30] flowing from the northern slope of the Turkestan ridge and the Nuratau ridge. These rivers (streams and sais) feed on seasonal snows and mainly due to wedging out of groundwater. The water consumption in them is small and are calculated in tens of liters per second. Only in the early spring and during mudflows do these rivers carry significant masses of water. At the exit from the mountains, all these rivers are disassembled for irrigation.

[30] Mountain river / stream.

The most significant rivers of the Jizzak region are the Zaaminsu and Sanzar rivers, which are fully disassembled for irrigation. The Sanzar River flows through the territory of the Bakhmal, Gallaaorol and Jizzak districts. In the lower reaches (after leaving the city of Jizzak), Sanzar flows under the name Kly River and, flowing through the territory of the Forish district, flows into Lake Tuzkan. In summer, there is not enough water, and additional water is directed to the oasis along the Eski Tuyatartar canal from the Zaravshan river. The Zaaminsu River originates from the slopes of the Turkestan Range and flows through the territory of the Zaamin district. In the northwestern part of the Jizzak region, the Aydar-Arnasay lakes system is located, which consists of lakes Arnasay, Aydarkul and Tuzkan. This is the largest system of lakes in Uzbekistan.[31] The mineralization of the Aydar Kul – Arnasay lake system is rising as well. It has doubled over the recent years, reaching 7 to 11 g/l. affecting the natural reproduction of fish stocks.[32]

257. Shallow aquifer groundwater is located at 3 -5 m depths in a few areas, but more often at depths of 10-20 m. Ground water is recharged by infiltration from irrigation waters and precipitation. The main sources of groundwater pollution in Jizzak are public utilities, agricultural production practices, industrial plants, and poorly functioning wastewater treatment plants.[33]

258. **Samarkand** – The main surface water source of Samarkand region is the Zaravshan river. 193 km of river flows through territory of the region. In Samarkand region significant inflow of pollutants are coming from Siab, Hauzaksay and Taligulyan collectors. MPC in these points are high for oil (1,7 times exceed MPC in point lower Samarqand city), suspended substances (7-4 MPC), iron and nitrites (from 4 up to 6-7 MPC). Main sources of pollution of the river by nitrogen group are untreated sewers of settlements discharged into collectors, then into the river through direct discharges or filtration through ground waters. Discharges of Samarkand, Kattakurgan and Juma cities have a significant role in that because of partly connection to centralized sewage system and ineffective maintenance of sewage treatment plants.

259. The territory belongs to the area of agricultural production, where the main source of groundwater contamination are mineral and organic fertilizers, chemical plant protection products (pesticides), discharges of livestock, poultry farms and municipal wastewater. The sources of industrial pollution are emissions and discharges of industrial plants in Samarkand, and numerous waste companies processing agricultural products, motor vehicles. However, in general the quality of groundwater remains at a satisfactory level, the basic operational horizons are not contaminated and are used for drinking purposes in urban and rural settlements.

260. **Bukhara** – The water resources of Bukhara region consist of a number of surface and ground waters, as well as return water from anthropogenic use (sewage and drainage water). Water resources are mainly generated in transboundary river basins. Bukhara is located in the Amudarya River Basin, which is one of the important surface water sources. The Amudarya River is the largest river in Central Asia in terms of catchment area, 2,600 km long, with a catchment area of 230,000 km^2 and an average annual water flow of 78 km^3. It accounts for half of the annual flow of Central Asia. In Uzbekistan, the Amu Darya flows in the south of Surkhandarya province, bordering Afghanistan. The river then enters Turkmenistan, separating the Karakum and Sundukli sands. Further on, the Amu Darya riverbed approaches the border of Uzbekistan in the area of the Kimirekkum sands, and in the south-west of Bukhara and Khorezm regions runs along the border of two countries.

[31] Prosperous Villages Project. Environmental and Social Management Framework. World Bank. 2019.
[32] The 6th National Report of the Republic of Uzbekistan on the Conservation of Biological Diversity. UNDP, GEF. SCNP. 2018.
[33] National Report on Environment and Use of Natural Resources in Uzbekistan. Tashkent, Chinor ENK, 2013.

261. The third longest river in Central Asia is the Zaravshan River, which also flows through Uzbekistan (781 km long, 12,300 km^2 of catchment area, with an average long-term water flow of 190 m3/sec). The Zaravshan originates from numerous tributaries of the Turkestan and Zaravshan ridges and flowing from east to west between these two ranges, it is basically replenished by its left tributaries: Fandarya, Magian and Kshtut. Below Panjikent, the mountains are gradually parting, and the river is already flowing in the plain part of Samarkand and then Navoi region, bounded by the spurs of Zaravshan and Turkestan ridges - Zirabulak and Ziatda mountains, Chumkartau, Nuratau, Karatepa and Aktau ridges. Further the river turns to the south-west, towards the Bukhara oasis, where it actively disassembles irrigation canals, getting lost in the south of the region, not reaching the Kimirekkum sands.

262. Surface waters of Bukhara region also include lakes - Tudakul, Dengeskul, Zamonbobo, Shorkul and Aydar as well as the Kuyumazar reservoirs. The main purpose of the Kuyumazar reservoir is irrigation. Canals in the area include Amu-Bukhara, Amu-Karakul, Dzhuyzar, Chor-Bakr, Shokhrud and others.

7.2.5. Climate

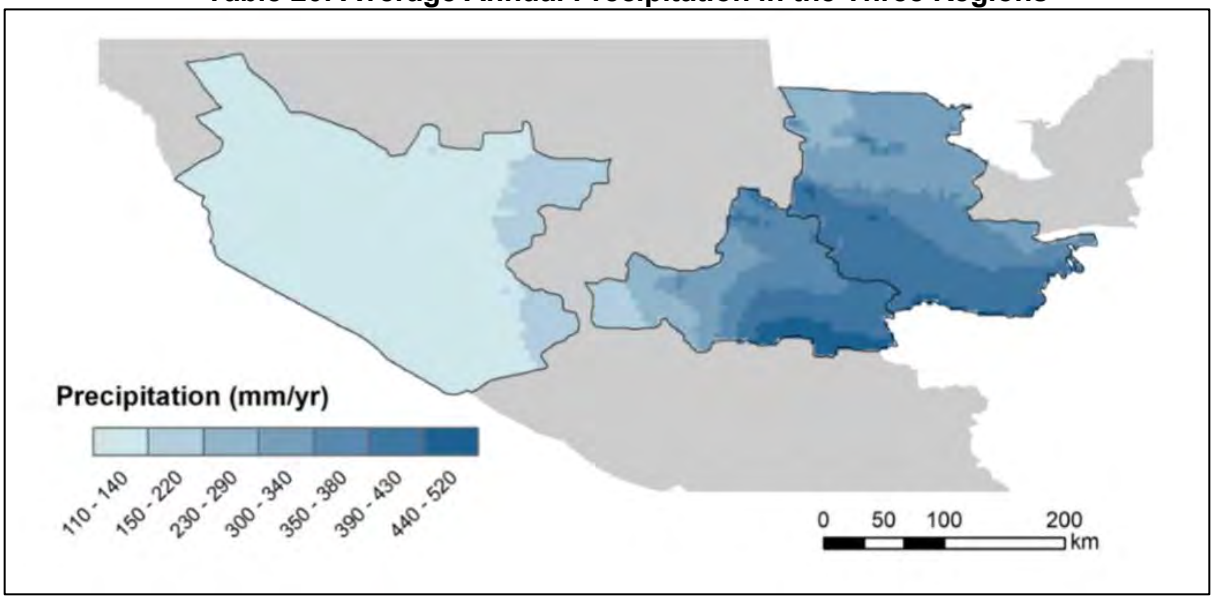
263. **Samarkand** - Samarkand features a Mediterranean climate that closely borders on a semi-arid climate with hot, dry summers and relatively wet, variable winters that alternate periods of warm weather with periods of cold weather. July and August are the hottest months of the year with temperatures reaching, and exceeding, 40°C. Most of the sparse precipitation is received from December through April. January 2008 was particularly cold, and the temperature dropped to −22°C.

264. **Bukhara** – Located in the south-western desert zone receives only 135 mm of rain per year. The monthly average temperature ranges from 3.5°C in January to 29°C in July, when highs are normally about 38°C. Despite the low precipitation amount, the region may experience some light snowfalls in winter. Winds from the north and north northwest (23.6% and 19.8% respectively) predominate.[34]

265. **Jizzak** - The climate of Jizzak city is continental with cold winter and hot summer. Average annual temperature is 13°C, with summer averages exceeding 40°C. Average annual relative humidity is ≤30%. In the area of Jizzak city, westerly, northern and north-west winds coming from Tamerlan Gates[35] prevail. Average annual wind speed is 2.5 - 6 m/sec. Cold air entering from northern part of the province causes sharp fluctuations in temperature. Frosts occur even in late spring, and damages fruit trees and crops. Level of precipitation is law (200-400 mm/year). Seismic zoning of the province territory belongs to the 7-seismic magnitude zone (The zones range from 1 to 9 with 9 being the worst).[36]

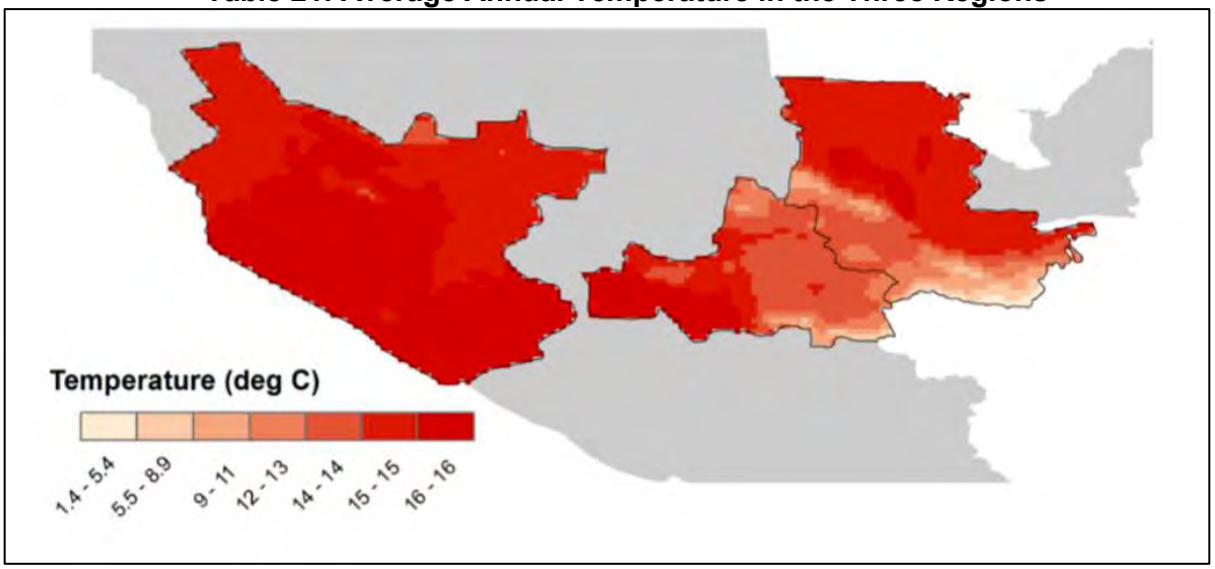
[34] UZB: Amu Bukhara Irrigation System Rehabilitation Project. Initial Environmental Examination. ADB. 2013.
[35] The Tamerlan Gate" is a narrow gorge in mountains located at the south-western entrance to Jizzak city where highways and railways pass through.
[36] Uzbekistan: Jizzak Sanitation System Development Project. Rehabilitation and Construction of Sewerage Collectors, Networks, and Pumping Stations in Jizzak City. Initial Environmental Examination. 2017.

Table 20: Average Annual Precipitation in the Three Regions



Source: TA-9656 UZB: Sustainable Energy Access – Distribution Network Modernization Program Climate Risk and Vulnerability Assessment. Futurewater. 2019

Table 21: Average Annual Temperature in the Three Regions



Source: TA-9656 UZB: Sustainable Energy Access – Distribution Network Modernization Program Climate Risk and Vulnerability Assessment. Futurewater. 2019.

7.3. Air Quality

266. Uzhydromet monitors 25 industrial cities across the country. The following table provides air quality data from Uzhydromet for Samarkand. These data are also marginal and none of the standard parameters such as PM10, PM2.5, CO or Volatile Organic Compounds (VOC) were monitored.

Table 22: Average Annual Concentration of Pollutants in Atmospheric Air, Samarkand

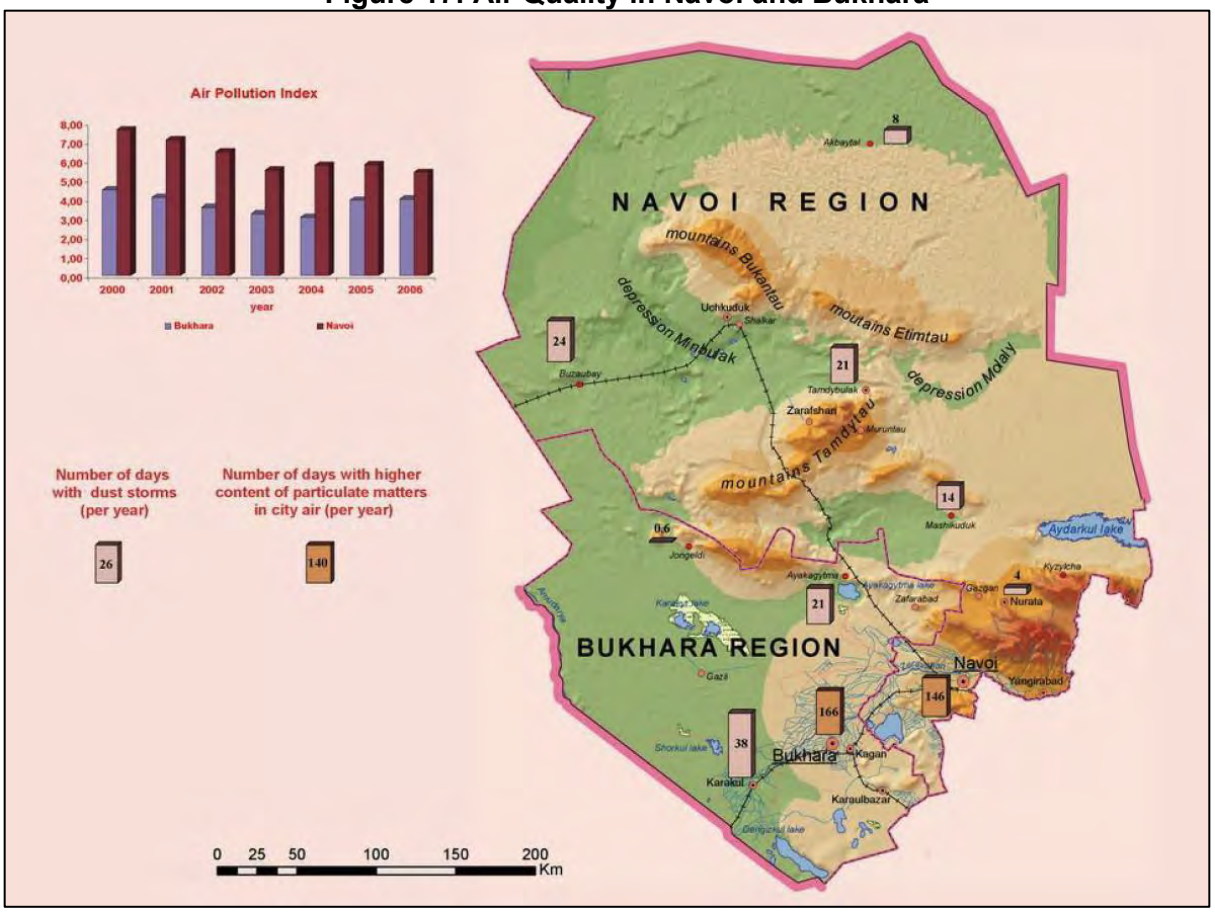
Parameter	2008	2009	2010	2011	Permitted Concentrations (daily average)
Ammonia (mg/m^3)	0.06	0.06	0.04	0.04	0.12
Nitrogen Dioxide	0.18	0.18	0.18	0.18	0.06
Sulphur Dioxide	0.02	0.02	0.02	0.02	0.02

Source: Uzbekistan: Jizzak Sanitation System Development Project. Rehabilitation and Construction of Sewerage Collectors, Networks, and Pumping Stations in Jizzak City. Initial Environmental Examination. 2017.

267. The data above indicates that the city suffers from elevated levels of nitrogen dioxide, probably a result of vehicle engine combustion emissions. During site visits to the various regions it is however noted that in rural locations air quality is generally good with few significant point sources of emissions and relatively low levels of traffic.

268. Air quality mapping in Figure 17 indicated that air quality in Bukhara, based on the air pollution index (API), is generally low (API below five is considered low level pollution). However, higher content of particulate matter in Bukhara city is noted in nearly 4 months of the year.

Figure 17: Air Quality in Navoi and Bukhara



Source: Environmental Atlas of Uzbekistan. UNDP. 2006.

7.4. Biodiversity

7.4.1. Internationally and Nationally Designated Sites

Nationally Designated Sites

269. Three nationally protected areas have been identified within the three regions, they are mapped in Figure 18 and listed in the table below.

Table 23: Nationally Designated Sites

#	Name	Designation	Region	IUCN Management Category	Status Year	Size (km^2)
1	Nuratinskiy	State Nature Reserve	Jizzak	Ia	1975	355.04
2	Zaamin	National Park	Jizzak	II	1976	482.2
3	Zeravshanskiy	State Nature Reserve	Samarkand / Jizzak	Ia	1975	47.04

Source: Protected Planet. https://www.protectedplanet.net.

270. Both the Nuratinskiy and Zaamin are located in remote mountainous areas. Only a few isolated villages have been identified in these areas. None of the year one investment activities are planned for these areas. The Zeravshanskiy is located almost adjacent to Samarkand City extending from the Chapan-Ata mountain upstream along the right bank of the Zaravshan river to the Pervomayskaya dam. The reserve comprises numerous small villages and agricultural land as well as the river floodplain which is an important area for birds, hence its status of an Important Bird Area (IBA) which is described further below. None of the current year one investment activities are planned to occur in this area.

Internationally Designated Sites

271. A number of internationally designated sites have been identified within the three regions, they are mapped in Figure 19 and listed in the table below.

Table 24: Nationally Designated Sites

#	Name	Type	Threat Score	Region	Area (ha)	Location of Relevant Year 1 Site
1	Karakyr Lakes	IBA / KBA	Very High	Bukhara	64,242	
2	Akakaghytma Lake and Surrounding Desert	IBA / KBA	Very High	Bukhara	32,854	
3	Khodzha-Davlet	IBA / KBA	Low	Bukhara	4,242	
4	Dengizkul Lake	IBA / KBA / RAMSAR	Very High	Bukhara	49,658	
5	Zekry Lake	IBA / KBA	High	Bukhara	1,555	
6	Dzheiran Ecocenter	IBA / KBA	High	Bukhara	32,709	
7	Kagan Fish Farm	IBA / KBA	Very High	Bukhara	1,763	
7a	Tudakul and Kuymazar Reservoirs	IBA	Very High	Bukhara	33,648	Yangi Tumush Charimgaron – 12km Distant
8	Karnabchul Steppe	IBA / KBA	Very High	Bukhara / Samarkand	177,156	
9	Kattakurgan Reservoir	IBA / KBA	High	Samarkand	14.249	
10	Zeravshanskiy State Nature Reserve	IBA / KBA	High	Samarkand / Jizzak	2,712	
11	Nuratau Range	IBA / KBA	High	Jizzak	34,681	
12	Dzhum-Dzhum	IBA / KBA	High	Jizzak	41,517	
13	Arnasay Lake System	IBA / KBA	Very High	Jizzak	31,706	
14	Tuzkan Lake	IBA / KBA	Very High	Jizzak	107,732	
15	North Shore of Aydarkul Lake	IBA / KBA	High	Jizzak	158,198	
16	Aydar-Arnasay Lake System	RAMSAR		Jizzak	527,100	

Note: IBA – Important Bird Area, KBA – Key Biodiversity Area, RAMSAR - Convention on Wetlands of International Importance.

272. Most of these sites are located in remote areas, or on and around lakes and reservoirs, meaning that there is a low likelihood of works being undertaken in these areas.

Figure 18: Locations of Nationally Designated Sites

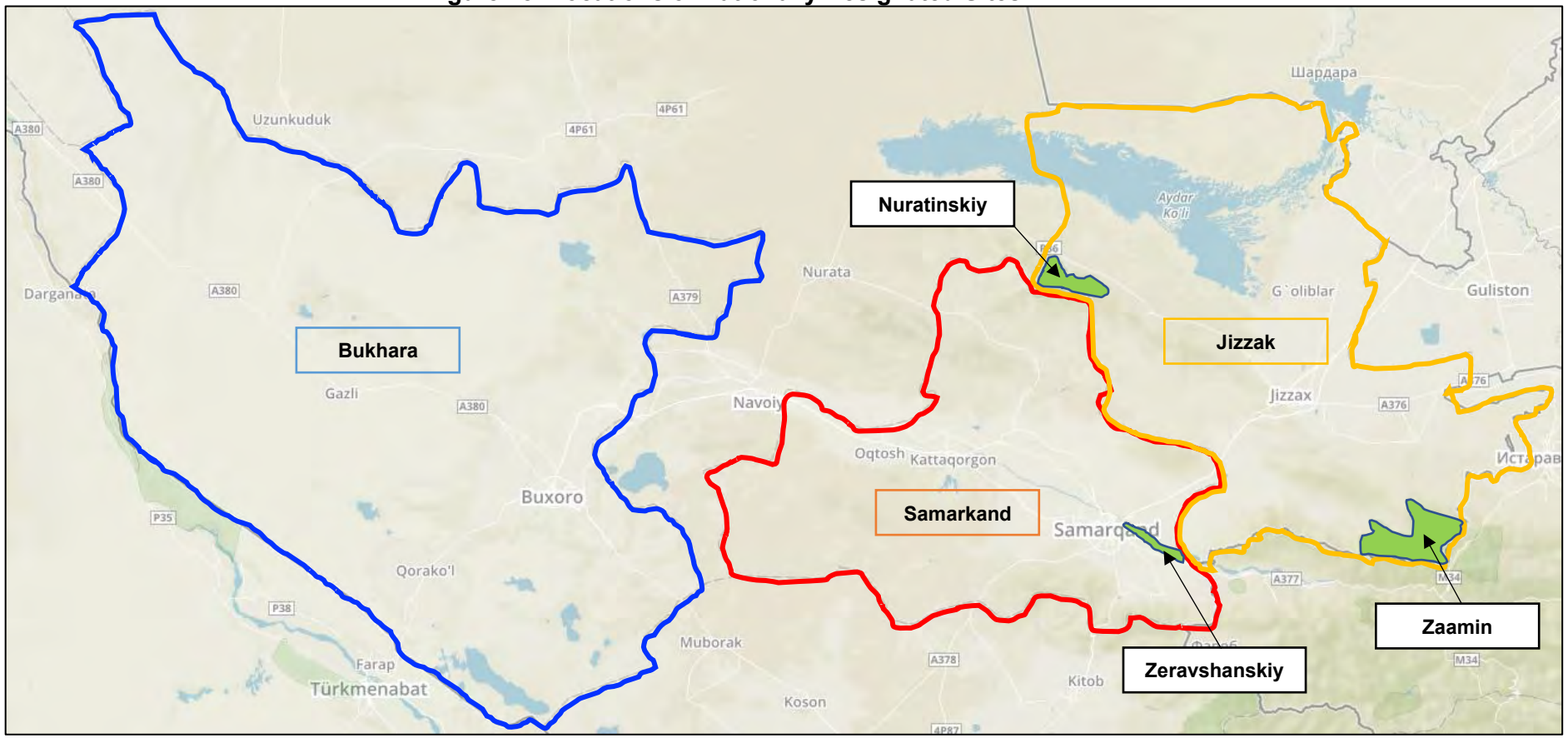
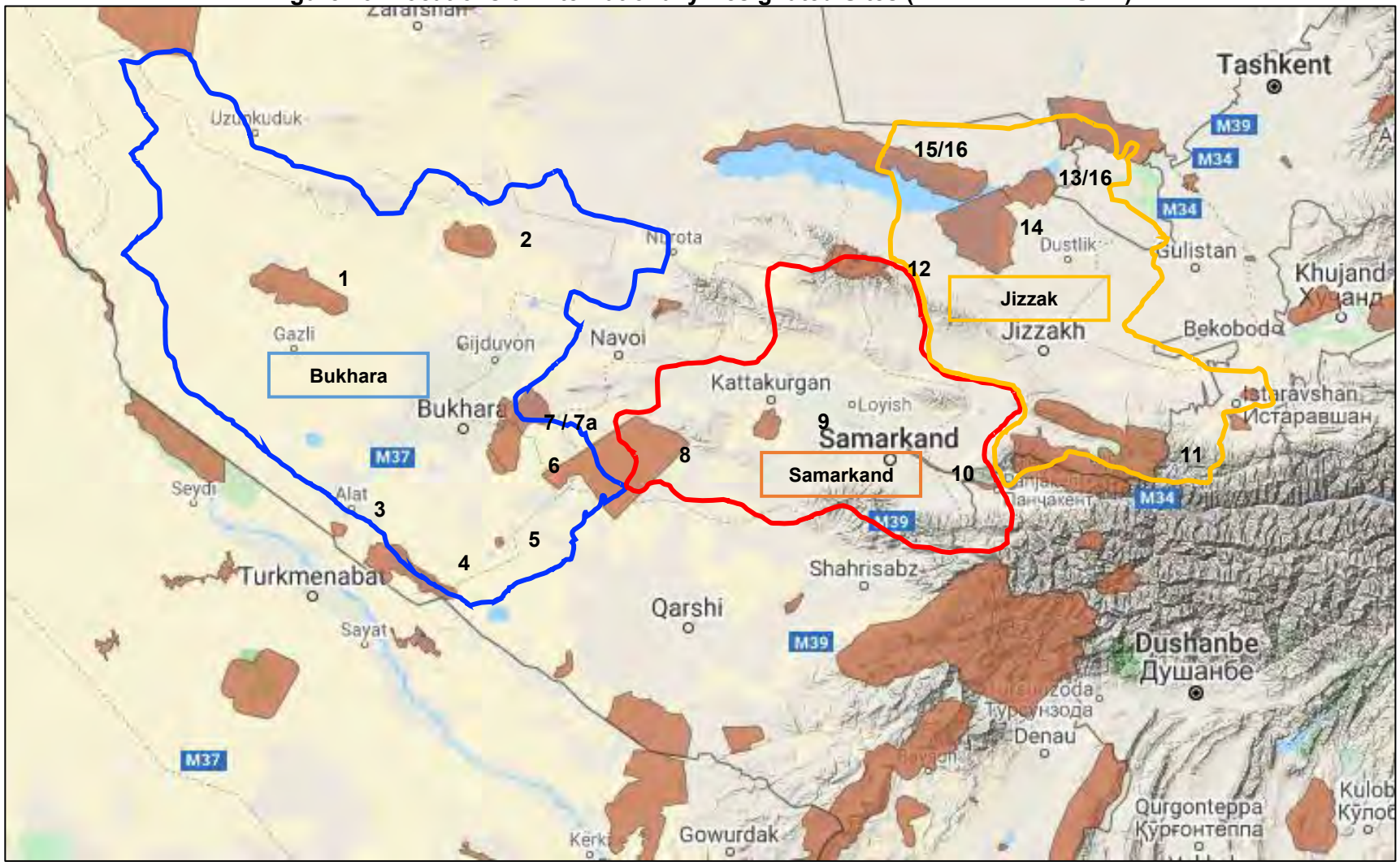


Figure 19: Locations of Internationally Designated Sites (KBA/IBA/RAMSAR)



Note: KBA/IBA/ RAMSAR sites are referenced according to the numbers in Table 23 above.

7.4.2. General Ecology

273. The following provides an overview of the general ecology of the three regions. An IBAT report has not been prepared as part of this IEE due to the wide geographic extent of the Project area. However, IBAT could be utilized as part of any future IEEs that may be required for the Project based on the potential for impacts to sensitive bird species identified as part of the Environmental Assessment Screening of sub-project sites.

274. **Jizzak** - Jizzak region is strongly developed and actively used in agriculture. Accordingly, the fauna is mainly represented by those few species of animals that are adapted to live in the vicinity of humans. And the flora of the region is quite strongly transformed as a result of agricultural development and is represented mainly by ephemeral communities. The degree of anthropogenic disturbance of the vegetation cover of the region is assessed as strong. Natural vegetation cover characteristic of the region can be found in the protected areas and in the highlands in the south of the region.

275. **Samarkand** - Samarkand region includes a fairly wide variety of landscapes with characteristic types of ecosystems. The development of irrigation and drainage has led to the formation of artificial water reservoirs and irrigation discharge lakes in natural depressions in the landscape, which eventually acquired a certain social and environmental status, provides well-known environmental (maintenance of biodiversity) and social services (irrigation, drinking water, recreation, hunting, fishing, etc.). All these natural and man-made landscape complexes are home to various representatives of flora fauna, including endangered species listed in Red Book of Uzbekistan and the IUCN (International Union for the Conservation of Nature) lists. The forest area in the Samarkand region constitutes 1.78%.

276. **Bukhara** – Bukhara region is home to over 400 species of vertebrates. In the water basins there are 37 species of fish, two amphibian species, 40 reptile species, more than 300 bird species, and about 300 insect species. The most widespread types of ecosystems in Bukhara region include deserts and semi-deserts, river and coastal ecosystems, wetland ecosystems. Conservation and sustainable use of biodiversity is extremely important for the Bukhara region, the territory of which is completely in the arid zone and is vulnerable to climate change, is prone to the phenomena of drought and desertification.

7.5. Socioeconomic Environment

7.5.1. Socioeconomic Profile

277. As of January 1, 2018, the resident population of the Republic of Uzbekistan was 32,653,900 people and, in the course of 2017, increased by 533,400 people or by 1.7%. In particular, the urban population was 16,533,900 people (50.6 % of the total population), the rural population – 16,120,000 thousand people (49.4 %). [37] All regions showed an annual decrease in population size from 1.6% to 0.1% in the year 2018 – 2019, the balance moving to Tashkent City (5.8%).

278. **Jizzak** – The region has an area of 21,200 km^2, 4.8% of the country's total area, and an arable area of 1.3 million ha. Regional population exceeded 1.2 million people in 2012 with a population density of 56.8 people per km^2. The region comprises 12 administrative districts, 6

[37] Uzstat, 2017.

cities, 8 urban-type settlements and 100 rural community assemblies (villages). 47.7% of the regional population lives in urban areas. The average age of the population was 26.4 years (2011). There are two tertiary educational institutions, 75 vocational colleges, 4 academic lyceums, 553 secondary schools (including specialized), 166 kindergartens, and 39 non- school educational institutions in the region. Health infrastructure in the region includes 63 hospitals (including 14 private ones), 272 polyclinics, 14 resorts, 124/174 rural medical centers, and 139 first-aid/ambulance units. Jizzak city is the administrative center of Jizzak region with a population of 162,500. It is expected that the city population of Jizzak city in 2020 will reach 169,800 (+12.8 %) and 236,000 by 2030. The total area of the city is 9640 ha. Of them, 3,517 ha are agricultural lands, 1,333 ha are occupied by houses (13.8%), and 233 ha by municipal buildings and roads. About 87.8% of the city population is Uzbek. The other major ethnic groups include Russians (3.9%), Tajiks (1.7%) and others (6.6%). The city is divided into 35 urban mahallas. There are 2,560 small business enterprises in the city, including 38 farms with average areas of 38 ha, 10 industrial enterprises, and 32 joint-venture enterprises. The social infrastructure includes 26 kindergartens, 30 schools (including two specialized), 2 musical schools, 9 vocational colleges, 3 academic lyceums, and 2 universities. There are 22 clinics in the city.[38]

279. **Bukhara** - The population of the region was about 1.9 million residents by October 1, 2018. Representatives of more than 100 ethnic groups live in the region. The majority of the population is Uzbek, with a large group of ethnic Russians and Kirgiz's. The average population density is 500 people per square km. According to preliminary data, as of January 1, 2019, the number of permanent population of Bukhara region was 1899,5 thousand people (5.7% of the Republic's total population). Thus, the number of urban population was 706,1 thousand people (37.1 % of the total population), rural population (as of January 1, 2019).

280. **Samarkand** – The population of Samarkand region is more than 3.3 million people. The population of Samarkand district is 214,900 people. According to the data provided by statistics agencies, as of 1 January 2011 the population density in Samarkand district was 150 people/km^2. The population of Samarkand district is living in 40,684 households. The data available from Mahalla committees suggests that the total number of families were 53,628 in 2011. Thus, making the average size of a household as 5.3 persons, and the average size of the family is – 4 persons.

7.5.2. Economy and Employment

Regional Context

281. The official unemployment rate was reported at 9.3% in 2018 (Table 25). No gender-disaggregated data exist for this updated data. In 2017, it was reported a total of 5.2%, with 5.2% for women and 5.4% for men (ADB Basic Statistics 2019).

Table 25: Unemployment rate (%)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Republic of Uzbekistan	5,0	5,4	5,0	4,9	4,9	5,1	5,2	5,2	5,8	9,3
Republic of Karakalpakstan	6,9	7,4	6,6	6,4	6,2	5,4	5,3	5,4	6,0	9,5
Oblast Level:										
Andijan	5,4	5,8	5,3	5,3	5,4	5,6	5,6	5,6	6,0	9,6
Bukhara	**4,9**	**5,2**	**4,9**	**4,7**	**4,8**	**5,2**	**5,5**	**5,4**	**5,5**	**9,0**
Jizzak	**4,5**	**5,7**	**5,2**	**5,0**	**5,1**	**5,4**	**5,2**	**5,4**	**5,0**	**9,4**

[38] Initial Environmental Examination, Uzbekistan: Jizzak Sanitation System Development Project. ADB, March 2017.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Kashkadarya	5,1	5,8	5,3	5,3	5,2	5,5	5,5	5,3	6,1	9,7
Navoi	5,1	4,9	4,7	4,9	5,2	5,2	5,0	5,0	5,2	8,7
Namangan	5,4	5,9	5,4	5,3	5,2	5,3	5,2	5,3	5,8	9,5
Samarkand	**5,4**	**6,0**	**5,5**	**5,4**	**5,3**	**5,6**	**5,7**	**5,7**	**6,5**	**9,7**
Surkhandarya	5,0	5,8	5,4	5,2	5,2	5,5	5,5	5,6	6,7	9,5
Syrdarya	4,4	4,5	4,3	4,0	4,3	4,6	4,9	4,4	5,1	9,6
Tashkent	4,5	4,1	3,8	3,6	3,6	3,9	4,1	4,1	5,2	9,0
Fergana	5,5	5,7	5,0	5,0	4,8	5,4	5,4	5,5	6,4	9,7
Khorezm	5,2	5,5	5,2	5,3	5,3	5,5	5,4	5,5	5,7	9,5
Tashkent city	3,4	3,3	3,4	3,3	3,4	3,6	3,8	3,6	4,5	7,9

Source: Website of the Statistics Agency of Uzbekistan, 2019.

282. In January 2019, the Government adopted the Strategy of Actions on Further Development of Uzbekistan in 2017–2021 and prioritizes reforms to (i) improve public sector development; (ii) ensure the rule of law and reform the judicial–legal system; (iii) develop and liberalize the economy; (iv) advance society and ensure security and interethnic harmony; (v) promote religious tolerance; and (vi) implement a balanced, mutually beneficial, and constructive foreign policy. The legal framework has been changing for enhancing women social and political participation.

283. **Samarkand** - The economy of the region is based on well-established agriculture and industry. Heavy industry, mining, machinery, metal reprocessing, chemical and construction are the major production activities. Light industry is represented by cotton cleaning, sewing, textile and footwear enterprises. For many centuries Samarkand has been famous for its silk products. The silk processing and sewing factories are provided with local raw materials. The city is also famous for its grape products, as well. The region is well known for karakul sheep breeding.

284. **Bukhara** - The priority sectors of the economy in the region are agriculture and sectors such as oil production and refining, as well as textile and clothing production. The share of small business in the Bukhara region was about 41% (of the total industrial volume). About 2,600 registered and 545 newly established enterprises exist in the region. Bukhara region occupies the 4th position in the Republic by the volume of investments in fixed resources per person for January-December 2018 - 4162,9 thousand sums (or 49,7% of the corresponding period of the previous year).[39]

285. **Jizzak** - Within the last 3-5 years its dominant agricultural base is being slowly matched by industries, such as weaving facilities, utilizing the locally grown cotton and wool to make raw as well as dyed fabric. In other words, other industries are being established to process the raw materials produced in the province. The government has designated Jizzak as an economic growth center for the country and as such conditions will continue to improve. At present income is lower than the national average, and 63.5% of the population have an income of around 144,000 UZS per month, which is considered Uzbekistan`s poverty income level. With the rapid expansion of industries these figures will improve so long as the government provide adequate capacity building; since otherwise businesses will have to bring in outside skilled labour.

[39] Environmental and Social Management Planning Framework (ESMPF). Bukhara Region Water Supply and Sewerage Project (BRWSSP). Ministry of Housing and Communal Services (MHCS). April 2020.

7.5.3. Infrastructure, Transportation and Utilities

286. Uzbekistan's population with Access to Electricity is rated at 100 % (ADB Basic Statistics). Renewable energy share estimated at 3.2% in the total final energy consumption (ADB. Basic Statistics, 2019). Though the country has reached 100% electrification of households, reportedly about 81% of rural households experience daily power interruptions that last from 1 hour to more than 5 hours (Uzbekistan Country Gender Assessment Update 2018, ADB). The interrupted gas and electricity supply have more affect to vulnerable groups (old and sick people, disable and handicaps), poor households and women.

287. The road network in Uzbekistan is gradually being rehabilitated and expanded, mainly led by donor funded projects. Accordingly, portions of the newly rehabilitated network are good, however large parts of the network are still neglected although this should not significantly impact the movement of construction equipment and supplies on the main road arteries. Local roads are a different story, they are, more often than not in poor condition and travel along these roads, which will be required by construction traffic, is often time consuming and can lead to damage of vehicles in the longer term.

7.5.4. Community Health, Safety and Education

Regional Context

288. The healthcare is mainly public-funded. As of 1 January 2017, there are 6,542 out-patient medical institutions that had grown more than twofold since 1991. However, the hospitals decreased with reforms for optimization to increase accessibility of health-care services; from 1,388 hospitals in 1991 to 1,106 units by 2016. In many regions of the country, the most morbidity per 100,000 persons falls on the share of women.

289. In the last 20 years, maternal mortality decreased from 20.7 to 17.4 per thousand, and infant mortality decreased from 24.2 to 10.7 per thousand, and the country has achieved the United Nations Millennium Development Goal in this area. The number of pregnant women with anemia decreased from 45.1% in 2014 to 38.2% in 2016 (Uzbekistan Country Gender Assessment Update 2018). Free immunization for children under the age of 1 year old against contagious diseases are as follows: diphtheria- 99.9%, polio- 100%, whooping cough immunization – 99.9%, measles immunization – 99.9%, and tuberculosis 99.8, and against viral hepatitis B - 99,9% reported (Statistics Agency of Uzbekistan, 2019). Despite significant progress access to rapid, affordable and high-quality health care needs improvement especially in rural areas. The main health indicators for the recent years are given in Table 26.

Table 26: Main Health Indicators

Description	2014	2015	2016	2017	2018
Number of hospitals	1058	1071	1106	1135	1165
Number of hospital beds: total, thousand	131	129,7	132	135,7	153,6
per 10 000 population	42,2	41,1	41,1	41,6	46,6
Number of treated patients in hospitals total, thousand	5294	5294	5582	5985	6236
Population per hospital bed	237	243	243	241	215
Number of beds for pregnant women/parturient women: total, thousand	18,1	17,6	17,4	17,7	17,4
for 10,000 women (15-49 years)	20,9	20,2	19,9	20,9	19,6
Number of ambulatory polyclinics	6054	6220	6542	5296	5627

Description	2014	2015	2016	2017	2018
The capacity of outpatient clinics, visits per shift: total, thousand	407	407	411,9	405,3	440,8
per 10 000 population	131	128,9	128,2	124,1	133,7
Number of obstetrics and gynecology offices	2823	2752	2640	2157	2186
Number of children's polyclinics (departments)	2104	1997	1783	1102	1128
Number of doctors of all specialties: total, thousand	82	83,4	84,1	85,4	89,8
per 10 000 population	26,4	26,4	26,2	26,1	27,2
Population per doctor	378	379	382	383	367
Number of female doctors-all specialties: total, thousand	42,7	41	43,2	43,1	44,8
in % to the total number of doctors	52,1	51,6	51,4	50,5	49,9
Number of nurses: total, thousand	332	336,4	341,3	348,2	356,7
per 10 000 population	107	106,5	106,3	106,6	108,2
Population per average medical worker	93	94	94	94	92

Source: Statistics Agency of Uzbekistan, 2019.

290. The proportion of Population Using Safely Managed Drinking Water Services is 51.2 %, that is 86.5 urban and 31.1 rural (ADB Basic Statistics 2019). Access to sanitation varied significantly between urban and rural areas in 2016 (around 78.7% vs. 42.1%, respectively). Though the lack of clean water supply affects both men and women, women and young girls mostly collect water for domestic needs. In rural areas, women and children transport drinking water several times a day. On average, water delivery accounts for 22 person-hours per month. Women must boil water to make it safe for drinking. They must heat water for laundry, bathing, and cattle watering in cold seasons (Uzbekistan Country Gender Assessment Update 2018).

291. The Constitution of Uzbekistan guarantees primary and secondary education to all. Schools are mainly public-funded but there are private schools too. The country for the indicator of the population with at least some secondary education is rated 1, placing the country in the group of countries with High Human Development. The pupils' teacher ratio for primary schools are ranked at 21, and for this indicator also Uzbekistan is in the group of countries with High Human Development.[40]

7.5.5. Physical Cultural Resources

292. **Samarkand** – The historic ton of Samarkand is a crossroad and melting pot of the world's great cultures. Founded in the 7th century B.C as ancient Afrasiab, Samarkand had its most significant development in the Timurid period from the 14th to the 15th centuries. The major monuments include the Registan Mosque and madrasas, Bibi-Khanum Mosque, the Shahki-Zinda compound and the Gur-Emir ensemble, as well as Ulughs-Beg's Observatory.

293. Samarkand is listed in the UNESCO World Heritage List based on the following criteria:

- **Criterion (i):** The architecture and townscape of Samarkand, situated at the crossroads of ancient cultures, are masterpieces of Islamic cultural creativity.
- **Criterion (ii):** Ensembles in Samarkand such as the Bibi Khanum Mosque and Registan Square played a seminal role in the development of Islamic architecture over the entire region, from the Mediterranean to the Indian subcontinent.

[40] Human Development Indices and Indicators: 2018 Statistical Update, UNDP.

- **Criterion (iv):** The historic town of Samarkand illustrates in its art, architecture, and urban structure the most important stages of Central Asian cultural and political history from the 13th century to the present day.

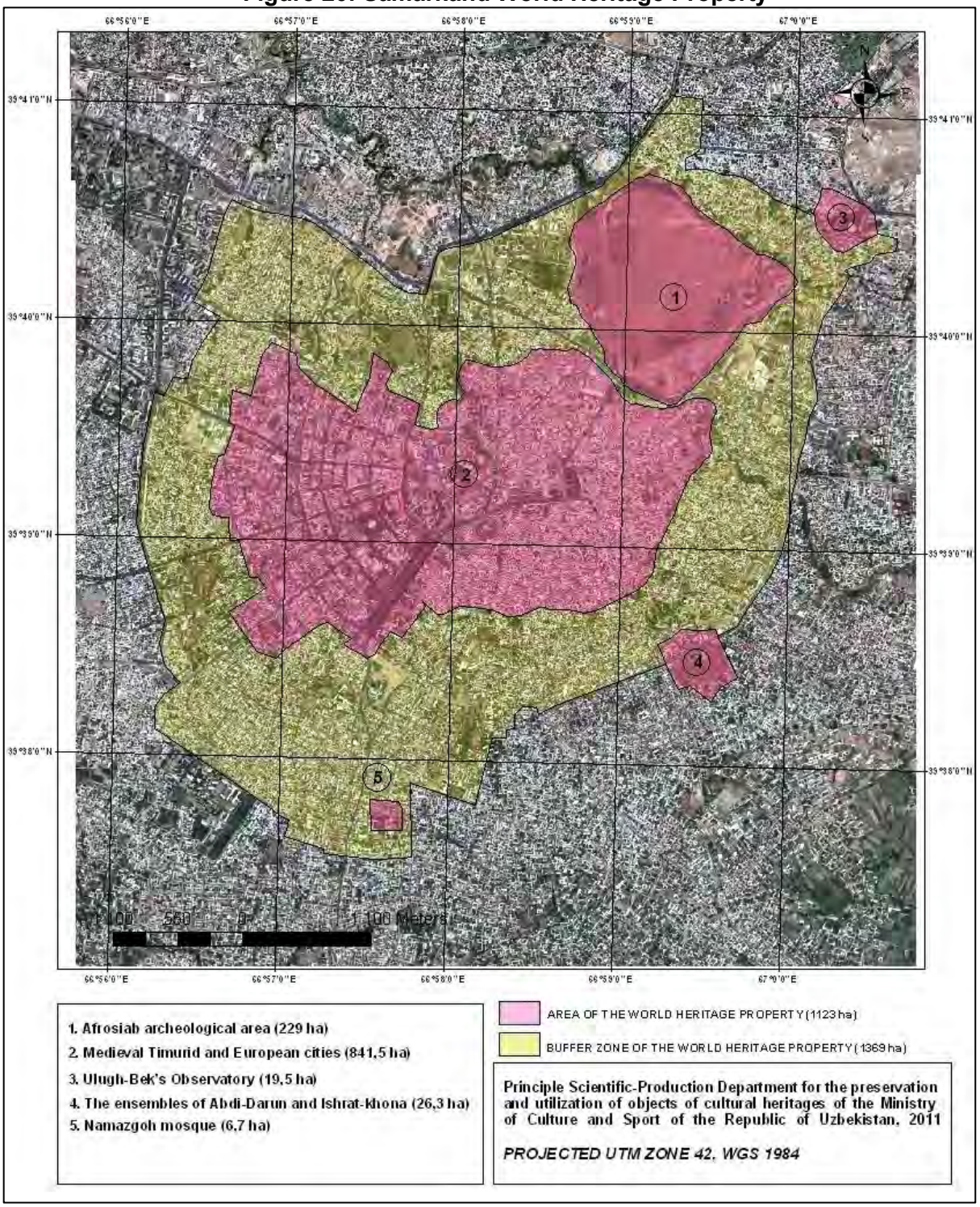
294. According to UNESCO[41] there are adequate legal provisions for the safeguarding of the heritage property. The State Samarkand Historical Architectural Reserve was established under the Decree of the Cabinet of Ministers of the Republic of Uzbekistan (26 May 1982). Within the Reserve all construction and development work is done according to the recommendations of the Samarkand Regional Inspection on Preservation and Restoration of Objects of Cultural Heritage.

295. Figure 20 illustrates the area of Samarkand demarcated as a World Heritage Site and also the areas buffer zone. Only one Year One site visited, Muborak, is located within the core UNESCO zone (described further below in **Section 6.6.3**).

296. **Bukhara** - Situated on the Silk Route, Bukhara is more than 2,000 years old. It is the most complete example of a medieval city in Central Asia, with an urban fabric that has remained largely intact. Monuments of particular interest include the famous tomb of Ismail Samani, a masterpiece of 10th century Muslim architecture, and a large number of 17th century madrasas.

[41] https://whc.unesco.org/en/list/603/.

Figure 20: Samarkand World Heritage Property



Source: UNESCO. https://whc.unesco.org.

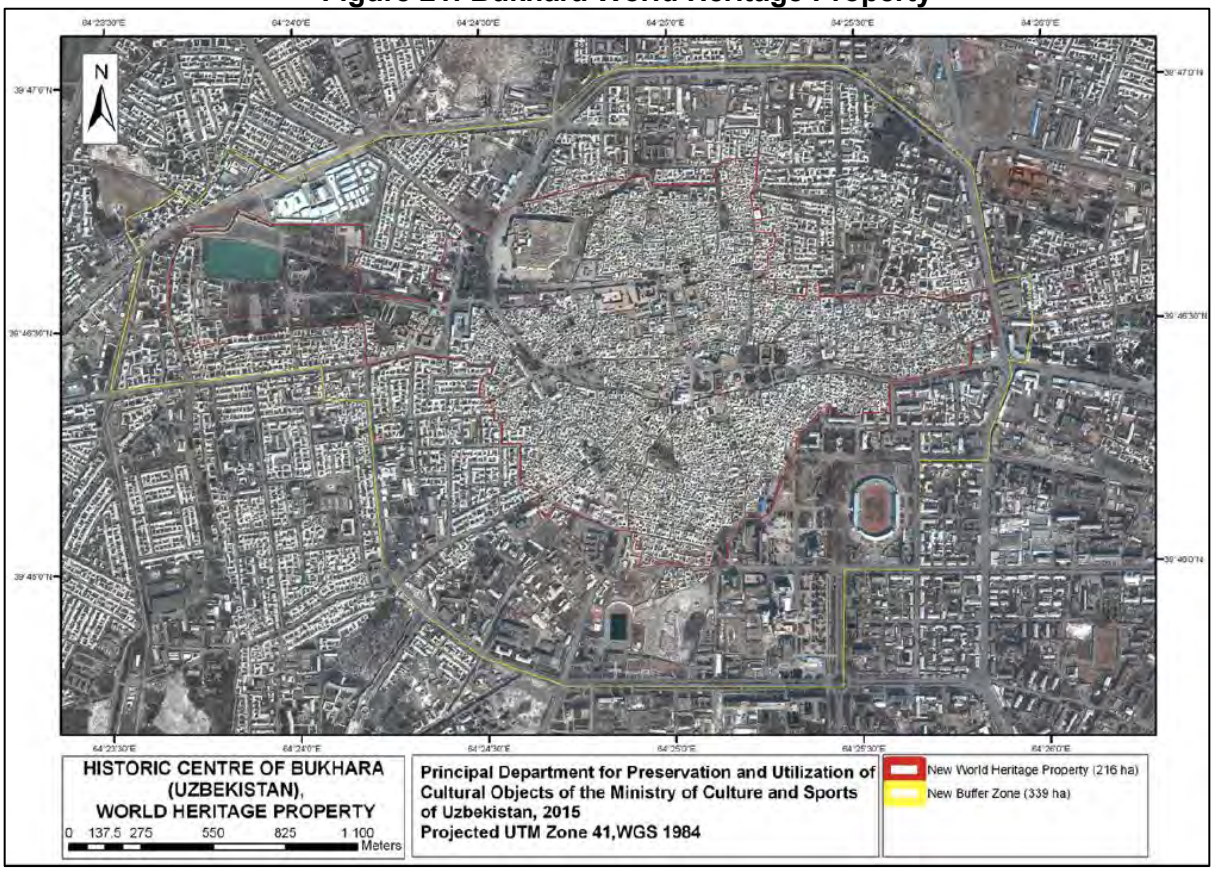
297. The real importance of Bukhara lies not in its individual buildings but rather in its overall townscape, demonstrating the high and consistent level of urban planning and architecture that began with the Sheibanid dynasty.

298. Bukhara is listed in the UNESCO World Heritage List based on the following criteria:

- **Criterion (ii):** The example of Bukhara in terms of its urban layout and buildings had a profound influence on the evolution and planning of towns in a wide region of Central Asia.
- **Criterion (iv):** Bukhara is the most complete and unspoiled example of a medieval Central Asian town which has preserved its urban fabric to the present day.
- **Criterion (vi):** Between the 9th and 16th centuries, Bukhara was the largest centre for Muslim theology, particularly on Sufism, in the Near East, with over two hundred mosques and more than a hundred madrasahs.

299. Relevant national laws and regulations concerning the World Heritage site include the Law on Protection and Exploitation of Cultural Heritage Properties, 2001. Current laws, together with other urban planning codes provide protection of monuments of cultural heritage and their buffer zones. These documents are reflected in the Master Plan of Bukhara City, 2005. In addition, the Cabinet of Ministers of the Republic of Uzbekistan approved special Decree No.49 of 23 March 2010 'On State program on research, conservation, restoration and adaption to modern use of the cultural heritage properties of Bukhara until 2020'. At present this state program is being implemented which provided an additional layer of protection and conservation in the city.[42] All of this information was confirmed to the Consultant during a meeting with the Head of the Bukhara Province Department for Cultural Heritage Protection (see Table 54). None of the proposed Year One sites visited are located in the core or buffer zone.

Figure 21: Bukhara World Heritage Property



Source: UNESCO. https://whc.unesco.org

[42] https://whc.unesco.org/en/list/602.

300. **Jizzak** – In contrast to Bukhara and Samarkand, Jizzak is not known for its physical cultural heritage. However, a number of sites in Jizzak are on the UNESCO Tentative List as shown in the following table.

Table 27: UNESCO Tentative List

#	Region	Item
1	Jizzak	Abdulkhan Bandi Dam
2		Khanbandi dam
3		Zaamin Mountains
4	Bukhara	Bahoutdin Architectural Complex
5		Chashma-Ayub Mausoleum
6		Memorial complex of Chor-Bakr
7		Minaret in Bobkent
8		Poykent
9	Samarkand	Arab-Ata Mausoleum

301. The minaret in Bobkent (1196-1197) is located in the center of Bobkent, Bukhara which is more than 4km from Bobkent Ogari village, site of some of the first-year activities.

7.5.6. Noise

302. Estimates of ambient noise levels based on population density can be made using guidelines provided by the US Federal Transport Association (FTA 2006). The average population density for Samarkand City is 4,300, Bukhara City 1,902 and Jizzak city 777. Using FTA figures ambient daytime noise levels would not exceed 55 dBA in Samarkand, and 50 dBA in the other cities (excluding traffic noise). In the rural villages where density is lower ambient daytime noise levels can be in the range of 35 – 40 dBA.

7.6. Environmental Setting

303. The following section describes the environmental setting of the year one investment plan activities visited as part of this IEE. The description is based on site visits made by the Consultant during February 2020. A full list of the 1,800 year 1 sites proposed for funding under Year 1 are included in **Appendix K.**

7.6.1. Bukhara

Yangi Turmush, Charimgaron village

	In this village the existing transformer will be replaced. The transformer is located in a small square of open land adjacent to residential properties in the middle of the village. No interesting environmental or social issues were noted in this area apart from some small oil staining around the base of the transformer, most probably leaking from the transformer due to its age. No schools or medical facilities were observed within 50m.

Shakarkent, Ogari village

	
Replacement of the existing transformer will be undertaken here. Located in the village adjacent to a local road and residential property. No specific environmental or social issues were identified in this area. No schools or medical facilities were observed within 50m.	

A. Navoi (Makhalla), Chakar village

Replacement of the existing transformer and upgrading of the existing overhead distribution line will be undertaken here. The transformer is set on a piece of open land, within the vicinity of some small properties and agricultural land. No leaks of oil were noted around the transformer. The distribution line follows a rural road before it enters the village. No issues of environmental or social concern were noted in this area. No schools or medical facilities were observed within 50m.

Chukurak, Yukori Chukurak village

	Replacement of the transformer. Located adjacent to the main road running through the village. A few small trees were dotted around the area, but no specific environmental or social issues were noted here. Some slight staining of the soils around the base of the transformer was noted. No schools or medical facilities were observed within 50m.

7.6.2. Jizzak

Khayrobod Makhalla - Buiuk Ipak and Ankhorilik

	
An additional 500 meters of distribution line will be constructed in this residential area. No specific environmental and social issues were identified in this location in the southern suburbs of Jizzak city. No schools or medical facilities were observed within 50m.	This transformer will be replaced with a new 160 kVA transformer. The existing transformer is located on open ground adjacent to a residential property. Some staining around the base of the transformer was noted. No schools or medical facilities were observed within 50m.

Yangihayot Makhalla, Kurgontepa village

	In order to decrease the overload capacity for the transformer substation No. 437/160 it is required to modernize additional 2.0 km line (10 kV) for a new 160 kVA transformer in this location. The line passes through a small low density village. No schools or medical facilities were observed within 50m.
	The existing transformer is located in an area of open land on the edge of the village. No specific environment al or social issues of note were observed in this area. No schools or medical facilities were observed within 50m.

Fayzabod (Kishlok),Omachi

	In order to decrease the overload capacity for the transformer substation No. 379 it is required to build additional new 160 kVA transformer. The Makhalla is a small suburb to the east of Jizzak city comprising low density housing. No specific environmental or social issues were observed during site visits. No schools or medical facilities were observed within 50m.

A. Temur

	
The existing transformer will be replaced a with a new 250 kVA transformer substation. The existing transformer is located on an open area of land adjacent to some residential properties. No schools or medical facilities were observed within 50m.	An additional 1km of distribution line will be constructed in this southern suburb of Jizzak city. No environmental or social aspects of note were observed. No schools or medical facilities were observed within 50m.

Bogishamol

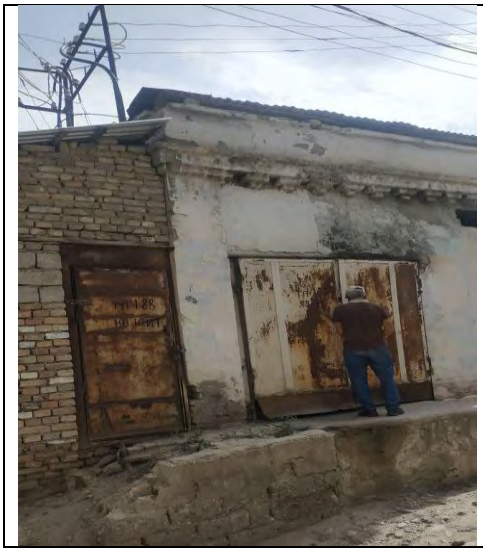
	In this area a 1,0 km line (10 kV) will be upgraded for an existing transformer (No.311). No environmental or social aspects of note were observed in this southern suburb of Jizzak city. No schools or medical facilities were observed within 50m.

Bunedkor

	In order to decrease the overload capacity for the transformer substation No. 257 it is required to build a new 160 kVA transformer station to replace the existing transformer which is located in a central residential area of Jizzak city. No schools or medical facilities were observed within 50m.

7.6.3. Samarkand

Muborak

	In this location, the transformer equipment inside this unit will be replaced. Upgrading of the building structure itself is not planned under the Project but is likely that PTES will consider replacing doors and roof in locations such as these. These works would be separate from those funded under the ADB loan. In such locations it is considered important to replace the roofs as often they can be leaking which results in damage to equipment and potential safety issues. Muborak is located within the core zone of the UNESCO world heritage site. But as can be seen, all ADB funded works will be undertaken inside the unit and there will be no specific impacts to PCR. No schools or medical facilities were observed within 50m.

Kavola 4

	In Kavola, a residential suburb of Samarkand (not within the UNESCO core of buffer zones), a pole mounted transformer will be replaced. Located on PTES owned land close to residential properties, some small oil stains were noted around the base of the transformer. No schools or medical facilities were observed within 50m.

Kul

Kul is another residential suburb of Samarkand adjacent to a local road and residential properties. This transformer will be replaced with a pad-mounted transformer. From a safety perspective, this unit can be easily interfered with by the local community, including children, so the replacement of this unit offers significant safety benefits. No schools or medical facilities were observed within 50m.

Samarqand district Jangijoy

Located in a southern suburb of Samarkand on GoU owned land, this transformer will be replaced with a pad-mounted transformer. Signs of oil staining were noted around the column support but leaks suggesting that the unit was leaking oil. No schools or medical facilities were observed within 50m.

Samarqand district Jangibog

	Located in a rural settlement south of Samarkand. This unit will be replaced with a pole-mounted transformer. Obvious signs of leakage were noted around the base of the unit. The surrounding land uses are agricultural, but the land occupying the unit is GoU property. Replacement of this unit will ensure that there is no future contamination of soils in this area. No schools or medical facilities were observed within 50m.

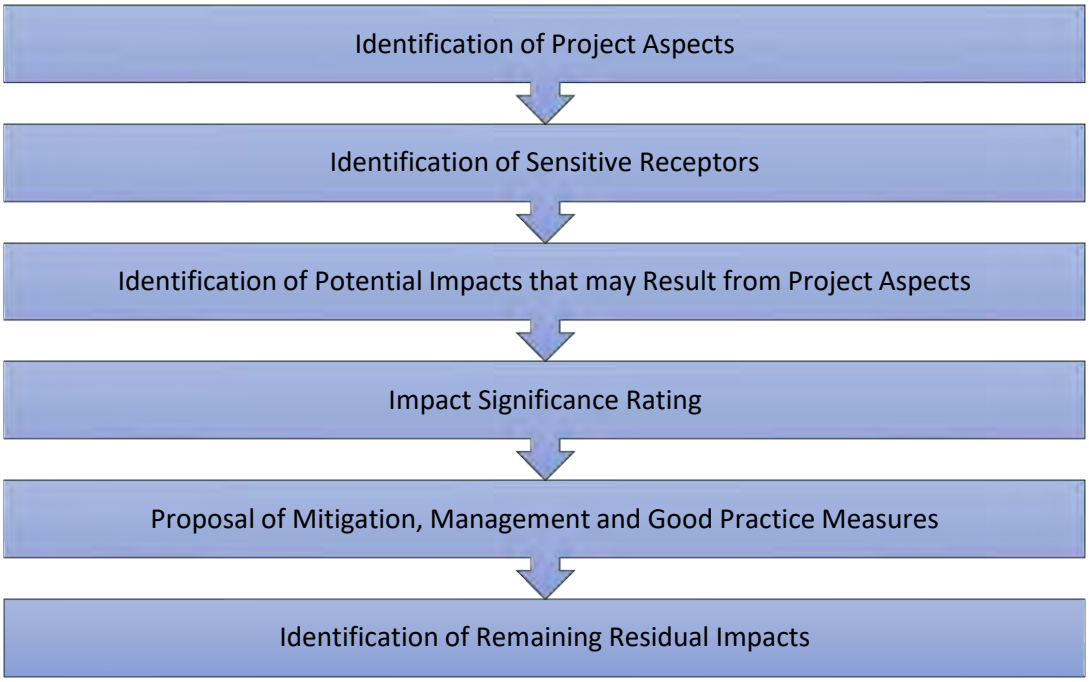
Samarqand district Urta Okhalik

	This unit will be replaced by a pad-mounted transformer. Leaks can be note around the base of the unit, but as can be seen the leaks do not extend all of the way down its supporting structure. A recreational area is located adjacent to the unit. Enclosing this unit will have safety benefits due to its location adjacent to a recreational area. No schools or medical facilities were observed within 50m.

8. Environmental Impacts and Mitigation Measures

8.1. Impact Assessment Methodology

304. This IEE follows a set format during the impact assessment process. As shown in the following flow chart and described further below.



8.1.1. Project Aspects

305. Firstly, the main environmental aspects of the Project are noted. An environmental aspect is any activity of the Project that interacts with the environment. E.g., an aspect of the Project that may impact upon air quality will be the movement of vehicles on unpaved roads through rural settlements. Another example could be removal of old poles and lines generating waste materials.

8.1.2. Identification of Sensitive Receptors

306. Once the main aspects of the Project have been identified any sensitive receptors within the Project area of influence are noted. Examples of sensitive receptors include; local residents, PTES staff, rivers, groundwater, birds, etc. Identification of receptors is a key part of the impact assessment process as without a receptor there will be no impact. For example, if a road generates significant noise but there are no sensitive receptors who can hear the noise, then there will be no noise impact.

8.1.3. Identification of Significant Environmental Aspects

307. Thirdly, the potential impacts of the identified aspects are outlined and how they could impact upon the identified receptors, in the case above, this could be the movement of a construction vehicle creating dust on an unpaved road which impacts upon local villagers.

308. The significance of an impact is determined based on the product of the consequence of the impact and the probability of its occurrence. The consequence of an impact, in turn, is a function primarily of three impact characteristics:

- magnitude
- spatial scale
- timeframe

309. Magnitude is determined from quantitative or qualitative evaluation of a number of criteria including:

(i) Sensitivity of existing or reasonably foreseeable future receptors.
(ii) Importance value of existing or reasonably foreseeable future receptors, described using the following:
  (a) inclusion in government policy.
  (b) level of public concern.
  (c) number of receptors affected.
  (d) intrinsic or perceived value placed on the receiving environment by stakeholders.
  (e) economic value to stakeholders.
(iii) Severity or degree of change to the receptor due to impact, measured qualitatively or quantitatively, and through comparison with relevant thresholds:
  (a) legal thresholds—established by law or regulation
  (b) functional thresholds if exceeded, the impacts will disrupt the functioning of an ecosystem sufficiently to destroy resources important to the nation or biosphere irreversibly and/or irretrievably
  (c) normative thresholds – established by social norms, usually at the local or regional level and often tied to social or economic concerns
  (d) preference thresholds—preferences for individuals, groups or organizations only, as distinct from society at large
  (e) reputational thresholds—the level of risk a company is willing to take when approaching or exceeding the above thresholds

310. Spatial scale is another impact characteristic affecting impact consequence. The spatial scale of impacts can range from localized (confined to the proposed Project Site) to extensive (national or international extent). They also may vary depending on the component being considered.

311. The impact timeframe is the third principal impact characteristic defining impact consequence and relates to either its duration or its frequency (when the impact is intermittent). Impact duration can range from relatively short (less than four years) to long (beyond the life of the Project). Frequency ranges from high (more than 10 times a year) to low (less than once a year). These timeframes will need to be established for each Project based on its specific characteristics and those of the surrounding environment.

312. Once the impact consequence is described on the basis of the above impact characteristics, the probability of impact occurrence is factored in to derive the overall impact significance. The probability relates to the likelihood of the impact occurring, not the probability that the source of the impact occurs. For example, a continuous Project activity may have an unlikely probability of impact if there are no receptors within the area influenced by that activity. The characteristics are outlined in the table below.

Table 28: Characteristics Used to Describe Impact

Characteristic	Sub-components	Terms Used to Describe the Impact
Type		Positive (a benefit), negative (a cost) or neutral
Nature		Biophysical, social, cultural, health or economic Direct, indirect or cumulative or induced
Phase of the Project		Construction and operation.
Magnitude	Sensitivity of Receptor	High, medium or low capacity to accommodate change High, medium or low conservation importance Vulnerable or threatened Rare, common, unique, endemic
	Importance or value of receptor	High, medium or low concern to some or all stakeholders High, medium or low value to some or all stakeholders (for example, for cultural beliefs) Locally, nationally or internationally important Protected by legislation or policy
	Severity or degree of change to the receptor	Gravity or seriousness of the change to the environment Intensity, influence, power or strength of the change Never, occasionally or always exceeds relevant thresholds
Spatial Scale	Area affected by impact – boundaries at local and regional extents will be different for biophysical and social impacts	Area or Volume covered Distribution Local, regional, transboundary or global
Timeframe	Length of time over which an environmental impact occurs or frequency of impact when intermittent	Short term or long term Intermittent (what frequency) or continuous Temporary or permanent Immediate effect (impact

Characteristic	Sub-components	Terms Used to Describe the Impact
		experienced immediately after causative project aspect) or delayed effect (effect of the impact is delayed for a period following the causative project aspect)
Probability – likelihood or chance an impact will occur		Definite (impact will occur with high likelihood of probability) Possible (impact may occur but could be influenced by either natural or project related factors) Unlikely (impact unlikely unless specific natural or Project related circumstances occur)

8.1.4. Impact Significance Rating

313. The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the approval process; secondly, it serves to show the primary impact characteristics, as defined above, used to evaluate impact significance. The impact significance rating system is presented in and described as follows:

(i) **Part A**: Define impact consequence using the three primary impact characteristics of magnitude, spatial scale and duration.
(ii) **Part B**: Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and
(iii) **Part C**: Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence.

314. Using the matrix, the significance of each described impact is rated.

Table 29: Method for Rating Significance

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE			
Definition		Criteria	
MAGNITUDE		Negative	Positive
	Major	• Large number of receptors affected • Receptors highly sensitive and/or are of conservation importance • Substantial deterioration, nuisance or harm to receptors expected • Relevant thresholds often exceeded • Significant public concern expressed during stakeholder consultation • Receiving environment has an inherent value to stakeholders	• Large number of receptors affected • Receptors highly amenable to positive change • Receptors likely to experience a big improvement in their situation • Relevant positive thresholds often exceeded
	Moderate	• Some receptors affected • Receptors slightly sensitive and/or of moderate conservation importance • Measurable deterioration, nuisance or harm to receptors • Relevant thresholds occasionally exceeded • Limited public concern expressed during stakeholder consultation • Limited value attached to the environment	• Some receptors affected • Receptors likely to experience some improvement in their situation • Relevant positive thresholds occasionally exceeded
	Minor	• No or limited receptors within the zone of impact • Receptors not sensitive to change • Minor deterioration, nuisance or harm to receptors • Change not measurable or relevant thresholds never exceeded • Stakeholders have not expressed concerns regarding the receiving environment	• No or limited receptors affected • Receptors not sensitive to change • Minor or no improvement in current situation • Change not measurable • Relevant positive thresholds never exceeded No stakeholder comment expected
TIMEFRAME		Duration of Continuous Aspects	Frequency of Intermittent Aspects

	Short term / low frequency	• Less than 4 years from onset of impact	• Occurs less than once a year
	Medium term / medium frequency	• More than 4 years from onset of impact up to end of life of project (approximately 30 years)	• Occurs less than 10 times a year but more than once a year
	Long term / high frequency	• Impact is experienced during and beyond the life of the project (greater than 30 years)	• Occurs more than 10 times a year
SPATIAL SCALE		Biophysical	Socioeconomic
	Small	• Within the defined 'Project area'	• Within the defined 'Project area
	Intermediate	• Within the district in which is the facilities are located	• Within the municipality in which the activity occurs
	Extensive	• Beyond the district in which the facilities are located	• Beyond the municipality in which the activity occurs

PART B: DETERMINING CONSEQUENCE RATING

MAGNITUDE	TIMEFRAME	SPATIAL SCALE		
		Small	Intermediate	Extensive
Minor	Short term / low frequency	Low	Low	Medium
	Medium term / medium frequency	Low	Low	Medium
	Long term / high frequency	Medium	Medium	Medium
Moderate	Short term / low frequency	Low	Medium	Medium
	Medium term / medium frequency	Medium	Medium	High
	Long term / high frequency	Medium	High	High
High	Short term / low frequency	Medium	Medium	High
	Medium term / medium frequency	Medium	Medium	High
	Long term / high frequency	High	High	High

PART C: DETERMINING SIGNIFICANCE RATING

		CONSEQUENCE		
		Low	**Medium**	**High**
PROBABILITY (of exposure to impacts)	**Definite**	Low / Medium	Medium	High
	Possible	Low	Medium	High
	Unlikely	Low	Low / Medium	Medium

8.1.5. Mitigation, Management and Good Practice Measures

315. Wherever the project is likely to result in unacceptable impact on the environment, mitigation measures are proposed (over and above the inherent design measures included in the project description). In addition, good practice measures may be proposed however these are unlikely to change the impact significance. In the case of positive impacts, management measures are suggested to optimize the benefits to be gained.

316. The following mitigation hierarchy will be utilized in selecting practical mitigation measures for unacceptable impacts as follows (in order of preference):

- Avoid the impact wherever possible by removing the cause(s).
- Reduce the impact as far as possible by limiting the cause(s).
- Ameliorate the impact by protecting the receptor from the cause(s) of the impact.

317. Providing compensatory measures to offset the impact will be undertaken where an impact is of high significance and none of the above are appropriate.

8.1.6. Residual Impacts

318. Once mitigation measures are declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

8.2. Physical Resources

8.2.1. Air Quality

319. This section discusses emissions of atmospheric pollutants and greenhouse gases during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to Emit Atmospheric Pollutants and Greenhouse Gases

- Construction of above ground distribution lines will require minor excavation works where the pole is inserted into the ground.
- Excavation of trenches for below ground distribution lines.
- Vehicle emissions from construction vehicles, e.g. bob-cat excavators, cherry pickers, etc.

Sensitive Receptors identified in Year 1 Project Locations Visited

320. The main sensitive receptors in the Project area are any residential properties close to the areas where construction or rehabilitation of distribution lines (above and below ground) and installation / rehabilitation of transformers will occur (e.g. within 20 meters). Agricultural crops may also be impacted by dust if poles are to be installed on or adjacent to agricultural land. Workers inside maintenance yards and buildings are also considered to be at risk from emissions and vapors.

Potential Impacts

Construction Phase

321. Release of Exhaust Gases - During construction, the release of combustion gases will mostly be from construction vehicles. These may locally increase concentrations of atmospheric pollutants (NO_X and SO_2) to a limited extent, but as they are from mobile sources (two or three vehicles) in use for a limited period of time (several hours in each location) any impacts are likely to be minor and localized.

322. Dust - Fugitive dust emissions arising from construction and rehabilitation activities are likely to be variable in nature and will depend upon the type and extent of the soil type and moisture content and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust. Dust will be generated during dry periods by construction vehicles (two or three arriving at site at any one time and remaining stationary for most of the works), excavation of pole holes and digging of underground cable trenches.

323. Indoor Air Quality – Rehabilitation of transformers will be undertaken in PTES maintenance buildings. Inspections of PTES maintenance yards indicated that ventilation systems inside the Jizzak, Bukhara and Samarkand maintenance buildings did not appear to be suitable for the size of the building. Although PCBs have not yet been identified in transformer oils it is possible that testing could identify them in the future. At room temperature PCBs do not readily vaporize. However, hazardous vapor levels can occur in confined spaces and when the material is heated, however, this is unlikely to occur during the removal and disposal of any PCB containing oil.

Operational Phase

324. None identified.

Impact summary and assessment of significance

325. L SEP Table 30 provides an assessment of the significance of potential air quality impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 30: Potential Impacts to Air Quality

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Release of exhaust gases*	*Nearby communities*	*L*	*L*	*L*	*L*	*MIN*	*ST*	*SMA*	*LOW*	*POSS*	***L***
C	*Dust*	*Nearby communities / Agric. Crops*	*L*	*L*	*L*	*L*	*MIN*	*ST*	*SMA*	*LOW*	*POSS*	***L***

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C / O	*Indoor Air Quality*	*REN Staff*	*L*	*M*	*L*	*M*	*MOD*	*LT*	*SMA*	*MED*	*POSS*	***L/M***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Pre-construction / Construction Phase

326. Release of Exhaust Gases and Fugitive Emissions - Emission sources (vehicles such as mobile cranes) shall be positioned as far as is practical from sensitive receptors (C-AQ-01).

327. Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to maximize fuel efficiency and help minimize emissions (C-AQ-02).

328. Dust - Measures that will be adopted to help prevent dust problems from occurring include:

- Carry out watering for dust control at least once a day near residential areas in the area of excavation works: in dry weather with temperatures of over 25˚, or in windy weather. (C-AQ-03).
- Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency) (C-AQ-04).

329. Indoor Air Quality – Although such impacts are not anticipated, in the event of PCB oils being heated, the vapor will be extracted from the work environment by using local exhaust ventilation (CAQ-05). If this is not possible suitable respiratory protection must be worn by workers (CAQ-06).

Operational Phase

330. No specific mitigation measures are required for the operational phase if the indoor air quality measures are implemented.

Residual Impacts

Table 31: Air Quality Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Release of exhaust gases*	***Low***	*Potential impacts are anticipated to be low. Generic mitigation measures will ensure residual impacts are not significant.*	***Not significant***
C	*Dust*	***Low***	*Potential impacts are anticipated to be low. Generic mitigation measures will ensure residual impacts are not significant.*	***Not significant***
C	*Indoor Air Quality*	***Low / Medium***	*Installation of suitable ventilation systems or use of respiratory ventilation will ensure residual impacts are not significant.*	***Not significant***

8.2.2. Hydrology

331. This section discusses potential impacts on surface and groundwater water during construction and operation of the project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to Affect Surface and Groundwater Resources

332. The following project aspects could affect surface water and groundwater resources in the Project area:

- Transformer oils from transformer unit.
- Use of fuel and other hazardous chemicals.
- Handling, storage and Disposal of hazardous liquids.
- Digging of shallow trenches for below ground cables.

Key Sensitivities identified in Year 1 Locations Visited

333. No major surface water courses or ground water resources have been identified close to Year 1 sites that were visited as part of this IEE. It is possible that groundwater wells are located within the boundary of properties close to the transformers to be replaced, however, it was not possible to confirm this during site visits.

Potential Impacts

334. Contamination of Groundwater and Surface Water – Spills and leaks of oils from transformers (possibly containing PCBs) could migrate into the groundwater and result in localized pollution thereby affecting local water supplies to a limited extent. This could have been occurring over a period of time prior to the Project commencement, and also during the removal, installation and operation of the transformers. Likewise, leaks and spills from PTES oil storage facilities may have also polluted groundwater.

335. Leaks and spills of hazardous / contaminated liquids during the construction phase of the Project could also occur, e.g. spills of lubricating oils, however the volumes of such liquids at each

work site would be minimal, no more than a few liters and such spills would not result in significant impacts to groundwater.

336. Digging of shallow trenches for below ground cables is not likely to have significant impacts on the groundwater table. No specific areas prone to flooding that could have significant impacts to the distribution facilities have been identified in the Year 1 sites that were visited as part of this IEE.

Impact summary and assessment of significance

337. Table 32 provides an assessment of the significance of potential surface water and groundwater impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 32: Potential Impacts to Surface Water and Groundwater

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Contamination of Groundwater*	*Local groundwater users*	*L*	*H*	*L*	*L*	*MOD*	*LT*	*SMALL*	*MED*	*UN*	***L/M***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UN: Unlikely Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

338. There are no specific guidelines from ADB, WBG, European Union (EU) to provide containment measures for oil spills and leaks from pad-mounted or pole-mounted transformers. However, it is recommended that all **pad-mounted transformers** procured by PTES, will at least comprise an impermeable spill / drip pan beneath the transformer which will be able to contain at least 110% of the oil content of the transformer (D-HY-01).

339. Regarding pole-mounted transformers, these types of transformers can contain between 20 and 40 liters of oil. International experience indicates that pole-mounted transformers do not comprise specific components to prevent oil leaks contaminating soils beneath the poles, rather consideration will be given to ensuring pole-mounted transformers are not located in sensitive sites, such as close to ground water extraction points, surface water courses, or agricultural land (D-HY-02). In these locations, pad-mounted transformers will be considered, which can include measures to contain oil leaks. Alternatively, where practical consideration will be given to the use of ‘dry transformers’ in these sensitive sites which would preclude the requirement for oil containment measures (D-HY-03).

Pre-construction / Construction Phase

340. Contamination of Groundwater – It is possible that leaks from old transformers could have been occurring over a number of years and that these leaks could have migrated into, and polluted groundwater. Removal of these old transformers and replacement with new modern equipment will not mitigate any historical pollution, but it will mitigate the risk of such events occurring again in the future (as long as the equipment continues to be maintained and transformers are replaced at the end of their lifecycle (O-HY-01)).

341. Notwithstanding the above, it is possible that transformers could be damaged during transport to PTES warehouses and to the site itself. This could result in leaks of oil from the unit. As such, all transformers will be inspected by PTES on delivery to PTES warehouses for signs of leaks before they are sent to site for installation (C-HY-01). Further on-site checks shall be undertaken before any transformers are mounted / installed (C-HY-02).

342. Regarding construction works themselves, no large-scale use of oils or hazardous liquids are anticipated during the construction of overhead lines and below ground cables. Accordingly, implementation of the good industry practice outlined in the Project EMP will ensure that no significant impacts to hydrological features arise from construction works.

343. **Appendix A** provides environmental guidelines for the installation and management of pad-mounted transformers. The guidelines will be strictly followed by the PTES throughout the Project (C-HY-03).

344. **Appendix B** provides environmental guidelines for the management of pole-mounted transformers. The guidelines will be strictly followed by the PTES throughout the Program (C-HY-04).

345. Specific measures for the management of waste oil and PCBs are provided below in the section relating to Waste Management.

Residual Impacts

Table 33: Surface Water and Groundwater Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Contamination of Groundwater*	***Low / Medium***	*Installation of new equipment will prevent any additional contamination of groundwater that may have occurred historically. In addition, the guidelines provided for pole-mounted and pad-mounted transformers further limit the potential for groundwater (and potentially at other investment year sites, surface water) pollution.*	***Not significant***

8.2.3. Soils, Geology and Geohazards

Aspects of the Project that have the potential to impact soils and geology and be impacted by geohazards

346. The following planned project activities could affect soils in the project area:
- Use of vehicles, heavy plant and equipment on agricultural land during the installation of poles.
- Topsoil clearance during installation of poles.
- Handling, storage and Disposal of hazardous liquids. This issue is discussed above under the heading of Hydrology.

347. The following Geohazards have been assessed:
- Landslides and mudslides. However, as noted in **Figure 16** only small portions of Samarkand and Jizzak (mainly in the mountains) are considered to be at risk of a significant impact.
- Flood risks are discussed above under Hydrology.
- Seismic Events.

Key Sensitivities Identified in Year 1 Sites Visited

348. Nearly all of the transformers to be replaced are located in the center, or outskirts of villages. As such productive soils are unlikely to be impacted in these locations. Some of the distribution lines follow local access roads which border with agricultural land. Some impacts to the agricultural land in these areas may occur.

349. Soil contamination has impacted around the base of some of the transformer sites. However, these soils are not used by the local community and the locations immediately around the base of the transformers is owned by PTES.

350. None of the Year 1 sites visited have been identified as being specifically prone to geohazards with the exception of seismicity which generally is an issue throughout Uzbekistan. Accordingly, all infrastructure is designed to take into account specific earthquake risks during the design phase of any Project.

Potential Impacts

351. Soil Compaction – The use of construction equipment during the installation of poles or digging of trenches could result in localized soil compaction in any agricultural area adjacent to these sites (although in general trenches will mainly be located in urban locations).

352. Impacts to Topsoil – Impacts to topsoil may occur when it is stripped for the construction of pole sites, pad-mounted transformers or cable trenches.

353. Geohazards – No landslide or mudslide locations have been identified that may impact upon the Year 1 activity sites visited. However, it is possible, although considered unlikely, that distribution lines could be located in areas that may be prone to landslides or mudslides in the remaining Project activity sites. Such events could damage or destroy poles and distribution lines resulting in power outages for the local population.

354. Contaminated Soil – Any soil contamination around the base of the transformers is unlikely to be resulting is significant impacts to the local community. However, as a good practice measures, this soil should be removed when new transformers are installed.

Impact summary and assessment of significance

355. Table 34 provides an assessment of the significance of potential air quality impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 34: Potential Impacts to Soils and Geology and From Geohazards

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Soil Compaction*	*Productive soils*	*L*	*L*	*L*	*-*	*MIN*	*ST*	*SMALL*	*LOW*	*POSS*	***L***
C	*Impacts to Topsoil*	*Productive soils*	*L*	*L*	*L*	*-*	*MIN*	*ST*	*SMALL*	*LOW*	*POSS*	***L***
C	*Contaminated soil*	*Local Community*	*L*	*M*	*L*	*M*	*MOD*	*MF*	*SMALL*	*MED*	*POSS*	***L/M***
O	*Geohazards*	*Project Infrastructure*	*L*	*M*	*L*	*-*	*MIN*	*LT*	*SMALL*	*LOW*	*UN*	***L***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

356. All designs shall incorporate specific measures, as required by Uzbek design and construction codes, to mitigate the risk of damage from seismic events, landslides and mudslides (D-SO-01)

Construction Phase

357. Soil compaction - To avoid compaction impacts outside the cleared areas, i.e. RoW, vehicle movements will be restricted to demarcated working areas (unless in the event of an emergency) (C-SO-01).

358. Topsoil - To facilitate natural re-vegetation of the disturbed area or RoW, the separately stockpiled topsoil will be spread over the surface of the RoW following completion of grading as appropriate (C-SO-02). Once the topsoil has been replaced it will be stone picked to remove any large stones which are not in keeping with the surrounding soil texture (C-SO-03).

359. Contaminated Land – Any soils around the base of transformer sites that appear to be contaminated by leaked oil (via visual inspection) shall be removed by the PTES and disposed of as hazardous materials (C-SO-04). The methods for storage and disposal are outlined in the section relating to Waste Management below.

Residual Impacts

Table 35: Soils and Geology Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Soil Compaction*	***Low***	*Any areas identified that have been contaminated by oil will be removed for appropriate disposal. Further, installation of new equipment will prevent future contamination. Residual impacts are therefore not considered to be significant.*	***Not significant***
C	*Impacts to Topsoil*	***Low***		***Not significant***
C	*Contaminated Land*	***Low / Medium***		***Not significant***
O	*Geohazards*	***Low***		***Not significant***

8.3. Biodiversity

8.3.1. Flora, Fauna and Habitat

360. This section discusses the impacts of the Project on habitat and flora during construction and operation of the Project and associated mitigation measures to be adopted. The Section should be read alongside the sections addressing surface water resources and geology and soils which include additional information on mitigation for potential impacts to aquatic species and habitat restoration respectively.

Aspects of the Project that have the potential to Impact Flora, Fauna and Habitat

361. The primary aspects of the project that could impact upon flora, fauna and habitat include:

- Vegetation clearance and topsoil removal activities within the working corridor of the OHL, however, in general the OHLs will be located within residential areas and along roads where the presence of vegetation is low. Vegetation clearance associated with underground cables is less likely due to the fact that these locations will be in dense residential areas.
- Operation of electrified components.

362. No other aspects have been identified that may generate significant impacts to biodiversity due to the relatively small-scale nature of project works and also due to the fact nearly all works will be undertaken in urban and semi-urban locations.

Sensitive Receptors

363. None of the Year 1 investment activity sites will be constructed in any nationally or internationally designated sites. In addition, site visits to Year 1 sites did not indicate the presence of any notable habitat, flora and fauna in these predominantly residential areas. Notwithstanding the above, it is possible that activities in the remaining activity locations in Year 1 and in future

years could be planned in designated areas (e.g. Zeravshanskiy State Nature Reserve close to Samarkand), or close to sensitive habitats, such as wetlands or forests.

Potential Impacts

364. As noted above, it is possible that works in future investment plans, or in sites not visited as part of this IEE could be planned in designated sites. However, in general it is considered unlikely due to the remoteness of these areas and their lack of consumers. Such a situation does, however, not apply to some designated areas specifically the Zeravshanskiy State Nature Reserve which overlaps with a number of settlements in Samarkand region.

365. It is noted that the Law on Especially Protected Territories does not specifically prohibit activities such as installation of electricity distribution lines and transformers in nationally designated sites, therefore the potential exists for REN to propose activities in these areas in future investment years.

366. Some small areas of land may need to be cleared for below ground cables, but these areas, as stated previously, will be in urban areas where any sensitive flora and fauna is absent. It should also be noted that the type of 0.4kV overhead lines to be installed are likely to be the insulated type which means that the requirements for tree clearance is minimal.

367. The most significant potential impact of the project, in terms of biodiversity, relates to potential bird electrocution on poles and wires. Risk of electrocution occurs when a bird simultaneously touches two energized parts or an energized part and a grounded conductor or equipment. A bird may touch energized parts when flying on or off a distribution pole, when defecating from the pole and causes a connection, or when a large number of birds roost on the lines at the same time, causing them to sway and make connections.

368. According to the US Fish and Wildlife Service (FWS) most electrocutions occur on distribution lines and poles compared to transmission lines. Distribution line conductors are placed closer together that on transmission lines, increasing the risk of electrocution on distribution lines. The following box provide an overview by the FWS relating to bird electrocution by the FWS.

Box 5: Distribution Lines and Bird Electrocution

The risk of bird electrocutions on a distribution pole is based on the combination of three factors: biological, environmental, and engineering.

Biological Factors - A bird's vulnerability to an electrocution is based on the following characteristics:

- Body size - Large birds are most at risk of touching two parts simultaneously as their wingspan and head-to-foot height is typically greater than the separation between energized components. However, small birds are also electrocuted as they can access smaller spaces where energized components are more closely aligned.
- Age - Young birds are less agile and may be less able to avoid wires and equipment thus increasing risk of electrocution. In addition, juvenile birds are less experienced with hazards on the landscape and require time to adapt to these risks.
- Use of Perches - Many birds, particularly raptors, seek out tall perches to hunt for food and some birds perch and roost on distribution poles. Frequent use of poles increases the exposure to energized parts while flying on and off a pole. Both large and small

birds have been observed nesting on distribution poles. Nesting material may cause an electrical connection, or the nest material could catch on fire, killing the bird and damaging the power structure. Birds that roost on distribution lines in large flocks (e.g., swallows) can cause lines to sway and touch.

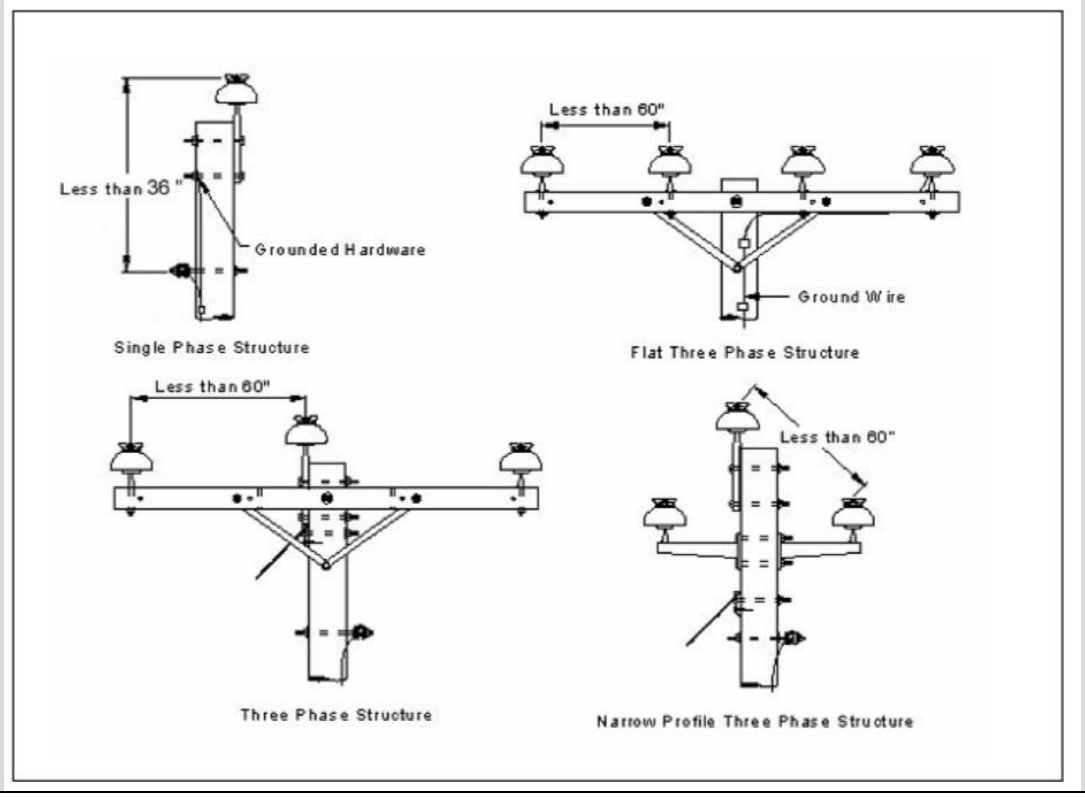
Environmental Factors - In addition to biological factors, other environmental factors influence electrocution risk:

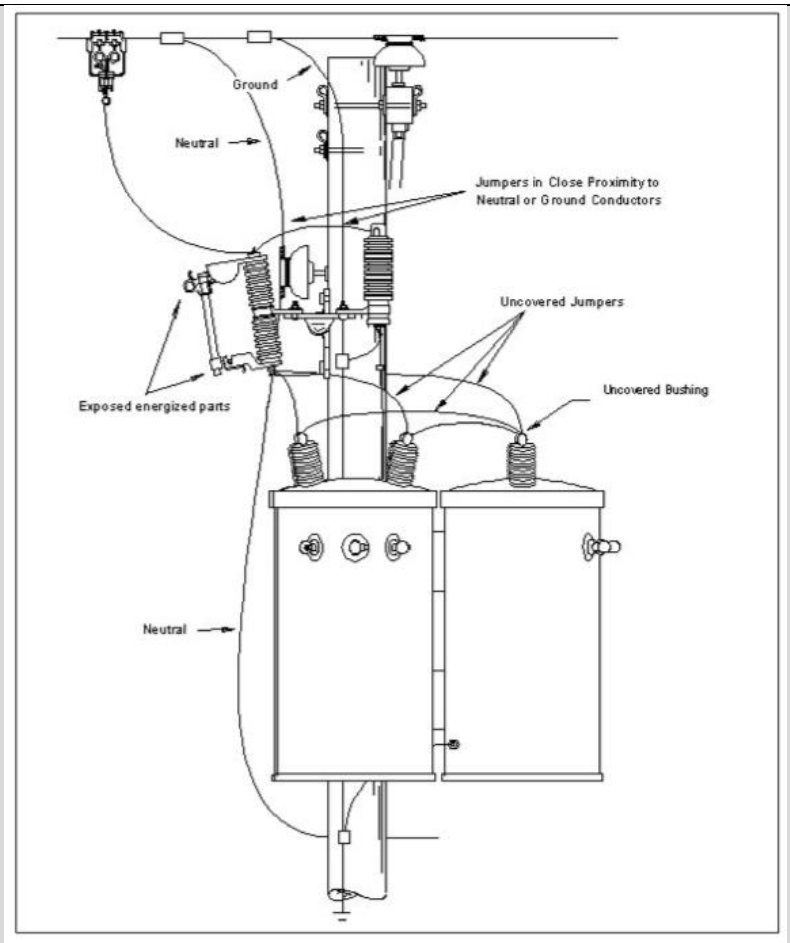
- Habitat Type - Studies indicate that electrocutions are more likely to happen in habitats with low vegetation where the distribution pole is the (or one of the) tallest structures in the habitat. Given a bird's preference for elevated perches for protection from predators or to obtain a higher vantage point for hunting, distribution poles that are prominent features on the landscape will likely have greater use than poles in landscapes with other tall structures or trees. Urban or disturbed areas are generally characterized as low quality habitats.
- Wet Weather - In dry conditions, feathers are not good conductors of electricity. Electrocution typically requires skin or bone contact (e.g., wrist to wrist) with the energized parts. However, when feathers are wet, they have a higher conductivity and electrocutions occur with wingtip to wingtip connections.
- Seasonal Variation - Birds are electrocuted year-round and studies vary on whether one season is of greater risk than others. During breeding season, more birds may attempt to nest on distribution poles, while in the fall there are more juveniles on the landscape, and finally in winter, some species congregate in large numbers, potentially increasing risk of pole use.

Engineering Factors - The critical factor that increases the risk of bird electrocutions on distribution poles is the distance between energized parts. This distance can be between components horizontally (where a bird typically connects the circuit with its wings) or vertically where a bird might make a connection with its body (head to foot distance), see . Ultimately, the design of a pole influences risk through:

- Phase design - The number of phases and phase separation distance directly influences electrocution risk.
- Pole type - Metal poles commonly used in Europe and increasingly used in the U.S. are higher risk for electrocutions than other materials.
- Pole equipment - Transformers, jumper wires, surge arresters, switch equipment, etc. increase the number of energized parts that can make connections when touched.

Typical Avian Risk Structures





Source: Avian Protection Plan Guidelines. A Joint Document Prepared By the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (FWS) April 2005

Bird types most commonly electrocuted include:

- Raptors - Eagles and buteos[43] are of primary concern due to their large size, preference for nesting, roosting, and hunting from tall perches, especially in open habitats.
- Waterbirds - Herons and storks may use poles near wetlands to roost, dry feathers, and nest. This taxa may have increased risk due to large size and frequency of having wet feathers
- Vultures and Condors - Very large birds that are known to roost on power poles. However, this is unlikely in the locations proposed in Year 1.
- Corvids - Species of raven and crow frequently nest and roost on power poles and are of medium size that can make the connection between energized parts on many poles.
- Songbirds - Smaller birds such as shrikes and kingbirds commonly try to nest on poles in small spaces created by pole equipment and wires.

369. Several factors will limit the risk of bird electrocutions occurring from the project:

[43] Buteo is a genus of medium to fairly large, wide-ranging raptors with a robust body and broad wings. In the Old World, members of this genus are called "buzzards", but "hawk" is used in North America.

- The project will include underground cables in high density urban areas which will eliminate the risk of bird electrocutions (currently around 30% of Year 1 activities will be undertaken in these locations).
- 0.4kV distribution lines will be fitted with insulated wires which will prevent bird electrocution on the insulated portions of these lines (but not the electrical components). It is also noted that the risk of electrocution under 1kV is low due to the relatively low voltage and the high electric resistance of birds. [44]

370. None of the Year 1 project sites visited are located in, or close to sensitive habitats such as IBAs, or nationally designated sites where priority bird species may be present in numbers. Tudakul and Kuymazar Reservoirs (Bukhara Region) are the closest IBA, to Year 1 sites, but more than 12km distant.

371. Bird Collisions - In general bird collisions are associated with transmission lines rather than distribution lines.[45] Studies have shown that birds collisions with transmission lines are four times more likely than distribution lines even though distribution lines are twice as abundant. [46] Given the low height of the distribution poles (around 4-5m) most birds will be flying above these heights, especially where poles and lines are located in residential areas (birds will generally fly over the houses not between them) and particularly in the case of migrating birds. In addition, the use of underground cables, limits the potential for bird collisions.

372. Nesting – Some birds, benefit from the presence of power lines by utilizing distribution poles for nesting. Bird nests can cause operational problems. Removal of nests generally does not solve the problem because most species are site-tenacious and rebuild shortly after the nest material is removed.[47] No bird nests were observed on the existing 10kV / 0.4 kV network during site visits, but this does not preclude their presence.

Impact summary and assessment of significance

373. Table 36 provides an assessment of the significance of potential ecology impacts before implementation of the proposed mitigation measures (discussed further in the rest of this section).

[44] Protecting birds on powerlines: a practical guide on the risks to birds from electricity transmission facilities and how to minimise any such adverse effects. erman Society for Nature Conservation, Registered Charity and BirdLife Partner Germany. Page 11.
[45] Bird collisions with power lines: State of the art and priority areas for research. Biological Conservation June 2018.
[46] Sandhill crane collisions with power lines in southcentral Nebraska. In. Proceedings 1988 North American Crane Workshop. 189–196. Ward, J.P., Anderson, S.H., 1992.
[47] Avian Protection Plan Guidelines. A Joint Document Prepared By the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (FWS) April 2005.

Table 36: Potential Impacts to Habitat and Flora

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Disturbance of vegetation / habitat*	*Local vegetation*	*L*	*L*	*L*	*-*	*MIN*	*ST*	*SMALL*	*LOW*	*POSS*	***L***
C/O	*Impacts to designated sites*	*Designated sites*	*L*	*H*	*M*	*L*	*MOD*	*LT*	*SMALL*	*MED*	*UN*	***L***
O	*Bird Electrocutions*	*Birds*	*L*	*M*	*L*	*-*	*MOD*	*LT*	*SMALL*	*MED*	*POSS*	***L/M***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely

Mitigation and Management Measures

Design Phase

374. Bird Electrocution – The following provides the procedures for ensuring that the risk of bird electrocution is minimized.

375. During the design phase, and prior to construction, the PIC will complete the EAS for each activity site (D-BIO-01). The EAS includes a specific section relating to designated sites and birds, including the following questions:

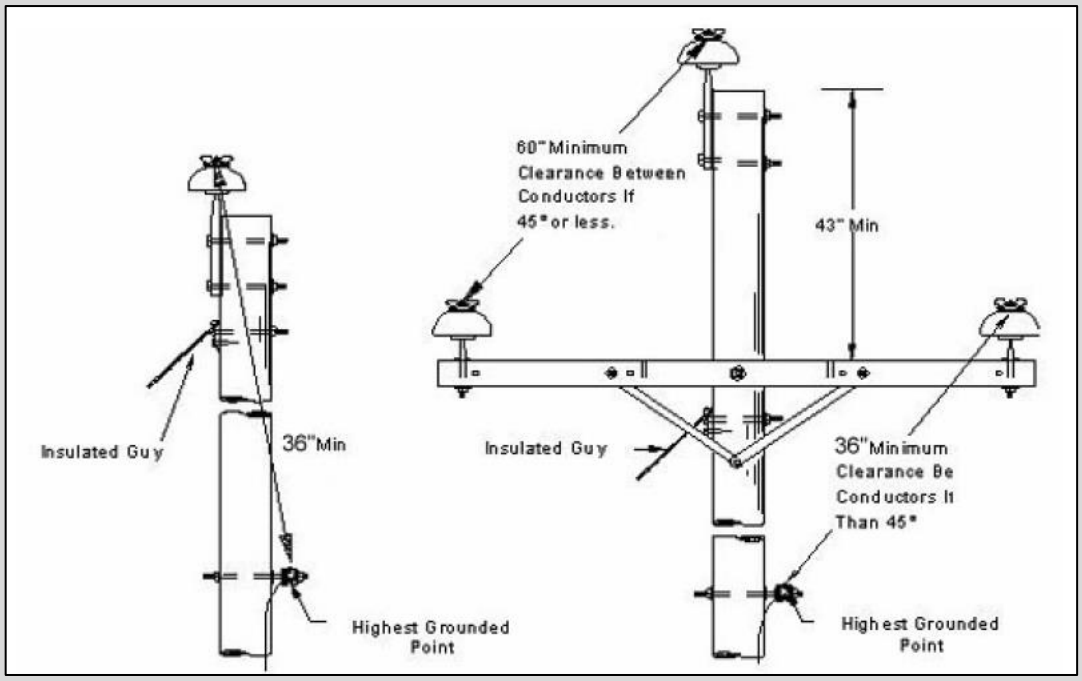
- Is the site located within 1km of an important bird area (IBA)?
- Is the site located in a rural area, e.g. areas outside city limits or beyond incorporated areas with commercial or residential development?

376. If the answer is positive to either questions, the PIC will engage a national specialist to visit the site and make an assessment of the types of birds that could potentially be affected and recommend design specifications (based on those outlined below by the Avian Power Line Interaction Committee (APLIC) for new distribution systems) to mitigate any impacts to these species (D-BIO-02). Where significant impacts are identified a new IEE will be prepared by the PIC.

Bird Electrocution Design Mitigation Measures

On single phase structures, a minimum vertical separation of 0.9m (36 inches) from phase to ground is needed (Figure 22). On three phase structures, a vertical clearance of at least 1.09m (43 inches) between un-insulated conductors, ground wires and grounded hardware on poles with 2.4m (8-foot) cross-arms will provide the 1.5m (60-inch) required clearance (Figure 22). Separation can be accomplished by lowering cross-arms and neutral attachments, or if vertical space is not available, a 2.4m (8–foot) cross-arm can be replaced with a 3m (10–foot) arm.

Figure 22: Typical Avian Safe Structures: Single-phase (left), Three-phase (right)



Source: Avian Protection Plan Guidelines. A Joint Document Prepared By the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (FWS) April 2005

An alternate method for ensuring separation of energized conductors is to use vertical construction. This is not the preferred method of separation, since considerable pole height is required to attain adequate clearance, making this an expensive solution.

Perch Guards - If conductor separation cannot be achieved and covering or reframing is impractical, perch guards (triangles) with optional perches may be used for large perching bird protection (Figure 24). Since raptors will often perch on the highest vantage point, the installation of perch guards between closely spaced conductors and the placement of perches above existing arms and conductors may keep a bird from contacting energized parts or wires. Perches may not be effective when used without perch guards. Perches and guards, when properly installed, are not an absolute solution, but they do reduce the risk to birds. Ideally, when a perch guard is installed, an alternative, safe perch site should be provided such as that shown in Figure 23.

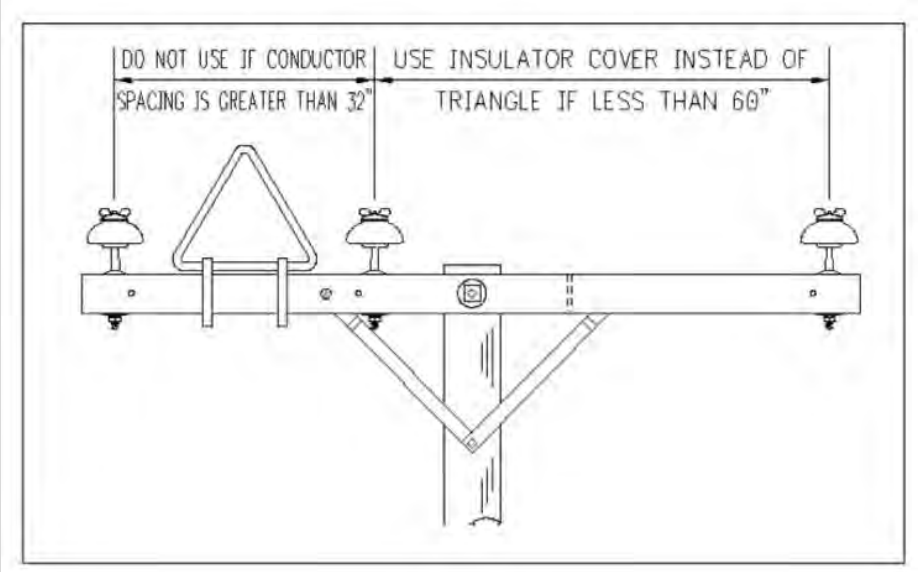
Figure 23: Perch Guard and Alternative Perch Site

Source: Raptor Resource Project Blog (https://raptorresource.blogspot.com/2012/11/bird-safe-power-poles.html)

Covering Conductors - Where adequate separation of conductors, or conductors and grounded parts, cannot be achieved, covering conductors may be the only solution short of reframing or replacing structures. Covering material should be used to cover both the conductor and the insulator.

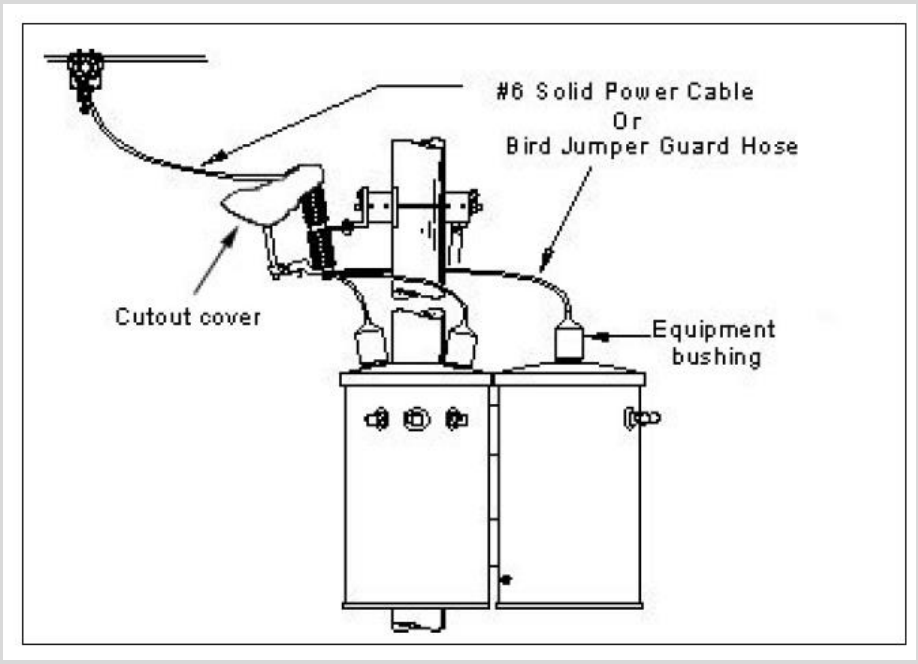
377. If transformers, cutouts or other energized or grounded equipment are present on the structure, jumpers, cutouts and bushings should be covered to decrease the chance of a bird electrocution (Figure 25). For jumper wires, use a bird jumper wire guard, cover-up hose or insulated power cable. For cutouts, various covers are available to fit different sizes and styles of cutouts. For bushings, use a bushing guard that provides the protection needed.

Figure 24: Example Perch Guard



Source: Avian Protection Plan Guidelines. A Joint Document Prepared By the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (FWS) April 2005

Figure 25: Hose and Bushing Gaps



Source: Avian Protection Plan Guidelines. A Joint Document Prepared By the Edison Electric Institute's Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service (FWS) April 2005

378. The PIC will be responsible for reviewing all of the design documents prior to their implementation to ensure that suitable mitigation measures recommended by the national bird specialist in line with those outlined above, have been included in the design to limit the potential for bird electrocution. (D-BIO-03).

Construction Phase

379. Vegetation and Habitat - The following is proposed to reduce or mitigate construction impacts to vegetation and habitat:

Table 37: General Mitigation Measures

Objective	Actions
Minimize impact footprint	Vehicle movements will be restricted to demarcated working areas (unless in the event of an emergency) to reduce unnecessary impacts to habitat (C-BIO-01). Sensitive habitats that need to be avoided during construction (e.g. specific trees that are to be retained) will be marked for protection by the PICs environmental specialist who shall make a pre-work survey (during the preparation of the EAS) of the work sites before any works commence (C-BIO-02).
Tree Protection	In accordance with the requirements of national legislation, any Red Book species will be identified and protected as part of the afore mentioned pe-work surveys (C-BIO-03). Where trees are removed, compensation planting will be undertaken based on the number of trees to be removed and using an appropriate re-planting ratio agreed with the PIC (species and region specific) (C-BIO-04). PTES will report to the PIC on the number of trees cut for specific sub-projects and the numbers and types of trees replanted (if required) (C-BIO-04.1).
Reinstatement of works areas	Temporary works areas will be reinstated to near original condition (C-BIO-05). PIC will inspect the area after works are completed to ensure they are rehabilitated to a satisfactory condition.

380. Designated Sites – First year activity site visited as part of this IEE will not impact upon any nationally and internationally designated sites. For other Year 1 site and subsequent years, activities in these areas will be prohibited under the ADB project (C-BIO-06). The PIC shall complete the EAS which include screening measures to prevent works in designated sites (C-BIO-07).

381. Nest Management – Prior to the start of construction the PICs environmental specialist shall prepare the EAS of the work sites before any works commence to identify any nests (C-BIO-08). Where nests are present on poles the old poles shall be left in-situ if possible so that the nest can continue to be used (C-BIO-09). Poles with nests shall not be removed during the nesting season (C-BIO-10).

382. Where the above is not possible consideration shall be given to the use of nesting platforms on new poles (C-BIO-11). Platforms provide for the needs of the birds, while preventing electrocutions and electrical outages (see Figure 26). Mounting a nest platform above energized equipment is not encouraged because birds are likely to drop nest materials that could cause a fire or outage. Nest platforms are commercially available or can be constructed with materials on hand such as wire spool ends or wooden pallets.

383. There may be times when nesting should be discouraged to prevent avian electrocutions or risks to electrical equipment – this will be identified during pre-work surveys. PVC or fiberglass

material perch discouragers, mounted on the cross-arm, will usually prevent the placement of nesting material (see Figure 27).

Figure 26: Nesting Platform

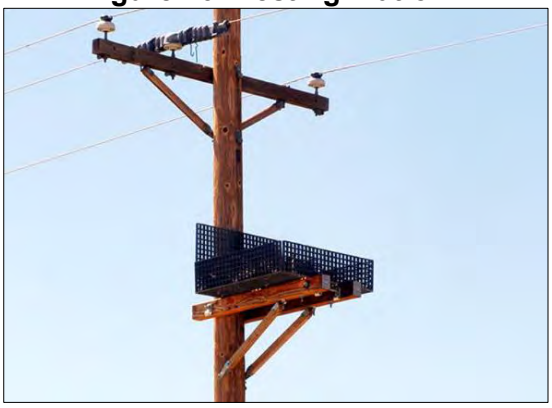


Figure 27: Nest Discourager

Residual Impacts

Table 38: Biodiversity Residual Impacts

Phase	***Potential Impact***	***Potential Impact Significance***	***Residual Impact***	***Residual Impact Significance***
C	*Disturbance of vegetation / habitat*	***Low***	*No significant residual impacts anticipated.*	***Not significant***
C/O	*Impacts to designated sites*	***Low***	*Screening sites to ensure they are not in designated areas will ensure there are no residual impacts to these areas.*	***Not significant***
O	*Bird Electrocutions*	***Low / Medium***	*Despite the proposed mitigation measures it is still possible that some bird electrocutions will occur. However, the proposed mitigation measures should limit the number of birds affected.*	***Low***

8.4. Socioeconomic Environment

8.4.1. Economy, Employment and Livelihoods

384. This section discusses the impacts of the project on the economy, employment and livelihoods during construction and operation of the project and associated mitigation measures to be adopted. A discussion of land acquisition and compensation is provided below under the section on Land Use.

Aspects of the Project that have the potential to cause impacts to the economy, employment and livelihoods

- Employment opportunities.
- Supply of constant levels of power throughout the day.

Key Sensitive Receptors

385. Local community and businesses

Potential Impacts During all Years of the Project

Construction Phase

386. The works will be undertaken directly by the PTES or by PTES sub-contractors most of which have existing contracts with the company. As such, there will be little benefit in terms of employment opportunities. The main socioeconomic benefit to the local community will be in terms of quality of power supply which will be constant and continuous. This will have benefits to local businesses and to local households which are affected by uneven power supply and power outages.

Operational Phase

387. During the operational phase impacts are anticipated to be beneficial.

Impact summary and assessment of significance

388. Table 48 Table 39 provides an assessment of the significance of potential impacts to the local economy, employment and livelihoods before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 39: Potential Impacts to Local Economy, Employment and Livelihoods

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
O	*Improved Electricity Supply*	*Local communities*	*H*	*H*	*H*	*-*	*MAJ*	*LT*	*SMALL*	*MED*	*DEF*	***M***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UN: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Pre-Construction / Construction Phase

389. None required.

Residual Impacts

390. None.

8.4.2. Land Acquisition and Compensation

391. This section discusses the issue of land acquisition and compensation and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to cause Land Acquisition and Compensation

- Local community and farmers

Sensitive Receptors and Potential Impacts

392. The program is classified B for involuntary resettlement as the impacts are deemed insignificant. Land is owned by the state in Uzbekistan. Currently there are no land acquisition requirements from the private land users for the installation of the transformers and distribution line poles as these will be rehabilitated or installed on state land, mostly along the road right of way. However, it is possible that they could arise in future investment years.

Impact summary and assessment of significance

393. Table 40 provides an assessment of the significance of potential land acquisition and compensation impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 40: Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C / O	*Land Acquisition*	*Land owners and users*	*L*	*M*	*L*	*L*	*MOD*	*LT*	*SMALL*	*MED*	*UN*	***L***
C / O	*Crop and tree loss*	*Crop and tree owners*	*L*	*M*	*L*	*L*	*MOD*	*LT*	*SMALL*	*MED*	*UN*	***L***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

394. A land acquisition and resettlement framework (LARF) has been prepared for the project. Although not a requirement under ADB's SPS (2009) for a stand-alone project loan, the LARF is prepared as a heads-up early action to help the EA prepare land acquisition and resettlement plans (LARPs) using a national resettlement consultant, should the need arise for land acquisition. This follows the instructions in ADB's Operations Manual (OM) Section F1 (2013), paragraph 52

that says that for project loans where subprojects or components are prepared after the ADB Board approval and have limited anticipated involuntary resettlement impacts, a resettlement framework may be submitted in lieu of safeguard plans for such subprojects or components. In such a case, the social assessments and safeguard planning documents are required to be formulated and approved before any physical activities start (C-LA-01).

Residual Impacts

Table 41: Land Acquisition and Compensation Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C / O	*Land Acquisition*	***Low***	*Implementation of the requirements outlined in the LARF for any potential land acquisition and compensation requirements will ensure any residual impacts are not significant.*	***Not significant***
C / O	*Crop and tree loss*	***Low***		***Not significant***

8.4.3. Waste Management

395. This section discusses the impacts of waste management during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the project that have the potential to generate waste

396. The following aspects of the Project are likely to generate waste:

- Installation of poles.
- Installation of overhead lines.
- Installation of below ground cables.
- Removal of old poles.
- Excavated material from trenches
- Removal of old overhead lines.
- Removal of old transformers.

Key Sensitivities

397. Project activities will occur mainly in and around residential areas. The volumes and types of waste generated from the works is unlikely to be significant and as no specific sensitive receptors have been identified that could be impacted by generation and disposal of waste. The key sensitivity relates to the disposal activities of the wastes, as often times there are no specific locations for the disposal of waste materials, including hazardous wastes within the vicinity of the work sites.

Potential Impacts

Construction Phase

398. Excavation Works – Excavated material from trenches will be replaced in the trenches after cables have been laid and the soils compacted meaning that no significant levels of spoil material will be generated. Small volumes of soil will also be generated in the areas where poles are to be places. Again, this material can be filled in and compacted around the base of the pole.

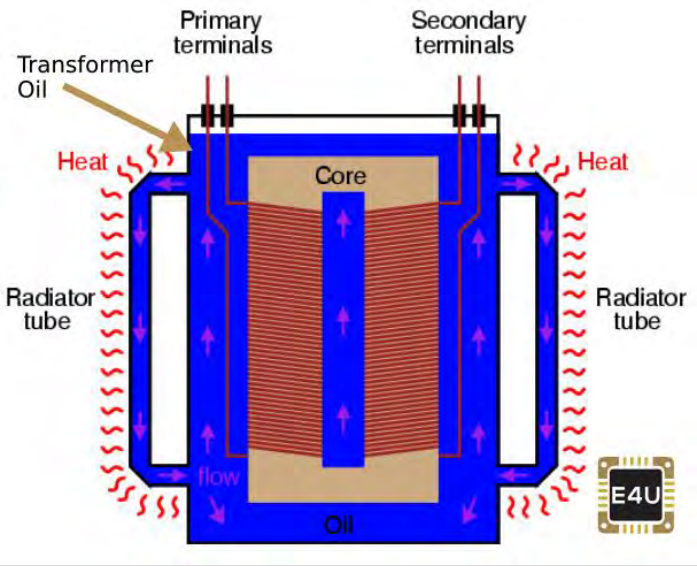
399. Cables, Cuttings, etc. – Installation of poles, overhead lines and underground cables will generate small volumes of generic waste types such as off-cuts of metals, wood, etc. Leaving these materials at the site does not represent a significant pollution risk, but it is considered best practice to remove these materials from the site so as not to litter the work sites.

400. Old Poles and Wires – Old concrete and wood poles will need to be removed from the work sites and not left in-situ. Overhead wires will be returned to the PTES maintenance yards for recycling.

401. Old Transformers – Removal and disposal of old transformers represents the biggest environmental and health risk associated with the project. All of the transformers proposed for replacement under Year 1 are oil based.

Box 5. Transformer Oil

Transformer oil (also known as insulating oil) is a special type of oil which has excellent electrical insulating properties and is stable at high temperatures. Transformer oil is used in oil-filled electrical power transformers to insulate, stop arcing and corona discharge, and to dissipate the heat of the transformer (i.e. act as a coolant). Transformer oil is also used to preserve the transformer's core and windings – as these are fully immersed inside the oil. Another important property of the insulating oil is its ability to prevent oxidation of the cellulose-made paper insulation. The transformer oil acts as a barrier between the atmospheric oxygen and the cellulose – avoiding direct contact and hence minimizing oxidation.



402. Many older transformers in the distribution system are more than 30 years old and show significant signs of wear and tear. As noted earlier, many of the transformers observed during site visits were leaking and patches of oil could be observed around the base of the units causing localized soil contamination and possibly groundwater contamination. Transformer leaks are most commonly caused by degrading cork gaskets (see Figure 29) or holes in the radiator fins (see

Figure 28) or the steel tank. Often these leaks are slow drips, but occasionally major leaks can occur. Contaminated soils around the base of the transformers will need to be removed prior to installation of the new units.

403. As noted in Section 5.7, discussions with the Design Institute (DI) confirmed that there are no specific design requirements to contain leaks and spills of oils for this type of equipment, mainly due to their relatively small size.

Figure 28: Fin Corrosion

Figure 29: Leaking Gasket

404. After removal from the site, the transformers will be taken to PTES maintenance facilities to be stripped down for spare parts, recycling and disposal.

405. If used for spare parts, the transformer will have its oil drained, be dismantled (including coil removal) and its oily components cleaned. All of the metal components will be either re-used by PTES, or recycled by state authorized companies. Some portions of the transformer, such as cellulose paper, cannot be re-used or recycled and need to be disposed of as hazardous waste as they will be contaminated by the transformer oil. Likewise, oily rags used to clean the transformers will also need to be disposed of as hazardous waste.

406. As noted in Section 5.6 some waste materials, including cellulose paper, were being burned on site at PTES maintenance yards. There is also a general lack of coordinated waste management at these facilities and often a lack of specific waste storage containers.

407. Oil which does not meet the technical requirements, after treatment and testing, is transferred to bulk oil storage tanks, most of which are located below ground. The tanks are periodically emptied by a licensed waste management company. The PTES keep a record of the volumes of waste oil removed from the site and report these details to the REN in Tashkent and SCNP. This procedure itself is considered an effective one, however, visits to PTES maintenance yards suggest that the oil storage facilities are aging, and it is not possible to confirm the integrity of the tanks.

408. Disposal and re-use of transformer oil raises one key issue, that of PCBs. Due to the age of the equipment used in large parts of the system (more than 30 years old) it is possible that PCBs could be present within transformer oil. Consultations with PTES staff and regional SCNPs revealed that there is little or no understanding of PCBs and their risks. However, according to a

recent World Bank funded transmission project in Uzbekistan "*A large sample of oil from transformers (around 30) was tested by UE, and no PCB was found*."[48,49] Additional testing of transmission system transformers was undertaken as part of the ADB funded Northwest Region Power Transmission Line Project in January 2020. Testing of the oil did not reveal the presence of PCBs above 0.1 mg/kg in any of the samples. Materials are generally considered to be PCB free if they contain levels below 2 mg/kg.[50]

409. The World Bank report suggests that the PCB findings are in line with the findings from other similar projects in CIS countries (for example in Moldova the conducted full inventory of PCBs that involved all electrical transformers shows only less than 1% of oil is contaminated with PCBs). However, these findings only relate to the transmission system and recent distribution modernization projects in Armenia indicate that PCBs are present in transformer oil, and in some cases in values greater than 50ppm (8 out of 20 transformers tested).[51]

410. In summary, until further testing of transformers is undertaken in the distribution system the presence of PCBs cannot, and should not, be ruled out. Given the status of PCBs as a POP it is important that they are identified and managed appropriately to avoid significant environmental and health incidents.

411. Further, the decision on the Program DSEI prepared by the SCNP (6th June, 2017) states that PCBs could be present in the distribution system and that a plan for identifying PCBs should be prepared as part of the next stage of SEE (SEI) for all regional activities.

Operational Phase

412. None identified that are specifically generated by the project.

Impact summary and assessment of significance

413. Table 42 provides an assessment of the significance of potential waste management impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

[48] Modernization and Upgrade of Transmission Substations, Uzbekistan. Environmental and Social Management Framework. World Bank, 2015.
[49] Combined Project Information Documents / Integrated Safeguards Data Sheet (PID/ISDS). Appraisal Stage. World Bank, 2016.
[50] Identifying and managing equipment containing polychlorinated biphenyls (PCBs). Department of Environment and Science. Queensland Australia. July 2019.
[51] Armenia: ENA-Modernisation of Distribution Network. EBRD, 2018.

Table 42: Waste Management Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Excavation waste*	*Local community*	*L*	*L*	*L*	*L*	*MIN*	*ST*	*SMALL*	*LOW*	*DEF*	***L***
C	*General Construction Waste*	*Local community*	*L*	*L*	*L*	*L*	*MIN*	*ST*	*SMALL*	*LOW*	*DEF*	***L***
C	*Removal of old poles and wires*	*Local community*	*L*	*L*	*L*	*L*	*MIN*	*ST*	*SMALL*	*LOW*	*DEF*	***L***
C	*Removal and Disposal of Transformers*	*Local community*	*L*	*L*	*L*	*L*	*MIN*	*ST*	*INTER*	*LOW*	*DEF*	***L***
C	*Disposal of PCBs*	*Local community*	*L*	*H*	*L*	*L*	*MOD*	*ST*	*INTER*	*MED*	*POS*	***M***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Construction Phase

414. Management Planning – REN, as part of his **Specific Environmental Management Plan** (SEMP) will prepare a **Waste Management Plan** (C-SEMP-02) which will be implemented by the PTES and their subcontractors for the construction phase of the project. The plan will include measures to limit impacts of waste during the construction phase of the project. This recommendation is in line with the decision made in the Program DSEI (6th June 2017) by the SCNP recommending that a plan should be development for waste management and that all collecting, and disposal of waste shall be undertaken by licensed companies.

415. The plan shall include the following items listed below.

A) General Measures

- To ensure waste management is adequately controlled during the construction phase of the Project, PTES and their Sub-contractors will be responsible for ensuring that the waste hierarchy is followed including prevention, minimization, reuse and recycling (C-WA-01).
- The impact of waste generation on environment during construction will be mitigated by proper storage, maximum reuse and recycling of waste and timely removal of unusable waste to agreed location according to national waste management regulations (C-WA-02).
- REN and PTES have an obligation to provide regular training of staff in waste management issues (C-WA-03).

B) Recycling

- All recyclable waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling where facilities for recycling of these materials exist (C-WA-04).

C) Domestic and Inert Waste

- No domestic waste shall be left at work sites, it shall be collected and returned to PTES facilities for disposal (C-WA-05).
- Ensure that wastes are not haphazardly dumped within the work sites and adjacent areas (C-WA-06).

D) Hazardous Waste

- At worksites where hazardous waste is generated PTES and its Subcontractors will ensure compliance with the following safety measures:
  - Use containers suitable for each type of waste (C-WA-07);
  - Mark containers adequately specifying the waste types (C-WA-08);
  - Do not mix various waste streams (C-WA-09).
- Remove waste at the completion of the work day and return it for storage at the appropriate PTES facility before final disposal via a state licensed contractor for hazardous waste removal and keep agreements with hazardous waste management company's active (C-WA-10).

E) Contaminated Soil

- Any areas of oil leaks beneath transformers will be excavated, stored in labelled metal drums and returned to PTES facilities for storage (C-WA-11).
- The labelled containers will include a reference number which correlates with the removed transformer which will be tested for PCBs at the PTES warehouse according to the procedures outlined below for PCBs (C-WA-12). If the PCB tests indicate that the transformer oil is contaminated, the container containing the soils will be labelled as PCB waste (C-WA-13). The waste will be managed according to the PCB Safe Management Procedures included as **Appendix D** (C-WA-14). If the results of the tests are negative for PCBs the soils will be collected for disposal as hazardous waste by a state licensed waste management company (C-WA-15).

F) Excavation Waste

- Soils from trenches and pole sites will be stored adjacent to the work sites and replaced in the trenches once work is completed (C-SO-02). The trench will be compacted, and the surface reinstated to its former condition, e.g. with topsoil, pavement, etc., (C-SO-03). Any additional spoil material will be removed from the site and sent to an appropriate state licensed waste management facility (C-WA-16).

G) Old Poles and Wires

- Poles shall be removed and returned to PTES warehouses for storage prior to their final disposal by a state licensed waste management company, or for recycling / re-use (C-WA-17).
- Overhead cables shall be returned to PTES warehouses for storage prior to their collection for recycling / re-use (C-WA-18).

H) Removal of Transformers

- Transformers shall be removed from site and returned to PTES facilities for re-use, recycling or disposal by state licensed waste management companies (C-WA-19).

- Oily rags used to clean the transformers and cellulose paper shall be disposed of as hazardous waste (C-WA-20).
- Burning of waste materials, including cellulose paper, shall be strictly prohibited both at work sites and PTES facilities (C-WA-21).

416. Transformer Oil and PCBs – The following procedures shall be followed to identify and ensure safe management of PCBs:

- Waste oil from transformers shall be tested according to the Guidelines for the Identification of Polychlorinated Biphenyls, **Appendix C** (C-WA-22).
- If PCBs are found in the oil, PTES shall follow the procedures outlined in the Framework Plan for the Safe Management of PCBs, **Appendix D** (C-WA-23).

Operational Phase

417. Although the project itself is not anticipated to generate operational phase impacts it is recommended that during this phase REN and PTES should continue to follow the waste management measures specified above, specifically those procedures relating to PCBs (O-WA-01).

Residual Impacts

Table 43: Waste Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Excavation waste*	***Low***	*Excavation waste impacts are anticipated to be low and no significant residual impacts are anticipated.*	***Not significant***
C	*General Construction Waste*	***Low***	*Volumes of construction waste will be relatively small and will be managed according to national waste management regulations.*	***Not significant***
C	*Removal of old poles and wires*	***Low***	*No significant impacts are anticipated from this activity.*	***Not significant***
C	*Removal and Disposal of Transformers*	***Low***	*Waste transformers will be re-used, recycled, or disposed of according to national waste management procedures. No significant residual impacts are therefore anticipated.*	***Not significant***
C	*Disposal of PCBs*	***Medium***	*Although the evidence suggests that PCBs may not be present in the distribution system in Uzbekistan, the potential does exist. The measures included in this IEE to undertake PCB testing and the procedures for management of any identified PCB containing oils will reduce the potential for significant impacts to occur, but ultimately Uzbekistan is still lacking adequate facilities for the treatment and disposal of PCB containing oils and therefore, despite the measures to store these wastes safely, the residual impacts will be low until such*	***Low***

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
			facilities are developed, or agreements can be made with an country that is capable of managing this waste.	

8.4.4. Noise and Vibration

418. This section discusses the impacts of noise and vibration during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate noise and vibration

419. The following planned project activities could generate noise and vibrations in the project area:

- Minor excavation works where the poles are inserted into the ground.
- Excavation of trenches for below ground distribution lines.
- Vehicle movements around work sites.

Sensitive Receptors

420. The main sensitive receptors are residential properties close to the areas where construction or rehabilitation of distribution lines (above and below ground) and installation / rehabilitation of transformers will occur (e.g. within 20 meters).

Potential Impacts

Construction Phase

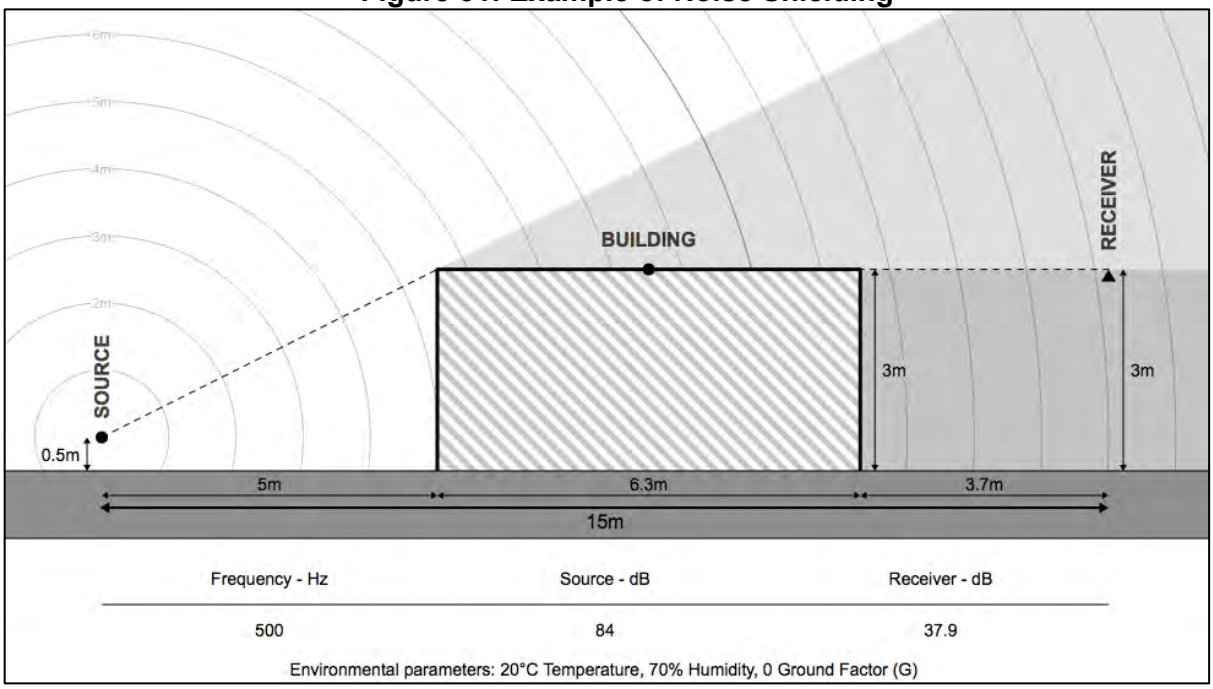
421. Project activities are planned in both urban centers, such as Jizzak city and rural settlements. The following tables illustrates noise levels over a typical day for pole excavation and for trench excavation.

Figure 30: Typical Noise Levels from Pole and Line Construction

Equipment	15m	50m	100m	250m	500m
Auger Drill	84	74	70	62	55
Bob Cat Excavator	64	54	46	38	32
Cumulative	84	74	70	62	55

422. Assuming that each piece of equipment is operating for maximum of 20% of the day (2 hours in an 10 hour day) the noise level at 50 meters (based on a simplified method of noise calculation based on BS 5228-1:2009) would be 61 dBA $L_{aeq,\ 10\ hour}$, 55 dBA $L_{aeq,\ 10\ hour}$ at 100m and 51 dBA $L_{aeq,\ 10\ hour}$ at 150m (including an additional 3 dBA for façade correction). However, these figures do not take into account the shielding effects from any nearby properties. Placing a solid 3m structure (e.g. a house) 5m from the source of the noise would provide a noise barrier to properties behind the first house which could see noise levels reduce to less than 40 dBA. The following figure illustrates this situation.

Figure 31: Example of Noise Shielding



Source: Mas Environmental, 2020

Figure 32: Typical Noise Levels from Trench Construction

Equipment	15m	50m	100m	250m	500m
Backhoe	78	68	62	54	48
Compactor	83	73	67	59	53
Excavator	81	71	65	57	51
Cumulative	86	76	70	62	56

423. Assuming that each piece of equipment is operating for maximum of 50% of the day (5 hours in an 10 hour day) the noise level at 50 meters would be 65 dBA $L_{aeq,\ 10\ hour}$, 59 dBA $L_{aeq,\ 10\ hour}$ at 100m and 55 dBA $L_{aeq,\ 10\ hour}$ at 150m. Taking shielding into account as shown above, the noise levels would reduce to below 40 dBA for properties behind the first line.

424. The data provided above indicates that the construction phase noise would be above IFC daytime limits for noise those front-line properties within 100m of construction works. In these areas these properties are likely to suffer short term noise nuisance for a few hours over a period of one or two days. For properties further than 150m from the work zones and set back behind other properties (note all Year 1 Project areas visited are flat), the noise levels are likely to be below IFC daytime guideline standards for noise.

425. Low levels of vibration could be induced by excavation works, but not at a level anticipated to cause cosmetic damage to buildings.

Operational Phase

426. No significant noise impacts in the operational phase are anticipated.

Impact summary and assessment of significance

427. Table 44 provides an assessment of the significance of potential noise and vibration impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 44: Noise and Vibration Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*General construction noise*	*Local community*	*L*	*L*	*L*	*M*	*MIN*	*ST*	*SMALL*	*LOW*	*DEF*	***L/M***
C	*Construction vibration*	*Surrounding Properties*	*L*	*M*	*L*	*L*	*MIN*	*ST*	*SMALL*	*LOW*	*UN*	***L***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

428. The following general measures to manage noise levels are required.

- Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise emissions (C-NV-01).
- During construction, work will be undertaken in daytime hours only – in accordance with WBG definitions (C-NV-02).
- Driver training will include advice on behaviors to reduce the potential for disturbance, including use of horn, loud radios with windows open, switching engines off when not in use, strictly observing speed limits and not accelerating or braking aggressively (C-NV-03).
- Project induction training will include instructions about minimizing noise disturbance (C-NV-04).
- Local residents will be forewarned of planned activities that are considered by the Project to be noisy (e.g. trench excavation) (C-NV-05).
- If complaints are received from the local population regarding elevated noise levels, temporary noise screens shall be installed around the work site, shielding the identified receptors from the source of noise (C-NV-06). An example of such a screen is shown below.

Figure 33: Mobile Noise Screen

Operational Phase

429. No significant noise or vibration impacts are anticipated.

Residual Impacts

Table 45: Residual Noise and Vibration Impacts

Phase	***Potential Impact***	***Potential Impact Significance***	***Residual Impact***	***Residual Impact Significance***
C	*General construction noise*	***Low / Medium***	*Some elevated noise levels may occur during the construction phase of the Project during the daytime period. This is an unavoidable consequence of the Project given its location in urban settlements. However, noise levels will be short term (lasting 30 minutes to 2 hours in any location). Use of noise screens can reduce noise levels to acceptable standards if complaints from locals are received.*	***Low***
C	*Construction vibration*	***Low***	*No significant vibration impacts are anticipated.*	***Not significant***

8.4.5. Physical Cultural Heritage

430. This section discusses the impacts upon physical cultural heritage (PCR) during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate impacts to PCR

431. The following planned project activities could impact upon cultural heritage in the project area:

- Excavation of trenches for belowground cables.

Sensitive Receptors

432. Both Samarkand and Bukhara are areas of national historical and cultural importance which is illustrated by portions of both cities being listed as UNESCO World Heritage Sites. However, no Year 1 activity site visited are planned in these sites. However, numerous physical cultural heritage sites exist in all three Project regions and it is possible that activities planned under the additional 1,800 Year 1 sites and in future investment years could be within the UNESCO sites or close to other PCR.

Potential Impacts

433. Project works mainly involve the rehabilitation and replacement of distribution lines and transformers. These like-for-like replacements are unlikely to have significant impacts on PCR. There is a trend for tourist areas to move pole-mounted distribution lines below ground, and examples of this were noted in Bukhara.

434. There may be cases where program activities are required within the core buffer zones of the UNESCO sites in Samarkand and Bukhara. Works in these core zones, primarily excavation of trenches for distribution lines, could disturb the sensitive cultural heritage in these areas.

435. Consultation with the Regional Inspection for the Protection of Cultural Heritage in Bukhara stated that there are procedures for working in these areas, which are duly followed by PTES. If the Regional Inspection require it, supervisors from the department will be sent to monitor works, such as excavation of trenches. The representative of the Regional Inspection department did however note that it was unlikely that PCR would be found in trenches close to roads (where most of these types of activities would be undertaken).

436. It is possible that unanticipated discoveries of PCR could occur during the excavation of trenches outside of the designated UNESCO sites.

Impact summary and assessment of significance

437. Table 46 provides an assessment of the significance of potential impacts to PCR before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 46: PCR Potential Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Loss/disturbance of previously unknown PCR*	*Unknown PCR*	*L*	*H*	*L*	*L*	*M*	*ST*	*SMALL*	*MOD*	*UN*	***L***
C	*Disturbance of known PCR*	*Known PCR*	*L*	*H*	*M*	*L*	*M*	*ST*	*SMALL*	*MOD*	*UN*	***L***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Pre-construction / Construction Phase

438. The regulations to protect the core cultural heritage zones of Bukhara and Samarkand are considered to be compliant with ADB Safeguard Principle 11 for PCR. [52] It is unlikely that any other works outside of these core areas will significantly impact upon PCR as it is unlikely below-ground distribution lines will be constructed outside of these areas. Nonetheless, a chance find procedure shall be required and followed as part of the impact management measures (C-PCR-01). A sample Chance Find procedure is included as **Appendix E** to this IEE. Further, as part of the EAS process for future sub-activities, consultation shall be undertaken with the Provincial Department for Cultural Heritage Protection if sites are located in or close to PCR sites (including UNESCO sites).

439. In addition, PCR training shall be provided to PTES Environmental Focal Points in PCR management, which will include input from the Head of the Bukhara Province Department for Cultural Heritage Protection (C-PCR-02)

Operational Phase

440. None anticipated.

[52] Principle 11 - Conserve physical cultural resources (PCRs) and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.

Residual Impacts

Table 47: Residual PCR Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Loss/disturbance of previously unknown PCR*	***Low***	*None anticipated if the proposed Chance Find Procedures are followed.*	***Not significant***
C	*Disturbance of known PCR*	***Low***	*National procedures for PCR protection are considered appropriate for the Project. No residual impacts are anticipated.*	***Not significant***

8.4.6. Utilities and Infrastructure

441. This section discusses the impacts of the project on utilities and infrastructure during construction and operation of the project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to cause impacts to Utilities and Infrastructure

- Undertake earth-moving/excavation works that may inadvertently damage existing infrastructure.
- Removal of existing overhead lines and transformers, i.e. existing power supply.

442. Volumes of construction traffic will be minor and are not considered to represent an impact to the existing road network, however, works may result in temporary road closures or temporary impacts to access.

Key Sensitivities

443. The local population are considered to be the key sensitive receptors that could be affected by the construction works in terms of supply of electricity and other services, e.g. water supply and gas as well as temporary access impacts.

Potential Impacts

Construction Phase

444. The main potential impacts during construction are as follows:
- Temporary loss or reduction in utility supply to consumers. However, temporary loss of electricity will be for a short period of time.
- Temporary Road closures and temporary loss of access to property and businesses. Again, such impacts will be short term.

Impact summary and assessment of significance

445. Table 48 provides an assessment of the significance of potential impacts to utilities and infrastructure before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 48: Potential Impacts to Utilities and Infrastructure

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Temporary loss of utilities*	*Local community*	*L*	*L*	*L*	*-*	*L*	*LF*	*SMALL*	*L*	*POS*	***L***
C	*Road closures, and limitations to access*	*Local community*	*L*	*L*	*L*	*-*	*L*	*LF*	*SMALL*	*L*	*POS*	***L***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Pre-Construction / Construction Phase

446. PTES and its Sub-contractors will:

- Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 72 hours before the disruptions (C-IU-01);
- Allow for adequate traffic flow around construction areas via diversions or temporary access roads (C-IU-02);
- Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control (C-IU-03); and
- The authorities will be notified when oversize heavy loads need to be transported and the loads will be escorted by the Project (C-IU-04).

447. Regarding utilities, the local community will be informed at least 72 hours before any planned disruptions (C-IU-05).

Residual Impacts

Table 49: Utilities and Infrastructure Residual Impacts

Phase	***Potential Impact***	***Potential Impact Significance***	***Residual Impact***	***Residual Impact Significance***
C	*Temporary loss of utilities*	***Low***	*No significant impacts have been identified. Notification of disruptions and*	***Not significant***

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Road closures, and limitations to access	**Low**	management of traffic will further ensure that no significant impacts arise.	**Not significant**

8.4.7. Occupational Health and Safety

448. This section discusses the occupational health and safety issues during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to cause OHS issues

449. The main project-related activities that may result in OHS issues are:
- Accidents involving the use of heavy equipment.
- Accidents involving working at height.
- Accidents involving live power lines.
- Accidents involving construction vehicles.
- Accidents due to lack of, or poor application of, personal protective equipment (PPE).
- Lack of first aid and medical facilities.

450. As noted in previous sections, maximum EMF levels are anticipated to be below the limit for public exposure. Therefore, no occupational exposure assessment is required and no further actions relating to EMF warranted.

Potential Impacts

451. The majority of workers engaged on the Project will be PTES staff and its Sub-contractors.

452. Construction activities will involve the operation of heavy equipment and trucks, working at height, construction traffic, use of electric devices, handling of hazardous materials and other hazardous activities. Due to the nature of the activities being undertaken during construction, OHS is a key risk with the potential for accidents that may result in injuries and fatalities as well as lost man-hours.

453. A limited assessment of the current occupational health and safety situation at REN on a regional level was undertaken as part of this IEE (see Section 5.9 Occupational Health and Safety). The key issues identified in the assessment appear to be workers not following set OHS procedures and also issues regarding falling from heights. The average length of work experience does not suggest that the workers were inexperienced for their jobs. Looking at the data provided by REN it would appear that workers need either better supervision or training and perhaps better equipment for working at height.

454. Regarding infectious disease and specifically COVID-19, the GOU have created a Special Republican Commission on preparation of the Program of measures to prevent the introduction and spread of coronavirus in the Republic of Uzbekistan (Commission) in accordance with ORDER President of Uzbekistan (On the formation of a special republican commission to prepare a program of measures to prevent the import and spread of a new type of coronavirus in the Republic of Uzbekistan dated January 29, 2020, № P-5537).

Impact summary and assessment of significance

455. Table 50 provides an assessment of the significance of potential OHS impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 50: Potential Workers Rights and OHS Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Accidents involving workers*	*PTES staff / sub-contractors*	*M*	*H*	*M*	*M*	*MOD*	*ST*	*SMALL*	*MED*	*POSS*	***M***
O	*Accidents involving workers*	*PTES Staff*	*M*	*H*	*M*	*M*	*MOD*	*LF*	*SMALL*	*MED*	*POSS*	***M***
C/O	*Exposure to EMF*	*PTES Staff*	*L*	*L*	*L*	*L*	*LOW*	*LT*	*SMALL*	*LOW*	*UN*	***L***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

456. All project works will be completed by PTES or their subcontractors. PTES undertakes the types of works planned under the project on a daily basis as part of their general operational activities and strictly follows Uzbek OHS legislation and internal REN OHS procedures.

457. The initial review of REN OHS undertaken as part of this IEE has indicated that accident and fatality rates are however quite high and also that staff require better PPE, supervision and training. However, this IEE does not present a detailed assessment of the occupational health and safety aspects of REN and the PTES, and it is therefore recommended that this topic is investigated further and in more detail by ADB to gain a comprehensive understanding of the OHS risks that currently exist in REN and PTES so that an action plan can be devised to ensure that accident numbers, and particularly fatalities, are reduced and ultimately all fatalities eliminated (Corrective Action Plan Requirement).

458. The assessment should be undertaken by an International OHS specialist with a background in occupational health safety in the electricity transmission and distribution sector. The purpose of the assessment should be:

- Review all work-related accidents (incl. the so-called “near-misses” and all fatalities) from the past three years (at level of REN and/or its subcontractors) and confirm the root causes were sufficiently identified and adequate remedial actions (both physical and organisational) have been implemented to prevent reoccurrence;

- Review isolation procedure to confirm adequate physical and organisational measures are included for all maintenance work to prevent contact with electrical conductors. This should also identify what verification is carried out to confirm energy has been isolated by the work party and any independent person from the work party;
- Review risk assessment for maintenance work on electrical conductors and confirm hazards have been identified, risks have been sufficiently evaluated and control measures are adequate to control risk to a tolerable level;
- Review the number, type and condition of PPE to ensure that it is adequate for the specific jobs, specifically equipment used for working at height;
- Review REN OHS training programs for workers (including induction programs) to ensure that they are consistent with international best practice.
- Prepare an action plan that can be implemented by REN and their subcontractors to address any key flaws identified during the assessment
- Provide a training program to REN relating to the implementation of the action plan.

459. The assessment should also be combined with a review of community health and safety, more of which is outlined in the section below.

460. These activities must be undertaken before any Year One construction works commence as noted in the Corrective Action Plan.

Construction Phase

461. In addition to any recommendations made on the OHS Action Plan, PTES shall ensure that the OHS measures for installing pad-mounted and pole-mounted transformers (**Appendix A** and **Appendix B**) are strictly followed (C-OHS-01).

462. Subcontractors – All Project sub-contractors will be supplied with copies of the SEMP (C-OHS-02). Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting (C-OHS-03). All subcontractors will be required to appoint a OHS representative who will be available on each work site (C-OHS-04).

463. Fatalities – REN shall, in the event of any fatality occurring during the construction phase at any Project work site, provide ADB with the details of the fatality within one week of the event occurring in a Fatality Report (see **Appendix F** for a sample report) (C-OHS-05).

464. Worker Grievances – REN shall establish a formal companywide Grievance Mechanism for its workers (C-OHS-06).

465. Infectious Disease – The EPC Contractor will follow the guidelines set by the Special Republic Commission and also follow official information Of the Agency for sanitary and epidemiological welfare under the Ministry of health of the Republic of Uzbekistan (C-OHS-32). [53] The EPC Contractor will be responsible for strictly implementing the GoU guidelines on these matters and will provide all necessary PPE and suitable accommodation and medical facilities to ensure that workers are protected according to the guidelines (C-OHS-33). As part of worker induction, all staff will be given training relating to these guidelines and the use of prescribed PPE

[53] There is a special website of the Ministry of Health of the Republic of Uzbekistan https://coronavirus.uz/ru and in the telegram channel @koronavirusinfouz. In addition, there is a CALL CENTER 1003 for Medical Issues, regarding with Coronavirus infection.

(C-OHS-34). The PICs Health and Safety Team will undertake regular inspections of work sites and camps to ensure that the guidelines are being followed.

Operational Phase

466. Occupational health and safety will be managed according to national regulations during the operational phase and also taking into account the findings of the afore mentioned OHS assessment.

Residual Impacts

Table 51: OHS Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Accidents involving workers*	***Medium***	*Until the OHS assessment is undertaken and specific measures are put in place to better manage OHS and reduce the potential risk for accidents and fatalities to occur, the residual risks remain medium.*	***Medium***
O	*Accidents involving workers*	***Medium***		***Medium***

8.4.8. Community Health and Safety

467. This section discusses the impacts of the Project on community health and safety during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to cause impacts to community health and safety

- Construction of network components, specifically electrical components.
- Operation of live electrical equipment.

468. As noted in previous sections, maximum EMF levels are anticipated to be below the limit for public exposure.

Key Sensitivities

469. The local community, and particularly those living adjacent to network equipment, are sensitive to the aspects outlined above. People working around the vicinity of OHLs and underground cables are also at risk, as are the drivers of trucks. [54]

Potential Impacts

470. No data on community accidents and fatalities associated with the distribution system in Uzbekistan have been provided by REN. However, in the UK on average, 20 people are killed and 400 people are injured as a result of coming into contact (or close proximity) with electricity

[54] Data from the UK Health & Safety Executive shows that one in four of accidents and fatalities in the distribution network (26%) will involve a lorry driver, making construction and road haulage workers at extreme risk of fatal injury in the workplace.

overhead lines and underground cables and therefore it is safe to assume that at least similar accident and fatality rates exist in Uzbekistan. [55]

Construction Phase

471. If access to work sites is not adequately controlled members of the public could encroach into these areas where the risk of electric shocks is potentially high. Electric shocks could result in significant injury, or fatality.

Operational Phase

472. A range of potential impacts exist during the operational phase. They are however, generic and associated with all of the distribution network, and not only those being rehabilitated or constructed as part of the Project. They include:

- Electric shocks from touching live equipment. This could be, for example, children climbing a pole to fetch something stuck in the equipment, e.g. a kite, or a child entering an unlocked pad-mounted transformer to retrieve a ball.
- Electric shocks from touching live OHL, e.g. by a fishing rod, a ladder, etc.
- Electric shocks from working around OHL and below ground cables, e.g. an overloaded truck could touch a live OHL, or an excavator could dig up a live cable.

Impact summary and assessment of significance

473. Table 52 provides an assessment of the significance of potential impacts to community health and safety before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Table 52: Potential Community Health and Safety Impacts

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C	*Accidents at work sites*	*Local community*	*L*	*M*	*L*	*-*	*MOD*	*ST*	*SMALL*	*LOW*	*POSS*	***L***
O	*Accidents at Project sites*	*Local community*	*L*	*M*	*L*	*-*	*MOD*	*LT*	*SMALL*	*MED*	*POSS*	***L/M***

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

[55] Avoidance of Danger from Electricity Overhead Lines and Underground Cables. Western Power Distribution. 2014.

474. It is recommended that the International OHS Specialist also undertakes a further assessment of community health and safety risks to determine if PTES procedures relating to community health and safety are in line with international best practice (Corrective Action). The recommendations of the assessment will be implemented during the operational phase of the Project.

Construction and Operational Phase

475. REN will implement the Grievance Procedure provided in Section 9.4 Grievance Redress Mechanism, to provide opportunity for local residents to raise concerns (C-CHS-01). In addition, complaints can also be handled through PTES telephone hotlines.

476. PTES will ensure that all Project infrastructure are constructed in accordance with national safety codes and safety zones (C-CHS-02). All Project infrastructure will be labeled / signposted in accordance with national regulations to inform the public of the specific safety risks of each item (C-CHS-03). All new pad-mounted transformers must be locked during operation with access only available to PTES (C-CHS-04).

477. All work sites will be appropriately signposted and isolated (through fencing or bunting) to prevent encroachment into these areas (C-CHS-05).

478. PTES will provide 72 hours advance notice of any works (not including emergency works) to the local community (C-CHS-06).

479. PTES shall prepare a Project Safety Awareness leaflet to be distributed to all homes within the vicinity of the work sites. The leaflets shall provide information relating to the risks of interfering with the distribution network. The leaflets will be written in non-technical language and will provide illustrations where practical (C-CHS-07). An example of a leaflet can be found in **Appendix G**. PTES will keep a record of the number of leaflets distributed and their locations (C-CHS-08).

480. Finally, as with OHS above, REN will keep a specific record of any community accidents that occur during the construction phase. REN should report the numbers (even if they are zero) to ADB on a monthly basis (C-CHS-09).

Residual Impacts

Table 53: Community Health and Safety Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	*Accidents at work sites*	***Low***	*It is considered unlikely that local community members would encroach into works sites in general due to the short term nature of project works and the continuous presence of workers there. Fencing sites and providing warning signs along with advance notice of works should ensure that no residual impacts occur.*	***Not significant***
O	*Accidents at Project sites*	***Low / Medium***	*Constructing equipment in line with national safety codes and implementing*	***Low***

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
			any recommended best practice procedures along with safety awareness campaigns, should limit the risk of accidents occurring. However, members of the public are still likely to do random things which lead to occasional accidents. This issue affects the distribution network as a whole and is not a result of any specific failure of the Project itself, but residual impacts remain low as accidents cannot be entirely ruled out (as seen in the UK).	

8.5. Cumulative, Transboundary and Induced Impacts

8.5.1. Cumulative Impacts

481. No other infrastructure projects have been identified close to Year 1 Project sites visited that may result in significant cumulative impacts, e.g. the rehabilitation of the road network in the Project area, development of large scale industrial or residential facilities, etc. Given the nature of the works it is also considered unlikely that any activities undertaken in future investment years would contribute to significant cumulative impacts.

8.5.2. Transboundary Impacts

482. No specific activities have been identified that could result in significant transboundary impacts. Either in Year 1, or in subsequent investment years.

8.5.3. Induced Impacts

483. Upgrading of the distribution system, especially extending the coverage of the network, may lead to some localized residential, and possibly light-industrial/commercial expansion in residential settlements. This is considered more likely in the small villages where upgrades are planned rather than in the city centers, such as Jizzak. The networks in these areas may be upgraded and expanded by one or two kilometers which is not anticipated to lead to levels of development in these areas which would result in significant induced impacts, for example in the form of pressure on local health care systems, or other social infrastructure.

9. Stakeholder Engagement, Information Disclosure and Grievance Mechanism

9.1. Public Consultation Requirements

484. According to the ADB Safeguard Policy Statement (2009):
"*The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:*

(i) Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;
(ii) Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;
(iii) Is undertaken in an atmosphere free of intimidation or coercion;
(iv) Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and
(v) Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report."

9.2. Stakeholder Engagement Activities

9.2.1. General Principles

485. Stakeholder engagement has been undertaken throughout the development of the project, with the view to determining and responding to the views of interested and parties potentially affected by the project throughout the life of the project, and ensure open and transparent communication between REN, PTES and stakeholders. The approach to engagement seeks to meet both national and international requirements.

486. The following general principles will govern stakeholder engagement activities:

- The content of documents for public comment will provide accessible and adequate information on the project, and not create undue fears (regarding potential negative impacts) or expectations (regarding potential positive impacts such as job creation, etc.);
- The information will be disclosed in the local language(s) where needed and in a manner that is accessible and culturally appropriate, taking into account any vulnerable people; and
- Efforts will be made to explain not only the proposed project and IEE process, but also applicable national laws and legislations, international principles and standards and how REN and PTES will address compliance.

9.2.2. Stakeholder Engagement Undertaken to Date

487. From the 25th April to the 6th March 2020 ten formal stakeholder engagement events have been held in addition to a number of informal discussions with members of the local community during site visits. The events were organized by REN with support from ADB.

488. These events collected environmental and social feedback for the project and discussed the draft findings of the IEE report and gathered feedback to refine the IEE before its finalization and final disclosure.

Table 54: Summary of Formal Stakeholder Engagement Events (April 2019–June 2019)

#	Event type and topic	Date	Location	Stakeholder group	No. of Participants
1	Project Feasibility Study and Environmental Issues	26 April 2019	Uzbekenergo Design Institute	Uzbekenergo Design Institute	6
2	Environmental Issues, PCBs, etc.	29 April 2019	Head Office of Jizzak PTES	Jizzak PTES	11
3	Environmental Issues, PCBs, etc.	29 April 2019	Head Office of Samarkand PTES	Samarkand PTES	8
4	Environmental Issues, PCBs.	29 April 2019	Head Office of Samarkand PTES	Regional Department of the Committee for Nature Protection	4
5	Environmental Issues, PCBs, etc.	30 April 2019	Head Office of Bukhara PTES	Bukhara PTES	9
6	Cultural Heritage	30 April 2019	Head Office of Bukhara PTES	Head of the Bukhara Province Department for Cultural Heritage Protection	4
7	Environmental Issues, PCBs, etc.	30 April 2019	Head Office of Bukhara PTES	Expert, Bukhara Regional Department of the Committee for Nature Protection	4
8	Environmental procedures of Uzbekistan with regards to Distribution projects	12 June 2019	State Committee for Nature Protection, Tashkent	State Committee for Nature Protection	5

Table 55: Summary of Informal Stakeholder Engagement Events (February 2020)

#	Event type and topic	Date	Location	Stakeholder group	No. of Participants
1	Focus Group Discussion	24 February 2020	Bobkent, Bukhara	Local community	5
2	Focus Group Discussion	24 February 2020	Chukar, Bukhara	Local community	4
3	Focus Group Discussion	24 February 2020	Chukurak, Bukhara	Local community	4
4	Focus Group Discussion	25 February	Bunedkor, Jizzak	Local community	2

489. The following table summarizes the key findings of the meetings**. Appendix H** provides a full description of the meetings, including list of attendees and photos of the event.

Table 56: Summary of Consultation Key Findings

#	Stakeholder	Comment	Where Addressed in the IEE
1	Design Institute	The Design Institute stated that there are no specific environmental management measures or codes for the types of small-scale works planned under the program—e.g., the requirement for transformers to have bunding, or secondary containment to capture spills and leaks of oils. As such, none have been included in the FS.	Specific measures have been included in the IEE to account for the management of oil leaks and spills from transformers (**Appendix A** and **Appendix B**).
2	Design Institute	Security zones exist for all project components. Where practical, these zones are implemented; but, in some cases (e.g., construction of distribution lines in dense urban areas), this is not always practical.	The Project will follow all national safety codes and design standards as specified in **Section 3.7**.
3	Design Institute	All project activities will be designed in accordance with Uzbek Health and Safety codes. The Design Institute provided the specifications of pole-mounted transformers showing that the minimum height above ground levels for the transformers was 3.0 meters.	The Project will follow all national safety codes and design standards as specified in **Section 3.7**.
4	Jizzak PTES	According to the representatives of Jizzak PTES, there is no testing, nor no previous testing, of PCBs in transformer oil. There was no knowledge within the PTES of PCBs or their hazards.	A program for the identification and management of PCBs is proposed in **Section 7.5.3** and in **Appendix C** and **Appendix D**.
5	Jizzak PTES	During transformer maintenance, oil is routinely removed from transformers in the central maintenance facility in Jizzak. The oil is treated and tested before it is reused in the repaired transformers. Oil that is no longer suitable for reuse after treatment is stored at the maintenance facility before it is removed by a state approved contractor.	Waste management procedures follow national regulations. Testing the integrity of waste oil storage facilities is recommended in as part of the **Corrective Action Plan.**
7	Jizzak PTES	Jizzak PTES do use air cooled 'dry transformers' in some locations. This has several benefits, including (i) reduced fire risk, (ii) lower noise levels, and (iii) the elimination of the need for cooling oil. However, it was noted that these transformer types are more difficult to maintain.	As discussed in **Section 4.5.4**, the decision to use dry transformers will be made on a case by case basis by PTESs depending on a range of economic and technical factors.
8	Jizzak PTES	According to Jizzak PTES, SF_6 is not used in the 10-kilovolt (kV) system. Vacuum switchers are used for 10 kV and below, with SF_6 only being used in switchgear for systems above 35 kV.	No specific requirements are needed for the management of SF_6.
9	Jizzak PTES	There is no environmental engineer within the company's staff. A Department of Health, Safety and Supervision works under the Chief Engineer. The department comprises engineers responsible for health and safety, fire safety, and operational activities.	A training program for the PTES is proposed as part of Section 9.5.1. The training program will provide education for the PTES safeguard Focal Points in environmental management.
10	Jizzak PTES	No environmental training is provided to staff. However, a range of health and safety training is provided, including (i) health and safety training once every 3 months to all staff working in areas of health and safety risks, (ii) fire safety training once every 6 months, and (iii) health and safety induction training for all new staff.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. In addition, a training program for the PTES is proposed as part of Section 9.5.1. The training program will provide education for the PTES safeguard Focal Points in environmental management.

#	Stakeholder	Comment	Where Addressed in the IEE
12	Jizzak PTES	Jizzak PTES do have set requirements and standards to follow for the use of personal protective equipment (PPE). However, some staff did note that the amount or availability of PPE was not always sufficient.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. This will included a review of PPE and an action plan for any non-compliances or additional requirements to ensure best international practice is met.
13	Jizzak PTES	Jizzak PTES keep records of accidents and incidents, including those involving local community; although, no specific documents were made available for review.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. The review will include a review of all accidents and incidents during the last three years.
14	Jizzak PTES	Most complaints from the local community relate to power outages. In the event of a planned power outage, large companies and heads of *makhallas* (communities) are informed in advance. According to Jizzak PTES, there are no complaints regarding noise from old transformers.	The Project will help limit the amount of power outages in the selected Project sites.
15	Jizzak PTES	Jizzak PTES has a telephone hotline for complaints; although, there is no formal grievance redress mechanism (GRM).	The Project will continue to follow this procedure as well as adopting the GRM outlined in **Section 8.4**.
16	Samarkand PTES	Samarkand PTES has an “environmental focal point” who sits in the PTES Production and Technical Department and provides quarterly reports on air emissions, waste (including oils), and water. These reports are sent to the SCNP.	A training program for the PTES is proposed as part of **Section 9.5.1**. The training program will provide education for the PTES safeguard Focal Points in environmental and social management matters.
17	Samarkand PTES	If tree trimming or cutting is required on government land, Samarkand PTES coordinates with the Regional Department of the Committee for Nature Protection who will make an assessment of the tree types and numbers affected, and informs the company of the fee required for any tree cutting. The company undertakes the tree cutting once permission is received from the Regional Department of the Committee for Nature Protection.	PTES shall continue to follow these national procedures for compensation as well as the requirements in this IEE for replanting of tree cut as outlined in **Section 7.3.1**.
18	Samarkand PTES	No herbicides or pesticides are used.	No further requirements needed in the IEE.
19	Samarkand PTES	Samarkand PTES has a log book of all community accidents. According to the PTES, accidents involving the local community are rare, but do happen.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. The review will include a review of all accidents and incidents during the last three

#	Stakeholder	Comment	Where Addressed in the IEE
			years and an action plan prepared to help reduce the number of accidents occurring.
20	Samarkand PTES	Local companies and heads of *makhallas* are informed in advance of any planned power outages or localized works. All transformers have a sticker with the complaint's hotline attached. However, there is no specific GRM for workers.	A workers grievance mechanism is required per **Section 7.5.7**. Requirements for notification of planned power outages and site works are included in **Section 7.5.6.**
21	Samarkand PTES	According to the Samarkand PTES, the main health and safety issues involve working at heights. They noted that the Samarkand PTES only has one crane lift (cherry picker) and often works are performed on ladders which are not suitable for these activities.	Accidents involving working at height are also noted in the accident reports provided to ADB by PTES (**Section 5.9**). This issue will be further investigated as part of the detailed OHS assessment (**Section 7.5.7) (**and forms part of the **Corrective Action Plan)**, and action plans prepared to ensure that adequate equipment and PPE is provided for workers.
22	Samarkand PTES	The Samarkand PTES Health and Safety Department keeps a log of all staff accidents and investigates the causes of all accidents.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. The review will include a review of all accidents and incidents during the last three years.
23	Samarkand PTES	According to the Samarkand PTES, there is a general lack of suitable first aid boxes and harnesses available at work sites.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. The review will include a review of all PPE and first aid equipment used in the PTES and at work sites and make recommendations for any improvements.
24	Samarkand PTES	The engineer in charge of the Samarkand PTES Oil Department had no knowledge of PCBs.	A program for the identification and management of PCBs is proposed in **Section 7.5.3** and in **Appendix C** and **Appendix D**.
25	Samarkand Head of Division, Regional Department of the Committee for Nature Protection	The specialist from the Regional Department of the Committee for Nature Protection recommended that the highest category of ADB ranking available should be applied to the project (i.e., Category B) and that he did not agree with the national Category IV categorization.	No further requirements needed in the IEE.

#	Stakeholder	Comment	Where Addressed in the IEE
26	Samarkand Head of Division, Regional Department of the Committee for Nature Protection	The specialist recommended that soil and groundwater protection should be provided below transformers. However, he did note that there are no specific regulations for this type of activity.	Specific measures have been included in the IEE to account for the management of oil leaks and spills from transformers (**Appendix A** and **Appendix B**).
27	Samarkand Head of Division, Regional Department of the Committee for Nature Protection	The Regional Department of the Committee for Nature Protection specialist did not know what PCBs were and had no knowledge of any measures to manage them.	A program for the identification and management of PCBs is proposed in **Section 7.5.3** and in **Appendix C** and **Appendix D**.
28	Bukhara PTES	During maintenance of transformers, oil is extracted from the transformers and treated before testing in a laboratory. If the oils meet the required technical standards, they are reused; if not, they are sent to a below-ground storage tank where the oil is stored before collection by a state authorized waste management company.	Waste management procedures follow national regulations. Testing the integrity of waste oil storage facilities is recommended in **Section 7.5.3** and forms part of the **Corrective Action Plan.**
29	Bukhara PTES	Bukhara PTES does not use air-cooled transformers due to the high summer temperatures in Bukhara.	No further requirements needed in the IEE.
30	Bukhara PTES	Bukhara PTES has a Department for Complaints and Executive Discipline comprising five staff. Complaints can be made to the department via telephone hotlines, website (via email), and social media. The head of the *makhalla*, who was present at the meeting, confirmed responsibility for the complaints telephone number, and that most of the complaints from locals in the *makhalla* were directed through him. The Department receives approximately 2,000 complaints per year, most of which are related to power cuts. Few complaints relate to environmental issues. According to the department, there are no complaints from the local community regarding safety aspects. Complaints are sent directly to the Bukhara PTES Director for review and then channeled through the Chief Engineer for action.	The Project will continue to follow this procedure as well as adopting the GRM outlined in **Section 8.4**.
32	Bukhara PTES	SF_6 is only used in substation switchgear (not part of the ADB-funded program). There is no specific instruction for the management of SF_6.	No further requirements needed in the IEE.
33	Bukhara PTES	According to the Bukhara PTES, several accidents have been recorded over the last few years involving the local community. All accidents are recorded by the Health and Safety Department.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**.

#	Stakeholder	Comment	Where Addressed in the IEE
			The review will include a review of all accidents and incidents during the last three years and an action plan prepared to help reduce the number of accidents occurring.
34	Bukhara PTES	Bukhara PTES has biannual media campaigns in the newspapers and on TV to raise awareness on electrical safety.	In addition to this program, the IEE recommends Project Safety Awareness leaflets to be distributed (**Section 7.5.8**).
35	Bukhara PTES	The Bukhara PTES Health and Safety Department noted that the quality and quantity of PPE is not adequate—e.g., they need more than 2,000 pairs of protective gloves, but only have less than 1,000. However, they noted that this is not increasing the levels of workplace injuries; instead, workers simply do not do the work until they have the correct PPE.	A detailed assessment of OHS is recommended as outlined in **Section 7.5.7** and forms part of the **Corrective Action Plan**. This will included a review of PPE and an action plan for any non-compliances or additional requirements to ensure best international practice is met.
36	Head of the Bukhara Province Department for Cultural Heritage Protection	The Head of the Bukhara Province Department for Cultural Heritage Protection stated that there are procedures for working in these areas which are duly followed by Bukhara PTES.	No further requirements needed in the IEE.
37	Head of the Bukhara Province Department for Cultural Heritage Protection	If the Department requires it, supervisors from the Department will be sent to monitor works, such as excavation of trenches.	No further requirements needed in the IEE.
38	Head of the Bukhara Province Department for Cultural Heritage Protection	The representative of the Department did however note that it was unlikely that PCR would be found in trenches close to roads (where most of these types of activities would be undertaken).	Although this is noted, a Chance Find Procedure has been included as part of the Project in **Appendix E**.
39	Bobkent Residents	Residents are happy that the project is being planned in their village as electricity voltage varies during the day which they occasionally complain about to the PTES.	No further requirements needed in the IEE.

#	Stakeholder	Comment	Where Addressed in the IEE
		According to the residents consulted there had not been any accidents involving distribution equipment in the village.	
40	Chukar Residents	Residents complained that the village was often without power for between one and two hours every day due to problems with distribution. Accordingly, they were supportive of the Project and did not think that there were any negative aspects of the Project. They also noted that there had not been any accidents involving distribution equipment in the village.	No further requirements needed in the IEE.
41	Chukurak, Residents	Villagers noted that there had not been any accidents involving distribution equipment in the village, however, there were occasional disruptions to household supply. No negative environmental issues were raised.	No further requirements needed in the IEE.
42	Bunedkor, Residents	One resident noted that there was a lack of safety signs on the transformer equipment and that although there had been no accidents in this area, safety awareness in the community could be improved.	**Section 7.5.8** outlines the requirements to follow all national safety standards including the requirements to label equipment with appropriate safety and warning signs.

9.3. On-going Consultation

490. In addition to the already completed consultation, the PIC, as part of the EAS, will undertake consultation with stakeholders at each activity location. The consultations will be informal consisting mainly of face to face interviews with neighbouring land and property owners. The consultation will continue for the full five years of the Project with the findings of the consultations recorded in the EAS. Details of the GRM will be provided during the consultation sessions.

9.4. Information disclosure

491. In compliance with ADB's SPS (2009) the draft IEE will be provided for disclosure on the ADB and REN Website (in local language).

492. With regards to information disclosure, ADB is committed to working with REN to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation.

9.5. Grievance Redress Mechanism

9.5.1. General

493. Grievance Redress Mechanisms (GRMs) are locally based, formalized way to accept, assess, and resolve community feedback or complaints. They provide predictable, transparent, and credible processes to all parties, resulting in outcomes that are relatively low cost, fair, and effective. They build on trust as an integral component and facilitate corrective action and pre-emptive engagement. GRMs also set out a timeframe in the resolution of complaints.[56]

494. The project GRM will serve as a venue for receiving and addressing project-affected peoples' concerns and grievances about environment, socioeconomic, and land acquisition related impacts. It will address concerns promptly through an understandable and transparent process that is accessible to all members of the community, gender responsive and culturally appropriate. The overall approach of the GRM is to deal with grievances at a local level first in an efficient manner and escalate to the next level or higher level of authority if grievance cannot be resolved.

495. The ADB Accountability Mechanism (AM) provides an independent forum and process for people to voice and seek solutions to their problem as well as alleged non-compliance by ADB with its operational policies and procedures. As ADB adheres to early problem prevention and problem-solving, project complaints and concerns should first be addressed promptly and effectively at the project, through the GRM, and operational levels. The AM is the "last resort" process for dealing with problems and compliance issues that were not prevented or solved at GRM and operational levels.

496. The GRM should be established and operated in compliance with the Uzbek Regulations and ADB Policy requirements.

[56] World Bank. 2014. Global Review of Grievance Redress Mechanisms in World Bank Projects. Washington, DC. © World Bank.

497. The ADB's 2009 Safeguards Policy Statement[57] requires the borrower/client to establish a mechanism that will receive and facilitate the resolution of affected persons' concerns and grievances about physical and economic displacement and other Project impacts, paying particular attention to vulnerable groups.

498. Along with the ADB requirements on development of a grievance redress mechanism by the EA, as indicated above, grievance redress procedure in Uzbekistan is also regulated by the national legislation of Republic of Uzbekistan, in particular by the "Law on the order of submission of appeals of physical and legal entities" (#378, 03 December 2014). According to this regulation, the application or complaint shall be considered within fifteen days from the date of receipt in the state authority, which is obliged to resolve the issue on the merits. If an additional study, set of additional/supporting documents or check procedure is needed, the term of complaint's resolving may be extended for up to one month.

9.5.2. Process

499. Based on the experience from other ADB-assisted projects in Uzbekistan and local practices, and also taking into account the complaints mechanisms that already exist in the REN at the regional level (i.e. telephone hotlines), the following grievance resolution process is envisaged under the project.

500. Residents usually approach to the Mahallas and Hokimiyats for issues or complaints. District hokimiyats are obliged by law to address the complaints and concerns of the citizens.

501. The people also can contact directly REN / PTES through telephone hotlines. Therefore, complaints can be received at the offices of all these three actors, registered and forwarded by email to the assigned staff/GRM focal person at REN PMU who shall have a consolidated database of all grievances and resolution status.

502. According to the "Law on the order of submission of appeals of physical and legal entities", the complaint shall be processed within **fifteen days** from the date of receipt, or **up to one month** if the case requires additional documents or investigation.

Table 57: Grievance resolution process

Level	Summary of the Process
Level 1 Local Makhalla Committee, Contractor and the District Hokimiyat	• The aggrieved person can forward his/her grievance directly to Makhalla, Hokimiyat or the REN / PTES by telephone, post/in person/or electronic form (emails/social media/messengers). • The responsible staff who accept the grievances, shall register it in the grievances registration Logbook and provide a written acknowledgment of receipt to the aggravated party within two days. • The staff of these actors will put efforts to solve the grievance at the entry point if possible. If the grievance is not related directly to the Project, the complainant will be recommended to contact the relevant agency. • At the same time, they will forward/email information about all grievances to the Safeguards Specialist of REN PMU/GRM Focal Point. The database of all grievances with their status and measures undertaken will be in the REN PMU. • The REN PMU's Safeguards Specialist will review the received grievances, coordinates with the related actors to resolve it within 15 days.

[57] ADB. 2009. *Safeguards Policy Statement.* Manila.

Level	Summary of the Process
	• The complainant shall be provided written notification about the decision taken, and information about that she/he shall inform the REN PMU within 15 days if not agree with the decision (contact information of REN PMU shall be provided).
Level 2 PMU Secretariat in Tashkent	• If the grievance was not redressed at the first level or the complainant is not satisfied with the decision, the REN PMU Safeguard Specialist shall forward the complaint with any additional information provided by the complaining party, to the REN PMU Secretariat in Tashkent. • The Secretariat of REN PMU will review the compliant and coordinates with the respective agencies to find resolution. • If the complaint requires more time and/or higher competence for resolution, the REN PMU will form an an-hoc complaint resolution commission represented by REN PMU Secretariat, District Hokimiyat and Makhalla or village assembly of citizens or/and farmer's councils, or/and women association, independent experts. • The complaint shall be resolved in **15 days** in this level. In case if additional details or expertise are required, within a maximum of **30 days**. The complainant shall will be provided a written notification about the decision.
Level 3 Economic Court	• If the issue was not solved or the aggrieved person is dissatisfied with the decision, he/she may apply to the Economic Court. Nevertheless, the Project GRM shall not impede the access of aggrieved person (s) to the country's judicial and administrative system at any time.

503. **Records and documentation –** The REN PMU will ensure all grievances and resolution process are documented in a Logbook at the offices of the REN PMU in paper and in the electronic form. The Mahalla and Hokimiyats of the project districts may use their procedures for registration and addressing the citizens' complaints. The staff of the REN, Makhalla or district hokimiyats who registered the grievance, shall, forward it to the REN PMU Social Safeguards Specialist (GRM Focal Person) along with all information. The complainant should be informed about the decision and actions to be taken at every resolution level.

504. The REN should incorporate the grievance cases in their semiannual monitoring reports to be submitted to ADB. All grievances and their resolution status will be monitored and reflected in the project's progress reports.

9.5.3. Communication

505. Prior to start of site works, the PTES shall:
- Communicate the GRM to communities in the project impact zone.
- Ensure that names and contact numbers of representatives of REN PMU are placed on notice boards outside the construction site.

10. Environmental Management Plan

10.1. Introduction

506. The EMP provides the overall project environmental management framework to be implemented by REN and its subcontractors and the project implementation consultant through all of the five-year investment period. It provides summary information of the types of impacts, which are described in detail in **Section 7**. It also provides detailed information about the required mitigation and monitoring measures, their implementation arrangements reporting requirements. In addition, the approximate costs of the EMP are outlined.

10.2. Environmental Management Plans

507. Table 58: Design Phase EMP, Table 59: Pre-construction / Construction Phase EMP and Table 60: Operational Phase EMP provide the environmental mitigation and observational monitoring for the project during all phases of the project.

Table 58: Design Phase EMP

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Assessment of Sites	Site specific impacts	D-EAS-01	Completion of the Environmental Assessment Screening form for all sites.	• ADB SPS (2009)	PIC	None
Hydrology	Contamination of groundwater and soils	D-HY-01	Transformers procured by PTES, should at least comprise an impermeable spill / drip pan beneath the transformer which should be able to contain at least 110% of the oil content of the transformer	• ADB SPS (2009) • IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012) • SanPiN Ruz No. 0202-06. • WBG EHS Guidelines: Hazardous Materials Management (2007)	Design Institute / REN	PIC
		D-HY-02	Locate pole-mounted transformers away from sensitive sites, such as close to ground water extraction points, surface water courses, or agricultural land where practical. Consider the use of pad-mounted transformers in these locations.		Design Institute / REN	PIC
		D-HY-03	Where possible, in sensitive sites, consider the use of dry transformers.		Design Institute / REN	N/A
Geohazards	Damage from earthquakes, landslides and mudslides	D-SO-01	All designs shall incorporate specific measures, as required by Uzbek design and construction codes, to mitigate the risk of damage from seismic events, landslides and mudslides.	• ADB SPS (2009)	Design Institute / REN	N/A
Biodiversity	Bird Electrocution	D-BIO-01	Complete the EAS for each activity site.	• ADB SPS (2009) • IFC Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • Suggested Practices for Avian Protection on Power Lines document. APLIC (2012)	PIC	REN
		D-BIO-02	If required, engage a national specialist to visit the site and make an assessment of the types of birds that could potentially be affected and recommend design specifications (based on those outlined below by the Avian Power Line Interaction Committee (APLIC) for new distribution systems) to mitigate any impacts to these species.		National Bird Specialist	PIC
		D-BIO-03	Review design documents prior to their implementation to ensure that suitable mitigation measures recommended by the national bird specialist have been included in the design to limit the potential for bird electrocution.		PIC	N/A

Table 59: Pre-construction / Construction Phase EMP

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Management Planning	General Project Impacts	C-SEMP-01	Preparation and implementation of the Project SEMP	• ADB SPS (2009)	REN / PTES	PIC
		C-SEMP-03	Preparation and implementation of the Waste Management Plan	• ADB SPS (2009) • The Law on Waste No.362-II of April 5, 2002 • WBG EHS Guidelines: Waste Management (2007)	REN / PTES	PIC
Air Quality	Release of Exhaust Gases and Fugitive Emissions	C-AQ-01	Emission sources (vehicles such as mobile cranes) shall be positioned as far as is practical from sensitive receptors.	• ADB SPS (2009) • Ambient Air Quality Standards, SanPiN 0293-11 • WBG Performance Standard 3: Resource Efficiency and Pollution Prevention (2012) • WBG EHS Guidelines: Air Emissions and Ambient Air Quality (2007)	PTES (and Sub-contractors)	PIC
		C-AQ-02	Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to maximize fuel efficiency and help minimize emissions.		PTES (and Sub-contractors)	PIC
	Dust	C-AQ-03	Carry out watering for dust control at least once a day near residential areas in the area of excavation works: in dry weather with temperatures of over 25°, or in windy weather.		PTES (and Sub-contractors)	PIC
		C-AQ-04	Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency).		PTES (and Sub-contractors)	PIC
	Indoor Air Quality	C-AQ-05	The vapor from hot PCBs should be extracted from the work environment in PTES facilities by using local exhaust ventilation.		PTES	PIC
		C-AQ-06	If extraction is not possible suitable respiratory protection must be worn by workers.		PTES	PIC
Hydrology	Contamination of groundwater and soils	C-HY-01	All transformers will be inspected on delivery to the PTES warehouses for signs of leaks before they are sent to site for installation.	• ADB SPS (2009) • IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012) • SanPiN Ruz No. 0202-06. • WBG EHS Guidelines: Hazardous Materials Management (2007) • Appendix A – Guidelines for the Environmental	PTES	N/A
		C-HY-02	Further on-site checks shall be undertaken before any transformers are mounted / installed.		PTES	PIC
		C-HY-03	Strictly follow the procedures for pad-mounted transformers provided in **Appendix A** of the IEE		PTES (and Sub-contractors)	PIC
		C-HY-04	Strictly follow the procedures for pole-mounted transformers provided in **Appendix B** of the IEE		PTES (and Sub-contractors)	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
				Management of Pad-mounted Transformers • Appendix B – Guidelines for the Environmental Management of Pole-mounted Transformers		
Soils	Soil Compaction	C-SO-01	To avoid compaction impacts outside the cleared areas, i.e. RoW, vehicle movements will be restricted to demarcated working areas (unless in the event of an emergency)	• ADB SPS (2009) • IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012) • The Law on Waste No.362-II of April 5, 2002 • SanPiN Ruz No. 0202-06. • Waste Disposal Limit Document (Oz RH 84.3.17: 2005. • WBG EHS Guidelines: Contaminated Land (2007)	PTES (and Sub-contractors)	PIC
	Topsoil degradation	C-SO-02	Separately stockpiled topsoil will be spread over the surface of the RoW following completion of grading as appropriate		PTES (and Sub-contractors)	PIC
		C-SO-03	Once the topsoil has been replaced it will be stone picked to remove any large stones which are not in keeping with the surrounding soil texture		PTES (and Sub-contractors)	PIC
	Contaminated Land	C-SO-04	Any soils around the base of transformer sites that appear to be contaminated by leaked oil shall be removed by the PTES and disposed of as hazardous materials.		PTES	PIC
Biodiversity	Project footprint	C-BIO-01	Vehicle movements will be restricted to demarcated working areas (unless in the event of an emergency) to reduce unnecessary impacts to habitat.	• ADB SPS (2009) • IFC Performance Standard 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • Suggested Practices for Avian Protection on Power Lines document. APLIC (2012)	PTES (and Sub-contractors)	PIC
		C-BIO-02	Sensitive habitats that need to be avoided during construction (e.g. specific trees that are to be retained) will be marked for protection by the PICs environmental specialist who shall make a pre-work survey of the work sites with the PTES Environmental Focal Point before any works commence.		PTES and PIC	N/A
		C-BIO-03	In accordance with the requirements of national legislation, any Red Book species will be identified and protected as part of the afore mentioned pe-work surveys (C-BIO-02)		PTES (and Sub-contractors)	PIC
		C-BIO-04	Where trees are removed, compensation planting will be undertaken based on the number of trees to be removed and using an appropriate re-		PTES (and Sub-contractors)	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
			planting ratio agreed with the PIC (species and region specific).			
		C-BIO-04.1	PTES will report to the PIC on the number of trees cut for specific sub-projects and the numbers and types of trees replanted (if required).		PTES	PIC
		C-BIO-04.2	A national ecologist to review the site locations as part of the team preparing the IEEs for future activities.		REN	PIC
		C-BIO-05	Temporary works areas will be reinstated to near original condition		PTES (and Sub-contractors)	PIC
	Designated Sites	C-BIO-06	Activities in Designated areas shall be prohibited under the ADB project.		REN	ADB
		C-BIO-07	Complete the EAS which include screening measures to prevent works in designated sites.		PIC	ADB
	Bird Collisions	C-BIO-08	In rural locations, overhead lines shall be fitted with marker balls, swinging markers, bird flight diverters, or other similar devices.		PTES	PIC
		C-BIO-08a	Wires will be fitted in a single level.		PTES	PIC
	Nest Management	C-BIO-09	Prior to the start of construction the PICs environmental specialist shall prepare the EAS of the work sites before any works commence to identify any nests.		PIC	N/A
		C-BIO-10	Where nests are present on poles the old poles shall be left in-situ if possible so that the nest can continue to be used.		PTES	PIC
		C-BIO-11	Poles with nests shall not be removed during the nesting season.		PTES	PIC
		C-BIO-12	Where the above is not possible consideration shall be given to the use of nesting platforms on new poles.		PTES	PIC
					PTES	PIC
Land Acquisition and Compensation	Land Acquisition and Compensation	C-LA-01	LARP shall be prepared in the event that Land Acquisition and Compensation is required in future investment years. The LARP shall be based upon the Project LARF.	• ADB SPS (2009)	REN	PIC
Waste Management	General impacts	C-WA-01	Ensure that the waste hierarchy is followed including prevention, minimization, reuse and recycling	• ADB SPS (2009) • IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012)	PTES (and Sub-contractors)	PIC
		C-WA-02	Ensure proper storage, maximum reuse and recycling of waste and timely removal of unusable waste to agreed location according to national waste management regulations.		PTES (and Sub-contractors)	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		C-WA-03	Provide regular training of staff in waste management issues.	• The Law on Waste No.362-II of April 5, 2002 • SanPiN Ruz No. 0202-06. • Waste Disposal Limit Document (Oz RH 84.3.17: 2005. Regulation Document on Production and consumption waste • WBG EHS Guidelines: Waste Management (2007) • WBG EHS Guidelines: Contaminated Land (2007) • Appendix C – Guidelines for the Identification of PCBs • Appendix D – Framework Plan for the Safer Management of Waste Oil Containing PCBs	PTES	PIC
	Recycling	C-WA-04	All recyclable waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling where facilities for recycling of these materials exist.		PTES (and Sub-contractors)	PIC
	Domestic and Inert Waste	C-WA-05	No domestic waste shall be left at work sites, it shall be collected and returned to PTES facilities for disposal.		PTES (and Sub-contractors)	PIC
		C-WA-06	Ensure that wastes are not haphazardly dumped within the work sites and adjacent areas		PTES (and Sub-contractors)	PIC
	Hazardous Waste	C-WA-07	Use containers suitable for each type of waste.		PTES (and Sub-contractors)	PIC
		C-WA-08	Mark containers adequately specifying the waste types.		PTES (and Sub-contractors)	PIC
		C-WA-09	Do not mix various waste streams.		PTES (and Sub-contractors)	PIC
		C-WA-10	Remove waste at the completion of the work day and return it for storage at the appropriate PTES facility before final disposal via a state licensed contractor for hazardous waste removal and keep agreements with hazardous waste management company's active		PTES (and Sub-contractors)	PIC
	Contaminated Soil	C-WA-11	Any areas of oil leaks beneath transformers will be excavated, stored in labelled metal drums and returned to PTES facilities for storage.		PTES	PIC
		C-WA-12	The labelled containers will include a reference number which correlates with the removed transformer which will be tested for PCBs at the PTES warehouse according to the procedures outlined below for PCBs.		PTES	PIC
		C-WA-13	If the PCB tests indicate that the transformer oil is contaminated, the container containing the soils will be labelled as PCB waste.		PTES	PIC
		C-WA-14	The waste will be managed according to the PCB Safe Management Procedures included as Appendix D of this IEE.		PTES	PIC
		C-WA-15	If the results of the tests are negative for PCBs the soils will be collected for disposal as hazardous waste by a state licensed waste management company.		PTES	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Excavation Waste	C-WA-16	Any spoil material from trenches will be removed from the site and sent to an appropriate state licensed waste management facility.		PTES (and Sub-contractors)	PIC
	Old Poles and Wires	C-WA-17	Poles shall be removed and returned to PTES warehouses for storage prior to their final disposal by a state licensed waste management company, or for recycling / re-use.		PTES (and Sub-contractors)	PIC
		C-WA-18	Overhead cables shall be returned to PTES warehouses for storage prior to their collection for recycling / re-use		PTES (and Sub-contractors)	PIC
	Removal of Transformers	C-WA-19	Transformers shall be removed from site and returned to PTES facilities for re-use, recycling or disposal by state licensed waste management companies.		PTES (and Sub-contractors)	PIC
		C-WA-20	Oily rags used to clean the transformers and cellulose paper shall be disposed of as hazardous waste.		PTES	PIC
		C-WA-21	Burning of waste materials shall be strictly prohibited both at work sites and PTES facilities.		PTES (and Sub-contractors)	PIC
	Transformer Oils and PCBs	C-WA-22	Waste oil from transformers shall be tested according to the Guidelines for the Identification of Polychlorinated Biphenyls, **Appendix C** in this IEE.		PTES	PIC
		C-WA-23	If PCBs are found in the oil, PTES shall follow the procedures outlined in the Framework Plan for the Safe Management of PCBs, **Appendix D** in this IEE.		PTES	PIC
Noise and Vibration	Elevated noise levels	C-NV-01	Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise emissions.	• ADB SPS (2009) • WBG Performance Standard 4: Community Health, Safety, and Security (2012) • WBG EHS Guidelines – Noise Management (2007) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • German Standard DIN 4150-3	PTES (and Sub-contractors)	PIC
		C-NV-02	Work will be undertaken in daytime hours only – in accordance with WBG definitions.		PTES (and Sub-contractors)	PIC
		C-NV-03	Driver training will include advice on behaviors to reduce the potential for disturbance, including use of horn, loud radios with windows open, switching engines off when not in use, strictly observing speed limits and not accelerating or braking aggressively.		PTES (and Sub-contractors)	PIC
		C-NV-04	Project induction training will include instructions about minimizing noise disturbance.		PTES (and Sub-contractors)	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		C-NV-05	Local residents will be forewarned of planned activities that are considered by the Project to be noisy (e.g. trench excavation).		PTES	PIC
		C-NV-06	If complaints are received from the local population regarding elevated noise levels, temporary noise screens shall be installed around the work site, shielding the identified receptors from the source of noise		PTES	PIC
Physical Cultural Heritage	Chance Finds	C-PCR-01	A chance find procedure shall be developed and followed.	• ADB SPS (2009) • WBG Performance Standard 8: Cultural Heritage (2012)	PTES (and Sub-contractors)	PIC
	Training	C-PCR-02	PCR training shall be provided to PTES Environmental Focal Points in PCR management, which will include input from the Head of the Bukhara Province Department for Cultural Heritage Protection.		PIC	N/A
Utilities and Infrastructure	Delays and Outages	C-IU-01	Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 72 hours before the disruptions.	• ADB SPS (2009) • WBG Performance Standard 4: Community Health, Safety, and Security (2012)	PTES (and Sub-contractors)	PIC
		C-IU-02	Allow for adequate traffic flow around construction areas via diversions or temporary access roads.		PTES (and Sub-contractors)	PIC
		C-IU-03	Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control.		PTES (and Sub-contractors)	PIC
		C-IU-04	The authorities will be notified when oversize heavy loads need to be transported and the loads will be escorted by the Project.		PTES (and Sub-contractors)	PIC
		C-IU-05	Regarding utilities, the local community will be informed at least 72 hours before any planned disruptions.		PTES	PIC
Occupational Health and Safety	Pad-mounted and Pole-mounted transformers	C-OHS-01	PTES shall ensure that the OHS measures for installing pad-mounted and pole-mounted transformers (Appendix A and Appendix B) are strictly followed.	• ADB SPS (2009) • WBG Performance Standard 4: Community Health, Safety, and Security (2012) • WBG Performance Standard 2: Labor and	PTES	PIC
	Sub-contractors	C-OHS-02	All Project sub-contractors will be supplied with copies of the SEMP.		PTES	PIC
		C-OHS-03	Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting.		PTES	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		C-OHS-04	All subcontractors will be required to appoint a OHS representative who will be available on each work site.	Working Conditions (2012) • Uzbekistan Labour Code and KMK "KMK 3.01.02-00 "Safety engineering during construction" • Law about Industrial Safety of dangerous industrial bodies (2006); • Regulation on Fire safety (2004); • Safety standards for operation of electrical devises (2006); • Rules for appliance and test of security facilities used in electrical devises (2002).	PTES	PIC
	Fatalities	C-OHS-05	In the event of any fatality occurring during the construction phase at any Project work site, provide ADB with the details of the fatality within one week of the event occurring in a Fatality Report.		REN	PIC
	Grievance	C-OHS-06	Establish a formal companywide Grievance Mechanism for its workers.		REN	PIC
	Work sites	C-OHS-07	Temporary safety fences shall be erected around each work site.		PTES (and Sub-contractors)	PIC
		C-OHS-08	Warning signs will be displayed around work sites to warn workers and members of the local community of potential risks.		PTES (and Sub-contractors)	PIC
		C-OHS-09	All crews shall have a competent person responsible for first aid.		PTES (and Sub-contractors)	PIC
		C-OHS-10	Every crew shall have a first aid box at the worksite.		PTES (and Sub-contractors)	PIC
Community Health and Safety	Grievances	C-CHS-01	REN will implement the Grievance Procedure to provide opportunity for local residents to raise concerns.	• ADB SPS (2009) • WBG Performance Standard 4: Community Health, Safety, and Security (2012) • WBG EHS Guidelines: Community Health and Safety (2007) • Safety Zones – KMK 2.05.06-97	REN	PIC
	Safety Codes	C-CHS-02	Ensure that all Project infrastructure are constructed in accordance with national safety codes and safety zones.		PTES (and Sub-contractors)	PIC
	Signs and Labels	C-CHS-03	All Project infrastructure will be labeled / signposted in accordance with national regulations to inform the public of the specific safety risks of each item.		PTES (and Sub-contractors)	PIC
		C-CHS-04	All new pad-mounted transformers must be locked with access only available to PTES.		PTES	PIC
		C-CHS-05	All work sites will be appropriately signposted and isolated (through fencing or bunting) to prevent encroachment into these areas.		PTES (and Sub-contractors)	PIC
	Outages	C-CHS-06	Provide 72 hours advance notice of any works (not including emergency works) to the local community.		PTES (and Sub-contractors)	PIC
	Safety Awareness	C-CHS-07	Prepare a Project Safety Awareness leaflet to be distributed to all homes within the vicinity of the work sites. The leaflets shall provide information		REN	PIC

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
			relating to the risks of interfering with the distribution network. The leaflets will be written in non-technical language and will provide illustrations where practical.			
		C-CHS-08	PTES will keep a record of the number of leaflets distributed and their locations.		PTES	PIC
	Record Keeping	C-CHS-09	Keep a specific record of any community accidents that occur during the construction phase. Report the numbers to ADB on a monthly basis.		REN	ADB

Table 60: Operational Phase EMP

Topic	Impact / Issue	Mitigation Ref. #	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Hydrology	Contamination of Groundwater	O-HY-01	Ensure transformers are maintained according to manufacturers specifications	• ADB SPS (2009) • IFC Performance Standard 3: Resource Efficiency and Pollution Prevention (2012) • SanPiN Ruz No. 0202-06. • WBG EHS Guidelines: Hazardous Materials Management (2007)	PTES	REN
		O-HY-02	Transformers replaced at the end of their lifecycle according to manufacturers specifications.		PTES	REN
Waste Management	General waste management	O-WA-01	Continue to follow the waste management measures specified during the construction phase, specifically those procedures relating to PCBs.	• ADB SPS (2009) • The Law on Waste No.362-II of April 5, 2002 • SanPiN Ruz No. 0202-06. • Waste Disposal Limit Document (Oz RH 84.3.17: 2005. Regulation Document on Production and consumption waste • WBG EHS Guidelines: Waste Management (2007) • WBG EHS Guidelines: Contaminated Land (2007) • Appendix C – Guidelines for the Identification of PCBs • Appendix D – Framework Plan for the Safer Management of Waste Oil Containing PCBs	PTES	REN
		O-WA-02	Develop standard operational procedures for waste management, including site-specific plans for maintenance areas and warehouses.		PTES	REN

10.3. Environmental Monitoring Plan

508. Due to the limited nature of Project works no significant noise, air or water quality impacts are anticipated which would require routine instrumental monitoring, except when specific complaints are received from the local community. Testing transformer oil for signs of PCB contamination is however required. The procedures for testing are outlined as part of **Appendix C**.

10.4. Implementation

509. This IEE outlines the measures to mitigate and manage the environmental and social impacts identified to date based on the sites visited as part of this IEE. This is done in three ways:

510. **Corrective Actions** - The CAP provides specific actions to be implemented by REN for their existing facilities. The corrective action plan is included in Section 6.10.

511. **Specific Environmental Management Plan** - The SEMP is the tool that REN will develop to implement the construction and operational phase measures. In addition, there are additional sites that will need to be assessed through the lifecycle of the Project.

512. **Environmental Assessment Screening** - An EAS process has been developed to do this (and described in detail as part of the Project Environmental Assessment Review Framework (EARF)). Both the SEMP and EAS procedures are described in more detail below.

10.4.1. Specific EMP (SEMP)

513. The SEMP is the document that REN will prepare outlining how they intend to implement the EMP and ensure that all of the mitigation and monitoring is completed according to the implementation arrangements specified in the EMP and the IEE as a whole.

514. The SEMP will describe the required mitigation and monitoring, the persons responsible for the mitigation and monitoring and the schedule and reporting methodology. The SEMP will be submitted to the PIC for approval at least 30 days before commencement of any Project works. Guidelines for completing the SEMP are provided in **Appendix I**. The SEMP will be approved and monitored by the International Project Implementation Consultant (PIC) throughout the construction phase of the Project.

515. New SEMPs will be prepared for any new IEEs as described below.

10.4.2. Environmental Assessment Screening

516. EAS is the tool used by the PIC to assess the potential key impacts of all future Project activity sites not covered in this IEE. Prior to the commencement of works at any activity site, the PIC shall undertake site assessment using the EAS.

517. The EAS will screen out any activities located in designated sites and ensure that, where potentially significant impacts are identified, a new IEE is prepared to account for these activities. The PIC will be responsible for preparing any new IEE. If a new IEE is prepared, REN will be responsible for preparing a SEMP for the IEE activities.

518. In addition, a new IEE will be required for construction of distribution line over 10km. For subsequent Project years, EAS will continue to be completed for each activity site by the PIC. These procedures are outlined in full in the Project Environmental Assessment and Review Framework (EARF).

10.5. Implementation arrangements

519. The Project Management Unit (PMU) of REN and the PTES will be responsible for ensuring correct implementation of the Environmental Management Plan (EMP), the EAS and the SEMP in order to comply with ADB's safeguards requirements and environmental national regulations.

520. For this, the REN PMU will hire a national safeguard specialist. The REN PMU will be supported by PTES safeguard focal points and will also be guided by the environmental, health and safety specialists of the PIC in supervising the implementation of EMP / SEMP.

521. The cost for implementing mitigation measures as outlined in the EMP will be included in the contract between the REN and ADB, and the cost for oversight of the EMP and SEMP will be included in the consulting service of the PIC.

10.5.1. REN

522. REN has the overall responsibility for the implementation of the project works via the REN PMU, PTES and their subcontractors.

REN Project Management Unit

523. Currently, the environmental capacity with REN centrally is weak primarily due to the fact that REN do not have a significant amount of experience implementing donor funded Projects, particularly from ADB. There is no specific person in charge of environmental and social issues within REN itself. REN have however hired one safeguard specialist (SS) to work within the REN PMU. The SS has helped contribute to this IEE and helped facilitate site visit, consultations and other meetings. However, the SS needs further training in order for him to effectively manage the project. Ideally the SS should be RENs Environmental Manager coordinating all of RENs environmental management across all of the PTES to ensure that safeguards are applied consistently across REN, not just in the ADB funded regions.

524. The PMU SS will be responsible for the following activities during the course of the project:

- Following the procedures set in the project IEE and EARF;
- Obtaining all necessary government permits and license, including ecological expertise for all civil works if needed;
- Preparing the project SEMP which will be endorsed by the PIC;
- Reviewing the EAS and any updated IEE prepared by the PIC;
- Updating the SEMP on an annual basis based on any new IEE;
- Ensure best practice designs and measures for transformer kiosks and pole-mounted transformers are applied;
- Ensure that the program for PCB identification and management is strictly followed;
- Preparing and submitting semiannual environmental monitoring reports to ADB for disclosure on their website;

- Reporting to ADB of any non-compliance or breaches with ADB safeguard requirements in a timely manner and take corrective actions promptly;
- Managing the Grievance Redress Mechanism (GRM);
- Conducting public awareness programs, and
- Coordinate throughout with ADB's program team in applying ADB's environmental safeguard procedures.

525. As noted above, the PMU SS needs additional training, and this should be provided to the PMU SS (as well as the PTES Focal Points – described further below) by the PIC prior to the start of the Project.

526. The training program will have modules specifically relating to; a) ADB Safeguards, b) Waste Management Procedures, c) PCB Management, d) Oil management, e) Environmental Management, Auditing and Reporting, and f) Identification and management of PCR.

PTES

527. During the development of this IEE several discussions were held with management of PTES, including several staff who hold the position of 'environmental focal point'. For example, Samarkand PTES has an 'environmental focal point' focal points who sits in their Production and Technical Department and provides quarterly reports on air emissions, waste (including oils), and water. These reports are sent to REN and the SCNP. The focal points are not engaged full time in this activity, rather it forms a part of their day to day work activities. They are not specifically trained in environmental or social issues. However, they are necessary for the successful implementation of the project. As such, the 'Safeguard Focal Points (SFPs) will be required to:

- Ensure that all necessary national and regional environmental permits and approvals are obtained;
- Participate in training programs provided by ADB;
- Monitoring and reporting on Project activities according to the requirements outlined below;
- Coordinate all activities with REN PMU SS.

528. Routine monitoring of work sites shall be carried out by the SFPs at least once per week, unless no specific work activities are on-going. If violations are observed, he/she will record it in his/her monitoring checklist and then all violations will be reported to the work site manager, the PTES Chief Engineer and the REN PMU SS. In addition, the SFP shall prepare weekly summary reports of the findings of site visits for submission to the SS and PTES Management (no more than 1 page).

Staff Costs

529. The following table provides a summary of the anticipated staff costs.

Table 61: REN Safeguards Staff Costs

#	Position	No. of Months	Month Cost ($)	Total Cost ($)
1	PMU Safeguards Specialist	60	1,500	90,000
2	Safeguard Focal Points	12 per PTES	1,500	Part of PTES costs

10.5.2. Project Implementation Consultant (PIC)

530. The PIC will ensure the correct implementation of the project's EMP, and all related documents. In addition, PIC will provide training to the REN PMU and also complete the Environmental Assessment Screening for all project activities. The PIC shall be responsible for the following tasks outlined in the table below.

Table 62: PIC Tasks

Action	Staffing	Schedule
Prior to the Commencement of Works		
Provide guidance to the PMU SS on the environmental and social aspects of the project with emphasis on compliance monitoring and reporting.	IESS, NESS	Prior to the commencement of works
Assist the PMU with establishing and operating the grievance redress mechanism, including creating a grievance chart which is to be updated on a weekly basis.	IESS, NESS	Prior to the commencement of works
Review the SEMP and recommend any modifications to these documents to be compliant with: (a) the environmental and social requirements of the construction contracts as reflected in the EMP, and (b) the conditions of environmental approvals of the Government, if required.	IESS, NESS	Prior to the commencement of works
Develop the compliance monitoring system to be used during the construction period for monitoring the PTES (and their Sub-contractors) performance relative to environmental requirements, including the preparation of: (a) monitoring and corrective action forms and checklists, (b) inspection procedures, and (c) documentation procedures.	IESS, NESS	Prior to the commencement of works
Conduct orientation sessions with PTES (and their Sub-contractors) on the compliance monitoring system to be used, notification of non-compliance, and the process of requiring contractors to implement corrective measures when necessary.	IESS, NESS	Prior to the commencement of works
Provide guidance to the REN PMU SS and PTES SFPs on how their respective SEMP will be implemented including the: (a) requirements for each mitigation measure, and (b) implementation schedule of each mitigation measure taking into consideration the general requirement that no specific construction activity will be approved to be commenced if the associated mitigation measures for such activity are not ready before work commences.	IESS, NESS	Prior to the commencement of works
OHS audit of REN and community health and safety assessment.	International OHS Specialist, National OHS Specialist	Prior to the commencement of works
Develop standard operational procedures for waste management, including site-specific plans for maintenance areas and warehouses.	IESS, NESS	Prior to the commencement of works

Action	Staffing	Schedule
During Implementation of the Works		
Preparation of EAS for all project activities in all three regions.	NESS	Prior to the confirmation of works at any activity site.
Engaging a bird specialist for surveys of activity sites where warranted by the EAS.	NESS	When identified by the EAS
Preparing new IEEs where the EAS identifies significant impacts.	IESS	When identified by the EAS
Supervise the implementation of the SEMPs and its relevant topic and site specific EMPs.	IESS, NESS	Throughout the project
Evaluate the PTES (and their Sub-contractors) submitted works activities and schedules relative to the requirements of the approved SEMP.	NESS	Throughout the project
Undertake inspection, monitoring and reporting of construction sites and all construction-related facilities to assess the PTES (and their subcontractors) compliance with the SEMP and the Project EMP.	NESS	Monthly, throughout the project
Require the REN PMU to prepare new SEMP when necessary.	NESS	When new IEEs are prepared.
Monitor the PTES (and their subcontractors) compliance with health and safety, and labor requirements of the project as stipulated in the contract documents.	International OHS Specialist, National OHS Specialist	Throughout the project
Record non-conformance cases, inform PTES (and their Sub-contractors) of improvements needed, prepare corrective action plans for PTES (and their Sub-contractors), and monitor their implementation.	National OHS Specialist, NESS	Throughout the project
Monitor the status of the PCB identification plan.	National OHS Specialist, NESS	Throughout the project
Include environmental and social monitoring and OHS monitoring in monthly monitoring reports for submission to the REN PMU.	National OHS Specialist, NESS	Monthly, throughout the project
Draft semi-annual safeguard monitoring reports, as required by ADB.	International OHS Specialist, IESS	Every six months, throughout the project.
Upon Completion of the Works		
The PIC shall prepare a report on the project's environmental and social compliance performance, including lessons learned that may help REN PMU in their environmental and OHS monitoring of future projects. The report will be an input to the overall project completion report.	International OHS Specialist, IESS	Upon completion of works

531. The PIC will retain the use of a team of environmental, social and health and safety specialists as shown in the figure below to provide oversight of the PTES environmental performance as outlined above. Qualifications of the specialists is provided below.

Figure 34: PIC Environmental and Social Team

International Environmental and Social Specialist (IESS)

532. Qualified with a master's degree or diploma in environmental sciences or equivalent. Fifteen years' experience in conducting environmental impact assessments and implementation of environment mitigation plans and/or monitoring implementation of environmental mitigation measures and health and safety plans during implementation of electricity transmission and distribution projects funded by developing partners, including at least twelve years' international experience. Working knowledge of Uzbekistan is essential. Russian speakers preferred.

National Environmental and Social Specialist (NESS)

533. Qualified with a degree in environmental sciences or equivalent. Preferably five years' experience in conducting environmental impact assessments and implementation of environment mitigation plans and/or monitoring implementation of environmental mitigation measures during implementation of projects including projects funded by developing partners. Must be fluent in English, Uzbek and Russian.

National Bird Specialist

534. Qualified with a degree in environmental or ecology related subject. At least ten year's experience of conducting field surveys of birds in Uzbekistan to international best practice standards. Should demonstrate experience of at least two similar projects. Must be fluent in Uzbek and Russian and have a good knowledge and understanding of English.

International OHS Specialist

535. Qualified with a formal internationally recognized qualification (e.g. NEBOSH) in occupational health and safety. Minimum of 15 years' experience in conducting health and safety audits and assessments and implementation of environment OHS plans and/or monitoring implementation of mitigation measures during implementation of electricity transmission and distribution projects funded by ADB or similar donors. Working knowledge of Uzbekistan is essential, Russian speakers preferred.

National OHS Specialist

536. Qualified with a formal recognized qualification in occupational health and safety. Preferably five years' experience in conducting health and safety audits and assessments and implementation of environment OHS plans and/or monitoring implementation of mitigation measures during implementation of projects including energy sector projects funded by developing partners. Must be fluent in English, Uzbek and Russian.

Staff Costs

537. The following table provides a summary of the anticipated staff costs.

Table 63: PIC Environmental, Social, Health and Safety Staff Costs (Annual Costs)

#	Position	No. of Months	Month Cost ($)	Total Cost ($)
1	IESS	2	20,000	40,000
2	NESS	12	1,500	18,000
3	National OHS Specialist	12	1,500	18,000
4	International OHS Specialist	2	20,000	40,000
5	National Bird Specialist	6	1,500	9,000

10.5.3. ADB

538. ADB will be responsible for reviewing the bi-annual environmental monitoring reports prepared by the PIC.

10.6. EMP Costs

539. Most costs associated with the environmental recommendations of the EMP are a normal part of the day to day works of REN and the PTES. General waste management is an environmental necessity, but not generally considered an "environmental cost". Table 64 lists the proposed mitigation measures and indicates where they would be "included in the project budget" and where additional costs are a likely "environmental cost" beyond what would normally be included in a project budget, or already part of the REN / PTES operational budget.

Table 64: EMP Mitigation Costs

Impact / Issue	Mitigation / Management Measure	Number of Units / Unit Cost (USD)	Cost Estimate (USD)	Responsibility
Design Phase				
Contamination of water and soil	Transformer oil containment measures	In all pad mounted transformers / Estimated additional 100USD per transformer	25,000	REN
Bird Electrocution	Incorporation of bird protection measures	If additional protection is required assume a lump sum of 10,000USD per investment year per region	150,000	REN
Construction Phase				
Management plans	Preparation of construction management plans	Included in REN PMU costs	N/A	N/A
Release of Exhaust Gases and Fugitive Emissions and generation of dust	General construction air quality management	Included in general construction costs	N/A	N/A
Contamination of groundwater and soils	Inspection of transformers	Included in general construction costs	N/A	N/A
	Pole-mounted transformer procedures	Included in general construction costs	N/A	N/A
	Pad-mounted transformer procedures	Included in general construction costs	N/A	N/A
Soil compaction and soil degradation	General management measures	Included in general construction costs	N/A	N/A
	200l Waste containers for contaminated soils	5 per PTES / 100USD	1,500	REN
	PPE for soil removal (gloves)	20 per PTES /	1,500	REN
General impacts to biodiversity	Marking and protecting trees	Included as part of IEE costs	N/A	N/A
	Tree replanting	TBD, assume 100 per PTES per year / 10USD per seedling	15,000	REN
	Pre-work surveys	Included in PTES and PIC costs	N/A	N/A
	Reinstatement of land	Included in general construction costs	N/A	N/A
Bird collisions	Collision protection devices	500 per PTES / 20 USD	30,000	REN
Nest Management	Nest platforms, if required.	Included in general construction costs	N/A	N/A
Land Acquisition	Implementation of LARF / LARP	Per LARP	Per LARP	REN
General waste Management	Waste containers for on site waste	50 per PTES / 50USD	7,500	REN
Spoil disposal	Disposal of limited quantities of spoil material	Included in general construction costs	N/A	N/A
Old poles and wires	Disposal of equipment	Included in general construction costs	N/A	N/A

Impact / Issue	Mitigation / Management Measure	Number of Units / Unit Cost (USD)	Cost Estimate (USD)	Responsibility
Removal of old transformers	Disposal / reuse / recycling	Included in general construction costs	N/A	N/A
PCBs	PCB testing	See monitoring costs below	See monitoring costs below	REN
	Containers for storage of PCB contaminated oils per the guidelines in **Appendix E**	20 x 200l UN approved drums per PTES / 250USD	15,000	REN
	PPE for PCB management	10 sets per PTES / 200USD	6,000	REN
	Storage area for PCB wastes per the PCB storage guidelines in **Appendix E**	3 / 5,000	15,000	REN
General construction noise	General noise mitigation measures	Included in general construction costs	N/A	N/A
	Mobile Noise Barriers	10 per PTES / 500	15,000	REN
PCR impacts	Training program	1 / 3,000USD	3,000	REN
General impacts to utilities	General mitigation measures	Included in general construction costs	N/A	N/A
OHS	Fatality reporting	Included in REN PMU costs	N/A	N/A
	General worksite measures, fencing, bunting, warning signs	Included in general construction costs	N/A	N/A
	First aid kits	10 per PTES / 100USD	1,000	REN
Community health and safety	Implementation of safety codes, and warning signs	Included in general construction costs	N/A	N/A
	Suitable locking mechanism for pad-mounted transformers	Included in general construction costs	N/A	N/A
	Safety awareness program	Lump sum / 5,000USD	5,000	REN
Contamination of soils and water	Transformer maintenance	Included in general operational phase costs	N/A	N/A
	Transformer replacement at end of life	Included in general operational phase costs	N/A	N/A
Waste Management	Following waste management procedures, including for PCBs	See PCB costs below.	See below	See below
	Standard operational procedures for waste management, including site-specific plans for maintenance areas and warehouses	3 / 5,000 USD per management plan	15,000	REN
Total Costs			**343,500**	

10.6.1. Monitoring costs

Table 65: Monitoring Costs

Activity / Item	Frequency / Number	Unit Cost / USD	Cost /USD	Responsibility
Construction Phase				
PCB monitoring	20 per PTES per year	250	75,000	PTES via an international Monitoring company
Air Quality Monitoring	10 per year as a contingency (in the event of complaints from locals)	200	10,000	PTES via a national monitoring company
Noise Monitoring	10 per year as a contingency (in the event of complaints from locals)	200	10,000	PTES via a national monitoring company
Water Quality	10 per year as a contingency (in the event of complaints from locals)	200	10,000	PTES via a national monitoring company

11. Conclusions and Recommendations

11.1. Conclusions

540. This IEE has established that, with the exception of the residual impacts mentioned below, there are no significant environmental issues that cannot be either totally prevented or adequately mitigated to levels acceptable to the national and international standards for project activities.

541. The key identified residual impacts in the construction phase are shown in the table below.

Table 66: Construction Residual Impacts

Topic	***Residual Impact***
Disposal of PCBs	*Although the evidence suggests that PCBs may not be present in the distribution system in Uzbekistan, the potential does exist. The measures included in this IEE to undertake PCB testing and the procedures for management of any identified PCB containing oils will reduce the potential for significant impacts to occur, but ultimately Uzbekistan is still lacking adequate facilities for the treatment and disposal of PCB containing oils and therefore, despite the measures to store these wastes safely, the residual impacts will be **low/medium** until such facilities are developed, or agreements are in place to transfer the waste to a suitable licensed and managed location.*
Accidents involving workers	*Until the OHS assessment is undertaken and specific measures are put in place to better manage OHS and reduce the potential risk for accidents and fatalities to occur, the residual risks remain **medium**.*

542. The key identified residual impacts in the operational are shown in the table below.

Table 67: Operational Phase Residual Impacts

Topic	***Residual Impact***
Accidents involving workers	*Until the OHS assessment is undertaken and specific measures are put in place to better manage OHS and reduce the potential risk for accidents and fatalities to occur, the residual risks remain **medium**.*
Accidents at Project sites involving local community	*Constructing equipment in line with national safety codes and implementing any recommended best practice procedures along with safety awareness campaigns, will limit the risk of accidents occurring. However, members of the public are still likely to do random things which lead to occasional accidents. This issue affects the distribution network as a whole and is not a result of any specific failure of the Project itself, but residual impacts remain **low / medium** as accidents cannot be entirely ruled out.*

11.2. Recommendations for Implementation

543. Implementation will be achieved via continuous assessment throughout the five-year investment program. Initially, the CAP, EMP and its mitigation and monitoring programs, contained herewith will be included within the contract documents between ADB and REN. The CAP will be implemented by REN according to the schedule provided in the CAP.

544. The requirements of the EMP will be implemented throughout the construction and operational period of the Project. Contract documents shall state that REN / PTES will be responsible for the implementation of the requirements of the EMP through his own SEMP which will adopt all of the conditions of the. The SEMP will be approved and monitored by the International Project Implementation Consultant (PIC) throughout the construction phase of the project.

545. In addition, prior to the commencement of works at any activity site, the PIC shall undertake additional site assessment using the EAS. The EAS will screen out any activities located in designated sites and ensure that, where potentially significant impacts are identified, a new IEE will be prepared to account for these activities (A consolidated IEE can be prepared for activities located in a similar geographical area). If a new IEE is prepared, REN will be responsible for preparing an updated SEMP. In addition, a new IEE will be prepared for any line longer than 10km and more than 0.4kV. For subsequent Project years, EAS will continue to be completed for each activity site by the PIC. These procedures are outlined in full in the Project Environmental Assessment and Review Framework (EARF).

546. Further, the environmental capacity of REN and PTES is not strong and as such development of a network of safeguards staff will be required centrally in the PMU, and within the three regions. A training program will be provided to these staff to ensure that the Project mitigation and monitoring activities (specifically those relating to PCBs) is followed.

547. The PIC will be responsible for oversight of REN / PTES activities throughout the construction phase of the Project. If the PIC notes any non-conformance with the SEMP (and the EMP) REN / PTES can be held liable for breach of the contractual obligations of the EMP / EIA.

Appendix A – Guidelines for the Environmental Management of Pad-mounted 'kiosk' Transformers[58]

Site Selection

General

- Kiosk substations must be located with due regard to safety of the public and safety of personnel working in and around the substation.
- It is essential to locate kiosk substations in areas that are well drained and are clear of underground or overhead obstructions. Sites shall preferably also be level or near level, to minimize soil erosion effects and long-term movement of the kiosk assembly. Kiosk sites must be able to withstand a bearing pressure of 55 kilopascals without movement.
- Kiosk substations will not be installed in the following areas, unless the regional electricity network companies (JSC TDs) determine that there is no reasonable alternative:
    - areas prone to stormwater runoff,
    - areas subject to declared 1-in-100 year (or less) floods,
    - unstable areas,
    - roadway areas including kerb blisters or similar traffic control narrowings.
- Kiosk substations and/or associated cables must not be installed on contaminated sites, or on landfill sites where gas emanating from the landfill may cause construction problems or safety problems.
- Kiosk substations will not be installed within buildings, on building roofs, in chambers, or in covered parking areas or garages.
- The siting of kiosk substations in the vicinity of public swimming pools, service stations, flammable gas, or liquid storage tanks will be avoided.
- Kiosk substations will not be sited under overhead high voltage power lines of nominal voltage 35 kilovolts (kV) or above. Kiosk substations will not be sited under overhead 10-kV power lines, unless there is no reasonable alternative. Kiosk substations will not be sited closer than 20 meters to a structure carrying 110-kV overhead power lines; and, where 110-kV overhead power lines are constructed along a public roadway, kiosk substations will not be located on the footpath on the same side.
- Kiosk substations will not be sited within a railway corridor alignment.

Access Requirement

- Kiosk sites will allow unimpeded access for JSC TD personnel and vehicles, directly from a public street, for 24 hours per day, 7 days per week.
- A heavy truck with a vehicle-mounted crane is needed to install or remove the kiosk and equipment. Access routes, where required, must be suitable under all weather conditions and constructed to withstand the loading. The access route will be a minimum of 4 meters wide, have a minimum of 4 meters headroom, and be continuous from the property boundary to the kiosk site.
- Access from the street to the kiosk site must not be fenced nor enclosed.

[58] Guidelines based on Ausgrid Network Standards: NS117 Design and Construction Standards for Kiosk Type Substations (2018) and NS141 Site Selection and Site Preparation Standards for Kiosk Type Substations (2017).

Environmental Requirements

Oil Containment

- Kiosk should be designed to contain oil spills either within a concrete base or an in-built metal bund provided within the kiosk.
- To further minimize any risk to the environment, the location of kiosk substations in the following situations will be avoided, wherever reasonably practicable:
    - in close proximity to rivers, creeks, natural or manmade water courses, stormwater drains, paved surfaces, or concrete aprons that drain to the stormwater system;
    - within 40 meters upstream of a waterway or sensitive environment, such as a wetland, national park, or nature reserve;
    - within 5 meters upstream of a grated drain or pit, where there would be less than 500 millimeters of permeable strip between the kiosk and the kerb;
    - within an area of high groundwater, where the groundwater would be normally less than 1 meter below ground level;
    - within an area prone to flooding, or a drainage path, or a stormwater ponding area;
    - adjacent to steep downhill slopes, of 10% grade or greater; or
    - within bush fire prone land areas, where there is a significant risk that a kiosk fault or fire could cause a bush fire.

Noise Limitation

- To reduce the possibility of noise interference complaints, the siting of the kiosk substation must comply with national and World Bank Group regulations relating to noise.

Fire Segregation Requirements

- The siting of kiosk substations must comply with the requirements of all relevant authorities (including fire control authorities) in relation to segregation from buildings, structures, etc. Kiosk substations must also be separated from building air intake and exhaust openings and natural ventilation openings by separation distances that meet the requirements of all relevant authorities and Government of Uzbekistan's standards.

Construction Considerations

- *Containment of silt*. The PTES (or its subcontractor) shall comply with all national regulations and requirements regarding the prevention of silt and other excavated spoil from entering any drain, creek, river, or natural watercourse.
- *Hours of work*. The PTES (or its subcontractor) shall only engage in work at the substation site at times and on days as approved by the local authority for the performance of building work.
- *Noise restrictions*. The PTES (or its subcontractor) shall comply with all relevant national regulations and requirements of the government to restrict the emission of noise from construction activities.
- *Site cleanup*. The PTES (or its subcontractor) shall ensure that the kiosk site is left in a clean and tidy condition. The PTES (or its subcontractor) shall be responsible for the correct disposal, in accordance with government requirements, of all items requiring disposal resulting from the construction of the substation. Disposal of rubbish and spoil shall comply with all government requirements.

Construction Health and Safety

The Electrical Safety Rules and other regulations include but are not limited to the following requirements:

- Correct personal protective equipment and/or clothing for the task is worn when working on or near the network.
- First aid kit must be available on site.
- Hazard Assessment Check (HAC) must be completed at the start of the construction and each subsequent day.
- Safety equipment and tools must be checked before each use.
- Traffic control procedures are to be implemented, where required.
- Work site must be defined and marked using reflective cones, where the work is undertaken in a public street.

Operational Accidents and Security

- *Reporting of accidents and/or incidents*. The PTES shall be responsible for the reporting of all injuries or accidents that occur to personnel or the general public.
- *Danger signs*. Kiosk substation housings will have two attached danger signs. If the danger signs are not already attached to the housing, or if existing danger signs are damaged or ineffective, the PTES will supply and attach danger signs in accordance with the specifications and requirements of the government.
- *Substation locking and security*. Suitable locking shall be provided at all kiosks to prevent unlawful entry to the kiosk.

Appendix B – Guidelines for the Environmental Management of Pole-mounted Transformers[59]

Siting

Wherever possible, pole-mounted substations will not be located:

- within 40 meters upstream of a waterway or sensitive environment (e.g., wetland, national park, or nature reserve);
- within 5 meters upstream of a grated drain or pit, where there would be less than 500 millimeters of permeable strip between the substation pole and the kerb;
- within an area of high ground water (where the ground water would be normally less than 1 meter below ground level);
- within an area prone to flooding, or containing a drainage path or storm water ponding area; and
- within high bushfire risk areas.

Where these options are not possible, in order to eliminate the risk of groundwater contamination due to oil spills, it is recommended that pole-mounted transformers be considered for substitution with pad-mounted secondary substations equipped with oil collectors.

Construction Health and Safety

The Electrical Safety Rules and other regulations include but are not limited to the following requirements:

- Correct personal protective equipment and/or clothing for the task is worn when working on or near the network.
- First aid kit must be available on site.
- Pole rescue kit must be at the base of the pole.
- Approved fall-arrest equipment must be worn when there is a risk of falling 2 or more meters.
- Hazard Assessment Check (HAC) must be completed at the start of the construction and each subsequent day.
- Safety equipment and tools must be checked before each use.
- Traffic control procedures are to be implemented, where required.
- Work site must be defined and marked using reflective cones, where the work is undertaken in a public street.

[59] Guidelines based on Ausgrid Network Standards: NS122 Pole-Mounted Substation Site Selection Construction (2018).

Appendix C – Guidelines for the Identification of Polychlorinated Biphenyls (PCBs)[60]

General

Currently, it is not known if polychlorinated biphenyls (PCBs) are present in the distribution network transformers. A recent report by the World Bank indicates that there were no PCBs found in tested transformers in the Uzbekenergo (UE) transmission network. However, there has been no testing for PCBs in the UE distribution network. Furthermore, there is a limited knowledge within REN regarding the risks and hazards associated with PCBs.

Accordingly, this Appendix outlines the procedures for REN to identify if PCBs are present in transformer equipment above 50 parts per million (ppm).

Sources of Contamination

The following potential sources of PCB contamination have been identified in the distribution network:

- *Spills of transformer oil:*
  - Maintenance operations
  - Transport operations
  - Draining, refilling operations
  - Disconnection <disassembly of transformers
  - Lack of spill containment provisions in work pits and/or servicing areas
  - Improper storage.
- *Leaks:*
  - Normal wear of equipment in service (e.g., valves, gaskets, and fittings)
  - Dismantling and/or reassembly of equipment
  - Damaged equipment
  - Cracked or damaged transformer bushings

Coverage of Testing Program

All end of life transformers removed from service as part of the ADB funded portion of the Program will be tested for the presence of PCBs. As transformers are removed, they are transported to the REN warehouses where components are stripped down for recycling and disposal. During this phase the oil within the transformers is drained from the unit and sent for reprocessing. Before the oil is removed the unit shall be assessed to determine if PCBs are present in the unit. The procedures for identification are outlined below.

Identification of PCB Equipment

The Basel Convention has defined PCBs as any substances or material with a PCB concentration of above 50 ppm.

There are two proposed options of identifying presence of PCBs in transformer oils:

[60] These guidelines are based on the guidelines prepared by the World Bank for Uzbekenergo, as part of the Environmental and Social Management Framework for the Modernization and Upgrade of Transmission Substations Project, 2015.

1. ***Visual checks to determine the PCB content***. Some former Soviet Union manufacturers identified the dielectric fluid in the type or serial number specifying that on plates on the transformers. These identification plates usually state that the transformer does contain Pyroclor, Askarel, Sovol or a specific serial no., etc. So, this is the first step to identifying the presence of PCBs in transformer oil. In cases where the type of oil is not specified, then it is necessary to apply the second option.

2. ***Testing on PCBs***. This would require applying nonspecific methods to identify classes of compounds, such as chlorinated hydrocarbons, to which PCBs belong. These methods include PCB field screening tests like CLOR-N-OIL and CLOR-N-SOIL test kits as well as the L2000 DX field analyzer or applying the Beilstein Method. This method is based on identification of the presence of chlorine in the transformer oils. For that purpose, a piece of copper oxide fastened to a platinum wire is moistened with the oil to be tested and held in the outer zone of a Bunsen flame. As soon as the carbon has burned away, the presence of chlorine is indicated by the greenish or greenish-blue color of the flame. This color is produced by volatilizing copper chloride, and its intensity and duration depend on the amount of chlorine present. As there is a risk that highly toxic dioxins are unintentionally formed and released during this identification, this test may only be performed in a laboratory by experienced chemists. As UE has used this method previously, the PCBs testing will be done based on the further application of this chlorine presence test method, which is also recommended by the United Nations Environment Programme (UNEP) “Guidelines for the identification of PCBs and materials containing PCBs.” The testing shall be undertaken in the REN maintenance area laboratories, which currently test oil quality as part of the general transformer maintenance works.

Safety Rules during PCBs Testing

Access to the potential PCB-contaminated equipment in terms of high voltage electrical equipment should be done according to the “Rules for technical usage of electrical equipment” (approved by the Chief of Electrical Inspection of Uzbekistan No. 207 on 21 May 2004). It is necessary to prepare a sampling box that contains basic equipment for sampling activities. This ensures access to essential equipment immediately when required. For that purpose, only glass bottles are used, which must be absolutely clean with capacity of about 20–30 milliliters (ml). In order to prevent the skin from coming into contact with PCBs, one-way protective gloves must be worn. The eyes must be protected against possible oil splashes by wearing goggles. The sample can be taken by using the drain tap, which usually is at the bottom of the transformer. If a transformer has been disconnected from power for over 72 hours, the sample should generally be taken from the bottom, as PCB sinks to the lower level because of its higher density. Sometimes, the gasket gets damaged when the drain tap is opened. It is therefore advisable to always have a spare gasket ready.

Alternatively, transformers can be sampled via the oil filling cap by using a hand pump (a new hand pump must be used for each transformer). Oil samples from the expansion receptacle cannot always be regarded as representative, because the oil does not circulate and thus it is not really mixed.

Steps in PCBs Testing

The following steps must be followed when sampling a transformer:
1. Place a drip tray under the drain tap,

2. Label the sample bottle with the same serial number as on the inventory form,
3. Drain off the required amount of oil into the sampling bottle—quantity depending on the intended analysis,
4. Carefully retighten the seal, and
5. Affix a label on the transformer with the same serial number as on the inventor form and sample bottle.

Testing of Phased-Out and Drained Transformers

Even if a device has been drained, there should still be some oil present in the passive part of the transformer due to the leaching in the days and week after the draining. Depending on the size of the transformer, leaching from the solid parts of the device (wood, insulation paper, etc.) can leave a few liters of oil at the bottom of the transformer. However, usually there is not enough oil to sample it via the drain tap, as the oil layer is deeper than the valve. In such cases, the device needs to be sampled through an opening in the top. Stiff tubes (e.g., glass or PE) can be used to take a sample of the oil at the bottom of the transformer. The PCB results obtained from drained transformers could be higher than the original contamination in the transformer. This is due to the leaching effect from the core and windings into only a limited volume of oil. If there is no oil at all left in the device, solid materials from the active part of the transformer could be sampled and analyzed (wood or insulation paper). However, such analysis can only be performed in a laboratory by gas chromatography. Due to practical reasons, it might be advisable to label such drained transformers as PCB-contaminated and note it accordingly in the physical site inspection report (respectively inventory form) and leave it for future investigations.

PCBs Database

The test results shall be included in a PCB database managed by the REN environmental and social safeguards manager (ESMM). The database shall include an inventory of all information relating to the PCB tests, including the location of the tested equipment and the results of the PCB tests.

Labelling

All equipment potentially contaminated with PCBs must be labelled as soon as it has been identified and added to the PCB database. Additionally, all the entrances to all buildings housing PCB-contaminated equipment must be labelled. The purpose of labeling PCB-contaminated equipment is:

- To provide immediate identification of PCB-contaminated equipment and PCB-containing wastes;
- To alert personnel that the labeled equipment or waste requires special handling and disposal considerations;
- To alert emergency services personnel to the presence of PCBs in the event of a spill, leakage, or fire; and
- To assist holders of PCB-contaminated equipment in reporting to the REN ESSM on their PCB inventories.

Confirmed PCB-contaminated equipment, i.e., contaminated with more than 50 ppm, must be labelled as presented below, as soon as contamination is confirmed. All doors of the premises where this equipment is kept will also be marked with the same label.

Warning PCB Contaminated Equipment

Wear Appropriate Personal Protective Equipment (PPE)

For proper disposal information, contact the REN ESSM

Database # XXX

Identified equipment with PCBs must have its own inventory number corresponding to the PCB database.

Recommended Actions in the Case of PCB-Contaminated Transformers

If testing of the unit reveals the presence of PCBs above 50 ppm, the oil from contaminated transformers will be drained from the equipment in a dedicated portion of the REN maintenance area. To prevent the leakage of oil into environment, concrete drain pans will be installed under the oil-filled equipment, which are adequate for the volume of oil in the equipment. This will exclude the leakage of oil into environment. In case of an emergency leakage of PCB oil spill kits will be provided in the maintenance area.

Following this, additional measures for the safe management of waste oil containing PCBs will be required. A framework for these procedures is provide in **Appendix D**.

Appendix D – Framework Plan for the Safer Management of Waste Oil Containing PCBs

The following section provides a framework for the safe management of waste oil containing PCBs.

This framework shall be reviewed and updated in the event that the PCB testing program recommended under the Program identifies PCBs per the procedures outlined in **Appendix C**.

These guidelines have been based on a number of documents including:

- Environmental and Social System Assessment for TAJIKISTAN, Key Elements of the PCB-containing Materials Management, World Bank April 2019.
- Power Sector Rehabilitation Project Toktogul Rehabilitation Phase 1 Project (ADB Loan/Grant Numbers: L2869/G0294-KGZ)
- Guidelines for Environmentally Sound Management of PCBs in the Mediterranean, UNEP
- User Guide: Environmentally Sound Management of PCB Contaminated Equipment and Materials, GIZ, 2012.
- A Guide to the Disposal and Decontamination of PCB Contaminated Transformers and Other PCB Applications, EPA Ireland.

Transformer Testing

If, during end of life sampling, PCBs are identified above 50ppm in transformer oil they will be labeled as PCB containing equipment as per the guidelines in **Appendix C.**

Draining of Oil from Oil-Filled Equipment

The oil from contaminated transformers will be drained from the equipment in a dedicated portion of the REN maintenance area. To prevent the leakage of oil into environment, concrete drain pans will be installed under the oil-filled equipment, which are adequate for the volume of oil in the equipment. This will exclude the leakage of oil into environment. In case of an emergency leakage of PCB oil spill kits will be provided in the maintenance area.

Containers

PCB-contaminated oil will be collected in 1000-liter intermediate bulk containers (IBC) or in 200-liter sealed metal containers coated with anti-corrosion and anti-oxide paint, new or in serviceable condition, or high-density polyethylene (HDPE) barrels with double groove with clamped ends and bulk containers. In the upper part of the barrel it is necessary to leave space of about 7-10 cm considering expansion.

Storage

Currently there are no facilities in Uzbekistan that are capable of disposing of PCB contaminated waste. As such PCB-contaminated equipment or PCB-containing oil will be transferred to an appropriate storage area within the REN warehouse / maintenance yard until such time that suitable facilities are developed in country. The storage area must have the following characteristics:

- Security – The storage area will be securely locked and access should be restricted to authorized personnel. Doors must be appropriately labeled;

- Fire protection – PCBs and PCB-contaminated equipment must be kept separate from flammable materials and holders should take all necessary precautions to avoid any risk of fire involving PCBs. The storage of combustibles will not be allowed within 10 metres of the equipment, and the storage area will have the necessary firefighting equipment;
- Spill containment – The storage area will be bunded. The floors and bund will be impermeable to PCBs. All floor drains, sumps or other openings in the floor will be closed and sealed to prevent the release of liquids. Spill kits should be readily available and all staff authorized to enter the storage area must be trained in using spill kits and the hazards associated with PCBs. Where sites have spillage response procedures specific details will be provided on PCB containment;
- PCBs segregation - No other waste will be stored within the designated storage area and no manufacturing or other activity will be undertaken there. Solids and liquids will be stored in separate drums. PCB-contaminated oils must not be mixed with other waste oils;
- Weatherproofing – The storage area will be located indoors, but if this is not possible an outside storage area will be covered with a waterproof barrier that protects the PCB-contaminated equipment and/or waste PCB containers and prevents moisture from entering the curbing or sides of the floor surface underneath;
- Adequate ventilation – A fresh air inlet and an air exhaust to the outside will be provided;
- ERP - A copy of the site's Accident Prevention and Emergency Response plan will be posted in the storage area and will contain specific information on PCBs on site. A first aid kit will also be located in the storage area; and
- Inspection - The storage area will be inspected weekly to verify that PCB-contaminated equipment and PCB-containing waste is appropriately stored and to minimize the potential of leaks or spillages.

Appendix E – Sample Chance Find Procedure

1.1 Objectives of the Procedure

The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. A Chance Find Procedure, as described in IFC Performance Standard 8, is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

1.2 Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

1.3 Procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
2. Immediately notify a foreman. The foreman will then notify the Construction Manager who will in turn must contact the REN SFP;
3. Record details in Incident Report and take photos of the find;
4. Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
5. Preliminary evaluation of the findings by REN SFP and if necessary, government archaeologists. The REN SFP must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
6. Sites of minor significance (such as isolated or unclear features, and isolated finds) will be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor. The results of all archaeological work must be reported to the Ministry/Agency, once completed.
7. In case of significant find the Agency/Ministry (Agency for Protection of National Heritage or Archaeological Research Centre, hereinafter referred to as Heritage team) will be informed immediately and in writing within 7 days from the find (ref. law on heritage protection).
8. The onsite archaeologist provides the Heritage team with photos, other information as relevant for identification and assessment of the significance of heritage items.
9. The Ministry must investigate the fact within 2 weeks from the date of notification and provide response in writing.

10. Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
11. Construction works could resume only after permission is granted from the responsible authorities.
12. In case no response received within the 2 weeks period mentioned above, this is considered as authorisation to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports – kept.

1.4 Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

1.5 Additional information

Management options for archaeological site

- **Site avoidance.** If the boundaries of the site have been delineated attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option)
- **Mitigation.** If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation. (The most expensive and time-consuming management option.)
- **Site Protection.** It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of high visibility fencing around the site or covering the site area with a geotextile and then capping it with fill. The exact prescription would be site- specific.

Management of replicable and non-replicable heritage

Different approaches for the finds apply to replicable and non-replicable heritage.

Replicable heritage

Where tangible cultural heritage that is replicable[61] and not critical is encountered, mitigation measures will be applied.
The mitigation hierarchy is as follows:

- Avoidance;
- Minimization of adverse impacts and implementation of restoration measures, in situ;
- Restoration of the functionality of the cultural heritage, in a different location;

[61] Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular areas and cultural values they represent are well represented by other sites and/or structures.

- Permanent removal of historical and archaeological artefacts and structures;
- Compensation of loss - where minimization of adverse impacts and restoration not feasible.

Non-replicable heritage
Most cultural heritage is best protected by in situ preservation, since removal is likely to result in irreparable damage or even destruction of the cultural heritage.

Nonreplicable cultural heritage[62] must not be removed unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and

Any removal of cultural heritage must be conducted using the best available technique advised by relevant authority and supervised by archaeologist.

Human Remains Management Options

The handling of human remains believed to be archaeological in nature requires communication according to the same procedure described above.

There are two possible courses of action:

- **Avoid.** The development project is redesigned to completely avoid the found remains. An assessment should be made as to whether the remains may be affected by residual or accumulative impacts associated with the development, and properly addressed by a comprehensive management plan.
- **Exhumated.** Exhumation of the remains in a manner considered appropriate by decision makers. This will involve the predetermination of a site suitable for the reburial of the remains. Certain ceremonies or procedures may need to be followed before development activities can recommence in the area of the discovery.

[62] Nonreplicable cultural heritage may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, adaptive strategies, and early forms of environmental management, where the (i) cultural heritage is unique or relatively unique for the period it represents, or (ii) cultural heritage is unique or relatively unique in linking several periods in the same site. Examples of non-replicable cultural heritage may include an ancient city or temple, or a site unique in the period that it represents.

Appendix F – Sample Fatality Report

MEMORANDUM

To: **Date:**

CC:

From: REN XXX

Subject:

Background

Operation Description:

Incident

- What has happened (e.g., fire, explosion, spill, vehicle accident) and when?
- How many fatalities?
- Are there effects off-site to the public or the environment?
- What was the cause of the accident?
- What is the status of any internal investigation?

Reporting/Legal

- Has the incident/accident been properly reported to the relevant authorities?
- What kind of follow-up investigation is being conducted?

Follow-up

- Who is the contact person at the Client for more information? (name, title, company, phone, e-mail, fax):
- If the Bank receives questions from the media or interested persons or groups, who is the appropriate press officer for the Client regarding the incident? (name, title, company, phone, e-mail, fax)
- Is the media already aware of the incident? What have they been told?

Appendix G – Sample Community Health and Safety Leaflet

Leisure Activity

TOP TIPS

- *Look Out, Look Up* for overhead power lines. If possible, always enjoy your leisure activity away from them.
- If the location is unfamiliar to people in your group make sure everyone is aware of the dangers of overhead power lines.
- To find the local electricity network operator, search 'electricity distribution map' on the ENA website at www.energynetworks.org.
- Warn others to keep well away, especially if any of the overhead power line is touching or is close to the ground.
- Electricity can jump gaps so even getting too close to lines can be dangerous. Many objects can also conduct electricity such as trees, string, rope and water.

In an emergency dial **999** and tell them electricity is involved.

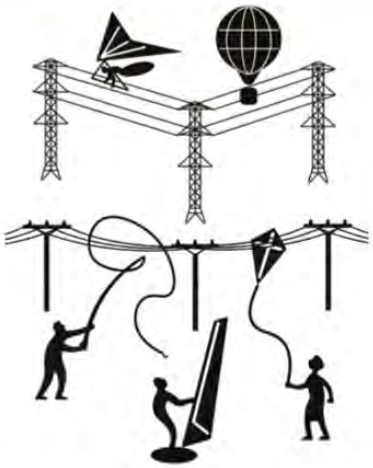
Call **105** if you have a safety concern related to the electricity network or if you spot damage to overhead power lines and substations that could put you, or someone else, in danger.

Energy Networks Association
4 More London Riverside
London SE1 2AU
Tel +44 (0) 20 7706 5100
www.energynetworks.org

The Voice of the Networks

Leisure Activity

Safety advice when taking part in leisure activities near overhead power lines.



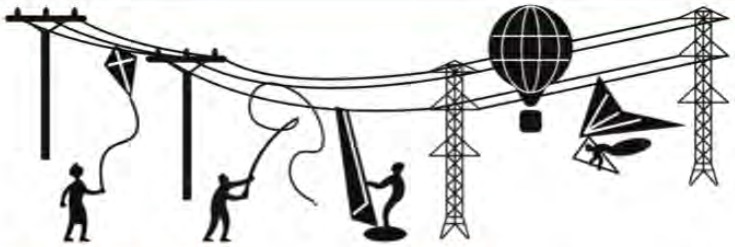
Leisure Activity

There are overhead power lines criss-crossing the country. Often unnoticed, they are essential to provide electricity to cities, towns, villages and rural communities. They carry voltages ranging from 230 volts (domestic voltage) up to 400,000 volts. Even domestic voltage can be fatal and high voltage electricity can jump large gaps.

The energy network is designed to keep you safe, but people die each year due to accidental contact with overhead power lines, whilst others endure life changing injuries with the lives of their families also suffering as a result.

GENERAL SAFETY INFORMATION

- Never touch overhead power lines.
- Do not assume that lines on wooden poles are telephone wires; most overhead power lines are supported on wooden poles.
- Most overhead power lines are not insulated.
- Always assume overhead power lines are live, even if they have fallen to the ground, are broken, or are not sparking.
- Almost any material, such as kite string, fishing rod, metal fencing, a TV aerial, even a jet of water, can conduct electricity.
- Stay away from any person or object in contact with an overhead power line and keep others away as touching them could be fatal.
- If your apparatus makes contact with an overhead power line, contact the Emergency Services and the electricity network operator. Do not attempt to retrieve it.
- Rubber boots do not protect you.
- Electricity can jump gaps.
- Damaged lines can stay live or be re-energised automatically or remotely without warning if the electricity network operator is not aware of an incident.
- Ensure you, your family and colleagues are familiar with the yellow and black 'Danger of Death' electricity sign seen on wooden poles, pylons, substations, etc.



Fishing and water sports on or near water

If there are overhead power lines in the area, where possible, enjoy your activity elsewhere, if not:

- Keep at least 30 metres away from any overhead power lines and cast fishing rods with care.
- Fishing rods and boat masts conduct electricity.
- Take particular care in car parks and on access routes.
- Always carry equipment at a low level, parallel to the ground.
- Rubber boots or waders do not protect you.
- Be mindful of overhead power lines when engaging in any water sports.

Tents, marquees, caravans and other temporary structures

If possible, avoid pitching a tent or caravan directly under, or close to, an overhead power line.

Be very aware when erecting TV aerials or radio masts on mobile homes or static caravans.

Never attach or tie anything to a wooden pole, pylon or piece of electrical equipment.

Be aware of underground cables when hammering stakes deep into the ground.

If leading a group, ensure everyone understands the danger from overhead power lines.

Do not light fires beneath overhead power lines.

Ensure any unmanned aerial vehicles, or drones, are not flown within the vicinity of overhead power lines.

Sports grounds

If there are overhead power lines crossing your site and you use tall equipment such as mobile ball stop systems, contact the electricity network operator for free safety advice.

Ensure all users of such equipment are aware they must carry it at a low level, parallel to the ground, and take special care when erecting, dismantling and moving equipment.

Advice to clubs, sites and activity centres

If there are overhead power lines on your site, contact your local electricity network operator for free safety advice.

Display maps showing the location of overhead power lines and emergency telephone numbers.

Instruct all staff on the dangers of overhead power lines, how to use equipment safely near to them and what to do in an emergency.

Advice for balloonists

Most charts and maps used by balloonists show major transmission lines, but they do not show many high and low voltage lines which are often mounted on wooden poles. These can be difficult to spot on a sunny day and that can sometimes lead to accidents and injuries.

- *Look Out, Look Up* for overhead power lines.
- Keep well away and think ahead before you take off.
- Make sure you know where overhead power lines are in the vicinity of your departure and arrival location.

Appendix H – Consultations

Department / Location:	Uzbekenergo (UE), Department of Environmental Works and Documents (DEP)	**Date:**	25 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Nadjimuddinov Nizomiddin, Head of Department, Uzbekenergo Department of Environmental Works and Documents 4. Mr. Muksinov Akmal, Senior Expert, Uzbekenergo Department of Environmental Works and Documents		
Summary	• The DEP is a unit serving UE generation, transmission, and distribution units. After the unbundling of UE, the unit was unsure if they would be working under transmission, transmission or distribution companies. • The main purpose of the unit is to prepare environmental documents for all units within UE. They noted that it is not mandatory for the units to use DEP and that units within UE, including regional electricity network companies (JSC TDs), could outsource the reporting to a consulting firm. • According to DEP, there is no department within UE responsible for auditing facilities. The only activities that are undertaken are collecting data in order to complete reports required for the State Committee for Nature Protection (SCNP). • DEP is primarily responsible for preparing environmental reports relating to air emissions, water emissions, and waste. Reports are required either as a follow on from the state ecological expertise (SEE) (environmental impact assessment or EIA)—3 years after the conclusion of SEE, management plans must be prepared and renewed every 5 years—or for existing facilities (constructed before the regulations for SEE came into force). • The Team were not able to undertake a detailed review of any of the reports. However, DEP did allow a quick review of one report relating to waste prepared recently. The reports are prepared by unit (generation, transmission, and distribution), region (Samarkand, Bukhara, etc.) and by type (waste, water, air). The report that was reviewed related to the waste generated by Samarkand JSC TD. • The report provides information on all of the Samarkand JSC TD facilities that produces waste, summarizing the types of waste produced, and their respective volumes. According to DEP, all waste oils are collected by licensed facilities for disposal or recycling. • DEP was unaware of any procedures for managing polychlorinated biphenyls (PCBs), or if any testing for PCBs had been completed previously by UE.		

Department / Location:	Uzbekenergo Design Institute	**Date:**	26 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Farida Gimalova, Head of Department, Department of City Electrical Networks, Design Institute 4. Miosar Musaeva, Senior Expert, Department of City Electrical Networks, Design Institute 5. Bahtiyor Batirov, Expert, Department of City Electrical Networks, Design Institute 6. Ilhomjon Nurmatov, Expert, Department of City Electrical Networks, Design Institute		

Summary	• The Design Institute have prepared feasibility studies (FS) for each regional project under the program. The FS includes a description of the regional project, but does not specify the locations of the activities, nor the exact nature of the activities. For example, they do not specify how many of the proposed new transformers will be pole mounted or kiosk types, or how many will be installed each year. The FS is generally a framework document that specifies the need for the project and the amount of goods and types of activities that are required to meet the needs of the projects within the framework of the program. • According to the Design Institute, each project is classified as Category IV according to Uzbek SEE regulations. This is the conclusion of the environmental portion of the FS. The Design Institute stated that this categorization has been approved by the SCNP; however, this approval has not been provided to date for review. • The Design Institute stated that there are no specific environmental management measures or codes for the types of small-scale works planned under the program—e.g., the requirement for transformers to have bunding, or secondary containment to capture spills and leaks of oils. As such, none have been included in the FS. • Safety zones exist for all project components. Where practical, these zones are implemented; but, in some cases (e.g., construction of distribution lines in dense urban areas), this is not always practical. • All project activities will be designed in accordance with Uzbek Health and Safety codes. The Design Institute provided the specifications of pole-mounted transformers showing that the minimum height above ground levels for the transformers was 3.0 meters.

Location: Head Office of Jizzak JSC TD	**Date:** 29 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Aziz Kurbanov, National Involuntary Resettlement Specialist 4. Mr. Uralov Sunnat, Deputy Director, Jizzak JSC TD 5. Mr. Saidov Komil, Chief Engineer, Jizzak JSC TD 6. Mr. Berdimurodov Berdiyor, Deputy Chief Engineer, Jizzak JSC TD 7. Mr. Odilov Bakhrom, Safety Engineer, Jizzak JSC TD 8. Mr. Almatov Farrukh, Operations Engineer, Jizzak JSC TD 9. Mr. Kholmurodov Furkat, Head of Department, Jizzak JSC TD 10. Mr. Akhmedov Akbar, Head of Department, Jizzak JSC TD 11. Mr. Kudratov Abduazim, Head of Department, Jizzak JSC TD
Summary	• According to the representatives of Jizzak JSC TD, there is no testing, nor no previous testing, of PCBs in transformer oil. There was no knowledge within the JSC TD of PCBs or their hazards. • During transformer maintenance, oil is routinely removed from transformers in the central maintenance facility in Jizzak. The oil is treated and tested before it is reused in the repaired transformers. Oil that is no longer suitable for reuse after treatment is stored at the maintenance facility before it is removed by a state approved contractor. • Other waste generated during the transformer maintenance works (e.g., aluminium, copper, etc.) are separated and recycled.

	• The company do use air cooled 'dry transformers' in some locations. This has several benefits, including (i) reduced fire risk, (ii) lower noise levels, and (iii) the elimination of the need for cooling oil. However, it was noted that these transformer types are more difficult to maintain. • According to the company, SF_6 is not used in the 10-kilovolt (kV) system. Vacuum switchers are used for 10 kV and below, with SF_6 only being used in switchgear for systems above 35 kV. • There is no environmental engineer within the company's staff. A Department of Health, Safety and Supervision works under the Chief Engineer. The department comprises engineers responsible for health and safety, fire safety, and operational activities. • No environmental training is provided to staff. However, a range of health and safety training is provided, including (i) health and safety training once every 3 months to all staff working in areas of health and safety risks, (ii) fire safety training once every 6 months, and (iii) health and safety induction training for all new staff. • The JSC TD do have set requirements and standards to follow for the use of personal protective equipment (PPE). However, some staff did note that the amount or availability of PPE was not always sufficient. • The JSC TD keeps records of accidents and incidents, including those involving local community; although, no specific documents were made available for review. • Most complaints from the local community relate to power outages. In the event of a planned power outage, large companies and heads of *makhallas* (communities) are informed in advance. According to the JSC TD, there are no complaints regarding noise from old transformers. • The JSC TD has a telephone hotline for complaints; although, there is no formal grievance redress mechanism (GRM).
Meeting Photos	

Protocol

Консультации по проекту АБР «Доступ к устойчивым источникам энергии – программа модернизации распределительных сетей

г. Джизак, Республика Узбекистан

29 Апреля 2019 года

СПИСОК УЧАСТНИКОВ КОНСУЛЬТАЦИИ

Место проведения: ПЭС Джизак

#	Организация	Ф.И.О.	Занимая должность	Электронная почта	Подпись
1	ПЭС АО Джизак	Саидов Комил Собиржонович	гл. инженер		
2	-//-	Уралов Суннатилла Кучкарович	Директор по КС		
3	-//-	Бердимуродов Бердиёр Абдумажидович	Бош мухандис ўринбосари		
4	-//-	Одилов Бахром Икромович	Хавфсизлик техникаси мухандиси		
5	-//-	Алмазов Фаррух Абдуллаевич	эксплуатация бўлим мухандиси		
6	-//-	Холмуродов Фуркат Отакулович	ИЧТБ бошлиғи		
7	-//-	Ахмедов Акбар Усмонович	МТЮХ бошлиғи		
8	-//-	Кудратов Абдуазиз Норматович	ОКС бошлиғи		

Location: Head Office of Samarkand JSC TD	Date: 29 April 2019

Participants

1. Nick Skinner, International Environmental Specialist
2. Sergey Kim, National Environmental Specialist
3. Aziz Kurbanov, National Involuntary Resettlement Specialist
4. Mr. Makhmud Pardaev, Director General, Samarkand JSC TD
5. Mr. Sunnat Shmurodov, Deputy Director, Samarkand JSC TD
6. Mr. Sukhrob Mirzakulov, Head of Department, Samarkand JSC TD
7. Mrs. Olga Okhotina, Standardization Engineer/Environmental Focal Point, JSC TD
8. Mr. J. Rabbimov, Safety Engineer, Samarkand JSC TD

Summary

- The organizational structure within Samarkand JSC TD is the same as in Jizzak.
- Samarkand JSC TD has an “environmental focal point” who sits in the JSC TD’s Production and Technical Department and provides quarterly reports on air emissions, waste (including oils), and water. These reports are sent to SEP and the SCNP.
- If tree trimming or cutting is required on government land, the JSC TD coordinates with the Regional Department of the Committee for Nature Protection who will make an assessment of the tree types and numbers affected, and informs the company of the fee required for any tree cutting. The company undertakes the tree cutting once permission is received from the Regional Department of the Committee for Nature Protection.
- No herbicides or pesticides are used by the JSC TD.
- The JSC TD has a log book of all community accidents. According to the JSC TD, accidents involving the local community are rare, but do happen—e.g., a person walked into a live distribution wire with an extended ladder and died. In addition, and relevant to other points discussed in the program safeguard systems assessment (PSSA), is that one young boy kicked a ball into an open transformer kiosk and died while trying to retrieve the ball.

	• As in Jizzak, local companies and heads of *makhallas* are informed in advance of any planned power outages or localized works. All transformers have a sticker with the complaint's hotline attached. However, there is no specific GRM for workers. • According to the JSC TD, the main health and safety issues involve working at heights. They noted that the JSC TD only has one crane lift (cherry picker) and often works are performed on ladders which are not suitable for these activities. • The Health and Safety Department keeps a log of all staff accidents and investigates the causes of all accidents. • According to the JSC TD, there is a general lack of suitable first aid boxes and harnesses available at work sites. • The engineer in charge of the JSC TD Oil Department had no knowledge of PCBs. However, he did comment that the maintenance yard would benefit from new oil storage facilities as the existing facilities were rather old.
Photos	 
Protocol	

Консультации по проекту АБР «Доступ к устойчивым источникам энергии – программа модернизации распределительных сетей
Самаркand, Республика Узбекистан
29 Апреля 2019 года

СПИСОК УЧАСТНИКОВ КОНСУЛЬТАЦИИ

Место проведения: АО ПТЭС Самарканд

#	Организация	Ф.И.О.	Занимая должность	Электронная почта	Подпись
1	АО Сам ПТЭС	Окотина Ольга	инженер по стандартизации		
2	АО Сам ПТЭС	С. Мирзакулов	Начальник ПТО	Suhrob_0510@mail.ru	
3	АО Сам. ПТЭС.	Ж. Раббимов	шпт СНТБ		
4	АО Сам ПТЭС	М.Х Мардаев	Ген директор		
5	Самобл экология	Т.Ж Хашимов	нач. отдела	90 505 72 82	
6	АО Сам ПТЭС	С. Шондротов	Директор по кап строительству		
7					
8					

Location: Head Office of Samarkand JSC TD	**Date:** 29 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Aziz Kurbanov, National Involuntary Resettlement Specialist 4. Mr. Tokhir Khashimov, Head of Division, Regional Department of the Committee for Nature Protection
Summary	• The specialist from the Regional Department of the Committee for Nature Protection recommended that the highest category of ADB ranking available

	should be applied to the project (i.e., Category B) and that he did not agree with the national Category IV categorization. • The specialist recommended that soil and groundwater protection should be provided below transformers. However, he did note that there are no specific regulations for this type of activity. • He stated that the JSC TD submit three types of reports to the Regional Department of the Committee for Nature Protection—i.e., on air emission, waste, and water use. • The Regional Department of the Committee for Nature Protection undertake one inspection per year of the JSC TD warehouse and maintenance yard in Samarkand. After the visit, the SCNP prepares a report of their findings, including any required corrective actions, and submits the report to the JSC TD. According to the Samarkand JSC TD environmental focal point, there were no significant findings from the most recent inspection; however, the findings, or report from the Regional Department of the Committee for Nature Protection, were not provided for review. • The Regional Department of the Committee for Nature Protection do not undertake site visits or inspections of any other facilities, e.g. substations or transformers. • The Regional Department of the Committee for Nature Protection specialist did not know what PCBs were and had no knowledge of any measures to manage them.
Photos	

Location: Head Office of Bukhara JSC TD	**Date:** 30 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Aziz Kurbanov, National Involuntary Resettlement Specialist 4. Mr. Sharipov Rukhullo, Engineer, Bukhara JSC TD 5. Mr. Makhmudov Ibratillo, Deputy Chief Engineer, Bukhara JSC TD 6. Mr. Mamatov Kamoliddin, Head of Department, Bukhara JSC TD 7. Mr. Khaydarov Mukhammad, Engineer, Bukhara JSC TD

	8. Mrs. Fattaeva Zulkhumor, Safety Engineer, Bukhara JSC TD 9. Mr. Azimov Akhmadjon, Head of Makhalla (Local Community), Bukhara City
Summary	• During maintenance of transformers, oil is extracted from the transformers and treated before testing in a laboratory. If the oils meet the required technical standards, they are reused; if not, they are sent to a below-ground storage tank where the oil is stored before collection by a state authorized waste management company. • Nobody in the meeting had any specific knowledge of PCBs or their hazards. • The JSC TD does not use air-cooled transformers due to the high summer temperatures in Bukhara. • A Supervising Engineer is the focal point for environment within the JSC TD, who (similar to the Samarkand focal point) prepares quarterly reports for air emissions, water, and waste for submission to the Regional Department of the Committee for Nature Protection. • The JSC TD has a Department for Complaints and Executive Discipline comprising five staff. Complaints can be made to the department via telephone hotlines, website (via email), and social media. The head of the *makhalla*, who was present at the meeting, confirmed responsibility for the complaints telephone number, and that most of the complaints from locals in the *makhalla* were directed through him. The Department receives approximately 2,000 complaints per year, most of which are related to power cuts. Few complaints relate to environmental issues, such as noise. According to the department, there are no complaints from the local community regarding safety aspects. Complaints are sent directly to the JSC TD Company Director for review and then channelled through the Chief Engineer for action. • The JSC TD also has a formal GRM. A copy of the GRM was requested for review, but has not been sent for review to date. • SF_6 is only used in substation switchgear (not part of the ADB-funded program). There is no specific instruction for the management of SF_6. • According to the JSC TD, several accidents have been recorded over the last few years involving the local community. All accidents are recorded by the Health and Safety Department. • The JSC TD has biannual media campaigns in the newspapers and on TV to raise awareness on electrical safety. • The Health and Safety Department noted that the quality and quantity of PPE is not adequate—e.g., they need more than 2,000 pairs of protective gloves, but only have less than 1,000. However, they noted that this is not increasing the levels of workplace injuries; instead, workers simply do not do the work until they have the correct PPE. • Occupational health and safety (OHS) accidents are reported on several levels to the (i) labor union, (ii) Ministry of Labor, (iii) Ministry of Emergency Situations, (iv) police, and (v) UE headquarter.
Photos	 

Protocol

Консультации по проекту АБР «Доступ к устойчивым источникам энергии
– программа модернизации распределительных сетей
Бухара, Республика Узбекистан
30 Апреля 2019 года

СПИСОК УЧАСТНИКОВ КОНСУЛЬТАЦИИ

Место проведения: Электросеть Бухара

#	Организация	Ф.И.О.	Занимая должность	Электронная почта	Подпись
1	Бухоро вилоят Давлат экология эксперт. Гиза маркази	Абдумоев Икромжон Иззатиллоевич	Етакчи мутахассис	93-450-77-37	
2	Бухоро ҲЭТК АЖ бош муҳандиси	Шарипов Рухилло Жабборович	бош муҳандис	91-444-98-55	
3	Бухоро ҲЭТК АЖ	Фаттоева Зулхумор	МХ ва ТХ муҳандиси	93 651 58 52	
4	Бухоро ҲЭТК АЖ	Маматов Камолиддин Рахматиллоевич	ИИТБ бошлиғи	90-715-31-66	
5	С. Бохарзий МФЙ	Азимов Ахмаджон	раис	91-415-20-44	
6	Бухоро ҲЭТК АЖ	Мамедов Ибрагим	Бош муҳандис ўринбосари	91-312-74-56	
7	Бухоро ҲЭТК АЖ	Хайдаров Муҳаммад	ИТБ муҳандиси (Экология соҳаси)	91-311-06 12	
8	Охрана памятников	Бабаев Сухроб Туйгунович	Начальник	s.bzboev@yandex.ru +998 90 9003970	

Location: Head Office of Bukhara JSC TD	**Date:** 30 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Aziz Kurbanov, National Involuntary Resettlement Specialist 4. Mr. Boboev Sukhrob, Head of the Bukhara Province Department for Cultural Heritage Protection
Summary	• The Head of the Bukhara Province Department for Cultural Heritage Protection stated that there are procedures for working in these areas which are duly followed by UE. • If the Department requires it, supervisors from the Department will be sent to monitor works, such as excavation of trenches. • The representative of the Department did however note that it was unlikely that PCR would be found in trenches close to roads (where most of these types of activities would be undertaken).

Location: Head Office of Bukhara JSC TD	**Date:** 30 April 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Aziz Kurbanov, National Involuntary Resettlement Specialist 4. Mr. Abdullaev Ikromjon, Expert, Bukhara Regional Department of the Committee for Nature Protection
Summary	• The specialist was new to the SCNP, so had a rather limited knowledge of procedures; although, he did comment that the project was more likely to be a Category III project than a Category IV project. • They undertake quarterly inspections of the distribution company, but only to inspect paperwork, not work sites or facilities. • They only inspect sites when plans and projects are being proposed, e.g., as part of the EIA process.

Location: State Committee for Nature Protection, Tashkent	**Date:** 12 June 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Anwar Boltaev, Technical Specialist 3. Tamara Timofeevma, Chief Expert of SEE, SCNP 4. Sardor Sultanov, Expert of SEE, SCNP
Summary	• Discussions were held relating the SEE regulations, specifically confirming: o Requirements for consultations o Requirements for consideration of alternatives o Requirements for the disclosure of reports and documents o Requirements and contents of an EMP • The findings of these discussions are all summarized in the safeguards diagnostics review in **Section 2**.
Photos	

Location: REN PIU	**Date:** 11th June 2019
Participants	1. Nick Skinner, International Environmental Specialist 2. Sergey Kim, National Environmental Specialist 3. Mr. Anvar Gaybullaev, Head of the Management of Implementation and Realization of the State Programs and Investment Projects 4. Mr. Murad Yunusmatov, Deputy Head of PMU “Distribution Network Modernization Program”
Summary	• Discussions were held relating to the findings of the PSSA and the Safeguards Actions Table. • The PIU agreed that all of the recommendations in the PSSA were reasonable and warranted.

Appendix I – Guidelines for the Preparation of a SEMP

1. Preparation

The Contractor is responsible for preparing the Specific Environmental Management Plan (SEMP). The SEMP is prepared after the award of the contract and is to meet the conditions of the relevant Contractor bidding documents.

The Contractor can move to the site and commence work only after the SEMP has been approved by the Implementing Agency (IA) Project Management Unit (PMU) and the Project Implementation Consultant (PIC, also referred to as the 'Engineer' or 'Supervision Consultant').

The SEMP is a contractually binding document and applies equally to the main Contractor and to Sub-contractors under its control.

The SEMP must be compliant with (i) the SEMP conditions, and (ii) any national legislation. All licenses and permits issued by any outside organization that are required to meet the SEMP conditions are to be attached to the SEMP. An example could be a license to operate a borrow pit.

The PMU / PIC may require the Contractor to assess the SEMP activities. When any inspection by the PMU / PIC is undertaken and the work is found to be unsatisfactory, a non-compliance notice will be issued to the Contractor. The Contractor will implement corrective action to address the issues raised in the notice. When the work is shown to be non-conforming with the SEMP, the Contractor will be responsible for meeting costs of all investigations and associated corrective actions.

After a period, the Contractor may request that the contents of the SEMP be changed, but any requests and alterations to the SEMP can be approved only by the PMU / PIC. Likewise, the PMU / PIC may also request changes be made to the SEMP. In this respect the SEMP can be referred to a live working document.

The Contractor is to keep a daily record of all work done to meet the SEMP requirements. The daily record is to be available to the PMU / PIC. The Contractor is to provide monthly reports to the PMU / PIC regarding compliance with the SEMP.

2. Content

The SEMP needs to be a concise and well-focused document that clearly sets out how the Contractor will meet the requirements of the project EMP. The SEMP shall consist of at least the following sections:

Introduction and Purpose

Identify the project and state the purpose of the SEMP. Identify who prepared the SEMP together with the contacts of the person who prepared the document.

Management Responsibilities

This section must clearly identify those persons within the Contractor's team who will be directly responsible for supervising the SEMP activities. Each person and position is to be identified and contact details provided for their work, after-hours phone numbers for emergency situations, and their email addresses. Details are to be provided as to whether these persons are available on a

full-time or part-time basis at the construction site. As a minimum, details are required for the following positions:

- The Contractor's environmental manager.
- The back-up person for the environmental manager whenever the environmental manager is away from the site.
- The Contractor's site engineer, who is responsible for supervising the contract on behalf of the Contractor.
- Any other persons on the Contractor's team who will have management responsibilities as required to meet the activities outlined in the SEMP conditions.

Legal Requirements

This section will outline the various environmental laws, regulations, and standards that the Contractor must comply with during construction. This will include all of the approved Project standards that have been outlined in the Project EIA, for example air quality standards, water discharge limits, etc.

Licenses and Permits

Provide details of licences and permits that the Contractor will require to undertake the works, e.g. licenses to operate a borrow pit, extract groundwater, etc.

Special Environmental or Cultural Issues

Show whether there are any special issues associated with the location of the work area that is, whether it is located inside or close to environmentally or culturally sensitive areas. Advise what approvals will be required and how work will be undertaken in these areas. Locate the boundaries to the areas in the plan of works.

Scope of Works

Define the construction requirements so that these clearly identify all of the work to be undertaken by the Contractor.

Plan of Works

The Contractor is to provide an overall plan of works that shows the location of all of the construction sites and the Contractor's support facilities and access roads. The plan of works should be based on the detailed engineering site plans and should show the following:

- Boundaries of the construction sites showing the extent of the disturbed area;
- Boundaries of any culturally or environmentally sensitive areas;
- Access roads (temporary and permanent);
- Contractor's facilities (show the location of offices, workshops, vehicle and machinery parking areas, material storage areas, fuel stores, etc.);
- Worker camps;
- Areas to be excavated;
- Areas where excavated fill will be dumped both as temporary and permanent dumps;

- Locations of material sources, sand, and stones;
- Waste disposal sites (non-hazardous and hazardous); and
- North, the map scale, contours, and existing drainage lines.

Machinery and Support Equipment Brought to Site

The Contractor is to provide:

- A list of all the machinery, vehicles, and support equipment that will be brought to the project;
- The age of the machinery;
- An assessment of the condition of the machinery[63] as good, average, or poor; where average or poor machinery is listed, describe the defect;[64]
- Where vibratory rollers are to be used, indicate the weight of the roller and the safe operating distances where the machine can be operated without causing harm to surrounding buildings or other susceptible infrastructure (the zone of vibration); and
- Any machinery that will create noise above 45 dBA is to be listed.

Table 68: Example of Table for Machinery that will be Brought to Site

Make and Type	Age (years)	Condition
Excavator	2	Good
Bulldozer	3	Average
7 Ton Truck	1	Good
Mobile Crane	7	Average

Details of Sites Used to Source Raw Materials

This includes borrow pits and quarries. The SEMP is to provide the following details:

- Location of material supply areas;
- Type of activity and material extracted, e.g., borrow pit for sub-base or quarry for aggregate;
- Requirement for any permits or approvals to open the borrow pit of quarry;
- Estimated amounts to be extracted – total volume required and daily amounts as numbers of truckloads for how many days/months;
- Names of villages and distances along road (in kilometers) that the haul road may need to traverse before reaching the site;
- Machinery that will be operated at the site; and
- Health and safety issues that will be required to be addressed at the site.

[63] Condition relates to the age and the maintenance of the machinery or vehicles. Any vehicles or machinery that are leaking oil or fuel and are operated without satisfactory silencing or are deficient in safety equipment must be classified as average or poor.
[64] Under the contract, the PSU is able to reject any machinery or vehicles that are unsatisfactory.

Contractor's Facilities and Worker Camps

Provide details of the facilities that the contractor will erect on-site for (i) its own use, and (ii) worker camps. The contractor is to show the location of these facilities on the plan of works and provide the following details:

- For Contractor facilities: show the areas required in square meters for all facilities such as administration offices, stores and workshops, vehicles and machinery parking areas. Show sources of electricity and water supply.
- For worker camps: provide details of (i) number of people occupying the camps; and (ii) areas (m^2) and facilities installed for (a) washing and sanitation areas, (b) cooking, (c) sleeping areas, and (d) recreation areas.

For both the Contractor and worker facilities, describe the following:

- Type of construction of facilities (floor, walls, and roof);
- Storm-water drainage, collection systems, flow paths, and disposal areas;
- Source of water and type of treatment required for cooking, washing, and drinking;
- Effluent systems to handle the disposal of washing, sanitation, and kitchen waste water;
- Source of energy to be used for heating and cooking;
- Confirm as "yes" or "no" if the facilities or camps are to be located within or closer than 2 kilometres of a protected or forested area;
- How long the camps will be required to be used; and
- Procedure for closing and dismantling the camps.

Enter details in a table like Table 2.

Table 69: Example of Contractor's Facilities to be Used during Construction

	Facility	Area (m^2)	Construction			Stormwater drains to…	Effluent drains to…
			Floor	Walls	Roof		
1	Administration offices	300 m^2 (30 m x 10 m)	New transportable building			Freshwater tanks	Closed septic system
2	Workshop and machinery washdown areas	200 m^2 (20 m x 10 m)	concrete	c.g.i.	c.g.i.	Oil & water separator > sediment basin> natural drainage system	Closed septic system
3	Vehicle and machinery parking area	800 m^2 (40 m x 20 m)	Compacted coral aggregate			sediment basin> natural drainage system	n.a.
4	Storage area – materials	400 m^2 (40 m x 10 m)	Coral aggregate	c.g.i.	c.g.i.	Sediment basin> natural drainage system	n.a.
5	Storage area – fuel (5,000 liter) skid tank	15 m^2 (5 m x 3 m)	Concrete bunded base			Oil and water separator > sediment basin> natural drainage system	n.a

c.g.i. = corrugated iron; n.a. not applicable.

3. Environmental Works Procedures

The SEMP is to provide a series of procedures that are designed to protect the environment. These are called environmental work procedures (EWP) and outline how work will be arranged to address the various issues that have been outlined in the SEMP.

The SEMP will review and build on the project EMP requirements to develop more detailed procedures for implementation in the construction activity. While the project EMP provides a list of mitigation requirements that will require procedures to be developed for each of them, the Contractor is required to review the adequacy of the requirements and if necessary include additional procedures. Should the Contractor consider that a procedure that is shown in the project EMP is not required, the Contractor will need to justify that decision.

The following is a list of procedures that may be required to be included in the SEMP. The project EMP will confirm which of these procedures or others will be required.

- Site preparation
- Excavation of construction sites
- Removal and disposal of excavated waste
- Erosion and sedimentation
- Storage and handling of construction materials, fuel, and lubricants
- Noise and vibration
- Dust generation
- Public access to site
- Risk to public and worker health and safety
- Use of hazardous materials
- Worker issues (e.g., use of fuel wood, hunting, clearing areas for gardening)
- Disposal of waste material (solid and liquid)
- Archaeological discoveries
- Rehabilitation of construction sites and Contractor facilities

4. Monitoring of Work

The SEMP is to provide details of how each activity will be monitored, how frequently the monitoring will be carried out, what criteria will be monitored, and who will undertake the monitoring. A monthly report on monitoring activities is to be included in the monthly SEMP report.

5. Staff and Worker Training

The SEMP is to provide details of staff and worker training and awareness programs that will be required to ensure compliance with the SEMP. Awareness of staff and workers about safety and environmental regulations, the SEMP requirements, and in special circumstances where work will need to be carried out within or adjacent to protected areas or areas of cultural heritage will be particularly important. The program will need to show who will be responsible for implementing

the program and where the program will be introduced so as to ensure that all workers are aware of the SEMP requirements before commencing work.

6. Reporting

The Contractor is to provide details in a monthly SEMP report. The report will be prepared by the person who has been identified within the Contractor's team as responsible for overseeing the SEMP procedures. The report will outline progress with regard to the project's physical monitoring targets and implementation of the SEMP for these works. The report should note which tasks have been completed and have been approved for payment by the PMU / PIC. The report is to specify if any notices have been issued by the PMU / PIC to correct work and what has been done by the Contractor to address these issues. Any complaints or issues that have been received from the public are to be listed in the report. Three copies of the report are to be sent to the PMU / PIC. The report will address the following topics:

- Status of work program: work completed, construction under way, and work planned Environmental unit and staff situation for the month
- Staff and worker awareness training carried out
- Waste volumes, types, and disposal (inorganic and organic) Areas revegetated and rehabilitated
- Dust control report
- Discovery of artefacts
- Safety and monthly accident report
- Status of SEMP environmental mitigation measures
- PMU / PIC notices issued and status of all nonconforming work
- Environmental Incidents
- Complaints received
- Other relevant environmental issues

Appendix J – Report Preparers

This report has been prepared by Nick Skinner, Environmental Specialist at Vista Environment AB. Mr Skinner is an experienced professional with a range of skills relating to environmental and social management, specifically in the infrastructure and power sectors. Key qualifications include:

- Prepared more than fifty environmental and social impact assessments (ESIA) for a range of funding agencies including the EIB, EBRD, World Bank Group, Millennium Challenge Corporation (MCC), JICA, ADB and USAID;
- Prepared environmental management and mitigation plans for a range of projects including power generation, transmission and distribution, gas production, roads, bridges, tunnels, irrigation and agriculture, rail and metro and water treatment;
- Preparation of ESIAs including the following technical elements; noise models, air quality models, thermal plume models, vibration models, analysis of tunnels on ground water flows;
- Team Leader for the impact assessment of road, hydrological and agricultural projects in Asia and Africa and Deputy Chief of Party for a USAID funded hydropower project study;
- Development of Strategic Environmental Assessment regulations for the Kyrgyz Republic;
- Environmental management for complex multi-project infrastructure programs with values of more than one billion USD;
- Preparation of environmental compliance documents, guidelines and training programs for USAID;
- Development of GRI based reporting mechanisms and reporting findings to the UNGC for a global power provider;
- Preparation of an Environmental Management System (EMS) for a 31MW CHP facility in Northern Ireland;
- Experience of the development of PPP infrastructure projects including the preparation of tender documents, environmental contract provisions and forming part of technical review panels;
- Advisory services to commercial lenders financing multi-billion euro infrastructure projects in Europe; and
- In depth knowledge of IFC Performance Standards and Equator Principles.

He has implemented projects in a diverse range of countries including Italy, United Kingdom, Poland, Romania, Kosovo, Ukraine, Albania, Macedonia, Turkey, UAE, Yemen, Qatar, Armenia, Georgia, Azerbaijan, Kazakhstan, Tajikistan, Kyrgyzstan, Uzbekistan, Afghanistan, Pakistan, Nepal, Vietnam, Indonesia, Laos, China, Ethiopia, Tanzania, Togo, Nigeria, Ghana, Sudan and Liberia.

Most recently he has been responsible for the preparation of EIAs or had input into the following ADB funded projects in Uzbekistan:

Gas Transmission Energy Enhancement (April 2019 to Present)
Preparing the EIA for two gas compressor stations and over 200 km of gas pipelines. Project includes an audit of existing facilities and air emissions modeling, noise modeling and biodiversity surveys.

Sustainable Hydropower Project (March 2019 – September 2019)
In association with Nippon Koei Consultants, updated the EIA of this run of river hydropower project. Managed an international team of experts in preparing ecological flows assessment and also and assessment of critical habitat in the nearby Key Biodiversity Area.

Distribution Network Modernization Program (February 2019 to June 2019)
Environmental specialist for the results based lending program for the electrical distribution company of Uzbekistan. Completed a Program Safeguards System Assessment of the national regulations and the utility practices. Outputs included a set of program safeguards actions, including measures to manage issues such as persistent organic pollutants.

Power Generation Efficiency Improvement Project (September 2016 – July 2017)
Prepared the Environmental Impact Assessment of for the expansion of the Talimarjan Gas Power Plant in Uzbekistan. The project will add 900 MW of power to the existing 1.7GW plant. Key aspects of the EIA are air dispersion modeling, assessment of thermal pollution, climate change impacts, social and health impacts and cumulative noise impacts. As part of the environmental assessment an environmental audit of the existing power plant was also prepared.

Appendix K – Year 1 Activity Sites

№	МФЙ, ҚФЙ ва кўча номи *(асос) - Location*	ЖАМИ - Total		Шу жумладан								Амалга ошириш муддати *(чорак кесимида) - Implimentation Period (quater)*
				Янги қурилиш - New Construction				Реконструкция - Reconstruction				
		0.4-10 кВ ЭУТ	ТП	ЭУТ (км)			ТП	ЭУТ (км)			ТП	
				Жами - Total	6-10 кВ	0,4 кВ	сони	Жами	6-10 кВ	0,4 кВ	сони	
Жами вилоят бўйича		**983.5**	**495**	**210.4**	**132.5**	**77.9**	**343**	**773.0**	**645.0**	**128.0**	**152**	
	Олот туман											
1	Олот марказ ПС Олот 35/6 кВ Ф.Олот 6 кВ га 6-10 кВ тармок куриш (асос 2661)	13.7	0					13.7	13.7			II-чорак
2	Пахтакор МФЙ ПС Жумабозор 35/10 кВ Ф.Навоий 10 кВ га 6-10 кВ тармок куриш (асос 2661)	42.6	0					42.6	42.6			III-чорак
3	Навруз МФЙ ПС Олот 35/6 кВ Ф.Шарк юлдиз 6 кВ га 6-10 кВ тармок куриш (асос 2661)	5.5	0					5.5	5.5			март
4	Кирлишон МФЙ Кул човдир к-к га ТП-212 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.3	0.2	1					IV-чорак
5	Касакли МФЙ Кесакли к-к га ТП-102 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.3	0.2	1					III-чорак
6	Шайхлар МФЙ Шайхлар к-к га ТП-113 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос обод кишлок)	0.1	1	0.1	0.0	0.1	1					февраль

7	Шайхлар МФЙ Кесакли к-к га ТП-113 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	0.4	1	0.4	0.1	0.3	1					февраль
8	Ёшботир МФЙ Чорбог к-к га ТП-219 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.3	0.2	1					III-чорак
9	Узбекистон МФЙ Бохористон к-к га ТП-89 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.2	0.3	1					IV-чорак
10	Арабхона МФЙ Арабхона к-к га ТП-250 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.2	0.2	1					III-чорак
11	Буржок МФЙ Буржоқ қ-қ га ТП-127 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					II-чорак
12	Халифа МФЙ Дўслик кўчаси га ТП-298 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1					II-чорак
13	Хосабуйи МФЙ Чиғатой к-к га ТП-245 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					II-чорак
14	Усмоншайх МФЙ Усмоншайх к-к га ТП-108 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1					IV-чорак

15	Эски олот МФЙ буйик ирак йўли га ТП-203 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1					II-чорак
16	Балант мачит МФЙ Ожиайров қ-қ га ТП-41 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					март
17	Денов МФЙ Тўзанли қ-қ га ТП-181 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					III-чорак
18	Солақоравул МФЙ Солақоравул қ-қ га ТП-285 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					II-чорак
19	Усмоншайх МФЙ Гулобот қ-қ га ТП-277 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					III-чорак
20	Маърифат МФЙ Юқори олот қ-қ га ТП-95 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.9	1	0.9	0.8	0.1	1					II-чорак
21	Хидрейли МФЙ Хидрейли қ-қ га ТП-118 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.4	0.2	1					IV-чорак
22	Нуробод МФЙ Нуробод к-к га ТП-214 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					III-чорак

23	Бустон МФЙ Бустон к-к га ТП-90 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					II-чорак
24	Бунёткор МФЙ Бунёткор к-к га ТП-13 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1					III-чорак
25	Халифа МФЙ Кулоллар кучаси га ТП-54 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.2	0.2	1					феврал
26	Балант мачит МФЙ Балант мачит к-к га ТП-180 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.5	0.1	1					II-чорак
27	Ёшботир МФЙ Ёшботир к-к га ТП-147 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.4	0.1	1					III-чорак
28	Пичокчи МФЙ Пичокчи к-к га ТП-190 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.5	0.1	1					март
29	Чандир МФЙ Чандир к-к га ТП-232 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.7	1	0.7	0.5	0.2	1					III-чорак
30	Човдир МФЙ Човдирк-к га ТП-187 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.5	0.1	1					II-чорак

31	Мухтор МФЙ Мухтор к-к га ТП-134 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1					IV-чорак
32	Кул човдир МФЙ Мургак к-к га ТП-122 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.1	0.1	1					II-чорак
33	Талконсаёт МФЙ Талконсаёт к-к га ТП-316 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1					III-чорак
34	Жайхун обод МФЙ Жайхун обод к-к га ТП-16 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.8	1	0.8	0.7	0.1	1					II-чорак
35	Навруз МФЙ Олот кучаси га ТП-107 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1					II-чорак
36	Халифа МФЙ Окпулот к-к га ТП-221 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.1	0.1	1					IV-чорак
37	Арабхона МФЙ Арабхона к-к га ТП-48 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.0	0.3	1					феврал
38	Кирлишон МФЙ Кирлишон к-к га ТП-32 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.0	0.2	1					IV-чорак

39	Шайхлар МФЙ Шайхлар к-к га ТП-231 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.0	0.1	1					март
40	Кул човдир МФЙ Кул човдир к-к га ТП-223 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.0	0.1	1					IV-чорак
	Жами:	**76.9**	**37**	**15.1**	**10.0**	**5.1**	**37**	**61.8**	**61.8**			
	Бухоро туман											
1	Янгиобод МФЙ Юринболо ахоли пункти га ТП-298 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлокк)	3.5	2	1.5	1.5		2	2	1.2	0.8		III-чорак
2	Истикбол МФЙ Талигандум ахоли пункти га ТП-94 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	2.1	2	1.7	0.8	0.9	2	0.4	0.3	0.1		II-чорак
3	Янгитурмуш МФЙ Чаримгар а-п га ТП-88 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1					0.2	0.1	0.1	1	IV-чорак
4	Арабхона МФЙ Кичикбой а-п га ТП-81 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.24	1					0.24	0.14	0.1	1	II-чорак
5	Кушкодим МФЙ Кушкодим га ТП-28 ни кувватини ошириш ва 0,4-6-10	0.2	1					0.2	0.1	0.1	1	III-чорак

	кВ тармок куриш (асос 2661)											
6	Сохибкор МФЙ Олмазор а-п га ТП-241 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1					0.4	0.3	0.1	1	II-чорак
7	Шехонча МФЙ Шехон а-п га ТП-476 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1					0.2	0.1	0.1	1	II-чорак
8	Истикбол МФЙ Хитоён а-п га ТП-95 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1					0.4	0.3	0.1	1	II-чорак
9	Богикалон МФЙ Юзон а-п га ТП-242 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1					0.4	0.3	0.1	1	II-чорак
10	Богикалон МФЙ Дугдуз а-п га ТП-23 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	0.1						0.1	0	0.1		III-чорак
11	Богикалон МФЙ Убанаяк га ТП-11 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.15	1					0.15	0.05	0.1	1	IV-чорак
12	Богикалон МФЙ Каракулён га ТП-139 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1					0.5	0.4	0.1	1	II-чорак
13	Гала Осиё МФЙ Кангав а-п га ТП-10 ни кувватини ошириш ва 0,4-6-10	0.5	1					0.5	0.4	0.1	1	II-чорак

	кВ тармок куриш (асос 2661)											
14	Дустлик МФЙ Ибн сино а-п га ТП-226 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1					0.1	0	0.1	1	II-чорак
15	Суфкоргар МФЙ Кумрабод а-п га ТП-156 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1					0.4	0.3	0.1	1	II-чорак
16	Маданят Работ МФЙ Кучкисофед а-п га ТП-374 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.15	1					0.15	0.05	0.1	1	III-чорак
17	Шергирон МФЙ Амир обод а-п га ТП-295 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.35	1					0.35	0.25	0.1	1	II-чорак
18	Амиробод МФЙ Огар а-п га ТП-293 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1					0.3	0.2	0.1	1	III-чорак
19	Маданят Работ МФЙ Янги Обод а-п га ТП-215 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1					0.1	0	0.1	1	феврал
20	Арабхона МФЙ Сулакиён а-п га ТП-283 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1					0.2	0.1	0.1	1	II-чорак

21	Амиробод МФЙ Авганон а-п га ТП-290 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1					0.2	0.1	0.1	1	март
22	Кунжикала МФЙ Юкори Новметан а-п га ТП-284 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1					0.3	0.2	0.1	1	IV-чорак
23	Новметае МФЙ Куйи Новметан а-п га ТП-311 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1					0.2	0.1	0.1	1	III-чорак
24	Новметае МФЙ Урта Новметан а-п га ТП-310 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1					0.2	0.1	0.1	1	II-чорак
25	Новметае МФЙ Урта Новметан а-п га ТП-314 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.15	1					0.15	0.05	0.1	1	III-чорак
26	Новметан МФЙ Кумробод а-п га ТП-315 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.15	1					0.15	0.05	0.1	1	II-чорак
27	Дилобод МФЙ Патпут а-п га ТП-491 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1					0.4	0.3	0.1	1	III-чорак

28	Ф.Узбекистон га 6-10 кВ тармок куриш (асос 2661)	36.19						36.19	36.19			II-чорак
29	Ф.Янги Турмуш га 6-10 кВ тармок куриш (асос 2661)	12.12						12.12	12.12			II-чорак
30	Истикбол МФЙ кобдун ахоли пункти га ТП-111 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.9	1	0.9	0.7	0.2	1					III-чорак
31	Кучкумар МФЙ Давлатобод ахоли пункти га ТП-530 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.2	1	1.2	0.8	0.4	1					IV-чорак
32	Янгитурмуш МФЙ Кечканок а-п га ТП-85 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	1	0.2	0	0.2	1					феврал
33	Янгитурмуш МФЙ Чораха а-п га ТП-116 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1	0.1	0	0.1	1					феврал
34	Шехонча МФЙ Шехон а-п га ТП-475 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	1	0.2	0	0.2	1					III-чорак
35	Истикбол МФЙ Кушхона а-п га ТП-91 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	0	0.1	0	0.1						II-чорак

36	Дустлик МФЙ Зарафшон а-п га ТП-514 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.73	0	0.73	0	0.73						III-чорак
37	Маданият Работ МФЙ Ёбукхона а-п га ТП-370 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	0	0.2	0	0.2						II-чорак
38	Янгиобод МФЙ Хазратбобо а-п га ТП-291 ни юкини енгиллаштириш (асос 2661)	0	1	0	0		1					III-чорак
39	Маданят Работ МФЙ Ёбухона а-п га ТП-371 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.4	1	0.4	0	0.4	1					март
40	Арабхона МФЙ Арабхона а-п га ТП-282 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	1	0.2	0	0.2	1					IV-чорак
41	Хумин МФЙ Хумин а-п га ТП-495 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.6	1	0.6	0	0.6	1					II-чорак
42	Талалён МФЙ Талалён а-п га ТП-403 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5	0	0.5	1					II-чорак
43	Дилобод МФЙ Той тепа а-п га ТП-337 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	0	0.1	0	0.1						III-чорак

44	Новметан МФЙ Янги обод а-п га ТП-313 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1	0.1	0	0.1	1					III-чорак
45	Богдошт МФЙ Разез 44 а-п га ТП-672 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.1	1	0.1	0	0.1	1					март
46	Гулшанобод МФЙ Туксабой а-п га ТП-349 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0	1	0	0		1					IV-чорак
47	Ф.Чорбакр га ТП-223 га 6-10 кВ тармок куриш (асос 2661)	22.17	0	22.17	22.17							III-чорак
	Жами:	**88.2**	**41**	**31**	**25.97**	**5.03**	**17**	**57.2**	**53.8**	**3.4**	**24**	
	Вобкент туман											
1	Пушмон МФЙ П/С Пахтакор 35/10 ф.Хайрабод 10 кВ га 6-10 кВ тармок куриш (асос 2661)	52.0	0	0				52.0	52.0			феврал-март
2	Хажувон МФЙ П/С ППР 110/10 кВ ф.Хажувон 10 кВ га 6-10 кВ тармок куриш (асос 2661)	14.0	0	0				14.0	14.0			феврал-март
3	Вобкент МФЙ П/С Вобкент 110/35/10 кВ ф.Райцентр 10 кВ га 6-10 кВ тармок куриш (асос 2661)	2.0	0	0				2.0	2.0			III-чорак
4	Дустлик МФЙ А.Дониш куча га ТП-1 ни 0,4 кВ тармок куриш (асос 2661)	1.5	0	0				1.5		1.5		IV-чорак

5	Шанба МФЙ Шанба кишлоги га ТП-471 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.3	1	0			1	0.3		0.3		III-чорак
6	Шанба МФЙ Шанба кишлоги га ТП-322 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	1	0			1	0.2		0.2		II-чорак
7	Катаган МФЙ Сарипанжа кишлоги га ТП-217 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	1.1	1	0.1	0.1		1	1.0		1		март
8	Катаган МФЙ Сарипанжа кишлоги га ТП-385 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	1.0	1	0.1	0.1		1	0.9		0.9		март
9	Шохнигор МФЙ Шохнигор кишлоги га ТП-82 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос обод кишлок)	0.3	1	0			1	0.3		0.3		III-чорак
10	Бешрабод МФЙ Бешрабод кишлоги га ТП-116 га 0,4 кВ тармок куриш (асос 2661)	1.5	0	0				1.5		1.5		III-чорак
11	Шохнигор МФЙ Ниёган кишлоги га ТП-78 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.05	0.05		1	0.0				феврал
12	Шохнигор МФЙ Работшех кишлоги га ТП-81 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				феврал

13	Пушмон МФЙ Пушмон кишлоги га ТП-433 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.1	0.4	1	0.0				III-чорак
14	Ширин МФЙ Ширин кишлоги га ТП-85 ни юкини енгиллаштириш ва 6-10кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				III-чорак
15	Ширин МФЙ Работ кишлоги га ТП-275 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				II-чорак
16	Роботохун МФЙ Работохун кишлоги га ТП-175 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.9	1	0.9	0.4	0.5	1	0.0				IV-чорак
17	Суфидехкон МФЙ Дукчилар кишлоги га ТП-45 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				II-чорак
18	Суфидехкон МФЙ Астарбоб кишлоги га ТП-576 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				III-чорак
19	Суфидехкон МФЙ Араблар кишлоги га ТП-41 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				матр
20	Хажувон МФЙ Авурдувон кишлоги га ТП-115 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.05	0.05		1	0.0				III-чорак

21	Хужаработ МФЙ Буйунтурук кишлоги га ТП-62 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				II-чорак
22	Шакаркент МФЙ Огаре кишлоги га ТП-11 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				III-чорак
23	Курувчи МФЙ Нарчок кишлоги га ТП-15А ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				IV-чорак
24	Шакаркент МФЙ Халач кишлоги га ТП-14А ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				II-чорак
25	Бозоржойи МФЙ Бозоржойи кишлоги га ТП-122 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				III-чорак
26	Муминобод МФЙ Муминобод кишлоги га ТП-111 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				март
27	Дустлик МФЙ Тинчлик куча га ТП-3 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				III-чорак
28	Истиклол МФЙ Г.Гулом куча га ТП-205 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				II-чорак

29	Работохун МФЙ Работохун кишлоги га ТП-113 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				IV-чорак
30	Чангарон МФЙ Найман кишлоги га ТП-37 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				II-чорак
31	Мирвоши МФЙ Чорработ кишлоги га ТП-483 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				III-чорак
32	Кулхатиб МФЙ Саркор кишлоги га ТП-48 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				III-чорак
33	Бешрабод МФЙ Кунгирот кишлоги га ТП-476 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.6		1	0.0				IV-чорак
34	Пушмон МФЙ Хайрабод кишлоги га ТП-227 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				II-чорак
35	Хажувон МФЙ Авурдувон кишлоги га ТП-607 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.0	1	2	0.5	1.5	1	0.0				III-чорак
36	Шанба МФЙ Кулбачи кишлоги га ТП-430 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				III-чорак

37	Узбакон МФЙ Арметон кишлоги га ТП-575 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				III-чорак
38	Узбакон МФЙ Сараосиё кишлоги га ТП-223 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				II-чорак
39	Диёр МФЙ Махалла кишлоги га ТП-241 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				IV-чорак
40	Халач МФЙ Халач кишлоги га ТП-244 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				III-чорак
41	Хужаработ МФЙ Буйунтурук кишлоги га ТП-282 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				III-чорак
42	Найман МФЙ Шофаёз кишлоги га ТП-172 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				II-чорак
43	Кулодина МФЙ Ниёзхужа кишлоги га ТП-125 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				III-чорак
44	Кулодина МФЙ Эшонлар кишлоги га ТП-267 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				II-чорак

45	Чорбогкент МФЙ Ширин кишлоги га ТП-330 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.8	1	0.8	0.8		1	0.0				II-чорак
46	Шохнигор МФЙ га 6-10 кВ тармок куриш (асос 2661)	1.1	0	1.1	1.1			0.0				IV-чорак
47	Шанба МФЙ Шанба кишлоги га ТП-224 ни юкини енгиллаштириш (асос 2661)	0.0	1	0			1	0.0				III-чорак
48	Узбакон МФЙ Арабхона кишлоги га ТП-236 ни юкини енгиллаштириш (асос 2661)	0.0	2	0			2	0.0				II-чорак
49	Шохнигор МФЙ Работак кишлоги га ТП-335 ни юкини енгиллаштириш (асос 2661)	0.0	1	0			1	0.0				III-чорак
	Жами:	**87.5**	**44**	**13.8**	**11.4**	**2.4**	**44**	**73.7**	**68.0**	**5.7**	**0.0**	
	Гиждувон туман											
1	Сарвари КФЙ ПС Бобур 35/10 кВ ф. Т.Болтаев 10 кВ га 6-10 кВ тармок куриш (асос 2661)	29.54	0	0				29.54	29.54			феврал-март
2	Пахтаобод МФЙ ПС Пахтаобод-35/10 кВ ф.Райнобод-10 кВ га 6-10 кВ тармок куриш (асос 2661)	39	0	0				39	39			феврал-март
3	Курик мфй Курик к-к га ТП-48 га 0,4 кВ тармок куриш (асос обод кишлок)	1.6	0	0				1.6		1.6		III-чорак
4	Курик мфй Кумбости к-к га ТП-465 га 0,4 кВ тармок куриш (асос 2661)	1.8	0	0				1.8		1.8		II-чорак

5	Курик мфй Кумбости к-к га ТП-217 га 0,4 кВ тармок куриш (асос 2661)	1.5	0	0				1.5		1.5		IV-чорак
6	Буктарой КФЙ, Буктарой га ТП-272 га 0,4 кВ тармок куриш (асос 2661)	1.16	0	0				1.16		1.16		II-чорак
7	Буктарой КФЙ, Буктарой га ТП-187 га 0,4 кВ тармок куриш (асос 2661)	1.8	0	0				1.8		1.8		II-чорак
8	Саидкент МФЙ Саидкент к-к га ТП-115 га 0,4 кВ тармок куриш (асос обод кишлок)	1.55	0	0				1.55		1.55		III-чорак
9	Саидкент МФЙ Саидкент к-к га ТП-138 га 0,4 кВ тармок куриш (асос обод кишлок)	1.8	0	0				1.8		1.8		III-чорак
10	Саидкент МФЙ Саидкент к-к га ТП-508 га 0,4 кВ тармок куриш (асос обод кишлок)	1.2	0	0				1.2		1.2		III-чорак
11	Буктарой КФЙ, Буйробоф к-к га ТП-339 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
12	Говшун МФЙ га ТП-425 ни кувватини ошириш (асос 2661)	0	1	0				0			1	IV-чорак
13	Сармижон МФЙ, Кулжаббор к-к га ТП-196 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
14	Узанон МФЙ Узанон к-к га ТП-648 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
15	Улфатбиби МФЙ Ростгуй к-к га ТП-672 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак

16	Саравари МФЙ Жигдазор к-к га ТП-163 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак
17	Вазиршох МФЙ Галгочи к-к га ТП-504 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак
18	Сармижон МФЙ, Сармижон к-к га ТП-381 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
19	Тарханон МФЙ Тарханон к-к га ТП-721 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак
20	Зарангари МФЙ Хархурон га ТП-156 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
21	Бобур МФЙ Улугбек кучасик га ТП-240 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак
22	Карна МФЙ Пархон к-к га ТП-89 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
23	Памуза МФЙ Памуза кучаси га ТП-305 ни кувватини ошириш (асос 2661)	0	1	0				0			1	IV-чорак
24	Окработ МФЙ Уригзор га ТП-651 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
25	Ростгуй МФЙ Ростгуй к-к га ТП-467 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак
26	Муганак МФЙ Муганак к-к га ТП-65 ни кувватини ошириш (асос 2661)	0	1	0				0			1	март
27	Зарангари МФЙ Юлканд к-к га ТП-30 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак

28	Окработ МФЙ Уригзор га ТП-77 ни юкини енгиллаштириш (асос 2661)	0	1	0			1	0				III-чорак
29	Тодон МФЙ Кушкпоён к-к га ТП-120 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.3	0.2	1	0				II-чорак
30	Улфатбиби КФЙ Гишти к-к га ТП-67 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.25		1	0				феврал
31	Армичан МФЙ Работоим к-к га ТП-290 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.25		1	0				III-чорак
32	Карна МФЙ Араблар к-к га ТП-404 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.25		1	0				III-чорак
33	Айритон МФЙ Тошработча к-к га ТП-461 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.65	1	0.65	0.3	0.35	1	0				IV-чорак
34	Саравари МФЙ Саравари к-к га ТП-481 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0				II-чорак
35	Гаждумак МФЙ Мирзаён к-к га ТП-402 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0				III-чорак

36	Узанон МФЙ Пизикмон к-к га ТП-150 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.35	1	0.35	0.35		1	0				III-чорак
37	Каллон МФЙ Каллон к-к га ТП-29 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0				IV-чорак
38	Шарк МФй Ю.Хамадоний кучаси га ТП-686 ни юкини енгиллаштириш (асос 2661)	0	1	0			1	0				феврал
39	Заргарон МФЙ Заргарон к-к га ТП-494 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.15	1	0.15	0.15		1	0				феврал
40	Баколлар МФЙ Кумработ га ТП-74 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.55	1	0.55	0.3	0.25	1	0				II-чорак
41	Улфатбиби КФЙ Хужамахалла к-к га ТП-72 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.45	1	0.45	0.45		1	0				IV-чорак
42	Хавузак МФЙ га ТП-63 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.25		1	0				III-чорак
43	Ф.Хужаев МФЙ А.Кодирий кучаси га ТП-323 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0				II-чорак

44	Шурча МФЙ Шурча к-к га ТП-103 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.35	1	0.35	0.35		1	0				II-чорак
45	Айритон МФЙ Юкори Сайдон к-к га ТП-53 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0				III-чорак
46	Кулжаббор МФЙ га ТП-349 ни юкини енгиллаштиришва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0				II-чорак
47	Шарк МФЙ Кабоби а/п га ТП-785 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0				III-чорак
48	Ф.Хужаев МФЙ А.Кодирий кучаси га ТП-649 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.2	0.2	1	0				IV-чорак
49	Улфатбиби МФЙ Хосакент а/п га ТП-76 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0				IV-чорак
50	Гулистон МФЙ Гулистон кучаси га ТП-658 ни юкини енгиллаштириш (асос 2661)	0	1	0			1	0				II-чорак
51	Чорсу МФЙ Кургон кучаси га ТП-6 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0				III-чорак

52	Гишти МФЙ Хупилар к-к га ТП-235 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0				IV-чорак
53	Армичан МФЙ Ишшо к-к га ТП-123 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1	0				III-чорак
54	Гулистон МФЙ И.Сино кучаси га ТП-2 ни юкини енгиллаштириш (асос 2661)	0	1	0			1	0				II-чорак
55	Баколлар МФЙ Баколлар к-к га ТП-73 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.55	1	0.55	0.45	0.1	1	0				III-чорак
56	Соктари МФЙ Шуробот к-к га ТП-678 ни юкини енгиллаштириш (асос 2661)	0	1	0			1	0				март
57	Улфатбиби КФЙ Каллахур к-к га ТП-70 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0				II-чорак
58	Буктарой МФЙ Буктарой к-к га ТП-187,272 ларни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.8	1	0.8	0.5	0.3	1	0				III-чорак
59		0.8	1	0.8	0.5	0.3	1	0				III-чорак
60	Курик МФЙ Курик к-к га ТП-49,48,217 ларни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.95	1	0.95	0.45	0.5	1	0				март
61		0.7	1	0.7	0.4	0.3	1	0				II-чорак

62		0.5	1	0.5	0.1	0.4	1	0				III-чорак
63	Саидкент МФЙ Саидкент к-к га ТП-115,138,508 ларни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.2	1	1.2	0.7	0.5	1	0				III-чорак
64		1	1	1	0.5	0.5	1	0				III-чорак
65		0.65	1	0.65	0.3	0.35	1	0				IV-чорак
	Жами:	**96.9**	**55**	**15.95**	**11.6**	**4.35**	**38**	**80.95**	**68.54**	**12.41**	**17**	
Бухоро шахар												
1	Шергирон МФЙ га ТП-357 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	8.26	1	0				8.26	8.26	0	1	феврал
2	Жубор МФЙ га ТП-100 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	3.8	1	0				3.8	3.8	0	1	март
3	Мохихоса МФЙ га ТП-601 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	6.3	1	0				6.3	6.3	0	1	III-чорак
4	Мохихоса МФЙ ПС Мохихоса 35/10 кВ ф.Ситорага 6-10 кВ тармок куриш (асос 2661)	10.8	0	0				10.8	10.8	0		IV-чорак
5	Гулчорбог МФЙ ПС.Шимолий 35/6 кВ ф.Кардиология га 6-10 кВ тармок куриш (асос 2661)	11.4	0	0				11.4	11.4	0		II-чорак
6	Гулчорбог МФЙ ПС.Шимолий 35/6 кВ ф.Сохибкор га 6-10 кВ тармок куриш (асос 2661)	15.2	0	0				15.2	15.2	0		III-чорак

7	М.Таробий МФЙ ПС Гарбий 35/6 кВ ф.Пояфзал Фабрикаси-2 га 6-10 кВ тармок куриш (асос обод махалла)	4.3	0	0				4.3	4.3	0		II-чорак
8	Ш.Юлдузи МФЙ га ТП-830 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос обод махалла)	0.5	1	0				0.5	0.5	0	1	III-чорак
9	Ш.Юлдузи МФЙ га ТП-1332 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос обод махалла)	1	0	0				1	1	0		IV-чорак
10	Пиридасгир МФЙ га ТП-578 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0				0.5	0	0.5	1	III-чорак
11	Х.Олимжон МФЙ га ТП-204 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.8	0	0				1.8	0.5	1.3		II-чорак
12	М.Таробий МФЙ га ТП-281 ни кувватини ошириш (асос обод махалла)	0	1	0				0	0	0	1	II-чорак
13	М.Таробий МФЙ га ТП-742 ни кувватини ошириш (асос обод махалла)	0	1	0				0	0	0	1	III-чорак
14	М.Таробий МФЙ га ТП-175 ни кувватини ошириш ва 0,4 тармок куриш (асос обод махалла)	1.7	1	0				1.7	0	1.7	1	III-чорак
15	Х.Олимжон МФЙ га ТП-44 ни кувватини ошириш ва 0,4 кВ	1.2	1	0				1.2	0	1.2	1	II-чорак

	тармок куриш (асос 2661)											
16	Х.Олимжон МФЙ га ТП-715 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	III-чорак
17	Шодлик МФЙ га ТП-375 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.6	1	0				0.6	0.6	0	1	II-чорак
18	Бахорзий МФЙ га ТП-330 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	1	0	0				1	0	1		IV-чорак
19	Дилкушо МФЙ га ТП-30 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.8	0	0				0.8	0.8	0		II-чорак
20	Ж.ИкромийМФЙ га ТП-17 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	II-чорак
21	Ж.ИкромийМФЙ га ТП-603 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	III-чорак
22	Х.Мушкин МФЙ га ТП-940 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	III-чорак
23	А.Темур МФЙ га ТП-313 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	1.5	1	0				1.5	1.5	0	1	III-чорак
24	А.Темур МФЙ га ТП-286 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	1	1	0				1	1	0	1	II-чорак
25	М.Улугбек МФЙ га ТП-15 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	II-чорак
26	Гулшан МФЙ га ТП-140 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	II-чорак

27	Ф.Хужаев МФЙ га ТП-774 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	III-чорак
28	Ф.Хужаев МФЙ га ТП-600 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	II-чорак
29	Ф.Хужаев МФЙ га ТП-297 ни кувватини ошириш (асос 2661)	0	1	0				0	0	0	1	III-чорак
30	А.Темур МФЙ ПС Жанубий 35/6 кВ ф.Бахтни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0				0.5	0.5	0	1	IV-чорак
31	М.Таробий МФЙ га 6-10 кВ тармок куриш (асос обод махалла)	1	0	0				1	1	0		IV-чорак
32	Дилкушо МФЙ га 6-10 кВ тармок куриш (асос 2661)	1	0	0				1	1	0		II-чорак
33	Дилкушо МФЙ га 6-10 кВ тармок куриш (асос 2661)	0.8	0	0				0.8	0.8	0		II-чорак
34	Сифатмуний МФЙ га 6-10 кВ тармок куриш (асос 2661)	1.3	0	0				1.3	1.3	0		III-чорак
35	Р.Хамроев МФЙ га ТП-710 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос2661)	0.3	1	0				0.3	0	0.3	1	II-чорак
36	Низомий МФЙ га 6-10 кВ тармок куриш (асос 2661)	1	0	0				1	1	0		IV-чорак
37	Низомий МФЙ га 6-10 кВ тармок куриш (асос 2661)	0.3	0	0				0.3	0.3	0		IV-чорак
38	Низомий МФЙ га 6-10 кВ тармок куриш (асос 2661)	0.5	0	0				0.5	0.5	0		II-чорак

39	М.Улугбек МФЙ га ТП-9А ни кувватини оширишга (асос 2661)	0	2	0				0	0	0	2	II-чорак
40	Низомий МФЙ га ТП-52 ни 0,4-6-10 кВ тармок куриш (асос 2661)	1	0	0				1	0.7	0.3		III-чорак
41	Истиклол МФЙ га 6-10 кВ тармок куриш (асос 2661)	1	0	1	1.0	0		0				II-чорак
42	Мохи Хоса МФЙ га 6-10 кВ тармок куриш (асос 2661)	1	0	1	1.0	0		0				III-чорак
43	Дилкушо МФЙ га ТП-252 ни юкини енгиллаштиришва 6-10 кВ тармок куриш (асос 2661)	1	1	1	1.0	0	1	0				IV-чорак
44	Ф.Хужаев МФЙ га ТП-207 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0	1	0				март
45	М.Таробий МФЙ га ТП-175 ни юкини енгиллаштириш (асос обод махалла)	0	1	0	0	0	1	0				II-чорак
46	М.Таробий МФЙ га ТП-832 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод махалла)	2.2	1	2.2	0.7	1.5	1	0				II-чорак
47	М.Таробий МФЙ га ТП-132 ни юкини енгиллаштириш (асос обод махалла)	0	1	0	0	0	1	0				III-чорак
48	Ш.Юлдузи МФЙ га ТП-79 ни юкини енгиллаштириш (асос обод махалла)	0	1	0	0	0	1	0				феврал
49	Ш.Юлдузи МФЙ га ТП-430 ни юкини енгиллаштириш (асос обод махалл)	0	1	0	0	0	1	0				II-чорак

50	Отбозор КФЙ га ТП-391 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				IV-чорак
51	Шейхон МФЙ га ТП-528 ни юкини енгиллаштиришва 6-10 кВ тармок куриш (асос 2661)	1.2	1	1.2	1.2	0	1	0				IV-чорак
52	Шейхон МФЙ га ТП-846 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				II-чорак
53	Тошмасжид МФЙ га ТП-325 ни юкини енгиллаштиришва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5	0	1	0				III-чорак
54	Янгиобод МФЙ га ТП-812 ни юкини енгиллаштириш (асос 2661)	0.2	1	0.2	0.2	0	1	0				II-чорак
55	Шергирон МФЙ га ТП-72 ниюкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				III-чорак
56	Шергирон МФЙ га ТП-357 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				II-чорак
57	Дилкушо МФЙ га ТП-529 ни юкини енгиллаштиришва 0,4-6-10 кВ тармок куриш (асос 2661)	1	1	1	1	0	1	0				март
58	А.Махалла МФЙ га ТП-733 ни юкини енгиллаштиришва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5	0	1	0				III-чорак
59	Жубор МФЙ га ТП-125 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				феврал
60	Шейхон МФЙ га ТП-92 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				II-чорак

61	Гулшан МФЙ га ТП-203 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				II-чорак
62	Янгиобод МФЙ га ТП-554 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				IV-чорак
63	Кукалдош МФЙ га ТП-13 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				II-чорак
64	Гулчорбох МФЙ га ТП-478 ни юкини енгиллаштириш ва тармок куриш (асос 2661)	0.5	1	0.5	0	0.5	1	0				II-чорак
65	Гулчорбох МФЙ га ТП-31 га 6-10 кВ тармок куриш (асос 2661)	1	0	1	1	0		0				III-чорак
66	Янгиобод МФЙ га ТП-125 ни юкини енгиллаштириш (асос 2661)	0	1	0	0	0	1	0				III-чорак
67	М.Таробий МФЙ га ТП-27 ни юкини енгиллаштириш (асос обод махалла)	0	1	0	0	0	1	0				II-чорак
68	М.Улугбек МФЙ га ТП-16 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.7	1	0.7	0.7	0	1	0				IV-чорак
	Жами:	**90.4**	**50**	**11**	**9**	**2**	**25**	**79.36**	**73.06**	**6.3**	**25**	
Жондор туман												
1	Далмунобод МФЙ Далмун қ.қ га ТП-147 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.62	1	0				1.62		1.62	1	II-чорак

2	Далмунобод МФЙ Далмун қ.қ га ТП-176 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.5	1	0				1.5		1.5	1	III-чорак
3	Далмунобод МФЙ Далмун қ.қ га ТП-657 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	1.5	1	0				1.5	0.2	1.3	1	IV-чорак
4	Пахлавон МФЙ Бўрбоги қ.қ га ТП-446 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.7	1	0				1.7	0.6	1.1	1	III-чорак
5	Пахлавон МФЙ Бўрбоги қ.қ га ТП-66 ни кувватини ошириш (асос 2661)	0	1	0				0			1	II-чорак
6	Пахлавон МФЙ Бўрбоги қ.қ га ТП-65 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.7	2	0				1.7	0.4	1.3	2	IV-чорак
7	Кўлён МФЙ Кўлён қ.қ га ТП-124 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	1.9	1	0				1.9	0.6	1.3	1	II-чорак
8	Кўлён МФЙ Кўлён қ.қ га ТП-125 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	1.2	1	0				1.2	0.7	0.5	1	III-чорак
9	Кўлён МФЙ Кўлён қ.қ га ТП-312 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.1	0	0				1.1		1.1		IV-чорак

10	Казокон МФЙ Казокон қ.қ га ТП-43 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0				0.6	0.6		1	III-чорак
11	Шуработ МФЙ Шуробот к-к га ТП-276 ни кувватини ошириш (асос 2661)	0	1	0				0			1	III-чорак
12	Далмунобод МФЙ Далмун қ.қ ПС Обод-35/10 ф. Кизбиби га 6-10 кВ тармок куриш (асос обод кишлок)	2	0	0				2	2			III-чорак
13	Дарвеши МФЙ ПС Яккатут-35/10 ф.Зарафшон га 6-10 кВ тармок куриш (асос 2661)	26	0	0				26	26			II-чорак
14	Хумин КФЙ ПС Яккатут-35/10 ф.Шарислон га 6-10 кВ тармок куриш (асос 2661)	35	0	0				35	35			феврал-март
15	Самончук МФЙ Самончук к-к га ТП-171 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.14	1	0.14	0.1	0.04	1	0				IV-чорак
16	Лукмон МФЙ Уба к-к га ТП-24 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.26	1	0.26	0.2	0.06	1	0				III-чорак
17	Лукмон МФЙ Асбобсоз к-к га ТП-21 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.30	0.15	0.15	1	0				II-чорак
18	Пулоти МФЙ Пулоти к-к га ТП-96 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.21	1	0.21	0.15	0.06	1	0				II-чорак

19	Жондор МФЙ Жондор қ.қ га ТП-209 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.65	1	0.65	0.50	0.15	1	0				III-чорак
20	Бахористон МФЙ Бахористон к.к га ТП-145 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.64	1	0.64	0.5	0.14	1	0				феврал
21	Бахористон МФЙ Урганжиён к.к га ТП-226 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.52	1	0.52	0.4	0.12	1	0				феврал
22	Работ МФЙ Хужалик к.к га ТП-5 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.18	1	0.18	0.1	0.08	1	0				IV-чорак
23	Каравул МФЙ Чоргули пункти га ТП-87 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1	0				II-чорак
24	Жондор МФЙ Манкуфи қ.қ га ТП-264 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.20	0.10	0.1	1	0				II-чорак
25	Нурафшон МФЙ Махон к.к га ТП-168 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.30	0.10	0.2	1	0				III-чорак
26	Занги МФЙ Патта к.к га ТП-406 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.78	1	0.78	0.70	0.08	1	0				IV-чорак

27	Кароли МФЙ Кулончи к.к га ТП-69 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.35	1	0.35	0.20	0.15	1	0				IV-чорак
28	Самончук МФЙ Самончук к-к га ТП-393 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.20	0.05	1	0				II-чорак
29	Самончук МФЙ Самончук к-к га ТП-395 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.46	1	0.46	0.40	0.06	1	0				III-чорак
30	Алели МФЙ Алели к.к га ТП-303 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.38	1	0.38	0.30	0.08	1	0				IV-чорак
31	Обод МФЙ Обод к.к га ТП-162 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.98	1	0.98	0.18	0.8	1	0				II-чорак
32	Самончук МФЙ Самончук к-к га ТП-399 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.26	1	0.26	0.2	0.06	1	0				март
33	Занги МФЙ Шодила к.к га ТП-134 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.32	1	0.32	0.25	0.07	1	0				феврал
34	Занги МФЙ Янгиобод к.к га ТП-133 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.3	1	1.30	0.4	0.90	1	0				IV-чорак

35	Хундонак МФЙ Мадамбой к.к га ТП-314 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.45	1	0.45	0.4	0.05	1	0				III-чорак
36	Шуработ МФЙ Шуробот к-к га ТП-120 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.60	0.3	0.30	1	0				IV-чорак
37	Намгони МФЙ Ёбу к.к га ТП-10 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.18	0.07	1	0				III-чорак
38	Нурафшон МФЙ Сепатта к.к га ТП-57 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.43	1	0.43	0.25	0.18	1	0				II-чорак
39	Жамият МФЙ Шамширгарон к.к га ТП-32 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.09	1	0.09	0.05	0.04	1	0				IV-чорак
40	Хужахайрон МФЙ Хужахайрон к-к га ТП-355 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.32	1	0.32	0.28	0.04	1	0				II-чорак
41	Чорзона МФЙ Чорзона к-к га ТП-515 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.25	1	0.25	0.10	0.15	1	0				март
42	Мустакиллик МФЙ Бодомзор к-к га ТП-88 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.30	0.20	0.1	1	0				март

43	Қозикенти МФЙ Қозикенти га ТП-208 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.40	0.25	0.15	1	0				II-чорак
44	Ибн Сино МФЙ Амонобод к.к га ТП-20 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.33	1	0.33	0.25	0.08	1	0				III-чорак
45	Мирзён МФЙ Араблар к.к га ТП-38 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.27	1	0.27	0.15	0.12	1	0				IV-чорак
46	Каравул МФЙ Манғит к.к га ТП-86 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.28	1	0.28	0.2	0.08	1	0				март
47	Чорзона МФЙ Чорзона к.к га ТП-59 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.28	1	0.28	0.1	0.18	1	0				II-чорак
48	Далмунобод МФЙ Хужалар қ.қ га ТП-19 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	0.35	1	0.35	0.20	0.15	1	0				III-чорак
49	Мустакиллик МФЙ Юкори Мохончул к-к га ТП-64 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.52	1	0.52	0.40	0.12	1	0				III-чорак
50	Навгади МФЙ Навгади к.к га 6-10 кВ тармок куриш (асос 2661)	0.78	0	0.78	0.78			0				III-чорак
	Жами:	**90.6**	**46**	**14.78**	**9.52**	**5.26**	**35**	**75.82**	**66.1**	**9.72**	**11**	

Когон тумани												
1	Зирабод МФЙ Навзирвбод кучаси га ТП-66 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0	0		1	III-чорак
2	Хукматобод МФЙ Илкиболо к.к га ТП-144 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.8	1	0.0				0.8	0.8		1	III-чорак
3	Тунирок МФЙ Тунирок к.к га ТП-111 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.6	1	0.0				1.6	0.2	1.4	1	II-чорак
4	Тунирок МФЙ Пераста к.к га ТП-151 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	3.4	1	0.0				3.4	2	1.4	1	IV-чорак
5	Хужа Якшаба МФЙ Найманча к.к га ТП-199 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.8	1	0.0				1.8	0.5	1.3	1	II-чорак
6	Туркистон МФЙ Зобитлар кучаси га 6-10 кВ тармок куриш (асос 2661)	4.8	0	0.0				4.8	4.8			III-чорак
7	А.Кодирий МФЙ Зобитлар кучаси га 6-10 кВ тармок куриш (асос 2661)	1.5	0	0.0				1.5	1.5			III-чорак
8	Бухорои шариф МФЙ А.Темур кучаси га 6-10 кВ тармок куриш (асос обод махалла)	0.9	0	0.0				0.9	0.9			II-чорак
9	Беклар МФЙ Сарой кишлоги га 6-10 кВ тармок куриш (асос 2661)	1.1	0	0.0				1.1	1.1			IV-чорак

10	А.Кодирий МФЙ Саодат кучаси га 0,4 кВ тармок куриш (асос 2661)	1.2	0	0.0				1.2	0	1.2		II-чорак
11	Янги хаёт МФЙ Туркман угли к.к га 0,4 кВ тармок куриш (асос 2661)	1.4	0	0.0				1.4	0	1.4		II-чорак
12	Мустакиллик МФЙ Окчамамат к.к га ТП-213 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.0				0.5	0.53		1	III-чорак
13	Бунёдкор МФЙ М.Таробий кучаси га 6-10 кВ тармок куриш (асос 2661)	1.4	0	0.0				1.4	1.4			IV-чорак
14	Зиёкор МФЙ Зиёкор кучаси га 6-10 кВ тармок куриш (асос 2661)	0.3	0	0.0				0.3	0.3			II-чорак
15	Мустакилик МФЙ Ката мачит кучаси га ТП-309 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0	0		1	II-чорак
16	Мирзо Улугбек МФЙ Ахиллик куча га ТП-33 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос обод махалла)	1.5	1	0.0				1.5	0	1.5	1	III-чорак
17	Тун ирок МФЙ Элоч кишлоги га ТП-113 ни 0,4-6-10 кВ тармок куриш (асос обод кишлок)	2.6	0	0.0				2.6	1.3	1.3		II-чорак
18	Махтум Қули МФЙ А Темур ни ТП-44 га ва 0,4 кВ тармок куриш (асос 2661)	1.4	0	0.0				1.4	0	1.4		IV-чорак
19	Когон МФЙ Гулобод к-к га ТП-189 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.2	1	0.0				2.2	0.9	1.3	1	II-чорак

20	Махтум Қули МФЙ А.Темур кучаси га ТП-1 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	1.4	1	0.0				1.4	0	1.4	1	II-чорак
21	Х.Якшаба МФЙ Яглов к.к га ТП-302 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0	0		1	II-чорак
22	Туткунда МФЙ Туткунда к.к га ТП-545 ни кувватини ошириш(асос 2661)	0.0	1	0.0				0.0	0		1	III-чорак
23	Навруз МФЙ Фаровон к.к га ТП-164 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0	0		1	IV-чорак
24	Уба чули МФЙ Калук к.к га ТП-505 ни 0,4 кВ тармок куриш (асос 2661)	1.4	0	0.0				1.4	0	1.4		II-чорак
25	Тунирок МФЙ Нишовур к.к га ТП-290 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0	0		1	II-чорак
26	Навруз МФЙ Хужкоб к.к га ТП-6 ни 0,4 кВ тармок куриш (асос 2661)	0.9	0	0.0				0.9	0	0.9		III-чорак
27	"Х.Якшаба" МФЙ Х.Якшаба к.к га ТП-304 ни 0,4 кВ тармок куриш (асос 2661)	1.1	0	0.0				1.1	0	1.1		III-чорак
28	"Соргун МФЙ" Соргун к-к га ТП-285 ни 0,4 кВ тармок куриш (асос 2661)	2.0	0	0.0				2.0	0	2		II-чорак
29	"Соргун МФЙ" Ойнасоз к-к га ТП-106 ни 0,4 кВ тармок куриш (асос 2661)	1.0	0	0.0				1.0	0	1		IV-чорак
30	Нурафшон МФЙ Жанафар к.к га ТП-185 ни 0,4 кВ тармок куриш (асос 2661)	1.2	0	0.0				1.2	0	1.2		II-чорак

31	Уба чули МФЙ Уба чули к.к га 6-10 кВ тармок куриш (асос 2661)	2.7	0	0.0				2.7	2.7			II-чорак
32	Хужабарги МФЙ Хужабарги га ТП-73 ни 0,4 кВ тармок куриш (асос 2661)	1.2	0	0.0				1.2	0	1.2		II-чорак
33	Хукматобод МФЙ Хукматобод кучаси га 6-10 кВ тармок куриш (асос 2661)	3.0	0	0.0				3.0	3			IV-чорак
34	Беклар МФЙ Беклар к.к га ТП-214 ни кувватини ошириш 0,4-6-10 кВ тармок куриш (асос 2661)	2.7	1	0.0				2.7	1	1.7	1	II-чорак
35	Адолат МФЙ Адолат кучаси га 6-10 кВ тармок куриш (асос 2661)	1.5	0	0.0				1.5	1.5			II-чорак
36	Сиёз поён МФЙ Узбакон к-к га ТП-103 ни кувватини ошириш 0,4-6-10 кВ тармок куриш (асос 2661)	2.7	0	0.0				2.7	1.57	1.1		III-чорак
37	Арабхона МФЙ Турон кучаси га ТП-16 ни кувватини ошириш 0,4 кВ тармок куриш (асос 2661)	1.6	0	0.0				1.6	0	1.6		II-чорак
38	Сиёз поён МФЙ Узбакон к-к га ТП-103 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				IV-чорак
39	Когон МФЙ Навбахор га ТП-511 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				II-чорак

40	Чолоки МФЙ Чолоки к-к га ТП-136 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.5	1	1.5	0.5	1	1	0.0				III-чорак
41	"Х.Якшаба" МФЙ Х.Якшаба кишлоги га ТП-107 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.2	1	1.2	0.6	0.6	1	0.0				II-чорак
42	Тун ирок МФЙ Элоч кишлоги га ТП-113 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос обод кишлок)	0.4	1	0.4	0.4		1	0.0				II-чорак
43	Янги Хаёт МФЙ Каликон к-к га ТП-410 ни кини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.5	1	1.5	0.5	1	1	0.0				IV-чорак
44	Бухоро ш. С.Айний МФЙ Урганжиён га ТП-266а ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод махалла)	2.1	1	2.1	1	1.1	1	0.0				III-чорак
45	"Уба чули" МФЙ Калук к.к га ТП-235 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.4	1	1.4	0.5	0.9	1	0.0				март
46	"Б.Накшбанд" МФЙ Пулотчи кишлоги га ТП-149 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.1	1	1.1	0.1	1	1	0.0				II-чорак
47	Бухоро ш. С.Айний МФЙ Тайтал га ТП-157 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок	1.4	1	1.4	0.2	1.2	1	0.0				март

	куриш (асос обод махалла)											
48	"Истикбол " МФЙ Катонги к.к га ТП-178 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.6	2	0.6	0.6		2	0.0				II-чорак
49	"Геофизика " МФЙ Нурафшон к.к га ТП-294а ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.4	1	1.4	0.4	1	1	0.0				феврал
50	Мирзо Улугбек МФЙ Ахиллик куча га ТП-418 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод махалла)	1.3	1	1.3	0.3	1	1	0.0				II-чорак
51	Махтум Қули МФЙ А Темур га ТП-44 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
52	Арабхона МФЙ Турон кучаси га ТП-16 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				III-чорак
53	Зиробод МФЙ Ашкабод га ТП-527 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.8	1	1.8	0.6	1.2	1	0.0				IV-чорак
54	Ниёз хожи МФЙ Ганчкаш га ТП-186 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.2	1	2.2	1.7	0.5	1	0.0				феврал
55	Ниёз хожи МФЙ Вадан к/к га ТП-123 ни юкини енгиллаштириш ва	4.0	2	4.0	4		2	0.0				феврал

	0,4-6-10 кВ тармок куриш (асос 2661)											
56	Чолоки МФЙ К Орифон га ТП-137 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.4	1	1.4	0.4	1	1	0.0				матр
57	Сараён МФЙ Сараён кучаси га ТП-590 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	1.3	1	1.3	1.27		1	0.0				II-чорак
58	Навзирабод МФЙ Навнихол кучаси га ТП-564 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.6		1	0.0				III-чорак
59	Темир йулчи МФЙ Зебинисо кучаси га ТП-644 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.13		1	0.0				II-чорак
60	Беклар МФЙ Чопик к.к га ТП-52 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос обод кишлок)	0.8	1	0.8	0.8		1	0.0				IV-чорак
	Жами:	**80.4**	**40.0**	**27.6**	**16.1**	**11.5**	**25.0**	**52.8**	**26.0**	**26.8**	**15.0**	**0.0**
Коракул тумани												
1	Куввача МФЙ га ТП-191 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	II-чорак
2	Куввача МФЙ га ТП-220 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	III-чорак
3	Чандиробод МФЙ ПС ЯНГИ ф.КОРАХОДЖИ га	31.0	0	0.0				31.0	31			III-чорак

	6-10 кВ тармок куриш (асос обод кишлок)											
4	Чекирчи МФЙ га ТП-318 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	IV-чорак
5	Дурман МФЙ га ТП-256 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	II-чорак
6	Сайёт МФЙ ПС Янги Сайёт ф.Сайёт-10 кВ га тармок куриш (асос 2661)	32.0	0	0.0				32.0	32			IV-чорак
7	Кораун мфй га ТП-369 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	III-чорак
8	Човли мфй га ТП-177 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	III-чорак
9	Даргали МФЙ га ТП-135 ни кувватини оширишва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.0				0.5		0.5	1	II-чорак
10	Регихайдар МФЙ га ТП-64 ни 0,4 кВ тармок куриш (асос 2661)	1.5	0	0.0				1.5		1.5		март
11	Тинчлик МФЙ га ТП-249 ни кувватини оширишва 0,4 кВ тармок куриш (асос 2661)	2.2	2	0.6		0.6	1	1.6		1.6	1	март
12	Тожикент КФЙ га ТП-128 ни юкини енгиллаштириш 0,4 кВ тармок куриш (асос 2661)	2.9	1	1.0		1.0	1.0	1.9		1.9		III-чорак
13	Чандиробод МФЙ га ТП-223 ни кувватини оширишва 0,4 кВ тармок куриш (асос обод кишлок)	1.3	1	0.0				1.3		1.3	1	III-чорак

14	Жигачи МФЙ га ТП-299 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.4	1	0.0				1.4		1.4	1	IV-чорак
15	Жигачи МФЙ га ТП-243 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.1	1	0.0				1.1		1.1	1	III-чорак
16	Жигачи МФЙ га ТП-511 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.1	1	0.0				1.1		1.1	1	IV-чорак
17	Даргали МФЙ га ТП-147 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.8	1	0.0				1.8		1.77	1	II-чорак
18	Даргали МФЙ га ТП-143 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.6	1	0.0				1.6		1.57	1	III-чорак
19	Хужалар МФЙ га ТП-440 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.7	1	0.7		0.7	1	0.0				III-чорак
20	Коракул МФЙ га ТП-463 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	1.2	1	1.2		1.2	1	0.0				IV-чорак
21	Чекирчи МФЙ га ТП-295 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.3	1	0.3		0.3	1	0.0				III-чорак
22	Бандбоши МФЙ га ТП-58 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	1.2	1	1.2		1.2	1	0.0				II-чорак

23	Солур КФЙ га ТП-266 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				III-чорак
24	Кулончи МФЙ га ТП-271 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.4	1	0.4		0.4	1	0.0				IV-чорак
25	Солур КФЙ га ТП-261 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.46	1	0.0				III-чорак
26	Околтин МФЙ га ТП-167 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.2	1	0.2		0.2	1	0.0				III-чорак
27	Камолот мфй га ТП-408 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.7	1	0.7		0.7	1	0.0				II-чорак
28	Арна мфй га ТП-213 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.4	1	0.4		0.4	1	0.0				феврал
29	Арна мфй га ТП-214 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				феврал
30	Тайкир МФЙ га ТП-124 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				феврал
31	Регихайдар МФЙ га ТП-64 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	1.5	1	1.5		1.5	1	0.0				III-чорак
32	Чандиробод МФЙ га юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос обод кишлок)	0.9	1	0.9		0.9	1	0.0				IV-чорак

33	Жигачи МФЙ га юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос обод кишлок)	0.7	2	0.7		0.7	2	0.0				III-чорак
34	Даргали МФЙ га юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.8	1	0.8		0.8	1	0.0				IV-чорак
35	Регихайдар МФЙ га ТП-69 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.6	1	0.6		0.6	1	0.0				II-чорак
36	Чекирчи МФЙ га ТП-6 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				IV-чорак
37	Зарафшон МФЙ га ТП-1 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.6	1	0.6		0.6	1	0.0				III-чорак
38	Хужакон МФЙ га ТП-394 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				II-чорак
39	Зиёрат МФЙ га ТП-303 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				III-чорак
40	Солур КФЙ га ТП-461 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				IV-чорак
41	Шуробод МФЙ га ТП-279 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				III-чорак
42	Чекирчи МФЙ га ТП-428 ни юкини енгиллаштириш (асос 2661)	0.0	1	0.0			1	0.0				III-чорак

43	Маллаишейх МФЙ га ТП-455 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.8	1	0.8		0.8	1	0.0				март
44	Даргали МФЙ га ТП-135 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.6	1	0.6		0.6	1	0.0				IV-чорак
45	Янги-замон МФЙ га ТП-174 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				II-чорак
46	Даргали МФЙ га ТП-149 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.5		0.5	1	0.0				III-чорак
47	Истиклол МФЙ га ТП-492 ни юкини енгиллаштириш (асос 2661)	0.0	1	0.0			1	0.0				IV-чорак
	Жами:	**95.4**	**46**	**18.7**	**0.0**	**18.7**	**32**	**76.7**	**63.0**	**13.7**	**14**	
Қоровулбозор тумани												
1	Тинчлик МФЙ Бегзод кучаси га 6-10 кВ тармок куриш (асос 2661)	3.0	0	0.0				3.0	3.0			II-чорак
2	Тинчлик МФЙ Нурчилар кучаси га ТП-134 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.0	1	0.5	0.5		1	1.5		1.50		IV-чорак
3	Чулкувар МФЙ Собир Рахимов га ТП-146 ни ва юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.0	1	1.0	1.0		1	1.0		1.00		март
4	Тинчлик МФЙ Нурчилар кучаси га ТП-2 ни 0,4 кВ	2.5	0	0.0				2.5		2.50		II-чорак

	тармок куриш (асос 2661)											
5	Тинчлик МФЙ Наквойи кучаси га ТП-93 ни 0,4 кВ тармок куриш (асос 2661)	1.5	0	0.0				1.5		1.50		III-чорак
6	Бузачи МФЙ Сардоба к-к га ТП-103 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.2	1	0.6	0.4	0.2	1	1.6		1.57		март
7	Тинчлик МФЙ Нурчилар кучаси га ТП-115 ни 0,4 кВ тармок куриш (асос 2661)	1.5	0	0.0				1.5		1.45		III-чорак
8	Чулкувар МФЙ Мехнатобод кучаси га ТП-138 ни 0,4 кВ тармок куриш (асос 2661)	2.0	0	0.0				2.0		2.00		IV-чорак
9	Чулкувар МФЙ Мехнатобод кучаси га ТП-24 ни 0,4 кВ тармок куриш (асос 2661)	0.8	0	0.0				0.8		0.80		III-чорак
10	Чулкувар МФЙ Геологлар кучаси га ТП-99 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.1	0.2	1	0.0				март
11	Тинчлик МФЙ Бобур кучаси га ТП-108 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	2	0.1	0.1		2	0.0				феврал
12	Тинчлик МФЙ Саховат кучаси га ТП-107 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				феврал
	Жами:	**17.8**	**7**	**2.5**	**2.1**	**0.4**	**7**	**15.3**	**3.0**	**12.3**	**0**	

Пешку тумани												
1	Навоий МФЙ Аллаёр ахоли пункти га ТП-114 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.5	2	0.8	0.3	0.5	1	0.7	0.2	0.5	1	феврал
2	Каракалпок МФЙ Каракалпок ахоли пункти га ТП-175 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.0				0.6	0.2	0.4	1	II-чорак
3	Навбахор МФЙ Навбахор ахоли пункти га ТП-2 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	0.6	1	0.0				0.6	0.2	0.4	1	IV-чорак
4	Бокимиришкор МФЙ Бобохожи ахоли пункти га ТП-159 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.7	1	0.0				0.7	0.6	0.1	1	II-чорак
5	Зандане МФЙ Жуябул ахоли пункти га ТП-161 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	III-чорак
6	Богмусо МФЙ Малишояк ахоли пункти га ТП-4 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	IV-чорак
7	Варахша МФЙ Вахимкор ахоли пункти га ТП-77 ни кувватини ошириш ва 0,4-6-10 кВ	0.3	1	0.0				0.3	0.2	0.1	1	II-чорак

	тармок куриш (асос 2661)											
8	Садир МФЙ Садир ахоли пункти га ТП-49 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	III-чорак
9	Пешку МФЙ Искомгазе ахоли пункти га ТП-81 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	март
10	Навгаҳон МФЙ Навгаҳон ахоли пункти га ТП-116 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	III-чорак
11	Бокимиришкор МФЙ Шоваре ахоли пункти га ТП-325 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	март
12	Хуррам МФЙ Каласанг ахоли пункти га ТП-92 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	IV-чорак
13	Хуррам МФЙ Жонхуроз ахоли пункти га ТП-99 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.0				0.3	0.2	0.1	1	III-чорак
14	Богимусо МФЙ Дурман ахоли пункти га ТП-16 ни кувватини ошириш ва 0,4-6-10 кВ	0.4	1	0.0				0.4	0.3	0.1	1	II-чорак

	тармок куриш (асос 2661)											
15	Калъа МФЙ Калъа ахоли пункти га ТП-132 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.0				0.5	0.4	0.1	1	II-чорак
16	Варахша МФЙ Коровул ахоли пункти га ТП-106 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.0				0.2	0.1	0.1	1	IV-чорак
17	Жонгелди МФЙ Жонгелди ахоли пункти га ТП-15ж ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.4	2	0.0				2.4	2.2	0.2	2	январ
18	Махаллаимиришкор МФЙ ПС Янгибозор35/10 кВ Ф.Бухоро га 6-10 кВ тармок куриш (асос 2661)	31.0	0	0.0				31.0	31			III-чорак
19	Навбахор МФЙ Валфажир МФЙ ПС Янгибозор35/10 кВ Ф.Узбекистон га 6-10 кВ тармок куриш (асос 2661)	24.0	0	0.0				24.0	24			III-чорак
20	Каракалпок МФЙ Каракалпок ахоли га ТП-176 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)пункти	1.0	1	1.0	0.4	0.6	1	0.0				II-чорак
21	Навбахор МФЙ Навбахор ахоли пункти га ТП-3 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	1.2	2	1.2	0.5	0.7	2	0.0				IV-чорак

22	Мустакиллик МФЙ Дустли к кучаси га ТП-541 ни 0,4 кВ тармок куриш (асос 2661)	1.0	0	1.0		1.0		0.0				II-чорак
23	Туркистон МФЙ Тегирмончи ахоли пункти га ТП-229 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.0	1	1.0	0.3	0.7	1	0.0				III-чорак
24	Деча МФЙ Кодравон ахоли пункти га ТП-53 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.0	1	1.0	0.5	0.5	1	0.0				III-чорак
25	Пешку МФЙ Пешку ахоли пункти га ТП-74 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.0	1	1.0	0.4	0.6	1	0.0				феврал
26	Хулбор МФЙ Хулбор ахоли пункти га ТП-170 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.1	1	1.1	0.5	0.6	1	0.0				III-чорак
27	Сусана МФЙ Уйбой ахоли пункти га ТП-138 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.9	1	1.9	1.2	0.7	1	0.0				II-чорак
28	Ибн Сино МФЙ Кургонтепа ахоли пункти га ТП-52 ни юкини енгиллаштириш (асос 2661)	1.0	1	1.0	0.4	0.6	1	0.0				IV-чорак
29	Дустлик МФЙ Ёрика ахоли пункти га ТП-179 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.1	1	1.1	0.5	0.6	1	0.0				III-чорак

30	Малишояк МФЙ Малишояк ахоли пункти га ТП-318 ни юкини енгиллаштириш (асос 2661)	0.0	1	0.0			1	0.0				феврал
31	Навоий МФЙ Муроди ахоли пункти га ТП-122 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.3	1	1.3	0.6	0.7	1	0.0				II-чорак
32	Зандане МФЙ Кукчи ахоли пункти га ТП-160 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.7	1	0.7	0.4	0.3	1	0.0				III-чорак
33	Навгахон МФЙ Саидмуродхур ахоли пункти га ТП-119 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.7	1	0.7	0.3	0.4	1	0.0				IV-чорак
34	Куёвхужа МФЙ Куёвхужа ахоли пункти га ТП-258 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.7	1	0.7	0.3	0.4	1	0.0				II-чорак
35	Каракалпок МФЙ Урганжи ахоли пункти га ТП-332 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.1	1	1.1	0.4	0.7	1	0.0				III-чорак
36	Зандане МФЙ Арабхона ахоли пункти га ТП-156 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.3	1	1.3	0.6	0.7	1	0.0				III-чорак

37	Малишояк МФЙ Кусаравон ахоли пункти га ТП-301 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1	0.0				IV-чорак
	Жами:	**82.1**	**37**	**18.3**	**7.9**	**10.4**	**19**	**63.8**	**61.0**	**2.8**	**18**	
Ромитан тумани												
1	Тошравот МФЙ Карахони га ТП-81 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	1.0	1	0.0				1.0		1.00	1	IV-чорак
2	Чандир МФЙ Чандир-1 га ТП-66 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.9	0	0.0				2.9	0.6	2.3		II-чорак
3	Тошработ МФЙ Тошработ га ТП-74 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.6	0	0.0				1.6	0.4	1.20		II-чорак
4	Кокиштувон МФЙ га ТП-248 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	2.0	1	0.0				2.0		2.0	1	III-чорак
5	Кокиштувон МФЙ га ТП-177 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	3.0	1	0.0				3.0		3.00	1	IV-чорак
6	Кокиштувон МФЙ га ТП-330 ни 0,4-6-10 кВ тармок куриш (асос обод кишлок)	4.3	0	0.0				4.3	0.5	3.8		II-чорак

7	Шуробод МФЙ Шуробод га ТП-92 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.0	1	0.0				0.0			1	феврал
8	Мугонча МФЙ Арабхона га ТП-48 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.6	1	0.0				0.6	0.6		1	II-чорак
9	Тошработ МФЙ Урганжиён га ТП-82 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.0				0.4	0.4		1	II-чорак
10	Узбекистон МФЙ муллоён га ТП-203 ни кувватини ошириш (асос 2661)	0.0	1	0.0				0.0			1	IV-чорак
11	Деча МФЙ Деча га ТП-272 ни кувватини ошириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.0				0.5	0.5		1	II-чорак
12	Деча МФЙ Деча га ТП-238 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	0.5	1	0.0				0.5		0.50	1	март
13	Самосий МФЙ Косхур га ТП-215 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.6	1	0.0				1.6	1	0.6	1	II-чорак
14	Пойжуй МФЙ Аспоб га ТП-163 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	2.7	1	0.0				2.7		2.67	1	III-чорак
15	Пойжуй МФЙ Деги куйна га ТП-166 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос 2661)	2.7	1	0.0				2.7		2.70	1	II-чорак

16	Богисайдон МФЙ Вагани га ТП-192 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	3.6	1	0.0				3.6	0.61	3.03	1	III-чорак
17	Богисайдон МФЙ Вагани га ТП-193 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	3.2	1	0.0				3.2	0.5	2.74	1	март
18	Ромитан МФЙ Музадузон га ТП-58 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.0				0.5	0.5	0.020	1	IV-чорак
19	Богча МФЙ Гараншох га ТП-21 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	1.0	1	0.0				1.0	1	0.01	1	II-чорак
20	Газберон Мфй Газберон га ТП-225 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.0				0.2	0.18	0.055	1	март
21	Деча МФЙ Работ гимизи га ТП-223 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.6	1	0.0				0.6	0.125	0.5	1	II-чорак
22	Кокиштувон МФЙ Пойжуй МФЙ Ромитан-2-35/10 ф.Кокиштувон ларга 6-10 кВ тармок куриш (асос 2661)	24.9	0	0.0				24.9	24.875			III-чорак
23	Богча МФЙ Богча к-к га ТП-22 ни кувватини ошириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	6.6	1	0.0				6.6	0.01	6.6	1	март

24	Чандир МФЙ Хасанобод га ТП-70 ни юкини енгиллаштириш ва 0,4 кВ тармок куриш (асос 2661)	1.3	1	1.3		1.3	1	0.0				феврал
25	Чандир МФЙ Тошмачитга ТП-69 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.2	1	2.2	0.7	1.5	1	0.0				феврал
26	Чандир МФЙ Тошмачит га ТП-311 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	2.4	1	2.4	1.2	1.2	1	0.0				IV-чорак
27	Кокиштувон МФЙ га ТП-174 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	3.7	1	3.7	1.6	2.1	1	0.0				II-чорак
28	Кокиштувон МФЙ га ТП-329 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	3.2	1	3.2	1.2	2.0	1	0.0				II-чорак
29	Калайчорбог МФЙ Калайчорбог га ТП-41 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	2.8	1	2.8	0.7	2.1	1	0.0				III-чорак
30	Калайчорбог МФЙ Лабирут га ТП-39 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	3.7	1	3.7	3.0	0.7	1	0.0				III-чорак
31	Бобир МФЙ Алпомиш кучаси га ТП-10 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0.0	1	0.0				II-чорак

32	Афросиёб МФЙ Хайрабатский кучаси га ТП-118 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5	0.1	1	0.0				III-чорак
33	Пойжуй МФЙ Узбакон к-к га ТП-170 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0.0	1	0.0				феврал
34	Пойжуй МФЙ Пойжуй к-к га ТП-171 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5	0.0	1	0.0				IV-чорак
35	Шурча МФЙ Хужалар к-к га ТП-155 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	2	0.5	0.5	0.0	2	0.0				II-чорак
36	Урганжиён МФЙ Кулипалос к-к га ТП-85 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0.0	1	0.0				II-чорак
37	Ифтихор МФЙ Работалак к-к га ТП-149 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0.0	1	0.0				III-чорак
38	Шурча МФЙ Янги шурча к-к га ТП-457 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.2	0.1	1	0.0				II-чорак
39	Зарафшон МФЙ Гулсанг кучаси га ТП-395 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0.0	1	0.0				III-чорак

40	Марзия МФЙ Марзия к-к га ТП-246 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3	0.0	1	0.0				II-чорак
41	Марзия МФЙ Гармоба к-к га ТП-358 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.3	0.2	1	0.0				II-чорак
42	Бахтиёрчи МФЙ Бахтиёрчи к-к га ТП-483 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2	0.0	1	0.0				III-чорак
43	Хазортут МФЙ Хазортут к-к га ТП-52 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.7	2	0.7	0.6	0.1	2	0.0				III-чорак
44	Шурча МФЙ Пиёзкорон к-к га ТП-153 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.3	0.1	1	0.0				IV-чорак
	Жами:	**88.9**	**42**	**24.4**	**12.6**	**11.8**	**23**	**64.6**	**31.8**	**32.8**	**19**	
Шофиркон тумани												
1	Ш.Рашидов МФЙ Дехконобод кишлок га ТП-21 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.0	0	0.0				1.0		1		феврал
2	Ш.Рашидов МФЙ Дехконобод кишлок га ТП-139 ни кувватини ошириш ва 0,4 кВ тармок куриш (асос обод кишлок)	1.1	0	0.0				1.1		1.1		феврал

3	А.Навоий МФЙ Ховлипоён кишлок П/С ХЗШ 35/10 кВ Фидер А.Норкулов 10 кВ га 6-10 кВ тармок куриш (асос 2661)	27.0	0	0.0				27.0	27			III-чорак
4	Гулистон МФЙ, Богиафзал МФЙ П/С Шофиркон 35/10 кВ Фидер Шофиркон 10 кВ ларга 6-10 кВ тармок куриш (асос 2661)	21.5	0	0.0				21.5	21.5			II-чорак
5	Зарчабек МФЙ Хоркаш МФЙ П/С Шофиркон 35/10 кВ Фидер Ф.Хужаев 10 кВ ларга 6-10 кВ тармок куриш (асос 2661)	20.4	0	0.0				20.4	20.4			IV-чорак
6	Паттахон МФЙ Юкори болоируд га ТП-88 ни кувватини ошириш	0.0	1	0.0				0.0			1	II-чорак
7	Куришкент МФЙ Куришкент кишлок га ТП-505 ни кувватини ошириш	0.0	1	0.0				0.0			1	III-чорак
8	Ш.Рашидов МФЙ Дехконобод кишлок га ТП-589 ни кувватини ошириш	0.0	1	0.0				0.0			1	
9	Жуйнав МФЙ Жуйнав кишлок га ТП-260 ни кувватини ошириш	0.0	1	0.0				0.0			1	III-чорак
10	Дурмен МФЙ Бобоатодаре га ТП-128 ни кувватини ошириш	0.0	1	0.0				0.0			1	II-чорак
11	Калмакон МФЙ Навоий кучаси га ТП-338 ни кувватини ошириш	0.0	1	0.0				0.0			1	II-чорак
12	Калон МФЙ Етимак кишлок га ТП-51 ни кувватини ошириш	0.0	1	0.0				0.0			1	III-чорак

13	Жилвон МФЙ Чакар кишлок га ТП-588 ни кувватини ошириш	0.0	1	0.0				0.0			1	IV-чорак
14	Талисангобод МФЙ Чакар кишлок га ТП-102 ни кувватини ошириш	0.0	1	0.0				0.0			1	II-чорак
15	Ш.Рашидов МФЙ Дехконобод кишлок га ТП-21 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос обод кишлок)	0.5	2	0.5	0.5		2	0.0				II-чорак
16	Ш.Рашидов МФЙ Дехконобод кишлок га ТП-139 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос обод кишлок)	0.9	1	0.9	0.2	0.7	1	0.0				III-чорак
17	Мингчинор МФЙ Янгибог кишлок га ТП-348 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				феврал
18	Денов МФЙ Денов кишлок га ТП-475 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				март
19	Денов МФЙ Денов кишлок га ТП-525 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				III-чорак
20	Денов МФЙ Денов кишлок га ТП-55 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				IV-чорак

21	Жуйнав МФЙ Варзонзе кишлок га ТП-261 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
22	К.Чукурак МФЙ Уртакент кишлок га ТП-33 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				II-чорак
23	Тезгузар МФЙ Курама кишлок га ТП-28 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
24	Арабхона МФЙ Арабхона кишлок га ТП-54 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				III-чорак
25	А.Навоий МФЙ Ховлипоён кишлок га ТП-72 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.2	1	0.2	0.2		1	0.0				II-чорак
26	Темирчи МФЙ Темирчи кишлок га ТП-125 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				III-чорак
27	Тезгузар МФЙ Болтакара кишлок га ТП-18 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				IV-чорак
28	Саврак МФЙ Саврак кишлок га ТП-32 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак

29	Тинчлик МФЙ Чандирча кишлок га ТП-40 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
30	Калон МФЙ Кухна калон кишлок га ТП-60 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
31	А.Навоий МФЙ Додбони кишлок га ТП-107 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				III-чорак
32	Дурмен МФЙ Дурмен кишлок га ТП-91 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				IV-чорак
33	А.Навоий МФЙ Махалла кишлок га ТП-156 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
34	Жуйнав МФЙ Жуйнав кишлок га ТП-723 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
35	Денов МФЙ Махаллиболо кишлок га ТП-135 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	2	0.4	0.4		2	0.0				IV-чорак
36	Дурмен МФЙ Когатон кишлок га ТП-152 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак

37	Котён МФЙ Котён кишлок га ТП-619 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				III-чорак
38	Темирчи МФЙ Шехлар кишлок га ТП-520 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
39	Шодлик МФЙ С.Айний кучаси га ТП-1 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				II-чорак
40	К.Варзонзе МФЙ Янгиобод кишлок га ТП-172 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				март
41	К.Варзонзе МФЙ Янгиобод кишлок га ТП-336 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				март
42	Зарчабек МФЙ Тарозидор кучаси га ТП-522 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				III-чорак
43	Пашмон МФЙ Маркуш кишлокга ТП-621 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
44	Тезгузар МФЙ Карвонбоши кишлок га ТП-15 ни юкини енгиллаштириш ва 0,4-6-10 кВ тармок куриш (асос 2661)	0.8	1	0.8	0.5	0.3	1	0.0				IV-чорак

45	Янгикишлок МФЙ Гулистон кишлок га ТП-398 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
46	Гуломте МФЙ Гуломте кишлок га ТП-14 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
47	А.Навоий МФЙ Кумбости кишлок га ТП-213 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
48	Жуйнав МФЙ Жуйнав кишлок га ТП-22 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.3	1	0.3	0.3		1	0.0				III-чорак
49	Хоркаш МФЙ Хоркаш кишлок га ТП-130 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.1	1	0.1	0.1		1	0.0				II-чорак
50	Шибиргон МФЙ Шибиргон кишлок га ТП-124 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				IV-чорак
51	А.Навоий МФЙ Уба кишлок га ТП-83 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.5	1	0.5	0.5		1	0.0				II-чорак
52	Богиафзал МФЙ Суфён кишлок га ТП-167 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.6	1	0.6	0.6		1	0.0				III-чорак

53	Искогаре МФЙ Ю.Чукурак кишлок га ТП-454 ни юкини енгиллаштириш ва 6-10 кВ тармок куриш (асос 2661)	0.4	1	0.4	0.4		1	0.0				IV-чорак
	Жами:	**88.4**	**50**	**17.4**	**16.4**	**1.0**	**41**	**71.0**	**68.9**	**2.1**	**9**	