



UPDATED ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

for

Emergency Power Infrastructure Rehabilitation Project Phase II (EPIRPII) Stage II -October 2016



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Abbreviations Used in the Report

AfDB	African Development Bank
EIA	Environmental Impact Assessment
EMA	Environmental Management Agency
ESMP	Environmental and Social Management Plan
ISS	Integrated Safeguards System
PPE	Personal Protective Equipment
PCBs	Poly Chlorinated Biphenyl's
ZETDC	Zimbabwe Electricity Transmission and Distribution Company

Proposed Project General Information

The total project scope was defined and approved at the onset, but executing was phased based on the availability of donor funding. Hence it was split into two stages, with Stage I covering components whose funding was available in 2014 and is currently under implementation and Stage II is for components that have been covered by additional resources received from donors in November 2016.

Project Number	EPIRP PH II Stage I EPIRP PH II Stage II	P-ZW-FA0-002 P-ZW-FA0-014
Starting Date Implementation	EPIRP PH II Stage I EPIRP PH II Stage II	January 2014 January 2017
Project Completion Date	EPIRP PH II Stage I EPIRP PH II Stage II	December 2017 January 2019
Date of Operation	EPIRP PH II Stage I EPIRP PH II Stage II	December 2017 January 2019
Period covered by the plan	January 2014 – December 2018	

1.0 Introduction

This ESMP has been updated to bring the project into compliance with the African Development Bank's Integrated Safeguards System (ISS), the applicable national legislation and regulations of Zimbabwe. The whole of EPIRP Phase II scope was validated by ORQR as Category 2 on 23 May 2013 in line with the Bank's Environmental and Social Assessment Procedures (ESAP). However with the time lapse, it is mandatory that the ESMP be updated if there are changes to ensure that it is still applicable and that no environmental changes pertaining to the project have occurred since its disclosure. It is in this regard that the Bank and ZETDC staff revisited the sites in October 2016 and ascertained that there have been no environmental changes that warrant intervention. As such this updated ESMP should be read in conjunction with the original disclosed plan.

1.1 Purpose of the ESMP

The Bank's safeguards policies and procedures and Zimbabwe's Environmental Management Act (Chapter 20:27) requires transmission line projects to be subjected to an Environmental and Social Impact Assessment (ESIA) process prior to implementation. The ESMP outlines the mitigating/enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts. It also assigns monitoring responsibilities to specific institutions and presents the budget required to ensure effective monitoring of the project impacts during the design, construction and operation phases.

1.2 ZETDC and Mandate

The Zimbabwe Electricity Transmission and Distribution Company (ZETDC) is a Government owned company responsible for the development, operation and maintenance of the transmission and distribution networks in Zimbabwe. The transmission system is made up of 420kV, 330kV, 220kV, 132kV, 110kV, 88kV and 66kV lines and substations while the distribution system is made up of 33kV, 22kV, 11kV and 380/220V lines and substations. The transmission and distribution lines have a combined length of over 130 000km and close to 31 000 substations servicing a customer base above 600 000. Through funding assistance from the African Development Bank (AfDB), ZETDC is replacing faulted transformers on the network at selected substations countrywide.

1.3 The Remaining Scope of work

The remaining scope excludes the replacement of a 50MVA 132/33kV transformer at Mashava 132kV Substation due to budget constraints but now includes a short 2.2km of 33kV dedicated line to Gimboki Sewage Works. The project will be implemented at the following substations:

1. Orange Grove 132/33kV substation
2. Marvel 330/88kV substation
3. Chertsey 330/132kV substation
4. Sherwood 330/88kV substation

The four (4) substations have been in existence for longer than 30years. The proposed work will be confined to within substations perimeter fences hence will not in any way increase the ecological footprint. The works will be confined to areas where access to the general public is restricted.

Table 1.4 details the scope of work to be undertaken at each of the substations.

Table 1.4 Scope of Work to be undertaken

Substation	Work to be done
Orange Grove 132/33kV substation	<ul style="list-style-type: none"> - Transport and install a new 50/75MVA 132/33kV transformer - Fill up new transformer with oil - Install and commission a new 132kV transformer bay - Install and commission new 33kV transformer bay - Replacement of existing protection and control cables
Dedicated 33kV line to Gimboki Sewage Works.	<ul style="list-style-type: none"> - Erecting 2.2km of a 33kV Overhead line which will be constructed within the wayleaves of the existing 11 kV line feeding Gimboki Sewage Works
Marvel 330/88kV substation	<ul style="list-style-type: none"> - Transport and install a new 175MVA transformer to site - Fill transformer with new oil - Construction of a bund wall and oil holding Sump - Install and commission the new transformer
Chertsey 330/132kV substation	<ul style="list-style-type: none"> - Construction of a bund wall and oil holding sump - Transport a new 90MVA transformer - Fill transformer with new oil - Install and commission the transformer - Replacement of existing protection and control cables
Sherwood 330/88kV substation	<ul style="list-style-type: none"> - Construction of a bund wall and oil holding Sump - Transport a new 175MVA 330/(132)88/11kV transformer

2.0 The Legal Framework Guiding Implementation of Projects and Environmental Management

2.1 Environmental Management Act (Chapter 20:27)

The key legislation guiding environmental management and implementation of development projects in Zimbabwe is the Environmental Management Act (Chapter 20:27). The First Schedule of the Act has a list of projects for which EIA studies are required before implementation (Prescribed Activities). Power transmission and distribution projects are listed as prescribed activities for which ESIA studies

are required prior to implementation of the projects. However, since the projects covered by this ESMP are refurbishment projects, the ESMP complies with the requirements of the Act. Apart from the ESIA requirement, other relevant provisions that require adherence to the Act are as follows:

- Avoidance of littering
- Proper management of hazardous substances, transformer oil in this case
- Disposal of solid waste from the project

2.2 Other relevant legislation

Table 2 below shows some of the of legislation relevant to the implementation of the project

Table 2.1 Relevant legislation

Act	Relevant aspect (s)
Water Act (CHAPTER 15:09)	- Site excavations have the potential to result in siltation of water bodies if excavated soil is not fully rehabilitated -Oil spillage can result in water pollution
Pneumoconiosis Act (CAP 15:08 – REVISED 1996)	-Dust emission arising from excavations pose the risk of pneumoconiosis to exposed people, especially the workers that are directly involved

Provisions of the above laws will be adhered to during the implementation phase of the project. The impacts associated with the rehabilitation works are largely expected to be confined to the project sites. Table 2.2 below shows the associated environmental aspects and the environmental impacts likely to arise.

Table 2.2 Environmental and Social/Economic Aspect and related impacts

Environmental/Socio-economic Aspect	Possible Environmental Impacts
<ul style="list-style-type: none"> ➤ Excavations ➤ Oil spillages ➤ Transfer of oil from containers to the transformer ➤ Storage of decommissioned transformer ➤ Transportation of transformers ➤ Labour recruitment 	<ul style="list-style-type: none"> - Erosion of soil from site - Siltation of natural drainage systems as a result of the erosion of soil from the site - Contamination of soil and water resources - Loss of aesthetic value due to disposal of old cables - Dust and noise pollution - Employment creation - Potential promiscuous behavior - Spread of STIs and HIV/AIDS

3.0 Environmental Aspects and Impacts to be managed

Implementation of the project is expected to be associated with the generation of both positive and negative impacts. Table 3.1 below identifies the project activities and the associated impacts.

Table 3.1 Project Activities and Anticipated Impacts

Project activity/Aspect	Possible Environmental Impacts	Environmental Media to be affected	Spatial Extent of impact
a) Excavations	<ul style="list-style-type: none"> - Loosening of soil and its exposure to erosion - Dust emission - Noise 	<ul style="list-style-type: none"> • Soil • Air • Air 	<ul style="list-style-type: none"> - On site - On site - On site
b) Transportation of transformers to site	<ul style="list-style-type: none"> - Potential accidents 	Human environment	<ul style="list-style-type: none"> - On/off site
c) Filling transformers with oil	<ul style="list-style-type: none"> - Contamination of soil through spillages 	<ul style="list-style-type: none"> • Soil, surface and ground water 	<ul style="list-style-type: none"> - On site
d) De-tanking of oil from decommissioned transformers	<ul style="list-style-type: none"> - Contamination of soil in the event of oil leaks - Potential exposure to PCB contaminated oil 	<ul style="list-style-type: none"> • Soil, ground water Soil, aesthetics 	<ul style="list-style-type: none"> - On site
e) Storage of de-tanked transformer oil and transformers	<ul style="list-style-type: none"> - Contamination of soil through spillages - Loss of vegetation and habitats 	<ul style="list-style-type: none"> • Vegetation, soil 	<ul style="list-style-type: none"> - On/off site - Off site
f) Opening of borrow sites for construction soil	<ul style="list-style-type: none"> - Dust emission - Potential erosion - siltation of water bodies - Aesthetic effects 	<ul style="list-style-type: none"> • Soil • Soil 	<ul style="list-style-type: none"> - Off site
<ul style="list-style-type: none"> - Disposal of construction rubble - Labour for the project 	<ul style="list-style-type: none"> - Pollution - Aesthetic effects - Employment creation - Improved living standards - Potential increase in HIV/AIDS and STIs. 	<ul style="list-style-type: none"> • Human environment 	<ul style="list-style-type: none"> - Off site - On/ Off site

The table above shows that most of the anticipated impacts will be confined to the substation sites and these have not changed since the disclosure in August 2013. A few off-site activities will potentially affect both the natural environment and surrounding communities hence the need to put more attention on the management of such impacts.

4.0 The Environmental and Social Management Plan

This ESMP was prepared and has been updated after the Bank and ZETDC staff had revisited the sites in October 2016. The team ascertained that there were no environmental changes pertaining to the project that warranted intervention. This implies that the ESMP is still in compliance with the African Development Bank's Integrated Safeguards System (ISS), the applicable national legislation and regulations of Zimbabwe. The ESMP outlines the mitigation and enhancement measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts, or to enhance the project beneficial impacts. It also assigns monitoring responsibilities to specific institutions and presents the budget required to ensure effective monitoring of the project impacts during the construction and operation phases.

4.1 Impacts on the Local Communities

The project is largely expected to have positive impacts on the local communities. As far as possible, the contractor will recruit most of the general staff from the surrounding areas. With respect to Sherwood and Chertsey, the surrounding areas are mainly farms while for Marvel and Orange Grove, these are mainly urban areas. There are positive impacts associated with employment opportunities that are going to be realized as a result of implementation of these projects.

At the same time, all ZETDC substations are security installations which are not accessible to the general public. They are also generally located far away from settlements, a factor which also reduces safety risks on members of the public. It is therefore highly unlikely that the general public will be negatively affected by the implementation of the project.

4.1.1 Gender issues

Gender issues in the country are promoted through the Ministry of Women Affairs, Gender and Community Development. The implementation of the proposed projects is expected to help improve reliability of power supplies to various areas around the four (4) substations. There are women projects that are being supported by the Ministry of Women Affairs which are set to benefit from these projects. These include irrigation projects outside Sherwood substation and small scale mines in and around Kwekwe, improved water supplies and sanitation in Mutare and other institutions for example, schools, clinics and etc. The contractor will be required to employ women as much as possible at each of the four (4) project sites.

4.2 Positive impacts

4.2.1 *Employment Opportunities*

As a matter of policy, ZETDC encourages contractors to employ the local community for non-technical work required as part of project implementation. Local people will therefore be employed for such activities at each of the four (4) project sites where rehabilitation work will be undertaken. This will have a positive impact on the standards of living for these people.

4.2.2 Improved reliability of electricity supplies

The implementation of these projects will improve reliability of power supplies in and around the four (4) substations. This is expected to stimulate economic activities and to improve standards of living. One of the facilities set to benefit from reliability of power supplies is the City of Mutare's sewage treatment plant (Gimboki) (Plate 4.2.2). The new 132/33kV transformer to be installed at Orange Grove will ensure reliable power supplies to the sewage treatment plant.

Plate 4.2.2 Gimboki sewage treatment plant to benefit from the installation of the new transformer at Orange Grove Substation and the 33kV line from where the new line extension to Gimboki sewage treatment works will be constructed.



The installation of the transformer will be accompanied by the construction of a 2.2kilometre 33kV line from the nearest 33kV feeder line which is about 2.2 km away from the sewage treatment works.

The new line will run parallel to the existing 11kV feeder currently supplying the sewage treatment works. It will not displace any homesteads neither does it cut across arable lands. Improved power supplies to the sewage treatment plant will help to reduce water pollution in Sakubva River. The treatment plant often discharges raw sewer into the river whenever there is a power cut.

4.3 Negative impacts

4.3.1 Dust emission from work sites

Civil works required at each of the four (4) substations entails excavating foundations for the transformer pad. Excavations will also be undertaken at different sites where gravel for construction works will be extracted. These excavations will generate dust. By nature, dust is fugitive. Its effects could be felt off site hence will require effective management.

Mitigation

In cases where excavations result in the generation of excessive dust, water will be sprinkled on the surface prior to commencement of works. This will effectively reduce the amount of dust emitted from the sites. Since there are no homesteads in the vicinity, no communities are expected to be negatively affected by dust. Workers should be provided with appropriate PPE to ensure that they are safe from dust emissions.

4.3.2 Noise

Construction noise will affect workers mostly. It is not expected that communities outside the project sites will be affected in any way.

Mitigation

Workers will be issued with appropriate PPE to protect them from effects of excessive noise.

4.3.3 Exposure of soil to erosion

Excavations will loosen soil and expose it to erosion. Eroded soil from the site could cause siltation of stream and rivers in the area. Land degradation may also arise from extraction of pit and river sand required for civil works.

Mitigation

The contractor will be required to carefully manage excavations and to ensure that all excavated soil is backfilled before moving off the site.

4.3.4 Traffic and construction accidents

The construction phase will witness an increase in vehicular traffic to and from the project area and will raise the risk of traffic accidents. Transportation of transformers to the sites also poses further risks of accidents especially in view of the nature of vehicles used to transport the transformers. These risks will be minimized through adherence to speed limits and placing adequate road signs in the area.

4.3.5 Aesthetic impacts

Several activities will affect the aesthetic aspects of sites in and outside the project areas. The disposal of piles of excavated soil, gravel extraction pits and storage of decommissioned transformers will affect the aesthetics aspects of the area.

Mitigation

Cables removed from the sites will be collected and disposed through registered recycling facilities. Faulted transformers to be removed from the system will be de-tanked and stored in temporary storage sites at each of the substations (Plate 4.3.5) and the oil recycled and reused.

Plate 4.3.5 showing the faulted Sherwood transformer which was de-tanked



De-tanking of the transformer ensures that transformer oil is stored safely and pre-empts the risk of gradual leaking of the oil from the transformer into the environment.

All on and off site excavations will be backfilled at the end of the project to minimize the aesthetic effects and risks to the general public.

4.3.6 Risk of pollution of soil and water resources

Spillage of oil may occur during the process of filling the new transformers with oil and de-tanking of the decommissioned transformers (Plate 4.3.5). This will immediately pollute soil in the affected area and in the long term cause ground and surface water pollution.

Plate 4.3.6 showing the location of the faulted Orange Grove transformer



Mitigation

The transformer has already been removed from site, the oil and copper windings recycled, however care should be exercised during the process of filling up new transformers. In the event that accidental spillages occur, the contractor will be required to ensure that the contaminated soil is scoped out and treated in accordance with regulation.

Bunding structures will be constructed around every newly installed transformer in order to ensure that oil spillages during transformer filling and during the operation phase does not spill into the environment (Plate 4.3.6).

Plate 4.3.7 showing bunding around one transformer at Sherwood



4.3.7 Health hazards associated with handling de-tanked oil

Oil will be removed from decommissioned transformers. There is risk of handling PCB contaminated oil since some of these transformers are very old and potentially contaminated by PCBs.

Mitigation

The oil handling procedure is in place and will be used to ensure minimum risk of exposure to workers. They will also be provided with the correct type of gloves for use when handling transformer oil. It should be noted the oil was drained, recycled and reused.

4.3.8 Generation of waste

Solid waste will be generated from construction works at the different sites. such waste will include empty cement bags, cable off cuts and various waste streams from domestic activities including putrescible waste

Mitigation

A waste management plan which identifies waste streams generated at each site must be at hand. Composting will be done on appropriate sites for putrescible waste. Any usable waste paper should be retrieved and where possible given to communities for re-use. Where this is not possible, all such waste should be collected and disposed in designated local authority landfill sites. Contractor to ensure that there is no littering around construction sites.

The comprehensive environmental and social management plan (ESMP) is presented in the tables below

5.0 Environmental and Social Management and Monitoring Plan (ESMP)

Impact	Mitigation/Enhancement during construction phase	Monitoring/reporting frequency	Locality	Responsibility
Employment of local labour	<ul style="list-style-type: none"> - Employ local people for non-technical work - Prioritize employment of women 	Monthly	Site offices	<ul style="list-style-type: none"> - ZETDC - Contractor
Occupational health problems	<ul style="list-style-type: none"> - Supply appropriate PPE and ensure that workers use it - Provide first aid kits at construction sites - All construction workers to undergo induction training 	Monthly	All construction sites and construction camps	<ul style="list-style-type: none"> - Contractor - ZETDC - Ministry of Health and Child Care
Soil pollution from oil spills	<ul style="list-style-type: none"> - Construction of bunding around transformers - Exercise due care when handling oil 	Monthly	Construction sites	<ul style="list-style-type: none"> - ZETDC - Contractor
Spread of HIV/STIs	<ul style="list-style-type: none"> - HIV sensation of workforce and local communities - Provision of information brochures on HIV/AIDS and STIs 	Quarterly	Project area	<ul style="list-style-type: none"> - Contractor - ZETDC - Ministry of Health and Child Care
Potential increase in traffic accidents	<ul style="list-style-type: none"> - Erect adequate construction warning sites - Enforce maximum speed limits of 40km/hr for construction vehicles on all access roads - Ensure all vehicles are well serviced 	Daily	Access roads in the project area	<ul style="list-style-type: none"> - ZETDC - Contractor

Impact	Mitigation/Enhancement during operation phase	Monitoring frequency	Locality	Responsibility
Loss of vegetation	- Confine vegetation clearance only to sites where gravel is extracted	Weekly	Borrow areas for each construction site	- ZETDC - EMA
Waste disposal	- Dispose waste in designated waste disposal sites	Weekly	Construction sites Construction camps	- Contractor - ZETDC - EMA
Disposal of decommissioned cables	- Dispose old cables in designated local authority waste disposal sites	Monthly	Construction sites	- Contractor - ZETDC
Erosion and sedimentation of rivers	- Rehabilitate all excavated sites and excess spoil	Quarterly	Pit sand extraction sites Excavation sites within substations	- Contractor - EMA -
Deterioration of ambient air quality due to dust emission	- Watering of surfaces prone to excessive dust before working - Limit vehicle speed limits to 40km/h - Maintain equipment in good working order	Daily	-Construction sites -Gravel extraction sites	- Contractor - ZETDC
Noise	- Provide workers with appropriate PPE - Confine noisy operations to normal working hours	Daily	Construction sites and campsites	- Contractor - ZETDC

6.0 ZETDC have an Environmental Management Unit

ZETDC have an Environmental Management Unit and together with the IE, they will monitor the works under the contracts in accordance with local legislation and the approved ESMPs. They will also monitor the environmental aspects and among others compliance with Personal protective clothing, monitoring and suppressing dust and noise. The Unit also ensures proper handling of transformer oil and other materials that may be hazardous to health as well as monitoring compliance with the safety toolbox talks that are a prerequisite before work commences every morning. The Unit ensures that the contractors comply with the requirements of undertaking regular Health and HIV awareness campaigns for the workers.

6.1 Monitoring Budget

Monitoring by ZETDC Environmental personnel will be undertaken at each site on a quarterly basis. The main cost items are mileage, water samples, solid waste disposal, personal protective equipment (PPE) and subsistence). Calculations for each of these items are as shown below:

6.1.1 Mileage

The following distances will be covered to each site every quarter (Mileage rates are as per the Automobile Association of Zimbabwe rates per km (\$0.65)).

1. Harare - Orange Grove substation 580km
2. Harare - Marvel substation 960km
3. Chertsey 330/132kV substation 500km
4. Mashava Substation 700km
5. Sherwood Substation 500km

6.1.2 Water samples

Three water samples will be taken from each of the four (4) project sites every quarter to determine if there is any ground water pollution related to the project. Average cost per sample is \$250.

6.1.3 PPE

A once off purchase of PPE will be done at the beginning of construction works. PPE will be required for five (5) Environmental personnel. Indicative costs per item are as shown below:

1. Gloves - \$15 per pair
2. Helmets - \$35 each
3. Work suits - \$60 each
4. Safety shoes - \$45 per pair

6.1.4 Solid waste disposal costs

The local municipal disposal sites will be used for the disposal of any solid waste arising from the implementation of the project. The average cost is \$350/per ton. This will apply to each of the four (4) substations.

6.1.5 Monitoring budget

Table 4.5 presents the proposed monitoring budget. This is the cost associated with implementation of mitigation measures for each of the impacts identified in the ESMP.

Table 4.5 Monitoring Budget

Cost item	First Quarter (\$)	Second quarter (\$)	Third Quarter (\$)	Fourth Quarter (\$)	Total (\$)
Mileage(3,240km/quarter) <i>Quarterly SHE audits and meetings</i>	2,106	2,106	2,106	2,106	8,424
Accommodation and subsistence <i>(Hotel accommodation required for Marvel, meals only for the other sites)</i>	1,920	1,920	1,920	1,920	7,680
Protective Personal Equipment	775	-	-	-	775
Ground water samples (Full sample, \$250/samples x3 samples x 5 sites)	3,750	3,750	3,750	3,750	15,000
Waste disposal (Municipal rates of disposing solid waste- \$350/t x 5 sites)	1,750	1,750	1,750	1,750	7,000
Grand Total	10,301	9,526	9,526	9,526	38,879

7.0 EPIRP Phase II Implementation Status

EPIRP Phase II Stage I components are under implementation and prior to commencement detailed site specific ESMPs were prepared for each of the works contracts by the appointed contractors and reviewed by the Implementing Entity (IE) and ZETDC in accordance with best practices and local legislation.

The **remaining scope of** work under EPIRP Phase II Stage II will comprise the following:

- Replacement of 1 x 175MVA, 330/(132)88/11kV transformer at Sherwood substation
- Replacement of 1 x 50/75MVA, 132/33kV transformer at Orange Grove substation
- Erecting 2.2km of a 33kV line to Gimboki Sewerage Works. This short line will be erected within the wayleaves of the existing 11 kV line feeding sewage works.

The above works are similar to those which are ongoing under Stage I and were included in the disclosure made in 2013. The Bank and ZETDC staff visited the sites in October 2016 and ascertained that there have been no environmental changes that warrant intervention. The visit revealed that the failed transformers have been safely removed from sites and stored in an environmental friendly manner. The oil removed from the transformers was filtered and reused.

8.0 Conclusion

The proposed project has significant socio-economic benefits to communities in the project area as well as ZETDC as the project developer.

The negative impacts of the project can all be managed since they are similar to those being managed in similar rehabilitation and network upgrading projects being implemented by ZETDC. All the impacts are of a temporary nature and largely confined to the project sites. At all the substations where work will be undertaken, there are no homesteads that are within a radius of one (1) km from the substations hence impacts on the local community will also be negligible. It is therefore possible to undertake the proposed rehabilitation work without adversely affecting local communities and the natural environment. The rehabilitation work will be closely monitored to ensure that all negative impacts are avoided or minimized while the positive ones are enhanced.

Also the ESMP that was prepared and disclosed in 2013 included components in EPIRP II Stage I and Stage II and it is still valid as ascertained by the Bank and ZETDC staff that visited the sites in October 2016. The main works are replacement of transformers and associated equipment, which have been removed from site in an environmentally friendly manner. The sites are clear of any obstructions and are ready to receive the new equipment. The monitoring of Stage II implementation will be done in a similar manner as Stage I.

The updated ESMP for October 2016 is in line with the ESMP disclosed in 2013 as the scope remains the same and the findings and actions remain the same and are sufficient to enable monitoring of the EPIRP II Stage II implementation.