

Environmental Monitoring Report – Part 1

Semiannual Report
July-December 2018
December 2018

INO: West Kalimantan Power Grid Strengthening Project

Prepared by Pusat Manajemen Proyek (Pusmanpro) for the PT PLN and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 31 December 2018)

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\$1.00	=	Rp14,518

NOTE

- (i) In this report, "\$" refers to US dollars.

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PT PLN (PERSERO) UIP KALBAGBAR

Jl. Letjend Suprpto No. 50 G, Pontianak
Kalimantan Barat

**West Kalimantan Power Grid Strengthening Project
Semi-Annual Environmental Monitoring Report
July to December 2018**



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ABBREVIATIONS

ADB	-	Asian Development Bank
AFD	-	Agence Française de Développement
EHS	-	Environmental Health and Safety
EHVTL	-	Extra High Voltage Transmission Line
EMF	-	Electric and Magnetic Fields
EMP	-	Environmental Management Plan
HIV/AIDS	-	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
HVDC		High Voltage Direct Current
HVTL		High Voltage Transmission Line
IEE	-	Initial Environmental Examination
SS	-	Substation
TL	-	Transmission Line
UPP KBB	-	PT PLN (Persero) <i>Unit Pelaksana Proyek Kalimantan Bagian Barat</i> (West of Kalimantan Region)
UIP KALBAGBAR	-	PT PLN (Persero) <i>Unit Induk Pembangunan Kalimantan Bagian Barat</i> (West of Kalimantan Region)
UIP KALBAGTIM		PT PLN (Persero) <i>Unit Induk Pembangunan Kalimantan Bagian Timur</i> (East of Kalimantan Region)
OHSMS	-	Occupational Health and Safety Management System (known as <i>Sistem Manajemen Keselamatan Kerja</i> or SMK3 according to the requirement of Indonesian Government)
PIC	-	Project Implementation Consultant
PLN	-	PT Perusahaan Listrik Negara (Persero) is the state-owned electricity company
PMU		Project Management Unit
ROW	-	Right of Way
UKL -UPL	-	<i>Upaya Pengelolaan Lingkungan and Upaya Pemantauan Lingkungan</i> (environmental management and monitoring effort document)
UP3B KALBAR	-	<i>Unit Pelaksana Penyaluran dan Pengaturan Beban</i> (West of Kalimantan Region)

Table of Contents

ABBREVIATIONS	ii
List Of Tables.....	iv
Chapter 1 Introduction.....	1
Chapter 2 Summary of the Work Progress.....	4
Chapter 3 Environmental Mitigation Status	4
3.1 Package 1: Bengkayang – Jagoibabang Transmission Lines.....	6
3.2 Package 2: Bengkayang Substation	9
3.3 Package 3: Bengkayang – Ngabang – Tayan Transmission Lines.....	12
3.4 Package 4: Ngabang and Tayan Substations	15
3.5 Package 5: Tayan, Sanggau, and Sekadau Substations.....	18
3.6 Package 6 and 7: Tayan – Sanggau and Sanggau – Sekadau Transmission Lines	28
Chapter 4 Environmental Monitoring Status	42
4.1 Package 1: Bengkayang – Jagoibabang Transmission Lines.....	43
4.2 Package 2: Bengkayang Substation	45
4.3 Package 3: Bengkayang – Ngabang – Tayan Transmission Lines.....	47
4.4 Package 4: Ngabang and Tayan Substations	49
4.5 Package 5: Tayan, Sanggau, and Sekadau Substations.....	51
4.6 Packages 6 and 7: Tayan – Sanggau and Sanggau – Sekadau Transmission Lines	56
Chapter 5 Findings on EMP Implementation and Required Corrective Actions	60
Chapter 6 ADB Mission Findings	66
Chapter 7 Conclusions.....	69

List of Tables

Table 2.1 Summary of the Work Progress.....	4
Table 3.1 Environmental Mitigation Status of Package 1.....	6
Table 3.2 Environmental Mitigation Status of Package 2.....	9
Table 3.3 Environmental Mitigation Status of Package 3.....	12
Table 3.4 Environmental Mitigation Status of Package 4.....	15
Table 3.5 Environmental Mitigation Status of Package 5.....	18
Table 3.6 Environmental Mitigation Status of Packages 6 and 7	28
Table 4.1 Environmental Monitoring Status of Package 1	43
Table 4.2 Environmental Monitoring Status of Package 2	45
Table 4.3 Environmental Monitoring Status of Package 3	47
Table 4.4 Environmental Monitoring Status Package 4	49
Table 4.5 Environmental Monitoring Status of Package 5	51
Table 4.6 Environmental Monitoring Status of package 6 and 7	56
Table 5.1 Findings on EMP Implementation and Required Corrective Actions	61
Table 6.1 ADB Mission Findings	66

List of Appendices

Appendix 1	Project Organization Chart
Appendix 2	Mitigation Implementations of 275 kV Bengkayang – Jagoibabang Transmission Lines (Operation Phase)
Appendix 3	Mitigation Implementations of 275/150 kV Bengkayang Substation (Operation Phase)
Appendix 4	Mitigation Implementations of 150 kV Bengkayang – Ngabang – Tayan Transmission Lines (Operation Phase)
Appendix 5	Mitigation Implementations of 150/20 kV Ngabang Substation and Tayan Extension Substation (Operation Phase)
Appendix 6	Mitigation Implementations of 150/20 kV Tayan Extension, Sanggau, and Sekadau Substations (Construction Phase)
Appendix 7	Mitigation Implementations of 150 kV Tayan – Sanggau and Sanggau - Sekadau Transmission Lines (Construction Phase)
Appendix 8	Monitoring Results
Appendix 9	Mission Findings Evidence

Chapter 1 Introduction

Project Background. The Government of the Republic of Indonesia has signed loan agreements with the Asian Development Bank (ADB) and the Agence Française de Développement (AFD) in the amount of US\$ 49.5 million each to provide funding required by PT Perusahaan Listrik Negara (Persero), hereafter referred to as 'PLN', for the Strengthening West Kalimantan Power Grid (the Project). The project includes construction of 82-km long of 275 kV power transmission line from the border of Sarawak in Mambong (East Malaysia) to Bengkayang (West Kalimantan of Indonesia) and 275/150 kV substation at Bengkayang. In addition, the construction of 145-km long of 150 kV transmission line from Bengkayang - Ngabang – Tayan as well as installation of 150/20 kV substations at Ngabang and Tayan are financed by this loan. The location of the Project within the context of Kalimantan Island is presented in **Map 1**.

PLN has assigned the joint venture of Tractebel Engineering Ltd. and Power Grid International Limited (Thailand), Contract No. 0107.PJ/041/DIR/2013 (dated 30 July 2013) to carry out the monitoring on environmental, health and safety (EHS) implementation related to the construction of the power transmission line and substations for the last period of January – June 2017. The semi-annual environmental monitoring report has been prepared by Tractebel/Power Grid to describe the EHS implementation of the project against the requirements of the Environmental Management Plans specified in the Initial Environmental Examination (IEE) documents prepared for the Project in July 2011.

The monitoring is now continued by PT PLN (Persero) Pusmankon since August 1, 2017 with contract no. 001.STg/KON.02.02/UIP KALBAGBAR/2017. This monitoring report has been prepared in accordance with the requirements of the IEE document dated in July 2011 for Package 1 to 4 and in July 2016 for Package 5 to 7. Following ADB review of the report in 2018, the monitoring report has been provided by PT PLN (Persero) *Pusat Manajemen Konstruksi* known as PUSMANKON which is a unit of PLN responsible for construction management. PLN Pusmankon takes over the works previously handled by the contractors mentioned earlier. Since September 2018, the name of PUSMANKON has been changed to PUSMANPRO.

Scope and Management of the Project. The EMP implementation elaborated in this report covers the work packages of the Project for a period of July to December 2018. These include:

- Package 1: 275 kV power transmission line from Bengkayang to Jagoibabang (the border with Sarawak, Malaysia);
- Package 2: 275/150 kV Bengkayang substation;
- Package 3: 150 kV power transmission line from Bengkayang to Ngabang (92-km long), and from Ngabang to Tayan (53-km long);
- Package 4: 150/20 kV Ngabang substation and extension of Tayan substation;
- Package 5: 150/20 kV extension of Tayan substation; and new Sanggau and Sekadau substations;
- Package 6: 150/20 kV power transmission line from Tayan to Sanggau; and
- Package 7: 150/20 kV power transmission line from Sanggau to Sekadau.

The environmental and OSH implementation of the Project is managed by PLN Head Office, represented by K3L Division as the Project Management Unit (PMU). The PMU is supported by Project Implementation Unit. PT PLN (Persero) UIP KALBAGTIM, for package 1 and 2, is located in Balikpapan and PT PLN (Persero) UIP KALBAGBAR is located in Pontianak for package 3 to 7, in which the working areas are divided as such: Environmental and OSH supervision is controlled by PLN UPP KBB with 3 located in Singkawang for package 3 and 4, and UPP KBB 2 located in Sintang for Package 5, 6 and 7. PLN is supported by PLN PUSMANPRO as Project Implementation Consultant (PIC) for environmental and OSH monitoring and reporting of the project. The environmental and OSH implementation and Management organization chart is detailed in **Appendix 1**.

Map 1 PLN Power Grid Strengthening Project in West Kalimantan



Chapter 2 Summary of the Work Progress

The status and progress of the implementation of West Kalimantan Power Grid Strengthening Project for July - December 2018 period is summarized in **Table 2.1** the project activities conducted in this period include the operation of transmission lines and substations for Packages 1, 2, 3, and 4. Earth works for substation on Package 5. The construction activities of Packages 6 and 7 are foundation and tower erection work.

Table 2.1 Summary of the Work Progress (as of December 2018)

Project Packages	Status	Responsible Party (as of Dec 2018)
Package 1: 275 kV Bengkayang – Jagoibabang Power Transmission Lines	Operation since May 31, 2016	UP3B KALBAR (Power Dispatch Unit)
Package 2: 275/150 kV Bengkayang Substation	Operation since Nov 1, 2017	UP3B KALBAR (Power Dispatch Unit)
Package 3: 150 kV Bengkayang - Ngabang – Tayan Power Transmission Lines	Operation since May 28, 2018	UP3B KALBAR (Power Dispatch Unit)
Package 4: 150/20 kV Ngabang Substation and Extension of Tayan Substation	Operation since Sep 10, 2018	UP3B KALBAR (Power Dispatch Unit)
Package 5: 150/20 kV Sanggau and Sekadau Substations and extension of Tayan substation	Construction – site clearing, excavation, backfilling, foundation and supply materials. The overall progress was 42.93%.	PT Siemens Indonesia and Siemens Malaysia Bhd (Contractor) supervised by UIP KALBAGBAR (Project Implementation Unit)
Package 6: 150/20 kV Tayan – Sanggau Power Transmission Line	Construction – foundation and tower erection. The overall progress was 49.27%.	PT Krakatau Engineering and PT Citramas Heavy Industries (Contractors) supervised by UIP KALBAGBAR (Project Implementation Unit)
Package 7: 150/20 kV Sanggau – Sekadau Power Transmission Line	Construction – foundation and tower erection. The overall progress was 46.87%.	

Chapter 3 Environmental Mitigation Status

The status and outcomes of the environmental mitigation conducted for the Packages 1 to 7 in the period of July - December 2018 is described in the following sub-chapters of this report.

The environmental mitigation measures defined in Table 9.1 Environmental Management Plan of the Project's Initial Environmental Examination or IEE (2011) should be conducted for both construction and operational works conducted under the Packages 1 to 4 (i.e. power transmission lines from Bengkayang to Tayan including associated substations). The mitigation measures implemented by the Project for Packages 1 to 4 are reported in sub-chapters 3.1 to 3.4.

The Project's IEE (2016) applies for Packages 5, 6 and 7. The construction activity currently underway is the 150 kV Sanggau and Sekadau substations and extension of Tayan substation for Package 5, 150 kV Tayan – Sanggau power transmission lines for Package 6, and Sanggau – Sekadau power transmission line for Package 7. Therefore, the environmental mitigation defined in Construction Phase section of Table 28 Environmental Management Plan of the IEE should be conducted. The mitigation measures implemented by the Project for Packages 5 to 7 are reported in Sub-chapters 3.5 to 3.6.

3.1 Package 1: Bengkayang – Jagoibabang Transmission Lines

The transmission lines from Bengkayang to Jagoibabang have been in operation since 2015/2016 and UP3B KALBAR oversees this operation. **Table 3.1** describes the mitigation measures implemented by the Project for the operation of the transmission lines, including its compliance status against the mitigation requirements defined in the IEE (2011). Some requirements defined in this table are intended for the mitigation of impacts due to substation operation and, therefore not applicable mitigating impacts due to the operation of transmission line.

Table 3.1 Environmental Mitigation Status of Package 1

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
1	Electric and Magnetic Fields/EMF (HVTL alignment, substation)		
	Monitor to ensure EMF are within national and international standards/guidelines	The status of EMF monitoring is discussed in the environmental monitoring chapter of this report.	The mitigation implemented with this regard is in compliant with its requirement.
2	Noise (substation)		
	The mitigation requirements for noise impacts are intended for substation operations, and therefore not applicable for those of the transmission lines reported in this table.		Not applicable.
3	Soil and Water Contamination (substation)		
	The mitigation requirements for soil/water contamination impact are intended for substation operations, and therefore not applicable for those of the transmission lines reported in this table.		Not applicable.
4	Vegetation Management (HVTL alignment, RoW)		
	<ul style="list-style-type: none"> • Vegetation removal will only be allowed within the designated width of the RoW. • Vegetation cutting within the RoW will be undertaken only to achieve the required clearances. • Tree removal and trimming will only be undertaken by hand tools, including chain saws. 	There was no vegetation removal conducted, and therefore these mitigation requirements were not applicable for the reporting period.	Not applicable.
	<ul style="list-style-type: none"> • The use of herbicides will be strictly prohibited. 	This requirement is undergoing discussion with AP2B KALBAR for the reporting period, and the results to be reported in the next report.	The absence of documentation with this regard is not compliant with the mitigation requirement.
5.	Restriction on Development in RoW (HVTL alignment, RoW)		
	Payment of compensation to affected people during the LARP processes.	Implementation of this mitigation requirement is reported separately in the social monitoring report submitted to ADB.	Not applicable.

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
6.	Fragmentation of Land Use (HVTL alignment)		
	Siting HVTL alignment is sited so as to avoid, as far as practicable, such fragmentation by following existing roads and boundaries and avoiding cutting across individual land use plots.	The Bengkayang – Jagoibabang transmission lines have been in operation since 2015/16, and therefore this mitigation requirement is no longer applicable.	Not applicable.
7.	Increased Access (HVTL alignment)		
	<ul style="list-style-type: none"> No permanent access roads to RoW. Any temporary access roads to be decommissioned and restored to natural conditions once construction has been completed. 	There was no permanent access road to the RoW of the transmission lines. The temporary access road has been naturally and gradually overgrown with local vegetation following completion of the construction as shown in Appendix 2.a .	The mitigation implemented with this regard is in compliant with its requirement.
8.	Health and Safety (HVTL alignment, substation)		
	<ul style="list-style-type: none"> Operation phase occupational health & safety (OHS) and community health & safety (CHS) plans developed, including, but not limited to: <ul style="list-style-type: none"> Live power line Working at height Electric and magnetic fields (EMF) Exposure to chemicals Emergency procedures for spills, fire, evacuation, and natural disaster; and Community safety. 	<ul style="list-style-type: none"> PLN Area <i>Penyaluran dan Pengatur Beban Kalimantan Barat</i> (West Kalimantan Dispatch Unit) has established an Occupational Health and Safety Management System (OHSMS) known as SMK3 for the operations of transmission lines and substations No.SMK3/AP2B/U/P/16 dated on June 21, 2017. The procedures on working with live power line, exposure to EMF and community safety, among other, have not been established in the OHSMS of PLN's West Kalimantan Dispatch Unit. 	The mitigation implemented with this regard is partially compliant with its requirements, and the outstanding issue remains unresolved since the 2017 environmental monitoring report.
	<ul style="list-style-type: none"> Towers to be fitted with anti-climbing devices and substations will have security fence and full-time security fence and full-time security personnel on site. 	Each operated transmission tower has been installed with anti-climbing device and lock nut. The documentation can be seen in Appendix 2.b .	The mitigation implemented with this regard is compliant with its corresponding requirements.
	<ul style="list-style-type: none"> Substations to be equipped with fire suppression systems and, as noted above, emergency response plans to be developed. 	These mitigation requirements are intended for substation operations, and therefore do not apply for the operation of transmission lines reported in this table.	Not applicable.
9.	Avian Collisions (HVTL alignment)		
	<ul style="list-style-type: none"> Monitoring will include asking local people and maintenance personnel to report occurrences of dead birds or other dead animals under the line. 	The HSE supervisor from PIC had conducted interviews with the community around the location of the transmission towers and the results suggested that no dead birds and animal have been seen (as shown in Appendix 2.c).	The mitigation implemented with this regard is compliant with its requirements.
	<ul style="list-style-type: none"> If a location is to be identified with frequent occurrence, 	Due to the above circumstances, installing the line	Not applicable.

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
	then action will be taken which following investigation could include installing line markers to reduce the incidence.	markers has not been conducted and unnecessary.	

3.2 Package 2: Bengkayang Substation

The Bengkayang substation has been operation since December 2015 and UP3B KALBAR is in charge of this operation. **Table 3.2** describes the mitigation measures implemented by the Project for the substation operation, including its compliance status against the mitigation requirements defined in the IEE (2011). Some requirements defined in this table are intended for the mitigation of impacts due to operation of the transmission line and, therefore not applicable for mitigating the impacts due to that of the substation.

Table 3.2 Environmental Mitigation Status of Package 2

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
1.	Electric and Magnetic Fields/EMF (HVTL alignment, substation)		
	Monitor to ensure EMF are within national and international standards/guidelines	The status of EMF monitoring is discussed in the environmental monitoring chapter of this report.	The mitigation implemented with this regard is in compliant with its requirement.
2.	Noise (Substation)		
	High noise operations enclosed in noise-proofed building that effectively contain the noise.	The Bengkayang substation does not generate high noise operation and the related site has been constructed not adjacent to sensitive areas such as housing and schools. The noise monitoring result within the substation is presented in Appendix 3.a .	The mitigation implemented with this regard is compliant with its requirement.
3.	Soil and Water Contamination (Substations)		
	<ul style="list-style-type: none"> Transformers and equipment selected will meet international standards and will be routinely maintained. 	The transformers and equipment selected for the project meet the International Electrical Community (IEC) 1999 Standard 60076 1 and 2. Further, the transformer is routinely maintained following the Decree of PLN Director No. 0520-2.K/DIR/2014 on Transformer Maintenance.	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> PCB will not be used in transformers and other electrical equipment 	According to PLN letter No. 0203 Facs./KLH.01.01/DIVK3L/2018 (dated on April 30, 2018) on <i>Persyaratan Pengadaan Material/Peralatan (Trafo, Kapasitor, Minyak Trafo) Bebas PCBs</i> . In the transformer procurement process that owned by PLN must be free from PCB.	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Areas around substation transformers and areas where oils, fuels, and hazardous wastes are stored will be encased in an impervious bund capable of holding 150% of oils, fuels, and hazardous wastes 	<ul style="list-style-type: none"> The 275 kV transformer at Bengkayang substation is equipped with oil pit structure made of concrete. This construction refers to PLN Standard SPLN T5.009: 2015 (dated on May 13, 2016) concerning to 	The mitigation implemented with this regard is partially compliant with its requirement.

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
	<p>in that area.</p> <ul style="list-style-type: none"> • Discharge from these bunds and other areas with the potential to be oil contaminated will be directed to oil-water separators. • Any oil contaminated material will be disposed of at a proper waste disposal approved as required by authorities. • An emergency spill response plan will be established, and staff will be trained on spill response procedures. 	<p><i>Pedoman Pemilihan Pemasangan Fire Prevention dan Fire Protection untuk Transformator Tenaga</i> sub-chapter 6.2.3 Fire Control. The oil pit is able to accommodate in approx. 70% of oil transformer (as shown in Appendix 3.b).</p> <ul style="list-style-type: none"> • At the time of operation there is no oil spill from the transformer. • The training is undergoing discussion with AP2B KALBAR and will be conducted in S1/2019. 	
4.	Vegetation Management (HVTL alignment, ROW)		
	The mitigation requirements defined for vegetation management impact are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.
5.	Restriction on Development in RoW (HVTL alignment, ROW)		
	Payment of compensation to affected people during the LARP processes.	Implementation of this mitigation requirement is reported separately in the social monitoring report submitted to ADB.	Not applicable.
6.	Fragmentation of Land Use (HVTL alignment, ROW)		
	The mitigation requirements for impact on land use fragmentation are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.
7.	Increased Access (HVTL alignment)		
	The mitigation requirements for impact on increased land access are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.
8.	Health and Safety (HVTL alignment, Substations)		
	<ul style="list-style-type: none"> • Operation phase occupational health & safety (OHS) and community health & safety (CHS) plans developed, including, but not limited to: <ul style="list-style-type: none"> - Live power line - Working at height - Electric and magnetic fields - Exposure to chemicals - Emergency procedures for spills, fire, evacuation, and natural disaster; and - Community safety. 	<ul style="list-style-type: none"> • PLN Area <i>Penyaluran dan Pengatur Beban Kalimantan Barat</i> (West Kalimantan Dispatch Unit) has established an Occupational Health and Safety Management System (OHSMS) known as SMK3 for the operations of transmission lines and substations No.SMK3/AP2B/U/P/16 dated on June 21, 2017. • The procedures on working with live power line, exposure to EMF and community safety, among other, have not been established in the OHSMS of PLN's West Kalimantan Dispatch Unit. 	The mitigation implemented with this regard is partially compliant with its requirements, and the absence of CHS plans remains an outstanding issue since 2017.
	• Towers to be fitted with anti-climbing devices and	This requirement applies for the transmission line.	The mitigation implemented with this

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
	substations will have security fence and full-time security fence and full-time security personnel on site.	Nevertheless, for security reasons, Bengkayang substation has been completed with security fence and full-time security personnel on site (as shown in Appendix 3.c).	regard is compliant with its requirements.
	<ul style="list-style-type: none"> Substations to be equipped with fire suppression systems and emergency response plans. 	Bengkayang Substation has been provided with fire extinguisher (as shown in Appendix 3.c).	The mitigation implemented with this regard is compliant with its requirements.
9.	Avian Collisions (HVTL alignments)		
	The mitigation requirements for avian collision impact are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.

3.3 Package 3: Bengkayang – Ngabang – Tayan Transmission Lines

The Bengkayang – Ngabang – Tayan transmission lines has been in the operation phase since May 2018 and UP3B KALBAR is in charge of this. **Table 3.3** describes the mitigation measures implemented by the Project for this construction activity, including its compliance status against the mitigation requirements defined in the IEE (2011). Some requirements defined in this table are intended for the mitigation of impacts due to substation operation and, therefore not applicable for mitigating the impacts due to the operation of transmission lines.

Table 3.3 Environmental Mitigation Status of Package 3

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
1	Electric and Magnetic Fields/EMF (HVTL alignment, substation)		
	Monitor to ensure EMF are within national and international standards/guidelines	The status of EMF monitoring is discussed in the environmental monitoring chapter of this report.	Not applicable.
2	Noise (substation)		
	The mitigation requirements for noise impacts are intended for substation operations, and therefore not applicable for those of the transmission lines reported in this table.		Not applicable.
3	Soil and Water Contamination (substation)		
	The mitigation requirements for soil/water contamination impact are intended for substation operations, and therefore not applicable for those of the transmission lines reported in this table.		Not applicable.
4	Vegetation Management (HVTL alignment, RoW)		
	<ul style="list-style-type: none"> Vegetation removal will only be allowed within the designated width of the RoW. Vegetation cutting within the RoW will be undertaken only to achieve the required clearances. Tree removal and trimming will only be undertaken by hand tools, including chain saws. 	There was no vegetation removal conducted, and therefore these mitigation requirements were not applicable for the reporting period.	Not applicable.
	<ul style="list-style-type: none"> The use of herbicides will be strictly prohibited. 	There is no evidence suggesting the prohibition for the use herbicides as anticipation if vegetation management is undertaken. Until now, this requirement is undergoing discussion with UP3B KALBAR, to be reported in the next report.	The absence of required document is not compliant with the mitigation requirement.
5.	Restriction on Development in RoW (HVTL alignment, RoW)		
	Payment of compensation to affected people during the LARP processes.	Implementation of this mitigation requirement is reported separately in the social monitoring report	Not applicable.

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
		submitted to ADB.	
6.	Fragmentation of Land Use (HVTL alignment)		
	Siting HVTL alignment is sited so as to avoid, as far as practicable, such fragmentation by following existing roads and boundaries and avoiding cutting across individual land use plots.	The Bengkayang – Ngabang – Tayan transmission lines have been in operation since May 2018, therefore this mitigation requirements is no longer applicable.	Not applicable.
7.	Increased Access (HVTL alignment)		
	<ul style="list-style-type: none"> • No permanent access roads to RoW. • Any temporary access roads to be decommissioned and restored to natural conditions once construction has been completed. 	There was no permanent access road to the RoW of the transmission lines. The temporary access road has been naturally and gradually overgrown with local vegetation following completion of the construction as shown in Appendix 4.a .	The mitigation implemented with this regard is in compliant with its requirements.
8.	Health and Safety (HVTL alignment, substation)		
	<ul style="list-style-type: none"> • Operation phase occupational health & safety (OHS) and community health & safety (CHS) plans developed, including, but not limited to: <ul style="list-style-type: none"> - Live power line - Working at height - Electric and magnetic fields (EMF) - Exposure to chemicals - Emergency procedures for spills, fire, evacuation, and natural disaster; and - Community safety. 	<ul style="list-style-type: none"> • PLN Area <i>Penyaluran dan Pengatur Beban Kalimantan Barat</i> (West Kalimantan Dispatch Unit) has established an Occupational Health and Safety Management System (OHSMS) known as SMK3 for the operations of transmission lines and substations No.SMK3/AP2B/U/P/16 dated on June 21, 2017. • The procedures for working with live power line, exposure to EMF, and community safety have not been established in the OHSMS of PLN's West Kalimantan Dispatch Unit. 	The mitigation implemented with this regard is partially compliant with its requirements due to the absence of CHS plans since 2017.
	<ul style="list-style-type: none"> • Towers to be fitted with anti-climbing devices and substations will have security fence and full-time security fence and full-time security personnel on site. 	Each operated transmission tower has been installed with anti-climbing device and lock nut (as shown in Appendix 4.b).	The mitigation implemented with this regard is compliant with its corresponding requirements.
	<ul style="list-style-type: none"> • Substations to be equipped with fire suppression systems and, as noted above, emergency response plans to be developed. 	These mitigation requirements are intended for substation operations, and therefore do not apply for the operation of transmission lines reported in this table.	Not applicable.
9.	Avian Collisions (HVTL alignment)		
	<ul style="list-style-type: none"> • Monitoring will include asking local people and maintenance personnel to report occurrences of dead birds or other dead animals under the line. 	The mitigation for the transmission line operation requires monitoring of dead birds and/or animals. The HSE supervisor from PIC had conducted interviews around the location of the transmission tower and obtained the results that no one reported the existence of birds from this network as reported in Appendix 4.c .	The mitigation implemented with this regard is compliant with its requirements.

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
	<ul style="list-style-type: none"> If a location is to be identified with frequent occurrence, then action will be taken which following investigation could include installing line markers to reduce the incidence. 	Due to the above circumstances, installing the line markers has not been conducted and unnecessary.	Not applicable.

3.4 Package 4: Ngabang and Tayan Substations

The Ngabang substation and Tayan substation (extended) have been in operation phase since October 2018 and under the responsibility of UP3B KALBAR. **Table 3.4** describes the mitigation measures implemented by the Project for the operation of these substations, including its compliance status against the mitigation requirements defined in the IEE (2011). Some requirements defined in this table are intended for the mitigation of impacts due to operation of the transmission line and, therefore not applicable for mitigating the impacts due to the operation of substation.

Table 3.4 Environmental Mitigation Status of Package 4

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
1.	Electric and Magnetic Fields/EMF (HVTL alignment, substation)		
	Monitor to ensure EMF are within national and international standards/guidelines	The status of EMF monitoring is discussed in the environmental monitoring chapter of this report.	The mitigation implemented with this regard is in compliant with its requirement.
2.	Noise (Substation)		
	High noise operations enclosed in noise-proofed building that effectively contain the noise.	The Ngabang and Tayan substation do not generate high noise levels and have been constructed away from the sensitive areas such as housing, schools, hospitals, and offices. The nearest residential area is about 500 m from the substation. The noise monitoring result within the substation is presented in Appendix 5.a .	The mitigation implemented with this regard is compliant with its requirement.
3.	Soil and Water Contamination (Substations)		
	<ul style="list-style-type: none"> Transformers and equipment selected will meet international standards and will be routinely maintained. 	The transformers and equipment selected for the project meet the International Electrical Community (IEC) 1999 Standard 60076 1 and 2. Further, the transformer is routinely maintained following the Decree of PLN Director No. 0520-2.K/DIR/2014 on Transformer Maintenance.	The mitigation implemented with this regard is compliant with its requirements.
	<ul style="list-style-type: none"> PCB will not be used in transformers and other electrical equipment 	<ul style="list-style-type: none"> According to PLN letter No. 0203 Facs./KLH.01.01/DIVK3L/2018 (dated on April 30, 2018) on <i>Persyaratan Pengadaan Material/Peralatan (Trafo, Kapasitor, Minyak Trafo) Bebas PCBs</i>. In the transformer procurement process that owned by PLN must be free from PCB. 	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Areas around substation transformers and areas where oils, fuels, and hazardous wastes are stored 	<ul style="list-style-type: none"> The transformer in 150 kV Ngabang substation is equipped with oil pit structure made of concrete. This 	The mitigation implemented with this regard is partially compliant with its

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
	<p>will be encased in an impervious bund capable of holding 150% of oils, fuels, and hazardous wastes in that area.</p> <ul style="list-style-type: none"> • Discharge from these bunds and other areas with the potential to be oil contaminated will be directed to oil-water separators. • Any oil contaminated material will be disposed of at a proper waste disposal approved as required by authorities. • An emergency spill response plan will be established, and staff will be trained on spill response procedures. 	<p>construction refers to PLN Standard SPLN T5.009: 2015 (dated on 13 May 2016) concerning to <i>Pedoman Pemilihan Pemasangan Fire Prevention dan Fire Protection untuk Transformator Tenaga</i> sub-chapter 6.2.3 Fire Control. The oil pit is able to accommodate approx. 110% of oil transformer volume in the event of spill (As shown in Appendix 5.b).</p> <ul style="list-style-type: none"> • At the time of the inspection, there is no oil spill from the transformer. • The emergency spill response plan is undergoing discussion with AP2B KALBAR and scheduled for implementation in S1/2019. 	<p>requirements due to the absence of evidence of an emergency spill response plan, and this this outstanding issue remains unresolved since 2017.</p>
4.	Vegetation Management (HVTL alignment, ROW)		
	The mitigation requirements defined for vegetation management impact are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.
5.	Restriction on Development in RoW (HVTL alignment, ROW)		
	Payment of compensation to affected people during the LARP processes.	Implementation of this mitigation requirement is reported separately in the social monitoring report submitted to ADB.	Not applicable.
6.	Fragmentation of Land Use (HVTL alignment, ROW)		
	The mitigation requirements for impact on land use fragmentation are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.
7.	Increased Access (HVTL alignment)		
	The mitigation requirements for impact on increased land access are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.
8.	Health and Safety (HVTL alignment, Substations)		
	<ul style="list-style-type: none"> • Operation phase occupational health & safety (OHS) and community health & safety (CHS) plans developed, including, but not limited to: <ul style="list-style-type: none"> - Live power line - Working at height - Electric and magnetic fields - Exposure to chemicals - Emergency procedures for spills, fire, evacuation, and natural disaster; and 	<ul style="list-style-type: none"> • PLN Area <i>Penyaluran dan Pengatur Beban Kalimantan Barat</i> (West Kalimantan Dispatch Unit) has established an Occupational Health and Safety Management System (OHSMS) known as SMK3 for the operations of transmission lines and substations No.SMK3/AP2B/U/P/16 dated on June 21, 2017. • The procedures on working with live power line, exposure to EMF and community safety, among other, have not been established in the OHSMS of 	<p>The mitigation implemented with this regard is partially compliant with its requirements due to the absence of CHS plans since 2017.</p>

No	Potential Impacts / Mitigation Requirements	Mitigation Implemented	Compliance Status / Remarks
	- Community safety.	PLN's West Kalimantan Dispatch Unit.	
	<ul style="list-style-type: none"> Towers to be fitted with anti-climbing devices and substations will have security fence and full-time security fence and full-time security personnel on site. 	This requirement applies for the transmission line. Nevertheless, for security reasons, Ngabang substation has been completed with security fence and full-time security personnel on site (as shown in Appendix 5. c).	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Substations to be equipped with fire suppression systems and emergency response plans. 	Ngabang Substation has been provided with fire extinguisher. The emergency response plan is included in the OHSMS procedure No. SMK3/AP2B/U/IK/10.01 (dated 21 June 2017) on Fire Work Instruction.	The mitigation implemented with this regard is compliant with its requirement.
9.	Avian Collisions (HVTL alignments)		
	The mitigation requirements for avian collision impact are intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported in this table.		Not applicable.

3.5 Package 5: Tayan, Sanggau, and Sekadau Substations

As of the end of December 2018, the Sanggau and Sekadau substations (new construction) and Tayan substation (extended) was reported in the construction phase and the progress was 42.93%. UIP KALBAGBAR is responsible for the development of these substations. **Table 3.5** describes the mitigation measures implemented by the Project during construction phase, including its compliance status against the mitigation requirements defined in the IEE (2016).

Table 3.5 Environmental Mitigation Status of Package 5

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
1.	Vegetation Clearing (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Vegetation removal will be allowed with the designated width of the RoW and the minimum area required for other infrastructure and activities. Vegetation cutting within the RoW will be undertaken to achieve the required clearances. For transmission lines, tree removal and trimming will only be undertaken by hand tools, including chain saws. 	These mitigation requirements are not applicable for the construction of substations reported herein as those are intended for the construction of transmission lines.	Not applicable.
	<ul style="list-style-type: none"> For substation, vegetation clearing will be conducted with the combination of cutting trees with hand and chainsaw, while the stump removal will be conducted by bulldozer. 	Vegetation clearing for the substation has been completed and therefore, this mitigation requirement is not applicable.	Not applicable.
	<ul style="list-style-type: none"> The use of herbicides will be strictly prohibited 	Prohibition of using herbicides has been implemented. On each construction site the warning sign has been made. The awareness about the prohibition of herbicide use is also delivered by the contractor in the toolbox meeting. Relevant evidence related to the these can be seen in Appendix 6.a .	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Local people will be allowed access to cleared vegetation for the collection of building materials and firewood. 	The clearing of vegetation for the substation construction has been completed, and therefore this mitigation requirement does not apply.	Not applicable.
	<ul style="list-style-type: none"> Burning of cleared vegetation will not be allowed; instead this material will be used to protect the soil from erosion, particularly in steeper slope areas, until more permanent soil protection 	The vegetation clearing has been completed for the areas require for the substation. Therefore, this requirement is not applicable.	Not applicable.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	measures are in place.		
2.	Soil Erosion (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Soil erosion control measures have been incorporated into the engineering design, including the use of adjustable height tower which allow the tower to conform to the slope of the site, thereby reducing land cutting and erosion. 	This mitigation requirement is not applicable for the construction of the substation reported herein as it is intended for that of the transmission line.	Not applicable.
	<p><i>a) Transmission line:</i></p> <ul style="list-style-type: none"> On steep slope: minimizing the extent and duration of land disturbance; using sandbags, banks or channels to divert water flows from upslope around the disturbed area; using vegetation cut or foliage to protect disturbed ground on a temporary basis On dry flat area, using vegetation cut or foliage to protect disturbed ground from rain water gives impact on a temporary basis Rice field and wet area no significant erosion is anticipated 	This mitigation requirement is not applicable for the construction of the substation reported herein as it is intended for that of the transmission line.	Not applicable.
	<p><i>b) Substation area:</i></p> <ul style="list-style-type: none"> Compaction the soil will be conducted in the embankment areas, and embankments should be re-vegetated with local grasses, and covered with protecting layers of rice straw or similar material to guard against rapid gully and rill erosion. 	The current activities on substation are cut and fill and also foundation works. In order to prevent erosion, in the early construction phase, compaction has been carried out in the embankment of the construction site (as shown in Appendix 6.b).	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Construction of slope protection (e.g. retaining wall, gabions etc.) and planting of vegetation strips shrubs and grasses across contours of exposed slopes. 	As stated earlier, there is no construction of slope protection yet; therefore, this mitigation is not applicable for this period.	Not applicable.
	<ul style="list-style-type: none"> Under the outdoor equipment there will be deployed gravel over the land; the unused open area will be covered with grass and small plants. 	At this moment the civil construction works is still on progress so this mitigation is not applicable for this period.	Not applicable.
	<ul style="list-style-type: none"> The soil erosion control measures will be regularly inspected and maintained during construction and until the area is stabilized or re-vegetated. 	<ul style="list-style-type: none"> Soil erosion control have been carried out and monitored regularly during this construction period. The implementation of soil erosion control measure has been reported in the HSE quarterly report. The 	The mitigation implemented with this regard is compliant with its requirements.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		checklist related to this mitigation is shown in Appendix 6.b.	
3. Drainage (substations)			
	Site drainage plans will be developed in accordance with good drainage practices management for each substation, including constructing above flood levels and ensuring drainage around the site is provided for high storm flows.	<ul style="list-style-type: none"> • In Q4/2018, the contractor has submitted engineering drawing for the site drainage plan, and this drawing has been approved by PLN. • The drawing ensures that site drainage and is discharged in a controlled manner into the nearby natural watercourses. • The engineering drawing and documentation related to this requirement is shown in Appendix 6.c. 	The mitigation implemented with this regard is compliant with its requirements.
4. Water Quality Impacts (HVTL alignments, substations)			
	<ul style="list-style-type: none"> • Mitigation measures to protect water quality from erosion are the same as “Vegetation Clearing” and “Soil Erosion, above. To protect against impacts on water quality arising from spillage of oil, fuel and other hazardous materials, good international practices will be adopted, including: • Fuel, oil and hazardous materials will be stored in designated areas with temporary impermeable bunds in accordance with international standards and at distance of at least 100 m from any water course. • Refueling of machinery, equipment and vehicles will be undertaken at distance of at least 100 m from any water course. • Any major work including oil changing and engine maintenance with the potential for oil to be spilled will be done in designated areas at distance of at least 100 m from any water course with containment to prevent any oil spills washing away. • Waste oil shall be collected and taken away for recycling. • Oil contaminated material shall be disposed of at 	<ul style="list-style-type: none"> • Fuel, oil and hazardous materials and wastes were stored in the temporary hazardous material warehouse with proper segregation at the contractor’s warehouse. • Refueling of vehicles was undertaken at the public fuel station. • Oil changing was conducted on site, and to prevent the potential for oil to be spilled, the oil was flowed through the hose and protected using oil secondary containment underneath. • Relevant evidences related to the above descriptions are shown in Appendix 6.d. 	The mitigation implemented with this regard is compliant with its requirements.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	designated waste disposal facilities.		
	<ul style="list-style-type: none"> Herbicides will not be used in the Project. 	Prohibition of using herbicides has been implemented. On each construction site, the warning sign has been made and the awareness was delivered during toolbox meeting for workers, the example is provided earlier in Appendix 6.a .	The mitigation implemented with this regard is compliant with its requirement.
5.	Air Quality Impacts (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Spray the dusty soil within substation construction area with water 	The construction site was on rainy season during the Semester 2/2018 period, and therefore water spraying was not required.	Not applicable.
	<ul style="list-style-type: none"> Accumulated soil and debris should be cleaned from adjacent asphalt roads in the entrance of substation. 	Accumulated soil and debris has been cleaned from adjacent asphalt roads in the entrance of substation as shown in Appendix 6.e .	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Truckloads with dusty soil should be covered, except for on-site or local trips. 	During rainy season, there's no need to cover the loads. The quarry is located only 300 m through the existing local road, so this is considered as local trip.	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Cut and fill should be balanced to the maximum extent possible at each site in order to minimize the need for fill and spoil disposal. 	The cut material has been used for fill material, and this eliminates the need for spoil disposal. Relevant evidence related to the above descriptions were shown in Appendix 6.e .	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Construction waste and garbage burning are prohibited. 	The contractor has provided the warning sign that the burning of cleared vegetation and waste is prohibited during this project. The awareness about the prohibition of burning vegetation and waste is delivered by the contractor in the toolbox meeting. Relevant evidence related to the above descriptions can be seen in Appendix 6.a .	The mitigation implemented with this regard is compliant with its requirement.
6.	Construction Waste Management (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Solid wastes generated from construction activities should not be haphazardly left around construction sites. Construction waste will be contained in a designated area on each site (tower site, substation). Wastes will be routinely collected and disposed of 	<ul style="list-style-type: none"> The contractor has provided separate trash bins for organic and non-organic wastes, placed at designated areas within the construction site. Trash bins that have been full of construction waste on regular basis have been disposed to the nearest final disposal. Supporting documents related to this mitigation are shown in Appendix 6.f. 	The mitigation implemented with this regard is compliant with its requirements.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<p>at safe waste disposal facilities indicated by the District Environmental agencies</p> <ul style="list-style-type: none"> Construction waste burning is prohibited 	<ul style="list-style-type: none"> The contractor has provided the warning sign that the burning of waste is prohibited during this project. The awareness about the prohibition of burning vegetation and waste is delivered by the contractor in the toolbox meeting. Relevant evidence related to the waste burning prohibition was shown earlier in Appendix 6.a. 	
7.	Domestic Waste Management (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Temporary worker camps will be required to be provided with appropriate sanitation facilities, including water supply, and washing facilities, temporary toilets, and waste containers. 	<p>The contractor rented a house from the local community for its employees. The house is equipped with adequate water supply obtained from groundwater, washing and toilet facilities, and a trash bag to collect domestic waste as shown in Appendix 6.g.</p>	<p>The mitigation implemented with this regard is compliant with its requirement, and some of them are not applicable.</p>
	<ul style="list-style-type: none"> Domestic waste will be routinely collected and disposed of at safe waste disposal facilities 	<p>Domestic wastes generated by the construction employees were collected in trash bags and disposed to Sei Kosak and Sanggau final disposal sites as shown in Appendix 6.g.</p>	
	<ul style="list-style-type: none"> Toilets should either be of a pit type that are at least 20 m from any water body, or porta-potty type. If the latter, toilets should be emptied on a regular or as needed basis, and the effluent disposed of at an approved waste disposal facility. 	<p>The Contractor does not develop the sanitation facilities as the house rented for its employee is already provided with such facilities. Therefore, this mitigation requirement is not applicable.</p>	
	<ul style="list-style-type: none"> Worker camp sanitation facilities should be developed in consultation with relevant local authorities and has all required local, province and national approvals 	<p>The rented house has adequate sanitation facilities, and therefore this mitigation is not applicable.</p>	
	<ul style="list-style-type: none"> All worker camps should be decommissioned when it is no longer required and restored to their natural condition. 	<p>Since the temporary worker camp is a rented house, so there is no requirement to conduct decommissioning. Therefore, this mitigation requirement is not applicable.</p>	
	<ul style="list-style-type: none"> Garbage burning is prohibited. 	<p>The contractor has provided the warning sign that the burning of waste is prohibited during this project. The awareness about the prohibition of burning vegetation and waste is delivered by the contractor in the toolbox</p>	

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		meeting. Relevant evidence related to the above descriptions was shown earlier in Appendix 6.a .	
8.	Roads and Infrastructure Impacts (HVTL alignments, substations)		
	<ul style="list-style-type: none"> A mapping of the locations of expected heavy equipment mobilization is needed versus settlement area locations. This needs inventory and monitors the potential damage to existing roads. 	The locations and routes of heavy equipment mobilization have been mapped against the settlement areas (as shown in Appendix 6.h).	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Any damaged infrastructure, after heavy equipment mobilization, will be repaired to at least the same standard and condition on completion of the Project, especially caused by the transportation of heavy equipment e.g. 150 kV power transformer. 	The monitoring indicated that there was no road damage after the transformer and other heavy materials mobilization in November 2018. The documentation of this monitoring is shown in Appendix 6.h .	The mitigation implemented with this regard is compliant with its requirement.
9.	Encroachment into Protected Forests, Hunting, Wood Collection (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Hunting extraction by workers of forest products such as firewood, and keeping of firearms on the Project, will be prohibited. To avoid impact on ecological valuable sites, habitats, natural forest, flora and fauna, this risk should be particularly be monitored along the ecologically sensitive alignments of the transmission line: <ul style="list-style-type: none"> along the 35 km between Tayan and Sosok where the alignment passes close by secondary forest within production forest reserves; along the alignment which runs close (3.5. and 11 km) to the primary forest within <i>Gunung Tiong Kandang</i> and <i>Gunung Sanggau</i>; and along the alignment which passes close (1.5-km distant) to the primary forests of the 'Pancur Aji' Forest Recreation Reserve. 	<ul style="list-style-type: none"> The construction sites of the substations are not located in the forest area. Nevertheless, the contractor has provided the signs stating that hunting is prohibited in the project areas. The awareness about the prohibition of hunting and wood collection is delivered by the contractor in the toolbox meeting. Relevant evidence related to the above descriptions can be seen in Appendix 6.i. 	The mitigation implemented with this regard is compliant with its requirement.
10.	Impacts on Cultural Heritage Sites (HVTL alignments, substations)		
	The Project area falls closely adjacent several notable heritage sites:	There were no cultural heritage sites found during heavy equipment and materials mobilization as	Not applicable.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<ul style="list-style-type: none"> Although, it is unlikely to suffer impact from Project due to separation distance (as a mitigation measure for these sites), Project workers should be made aware that these sites should not be disturbed, or material extracted if visited. Project construction traffic and heavy equipment should also not be routed anywhere near these sites to avoid vibration damage. 	<p>presented on mapping road (as shown earlier in Appendix 6.h). However, the contractor already delivered awareness related to cultural heritage during toolbox meeting for workers. The evidence related to this mitigation can be seen in Appendix 6.j.</p>	
	<ul style="list-style-type: none"> The transmission line construction should also take care not to make impact on the potential un-mapped locally important cultural sites, such as community sacred forest groves (<i>hutan adat</i>) and sacred grave sites (<i>tempat keramat</i>). Consultation should be conducted with local Traditional Leaders (<i>Temengung</i>) for each indigenous ethnic group to identify and avoid any such sites prior to construction of all project works. 	<p>To anticipate the existence of the potential un-mapped locally important cultural sites, the contractor has consulted on this matter with the customary head and conducted the <i>Ngudas</i> event prior to the start of the construction activities. The conduct of this event does not indicate that such culturally important sites are present within the construction site. The <i>Ngudas</i> event was no longer conducted in this reporting period.</p>	<p>Not applicable.</p>
11. Occupational Health and Safety (HVTL alignments, substations)			
	<p>Prior to the commencement of civil works a construction phase Occupational Health and Safety Plan (OHSP) will be developed. The OHSP should:</p> <ul style="list-style-type: none"> identify and minimize, so far as reasonably practicable, the causes of potential hazards to workers, including communicable diseases and vector borne diseases; provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions, with particular attention to live power lines, working at height, working during thunderstorms (lightning strikes), EMFs, and exposure to chemicals; Provide measures for the management and appropriate disposal of hazardous wastes to ensure protection of the workforce and the prevention, and to control of releases and accidents; Provide the provision of appropriate personal 	<ul style="list-style-type: none"> PT Siemens as the contractor of Tayan, Sanggau and Sekadau substations (Package 5) have developed an environmental health & safety (EHS) plan (covering OHSP) that has been reviewed and signed by PLN UPP 2 and PUSMANPRO on October, 16 2018 as shown in Appendix 6.k. The EHS plan provides guidance and procedures for safety and environment aspects which are considered adequate for the nature and scale of the substation construction, including: <ul style="list-style-type: none"> Hazard communication program to identify potential hazard for workers; To eliminate hazardous condition with attention to severe weather response plan (i. e. perilous winds, electrical storms, and heavy rainfall) and hazardous chemical and materials; Personal protective equipment to minimize 	<p>The mitigation implemented with this regard is compliant with its requirements.</p>

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<p>protective equipment (PPE) to minimize risks;</p> <ul style="list-style-type: none"> • Provide training for workers, and establish appropriate incentives to use and comply with health and safety procedures and utilize PPE; • Include procedures for documenting and reporting occupational accidents, diseases, and incidents; and • Include emergency prevention, preparedness, and response arrangements in place. 	<p>risk;</p> <ul style="list-style-type: none"> - Safety, health and environmental training to establish awareness on site; - Documenting and reporting accidents, diseases and incident with accident reporting procedure; - Emergency preparedness to prevent, prepare, and response regarding to emergency situation. <ul style="list-style-type: none"> • The protective measure for working at height is stated in the PT Siemens HIRARC. • PT Siemens has implemented the EHSP (covering OHSP) by, among others: <ul style="list-style-type: none"> - Providing safety induction to workers on OSH rules and use of PPE properly; - Providing appropriate PPE; - Submitting monthly reports including documenting and reporting occupational accidents, diseases, and incidents; - Establishing emergency response procedures including provision of first-aid kits, fire extinguishers, and emergency call lists at construction sites. - Providing a HIV/ AIDS awareness session for workers. Relevant evidence of this event is included in Appendix 6.k. 	
12.	Community Health and Safety (HVTL alignments, substations)		
	<p>Prior to the commencement of civil works a construction phase Community Health and Safety Plan (CHSP) will be developed. The CHSP should include:</p> <ul style="list-style-type: none"> • procedures to identify and minimize, so far as reasonably practicable, the causes of potential Project related hazards to local communities, including communicable diseases such as HIV/AIDs and vector borne diseases; <p>The houses and settlements in close</p> <ul style="list-style-type: none"> • location from the transmission line should be 	<ul style="list-style-type: none"> • The general provisions for community health and safety are already stated in the EHS plan. However, these do not cover the specific guidance and procedures as defined in the mitigation measures, particularly: <ul style="list-style-type: none"> - Procedures and socialization related to communicable diseases for the community near construction site; - Specific emergency responses procedures; - Hazard communication program for community; 	<p>The mitigation implemented with this regard is partially compliant with the mitigation requirements.</p>

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<p>clearly spatially mapped in order to better inventory and address the EMF (electro-magnetic fields) health and safety impact risk.</p> <ul style="list-style-type: none"> • an effective socialization program should follow in this at the mapped locations to address community concerns in regard to the EMF effects of Transmission line operation. • specific emergency response procedures • relevant emergency equipment. • protocols for emergency vehicle services. • put safety sign. 	<ul style="list-style-type: none"> - Protocols for emergency vehicle services. • Nevertheless, the safety sign has been installed in the front gate. The substation is surrounded by high fences and there are prohibitions on those who are not authorized to enter the site in the front gate as a mitigation for community safety aspects. Relevant evidence of these mitigation measures as shown in Appendix 6.I. 	
13.	Employment Opportunities (HVTL alignments, substations)		
	<ul style="list-style-type: none"> • To Communicate about employment opportunities on a regular basis and to demonstrate the efforts are made to accommodate as many people as possible. • Be clear about the limited possibility and communicate this limitation during the meetings • Give priority to impact affected people to participate with the project works e.g. in transmission work the material transportation from roadside to tower site, and other unskilled and semi-skilled available labor –either transmission line or substation works. 	<ul style="list-style-type: none"> • The contractor has delivered the employment opportunity with the village officials before the construction started. • Local people who have been hired to become laborers in the project have skill as needed such as material transport and pouring concrete work. In Semester 2/2018, the percentage of workers in the Tayan SS are 41.67% local and 58.33% non-local, in the Sanggau SS are 95.56% local and 4.44% non-local, and in Sekadau SS are 80.77% local and 19.32% non-local employees. 	The mitigation implemented with this regard is compliant with its requirement.
14.	Physical Cultural Resources (HVTL alignments, substations)		
	<p>Awareness to all workers concerning chance find physical cultural resources during construction implementation:</p> <ul style="list-style-type: none"> • If physical cultural resources are encountered during the construction phase, all works at the find site should be immediately halted. • The find should be assessed by a competent expert, and procedures to avoid, minimize or mitigate impacts to the physical cultural resources should be developed by the expert in cooperation with the relevant local heritage authority, proportionate to the value of the resource in 	<ul style="list-style-type: none"> • A chance find procedure from PT Siemens has been developed (Ref: page 50 chapter 5.32 about Unexpected Discovery). The contractor has conducted the awareness to the employee during toolbox meeting. Relevant documents related to this mitigation are shown earlier in Appendix 6.j. • During Semester 2/2018 reporting period, there are no cultural physical resources found yet in project location. 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<p>question and the nature and scale of the Project's potential adverse impacts on it.</p> <ul style="list-style-type: none"> • The find should be assessed in consultation with local Traditional Leaders (Temenggung) for each indigenous ethnic group to identify the local cultural significance and obtain guidance on what follow-up actions to conduct under supervision of local communities. • Work should not begin until the procedures to avoid, minimize or mitigate impacts to the physical cultural resources have been implemented. • In case avoidance is not feasible, no alternatives to removal exist, and the Project benefits outweigh the anticipated cultural heritage loss from removal; the physical cultural resource should be removed and preserved according to the best available technique. • Any removal should be conducted in accordance with relevant provisions of national and/or local laws. • Records should be maintained of all finds, including chain of custody instructions for movable finds. • All Project workers and staff should be made aware of the chance-find procedure. 		

3.6 Packages 6 and 7: Tayan – Sanggau and Sanggau – Sekadau Transmission Lines

The Tayan – Sanggau (Package 6) and Sanggau - Sekadau (Package 7) transmission lines were in the construction phase with foundation work as the primary activity in the semester 2/2018 under the supervision of UIP KALBAGBAR. The progress of the construction phase was reported 49.27% for Package 6 and 46.88% for Package 7 as of the end of December 2018. **Table 3.6** describes the mitigation measures implemented by the Project at the construction phase, including its compliance status against the mitigation requirements defined in the IEE (2016).

Table 3.6 Environmental Mitigation Status of Packages 6 and 7

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
1.	Vegetation Clearing (HVTL alignments, substations)		
	<ul style="list-style-type: none"> Vegetation removal will be allowed with the designated width of the RoW and the minimum area required for other infrastructure and activities. Vegetation cutting within the RoW will be undertaken to achieve the required clearances. For transmission lines, tree removal and trimming will only be undertaken by hand tools, including chain saws. 	<ul style="list-style-type: none"> Vegetation cutting within the RoW was conducted to achieve the required clearance in accordance with the requirements of the MEMR Regulation No. 18/2015. In the PT KE's HSE plan document on page 27 chapter 7.22 concerning Environmental Management - vegetation clearing, it is mentioned that vegetation clearing such as cutting trees can only be done manually (using a chainsaw). During this foundation work phase, tree removal and trimming process were only undertaken by hands tools, including chain saw. Subsequently, the local people are allowed to collect the remaining vegetation, as shown in Appendix 7.a. 	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> For substation, vegetation clearing will be conducted with the combination of cutting trees with hand and chainsaw, while the stump removal will be conducted by bulldozer. 	This mitigation requirement is not applicable for the transmission line construction reported herein as it is intended for the substation construction.	Not applicable.
	<ul style="list-style-type: none"> The use of herbicides will be strictly prohibited 	<ul style="list-style-type: none"> In the PT KE's HSE plan (page 28 chapter 7.22) concerning Environmental Management sub clause vegetation clearing it is mentioned that the use of herbicides is prohibited in vegetation clearing process. 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		<ul style="list-style-type: none"> PLN has already conveyed a prohibition on the use of pesticides during construction in in Minute of Meeting monthly HSE on May, 4 2018. The prohibition on the use of herbicides is also made in the form of warning sign, and has been delivered to the workers in each construction site as shown in Appendix 7.a. 	
	<ul style="list-style-type: none"> Local people will be allowed to access to cleared vegetation for the collection of building materials and firewood. 	<ul style="list-style-type: none"> In the PT KE's HSE plan (page 28 chapter 7.22) concerning Environmental Management sub clause vegetation clearing. It's mentioned that the use of vegetation cleared for buildings or firewood was only allowed to be used by the surrounding people. The land owner and local people participated during vegetation removal process and took the cut wood or the vegetation for their domestic purposes as shown in Appendix 7.a. 	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Burning of cleared vegetation will not be allowed; instead this material will be used to protect the soil from erosion, particularly in steeper slope areas, until more permanent soil protection measures are in place. 	<ul style="list-style-type: none"> In the contractor's HSE plan (page 28 chapter 7.22) concerning Environmental Management sub clause vegetation clearing it is mentioned that burning cleared vegetation were prohibited. PLN has already conveyed a prohibition on burning of cleared vegetation during construction in in Minute of Meeting monthly HSE on May, 4 2018. The prohibition on the burning cleared vegetation is also made in the form of warning sign and has been delivered to the workers in each construction site as shown in Appendix 7.a. 	The mitigation implemented with this regard is compliant with its requirement.
2. Soil Erosion (HVTL alignments, substations)			
	<ul style="list-style-type: none"> Soil erosion control measures have been incorporated into the engineering design, including the use of adjustable height tower which allow the tower to conform to the slope of the site, thereby reducing land cutting and erosion. 	<ul style="list-style-type: none"> Based on engineering design due to requirement of RoW clearances, adjusting of tower height has already applicable. So the land cutting work is not in significant quantity. It allows the tower that conform the slope of the site and reduce soil erosion as well. The drawing design can be seen in Appendix 7.b. While, the mitigation of retaining wall will be based 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		on the calculation of slope stability, based on actual measurement site.	

- In addition, mitigations, designed in accordance with relevant guidelines and good construction practices adapted to suit the requirements at each site e.g:
 - a) Transmission line:
 - On steep slope:

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<ul style="list-style-type: none"> The soil erosion control measures will be regularly inspected and maintained during construction and until the area is stabilized or re-vegetated. 	<ul style="list-style-type: none"> In the contractor's HSE plan document on page 28 chapter 7.22 concerning Environmental Management sub clause soil erosion have been mentioned that the control of soil erosion will be monitored regularly during the construction stage until the area is stabilized and re-vegetated The soil erosion control measure has been reported in the HSE monthly report by the contractor as shown in Appendix 7.b. 	The mitigation implemented with this regard is compliant with its requirement.
3. Drainage (substations)			
	The mitigation requirements for drainage are intended for the operation of substations, and therefore not applicable for the operation of transmission lines reported in this table.		Not applicable.
4. Water Quality Impacts (HVTL alignments, substations)			
	<ul style="list-style-type: none"> Mitigation measures to protect water quality from erosion are the same as "Vegetation Clearing" and "Soil Clearing", above 	The prevention to protect water quality from erosion during vegetation clearing as described before in Chapter 3.6 Number 1 and 2	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> To protect from impacts on water quality arising from spillage of oil, fuel and other hazardous materials to be taken away by licensed third party. 	<p>In the contractor's HSE plan (page 29 chapter 7.22) concerning Environmental Management sub clause Water Quality Impact it is mentioned that Fuel, oil and hazardous materials must be taken away by licensed third party.</p> <p>At this moment, the hazardous waste is still insignificant quantity and has been stored in temporary waste shelter. The documentation related to this mitigation is presented in Appendix 7.c.</p>	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Fuel, oil and hazardous materials will be stored in designated areas with temporary impermeable bunds in accordance with National standards and at distance of at least 100 m from any water course. 	<p>In the contractor's HSE plan document on page 29 chapter 7.22 concerning Environmental Management sub clause Water Quality Impact it is mentioned that Fuel, oil and hazardous materials must be stored in designated areas with a minimum distance of 100 m</p> <p>Fuel, oil and hazardous materials have already stored in designated areas with temporary impermeable bunds in contractor warehouse accordance with National standards and at distance of at least 100 m from any water course as shown in Appendix 7.c.</p>	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Refueling of machinery, equipment and vehicles 	<ul style="list-style-type: none"> In the contractor's HSE plan on page 29 chapter 	The mitigation implemented with this

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	will be undertaken at distance of at least 100 m from any water course.	<p>7.22 on Environmental Management - Water Quality Impact it is mentioned that refueling of engine fuel, equipment and vehicles must be carried out at a minimum distance of 100 m from the water course.</p> <ul style="list-style-type: none"> Refueling of the vehicles are undertaken at the public fuel station. However, refueling the concrete mixer machine is carried out at site, at the time, refueling used external drum and provide secondary containment to accommodate in case of oil spill, as shown in Appendix 7.c. 	regard is compliant with its requirement.
	<ul style="list-style-type: none"> Any major work including oil changing and engine maintenance with the potential for oil to be spilled will be done in designated areas at distance of at least 100 m from any water course with containment to prevent any oil spills washing away. 	<ul style="list-style-type: none"> Any oil changing and engine maintenance carried out in particular workshop far away from the nearest water course, it is about 4 km in distance. The oil changing documentation can be seen in Appendix 7.c. The concrete mixer machines' oil changing was conducted in the site location, secondary containment was provided to prevent oil spill. 	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> During construction of tower site in rice field and wet areas, extra measures shall be applied to prevent water contamination by the oil drip or spilled waste water from cement mixers and concrete. 	Since there is no construction work located at rice field and wet areas during this period, therefore this mitigation measures is not applicable.	Not Applicable
	<ul style="list-style-type: none"> Waste oil and oil contaminated material shall be collected to be taken away by licensed third party. Oil contaminated material to be taken away by licensed third party. 	Waste oil and oil contaminated materials is still only collected in contractors' warehouse, because of its very small/insignificant amount. If the amount of oil waste has met the requirements for disposal, it will be submitted to the waste manager to be managed according to Government Regulation no. 101/2014 concerning Management of Hazardous and Toxic Wastes.	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Herbicides will not be used in the Project 	<ul style="list-style-type: none"> In the contractor's HSE plan document on page 28 chapter 7.22 concerning Environmental Management - vegetation clearing it is mentioned that herbicides were prohibited in vegetation clearing process. 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		<ul style="list-style-type: none"> The prohibition on the use of herbicides is also made in the form of warning sign and has been delivered to the workers in each construction site, as shown earlier in Appendix 7.a. 	
5. Air Quality Impacts (HVTL alignments, substations)			
	<ul style="list-style-type: none"> Spray the dusty soil within substation construction area with water 	This mitigation requirement is not applicable for the construction of the transmission line reported in this table.	Not Applicable
	<ul style="list-style-type: none"> Accumulated soil and debris should be cleaned from adjacent asphalt roads in the entrance of substation. 	This mitigation requirement is not applicable for the construction of the transmission line reported in this table.	Not Applicable
	<ul style="list-style-type: none"> Truckloads with dusty soil should be covered, with the exception of on-site or local trips. 	During the construction of tower foundation, excavated soil is not transported away from the construction site, but used as a fill material when the tower construction has been completed. Therefore, this mitigation requirement is not applicable during this reporting period.	Not Applicable
	<ul style="list-style-type: none"> Cut and fill should be balanced to the maximum extent possible at each site in order to minimize the need for fill and for spoil disposal. 	As described earlier, soil cut and fill are used at the construction site, and this eliminates the need for its disposal. Therefore, this mitigation requirement is not applicable for this reporting period.	Not Applicable
	<ul style="list-style-type: none"> Construction waste and garbage burning are prohibited. 	<ul style="list-style-type: none"> In the contractor's HSE plan document on page 17 chapter 7.8 concerning Housekeeping, at point 7 it is mentioned that waste or the rest of materials should not be burned. The prohibition on burning of cleared vegetation and waste is also made in the form of warning sign and has been delivered to the workers in each construction site as shown earlier in Appendix 7.a. 	The mitigation implemented with this regard is compliant with its requirement.
6. Construction Waste Management (HVTL alignments, substations)			
	<ul style="list-style-type: none"> Solid wastes generated from construction activities should not be haphazardly left around construction sites. 	<ul style="list-style-type: none"> The contractor has provided a trash bag to collect the garbage contained at each tower construction site and routinely dispose of the waste routinely to 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<ul style="list-style-type: none"> • Construction waste will be contained in a designated area on each site (tower site, substation). • Wastes will be routinely collected and disposed of at safe waste disposal facilities indicated by the District Environmental agencies • Construction waste burning is prohibited 	<p>Sei Kosak final disposal owned by Sanggau district and Sekadau final disposal owned by Sekadau district, as shown in Appendix 7.d.</p> <ul style="list-style-type: none"> • In the contractor's HSE plan document on page 17 chapter 7.8 concerning Housekeeping, at point 7 it is mentioned that waste or the rest of materials should not be burned. • The prohibition on burning of cleared vegetation and waste is also made in the form of warning sign and has been delivered to the workers in each construction site as shown earlier in Appendix 7.a. 	
7.	Domestic Waste Management (HVTL alignments, substations)		
	<ul style="list-style-type: none"> • Temporary worker camps will be required to be provided with appropriate sanitation facilities, including water supply, and washing facilities, temporary toilets, and waste containers. • Domestic waste will be routinely collected and disposed of at safe waste disposal facilities. • Toilets should either be of a pit type that are at least 20 m from any water body, or porta-potty type. If the latter, toilets should be emptied on a regular or as needed basis, and the effluent disposed of at an approved waste disposal facility. • Worker camp sanitation facilities should be developed in consultation with relevant local authorities and has all required local, province and national approvals. • All worker camps should be decommissioned when no longer required and restored to their natural condition. 	<p>The contractor working for Packages 6 and 7 primarily employs the local communities as their workers. As such, a temporary worker camp is not required, and associated mitigation requirements do not apply herein.</p>	<p>Not Applicable</p>
	<ul style="list-style-type: none"> • Garbage burning is prohibited. 	<ul style="list-style-type: none"> • In the contractor's HSE plan document on page 17 chapter 7.8 concerning Housekeeping, at point 7 it is mentioned that waste or the rest of materials should not be burned. • The prohibition on burning of cleared vegetation 	<p>The mitigation measures implemented with this regard is compliant with its requirements.</p>

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		and waste is also made in the form of warning sign and has been delivered to the workers in each construction site as shown earlier in Appendix 7.a.	
8. Roads and Infrastructure Impacts (HVTL alignments, substations)			
	<ul style="list-style-type: none"> A mapping of the locations of expected heavy equipment mobilization is needed versus settlement area locations. This needs inventory and monitors the potential damage to existing roads. 	<ul style="list-style-type: none"> The contractor has provided maps of the material transport process from port to warehouse and site that passes through settlement area locations. The road mapping of mobilization as shown in Appendix 7.e. 	The mitigation implemented with this regard is compliant with its requirement.
	<ul style="list-style-type: none"> Any damaged infrastructure after heavy equipment mobilization will be repaired to at least the same standard and condition on completion of the Project, especially caused by the transportation of heavy equipment e.g. 150 kV power transformer. 	<ul style="list-style-type: none"> In the contractor's HSE plan document on chapter 7.22 page 31 of Environmental Management have been mentioned that the construction activities and transportation of building materials (rock, sand and cement) from supplies and heavy equipment could cause damage to roads and other local infrastructure. To reduce its impact, the contractor must repair the damage at least with the same standards and conditions as before. Mapping the location of heavy equipment mobilization needs to consider the location of settlements. In TL construction site, the access road is not always in the form of pavement, some of them still dirt road. The contractor has made a temporary access road to avoid the damaged. If the damage road occurred, it would be immediately repaired by contractor. The documentation is presented in Appendix 7.e. 	The mitigation implemented with this regard is compliant with its requirement.
9. Encroachment into Protected Forests, Hunting, Wood Collection (HVTL alignments, substations)			
	<ul style="list-style-type: none"> Hunting extraction by workers of forest products such as firewood, and keeping of firearms on the Project, will be prohibited. To avoid impact on ecological valuable sites, habitats, natural forest, flora and fauna, this risk should be particularly be monitored along the ecologically sensitive alignments of the 	<ul style="list-style-type: none"> In the contractor's HSE plan, chapter 7.22 (page 31) on Environmental Management states that the contractor must ensure that project work does not interfere with or pass through areas that have status as protection forests, wildlife reserves, national parks or other ecologically sensitive areas. 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<p>Transmission line: along the 35 km between Tayan and Sosok where the alignment passes close by secondary forest within production forest reserves; along the alignment which runs close (3.5. and 11 km) to the primary forest within Gunung Tiong Kandang and Gunung Sanggau; and along the alignment which passes close (1.5 km distant) to the primary forests of the Pancur Aji Forest Recreation Reserve.</p>	<ul style="list-style-type: none"> • The impact of working on small scale projects such as hunting, lighting fires & collecting wood must be monitored and minimized. • Although that the project site is not located in the forest area, the contractor has provided the warning sign that hunting is prohibited during this project to avoid impact on ecological valuable sites. • The awareness about the prohibition of hunting and wood collection is delivered by the contractor in the toolbox meeting. <p>Relevant evidences related to the above descriptions are included in Appendix 7.a.</p>	
10. Impacts on Cultural Heritage Sites (HVTL alignments, substations)			
	<p>The Project area falls closely adjacent several notable heritage sites:</p> <ul style="list-style-type: none"> • Although unlikely to suffer impact from Project due to separation distance, as a mitigation measure for these sites, Project workers should be made aware that these sites should not be disturbed or material extracted if visited. Project construction traffic and heavy equipment should also not be routed anywhere near these sites to avoid vibration damage. 	<p>In May 2018, capacity building of the IEE 2016 document and implementation was followed by all implementing contractors and supervisors in the field. Contractors have been transport heavy equipment and material away from cultural heritage sites and delivered awareness related to this mitigation during toolbox meeting for workers. The evidence related to the above description can be seen in Appendix 7.f.</p>	<p>The mitigation implemented with this regard is compliant with its requirement.</p>
	<ul style="list-style-type: none"> • The Project Transmission Line construction should also take care not to make impact on the potential un- mapped locally important cultural sites, such as community sacred forest groves (Hutan Adat) and sacred grave sites (tempat keramat). Consultation should be conducted with local Traditional Leaders (Temengung) for each indigenous ethnic group to identify and avoid any such sites prior to construction of all project works. 	<p>To anticipate the existence of the potential un-mapped locally important cultural sites, prior to the start of construction; the contractor has coordinated with the customary head in the Ngudas event. The Ngudas event was not conducted during this period. Therefore mitigation measures in this period are not applicable.</p>	<p>Not applicable.</p>
11. Occupational Health and Safety (HVTL alignments, substations)			
	<ul style="list-style-type: none"> • Prior to the commencement of civil works a construction phase Occupational Health and Safety Plan (OHSP) will be developed. The OHSP should: 	<ul style="list-style-type: none"> • PT Krakatau Engineering as the contractor of Package 6 and 7 has developed an environmental health & safety plan (covering OHSP) in January 	<p>The mitigation implemented with this regard is compliant with its requirement.</p>

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		<p>2017. The HSE plan has been reviewed and approved by PLN UPP 2 in October 2017, and found to be adequate in terms of its:</p>	

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
		<p>of the workforce and the prevention and control of releases and accidents;</p> <ul style="list-style-type: none"> The contractor has made hazardous waste warehouse and provides labeling (MSDS) according to the type and characteristic, as the documentation shown in Appendix 7.g. 	
	<ul style="list-style-type: none"> Provide for the provision of appropriate personal protective equipment (PPE) to minimize risks; 	<ul style="list-style-type: none"> In the contractor's HSE document on page 16 chapter 7.7 concerning Personal Protective Equipment (PPE), It is mentioned that the needs of PPE during the project were derived from the identification and control of occupational risks contained in the Job Health Safety and Environment (JSEA) documents. Types of PPE adjusted for potential hazards in the work to be performed. In implementation workers have used PPE in accordance with the type of work, as the documentation is shown in Appendix 7.g 	<p>The mitigation implemented with this regard is compliant with its requirement.</p>
	<ul style="list-style-type: none"> Provide training for workers, and establish appropriate incentives to use and comply with health and safety procedures and utilize PPE; 	<ul style="list-style-type: none"> In the contractor's HSE document on page 13 chapter 7.5 concerning Trainings, it is mentioned that PT. KE conducts regular training related to HSE, both in house and external training in order to increase competence regarding HSE. During this period the contractor has held some training such as emergency response and HIV AIDS prevention, as the documentation shown in Appendix 7.g 	<p>The mitigation implemented with this regard is compliant with its requirement.</p>
	<ul style="list-style-type: none"> Include procedures for documenting and reporting occupational accidents, diseases, and incidents; and 	<ul style="list-style-type: none"> In the contractor's HSE document on page 36 chapter 9 concerning Incident Reporting and Investigation, contractor has provided procedure for documenting and reporting occupational accidents, diseases, and incidents. The contractor makes a report related to accidents, disease and incidents and reports it to the HSE supervisor monthly, as the documentation shown in Appendix 7.g 	<p>The mitigation implemented with this regard is compliant with its requirement.</p>

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<ul style="list-style-type: none"> • Include emergency prevention, preparedness, and response arrangements in place. 	<ul style="list-style-type: none"> • In the contractor's HSE document on page 34 chapter 8 concerning Emergency Condition, contractor has provided procedure for emergency prevention, preparedness and response arrangements in place. • The contractor has set up the emergency team which equipped with emergency training procedure and emergency equipment (first aid kit box, fire extinguisher, evacuation route, safety sign, etc.) that can be used in emergency conditions, as shown in Appendix 7.g 	The mitigation implemented with this regard is compliant with its requirement.
12.	Community Health and Safety (HVTL alignments, substations)		
	<p>Prior to the commencement of civil works a construction phase Community Health and Safety Plan (CHSP) will be developed. The CHSP should include:</p> <ul style="list-style-type: none"> • Procedures to identify and minimize, so far as reasonably practicable, the causes of potential Project related hazards to local communities, including communicable diseases such as HIV/AIDs and vector borne diseases; • Specific emergency response procedures; • Relevant emergency equipment; • Protocols for emergency vehicle services; • Put safety sign. 	<ul style="list-style-type: none"> • PT KE's HSE plan (Page 34) includes explanation related to community health and safety risks and mitigation identified in the mitigation requirements. However, there are no procedures for the risk assessment, specific emergency response and emergency vehicle services in the EHS plan. • Each construction site has been equipped with emergency equipment in the form of first aid kit that can be used in minor accident and also fire extinguisher (as shown in Appendix 7.g). • The contractor has provided the emergency vehicle services (double cabin-pick up car) as transportation in case of emergency (as shown in Appendix 7.h). • Safety signs have been installed, to warn the community on the potential risk of entering the project sites. location that having potential danger, as shown in Appendix 7.h. 	The mitigation implemented with this regard is partially compliant with its requirement.
	<ul style="list-style-type: none"> • The houses and settlements in close location from the Transmission line should be clearly spatially mapped in order to better inventory and address the EMF (electro-magnetic fields) health and safety impact risk. An effective socialization program should follow in this at the mapped locations to address community concerns in regard to the EMF 	<ul style="list-style-type: none"> • PLN has delivered information regarding to EMF during the construction socialization of 150 kV Tayan – Sanggau – Sekadau. The acknowledgement can be seen in Appendix 7.h. 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	effects of Transmission line operation.		
13.	Employment Opportunities (HVTL alignments, substations)		
	<ul style="list-style-type: none"> • Communicate about employment opportunities on a regular basis and demonstrate the efforts being made to accommodate as many people as possible. • Be clear about the limited possibility and communicate this limitation during the meetings • Give priority to impact affected people to participate with the project works e.g. in transmission work the material transportation from roadside to tower site, and other unskilled and semi-skilled available labor either transmission line works and substation works 	<ul style="list-style-type: none"> • The contractor has already delivered the employment opportunity with the village apparatus before the construction started. • In the beginning the contractors started to recruit local people for unskilled work, such as transporting materials and then they also trained for concreting work. Before starting work on the project, safety induction was carried out first by the HSE team. Current composition of workers in package 6 the percentage of local workers is 68% and non-local 32%, while for package 7 the percentage of local workers is 90.6% and non-local 9.4%. 	The mitigation implemented with this regard is compliant with its requirement.
14.	Physical Cultural Resources (HVTL alignments, substations)		
	<p>Awareness to all workers concerning chance find physical cultural resources during construction implementation:</p> <ul style="list-style-type: none"> • If physical cultural resources are encountered during the construction phase, all works at the find site should be immediately halted. • The find should be assessed by a competent expert, and procedures to avoid, minimize or mitigate impacts to the physical cultural resources should be developed by the expert in cooperation with the relevant local heritage authority, proportionate to the value of the resource in question and the nature and scale of the Project's potential adverse impacts on it. • The find should be assessed in consultation with local Traditional Leaders (Temenggung) for each indigenous ethnic group to identify the local cultural significance and obtain guidance on what follow-up actions to conduct under supervision of local communities. • Work should not begin until the 	<ul style="list-style-type: none"> • In the contractor's HSE document on page 31 chapter 7.22 concerning Environmental Management section find chance procedure, there are already procedures incorporated for finding chance regarding physical cultural resources. This procedure gives guidance for someone who working on the project finds a physical cultural resource, then he has to stop all the activities within the discovery, marking the site area found, secures the site area, prevents the collection of objects by labor or other person, notify the nearest cultural management agency within 24 hours, reminds all project personnel of the finding and carry out temporary protection measures, submitted the object found to local cultural management agency, record all the findings and actions taken. The contractor has conducted the awareness to the employee related physical resources during toolbox meeting, as shown earlier in Appendix 7.f. • During this period there are no cultural physical resources found yet in project location. 	The mitigation implemented with this regard is compliant with its requirement.

No	Potential Impacts / Mitigation Requirements per IEE (2016)	Mitigation Implemented	Compliance Status / Remarks
	<p>procedures to avoid, minimize or mitigate impacts to the physical cultural resources have been implemented.</p> <ul style="list-style-type: none"> • Where avoidance is not feasible, no alternatives to removal exist, and the Project benefits outweigh the anticipated cultural heritage loss from removal; the physical cultural resource should be removed and preserved according to the best available technique. • Any removal should be conducted in accordance with relevant provisions of national and/or local laws. • Records should be maintained of all finds, including chain of custody instructions for movable finds. • All Project workers and staff should be made aware of the chance-find procedure. 		

Chapter 4 Environmental Monitoring Status

The outcomes of the environmental mitigation conducted for the Work Packages 1 to 7 in the period of July – December 2018 were monitored to ensure its effectiveness and compliance with the requirements of the environmental monitoring plan defined in the Project's IEE. The work packages that are in the construction and operation phases are required to implement environmental monitoring as defined in the IEE.

The environmental monitoring requirements of Packages 1 to 4 (i.e. power transmission lines from Bengkayang to Tayan including associated substations) are defined in Table 9.2 on EMP of the 2011 IEE and its implementation including compliance status is described in sub-chapters 4.1 to 4.4.

The environmental monitoring requirements of Packages 5 to 7 (i.e. power transmission lines from Tayan to Sekadau including associated substations) are defined in Table 29 on the EMP of the 2016 IEE and its implementation including compliance status is described in sub-chapters 4.5 to 4.6.

4.1 Package 1: Bengkayang – Jagoibabang Transmission Lines

The transmission lines from Bengkayang to Jagoibabang have been in operation since 2015/2016 and is under the responsibility of the UP3B KALBAR. **Table 4.1** describes the environmental monitoring conducted by the Project for the operation of the transmission lines, including its compliance status against the related requirements defined in the IEE (2011).

Table 4.1 Environmental Monitoring Status of Package 1

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks												
1.	Electrical and Magnetic Fields/EMF (RoW)														
	Monitoring to determine if EMFs within national and international standards/guidelines (once every 5 years).	<p>According to the EMF monitoring conducted by Tanjungpura University on December 2018 at Magan Karya village, Bengkayang District, the concentrations measured as shown below:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Magnetic Fields (μ Tesla)</th> <th colspan="2">Electric Fields (kV/m)</th> </tr> <tr> <th>Result</th> <th>Threshold</th> <th>Result</th> <th>Threshold</th> </tr> </thead> <tbody> <tr> <td>0.24</td> <td>1.000</td> <td>2.15</td> <td>5</td> </tr> </tbody> </table> <p>This parameter was safe for the environment near the transmission, since the value measured was still far below threshold point. The report on the EMF measurement result is shown in Appendix 8.a.</p>	Magnetic Fields (μ Tesla)		Electric Fields (kV/m)		Result	Threshold	Result	Threshold	0.24	1.000	2.15	5	The monitoring implemented with this regard is compliant with its corresponding requirements as per the SNI 04-6950-2013 document.
Magnetic Fields (μ Tesla)		Electric Fields (kV/m)													
Result	Threshold	Result	Threshold												
0.24	1.000	2.15	5												
2.	Vegetation Management (RoW)														
	Ensure that vegetation removal mitigations are implemented (monitoring on quarterly basis).	No vegetation removal was conducted during the reporting period, and therefore monitoring was not conducted.	Not applicable.												
3.	Oil, Fuel and Hazardous Materials Management (Substation)														
	The monitoring requirement defined under this subject is intended for the operation of substation, and therefore not applicable for the operation of transmission line reported herein.		Not applicable.												
4.	Health and Safety (RoW)														
	<ul style="list-style-type: none"> Ensure operation phase OHS and CHS have been develop and are being implemented (monitoring on quarterly basis). 	The PLN's Dispatch Unit has OHS procedures to manage health and safety risks related to the operation of transmission lines (dated on June 21, 2017). However, there is no evidence whether the OHS and	The monitoring implemented with this regard is partially compliant with its requirement.												

		CHS have been implemented and reported.	
	<ul style="list-style-type: none"> Ensure towers fitted with anti-climbing devices, and substations fitted with security fences (monitoring on quarterly basis). 	The monitoring indicates that every tower has been equipped with anti-climbing devices (as shown in Appendix 2.b).	The monitoring implemented with this regard is compliant with its requirement.
5.	Bird Collision (RoW)		
	Monitor bird collision occurrences (monitoring on quarterly basis).	The monitoring of bird collisions has been conducted by the PIC supervisor and obtained the results that no one reported the occurrence of death birds within the RoW. Appendix 2.c provides the photo showing the personnel conducts the interview and reports the results of the mentioned monitoring.	The monitoring implemented with this regard is compliant with its requirement.

4.2 Package 2: Bengkayang Substation

The Bengkayang substation has been operation since December 2015 and is under the responsibility of UP3B KALBAR. **Table 4.2** describes the environmental monitoring conducted by the Project for the operation of the substation, including its compliance status against the mitigation requirements defined in the IEE (2011).

Table 4.2 Environmental Monitoring Status of Package 2

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks												
1.	Electrical and Magnetic Fields/ EMF (RoW)														
	Monitoring to determine if EMFs within national and international standards/guidelines (once every 5 years).	<p>According to the EMF monitoring conducted by Tanjungpura University on December 2018 at Lumar village, Bengkayang District, the concentrations measured as shown below:</p> <table border="1"> <thead> <tr> <th colspan="2">Magnetic Fields (μ Tesla)</th> <th colspan="2">Electric Fields (kV/m)</th> </tr> <tr> <th>Result</th> <th>Threshold</th> <th>Result</th> <th>Threshold</th> </tr> </thead> <tbody> <tr> <td>0.65</td> <td>1.000</td> <td>2.83</td> <td>5</td> </tr> </tbody> </table> <p>This parameter was safe for the environment near the substation, since the value measured was still far below threshold point. The EMF monitoring report is shown in Appendix 8.b.</p>	Magnetic Fields (μ Tesla)		Electric Fields (kV/m)		Result	Threshold	Result	Threshold	0.65	1.000	2.83	5	The monitoring implemented with this regard is compliant with its corresponding requirements as per the SNI 04-6950-2013 document.
Magnetic Fields (μ Tesla)		Electric Fields (kV/m)													
Result	Threshold	Result	Threshold												
0.65	1.000	2.83	5												
2.	Vegetation Management (RoW)														
	The monitoring requirement defined under this subject is intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported herein.		Not applicable.												
3.	Oil, Fuel and Hazardous Materials Management (Substation)														
	Ensure mitigation measures are in place with respect to oil, fuel and other hazardous materials storage, handling, disposal; and fueling and maintenance of equipment (monitoring on quarterly basis).	The monitoring indicates that the OHS management system (locally known as SMK3) of PLN <i>Area Penyaluran dan Pengaturan Beban Kalimantan</i> was implemented i.e. oil pit is provided underneath it and no evidence of spills in its surrounding reported for the Semester 2/2018 reporting.	The monitoring implemented with this regard is compliant with its requirement.												
4.	Health and Safety (RoW)														
	<ul style="list-style-type: none"> Ensure operation phase OHS and CHS have been develop and are being implemented (monitoring 	The monitoring is intended for the operation of transmission line, and therefore not applicable for that of	Not applicable.												

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks
	on quarterly basis).	the substation.	
	<ul style="list-style-type: none"> Ensure towers fitted with anti-climbing devices, and substations fitted with security fences (monitoring on quarterly basis). 	The monitoring by HSE supervisor indicates that substation has been fitted with security fence and full-time security personnel. Relevant evidence is included in Appendix 3.c .	The monitoring implemented with this regard is compliant with its requirement.
5.	Bird Collision (RoW)		
	The monitoring requirement defined under this subject is intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported herein.		Not applicable

4.3 Package 3: Bengkayang – Ngabang – Tayan Transmission Lines

The Bengkayang – Ngabang – Tayan transmission lines has entered the operation phase since May 2018 and since then are under the responsibility of UP3B KALBAR. **Table 4.3** describes the environmental monitoring conducted by the Project for this construction activity, including its compliance status against the monitoring requirements defined in the IEE (2011).

Table 4.3 Environmental Monitoring Status of Package 3

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks																			
1.	Electrical and Magnetic Fields/EMF (RoW)																					
	Monitoring to determine if EMFs within national and international standards/guidelines (once every 5 years).	<p>According to the EMF monitoring conducted by Tanjungpura University on December 2018, the concentrations measured as shown below:</p> <table border="1"> <thead> <tr> <th rowspan="2">Village</th> <th colspan="2">Magnetic Fields (μ Tesla)</th> <th colspan="2">Electric Fields (kV/m)</th> </tr> <tr> <th>Result</th> <th>Threshold</th> <th>Result</th> <th>Threshold</th> </tr> </thead> <tbody> <tr> <td>Mamek</td> <td>0.82</td> <td>1.000</td> <td>2.84</td> <td>5</td> </tr> <tr> <td>Tebang Bena</td> <td>0.67</td> <td>1.000</td> <td>2.84</td> <td>5</td> </tr> </tbody> </table> <p>This parameter was safe for the environment near the transmission, since the value measured was still far below threshold point. The EMF monitoring report is shown in Appendix 8.c.</p>	Village	Magnetic Fields (μ Tesla)		Electric Fields (kV/m)		Result	Threshold	Result	Threshold	Mamek	0.82	1.000	2.84	5	Tebang Bena	0.67	1.000	2.84	5	The monitoring implemented with this regard is compliant with its corresponding requirements as per the SNI 04-6950-2013 document.
Village	Magnetic Fields (μ Tesla)			Electric Fields (kV/m)																		
	Result	Threshold	Result	Threshold																		
Mamek	0.82	1.000	2.84	5																		
Tebang Bena	0.67	1.000	2.84	5																		
2.	Vegetation Management (RoW)																					
	Ensure that vegetation removal mitigations are implemented (monitoring on quarterly basis).	No vegetation removal was conducted during the reporting period, and therefore monitoring was not conducted.	Not applicable.																			
3.	Oil, Fuel and Hazardous Materials Management (Substation)																					
	The monitoring requirement defined under this subject is intended for the operation of substation, and therefore not applicable for the operation of transmission line reported herein.		Not applicable.																			
4.	Health and Safety (RoW)																					
	<ul style="list-style-type: none"> Ensure operation phase OHS and CHS have been develop and are being implemented (monitoring on quarterly basis). 	The PLN's Dispatch Unit has OHS procedures to manage health and safety risks related to the operation of transmission lines based on SMK3 document dated on	The monitoring implemented with this regard is partially compliant with its requirement.																			

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks
		June 21, 2017. However, there is no evidence whether monitoring on the implementation of these procedures has been conducted on quarterly basis.	
	<ul style="list-style-type: none"> Ensure towers fitted with anti-climbing devices, and substations fitted with security fences (monitoring on quarterly basis). 	The monitoring indicates that every tower has been equipped with anti-climbing devices. Relevant evidence of this monitoring is shown in Appendix 4.c .	The monitoring implemented with this regard is compliant with its requirement.
5.	Bird Collision (RoW)		
	Monitor bird collision occurrences (monitoring on quarterly basis).	The monitoring of bird collisions has been conducted by the PIC supervisor and obtained the results that no one reported occurrence of death birds within the RoW. Appendix 4.d provides the photo showing the personnel conducts the interview and reports the results of the mentioned monitoring.	The monitoring implemented with this regard is compliant with its requirement.

4.4 Package 4: Ngabang and Tayan Substations

The Ngabang substation and Tayan substation (extended) have been in operation phase since 2016/2017 and under the responsibility of UP3B KALBAR. Table 4.4 describes the environmental monitoring implemented by the Project for the operation of these substations, including its compliance status against the mitigation requirements defined in the IEE (2011).

Table 4.4 Environmental Monitoring Status Package 4

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks												
1.	Electrical and Magnetic Fields/EMF (RoW)														
	Monitoring to determine if EMFs within national and international standards/guidelines (once every 5 years).	<p>According to the EMF monitoring conducted by Tanjungpura University on November 2018 at Tebedak village, Landak Sub-district, the concentrations measured as shown below:</p> <table border="1"> <thead> <tr> <th colspan="2">Magnetic Fields (μ Tesla)</th> <th colspan="2">Electric Fields (kV/m)</th> </tr> <tr> <th>Result</th> <th>Threshold</th> <th>Result</th> <th>Threshold</th> </tr> </thead> <tbody> <tr> <td>0.70</td> <td>1.000</td> <td>2.83</td> <td>5</td> </tr> </tbody> </table> <p>This parameter was safe for the environment near the transmission, since the value measured was still far below threshold point. The EMF monitoring report is shown in Appendix 8.d.</p>	Magnetic Fields (μ Tesla)		Electric Fields (kV/m)		Result	Threshold	Result	Threshold	0.70	1.000	2.83	5	The monitoring implemented with this regard is compliant with its corresponding requirements as per the SNI 04-6950-2013 document.
Magnetic Fields (μ Tesla)		Electric Fields (kV/m)													
Result	Threshold	Result	Threshold												
0.70	1.000	2.83	5												
2.	Vegetation Management (RoW)														
	The monitoring requirement defined under this subject is intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported herein.		Not applicable.												
3.	Oil, Fuel and Hazardous Materials Management (Substation)														
	Ensure mitigation measures are in place with respect to oil, fuel and other hazardous materials storage, handling, disposal; and fueling and maintenance of equipment.	<ul style="list-style-type: none"> The monitoring indicates that the OHS management system (locally known as SMK3) of AP2B KALBAR was implemented i.e. oil pit is provided underneath it and no evidence of spills in its surrounding. Ngabang Environmental Commission (DLH) has surveyed the location, due to insignificant quantity of hazardous waste; permission related to management waste material in accordance with the requirement of Government Regulation No. 101/2014 on Hazardous 	The implementation of this monitoring is partially compliant with its requirement.												

No	Aspects, Means, and Frequency of Monitoring	Monitoring Implemented	Compliance Status / Remarks
		<p>and Toxic Waste Management is not required.</p> <ul style="list-style-type: none"> In the implementation, the hazardous waste already separated and collected based on its type. During this monitoring period, hazardous materials and waste are collected in warehouse inside substation area due to insignificant quantity and eventually it will be disposed to the hazardous waste disposal services as shown in Appendix 8.e. 	
4.	Health and Safety (RoW)		
	<ul style="list-style-type: none"> Ensure operation phase OHS and CHS have been develop and are being implemented. 	<ul style="list-style-type: none"> The monitoring is intended for the operation of transmission line, and therefore not applicable for that of the substation. 	Not applicable.
	<ul style="list-style-type: none"> Ensure towers fitted with anti-climbing devices, and substations fitted with security fences. 	<ul style="list-style-type: none"> Installing the warning sign, assembly point and the substation has fitted with the security fence. Relevant evidence is shown in Appendix 5.b. 	The monitoring implemented with this regard is compliant with its requirement.
5.	Bird Collision (RoW)		
	The monitoring requirement defined under this subject is intended for the operation of transmission lines, and therefore not applicable for the operation of substation reported herein.		Not applicable.

4.5 Package 5: Tayan, Sanggau, and Sekadau Substations

Sanggau and Sekadau substations and Tayan substation (extended) was in the construction phase in Semester 2/2018 under the supervision of UIP KALBAGBAR. The **Table 4.5** describes the environmental monitoring implemented by the Project including its compliance status against the mitigation requirements defined in the IEE (2016).

Table 4.5 Environmental Monitoring Status of Package 5

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks
1.	Vegetation Clearing (RoW)		
	<ul style="list-style-type: none"> Ensure that vegetation removal mitigations are implemented. Monitor effectiveness of vegetation removal control measures. 	This monitoring is intended for the ROW of transmission lines, and therefore not applicable for the substation construction reported herein.	Not applicable.
2.	Drainage (Substations)		
	<ul style="list-style-type: none"> Ensure drainage plans are implemented 	Monitoring indicates that the drainage plan is already in the design engineering document and it has been finalized by the contractor.	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of drainage system 	The construction of temporary drainage system has been finished, so the water springs can flow through the drainage to the natural ditch. The documentation can be seen in Appendix 8.f .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
3.	Soil Erosion (Tower and Substation Sites)		
	<ul style="list-style-type: none"> Ensure soil erosion control measures are applied 	Based on the results of monitoring by the environmental supervisor from PIC at the location of the Sanggau substation, erosion prevention has been carried out due to its location, which is directly adjacent to the river, namely by creating an embankment that functions as a sediment trap. The monitoring described is shown in Appendix 6.b .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of soil erosion control measures 	Erosion handling by making sediment traps at the Sanggau substation and controlling the drainage flow that appear effective in preventing erosion (as shown in Appendix 8.g).	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
4.	Water Quality (Construction Sites and Storage Areas)		
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with 	The oil, fuel and other hazardous materials storage and	The implementation of this

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks																														
	respect to oil, fuel and other hazardous materials storage, handling, disposal; and fueling and maintenance of equipment	handling has been done as the mitigation requirement (as shown earlier in Appendix 6.d) and has been well implemented with providing secondary containment to prevent oil spill.	monitoring is in compliant with the mean of monitoring defined herein.																														
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on water quality 	In addition, based on the results of measurements of water quality at the Sanggau substation conducted on November 09, 2018 in collaboration with the University of Tanjung Pura, it was stated that all parameters were still under the threshold for water quality grade 1, according to Government Regulation 82/2001. The water quality measurement result is shown in Appendix 8.h .																															
5. Air Quality (Construction Sites and Storage Areas)																																	
	<ul style="list-style-type: none"> Ensure mitigation measures with respect to dust control, truck cleaning, load covering, and soil and spoil pile management are in place 	During this monitoring period, the construction site was on rainy season so there was no dust and truck cleaning was not required. The spoil pile management was also implemented well by the contractor as shown in Appendix 8.i .	The implementation of this monitoring in compliant with the mean of monitoring defined herein.																														
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on air quality 	<p>According to the air quality quarterly monitoring conducted in Sanggau Substation by Tanjungpura University on November 2018 at Sei Mawang village, Sanggau District, the concentrations measured as shown below:</p> <table border="1" data-bbox="879 964 1512 1300"> <thead> <tr> <th>No</th> <th>Parameter</th> <th>Unit</th> <th>Result</th> <th>Threshold value*</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Dust</td> <td>µg/Nm³</td> <td>87.2</td> <td>230</td> </tr> <tr> <td>2.</td> <td>NO₂</td> <td>µg/Nm³</td> <td>277.5</td> <td>400</td> </tr> <tr> <td>3.</td> <td>Sulfur Dioxide (SO₂)</td> <td>µg/Nm³</td> <td>93.24</td> <td>900</td> </tr> <tr> <td>4.</td> <td>Oxidant (O₃)</td> <td>µg/Nm³</td> <td>71.41</td> <td>235</td> </tr> <tr> <td>5.</td> <td>Carbon Monoxide (CO)</td> <td>ppm</td> <td>1</td> <td>-</td> </tr> </tbody> </table> <p>According to the air quality quarterly monitoring conducted in Sekadau Substation by Tanjungpura University on</p>	No	Parameter	Unit	Result	Threshold value*	1.	Dust	µg/Nm ³	87.2	230	2.	NO ₂	µg/Nm ³	277.5	400	3.	Sulfur Dioxide (SO ₂)	µg/Nm ³	93.24	900	4.	Oxidant (O ₃)	µg/Nm ³	71.41	235	5.	Carbon Monoxide (CO)	ppm	1	-	The implementation of this monitoring in compliant with the mean of monitoring defined herein.
No	Parameter	Unit	Result	Threshold value*																													
1.	Dust	µg/Nm ³	87.2	230																													
2.	NO ₂	µg/Nm ³	277.5	400																													
3.	Sulfur Dioxide (SO ₂)	µg/Nm ³	93.24	900																													
4.	Oxidant (O ₃)	µg/Nm ³	71.41	235																													
5.	Carbon Monoxide (CO)	ppm	1	-																													

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks																														
		<p>November 2018 at Mungguk village, Sekadau Hilir District, the concentrations measured as shown below:</p> <table border="1" data-bbox="879 337 1512 711"> <thead> <tr> <th>No</th> <th>Parameter</th> <th>Unit</th> <th>Result</th> <th>Threshold value*</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Dust</td> <td>µg/Nm³</td> <td>71.14</td> <td>230</td> </tr> <tr> <td>2.</td> <td>NO₂</td> <td>µg/Nm³</td> <td>115.26</td> <td>400</td> </tr> <tr> <td>3.</td> <td>Sulfur Dioxide (SO₂)</td> <td>µg/Nm³</td> <td>231.97</td> <td>900</td> </tr> <tr> <td>4.</td> <td>Oxidant (O₃)</td> <td>µg/Nm³</td> <td>35.97</td> <td>235</td> </tr> <tr> <td>5.</td> <td>Carbon Monoxide (CO)</td> <td>ppm</td> <td>1</td> <td>-</td> </tr> </tbody> </table> <p>Note: *Ambient air quality Government Regulation No. 41/1999.</p> <p>Relevant air quality measurement result is shown in Appendix 8.i. Based on the data, the dust detected values were still complied with regulation where the maximum dust allowed is 230 µg/Nm³.</p>	No	Parameter	Unit	Result	Threshold value*	1.	Dust	µg/Nm ³	71.14	230	2.	NO ₂	µg/Nm ³	115.26	400	3.	Sulfur Dioxide (SO ₂)	µg/Nm ³	231.97	900	4.	Oxidant (O ₃)	µg/Nm ³	35.97	235	5.	Carbon Monoxide (CO)	ppm	1	-	
No	Parameter	Unit	Result	Threshold value*																													
1.	Dust	µg/Nm ³	71.14	230																													
2.	NO ₂	µg/Nm ³	115.26	400																													
3.	Sulfur Dioxide (SO ₂)	µg/Nm ³	231.97	900																													
4.	Oxidant (O ₃)	µg/Nm ³	35.97	235																													
5.	Carbon Monoxide (CO)	ppm	1	-																													
6.	Waste Management (Construction Sites and Worker Camps)																																
	<ul style="list-style-type: none"> Ensure construction and domestic waste management collection, storage and disposal mitigations are in place 	<p>Monitoring indicates that for construction waste management, contractor already provide trash bin that separated between organic and non-organic and will be disposed in the nearest final disposal. Meanwhile, in the worker camp, contractor has been developed good sanitation and domestic waste management that separated by its type and will be disposed to the nearest final disposal. Relevant evidences of the monitoring described are shown in Appendix 6.f and 6.g.</p>	<p>The implementation of this monitoring in compliant with the mean of monitoring defined herein.</p>																														
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on waste management 	<p>Implementation of mitigation measures related to waste management has been well-implemented and effective based on the information and evidence provided in this report.</p>																															
7.	Roads and Infrastructure (Construction Sites, Access Roads, Relevant District Roads)																																

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with respect to road and infrastructure damage by heavy equipment transport (monthly during construction). 	The heavy equipment is transported to site with low bed truck and there is no road damaged was found after the transportation finished.	The implementation of this monitoring is in compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Ensure any damage does is documented and repaired 	The monitoring indicates that there is no road damage that has been affected by the construction activities, so there was no road repairmen conducted. Relevant evidence of the monitoring described as shown in Appendix 6.h .	The implementation of this monitoring is in compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on Road and infrastructure 	There was no road damage that occurred during this period.	The implementation of this monitoring is in compliant with the mean of monitoring defined herein.
8.	Encroachment (Gunung Condong in West Kalimantan, Areas adjacent to RoW)		
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with respect to no hunting or wildlife collection, plant or timber collection, or lighting of fires, or possession of firearms, traps or snares, by workers. 	<ul style="list-style-type: none"> Monitoring indicates that, the location of the substation on package 5 is entirely in the plantation land owned by the local resident who have been bought by PLN and surrounded by settlements and plantation land. The contractor has delivered awareness related to this mitigation and there was no hunting or wildlife collection, plant or timber collection, or lighting of fires, or possession of firearms, traps or snares that has been done by the workers. <p>Relevant evidence of this monitoring describe earlier in Appendix 6.i.</p>	The implementation of this monitoring is in compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on Encroachment impact 	Monitoring indicated that the workers obey with the mitigation as there was no report related to hunting animals or wildlife collection, plant or timber collection, or lighting of fires, or possession of firearms, and traps or snares during this period.	The implementation of this monitoring is in compliant with the mean of monitoring defined herein.
9.	Occupational and Community Health and Safety (Construction Sites and Worker Camps)		
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with respect to construction phase and OHS and CHS have been developed and are being implemented 	The explanation for community health and safety are already stated in the EHSP (covering OHSP), however the contractor needs to specifically develop CHSP as stated in the mitigation requirement.	The implementation of this monitoring is partially compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on 	The mitigation of OHS has been effectively implemented as evidenced because there was no accident reported during	

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks
	Occupational and Community Health and Safety	this monitoring period. The contractor has informed the workers related to this mitigation, such as using PPE and implementing the procedure in the construction area.	
10.	Physical Cultural Resources (Construction Sites)		
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with respect to implementation of chance-finding physical cultural resources awareness and applied if required 	Monitoring indicates that mitigation measures on the chance-find of physical cultural resources are in place and applied if it's required. The workers has been inform related to this mitigation during toolbox meeting as shown earlier in Appendix 6.j .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on physical cultural resources 	This monitoring is not applicable because there were no physical cultural resources found in this reporting period.	Not applicable.

4.6 Packages 6 and 7: Tayan – Sanggau and Sanggau – Sekadau Transmission Lines

The Tayan - Sanggau and Sanggau - Sekadau transmission lines were in the construction phase with foundation and tower erection as the primary activity in the Semester 2/2018 period. These construction works are under the responsibility of UIP KALBAGBAR. **Table 4.6** describes the environmental monitoring implemented by the Project at the construction phase, including its compliance status against the mitigation requirements defined in the IEE (2016).

Table 4.6 Environmental Monitoring Status of package 6 and 7

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks
1. Vegetation Clearing (RoW)			
	<ul style="list-style-type: none"> Ensure that vegetation removal mitigations are implemented 	Monitoring indicates that the vegetation removal mitigations are implemented, as shown earlier in Appendix 7.a .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of vegetation removal control measures 	Implementation of mitigation measures related to vegetation removal control has been well-implemented and effective since the mitigation removal in construction site only used hand tools as shown earlier in Appendix 7.a .	
2. Drainage (Substations)			
	The monitoring requirement defined under this subject is intended for the construction of substation, and therefore not applicable for that of transmission lines reported herein.		Not applicable.
3. Soil Erosion (Tower and Substation Sites)			
	<ul style="list-style-type: none"> Ensure soil erosion control measures are applied 	Monitoring indicates that the soil erosion control mitigation measures are implemented, as shown earlier in Appendix 7.b .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of soil erosion control measures 	Implementation of mitigation measures related soil erosion control has been well-implemented and effective since there was no significant soil erosion occurred in the tower base that has been constructed.	
4. Water Quality (Construction Sites and Storage Areas)			
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with respect to oil, fuel and other hazardous materials storage, handling, disposal; and fueling and maintenance of equipment. 	Monitoring indicates that the mitigation measures are in place with respect to oil, fuel and other hazardous materials storage, handling, disposal; and fueling and maintenance of equipment. To prevent oil spill contact with soil and water, the contractor has provide secondary containment as shown earlier in Appendix 7.c .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on water quality 	Monitoring indicates that contractor already had procedure	

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks																																																										
		regarding with this mitigation. In the implementation, the hazardous waste was stored in contractors' temporary warehouse because the amount is relatively small.																																																											
5. Air Quality (Construction Sites and Storage Areas)																																																													
	<ul style="list-style-type: none"> Ensure mitigation measures with respect to dust control, truck cleaning, load covering, and soil and spoil pile management are in place. 	This mitigation measure is not applicable for the construction of transmission line because the excavated soil is used as a fill material when the tower construction has been completed.	Not applicable.																																																										
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on air quality. 	<p>According to the air quality quarterly monitoring conducted by Tanjungpura University on November 2018 at Cempedak village Tayan Hilir District for package 6, the concentrations measured are shown below:</p> <table border="1"> <thead> <tr> <th rowspan="2">No</th> <th rowspan="2">Parameter</th> <th rowspan="2">Unit</th> <th colspan="2">Result</th> <th rowspan="2">Threshold values*</th> </tr> <tr> <th>T.44</th> <th>T.88A</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Dust</td> <td>µg/Nm³</td> <td>3.45</td> <td>Not detected</td> <td>230</td> </tr> <tr> <td>2.</td> <td>NO₂</td> <td>µg/Nm³</td> <td>123.25</td> <td>168.14</td> <td>400</td> </tr> <tr> <td>3.</td> <td>Sulfur Dioxide (SO₂)</td> <td>µg/Nm³</td> <td>421.78</td> <td>131.7</td> <td>900</td> </tr> <tr> <td>4.</td> <td>Oxidant (O₃)</td> <td>µg/Nm³</td> <td>56.32</td> <td>90.26</td> <td>235</td> </tr> <tr> <td>5.</td> <td>Carbon Monoxide (CO)</td> <td>ppm</td> <td>3</td> <td>3</td> <td>-</td> </tr> </tbody> </table> <p>According to the air quality quarterly monitoring conducted by Tanjungpura University on November 2018 at Sungai Ringin village Sekadau Hilir district for package 7, the concentrations measured are shown below:</p> <table border="1"> <thead> <tr> <th rowspan="2">No</th> <th rowspan="2">Parameter</th> <th rowspan="2">Unit</th> <th colspan="2">Result</th> <th rowspan="2">Threshold value*</th> </tr> <tr> <th>T.103</th> <th>T. 116</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Dust</td> <td>µg/Nm³</td> <td>6.74</td> <td>8.54</td> <td>230</td> </tr> <tr> <td>2.</td> <td>NO₂</td> <td>µg/Nm³</td> <td>130.16</td> <td>62.23</td> <td>400</td> </tr> </tbody> </table>	No	Parameter	Unit	Result		Threshold values*	T.44	T.88A	1.	Dust	µg/Nm ³	3.45	Not detected	230	2.	NO ₂	µg/Nm ³	123.25	168.14	400	3.	Sulfur Dioxide (SO ₂)	µg/Nm ³	421.78	131.7	900	4.	Oxidant (O ₃)	µg/Nm ³	56.32	90.26	235	5.	Carbon Monoxide (CO)	ppm	3	3	-	No	Parameter	Unit	Result		Threshold value*	T.103	T. 116	1.	Dust	µg/Nm ³	6.74	8.54	230	2.	NO ₂	µg/Nm ³	130.16	62.23	400	The implementation of this monitoring is in compliant with the mean of monitoring defined herein.
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No	Aspect and Means of Monitoring	Monitoring Implemented					Compliance Status / Remarks	
		3.	Sulfur Dioxide (SO ₂)	µg/Nm ³	328.75	89.85	900	
		4.	Oxidant (O ₃)	µg/Nm ³	22.3	16.60	235	
		5.	Carbon Monoxide (CO)	ppm	3	2	-	
Note: *Ambient air quality Government Regulation No. 41/1999. Based on the data, the dust detected values were still complied with regulation where the maximum dust allowed is 230 µg/Nm ³ . Relevant air quality measurement result is shown in Appendix 8.j .								
6. Waste Management (Construction Sites and Worker Camps)								
	<ul style="list-style-type: none"> Ensure construction and domestic waste management collection, storage and disposal mitigations are in place. 	Monitoring result indicates that the construction sites have been provided with trash bags and the waste collected are disposed regularly to the final disposal site operated by Sekadau Regency. Relevant evidence of the monitoring described is shown in Appendix 7.d .					The implementation of this monitoring is compliant with the mean of monitoring defined herein.	
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on waste management. 	Implementation of mitigation measures related to waste management has been well-implemented and effective based on the information and evidence provided in this report.						
7. Roads and Infrastructure (Construction Sites, Access Roads, Relevant District Roads)								
	<ul style="list-style-type: none"> Ensure mitigation measures are in place with respect to road and infrastructure damage by heavy equipment transport. 	The contractor has provided maps of the material transport process from port to warehouse and site that passes through settlement area locations as shown in Appendix 7.e .					The mitigation implemented with this regard is compliant with its requirement.	
	<ul style="list-style-type: none"> Ensure any damage is documented and repaired. 	The monitoring indicates that there is no significant road damage occurred and the contractor has repaired the damage road immediately, as shown in Appendix 7.e .					The implementation of this monitoring is compliant with the mean of monitoring defined herein.	
	<ul style="list-style-type: none"> Monitor effectiveness of mitigation on road and infrastructure. 	The access road is not always in the form of pavement, some of them still dirt road. The contractor has made a temporary access road to avoid the damaged. The monitoring indicates that, if the damage road occurred, it would be immediately					The implementation of this monitoring is in compliant with the mean of monitoring defined herein.	

No	Aspect and Means of Monitoring	Monitoring Implemented	Compliance Status / Remarks
		repaired and there is no complaint filed by community, as presented earlier in Appendix 7.e .	
8.	Encroachment (Gunung Condong in West Kalimantan, Areas adjacent to RoW)		
	<ul style="list-style-type: none"> • Ensure mitigation measures are in place with respect to no hunting or wildlife collection, plant or timber collection, or lighting of fires, or possession of firearms, traps or snares, by workers. • Monitor effectiveness of mitigation on Encroachment impact. 	Monitoring indicates that the project site constructed to date is not located in the forest area, the contractor has provided the warning sign that hunting is prohibited during this project to avoid impact on ecological valuable sites. The awareness about the prohibition of hunting and wood collection is delivered by the contractor in the toolbox meeting, as shown earlier in Appendix 7.a , and there has been no cases with this regard reported.	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
9.	Occupational and Community Health and Safety (Construction Sites and Worker Camps)		
	<ul style="list-style-type: none"> • Ensure mitigation measures are in place with respect to construction phase and OHS and CHS have been developed and are being implemented. 	<ul style="list-style-type: none"> • The monitoring results show that the OHS plans have been developed and well implemented in the construction phase. as shown earlier in Appendix 7.g. • The contractor has been informed workers related to this mitigation, such as using PPE and obeys the procedure in the construction area. • However, the CHS procedures have not been developed by the contractor. 	The implementation of this monitoring is partially compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> • Monitor effectiveness of mitigation on Occupational and Community Health and Safety. 	The mitigation of OHS has been effectively implemented as evidenced there is no accident reported during this monitoring period.	
10.	Physical Cultural Resources (Construction Sites)		
	<ul style="list-style-type: none"> • Ensure mitigation measures are in place with respect to implementation of chance find physical cultural resources awareness and applied if required. 	Monitoring indicates that mitigation measures on the chance-find of physical cultural resources are in place and applied if it is required. The workers has been informed related to this mitigation during toolbox meeting as shown earlier in Appendix 7.i .	The implementation of this monitoring is compliant with the mean of monitoring defined herein.
	<ul style="list-style-type: none"> • Monitor effectiveness of mitigation on physical cultural resources. 	This monitoring is not applicable because there is no physical cultural resources found in this reporting period.	Not applicable.

Chapter 5 Findings on EMP Implementation and Required Corrective Actions

As described in Chapters 3 and 4 on the environmental mitigation and monitoring conducted by the Project, related PLN units and contractors involved have primarily conducted, these requirements according to the 2011 and 2016 IEE. Most mitigation and monitoring implemented are in compliant with the requirements of IEE. However, few remains partially or not implemented due to unawareness, delay in the planning or operational constraints.

The following table summarizes the environmental mitigation and monitoring that are not compliant or partially compliant identified based on the descriptions in Chapters 3 and 4 of this monitoring report, as well as the recommended corrective actions that should be implemented by PLN including its associated units and contractors.

Table 0.1 Findings on EMP Implementation and Required Corrective Actions

No	Aspects / Findings	Corrective Actions	Responsible Parties (and Due Date)	Remarks
Package 1: Bengkayang – Jagoibabang Transmission Lines (Operation Phase); Package 2: Bengkayang Substation (Operation Phase)				
Package 3: Bengkayang – Ngabang – Tayan Transmission Lines (Operation Phase); and Package 4: Ngabang – Tayan Substations (Operation Phase)				
1.	Soil and Water Contamination (Substations)			
	There is no document stating that oil containing PCB or transformer containing PCB must not be used in the Project.	According to PLN letter No. 0203 Facs./KLH.01.01/DIVK3L/2018 on <i>Persyaratan Pengadaan Material/Peralatan (Trafo, Kapasitor, Minyak Trafo) Bebas PCBs</i> the transformer oil must be free from PCB (see in Appendix 3.b).	PLN DIVK3L (Q2/2018)	Closed.
2.	Vegetation Management (HVTL alignment, RoW)			
	There is no evidence suggesting the prohibition for the use herbicides as anticipation if vegetation management is undertaken.	Develop a related document e.g. instruction prohibiting the Project to use herbicides; and report the monitoring of this in the site inspection record, minutes of meeting or other documents as appropriate. Until now, this mitigation is undergoing discussion with UP3B KALBAR.	PLN UP3 KALBAGBAR (Q2/2018)	This aspect remains pending from the previous semesters.
3.	Occupational and Community Health and Safety (HVTL alignment, Substations)			
	The current OHSMS of PLN's AP2B is also used as the community health & safety plan, and it does not include specific procedures on, among others: live power line, working at height, electromagnetic field; and community safety.	Review the current OHSMS to identify the gaps (in detail) against the requirements of the IEE; and subsequently close these gaps by developing the required procedures or other documents; and conduct and report the monitoring results in a formal manner supported by written evidence.	PLN UP3 KALBAGBAR (Q2/2018)	This aspect remains pending from the previous semesters.
4.	Avian Collisions (HVTL alignment)			
	The Project does not have a formal mechanism (e.g. procedure, inspection or similar) to monitor and report the occurrence of dead birds and animals due to the operation of transmission lines.	The inspection had been implemented by PIC supervisor. Relevant record on this implementation is included in Appendix 2.d .	PLN UP3 KALBAGBAR (Q2/2018)	Closed.
Package 3: Bengkayang – Ngabang – Tayan Transmission Lines (Operation Phase)				
1.	Vegetation Removal (HVTL alignment)			
	There is no formal documentation indicating that the Project does not use herbicides for pest	Develop a related document e.g. instruction prohibiting the Project to use herbicides; and	KEC International Ltd (Q2/2018)	Until the construction has been finished, the

No	Aspects / Findings	Corrective Actions	Responsible Parties (and Due Date)	Remarks
	management.	report the monitoring of this in the site inspection record, minutes of meeting or other documents as appropriate.		contractor has not closed this issue. Therefore, this aspect remains pending from the previous semesters.
2.	Acid sulphate soils (HVTL alignment)			
	There is no formal documentation, procedures or awareness on mitigation requirements related to the potential acid sulphate soils in the project areas.	Conduct awareness to workers regarding the potential presence of acid sulphate soil at the construction site and provide management directions if this type of soil is encountered. Evidence can be delivered in the form of MoM meetings, attendance list and handout of capacity building.	PLN UIP KALBAGBAR KEC International Ltd (Q1/2018)	Until the construction has been finished, the contractor has not closed this issue. Therefore, this aspect remains pending from the previous semesters.
3.	Encroachment into Protected Forest, Hunting and Wood Collection			
	There is no sign or procedure to all workers about the prohibition to accessing forest and forest products, including maintaining firearms on the Project areas	Develop the required instruction and communicate it through safety or minutes of meeting as appropriate	PLN UIP KALBAGBAR, KEC International Ltd (Q2/2018)	Until the construction has been finished, the contractor has not closed this issue. Therefore, this aspect remains pending from the previous semesters.
4.	Occupational Health and Safety			
	EHS plan does not provide identification and minimization of potential hazards to worker, including corresponding preventive and protective measures.	Develop a related procedure or other documents as appropriate and consistently enforce the implementation of the procedures and increase its supervision.	KEC International Ltd (Q2/2018)	Until the construction has been finished, the contractor has not closed this issue. Therefore, this aspect remains pending from the previous semesters.
5.	Community Health and Safety			
	There is no procedure for interaction with local and regional emergency and health authorities in EHSP	Contractor submitted procedure for interaction with local and regional emergency and health	KEC International Ltd	Until the construction has been finished, the

No	Aspects / Findings	Corrective Actions	Responsible Parties (and Due Date)	Remarks
	document.	authorities in EHSP document.	(Q2/2018)	contractor has not closed this issue. Therefore, this aspect remains pending from the previous semesters.
6.	Physical Cultural Resources			
	The chance find procedure to identify and manage physical cultural resources in the project area has not been developed.	Develop a chance find procedure considering the requirements of the Project's IEE (2011).	PLN UIP KALBAGBAR, KEC International Ltd (Q2/2018)	Until the construction has been finished, the contractor has not closed this issue. Therefore, this aspect remains pending from the previous semesters.
Package 5: 150/20 kV Sanggau and Sekadau Substations (Construction Phase)				
1.	Drainage			
	There is no approved drainage engineering design yet.	The contractor has submitted engineering drawing for drainage and already approved by PLN. The contractor also provides site drainage design drawing have been developed in accordance with good drainage practices, indicating site drainage and sedimentation are channeled into a channel and sedimentation pond. Relevant evidence is provided in Appendix 6.c.	PT Siemens Indonesia (Q4/2018)	Closed.
2.	Air Quality			
	There is no air quality management by spraying dusty areas because there is no water supply to the construction location yet.	Due to the construction progress is in rainy season, there is no need to spraying water on site to prevent air pollution. Then accordance with the contractor plans, water supply will be implemented after the development of site office is completed.	PT Siemens Indonesia (Q4/2018)	Closed.
3.	OSH Implementation			
	There are no workers training related to HSE	Worker training was conducted related to	PT Siemens Indonesia	Closed.

No	Aspects / Findings	Corrective Actions	Responsible Parties (and Due Date)	Remarks
	implementation yet	HIV/AIDS awareness in December, 2018 as presented earlier in Appendix 6.k .	(Q4/2018)	
4	EMP Incorporation into Detailed Project Design			
	There is no evidence suggesting that monitoring has been conducted to ensure that EMP is incorporated into detailed design of the substation.	The substations detail design refers to the applicable standards and based on General Conditions of Contract Document no 0691.PJ/DAN.02.02/DIR/2017 (dated on November 24, 2017) clause 20 related to design and engineering, the contractor shall execute the basic and detailed design and engineering work in compliance with provisions of the Contract, or where not specified, in accordance with good engineering practice.	PLN UIP KALBAGBAR, PLN DIVK3L (Q4/2018)	The general condition of this contract does not specifically state that the EMP is incorporated into the detailed design. Therefore, this corrective action remains pending.
5	Overall Project Siting			
	The location of the substation has reportedly been selected to avoid sensitive locations. However, there is no evidence available to support the earlier statement.	The locations of Sanggau and Sekadau substations are not in the forest areas or other ecologically sensitive location as supported by: <ul style="list-style-type: none"> • The decree of <i>Bupati</i> Sanggau No. 19/2015 (dated 16 January 2015) on the location permit for Sanggau substation; and • The decree of <i>Bupati</i> Sekadau No. 671.32/133/UMUM/2016 (dated 1 March 2016) on the location permit for Sekadau substation. 	PLN UIP KALBAGBAR, PLN DIVK3L (Q4/2018)	Closed.
Packages 6 and 7: 150 kV Tayan – Sanggau - Sekadau Transmission Line (Construction Phase)				
1.	Disturbance of Houses Infrastructure and Sensitive Ecosystem, including Impacts from EMF			
	Careful routing of the transmission lines to ensure that final alignment avoids possible sensitive ecosystems such as forests and sensitive buildings.	Based on the final tower schedule there is no tower that have been crossing forestry and sensitive buildings.	PLN UIP KALBAGBAR, PT Krakatau Engineering (Q4/2018)	Closed.
2.	Impacts on Rivers at Crossings			
	The placement of the tower base that cross the river has not paid attention to the flood plan area.	Conduct a survey of potential flood areas in T.60 – T 62 located in Penyeladi Village and T 72 - T 73 in Semuntai Village which crosses the Kapuas River. The design of the tower crossing has not been finalized.	PLN UIP KALBAGBAR, PT Krakatau Engineering (Q4/2018)	Closed.

No	Aspects / Findings	Corrective Actions	Responsible Parties (and Due Date)	Remarks
		<p>As per No. 28/PRT/M/2015 concerning the determination of commensurate river lines and commensurate lake lines; PUPR PERMEN Article 15, paragraph 2, point E is stated that line power towers are allowed to be installed along the watershed (DAS).</p> <p>For construction good practices, high foundation can be designed.</p>		
3.	EMP Incorporation into Detailed Project Design			
	<p>There is no evidence suggesting that monitoring has been conducted to ensure that EMP is incorporated into detailed design of the location of tower base/siting.</p>	<p>PLN has obtained UKL-UPL approval from the relevant office in accordance with letter No 660.1/733/BLHD-A dated on October 12, 2012 and No 660.1/224/BLHKPK-A (dated May 11, 2015). Therefore, the chosen location has taken into environmental aspects.</p>	<p>PLN UIP KALBAGBAR, PT Krakatau Engineering (Q4/2018)</p>	<p>Closed.</p>
4.	Overall Project Siting			
	<p>There is no evidence to show that these monitoring requirements have been incorporated at the time of the design of tower siting.</p>	<p>Based on the Location Permit issued by the local regent, the tower locations are primarily not in forest areas, but those located in the forest has been permitted under the MoEF permit No. No. 6/1/IPPKH/PMDN/2017 (dated 16 January 2017) for Package 3.</p>	<p>PLN UIP KALBAGBAR, PT Krakatau Engineering (Q4/2018)</p>	<p>Closed.</p>
5.	Roads and Infrastructure Impacts (HVTL alignments, substations)			
	<p>There is no mapping of the locations of expected heavy equipment mobilization is needed versus settlement area locations were undertaken during the foundation works.</p>	<p>The contractor has provided maps of material transport process from port to warehouse and site that passes through settlement area locations. The related document is shown in Appendix 7.e.</p>	<p>PLN UIP KALBAGBAR, PT Krakatau Engineering (Q4/2018)</p>	<p>Closed.</p>
6.	Physical Cultural Resources (HVTL alignments, substations)			
	<p>Awareness related to the chance finding procedure has not been done yet for all workers.</p>	<p>The contractor has conducted the awareness session to the workers related to the chance finding procedure. The attendance list of this session is included in Appendix 7.i.</p>	<p>PLN UIP KALBAGBAR, PT Krakatau Engineering (Q4/2018)</p>	<p>Closed.</p>

Chapter 6 ADB Mission Findings

A joint review mission from ADB and PLN have been conducted in May and September 2018 to assess whether the environmental, health and safety management of the Project has been carried out during the construction and operation period. Key findings of the mission including corrective actions, schedule and the party assigned to implement these actions are presented in Table 6.1. The findings of the previous missions that have been completed in the period of 1st semester/2018 monitoring report are not presented in this 2nd semester/2018 report.

Table 6.1 ADB Mission Findings

No	Findings	Responsible Party	Corrective Action (and status)
1	Separate environmental monitoring consultants independent from the PIC to be recruited by PLN and responsible for implementing the EMP and assisting in environmental reporting.	PLN (K3L)	Completed - PLN PUSMANKON (now PUSMANPRO) has been appointed as the independent monitoring consultant of the Project.
2	Submit the evidence that PLN has submitted the semi-annual plan and implementation report to MoEF particularly those stated in Point 7, Item 'n' and 'o.'	PLN (PPT)	Completed - PLN UIP KALBAGBAR has submitted the semi-annual plan and implementation report to MoEF with the following notes: <ul style="list-style-type: none"> • In accordance with the IPPKH permit, section 7.a, all locations are used, so that no reclamation and re-vegetation plans are implemented. In addition, the tower foundation is naturally regrown by local vegetation. • Water shed planting rehabilitation - conduct procurement consultant for the implementation of verification of watershed planting in 2018, overall schedule up to 2023 (up to the implementation of vegetation growth) The relevant evidences for the above description are shown in Appendix 9.a .
3	Conduct a periodic site visit to transmission towers (already in the operation phase) to document natural vegetation regrowth at areas previously disturbed at the time of construction.	PLN (K3L)	Completed – This is ongoing activity, and the monitoring result is included in the 2 nd semester/2018 environmental monitoring report (see Appendix 9.b).
4	Conduct an EHS awareness session, particularly on the IEE requirements applicable for the substation operation. This action also applies for the operator of the transmission lines.	PLN (K3L)	Pending – The EHS awareness session is to be conducted and reported in the 1 st semester/2019 environmental monitoring report.
5	Provide a written review on PLN standard that describe the firefighting equipment and capabilities required for Ngabang substation. If gaps are identified between the standard and the conditions identified at the September 2018 mission, an action plan	PLN (K3L)	Completed – The firefighting equipment of Ngabang substation has met with the requirement of PLN standard T.5.0009:2015. However, to complete the firefighting equipment, UP3B KALBAR has provided written review and needs related to the water

No	Findings	Responsible Party	Corrective Action (and status)
	should be developed to close these gaps.		reservoir for fire-fighting purposes (see Appendix 9.c).
6	Provide a secondary containment and pit system to contain and control spills and leaks at the fuel storage area.	PLN (K3L)	Pending - The design of the secondary containment system has been completed. The construction of this containment system will be completed in 2019 (as reported in Appendix 9.d).
7	Develop and implement a standardized solid waste management procedure including prohibition on waste burning at substation.	PLN (K3L)	Pending - Solid waste has been cleared from the Ngabang substation (see Appendix 9.e.). The procedures on waste management has not been developed, and this to be discussed with AP2B KALBAR.
8	Mobilization of field environmental safeguard officer from contractors for P5 (Sanggau and Sekadau substations).	PLN UIP KALBAGBAR, PLN (K3L)	Completed - The environmental safeguard officer has been assign in the construction site, the assignment letter can be seen in Appendix 9.f .
9	Develop a formal drainage plan and drawing that clearly describe as to how runoff and sedimentation to nearby streams and areas will be controlled during construction activities.	PLN (K3L)	Completed - The formal site drainage drawing plan that clearly describe as to how runoff and sedimentation to nearby streams has been submitted by contractor for the Ngabang substation and approved by PLN (see Appendix 6.c).
10	Expedite the approval of PT Siemens' EHS plan for subsequent implementation during the construction activities; and appropriately communicate this plan to key Project's stakeholders.	PLN (K3L)	Completed - The HSE plan for package 5 has been approved by PT Siemens and PLN (see Appendix 6.k).
11	Design and implement an appropriate general layout (denah) that presents, among others, the storage or stockpile for construction materials and equipment, waste disposal, and rest area should be orderly located in a typical tower construction site. (Packages 6 & 7).	PLN (K3L)	Completed – PT Krakatau Engineering has submitted the design and implement an appropriate general layout (denah) that presents the typical layout of a construction site (see Appendix 9.g).
12	Monitor (visually) and document water quality, vegetation (e.g. palm oil) and ecological impacts (if any) that may be impacted due to extensive water pumping from the pits where the tower construction is being conducted. (Packages 6 & 7).	PLN (K3L)	Completed - The monitoring to the water quality and vegetation that may be impacted due to extensive water pumping have been conducted as reported in Appendix 9.h .
13	Develop and implement standard procedure/drawing on the retaining walls that ensure a safe condition for the employees working in the pit (Packages 6 & 7).	PLN (K3L)	Completed - The contractor has been submitted the standard procedure and drawing on the retaining walls that ensure a safe condition for the employees working in the pit (see Appendix 9.i).
14	Provide a detailed review of the EHS and community risk and corresponding mitigation of PT Krakatau Engineering's EHS plan, particularly for the tower construction that will cross Kapuas River.	PLN (K3L)	Completed - The contractor has submitted the mitigation plan for the tower that will cross Kapuas River in the HSE Plan document that has been approved by PLN UPP 2 in October 2017, on page 23 chapter 7.16 concerning

No	Findings	Responsible Party	Corrective Action (and status)
	The results of the review should be appropriately communicated to key Project's stakeholder.		working above the water and JSA related to working above the water.
15	Conduct a periodic and rigorous EHS inspection by involving all level of workers (from supervisor up to daily worker level). This inspection should be conducted using specific EHS forms and at an appropriate frequency.	PLN (K3L)	Completed - The supervisor on site has done a periodic EHS inspection by involving all level of workers (from supervisor up to daily worker level), as reported in Appendix 9.j.
16	Submit the revised environmental monitoring reports of 2017.	PLN (K3L)	Completed. <ul style="list-style-type: none"> • September 2018 for the Semester 1/2017 report • October 2018 for the Semester 2/2017 report
17	Sept 2018 mission identified - Starting 2018, submit: <ul style="list-style-type: none"> • the semi-annual environmental monitoring report only for the packages that are in the construction phase; • annual environmental monitoring report for the packages that are in the operation phase. The annual monitoring report is the second semester report and describe EHS statistics and costs incurred for mitigating and monitoring EHS matters. 	PLN (K3L)	Completed - The contractor has provided the statistic of the project, that explain about manpower, incident occurred, environmental contamination, and inspection that have been conducted, as reported in Appendix 9.k.

Chapter 7 Conclusions and Recommendations

The 2nd semester/2018 environmental monitoring report describes the environmental mitigation and monitoring conducted by the PLN West Kalimantan Power Grid Strengthening Project for the period of July to December 2018 and evaluates its compliance against the Initial Environmental Examination (IEE) documents of 2011 and 2016.

Related PLN units i.e., UIP KALBAGBAR (in charge of the construction of packages 5 to 7) and UP3B KALBAR (in charge of the operation of packages 1 to 4) have been primarily implementing the environmental mitigation and monitoring, and therefore considered compliant with the requirements of IEE.

Nevertheless, few partial compliant or non-compliant with the requirements of IEE are identified as those related to, among others: vegetation management; mitigation of soil and water contamination; implementation of occupational and community health and safety aspects of the Project.

The key issues associated with the above shortfalls are: incomplete evidence; shortage of competent project supervision and reporting; and delay in the planning and execution on the emergency spill responses.

Th contractors shall improve their performance in presenting monthly reports submitted to PLN, including: complete and accurate data of the mitigation items in accordance with the requirements mentioned in the IEE 2011 and IEE 2016 documents completely; and complete evidence of the implementation of mitigation measures in the form of photos, supporting documents as well as relevant drawing.

Related PLN units in charge of the project and operations for West Kalimantan areas should cooperate closely in addressing the key non-compliances or outstanding items that have not been addressed since 2017.